CHAPTER 2

Make Full Use of the Experience of International Green Development

1 It Is Necessary to Draw on the Experience of International Green Development

Green development comes from green economy. The idea of a "green economy" comes from Rachel Carson's book *Silent Spring*. The purpose of green economy is to fight against the behavior of polluting environment and destroying ecology for the sake of economic development. With the increasingly obvious restriction of ecological environment on economic development, countries around the world have gradually realized the importance of living in harmony with the natural environment, and have taken measures to develop green economy. The United States, Europe, Japan and other major developed countries have taken active actions and formulated and advanced a series of plans to promote economic growth through the development of green economy. Some developing countries also have ambitious plans to create miracles in the development of "green economy".

It should be acknowledged that China, limited by its stage of development, still lags far behind many other countries, especially developed countries such as Europe, the United States and Japan, in developing green economy and promoting green development. These countries have conducted a lot of useful explorations and practices in terms of legal system building for green development, institutional transformation and institutional innovation, and have produced quite a few successful

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practices and typical experiences. As the largest developing country, China should be practical and realistic to study and draw lessons from foreign practices and experience of the development of green, combined with China's national conditions, the condition of the people, by localization transformation, the transformation and absorption, especially with the overall goal of ecological civilization construction, the overall deployment, accelerating the green transformation development in our country. It is beneficial and necessary to learn from the experience of green development abroad.

2 Draw on the Experience and Practices of the United States in Green Economy

For a long time, the United States has been the world's largest producer, consumer and importer of energy. After a series of disasters such as resource destruction, environmental pollution and energy crisis, the United States began to take some measures and gradually embarked on the path of energy-saving and green development. In recent years, in order to cope with climate change and get rid of the economic difficulties caused by the financial crisis, the development of green economy has received unprecedented attention in the United States. At the same time, in order to promote green development and realize green recovery, the US government has introduced a lot of policies and measures to promote the economic transformation to a clean energy economy.

2.1 Pay Attention to Energy Conservation and Efficiency

On February 15, 2009, the United States enacted the *American Recovery and Reinvestment Act*, which aims to promote energy efficiency through capital investment and reduce energy consumption in multiple economic sectors. For example, the bill provides $5 billion for Weatherization Assistance, a $6500 grant to low-income homes to improve their energy efficiency; The bill also provides $3.2 billion for the Conservation BlockGrant program, most of which is used to help US states, local governments and native American tribes invest in projects to improve energy efficiency, reduce energy use and reduce fossil fuel emissions. At the same time, under the bill, the United States will focus on investing in advanced vehicle and fuel technologies, research

and development and use of next-generation vehicle batteries, advanced biofuels, plug-in hybrid vehicles, all-electric vehicles and the infrastructure necessary to reduce America's dependence on oil for transportation. In addition, by improving traditional transportation and vigorously developing high-speed railways, more people are likely to choose railways or public transportation with low energy consumption. In the ACES act, it requires higher energy efficiency standards for industry, buildings, lighting, appliances, transportation, promotes energy efficiency labeling for buildings, develop smart transportation, implements energy conservation programs in the public sector, subsidizes the renovation of old buildings, rewards the recovery of electricity and heat energy and promotes contract energy management to increase energy efficiency.

2.2 Develop the Manufacturing Industry of Clean Energy and Related Equipment

In the Obama administration's proposed 2011 budget, the administration said it would invest in basic research and development in clean energy as part of a drive to transform the way energy is used and produced, while addressing climate change. At the same time, the United States is committed to developing the manufacturing of clean energy equipment, with an emphasis on manufacturing wind turbines, solar panels, electric cars, batteries, and other components of clean energy. As the United States transitions from dependence on fossil fuels to clean energy, demand for advanced energy products will increase significantly, and these investments will help clean energy manufacturers in the United States increase their manufacturing capacity to meet growing demand. The total is expected to exceed $90 billion by 2019.

