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The Problems and Strategies of the Low Carbon Economy Development

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Abstract

Low carbon economy is the inevitable choice to tackle global warming and achieve the sustainable development. Based on describing the connotation, characteristics and development pattern of low carbon economy, this paper analyses the actuality and existing problems of low carbon economy, mainly including the unreasonable energy structure, irrational industrial structure, backward technology level, developed countries "lock-in effect" and imperfect carbon financial system, finally aiming at these problems, proposed countermeasures and suggestions to achieve the development of China's low-carbon economy.

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Along with the continuous growth of global population and economic scale, the environmental problems and the incentive caused by energy has been constantly realized by people. The increasing concentrations of carbon dioxide causing global warming are a serious threat to the earth's environment, which has been identified as an undisputed fact. In this context, "carbon footprint", "low-carbon economy", "low carbon technology" and "low carbon development", "a low-carbon lifestyle", "low carbon city" and so on, a series of new concepts, new policy emerged, low carbon became a kind of fashion. From the "Bali roadmap", the Kyoto agreement to the subsequent Copenhagen conference and "earth-hour initiative", which explain that a low-carbon economy as the core of the industrial revolution had appeared, towards low carbonization time is an inevitable trend.

1. Connotation, features and development models of Low-carbon economy

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1.1 Connotation of Low-carbon economy

As a broad social frontier economic philosophy, low-carbon economy actually has no conventional definition. It involves a wide range of industries and management field. "Low-carbon economy" first observed in government documents were in 2003, the white paper "Our energy future: create low-carbon economy". It thinks "low-carbon economy is through the less of natural resource consuming and less of the environmental pollution, to get more economic output, low-carbon economy is an approach and chance to create a higher standard of living and better quality of life, and also creates opportunities for the development, application and output of advanced technology, at the same time, it also can create new business opportunities and more employment opportunities."

Low-carbon economy has become the hot issues around the world; however, the connotation of low-carbon economy has not been formed consensus. Niu Wenyuan thought that constructing low carbon city, needs to make cluster-economy as the core, promoting industrial structure innovation; to make circular-economy as the core, promoting energy conservation and emission reduction innovation; to make knowledge-economy as the core, promoting the connotation development innovation. Xia Kunbao thought low-carbon economy mainly is two kinds: one kind is low carbon production, one kind is low carbon consumption, and low carbon production is a kind of sustainable production mode [1]. Zhuang Guiyang thought under the premise of unaffected the economic development, low-carbon economy through the innovation of technology and institution to reduce the consumption of energy and resources, as far as possible minimize emissions of greenhouse gases and pollutants and realize the sustainable development of economy and society [2].

Thus we think, low-carbon economy is an economic growth pattern, under the guidance of the concept of sustainable development, through technical innovation, system innovation, the industrial transformation and development of new energy and so on many kinds of means, to reduce the consumption of carbon energy and reduce the emissions of greenhouse gas. Its essence is green economy on the basis of the low energy consumption and low pollution; the key is energy efficiency and clean energy structure, the core is the technology innovation and institution innovation of the energy, the goal is to slow climate change and promote the sustainable development of human beings.

1.2 Characteristics of low-carbon economy

① Externality. Externality and the external characteristics of public goods exist in low-carbon economy. This is not a country internal problems, but the problems between global public interests and the interests of the state, and the problems among the national interests. It consists of two levels: the external economy and external diseconomy. When a country dedicates to active reforestation, energy conservation and emission reduction, this is the external economy (i.e. positive externality); When the automobile emissions pollute the air, the cost of such damage plus the cost of business constitute the social total cost. Marginal social cost of environmental pollution will be higher than marginal personal cost of business; this is not the external economy (i.e. negative externality).

② Economy. Low-carbon economy as global public products must be developed in accordance with the market economy principle and mechanism. The "invisible hand" guides low carbonization of enterprise production methods and the life. And this kind of low carbon economic development can not be with the cost of the decline of people's living conditions and welfare, namely low-carbon economy must constantly improve people's living standards.

