CHAPTER 6

Government Finance and Green Transformation and Development

1 The Meaning of Green Finance

The meaning of green finance can be understood from the following three aspects:

First, it is, conceptually, a new kind of finance. In other words, it is a kind of finance that introduces the concept of green environmental protection on the basis of the traditional public finance system, adapts finance to green transformation and development, and plays an active role in resource conservation and environmental protection. The development of economy cannot be separated from the exploitation and utilization of natural resources. The traditional public finance system fails to clearly include natural resources and ecological environment in the pursuit of goals. Therefore, while promoting economic development, it also brings destruction of natural resources and ecological environment. While pursuing economic and social development, the new finance also strives for the protection of resources and environment, and takes the protection of resources and environment as an important goal. Therefore, it is a new type of finance consistent with green transformation and development. Some scholars, such as Han Wenbo (2004), believe that green finance is to integrate "green elements" into the public finance system and integrate the extended concepts of low carbon,

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health, environmental protection, safety, civilization and other economic development into the theory of the public finance system.

Second, it is formally a set of fiscal instruments. In other words, it is the "greening" of traditional financial tools, which integrates the concepts of economy, low carbon and environmental protection into various financial tools to achieve the effect of resource conservation and environmental protection while promoting economic and social development. Various financial instruments, such as taxation, subsidies, budgets, treasury bonds, government procurement, public investment and transfer payments, have regulatory and moderating effects on economic development. When the concept of finance becomes "green", the fiscal tools that play a role in operation and application are also "green" accordingly. Therefore, in the aspect of operation and application, green finance is a set of fiscal tools aimed at saving resources and protecting the environment. As defined by scholars such as Yang Tao (2006), green finance is to protect the environment, rationally develop and utilize resources, promote clean production and green consumption, and thus promote green economic growth.

Third, it is essentially an environmental protection means. That is, green finance is one of the environmental protection means. Together with many other environmental protection means, it achieves the purpose of promoting resource conservation and environmental protection by adjusting the distribution of economic interests and redistribution of national income in the process of economic and social development. There are many means of environmental policy, including legislative means, administrative means, economic means and technical means, and green finance is one of them. It corrects the negative environmental externalities of resource development and product use through green taxation, green procurement, green public investment and construction, and guides and promotes the development of green industry and accelerates the formation of a good ecological environment.

To sum up, green finance is a new type of finance that absorbs the concepts of resource conservation and environmental protection on the basis of the traditional public finance system, and makes the fiscal policy have the dual purposes of promoting economic and social development and resource and environmental protection by strengthening the green design of fiscal tools. In essence, it is a tool of environmental protection and plays a role mainly through the adjustment of economic interests and redistribution of social products.

2 The Mechanism of Green Finance on Transformation and Development

2.1 The Mechanism of Green Fiscal Revenue

The revenue sources of the government's public finance mainly include tax revenue, income from state-owned assets, national debt revenue, fee revenue and other revenue. Among them, tax revenue is the main subject, which is the main source of government revenue (see Fig. 1). The income from state-owned assets is also an important source of fiscal revenue, especially in China, a socialist country dominated by public ownership. The amount of state-owned assets is huge, and the income from state-owned assets should be an important part of government fiscal revenue. It is mainly in the form of the operating profit of state-owned enterprises, the transfer or rental income of state-owned assets and the dividend income of state-owned assets. The national debt income is the compensatory income which the country obtains through the credit way, it is the government that raises the fund to society to make up the short-term fund insufficiency the important channel; fee income refers to the form of income in which the state government agencies or institutions

