ISSN: 2688-9323

Challenges and Paths for My Country to Achieve "Carbon Neutrality" under the New Development Pattern

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Abstract

China is in the context of a new development pattern. The “carbon neutrality” goal and vision will help China’s sustainable economic development, energy green and Low-carbon transformation, speed up the process of ecological civilization construction, and deepen international emission reduction . Exchange and cooperation, etc. At present, China's goal of "carbon neutrality" is faced with a large base of carbon emissions , a coal-dominated energy structure, still relying on a high-carbon industrial structure , difficult to tackle key issues in emission reduction technologies, and imperfect Low-carbon incentive policies and institutional mechanisms, etc. Shortcomings, it is urgent to improve the ecological carbon sink capacity , accelerate the adjustment and reform of the energy structure, promote the Low-carbon transformation and upgrading of the industrial structure, promote the innovation and application of green and Low-carbon technologies, and improve Low-carbon incentive policies and institutional mechanisms.

Keywords

New Development Pattern; "Carbon Neutrality"; Challenge; Path.

1. Introduction

"Carbon neutrality" means that the carbon emissions generated by humans are absorbed through various carbon sequestration technologies and then offset each other to achieve a dynamic and stable carbon balance state. At present, the world has entered the era of global climate change. Climate change not only affects the balance of natural ecosystems and the sustainable development of human society, but also affects the social and economic development and national security of various countries. Accelerating carbon emission reduction actions to ensure global climate security has been It has become the political consensus and major action of all countries. China put forward the vision and goal of "strive to peak carbon dioxide emissions by 2030, and strive to achieve carbon neutrality by 2060" , which has been highly praised by the international community. Leap can not only further accelerate China's victory in the battle of pollution prevention and control, and accelerate the pace of ecological civilization construction, but also help to improve the quality of the global ecological environment and accelerate the comprehensive green and Low-carbon transformation of the world economy and society. This paper aims to conduct in-depth research and discussion on the "dual carbon" goals and vision proposed by China under the new development pattern . Based on the increasingly serious global climate change problem and the era of China's new development pattern, it analyzes China's realization of "carbon neutral". The contemporary meaning of "and". On this basis, combined with the challenges of China's realization of "carbon neutrality" under the new development pattern, a feasible solution is proposed, with a view to providing certain insights for future scholars' research on the "dual carbon" goal and China's realization of the "dual carbon" goal. value reference.

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2. The Contemporary Implication of China's Realization of "Carbon Neutrality" under the New Development Pattern

At present, as global environmental problems and climate change problems become more and more prominent, human beings are increasingly aware of environmental protection and sustainable development, aware of the seriousness and urgency of global problems, and call for joint efforts to deal with common problems and protect the survival and development of human beings. development of the "global village". China is in the context of a new development pattern, escorting the realization of the goal and vision of "carbon neutrality". On the contrary, the vision and goal of "carbon neutrality" provide a "pointing light" and press for China's new development pattern. The "accelerator key" not only promotes the process of China's sustainable development and accelerates the realization of the goal of building a beautiful China, but also brings earth-shaking changes to global economic and social development and "promote the world to achieve the goals of the Paris Agreement ahead of schedule".

2.1. Contribute to Sustainable Economic Development

After the Industrial Revolution, the traditional industrialization model characterized by the large-scale production and consumption of industrial wealth has unprecedentedly promoted human historical progress and economic and social development. development is not sustainable. "Carbon neutrality" means that there is an urgent need to fundamentally change high-carbon development and consumption patterns, and economic development is largely decoupled from carbon emissions. As global climate change and environmental problems become increasingly severe, affecting or even threatening the survival and development of human beings, countries around the world have put forward political commitments and formulated "carbon neutrality" timetables in different forms. For example, the EU proposed the EU Green Deal, the UK Announcing the "10 Plans for the Green Industrial Revolution", etc., to reduce carbon emissions and promote sustainable economic development.

