Research on the Fiscal and Tax Policies of Low Carbon Leading China's Development

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2 "China's Policies and Actions to address climate change 2019 Annual Report"

Abstract: In recent years, the greenhouse effect, extreme weather, and other phenomena brought about by global warming have further intensified, and it has gradually become the focus of attention of the international community. Facing severe climate problems, reducing carbon dioxide and other greenhouse gas emissions has become an inevitable choice. With China's economy towards high-quality development, it does not only face the constraints of resources but also needs to deal with environmental constraints. The low-carbon event should take into account economic development and environmental protection and help China's economic transformation and upgrading. The low-carbon event should take into account economic development and environmental protection and help China's economic transformation and upgrading. In the face of the greenhouse gas effect of carbon emissions, it is necessary to limit it to a reasonable range. And it is essential to implement reasonable and practical carbon reduction policies. Moreover, the study of China's fiscal and taxation policies for carbon emission reduction has excellent demonstration significance for the developing countries, energy cooperation in the future, cooperation on climate change, and so on.

1. INTRODUCTION
Economic development has always been the leading theme of human development, which is limited by the capacity of resources and environment, so we must adhere to the pace of sustainable development, which is low-carbon development. In the 1970s and 1980s, the "limits of growth" were discussed worldwide, and various environmental protection movements emerged. Then, in 1972, the "Declaration of the Human Environment" revealed the prelude for people to jointly protect the environment, which also means that environmental behavior rose from popular activities to government behavior. With the publication of Our Common Future in 1987, the concept of sustainable development was recognized. Thus, the introduction of a low-carbon economy and ecological civilization is the inevitable result of deepening people's understanding of sustainable development. Economic development must consider the carrying capacity of the ecological environment, and implementing carbon emission reductions will help to combat climate change. As the world's largest developing country, China has chosen the economic model of high pollution and high energy consumption, which has led to a continuous increase in carbon emissions. Now the low-carbon development mode has been chosen, basically reversing the rapid growth of carbon emissions. By 2018, China had achieved 5.26 billion tons of carbon dioxide
emission reduction, and non-fossil energy accounted for 14.3% of primary energy.\(^2\) To achieve carbon emission reduction, we need to consider the influencing factors, measurement standards, and consumers.

2. China chooses a low-carbon development path
Low-carbon development means the organic integration of low-carbon and development, which should not only reduce carbon dioxide emissions but also achieve economic and social development. As a developing country, China's economy has changed from a high-speed growth stage to a high-quality development stage, considering the severe challenges of resource constraints, environmental pollution, and climate change, and it is urgent to promote low-carbon development.

2.1 Xi Jinping Thought on New-Era Chinese Socialism
President Xi Jinping has repeatedly pointed out that addressing climate change is not only an inherent demand for sustainable development but also an inevitable requirement for building high-quality development. The construction of ecological civilization is helpful to realize the harmonious unity of economic and social development and green environmental protection and promote the peaceful coexistence between man and nature.

At the Fifth Plenary Session of the 18th Central Committee, China for the first time referred "Green Development" to the "Five Great Development Concepts". In June 2015, China submitted a document to the United Nations on the country 's contribution to climate change, proposing to reduce carbon dioxide emissions per unit of GDP by 60% -65% by 2030 compared with 2005, and non-fossil energy accounts for about 20% of primary energy consumption. The Fourth Plenary Session of the 19th Central Committee in October 2019 pointed out that we should improve the production and consumption of low-carbon, and promote the low-carbon development of the green cycle more consciously.

At present, the main contradiction in Chinese society has turned into a contradiction between the people's growing need for a better life and unbalanced and inadequate development. The yearning for a better life not only reflects the goal of Xi Jinping's thought on the new era but also includes the people's yearning for a better ecological environment.

2.2 Great-nation Image
Climate itself is a global public good, so protecting the environment is a common challenge and responsibility for the world. As China becomes the world's largest emitter of greenhouse gases, carbon reduction is our international responsibility. At the same time, China is facing an economic transformation, and how to move towards high-quality development has become a top priority. Complying with low-carbon development is not only the fulfillment of international obligations but also an inherent requirement for achieving sustainable development.