2.3 Control Greenhouse Gas Emissions and Combat Climate Change

First, carbon capture and storage. Carbon capture and storage (CCS) is a method used to limit greenhouse gas emissions by capturing and sequestering carbon from the burning of fossil fuels and preventing it from entering the atmosphere. Of course, although some carbon has already been stored in the ocean or deep underground, there are still some persistent problems to be solved in terms of storage and so on. Under the *American Recovery and Reinvestment Act*, the United States

invests primarily in core research, development, and demonstration of these technologies. In addition to the application of carbon dioxide capture and storage (CCS), the United States is also developing low-carbon fuels, plug-in electric vehicle infrastructure construction, promote large-scale transportation electrification, speed up the "smart grid" research and development and promotion, improve the power grid transmission and allocate, established the clean energy innovation center, etc., to reduce dependence on oil imports and ensure national energy security.

Secondly, the establishment of emissions data statistics. Since 2010, the United States has been collecting and compiling accurate greenhouse gas emissions data from various sectors of the economy, such as generators and cement producers. This statistical result provides an important basis for formulating policies to minimize carbon emissions.

Finally, clean energy and security laws. In June 2009, the US House of Representatives passed the *Clean Energy and Security Act of America* (ACES). The bill includes a cap-and-trade program and a goal of reducing greenhouse gas emissions by more than 80% by 2050.

2.4 Establishing a Market Mechanism for Promoting the Transformation of the Clean Energy Economy

First, establish a cap-and-trade system. The United States has used a cap-and-trade system to reduce sulfur dioxide (SO_2) emissions since 1995. According to the implementation results over the years, the cost of the total sulfur dioxide control and emission trading system has been greatly reduced compared with the expected cost and achieved good results. At the same time, a deposit and lending mechanism for emissions trading rights will be set up to make the polluter's emission reduction behavior have certain flexibility during the discharge period. Under this mechanism, with the change of transaction right price, the polluter can make a large degree of emission reduction when the transaction right price is higher and store the emission reduction right in the bank for later use. Similarly, firms can reduce their borrowing costs by future management, thus allowing them to discharge more pollution in the present. In addition, a price cap or floor has been set in the cap-and-trade system. Because while trading rights deposits and loans allow companies to control their emissions costs, they may not be able to prevent unexpected and potentially long-term changes in trading rights that could be affected by a recession or economic boom, fuel price

fluctuations or technological breakthroughs. As a result, cap-and-trade schemes often include protection mechanisms to curb overpricing. For example, in the northeastern United States, the greenhouse gas trading system, when the price of a trading right exceeds a certain threshold, will enable some additional flexible terms to reduce the cost of enterprises.

Second, the establishment of offset trading system. Offset trading is also an important measure to reduce the cost of the cap-and-trade program. Offset trading refers to the "emission savings" that enterprises can purchase from other enterprises to reduce their emissions to meet their own emission needs. Since greenhouse gases are a global pollutant and have the same impact wherever they are emitted, offsetting trading strategies make it possible to achieve emission reduction targets at a lower cost.

Third, establish an international cooperation mechanism for emission reduction. Given the global nature of greenhouse gas emissions and the declining share of the United States in them, the United States alone will not be able to address the most serious risks posed by climate change. Therefore, international cooperation is extremely important in carbon emission reduction. To achieve this goal, the US government is actively working with major developed and emerging economies to reduce greenhouse gas emissions, reduce emissions intensity and promote economic development.

2.5 Formulating Relevant Laws and Regulations

In order to reduce energy consumption, the United States has promulgated the *National Energy Conservation Policies and Regulations*, *National Home Appliances Energy Conservation Act* and other bills. In order to meet the needs of the situation and strengthen energy conservation and new energy development, the United States promulgated the *National Energy Policy Act 2005* in 2005. The *Energy Policy Law*, with more than 1720 pages, 18 chapters and more than 420 clauses, is the most extensive energy law in the United States in nearly 40 years. Since taking office, US President Barack Obama has taken a more active stance on global climate issues, striving to develop a green economy as a major policy means to turn "crisis" into "opportunity" and revitalize the US economy, and pushing the controversial *US Clean Energy and Security Act* through the US congress.