At present, China is in the process of building socialist modernization. "Carbon neutrality" means that China will speed up to get rid of the constraints of the traditional extensive economic development mode and mindset, reorganize, integrate and optimize the industrial structure layout to save energy and high efficiency. and pollution reduction as the focus of sustainable economic development. Vigorously develop and apply green and Low-carbon technologies, gradually eliminate outdated production capacity in various industries and orderly promote the transformation of industries to Low-carbon and green, maximize carbon conversion and accelerate the construction of a green development model, and form a high-value-added Low-carbon and green development model. Green supply chain, production of Low-carbon green products and development of circular economy, to meet the living needs of residents and promote high-quality economic development. Strictly implement carbon emission standards and increase emission reduction efforts, increase a large number of green investments such as non-fossil energy, technological transformation and Low-carbon technologies, drive job growth in new energy industry fields and scopes, and promote technological, clean and strategic It aims to promote the development of emerging industries, truly realize "net-zero emissions" and Low-carbon industrial development, accelerate the pace of sustainable economic and social development, increase the gross domestic product, and improve people's quality of life and happiness index.

2.2. Contribute to the Green and Low-carbon Transformation of Energy

At present, the world has entered a post-digital era, and science and technology are rapidly changing and widely used. Under the guidance of the "dual carbon" goal and national demand orientation, countries around the world have gradually established a global cooperation mechanism, and successively proposed to adopt more powerful policies and policies. Measures

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to reduce carbon emissions, promote the transformation of energy form from absolute dominance of fossil energy to Low-carbon multi-energy integration, the transformation of energy industry from energy resource-based to energy technology-based, and the development of energy management from centralized utilization to systematic intelligent balanced energy use In order to achieve the goal of “carbon neutrality” of energy green and Low-carbon transformation and carbon cycle system.

China is in a critical period of promoting high-quality economic development. The goal of "carbon neutrality" indicates that China should reposition and consider the functions of different energy sources, further transform and transform the energy system, and gradually reduce and reduce its high dependence on fossil energy. Resist the psychology and behavior of driving economic growth with high-carbon investment, focus on increasing the proportion and total amount of non-fossil energy, and effectively reduce energy demand and carbon emissions through scientific supply . At the same time, develop clean energy and strategic cutting-edge technologies with ecological technology innovation, "relying on 'clean replacement' on the production side and 'electric energy replacement' on the consumer side" to reduce energy production costs and consumer prices, and greatly improve the efficiency and safety of new energy use It can effectively reduce and reduce the concentration of CO2 in the atmosphere, and promote high-quality economic and social development with energy transformation as the main line. Accelerate the continuous development of Low-carbon, clean and diversified energy structure, effectively promote the green and Low-carbon transformation of energy and ensure the safe supply of energy in China, strengthen the pattern of energy production and consumption, and accelerate the formation of an energy-saving society.

2.3. Helps to Speed up the Process of Ecological Civilization Construction

With the frequent occurrence of global extreme climate events and the increasingly serious environmental problems, the destruction of the earth's ecosystem and the risk of species extinction have led to the formation and growth of a global consensus on "carbon neutrality". "As of December 2020, More than 110 countries, including China, the United Kingdom and Japan, which account for more than 65% of greenhouse gas emissions, have made commitments.”

At the same time, the goal of "carbon neutrality" is highly compatible with the concept of a community of man and nature, both of which aim to build a harmonious and symbiotic relationship between man and nature, promote the "green recovery" of the world economy and jointly build a beautiful global village.

At present, China is in the critical period of comprehensive green transformation of economic and social development. The "carbon neutrality" vision shows that China will continue to implement the new development concept and the "two mountains" theory, firmly implement the green development strategy and promote the reform of the ecological civilization system. Accelerate the construction of an "ecological government" and a green financial system, incorporate energy-saving indicators into the target responsibility and performance evaluation system of government officials, and consciously help enterprises to form a green industrial chain and build an ecological economic development model. Education departments and local schools at all levels will continue to attach importance to the education of ecological civilization for students, enhance the green environmental protection awareness and sense of responsibility of teachers and students, and accelerate the formation of consensus on the mainstream values of ecological civilization and the concept of Low-carbon development in the whole society, and consciously practice green consumption Views and lifestyles, so as to gather the majestic power of the whole society to promote the comprehensive green transformation of the economy and society and the construction of ecological civilization.

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2.4. Contribute to Deepening International Exchange and Cooperation on Emission Reduction

At present, the serious climate change issue has reached an international consensus and has become a non-traditional security challenge of global concern. CO2 is the "initiator" of the greenhouse effect and climate imbalance on the earth's surface, which seriously threatens the survival, development and even health and safety of human beings. Some countries and The region has entered a "climate emergency". Due to the different stages of carbon emissions in various countries in the world, developed countries are currently in a declining stage after peaking, China's carbon emissions are gradually entering a "platform period", and emerging countries' carbon emissions are still on the rise. In this context, all countries realize that the nationally determined contributions proposed under the Paris Agreement are not enough to achieve and achieve the goal of "controlling global warming to less than 1.5°C", and it is urgent for all countries to work together to strengthen climate protection action and intensity.