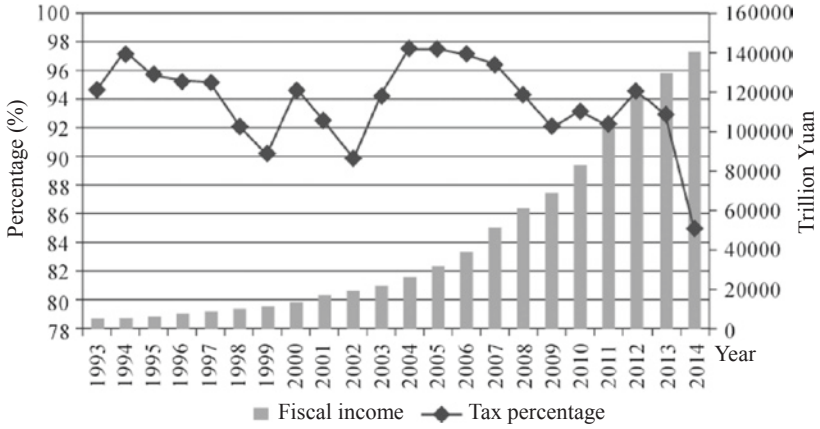

Fig. 1 Proportion of China's tax revenue in government revenue from 1993 to 2014 (*Data source* 1993–2013 data according to China statistical yearbook calculation, 2014 data provided by China news financial network)

charge certain fees to the beneficiaries when providing public services, implementing administrative management or providing the use of specific public facilities. It includes user fees and charges. The former refers to the fees charged by the government to the users of public facilities according to certain standards, while the latter refers to the fees charged by the government to citizens for providing specific services or specific administrative management. Other incomes include capital construction loan repayment income, capital construction income and donation income.

It is not difficult to see from the above that the main part of green fiscal revenue is green tax, followed by green state-owned asset income, green national debt and green government charges. The main principle of green taxation is to promote the formation of environment-friendly behaviors and industries through a good tax design and a guiding tax inclination mechanism, thus inhibiting the generation of environmental adverse behaviors or industries. The content of green state-owned assets income is quite rich. It can be the profit obtained by the green operation of state-owned enterprises, the green transfer fee obtained by the green transfer of state-owned assets and the green rent obtained by the green lease of state-owned assets. For example, in the process of transferring or leasing state-owned resource assets, the deduction of resource scarcity costs and environmental maintenance costs will result in green transfer fees or green rents, and dividends can be obtained by investing in environment-friendly enterprises and participating in their green management. In terms of green bonds, the central government can issue green bonds to raise funds at home and abroad to make up for the lack of funds in resource and environmental protection when the funds are insufficient. In terms of green government charges, the administrative cost can be reduced as far as possible through the electronic and low-carbon office, so as to reduce the revenue of fees and charges. At the same time, through the scientific research of people's behavior and the exquisite design of the fee standard, it induces people to form the behavior that is beneficial to resource conservation and environmental protection consciously when using public facilities.

2.2 The Mechanism of Green Fiscal Expenditure

With the exchange of goods and services as the criterion, fiscal expenditure can be divided into purchase expenditure and transfer expenditure.

The former is directly manifested as the government's purchase of goods and services, while the latter is manifested as the free and unilateral transfer of funds. Generally speaking, developing countries spend more on the former than on the latter, while developed countries spend less.

The purchasing expenditure of the government will have an important impact on green consumption and green production. First, the scale of government purchases will boost production of green goods. Since government procurement serves the whole society, it is difficult for private individuals to achieve the procurement volume. Especially in the early stage of economic development in the developing countries, due to the economic construction needs a large amount of infrastructure investment and the market economy development degree is not high, many economic activities have to be completed by the government directly involved. Therefore, the scale of government procurement directly affects the total scale of social commodity consumption. If the government orders a large number of green products, it will undoubtedly stimulate the production of green products in the whole society. Second, government purchasing expenditure legislation will promote green technology. In purchasing expenditure, the government is a special "private" consumer, who not only orders a large number of products with stable demand, but also may take measures such as punishment on the after-sales service experience of products. Manufacturers have to scramble to improve the product quality to win over such a special consumer. Therefore, if the government legislates to purchase green products with high quality and low price and adopts the way of public bidding and social supervision, it will stimulate many manufacturers to improve green production technology to gain competitive advantage, which will stimulate the progress of green production technology in the whole society. For example, the study of Xu Jinliang et al. (2014) shows that the procurement of new energy vehicles by the Beijing municipal government not only improves the air quality of Beijing, but also promotes the level of independent innovation of new energy vehicles and the transformation of scientific and technological achievements: Taking Foton Motor Company as an example, the government's procurement of new energy vehicles contributed as much as 86.16 and 56.25% to the increase of its development project expenditure and the number of patent approvals, respectively, and 17.89 and 74.24% to the increase of its main business income and profit margin, respectively. Third, the government's purchasing expenditure will produce the demonstration effect of