3 Draw on the Experience of the EU in Green Development

The financial crisis that erupted in 2008 destroyed two decades of economic and social progress in European countries, while exposing structural flaws, slow growth, low productivity and a lack of investment in research and innovation. This eventually led to the outbreak of the European sovereign debt crisis, the rise of business bankruptcies and unemployment, and the emergence of the real economy recession. At the same time, the EU was striving to maintain its world leadership in tackling climate change and green and clean development. These problems have forced the EU to undertake reforms in the transition to a green economy.

3.1 Formulate a Green Plan or Action Plan

The EU is ahead of the world in tackling climate change and developing a low-carbon economy. In December 2008, the EU agreed on an energy and climate package covering six aspects: amendments to the emissions trading scheme, complementary measures and quota allocation directives for member states, CCS regulations, renewable energy directives, vehicle CO_2 emission regulations and fuel quality directives. In order to meet the challenge of climate change and achieve the three 20% targets (by 2020, the greenhouse gas emissions of the 15 EU countries will be cut by 20% on the basis of 1990. Renewable energy consumption will account for 20% of the total energy consumption in the EU, and energy efficiency will be improved by 20%) proposed by the EU, and drive the economic transformation toward high energy efficiency and low emissions, and to lead the world into the "post-industrial revolution" era, EU countries have developed national plans or action plans, and governments have put forward policies and measures to promote the development of low-carbon economy, so that enterprises, especially transnational corporations, can capture business opportunities.

On June 17, 2010, the leaders of the 27 EU countries formally adopted the *EU 2020 Strategy*. The main purpose of building a resource-efficient Europe is to support the transformation of the European economy into a resource-efficient and low-carbon one, achieve economic growth by reducing the use of resources and energy, and ensure energy security. The main measures include: improving

energy and resource efficiency; developing new green transport modes, improving the overall efficiency of the EU transport system and stimulating the development of emerging industries; giving full play to the role of the network; accelerating the development of information and communication technology; helping small and medium-sized enterprises improve their ways of production and operation and save energy and reduce emissions.

3.2 Develop New and Renewable Energy Industries

The new energy industry is the focus of low-carbon economy and also the focus of increased investment in the world after the financial crisis. For example, the European Union has pledged to raise the share of renewable energy in energy consumption to 20% by 2020, reduce the consumption of coal, oil, natural gas and other fossil fuels by 20% and reduce the share of biofuels in transportation energy consumption by 10%. The UK leads the world in the development of low-carbon energy such as offshore wind energy and seaweed energy. In 2008, China set a target of building 33 GW of wind capacity within 10 years, which could power 25 million homes. In December 2008, the French Environment Ministry unveiled a package of 50 measures to develop renewable energy, including biofuels, wind, geothermal, solar and hydropower. In addition to the vigorous development for renewable energy, the French government spent 400 million euros in 2009 on research and development for clean energy vehicles and "low-carbon vehicles". In addition, nuclear energy has been a pillar of France's energy policy and a focus of its green economy.

3.3 Reduce the Cost of Greenhouse Gas Emission Reduction by Economic Means

The market means to reduce carbon emissions mainly include emission trading and carbon tax, etc. The EU has good experience in this respect. In carbon trading, there are plan-based and project-based emissions trading—the former is the trading market of the European Union, the United Kingdom, etc., and the latter is the voluntary emission trading of the Chicago board of trade. In the amendment to the EU Emission Trading System (EUETS) in 2008, the EU adjusted the scope of coverage, the method for determining emission caps, the allocation of quotas and the use of emission reduction credits, and setting emission caps

for non-EUETS coverage and provided that by 2020, emissions from transportation, construction, agriculture and waste utilization be reduced by an average of 10% compared with that in 2005. The UK's economic policy instruments include an emissions trading scheme, a carbon fund, etc. The government also supports the establishment of a carbon credit fund to support the creation of low-carbon, high-growth enterprises. Norway, Sweden, the Netherlands, Denmark, Germany and the UK have all introduced carbon taxes. Norway has imposed a $50 per ton carbon tax on more than 60% of carbon dioxide emissions since 1991. In 1991, Sweden introduced a carbon dioxide tax on oil, coal, natural gas, liquefied petroleum gas, gasoline and domestic aviation fuel, based on the average carbon content and calorific value of the fuel. Practice shows that the adjustment of tax policy can not only promote the improvement of energy efficiency, the development of renewable energy and emission reduction, but also promote the economic development.

