# Suggestions on Carbon Asset Management of Power Grid Company under Double Carbon Targets

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**ABSTRACT**
Under the dual carbon goal, power grid enterprises are facing new development opportunities. In view of the new business format generated by the dual carbon goal, it is necessary to carry out the research on the carbon asset management of power grid companies to support the business expansion of emerging markets under the dual carbon goal.

***Keywords****: carbon assets; double carbon target; power grid company; carbon reduction*

## 1. INTRODUCTION

With the increasingly severe global warming situation, since 1980s, countries around the world have deepened their understanding of climate change, and gradually formed an international climate system involving global politics, economy and environment, which is constantly being improved, which directly promotes the development and progress of international carbon trading market. By June 2021, 127 countries in the world have committed to carbon neutrality, among which 5 of the top 10 coal-fired power countries in the world have made corresponding commitments. On September 22, 2020, General Secretary Xi Jinping announced at the general debate of the 75th United Nations General Assembly that carbon dioxide emissions will strive to reach the peak before 2030 and strive to achieve carbon neutrality before 2060.

As the hub connecting the upstream and downstream of the power industry, power grid companies have great responsibilities in the clean and low-carbon transformation of service energy. Under the double carbon target, power grid enterprises are facing new development opportunities. The operation of the national carbon market will further stimulate the power of energy users to implement carbon emission reduction, and create better conditions for power grid enterprises to carry out carbon emission reduction services such as electric energy substitution, comprehensive energy services and energy conservation and loss reduction. Therefore, how to use the status of power grid hub and a large amount of accumulated data and innovate the business model of carbon asset management based on information platform will be the key research content of market business expansion of power grid enterprises.

With the proposal of the dual carbon goal, the carbon asset management needs of energy users in the process of construction and operation are becoming increasingly prominent. Therefore, the purpose of the paper is to carry out the research on the carbon asset management of power grid companies in view of the new business forms generated by the dual carbon goal, so as to support the business expansion of emerging markets of power grid companies under the dual carbon goal. The research idea of the paper is shown in Figure 1.

The paper mainly analyzes the current policy needs from the aspects of clarifying the responsibility sharing of carbon emission reduction, establishing the interest balance mechanism, studying the rational utilization rate of new energy, improving the research and development of key technologies, and improving the green finance

 

policy framework. Based on the current situation faced by the power grid company, the paper puts forward some suggestions on the carbon asset management of the power grid company under the double carbon goal.

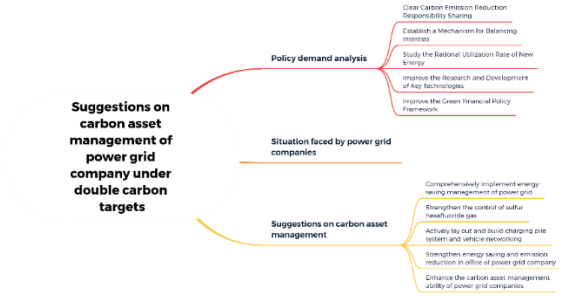


**Figure 1.** Research ideas of the paper

## 2. POLICY DEMAND ANALYSIS

### *2.1. Clear Carbon Emission Reduction Responsibility Sharing*

Achieving the 2030-2060 target refers to the peak carbon dioxide emissions and carbon neutrality in the whole country and society. In terms of regions, differences in economic development level, industrial structure, energy consumption structure and electrification level will all affect CO2 emission. From the perspective of departments, there are great differences in energy consumption structure and energy efficiency level among departments, and carbon emission reduction paths are different. Therefore, it is necessary to promote differentiated and inclusive coordinated development and coordinated emission reduction to ensure the realization of the overall national goal.

First, speed up the formulation and implementation of the peak time and main indicators of carbon emissions in each province, improve the assessment mechanism of carbon emissions targets, formulate the assessment indicators of total carbon emissions and carbon emissions intensity based on the characteristics of each province's development stage, and dynamically adjust them according to the progress of each province. Second, promote the formulation and implementation of peak carbon dioxide emissions planning and action plans for major industries. In the future, all departments should further jointly fulfill their carbon emission reduction responsibilities. The power sector is committed to increasing the proportion of clean energy generation and installing CCUS facilities in thermal power plants to ensure the safe and stable operation of the power grid. Industry, transportation and construction departments focus on improving energy efficiency, increasing the proportion of electric energy and other clean energy in terminal energy consumption, and installing CCUS facilities in centralized emission sources, so as to achieve the peak of carbon emissions in turn.