green consumption and "soft force" effect. Government's purchasing expenditure includes consumption expenditure and investment expenditure, covering all areas of social consumption, especially the consumption expenditure of government departments, which will have a certain demonstration effect on the consumption of the public. Investment expenditure, to some extent, determines the behavior of the public and thus affects its green consumption. For example, many city residents with the awareness of environmental protection are willing to put some recyclable wastes into different categories, but they are troubled by the lack of convenient recycling facilities. For another example, in the process of urbanization, many local governments lack low-carbon and energy-saving planning for road traffic, so many citizens have to choose to buy private cars to travel.

Transfer spending also has a strong impact on green transformation and development. For example, the government's financial allocation for green technology research, economic subsidies for consumers to buy green products and producers to produce green products, discount support for green enterprise loans, etc., promote the development of green industry and green science and technology by directly adjusting the economic income distribution relationship. In addition, due to the existence of environmental externalities and environmental integrity, inter-governmental green transfer payment also plays an important role in green transformation and development. Green fiscal transfer payment includes vertical transfer payment between superior and subordinate governments and horizontal transfer payment between governments at the same levels. The green transfer payment from the central government to the local government will improve the enthusiasm of local governments in environmental governance, while the horizontal green transfer payment between regional governments will promote the cooperation and coordination of different regional governments in environmental governance. For example, economically underdeveloped regions are more dependent on the resource industry, and the development of resource industry not only destroys the ecological environment of the region, but also leads to the deterioration of the ecological environment of related and adjacent regions. The relevant and adjacent regions help the less developed regions through horizontal financial transfer payment, thus weakening the dependence of the less developed regions on the resource industry, and thus maintaining the ecological environment quality of the relevant and adjacent regions.

2.3 The Mechanism of Green Finance

Green finance operation includes several basic links, such as green finance legislation, green finance organization, green finance implementation, green finance supervision and green finance evaluation. These links affect each other and jointly affect green finance.

Green fiscal legislation is the foundation. It sets out the basic rules for the operation of green finance, involving green taxation, green procurement and green budget. The green transformation of finance needs to start from legislation, to force the green transformation of finance from laws and regulations and to strengthen its feasibility by formulating specific rules.

Green finance organization is the core. It involves the division and coordination of financial and administrative power between the central government and local government in the financial system and affects the enthusiasm of local governments in the practice of green finance. Due to the externality of environmental problems, improper financial division of labor aggravates the emergence of environmental problems and delays the governance of environmental problems. For example, in China's tax distribution system, local governments have to bear the basic costs of local economic and social development. Therefore, local governments in less developed areas often neglect environmental protection and indulge the development of polluting industries to a certain extent when they are unable to introduce high-tech industries with less pollution. For another example, due to the high concentration of tax power in the central government, local governments are unable to levy or regulate some green taxes according to local specific conditions, which makes some green taxes formulated by the central government very inefficient or even completely invalid in local practices.

Green finance implementation is the key. It determines whether green finance can be put into practice in the end, and it is also the fundamental way for finance to promote green transformation and development. Different from the previous financial system, green finance has a high degree of scientific and technical requirements. It not only needs to identify which substances are harmful to the environment, but also needs to design the tax system according to the user's behavior, so as to inhibit harmful production and consumption, and stimulate environmental protection behavior. The fundamental reason why many green taxes fail to play a role in promoting green transformation is that they are poorly understood and poorly designed.

Green fiscal supervision is promoting. As green finance is a kind of fiscal promoting the transformation and development, it is inevitable to encounter many obstacles in its operation. It not only needs to be enforced by legislation, but also needs to strengthen supervision to promote its thorough implementation, avoid deformation or distortion and find problems in operation.