3.4 Promote a Low-Carbon Lifestyle

The EU attaches great importance to the construction of low-carbon lifestyle. For example, in the aspect of transportation, the EU requires the carbon emission of cars to be reduced to the level of 120 g/km by 2012. It is clearly proposed to develop decarbonized transport, develop intelligent, upgraded and comprehensively interconnected transport modes, as well as supporting infrastructure and give full play to the role of information and communication technology. It promotes the construction of hybrid infrastructure, accelerates the construction of power grid and power infrastructure, strengthens the management of intelligent transportation, launches the "green" vehicle plan to reduce carbon dioxide emissions of road vehicles, and develops hybrid electric vehicles and hybrid technology. They work together to develop new standards. Britain has a number of means to steer people towards a low-carbon lifestyle. For example, it requires all new homes to be carbon neutral by 2016, at least one-third of new homes to have a carbon footprint reduction plan, with zero disposable plastic bags, and so on. The London government believes that measures to tackle climate change, including energy conservation and energy efficiency, should not reduce the original quality of life, stressing that "it is not necessary to reduce the quality of life, but to change the way of life". Finland's low-carbon lifestyle starts with concrete energy saving actions. Without slogans or catchword, finns have many energy-saving

habits, such as manual elevator doors, non-use of removable paper towel, use of peat (A coal with a low degree of metamorphism) for electricity, and wood for fuel. Also, no one leaves an office building with the lights on or over-wraps gifts. In a word, low carbon society requires people to live a good life, but not extravagant.

3.5 Strengthen International Cooperation on Carbon Emission Reduction and Low-Carbon Economy

Climate is the world's largest public good, a country is difficult to achieve carbon reduction task, so Western countries strengthen mutual cooperation. Together with eight industrial powers and EU partners, the United Kingdom is working to develop technologies to combat climate change, to meet its carbon reduction targets and to get the most out of it by helping other countries, particularly the developing countries meet their carbon reduction targets. Germany has cooperated with many countries, especially developing countries in the field of climate protection, strengthened coordination with the United States and initiated the trans-Atlantic climate and technology action between the European Union and the United States. The focus was on harmonizing standards and developing common research plans, and specific measures for this action were identified at the EU-US summit in April 2007.

4 Draw Lessons from Japan's Experience in Green Development

Japan is one of the earliest countries to produce the idea of green economic development, one of the earliest countries to practice the green economic development model, and one of the countries with relatively successful green economic development at present.

4.1 Development of the Green Economic Model

After the Meiji restoration in the late nineteenth century, Japan quickly embarked on the road of modern industrialization. However, due to the lack of resources, Japan has to rely on imports. The huge contradiction between the passive supply of resources and the growing demand for industrial development forces Japan to constantly explore and change its economic development model.

First, the incubation period of green economic model. The scarcity of resources in the Second World War forced Japan to seek alternatives to resources and advocate the conservation of materials and energy. In 1941, Japanese militarism launched the Pacific war in order to plunder strategic resources and realize the ambition of global hegemony. However, the war not only caused disasters and sufferings to the people of Asian countries, but also made Japan more short of resources. Subsequently, the maritime supply lines were blocked, which objectively accelerated its defeat. After the war, Japan, deeply constrained by resources, laid the foundation for the change of Japanese economic model in terms of material substitution and economy.

Second, the beginning of the green economy model. After Second World War, Japan devoted itself to economic development and achieved the rapid economic growth from the 1950s to the 1970s. By 1968, Japan's GDP ranked second in the world. However, in exchange for rapid economic growth at the expense of the environment, environmental pollution, ecological destruction and imbalance and other environmental hazards occurred frequently. During this period, Japan became a world-famous "public hazard country". In this regard, the Japanese government has put the problem of solving public hazards on the agenda and formulated and implemented a number of public hazards prevention and control laws, which effectively stimulated the development of Japan's green economy. In the mid-1970s, Japan's economic development entered a stable stage, and a resource-saving economic model was basically formed, which laid a foundation for the establishment of a green economy.