### *2.2. Establish a Mechanism for Balancing Interests*

With the continuous improvement of the penetration rate of new energy power generation, the influence of new energy on the power system is deepening day by day, and the system cost is hard to ignore and rapidly expanding. Therefore, it is necessary to study and establish a balanced mechanism of interests, raise the system cost for absorbing new energy, ensure the reasonable return of investment and construction cost of power grid, and promote the large-scale and sustainable development of new energy.

First, attach great importance to the cost of new energy utilization, study the cost diversion mechanism in advance, and solve the problem of cost increase by means of marketization. Continue to promote technological progress, and ensure that the cost of new energy power stations continues to decline. Second, actively explore the capacity compensation mechanism, strengthen the power system source network load storage flexible resource potential mining, ensure the efficient consumption of new energy, and improve the financial viability of flexible adjustment of power supply. Third, gradually implement the carbon tax, guide the investment, production, circulation and consumption of the whole society through fiscal and taxation policies, and promote the establishment and improvement of a green and low-carbon circular development economic system.

### *2.3. Study the Rational Utilization Rate of New Energy*

Under the condition of high-tech energy penetration rate, it is economical and necessary to abandon power reasonably. The utilization rate target will affect the acceptable scale of new energy development, the flexible resource demand of the system and the power supply cost. Setting the consumption target with too high utilization rate will not be economical, but will also limit the scale of new energy development. Therefore, based on the principle of comprehensive and optimal technology and economy, the rational utilization rate of new energy should be scientifically explored and made clear in practice.

### *2.4. Improve the Research and Development of Key Technologies*

Key technological breakthroughs are very important to the realization of peak carbon dioxide emissions and carbon neutral goals. Therefore, we should formulate strategic plans for carbon neutral key technologies,

strengthen the guidance and support of supporting policies, accelerate the demonstration and guidance of major projects, and vigorously promote the innovation and breakthrough of key technologies.

Continue to strengthen research and development support for key technologies of carbon neutrality, and improve the supporting policy system. Continue to increase financial support for scientific and technological innovation, especially carbon neutral key technologies, and provide financing, preferential tax policies and financial subsidies to enterprises participating in research and development of key technologies and equipment materials; Improve laws and regulations related to intellectual property protection, and strengthen the supervision mechanism and ability of intellectual property protection.

### *2.5. Improve the Green Financial Policy Framework*

Green finance is a key financial means to promote the energy transformation and the development of low-carbon industries. It can not only use financing support to promote the development of industries in low-carbon life, but also guide social capital, restrain the blind expansion of high-emission industries and provide financial support for negative-emission industries. At present, the scale of green finance is increasing, and it is of great significance to build an effective green financial policy framework for promoting the development of green finance and helping the process of carbon neutrality.

Government support is the premise and guarantee for the development of green finance. It is necessary to clarify the unique nature and requirements of green finance, and construct and improve the institutional framework of green finance in combination with the actual situation and the specific needs of the carbon neutralization process. Clear green finance as a part of the socialist financial system with Chinese characteristics, and effectively incorporate it into the overall operation system and management framework of the financial system, and improve the related system construction of green finance.

## 3. SITUATION FACED BY POWER GRID COMPANIES

The growth rate of power demand is much higher than that of energy demand, and the proportion of electricity generated by long-term hydrogen production continues to increase. Under the requirement of carbon emission reduction, the consumption demand of fossil energy in other industries will be reduced and shifted to the consumption of electric energy, which will promote the continuous increase of power demand.

China's energy efficiency level needs to be further improved. China needs to further accelerate technological progress, improve energy efficiency and save energy resources. With the large-scale access of new loads such as new energy and electric vehicles, the load peak-valley difference increases and the contradiction between power supply and demand intensifies. The company needs to provide more economical and intelligent energy-using solutions to meet the needs of customers, extend the service content, dig deep into the value of customer service, create new formats, and expand the company's revenue scale and profit level; Give play to the role of adjustable load resources on the customer side, strengthen the interaction between power grid and load, and improve the utilization efficiency of power grid assets.

Large-scale new energy consumption technology needs to be broken through. Ultra-large-scale new energy power generation is the main path to achieve carbon neutrality and its development modes are centralized and distributed, onshore and offshore, local consumption and trans-regional transportation. In view of the wide and high proportion of new energy in the country in the future, the development pattern of "Three North" large-scale scenery base, large-scale distributed photovoltaic/wind power in central and eastern China, and far-reaching sea breeze power simultaneously, it is urgent to solve the problems of stable operation and large-scale delivery of large-scale new energy bases and considerable mass distributed photovoltaic.