Green finance evaluation is strengthening. The purpose of green finance evaluation is to evaluate the "green" degree of finance in practice through the establishment of green finance evaluation objectives and evaluation criteria in order to analyze its practical effect and existing problems, point out the direction and key points for the next step of green finance, so as to further strengthen the degree of "green development" of finance. The evaluation index can consider the energy consumption ratio of ten thousand Yuan of fiscal revenue, the proportion of total revenue of specialized green taxes in total tax revenue, the proportion of green fiscal expenditure in total fiscal expenditure, the ratio of total revenue of specialized green taxes to environmental governance expenses, and so on.

3 Green Finance Practices Abroad

3.1 Green Taxation

EU Countries

In general, the green tax system of EU countries has the following characteristics: Firstly, the establishment of the green tax system is quite early. Some countries are the earliest in the world in setting up green taxes. For example, Sweden is the first country in the world to levy environmental tax, and the Netherlands is one of the first countries to levy garbage tax. Secondly, with energy tax as the core, control over energy consumption can be strengthened by setting up a number of energy-related taxes, such as carbon dioxide tax and sulfur tax when general taxes are imposed on oil and natural gas. Thirdly, the system of levy is meticulous and perfect with gradation adjustment, emphasizing practicality and motivation. Fourth, the overall transformation of the tax system, from the original emphasis on the introduction of special green taxes to the later control not only from the source of consumption but also through the garbage tax or charges to promote the use of resources, recycling. Fifth, tax

suppression and tax incentive should be combined to strengthen the taxation of environmental harmful products and their behaviors, and at the same time to improve people's enthusiasm for reducing consumption and environmental protection management through tax reduction and exemption. Here are a few examples of green tax systems in typical EU countries.

Sweden

Sweden is the world's first country to levy environmental taxes and promulgated the world's first environmental tax adjustment act in 1991. Its green tax revenue is large, accounting for about 13% of GDP, and its annual green tax revenue accounts for about 15% of the total tax revenue. Its green tax content includes two aspects: First, a sound energy tax system should be established, such as general energy tax, carbon dioxide tax, sulfur tax, gasoline and methanol tax, mileage tax and motor vehicle tax. The second is to achieve a green tax transition, with a focus on increasing taxes on environmentally damaging activities and reducing taxes on labor employment and income, such as those on fertilizers, pesticides and batteries.

Sweden's energy tax, a combination of specific taxes on fossil fuels, thermal power and greenhouse gas emissions, is at the core of its green tax. By levying general energy tax on fuel and various special energy taxes related to fuel, the energy consumption level can be controlled, so as to not only curb the excessive consumption of natural resources and achieve the goal of environmental protection, but also to raise funds for environmental protection. The energy tax is as follows: (1) The general energy tax on fuel. Oil, coal and natural gas are the targets. The taxpayer is the person who produces the taxable product in Sweden or uses the product to produce the corresponding product and imports the taxable product. (2) Value-added tax on energy. Introduced in March 1990, the tax is 25% of the energy price, which includes excise tax. (3) Carbon dioxide tax. A carbon dioxide tax is a tax on oil, coal, natural gas, liquefied petroleum gas, gasoline and domestic aviation fuels. It's a tax on fossil fuels that contain a certain percentage of carbon or on businesses or individuals that directly emit carbon dioxide. The tax base is based on the average carbon content and calorific value of various fuels at a rate of 0.25 Swedish krona per kilogram of carbon dioxide. Different fuels have different tax rates because of their emissions. (4) Sulfur taxes. The tax is on the sulfur content of oil and coal. (5) Gasoline and methanol tax,

mileage tax, motor vehicle tax, etc. Gasoline is taxed according to the size of the lead content, the tax rate is Swedish krona 2.37 per kilogram of unleaded gasoline and Swedish krona 2.68 per kilogram of unleaded gasoline. Methanol is taxed at 0.8 Swedish kronor per kilogram. A mileage tax is levied on diesel vehicles, depending on the type and weight of the vehicle.