Third, the development period of green economic model. Since the 1990s, Japan has become a big waste producer in developed countries. The occurrence of dioxins from waste incineration has once again aroused people's concern about waste disposal. To this end, the Japanese government began to revise the *Waste Disposal Law* for many times in 1991, and successively introduced laws on the utilization of renewable resources, such as the *Recycling Law of Containers and Packages* and the *Recycling Law of Household Appliances*. The implementation of the policy of resource recycling has strongly promoted the development of Japan's green economy. The green economy has been slowly coming to be accepted.

Fourth, the emergence period of the green economy mode under the global financial crisis. In 2008, the subprime mortgage problem in the United States broke out and rapidly evolved into the largest global

financial crisis after Second World War, which was worse than before for the long-term depressed Japanese economy, causing the Japanese economy to fall into the historical trough again. The financial crisis has renewed Japan's search for a new economic model. The green economy is gaining ground. In April 2009, Japan released a draft policy entitled *Green Economy and Social Change*, which proposed to vigorously develop green economy, increase green demand and promote green technological innovation. It will inject green vitality into the Japanese economy and help it recover from the crisis. Meanwhile, it will cope with the increasingly serious environmental crisis, promote the coordinated development of environment, resources and economy, and achieve the unity of low-carbon society, circular society and harmonious coexistence of nature.

4.2 Main Policies and Practices of Japan in Developing Green Economy

At present, the main feature of Japan's green economic development model is that the government starts from increasing the demand for green products and services and green technological innovation, gradually promotes the green awareness and ability of market players, gives full play to the role of local governments and non-governmental organizations, strengthens international cooperation and gradually creates a large and sound green market. The main policies are as follows:

Promote the "Greening" of Infrastructure Construction

First, green transformation of public infrastructure such as primary and secondary school buildings. Installing solar power installations in primary and secondary school buildings. In accordance with the *Greenhouse Gas Emission Control Measures Plan for Government Facilities* approved by the cabinet, low-carbon transformation of central government office facilities will be carried out, and local government facilities and parks and other public places under their management will be gradually transformed.

Second, strengthening the construction of compact cities and low-carbon transportation. We will build a new generation of urban basic transportation, including pedestrian spaces, bicycle spaces and rail transit systems, strengthen the intensive construction of urban functional areas and promote the economical use of untapped resources in urban rivers and groundwater.

Third, improving the quality of our land. Control illegal dumping of industrial household refuse; carry out integrated management of attached and drifting garbage across regions; carry out harmless disposal of toxic waste.

Fourth, natural disaster prevention capability. Transforming the natural environment of national parks and other places to ensure the water quality of river courses; protection of forest resources; establishing emergency facilities to respond to natural disasters caused by climate change.

Promote the "Greening" of National Living Consumption

Promote the consumption of energy-saving household appliances, rely on green points to popularize green household appliances, use green product identification, guide the consumption of energy-saving household appliances, use fiscal subsidies and tax breaks to promote the consumption of energy-efficient or new energy vehicles, promote the deployment of biofuel supply facilities and fast car charging facilities, and promote the use of biofuels. Government departments take the lead in using the new generation of automobiles; develop energy-efficient buildings, support innovation in insulation, revise LCA guidelines, implement the 200-year housing plan and develop fuel cells and heat pumps; at the national level, the government green procurement system was first introduced and then gradually promoted to the local level.

Enhance the "Greening" of Enterprises' Production and Investment

First, establishing a green economy operation system. To expand the domestic credit trading system and steadily promote the voluntary domestic carbon emission trading system (JVETS) led by the Ministry of Environment, in accordance with the provisions of the *Trial Measures for the Comprehensive Domestic Market of Carbon Trading*, which was implemented in October 2008; Promote carbon neutrality and carbon footprint.