Large-scale development of new energy is an inevitable requirement to achieve the goal of carbon neutrality. During the period from peak carbon dioxide emissions to carbon neutralization, non-fossil energy power generation realized that "the increment of power demand was fully met and the stock was gradually replaced". Non-fossil energy power generation based on new energy can fully meet the new power demand after 2030, while gradually replacing the existing fossil energy power generation. After 2030, traditional non-fossil energy sources such as water, nuclear and biomass are constrained by resources and stations, and the growth rate gradually slows down, and the development speed of new energy is further improved.

The performance, compactness, service life and localization rate of power equipment need to be further improved. With the increase of power system instability factors and the improvement of requirements for stable operation, the flexibility and reliability of power equipment need to be further improved. There is still a big gap between domestic equipment and imported equipment in terms of performance and service life, especially for some products with high complexity. For example, 500kV and above wires and cables and cable terminals basically need to be imported, mainly from Europe and Japan; High-performance silicon steel

sheets, insulation molding parts, partial bushings and control system core chips in control and protection equipment used in UHV transformers are imported from foreign countries; Core industrial software, such as key design software, digital design and simulation analysis software and industrial control software, is weak, and the verification program still needs to rely on foreign countries.

Auxiliary service costs are only allocated on the power generation side, but not diverted to the user side. At present, the cost of auxiliary services is shared by the power supply side, which further squeezes the living space of the power supply side. Insufficient economic bearing capacity of power supply is not conducive to the stable operation of power system in the future. At the same time, the power grid company is responsible for ensuring stable power supply for users, and the pressure on the power supply side will be gradually transmitted to the power grid side.

The electricity market cannot fully reflect the green attribute of renewable energy, which leads to the optimal allocation of market resources only considering the attribute of electricity price, but not reflecting the comprehensive value of renewable energy. At present, despite the existence of consumption trading market, voluntary green card trading market and carbon market, the coordination between several markets and electricity market needs to be improved, and there are problems such as multiple subsidies. In addition, there is no quantitative measurement of the comprehensive impact of various markets on energy and power development, and it is difficult to predict the actual effects of various mechanisms.

## 4. SUGGESTIONS ON CARBON ASSET MANAGEMENT

Comprehensively implement energy-saving management of power grid. Optimize the power grid structure, popularize energy-saving wires and transformers, strengthen energy-saving dispatching, and improve the energy-saving level of the power grid. Strengthen the research and development of green and low-carbon technologies in all aspects of power grid planning and design, construction and operation, operation and maintenance, and realize energy saving, water saving, material saving, land saving and environmental protection in the whole process.

Strengthen the control of sulfur hexafluoride gas. Enhance the refined management level of sulfur hexafluoride in power grid company, strengthen the whole life cycle management, reduce the consumption of sulfur hexafluoride gas, and actively explore and study new environmental protection gases instead of sulfur hexafluoride.

Actively lay out and build charging pile system and vehicle networking. Promote the construction of charging piles in highways, urban main roads and other scenes, and actively build a charging infrastructure system with dense outlets and convenient use in second- and third-tier cities with great development potential in advance; Expand the service scope of car networking, enhance the intelligent degree of car networking, build a smart car networking platform, realize data fusion among different brands' own charging piles, dig deep into the data value by relying on technologies such as big data and cloud computing, enhance the intelligent degree of services, and expand new business fields such as data services related to car networking.

Strengthen energy saving and emission reduction in office of power grid company. Save energy for office lighting, air conditioning, printing and water; Promote the energy-saving renovation of existing office buildings and the energy-saving design of new buildings, promote the use of high-efficiency energy-saving equipment, and strengthen the energy-saving of office buildings; Electronic operation, such as network, telephone and video, is adopted to reduce unnecessary travel, and energy-saving and environment-friendly vehicles and new energy vehicles are adopted to promote the cleanness of travel energy.

Enhance the carbon asset management ability of power grid companies. Actively participate in the construction of the national carbon market, track the policy changes, timely develop renewable energy carbon emission reduction (CCER) projects, and increase the company's carbon asset reserves. We will step up the construction of a comprehensive carbon asset management mechanism covering the whole process of "data management, transaction and performance", give full play to the advantages of the company's integration of production, research and use, foster new businesses in the carbon market, promote the company's transition from simple performance to comprehensive carbon asset management, and realize multiple benefits.

## 5. CONCLUSION

As the main network platform connecting power production and consumption, power grid company is the core hub of carbon emission reduction in power system. Therefore, while actively promoting its own emission reduction, power grid enterprises should also ensure the large-scale development and efficient utilization of new energy, serve the economy, society and industry for emission reduction, and contribute wisdom and strength to achieve the goal of double carbon. In this paper, from three dimensions: policy demand analysis, the situation faced by the company and carbon asset management, the market business expansion of power grid companies

under the double carbon target is discussed from a brand-new perspective, and the new development direction of the company is proposed from the perspective of carbon asset management.

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