Sweden has taxed the use of fertilizers and pesticides since 1984, and the green tax transition began in 2000. To reduce carbon dioxide emissions from the air and encourage green production and consumption, Sweden recognized the need for a change in the tax system, reforming the existing tax structure to meet the needs of environmental developments, and shifting the focus of taxation to industries with high energy consumption and high pollutant emissions to control carbon dioxide emissions from related enterprises and individuals at the source. In order to control environmental pollution at source, Sweden imposes a tax on fertilizers, pesticides and batteries. The tax standard is as follows: fertilizer, 0.6 Swedish krona per kilogram of nitrogen, 12 Swedish krona per kilogram of phosphorus; pesticides, 20 Swedish krona per kilogram; batteries, including those containing alkali and mercury, 23 Swedish krona per kilogram, and nickel and tin batteries 13 Swedish krona per kilogram. The tax revenue is mainly used for environmental research, agricultural consultation and soil salinization treatment. To curb industries with high emissions and pollution, in 2006 the Swedish government decided to raise taxes on the petroleum-intensive transport sector and on commercial electricity users. Sweden has raised taxes on key energy users such as vehicles, residents and the service sector. It has eliminated tax breaks for traditional users, such as electricity and natural gas, and introduced new taxes under new EU rules.

In addition to establishing a relatively complete energy tax system and realizing the green tax transformation, the Swedish government also stimulates the enthusiasm of enterprises and the public to reduce energy consumption and protect the environment through appropriate tax reduction and exemption policies.

The Netherlands

As early as 1960, the Netherlands introduced green tax into the tax system, which is one of the earliest countries in the world to levy garbage tax. Green tax revenue in the Netherlands accounts for about 14% of total tax revenue and 3.2% of GDP. Its green taxes include fuel tax,

carbon dioxide tax, energy regulation tax, water tax, garbage tax, surplus manure tax and noise tax, up to more than 10 kinds, the following are the main types: (1) Fuel tax. Fuel tax is a tax levied by the government on major fuels such as gasoline, diesel and natural gas to raise funds for environmental protection. The taxpayer is the producer and importer of fuel. It has a flat rate, which is set annually by the Swedish government based on the amount of money needed to meet environmental targets set by the environment ministry. (2) Carbon dioxide tax. The carbon tax was introduced in 1990 and changed to a 50% energy/carbon tax in 1992. A carbon tax applies to all energy sources. Electricity is indirectly taxed through a tax on the use of fuel. Part of the energy tax is exempt for some energy-intensive sectors (big gas consumers), and part of the carbon tax is not. (3) Energy regulatory tax. The subject of tax payment shall be enterprises engaged in energy. Household users and small commercial enterprises that substitute mineral oil (gasoline, diesel, etc.) for natural gas have also been subject to tax since 1996. (4) Water. The water tax consists of two parts: One is a water pollution tax, which is levied on the pollution of water resources. The tax will be levied according to the amount of oxygen and heavy metals emitted, and different tax rates will be applied to different water resource reserves. The other is a tax on the exploitation and use of water resources called a groundwater tax. (5) Garbage tax. The main purpose of the garbage tax is to raise funds for garbage collection and disposal. At first, every family was listed as the target of garbage tax, and families with small population could get certain tax deduction. However, this method does not take into account the amount of waste discharged by different households and fails to better reflect the fairness of tax and the incentive of tax to green development. To this end, the government later introduced a garbage collection tax, in the garbage collection tax, according to the number of each household bin and the number of units of each bin to collect, and local governments are free to choose between the two. (6) Surplus manure tax. The surplus manure tax is a national levy imposed by the Dutch central government on farms that produce manure since 1987. The rate is based on the weight of phosphorus produced per hectare of farmland. (7) Noise taxes. A noise tax is a tax levied on the use of civil aircraft, mainly by airlines, to produce noise in a particular area (a noise-affected area, mainly around an airport). Its tax base is the amount of noise produced. The main purpose of the levy is to raise funds for the government to install sound insulation near the airport and relocate residents.