China is in the process of green and Low-carbon transformation. It has always attached great importance to and paid attention to global climate change issues, actively participated in the quantitative emission reduction and energy conservation and emission reduction actions of global climate change governance, put forward the vision and goal of "carbon neutrality" , and carried out carbon emission reduction activities. Project demonstration in pilot areas of rights trading. This not only demonstrates China's responsibility as a major responsible country, but to a certain extent provides "China options" and "China solutions" for the emission reduction work of other major carbon-emitting countries, and drives other major carbon-emitting countries to accelerate the implementation of emission reduction projects and achieve "net It will help China expand its ecological "circle of friends" and break down "carbon barriers", enhance, deepen and expand international exchanges and cooperation on emission reduction, inject new vitality into addressing climate change and prevent climate risks, and promote global The process of climate governance and the "green recovery" of the world economy.

3. China's Realization under the New Development Pattern

The Challenge of "Carbon Neutrality" It is true that China has made many fruitful attempts and achieved remarkable results in emission reduction , but it still faces enormous pressure of increasing carbon emissions and many "stuck neck" problems. For example, due to the large base of carbon emissions, coal-dominated energy structure, still relying on high-carbon industrial structure , difficulty in tackling key emission reduction technologies, and imperfect Low-carbon incentive policies and institutional mechanisms, China urgently needs to take targeted measures. Effective measures to deal with the difficulties and challenges of achieving the goal of "carbon neutrality", the comprehensive green and Low-carbon transformation of the economy and society and the task of reducing emissions are a long way to go.

3.1. The Base of Carbon Emissions is Large

China is in the stage of accelerating rapid industrialization and modernization transformation, and its potential demand for high-carbon energy is much higher than that of other economies. .7%". - On the one hand, China is in the stage of rapid industrialization development. Fossil energy is still the main body of energy generation and consumption in China. Carbon emissions will increase in a certain period and stage. In addition, the independent research and development technology of China's energy industry is relatively weak and the innovation model needs to be upgraded. , blocking the process and effect of emission reduction to a certain extent . On the other hand, as a major developing country, China has a large population and a large development base, and its per capita level is still lower than that of developed countries. The process of urbanization is in the stage of continuous acceleration and development, and large -

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scale infrastructure needs to be built and renovated . , inevitably consume a lot of energy and use carbon-intensive products, further aggravating the difficulty and cost of carbon emission reduction.

In addition, people blindly and unreasonably pursue economic development and obtain their own material wealth and economic benefits, ignore the importance and urgency of ecological protection, violate the "internal scale" and objective laws of natural development, and consciously or unconsciously destroy the ecological environment. environment. For example, the unabated and exponential growth of agricultural fertilization, the burning of crop residues and large-scale farming, etc., not only far exceed the maximum absorption capacity of C02 by the marine and terrestrial systems, but also exacerbate climate and ecosystem collapse to a certain extent. sexual disorder.

3.2. Energy Structure Dominated by Coal

Energy is the "blood" of economic and social development. China has a resource endowment that is "rich in coal, lacking in oil, and lacking in gas" and an unbalanced energy pattern. The production, utilization and consumption methods are still highly dependent on fossils that are " dominated by one coal ". Energy supply, "coal consumption will account for 56.8% of total energy consumption in 2020", and non-fossil energy accounts for a relatively low proportion in the energy consumption structure. In a nutshell, China's existing energy structure system is not suitable and lacks flexibility.

Specifically, the distribution of new energy is uneven and there are spatial and temporal differences. For example, wind energy resources are mainly distributed in the north and east of China, and solar energy resources are mainly concentrated in the northwest region of China. In addition, new energy supporting equipment is not perfect, core technologies are lacking, innovation systems are insufficient, and the overall cost and selling price of power generation are still higher than coal power generation . The higher predicament will further squeeze the market demand and consumption capacity of renewable energy. "In particular, the global crude oil price will plummet in 2020, and the cost advantage of fossil energy will have an adverse impact on the transformation of new energy." At the same time, in order to meet the cross-regional consumption demand and accelerate local economic development, large-scale development and utilization of fossil energy, "a large amount of carbon emission transfer has led to the 'carbon leakage' between regions"? This not only increases the pressure on the ecological environment and emission reduction to a certain extent, but also destroys the carbon cycle balance and hinders the realization of emission reduction targets, causing energy supply and ecological security issues.