At the same time, the realization of carbon emission reduction not only reflects China's deep participation in global climate governance but also shows the determination of the community of human destiny. At the international level, China actively assumes international responsibilities corresponding to its development stage and national conditions, contributes to China's wisdom and propositions. At the domestic level, China actively implements policies to combat climate change, accelerates the implementation of low-carbon leading transformation routes, and contributes to the construction of ecological.

3. Measurement of carbon emission reduction
According to the Kaya identity of carbon emissions, the basic formula for carbon emissions is:

\[ C = \sum C_i = \sum \frac{E_i}{E} \times \frac{Y}{Y} \times \frac{P}{P} \times \frac{Y}{Y} \times \frac{P}{P} \]  \hspace{1cm} (1)

As in formula (1), \( C \) is carbon emissions; \( C_i \) is the carbon emissions of energy in \( i \); \( E \) is the consumption of primary energy; \( E_i \) is the consumption of \( i \) kinds of energy; \( Y \) is the gross domestic
product (GDP); P For the population. Therefore, the energy structure factor \( S_i = \frac{E_i}{E} \); that is, the share of \( i \) energy in primary energy consumption; the emission intensity of various energy sources is \( F_i = \frac{C_i}{E_i} \); that is, the carbon emissions of \( i \) energy from the consumer unit; Factor \( I = \frac{Y}{E} \); which is the energy consumption per unit of GDP; economic development factor \( R = \frac{Y}{P} \). Therefore, per capita carbon emissions can be written as:

\[
A = \frac{C}{P} = \sum_i C_i F_i R
\]  

According to formula (2), the change in per capita carbon emissions \( A \) comes from changes in \( S_i \) (energy structure), changes in \( F_i \) (energy emission intensity), changes in \( I \) (energy efficiency), and changes in \( R \) (economic development). Therefore, the main factors affecting China's per capita carbon emissions are changes in energy structure, changes in energy efficiency, and changes in economic development. As a result, carbon dioxide emissions are directly related to the burning of fossil fuels, and the improvement of energy efficiency and the advancement of science and technology in economic development all contribute to the reduction of carbon dioxide emissions. Zhang Renjie (2020) pointed out that the carbon emissions caused by energy consumption have staged characteristics. Urbanization rate and industrial structure have an inhibitory effect on carbon emissions, and transportation intensity and technological development level have a promoting effect on carbon emissions. In summary, the use of renewable energy, technological changes, and industrial structure upgrades all contribute to the reduction of carbon emissions.

Meanwhile, China is adopting carbon emission intensity and carbon productivity indicators as the core indicators for testing carbon emissions. Both belong to two aspects of the same problem, but neither can control the total amount of carbon emissions. There is a relative expansion of GDP, which leads to a reduction in carbon emission intensity and an increase in carbon productivity. Therefore, the country also needs to control the total carbon emissions. That is to ensure the basic balance of the carrying capacity of the ecological environment and the scale of economic development, and promote the harmonious development of man and nature.

4. Carbon emission reduction policies that lead to low-carbon development

Low-carbon development must follow not only market laws but also support the use of relevant fiscal and taxation policies. Faced with actions to reduce carbon emissions, the government should focus on applying the corresponding budgetary and tax policies from the perspective of actors. The measures adopted by the fiscal and taxation policy for carbon emission reduction are sewage charges (by penalizing excessive emissions, thereby promoting enterprise emission reduction), low-carbon subsidies (subsidies for low-carbon production methods and products), technological innovation subsidies (by supporting low-carbon The development and use of technology promote carbon emission reduction) and carbon tax (taxation of carbon-containing fossil energy or carbon emissions to suppress energy consumption).
4.1 Adjust the energy consumption structure and improve the energy efficiency