③ Innovation. Development of low-carbon economy is the reflection and innovation of model of economic development during industrial civilization of human society, which is characterized by improving energy efficiency and reducing emissions of greenhouse gases such as carbon dioxide through

technological innovation. It also includes sustainable production, consumption, mode of thinking and other aspects of innovation.

1.3 Development mode of low-carbon economy

Low-carbon economy is a kind of innovative high-level model of economic development, which is characterized by enhancing the efficiency of energy utilization and creating clean energy structure on the basis of low energy consumption and low pollution and low emission [3]. Future competition in the world economy is bound to the competitive low-carbon economy. Countries will focus on the development of low-carbon economy according to their own actual situation and there is no general mode at present. China's low-carbon economy mode stressed the resultant force between the government, market, enterprises and public. The government plays an important role in promoting low carbon economic development, leads guides and supervises the action of powerful regulations and economic measures; Enterprises as an important carrier of low-carbon economy, under the guidance of the relevant policies, promote the low carbon economic and technical innovation and diffusion, and achieve the industrial structure adjustment and optimization; Through the "invisible hand", market guide the direction of low-carbon economy and achieve economic and social sustainable development.

2. China's Low-carbon economy development situation and restriction factor

According to the international energy agency's report, China's carbon dioxide emissions from energy has already surpassed the United States and became the first of the world in 2007; in 2010 August, NDRC determines that developing low carbon industry construction experimental work involving five provinces and eight cities; the 2010 Shanghai world expo with low carbon environment protection as the theme,....., In recent years China has intensified energy saving and emission reduction. China is a developing country, in the key stage of fast development about the industrialization and the urbanization, the primary task is still developing. Therefore, developing low-carbon economy faces more serious troubles , Mainly reflects in the following aspects:

2.1 The unreasonable energy structure

Chinese energy stock characteristic is "More coal, lack of oil, less gas", In our country's energy proven reserves coal is 94%, oil is 5.4%, gas is 0.6%,in 1978-2008 about thirty years coal have been leading energy, is about 70%, Oil accounts for 20%, while in 2008 the proportion declined, this reflects Chinese endowment of energy resources. This special energy structure causes that coal-based energy production and consumption pattern will exist for a long time in our country such high carbon energy structures are long-term restricting factors in low-carbon economy development [4].

2.2 Irrational industrial structure

Chinese economic subject is the second industry, and economic growth relies on the second industry, determines the main departments of energy consumption are industrial, Industrial production technology level is backward, the tertiary industry and service sector of low energy consumption is low, these aggravate high carbon characteristics of Chinese economy. For historical reasons Chinese various infrastructure levels is backward, China is in the rapid growth stage of energy demand in the rapid development infrastructure construction must continue how to realize the sustainable economic

development but not at the expense of the environment and increasing carbon emissions, are the problems we must face.

2.3 Backward technology level

The core of low-carbon economy energy is the technology innovation and institution innovation, as a developing country, the overall technology level is backward and technology research and development ability is limited, these are the biggest constraints of realizing from "high carbon" to "low carbon" in Chinese economy. This is mainly embodied in huge scientific research outlays and insufficient capital investment, take wind farm for example, Wind field is in the remote and more weak area relatively, Grid equipment, human resources are backward, the biggest difficulty is the high investment funds in technical renovation. According to gauge, realizing from high carbon economy to low-carbon economy transformation needs 25 billion us dollars a year, it is impossible to undertake for developing China.