3.3. Still Relying on High-Carbon Industrial Structure

At present, China's economic and social development is still highly dependent on heavy industry and high-energy-consuming manufacturing industries. The overall production factor level is relatively low and it is at the low end of the global value chain division of labor. The infrastructure construction is relatively weak, and there is a big gap with developed countries. Digitalization The level is unsatisfactory and lags behind developed countries, and the degree of carbon asset financial productization is low. At the same time, terminal energy consumption is mainly concentrated in industries, construction and transportation sectors, which account for a relatively high proportion in the entire industry and it is difficult to reduce carbon emissions.

It is worth noting that in many economically underdeveloped areas and surrounding areas in China, enterprises' awareness of green and Low-carbon development is at a low level, and they are still limited by the traditional extensive economic growth mode and thinking mode. A large number of factors are used to drive economic growth, and the failure to consciously incorporate

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carbon cost and carbon control into the development plan of enterprises will undoubtedly cause problems such as a large number of pollutants and large energy consumption. At the same time, due to the challenges of imperfect public infrastructure and service systems, insufficient social capital financing, limited scientific and technological support, and high cost of new energy power generation in economically underdeveloped areas, it is determined to a certain extent that fossil fuels are still used as the main body of power generation and consumption. . In addition, it will inevitably encounter challenges such as "re-industrialization" and technical barriers in developed capitalist countries.

3.4. It is Difficult to Tackle Key Problems in Emission Reduction Technologies

At present, there is still a big gap between China and developed countries such as Europe and the United States in terms of energy conservation, emission reduction and green and Low-carbon development. Although great progress has been made in technological innovation, there is still a general lack of core technologies for green and Low-carbon development. , carbon sequestration and emission reduction technologies , etc., the decoupling of economic development and carbon emissions has not yet been fully realized, "existing Low-carbon, zero-carbon and negative emission technologies cannot support China's realization of carbon neutrality by 2060."

On the one hand, China's green and Low-carbon technologies are still based on end-of-life governance and are not yet mature. Technological ecological innovation is still in the demonstration or preliminary stage, the development direction and goals of energy conservation are not clear, and energy conservation and emission reduction technologies need to be improved. Compared with the advanced countries in the world, the independent research and development capabilities are relatively weak, and there are difficulties such as insufficient flexibility, high research and development costs, and difficult implementation. It is urgent to strengthen the policy inclination and application of research and development of Low-carbon technologies. On the other hand, the basic research and core technologies of non-fossil energy are far from those of developed countries. The new energy power generation peak regulation technology needs further innovation, and it is difficult to fundamentally improve the system efficiency. At the same time, large-scale promotion and industrial application have not yet been realized. . In addition, it is difficult for some developed capitalist countries to actively lend a helping hand in terms of capital and technology to help developing countries conduct independent research and development. On the contrary, they will allow developing countries to bear huge scientific and technological research and development risks and costs alone, forcing them to introduce Western technology and imported products, further aggravating unfair competition, friction and conflict in international bilateral trade, and worsening the relationship between countries , deepening the competitiveness of countries and widening the gap between the rich and the poor.

3.5. Low-carbon Incentive Policies and Institutional Mechanisms are Not Perfect

present, China's carbon trading market has not yet implemented and implemented the concept of green finance, and still lacks substantive and supportable specific emission reduction policy documents, effective policy incentives and market-based incentive mechanisms, resulting in actual progress in carbon emission reduction . Contrary to the expected plan, the emission reduction effect is not obvious.

Specifically, the carbon trading market has not yet established a scientific and reasonable indicator system and pricing mechanism, lacks quantitative standard rules and fair and effective accounting and distribution methods, and cannot clarify and standardize the property rights among various stakeholders. Carbon emission allowances are difficult to trade, affect the

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efficiency of resource allocation and restrict regional development, and reduce the enthusiasm of enterprises to reduce emissions, making it difficult to consciously bear the emission reduction costs and ecological damage caused by carbon pollution emissions . At the same time, the ecological compensation mechanism, market-oriented mechanism, laws and regulations are not perfect, the investment and financing entities are single, the project financing lacks innovation, the government financial support is insufficient, and there is a lack of market trading platforms, which not only lead to the lack of diversified compensation funds channels and sources, As a result, the relationship between ecological beneficiaries and protectors has not been properly and justly dealt with, and it has also led to a large number of financial assets stranded and "free-rider" phenomena everywhere, making the actual effect of ecological compensation unsatisfactory. In addition, the government's regulation of carbon emissions, the regulatory mechanism to deal with carbon leakage, and the energy law and institutional system lack operability and coordination, fail to effectively reduce carbon emissions and intensity, and it is difficult to achieve the expected reduction effect.