Second, promoting green business practices. Promote the construction of ISO40001, Eco action21 and other environmental management systems to improve environmental management; accelerate the introduction of environmental management systems such as environmental reporting and environmental accounting; develop corporate biodiversity conservation responsibility guidelines.

Third, promoting the development of recycling industry. Strengthen the construction of good material recycling industry; promote low carbonization of waste disposal system.

Fourth, improving the green investment and financing system. Expand the financing of environmental equipment, invest in environment-friendly enterprises and industries, and evaluate the "environmental capability" of enterprises. For example, preferential loans for environmental protection have low interest rates and long repayment periods, with a general repayment period of 15 years, and the interest rate is 1~2% lower than the market rate: Loans to small and medium-sized enterprises amount to 520 million yen, and loans to large enterprises amount to 40% of their total environmental protection expenses. The government makes up for the shortage of funds received by enterprises from private financial institutions and makes up for the shortage of funds in long-term areas that are difficult for private financial institutions to reach. It has effectively promoted enterprises to implement environmental protection and successfully transformed enterprises into the main subject of environmental protection investment.

Fifth, the green transformation of the energy structure. We will formulate development plans for renewable energy and improve the policy for generating electricity from new energy sources. We will carry out trials for smart power grids. Making full use of local resources, such as developing small hydropower and geothermal energy; we will steadily develop nuclear power.

Strengthen Research and Development of "Green" Technologies

In the field of technology research and development, we will strengthen research and development of technologies that are both economic and environmental friendly, promote research on environmental and economic policies, and formulate a medium- and long-term roadmap for building a "low-carbon society".

Due consideration should be given to the advanced nature of technological development to develop technologies that will be popularized in 10–20 years, such as photovoltaic, solar thermal utilization, biomass energy, wind power, small hydropower and geothermal energy, LED lighting, high-performance thermal insulation materials without fluorocarbon compounds and energy-saving appliances.

We will strengthen research and development of technologies to address climate change, and study the impacts of climate change on water, food, ecosystems and disaster prevention. From a long-term perspective, we should consider the technological development of climate greenhouse gas emission reduction, and accelerate the development of

solar cells, electric vehicles, CCS, methane hydrate, energy allocation system, and we shall the use of non-fossil energy to produce hydrogen and nuclear fusion energy; we will actively participate in the formulation of international standards and strengthen environmental monitoring and management and information collection and analysis.

Attach Importance to and Mobilize Local Governments and Civil Society to Develop Green Economy

To build an organizational structure centering on local public bodies (Japanese local administrative organs). Establish local green construction fund to support local green economy development; build an environmentally friendly local transportation system; prevent and control air pollution, water pollution and other public hazards. We will attach great importance to promoting the role of non-governmental organizations in protecting the natural environment and training talents and establish local organizations for the purpose of cultivating talents.

We will strengthen support for non-governmental organizations and corporate public welfare activities, construct a circular society between cities and regions and promote the recycling of renewable resources, water resources, phosphorus and other elements.

Set up corresponding environmental protection service organizations to provide technical and financial support to private enterprises and local governments. Set up JRC. Through the Japanese government's finance and investment loan program, JRC mainly engages in the construction and transfer of pollution control projects and provides loans to private enterprises and local governments. It has played a leading role in guiding investment in pollution control, successfully driving private capital in the market and guiding the majority of small and medium-sized enterprises to become the main subject of investment in pollution prevention and control: In construction and transfer projects and loan projects, JEC plays the role of technical consultant, especially in loan projects. JEC's suggestions and guidance on the technical rationality and investment scale of enterprises promote the pollution control of enterprises.

International Cooperation on Green Development

In terms of international cooperation, seek cooperation at different levels, including enhanced cooperation based on the Clean Asia Initiative; strengthen cooperation in personnel, technology and funds; developing Asian standards for green technologies; conduct extensive collaborative

research with different institutions such as universities. We will establish an information-sharing platform to promote Asia's circular economy and social development. At the same time, strengthen air pollution detection and afforestation activities.