The energy structure is divided into low-carbon and high-carbon energy. It can be seen from Table 1 that the carbon emission coefficients of coal and petroleum are higher than that of natural gas. In China's energy consumption structure, the proportion of coal use has gradually decreased from 69.2% in 2010 to 57.7% in 2019; the share of new energy (hydropower, nuclear power, wind power) in total energy consumption increased from 9.4% in 2010 to 15.3% by 2019. In short, China needs to enhance further the proportion of natural gas and hydropower, nuclear power, and wind power used in the energy structure. At present, the carbon trading market is gradually expanding from the power industry to other industries, which can not only achieve total control but also give subsidies to advantageous enterprises to promote development. For high-carbon industries, the carbon tax is proposed in a reasonable and timely manner, and high-efficiency forces enterprises to innovate and improve energy efficiency. For low-carbon industries, technical subsidies and support, government procurement, and other methods are used to promote development.

Table 1 Carbon emission coefficients of various energy sources (t carbon / t standard coal)

| Data Sources                                      | coal  | petroleum | natural gas |
|--------------------------------------------------|-------|-----------|-------------|
| DOE/EIA                                          | 0.7020| 0.4780    | 0.3890      |
| Japan Energy Agency                               | 0.7560| 0.5860    | 0.4490      |
| National Science and Technology Commission Climate Change Project | 0.7260| 0.5830    | 0.4090      |

4.2 Promote energy transformation and improve energy efficiency

Adjust the scope of expenditure in the low-carbon field and increase the support for key projects. For industrial enterprises, select key enterprises for low-carbon transformation. Accelerate the elimination of outdated production capacity, and strive for rectification and transformation of financial funds. Promote the construction of industry guidance funds and use financial discounts to guide social capital into low-carbon environmental protection.
4.3 Change the energy consumption structure of residents and increase the use of clean energy
Carbon reduction is related to everyone in society, so it is necessary to advocate a low-carbon lifestyle and cultivate the concept of saving resources and protecting the environment. In energy consumption, the energy consumption of residents reaches about 10% of the total energy consumption. With the acceleration of urbanization and the improvement of residents’ quality of life, carbon emissions due to energy consumption will continue to increase. Therefore, it is possible to effectively change the residents’ energy consumption habits and structure, such as strengthening the supply and heating measures of natural gas, promoting energy-saving buildings, and traveling on different peaks, so that the traffic is smooth. Properly guide residents to use photovoltaic power generation through fiscal subsidies to encourage the use of clean energy.

4.4 Strengthen vegetation construction and promote ecological civilization
In addition to reducing energy consumption and use at the source, carbon emission reduction measures can also reduce carbon emissions through ecological construction. Firstly, the destruction of vegetation caused an increase in carbon emissions second only to fossil energy. Secondly, China's forests face the problem of the insufficient total. As a result, private capital can be introduced and afforested utilizing financial subsidies. Therefore, vegetation construction not only helps to reduce carbon emissions but also protect water and soil and maintain biodiversity.

4.5 Regular policy review to ensure policy consistency
In response to fiscal and taxation policies in low-carbon development, it is necessary to carry out timely assessments to clear up stock policies that impede fair competition in the market. At the same time, policy coherence contributes to a smooth transition of the economy. For example, financial subsidies in photovoltaic enterprises, due to the existence of a subsidy retreat mechanism, enterprises have the behavior of grabbing subsidies, resulting in the consequences of vicious competition. Fiscal and taxation policies are linked to the use of carbon emission reductions, and it is necessary to pay attention to the complementarity between policies.

5. CONCLUSION
The history of carbon utilization is the history of the human journey, including the development of the energy revolution. With the use of energy and environmental constraints, how to deal with climate change has become a reality facing us in the future. All countries are implementing orderly carbon emission reduction strategic measures. China chooses low-carbon development and promotes the adjustment of industrial structure. It is necessary to use legal, economic, technological, and other methods to promote sustainable development. China needs to use fiscal and tax policies to reduce carbon emissions to solve the energy crisis and climate change problems.

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