4. China 's Path to Achieve "Carbon Neutrality" under the New Development Pattern

Based on China's resource endowment and national conditions, the country and the government should analyze and clarify China's "carbon neutrality" goal in depth, plan and deploy a "roadmap" and "timetable" for carbon reduction step by step, and further consolidate the responsibilities of all parties and adapt to local conditions. We should quantify it in stages, take effective measures to “reduce emissions” and “increase foreign exchange”, and work together from top-down and bottom-up to create a set of “combination punches” to turn crises into opportunities.

4.1. Improve Ecological Carbon Sink Capacity

Xi Jinping proposed "to reach the peak of carbon, neutralize carbon and integrate into the overall layout of ecological civilization construction", indicating that China should continue to implement and practice the "two mountains" theory, which contains "both green water and lush mountains, There are also three levels of invaluable assets, "lucid waters and lush mountains and invaluable assets are by no means opposed" and "lucid waters and lush mountains are invaluable assets", explaining the dialectical and unified relationship between economic development and environmental protection from different perspectives. We implement new development concepts and firm the path of sustainable development, strengthen and enhance the capacity of the ecosystem to increase carbon sinks , thereby slowing down global climate change and maintaining the dynamic balance of the global carbon cycle.

First, scientifically plan and implement ecological protection and restoration projects, deeply promote and carry out large-scale Low-carbon land remediation and land greening, reasonably reduce the amount of inorganic fertilizers and nutrient discharge in rivers, stop the destructive development of vegetation and wetlands, and expand energy crop cultivation size and forest cover. Observing and implementing negative emissions in anoxic acidified sea areas and mariculture environments, monitoring carbon fluxes in coastal areas and coral reef ecosystems and comprehensively assessing the effect of increasing sinks, establishing marine negative emissions and coastal wetland blue carbon demonstration areas , and developing marine Carbon sink verification and estimation, marine geological carbon sequestration and other technologies can effectively protect biodiversity and improve the carbon sequestration capacity of ecosystems . Secondly, the government should take the lead in setting an example and building a conservation-minded government, strengthening the public's ecological environment values and Low-carbon development awareness, deepening people's awareness

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and understanding of the "carbon neutrality" goal, re-understanding China's energy security and resource endowments, "I want to reduce" practice zero-carbon travel and green consumption model, forming a "big environmental protection pattern". In addition, consciously and proactively make a list of energy conservation and emission reduction, actively carry out in-depth exchanges and cooperation with various countries on emission reduction related technologies and carbon price and tax reduction, actively participate in and establish a multilateral cooperation platform for carbon emission reduction policies , and build a global climate A new governance system and a long-term mechanism for benign competition and cooperation. Explore "carbon-neutral" technological innovation and share energy-saving and emission-reduction technologies, help developing countries and backward regions develop hydropower to cope with climate change, and promote international climate control and South-South cooperation and emission reduction measures along the "Belt and Road". It is worth noting that we must adhere to "common but differentiated responsibilities", set up necessary "glass doors" and "locks" at different stages, quantify and prevent the risks and impacts of carbon emissions transfer from other countries, and jointly build people and The community of natural life and the vision of achieving a global "zero carbon future".

4.2. Accelerate the Adjustment and Reform of Energy Structure

At present, the world's energy is in a pattern of "four parts of the world", a large number of "unsettled" new energy and "reliant on the weather" renewable energy, forcing China to take a two-pronged approach to "hurt the muscles and move the bones" Measures to implement and implement the requirements of the "four revolutions, one cooperation" energy strategy, speed up the pace of energy structure adjustment and reform, reorganize the energy industry chain and optimize the energy structure, break down the institutional barriers between various energy types on the supply side, and improve comprehensive energy Refinement, digitization and intelligent management level of the system, accelerate the formation of a professional team for energy strategy research and the construction of a national laboratory in the field of clean energy, vigorously research and develop multi-energy complementary integration technologies, and form a new energy-based "three small and one large". "Energy Structure System.