5 Draw on the Experience of South Korea in Green Development Experience

South Korea is a resource-poor country. Since the 1990s, due to the long-term implementation of extensive economic growth mode, resource consumption is too high. The growth mode of "high energy consumption and high pollution" is difficult to create enough jobs, and South Korea is trapped in the economic growth dilemma of "low employment rate and low growth rate". In order to accelerate the transformation of traditional energy-intensive manufacturing economy, South Korea will set green growth as the axis of future development. It is hoped that by vigorously developing the green technology industry to enhance the ability to cope with climate change, improve the rate of energy independence and national green competitiveness, and finally achieve long-term sustainable economic growth, and to this end, a series of effective measures have been taken.

5.1 Establish a Regulatory System and New Standards to Promote the Achievement of Emission Reduction Targets

Enhancing the ability to cope with environmental change is an important part of South Korea's green growth strategy. At the G8 Summit held in July 2008, South Korea proposed a voluntary carbon dioxide emission reduction target of 30% by 2020. In order to implement this target, South Korea adopted the following four systems:

First, South Korea requires emitters to buy emissions from a "carbon market" if they exceed the legal limit. South Korea's carbon market, which limits annual carbon dioxide emissions to 600 million tons, requires companies, construction sites and large buildings with annual emissions of more than 3000 tons to enter the market. The carbon market is managed by South Korea's environment ministry. At present, 30 large companies, factories and three supermarkets, including Hyundai Motor and Samsung Electronics, have been added to the carbon trading system.

Second, establishing a greenhouse gas inventory reporting system. The South Korean government will implement a greenhouse gas emission and energy use target management system for more than 600 enterprises with high greenhouse gas emissions nationwide. Enterprises selected by the government shall follow the emission reduction targets and energy use saving targets set by them, and report their emission reduction and energy use. The government shall supervise and inspect the target enterprises.

Third, the establishment of carbon credits system. Carbon credits system is an emission reduction system mainly aimed at national individuals. "Carbon credits" are calculated according to the saving amount of water and electricity, that is, one credit is gained for every 10 grams of carbon dioxide emission reduction. Households and businesses that save water, electricity and gas receive carbon credits, and the government awards residents and businesses based on how many carbon credits they receive in a year. Funding for the awards came from the government budget, with the central and local governments taking 50% each. Incentives will be offered in the form of cash, resident transportation cards, shopping cards, vouchers for the use of public facilities, local tax breaks and property fee waivers and so on.

Fourth, establishing an environmental risk assessment system. In order to cope with climate change, in addition to strict regulation on energy conservation and emission reduction, the government has also established an environmental risk assessment system to assess the impact of climate change, agriculture, biodiversity, health and water quality changes, so as to improve the government's ability to respond to climate change.

5.2 Improve Energy Efficiency and Increase Energy Conservation

Because of the large gap between South Korea's energy consumption and that of other OECD countries, the country's green growth strategy places great emphasis on improving energy efficiency and saving energy.

The first is to sign energy use agreements with high-energy-consuming enterprises. Companies whose energy consumption exceeded 500,000 TOE (tons oil equivalent) in 2010, 50,000 TOE in 2011 and 20,000 TOE in 2012 are all targets for the government to negotiate and sign energy consumption agreements.

Second, establishing an energy consumption reporting system for transportation enterprises, implementing new fuel efficiency standards

and promoting the use of hydrogen-powered vehicles. We will promote the use of light-emitting diode (led) lighting, ban incandescent lighting, and improve the efficiency of lighting energy use.

Third, building low-carbon villages and green and energy-efficient houses, and promoting energy-saving renovation of buildings. By 2020, 600 low-carbon green villages and 1 million energy-efficient green houses will be built in South Korea, and existing houses will be retrofitted for energy conservation.

Fourth, the establishment of smart grid system. The South Korean government plans to set up a smart grid system by 2030 to improve energy production and consumption efficiency across the board.

Fifth, setting a cost-based electricity price to encourage businesses and households to change the way they consume energy. The government subsidized energy prices for low-income households, reducing the share of energy expenditures in the total income of 10% of households from 7.3% in 2009 to 5.0% in 2013.