2.4 Bondage of "Locked-in effect"

"Locked-in effect" is essentially a kind of "path dependence" phenomenon in the process of industry clusters life cycle evolution. Arthur think techniques with more advantages than other probably get in plight or even locked in a vicious circle of passive state to extricate themselves due to late step and don't get enough supporters. Overseas of developed countries energy-intensive enterprise and "Locked-in effect" of infrastructure and other inputs bring developing countries including China great pressure to perform emission obligations and develop low-carbon economy. Use fixed year number of durable consumer goods such as infrastructure, machine and equipment are in 15 years to 50 years during which cannot be easily abandoned once invested. For example, China needs invest 3.7 trillion dollars accumulatively to the energy sector during 2006-2030. Therefore, how to avoid bondage of "Locked-in effect" of financial and technical is an urgent and practical challenge.

2.5 Carbon financial system has not been perfected yet

Carbon financial refers to various financial solutions serve on reducing greenhouse gas emissions, including bank loans, direct financing and carbon index trading [6]. It contains a series of integral factor such as the market, institution, products, services, policy and so on. China's financial system is still not fully exert its due role to promote economic development of low carbon, on the one hand, low carbon financial knowledge should be further enhanced for financial institutions. Low carbon finance is a financial innovation; most domestic financial institutions including commercial banks are lack of understanding for carbon financial business project development, approval and operating mode and the profit space. Loss of institutions relevant to carbon financial business and talents lead to the lack of internal driving force in carbon financial transactions. On the other hand, risk of saving energy industry is more big and project about low-carbon economy has a great uncertainty, it is difficult for banks to give project benefits, profitability and risky an accurate judgment, which makes financial institutions in contradiction to the pursuit of profit maximization.

3. The Countermeasures for the Development of Low-carbon Economy

To develop low-carbon economy is an inevitable choice to achieve win-win between the development of economy and the protection of environment and resources. Western developed countries have made certain achievements on the exploiter and utilization of low-carbon techniques and the development of

low-carbon economy, which is worthy of our study. On the whole, in view of our special national conditions and the current development and the constraints of low-carbon economy, our country should adopt various strategies to develop low-carbon economy.

3.1 Cultivate low-carbon economy consciousness

To develop low-carbon economy, we should first of all improve the low-carbon economic sense among the government, enterprises and the public. As to the public, they should train up low-carbon consuming habits and style, start from the trivial things to meet the requirement of developing low-carbon economy and make contribution to the development of low-carbon economy. The enterprises should set up new concept and sense of developing low-carbon economy. They should establish high-efficient and clean productive mechanism and handle the business on energy conservation and emission reduction and pollution abatement positively. The government should go farther to propagate low-carbon production and low-carbon consumption, encourage the enterprises to do low-carbon production and guide the population to change their concept of consumption. Politically, the government should provide them with preferential measures on subsidy, tax and etc.

3.2 Optimizing energy structure

Directing at the unreasonable energy structure in our country, to develop low-carbon economy we shall start from adjusting energy structure and optimizing energy utilization pattern to enhance the utilization efficiency of energy. In the short term, our country should speed up the technology development of low carbon and fixing carbon and substitution and renewable energy using the energy conservation and emission reduction and coal cleaning as an emphasis to promote energy supply diversified; The more long term, we should establish the renewable energy, clean coal, advanced nuclear etc as the main body of the sustainable energy system, vigorously promote hydrogen fuel and other new energy technology applications, raise the proportion of renewable energy, break unreasonable structure of our resources endowment.

3.3 Accelerate carbon Finance derivative product innovation

In international carbon trading market, the developed countries have formed carbon financial system which contains a series of financial instruments, while Chinese carbon trading market still stays in the project level. Therefore, to enhance research, promote carbon financial derivatives of innovation, it is critical to construct China's carbon financial system.

First point, it is necessary to establish carbon fund investment which makes service for carbon management service and low carbon technologies, energy saving and emission reduction enterprise of environmental protection and support the implementation of projects, issue green loans, environmental protection loans, etc; Second point, encourage financial institutions to set up special carbon financial business department, alleviate the information asymmetry problem in carbon trading, increase risk management ability of the financial services industry. Third point, establish and perfect the laws and carbon financial supporting policies, encourage low carbon enterprise in the stock market financing, guide and encourage private capital to enter low-carbon economy.

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