"Energy saving, efficiency improvement, and reasonable control of energy demand are the top priorities of energy strategies." The government needs to improve and implement the energy "dual control" system, dynamically monitor and early warning energy security risks, clearly locate and define the development direction of coal, and strictly control coal Supply and reduce the demand for energy consumption, rationally allocate the supply proportion of coal and zero-carbon new energy and renewable energy, so as to maximize the value and potential of clean and Low-carbon energy, renewable energy and alternative energy. At the same time, promote and improve the efficient and clean utilization of coal, and achieve a "soft landing" of coal energy and a Low-carbon energy structure. In other words, it is necessary to plan the implementation path and action plan of "de-coalization" in a scientific and orderly manner, so as to realize the complementary coexistence and collaborative innovation of coal, clean energy and renewable energy. In addition, it is necessary to maintain the safe utilization of natural gas and promote the increase of conventional natural gas production, accelerate the construction of the hydrogen energy industry and realize the "four-station joint construction", continuously reduce the production cost and difficulty of clean energy, and properly handle its utilization rate and supply and demand matching degree. Promote the "vanguard" and "leader" of sustainable economic and social development, and promote the implementation of the "hydrogen China" strategy and the realization of China's "energy independence". In addition, it is necessary to deepen domestic and foreign energy partnerships, promote the development of green and Low-carbon energy in China and regional energy security, and improve the effectiveness of energy governance and global climate governance.

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4.3. Promote Low-carbon Transformation and Upgrading of Industrial Structure

China is in the critical period of economic and social transformation. The government needs to fully consider the influencing factors and heterogeneity of carbon emissions in all walks of life, and take the promotion of supply-side structural reform and technological innovation to promote economic development as a strategic orientation, and vigorously develop energy and technology-intensive industries. , Low-carbon high-tech and energy-saving and environmental protection industries, resolutely curb the "three high" projects and prevent the "resurgence" of traditional enterprises. Promote the research and development and application of green and Low-carbon generic technologies, carry out technological upgrades and deep decarbonization of traditional high-energy-consuming industries, reduce the carbon intensity of production and operation and the allocation of high-carbon assets, promote green manufacturing and circular economy supply chains, and realize all aspects of the industrial chain . The carbon emission reduction of the links will eventually achieve a dynamic balance between carbon emissions and carbon reduction costs . Specifically, as far as the transportation industry is concerned, it is necessary to increase the research and development and innovation of new technologies, improve the matching technology of transportation energy supply and demand, coordinate various transportation modes, accelerate the formation of green and Low-carbon transportation methods, optimize transportation structure, and improve urban transportation. system to reduce "black carbon" emissions from the source. As far as the construction industry is concerned, with the support of sustainability indicators, energy-saving standards and "black technology", fully develop renewable energy and accelerate the construction of an ultra- low energy consumption system, focus on promoting energy-saving renovation of thermal equipment and bulk production of building materials from solid waste, encourage And accelerate the development of new materials for green building materials, promote the cement industry's collaborative waste recycling, and establish a recycling system with other industries, so as to speed up the construction and construction of green cities. As far as the power industry is concerned, it is necessary to develop, apply and promote the CCUS energy-saving technology, encourage and strictly implement "determining electricity by heat", adjust and optimize the power supply structure, increase the energy-saving renovation of equipment and power grids, and improve the flexibility of the power system and in-depth peak regulation . capacity, comprehensively utilize power plants to generate power and build a circular economy chain with related industries, give priority to supporting new energy and renewable energy power generation, phase out coal power generation plans in a planned way, and build an integrated power supply system suitable for near-zero emissions.

4.4. Promote the Innovation and Application of Green and Low-carbon Technologies

China is in the stage of high-speed economic development. It is necessary to properly handle the contradiction between the economy and Low-carbon transformation, scientifically and rationally adjust and clarify the supply and demand of technology research and development, and deploy "carbon neutral" technology research and development in advance, so as to achieve long-term depth Vision goals for decarbonization and "carbon neutrality" . Therefore, in view of the "technical shortcomings" of China's emission reduction, build a green technology innovation system that is market-oriented and digital, implement and implement new development concepts, and strengthen the awareness of carbon reduction, carbon -free (or zero-carbon) and decarbonization technologies. At the same time, reference and learn from the carbon emission reduction technologies of developed countries to reduce the amount of "black carbon" in the atmosphere and the cost of emission reduction.