5.3 Improve the Fuel Efficiency of Transportation and Improve the Urban Transportation Network

South Korea, the world's fifth largest auto maker, has much to do to reduce energy consumption by making transportation more fuel efficient.

First, improving automobile fuel efficiency and emission standards. In the *Green Growth Five-Year Plan* formulated in 2009, South Korea explicitly required that the fuel consumption and emission standards of automobiles be raised to 17 kilometers per liter of gasoline mileage, and all automobiles should meet the standards by 2015.

Second, actively promoting the use of renewable transport fuels. The government plans to pass a renewable fuel standard to encourage carmakers to offer dual-fuel vehicles that run on biodiesel, bioethanol and gas, and to make biodiesel use 7% of the total by 2020.

Third, investment in building a public transport system to increase the number of people who ride bicycles. The government invested in the construction of urban public transport systems and railway networks, greatly increasing the capacity of urban public transport. To promote green transportation, the government is also laying thousands of meters of bike lanes across the country. The paving of bicycle lanes will significantly increase the cycling rate.

5.4 Building Water Source Protection and Ecological Infrastructure

Due to the deterioration of the environment and climate, the incidence of drought and flood disasters is also increasing year by year. The South Korean government invests 4.3 billion us dollars annually in the construction and maintenance of disaster prevention facilities. In order to improve the ability to protect water resources and improve the ecological environment, South Korea mainly adopts the following measures:

First, the implementation of river restoration projects. The main purpose is to protect water resources, reduce the pressure of water scarcity, control the flood, improve water quality and restore ecosystems, create multi-functional space for local residents, promote regional economic development in the river center.

Second, strengthening green infrastructure. In terms of construction of sewage treatment and algae control facilities, by the end of 2009, South Korea had built 323 sewage treatment facilities and 58 wastewater treatment facilities.

Third, building an ecosystem monitoring network. Since 2007, more than 929 kilometers of small rivers in 540 regions have been included in the monitoring system. In order to promote ecosystem restoration, South Korea will also carry out 120 regional river reconstructions and rebuild 84 river coastal wetlands. Ecosystem restoration projects could create 340,000 jobs and generate $31.1 billion in local economic benefits.

5.5 Formulate Policies to Promote Green Growth

Time-limited and targeted fiscal, taxation and financial incentive policies are the basic factors to promote green economic transformation. The main policies adopted by the South Korean government are as follows:

First, increasing government green investment. The government injected $83.6 billion, or about 2% of gross domestic product, into green growth between 2009 and 2013.

Second, providing tax incentives to encourage private capital to invest in green industries. We will exempt green deposits from interest income tax and offer tax breaks on the interest earned by private individuals on bonds invested in green industries.

Third, the establishment of green funds and credit guarantee funds. The South Korean government has launched a "Green Fund" (about us $400 million) to provide financial support for SMEs to make green investments. It set up a green loan guarantee fund and the amount of guaranteed capital was increased from $1.9 billion in 2009 to $5.4 billion in 2013.

5.6 Establishing Relevant Supporting Laws and Systems

At the end of August 2008, the Republic of Korea released the *National Basic Energy Plan*, calling for increasing energy independence, reducing the proportion of coal and oil consumption and increasing the proportion of new and renewable energy. In September 2008, the *Low-Carbon and Green Growth Strategy* put forward the implementation of the "green technology and clean energy to create new growth drivers and employment opportunities" of the new development model, to achieve high energy consumption from the manufacturing economy to the service economy. On January 6, 2009, the state council of the republic of Korea adopted the "green project" plan, which proposed to provide new growth impetus for the future development of the South Korean economy through green investment, and put forward the three "green New Deal" goals of "creating jobs, expanding future growth momentum and basically establishing low-carbon growth strategy". On January 13, 2009, the *Outlook and Development Strategy for New Growth Drivers* was formulated, and 17 new growth drivers, including renewable energy, were identified to guide future development. On April 14, 2010, the *Basic Law on Green Growth* was formally implemented, further clarifying South Korea's green growth strategy in the form of national laws.