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Specifically, the party and the country need to fully realize the necessity and importance of green and Low-carbon innovation from a theoretical and strategic perspective, recognize the urgency of scientific and technological development and climate change, and increase the awareness of high-efficiency recycling technologies and zero-carbon Invest in the research and development of negative emission technologies such as energy technology, agriculture and forestry carbon sinks, carbon capture, utilization and storage, and update and replace scientific research and experimental equipment and facilities in a timely manner. Formulate relevant standards and norms for the development of relevant green and Low-carbon technologies, encourage and promote innovative entities such as universities, research institutes, scientific and technological personnel and enterprises to participate in green and Low-carbon technology innovation activities, and build and form diversified and multi-level scientific and technological talents system. Strengthen basic scientific and technological research and overcome bottlenecks in key technologies, break through barriers between various fields, cross-fields and industries, attach importance to R&D and innovation of key energy technologies and develop clean energy, bio-energy and green hydrogen energy, and comprehensively utilize zero-carbon technologies and coupling Apply different techniques. In terms of production and consumption, consumers are guided in Low-carbon and green consumption, reducing energy consumption and carbon emission intensity, gradually replacing high-polluting fossil energy power generation, improving energy efficiency and developing a circular economy, so as to achieve low energy consumption and high development. In addition, it is necessary to attach importance to and actively participate in international scientific and technological development exchanges and cooperation, study, absorb and learn from the scientific research achievements of scientific and technological developed countries, promote international South-South cooperation and strengthen global cooperation.

4.5. Improve Low-carbon Incentive Policies and Institutional Mechanisms

China should continuously improve and perfect Low-carbon incentive policies and institutional mechanisms, accurately judge and take effective measures to reduce emissions based on regional differences and synergies, scientifically and rationally optimize the allocation of resources and achieve social equity. For example, for the underdeveloped areas in central and western China, we can focus on solving the problems of ecological pollution and environmental damage in the short term, and comprehensively consider and control the symbiotic dividend of carbon emission reduction .

Specifically, improve the supporting rules and information disclosure mechanism of the carbon emissions trading market. Commercial banks should build and improve the green financial system, scientifically measure and evaluate the carbon intensity of credit funds and their own comprehensive carbon emission reduction benefits, timely standardize and refine the identification standards for green and Low-carbon industries, and serve the “carbon neutral” industry. Vision and strategic deployment. The government should clarify the behavioral standards and norms of carbon trading parties, use green financial means to rectify and improve the carbon market, incorporate ocean carbon sinks and climate investment into the carbon trading system, introduce carbon pricing standards and mechanisms, and increase the utilization and utilization of fossil carbons. Carbon emission cost, scientifically quantify the economic value of carbon resources and carbon emission evaluation indicators, and comprehensively and effectively evaluate carbon quotas that match current production conditions. At the same time, adopt an independent and effective carbon tax system combined with an emission permit system in the ecological field, implement the principles of "polluter pays" and "three wastes" collaborative governance, scientifically formulate carbon emission accounting methods and build a modern energy market system. Guide and invite enterprises to stabilize their investment direction, so that enterprises can provide and publish carbon

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emission data in a timely and voluntary manner, so that enterprises can "know" and let citizens become "supervisors" of Low-carbon and environmental protection, so that polluting enterprises can be free from pollution. Escape and unsustainable, effectively avoid the risk of illegal emissions and solve the information asymmetry between stakeholders, and promote the healthy development of the carbon market and carbon trading . In addition, improve Low-carbon incentive policies and quantitative ecological compensation mechanisms. The government should define property rights in advance and clarify key compensation targets through legislation, broaden fund-raising channels and raise compensation fund standards, cultivate an open and transparent market trading platform and set up "green GDP" standards. Focus on accelerating the construction of a renewable energy, efficient and clean energy subsidy policy system, dynamically adjust and optimize renewable energy electricity price subsidies in a timely manner, effectively make up for the deficiencies and defects of the carbon trading market "grabbing the big and letting go of the small", and solve the potential problems in the green and Low-carbon transformation process. Employment distress and structural unemployment.

Acknowledgments

This work was funded by the Innovation and Entrepreneurship Training Program for College Students of Anhui University of Finance and Economics., Project number: 202110378002.

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