The Dutch government not only collects taxes on environmentally unfriendly materials and their consumption behaviors, but also provides incentives through tax differentiation and tax deduction. For example, in the energy regulatory tax, there is no tax on fuel for transportation and natural gas for greenhouse and horticultural sectors, as well as natural gas for non-fuel use and power generation; specify the types of projects enjoying preferential energy tax policies; use tax law provisions to promote the development and utilization of cleaner production technologies. For enterprises adopting innovative cleaner production or pollution control technologies, their investment can be depreciated at 1 year (the depreciation period of other investments is usually 10 years).

Denmark

Denmark's green tax system is somewhat similar to that of Sweden, with energy tax as the main target, and "environmental tax" is introduced to help curb the occurrence of harmful environmental behaviors and reduce the scale of resource consumption to accelerate the green tax transformation. Conventional taxes are levied on traditional fossil fuels such as coal, oil and natural gas, including gasoline and diesel engine oils. In 1992, the tax on carbon dioxide was introduced, and in 1996, the tax on sulfur dioxide was increased. Green owner's tax is levied on conventional car owners based on the fuel consumption of cars. The basis of the tax is the fuel consumption of cars. Environmental taxes have also been levied on water, waste water, garbage, disposable tableware, plastic bags and pesticides. There are 16 in all.

Denmark's green taxes have paid off. In the past 30 years, Denmark's GDP has increased by 50%, while its carbon dioxide emissions have decreased by 13.9%, forming the "Danish model" of "coexistence of emission reduction and economic prosperity".

Germany

On April 1, 1999, Germany launched the green tax reform for the first time. Germany's green tax reform mainly includes increasing the tax on mineral oil, improving the water pollution tax and environmentally friendly tax breaks. For example, in Germany, a water pollution tax has been levied since 1981. The taxation system for water pollution is relatively complete. Based on the "pollution unit" of waste water (equivalent to one resident's annual pollution load), the unified national tax rate is implemented. All the taxes collected are used to improve the

water quality of the region, and obvious ecological and social benefits have been achieved. For another example, products that eliminate or reduce environmental hazards can be exempted from sales tax and only need to pay income tax. Exemption of electricity tax on electricity generated directly from renewable energy sources such as electric energy, solar energy, biological energy and water energy; In the financial year of purchase or construction, the environmental protection facilities of the enterprise can be depreciated by 60%, after that, it will be depreciated by 10% of the cost every year.

Germany's green tax reform has achieved remarkable results. Since the reform, carbon monoxide and sulfur oxide emissions have been greatly reduced, and nitrogen oxide emissions have also been significantly reduced.

Other EU Countries

Finland has imposed a gas tax on cars since 1990. Finland uses different tax rates for vehicles with and without exhaust conversion devices and applies differential GST rates to petrol and diesel vehicles. Since 1993, a preferential tax rate has been applied to sulfur-free diesel and refined petrol.

British businesses can sign up for energy efficiency targets and carbon-dioxide reduction targets with the government. Companies that meet their targets can get a 20% energy tax cut. Tax breaks are given to solar, wind and other new energy sources for generating electricity.

The United States

The green tax in the United States has the characteristics of wide coverage and flexible preference. Both the federal and state governments have introduced environmental taxes of varying degrees, covering a wide range of categories, including energy, consumer goods and consumer behavior. Its fundamental purpose is to reduce the emission of harmful substances to the environment and provide funds for environmental governance and residents' health care. Its green tax is reflected in the following aspects:

Taxes on fuel: (1) Taxes on gasoline and diesel. The federal gasoline and diesel taxes are 18.4 cents and 24.4 cents per gallon, respectively. Tax rates vary from state to state. Rates vary from about 8 cents per gallon to about 30 cents per gallon. (2) High gas consumption vehicle tax. The tax is a federal excise tax on inefficient fuels that do not meet

minimum combustion targets. (3) The formation of underground storage tank leakage fund tax. The tax, which comes from excise tax on gasoline, diesel, jet fuel and other fuels, is 0.1 cents per gallon.

Energy taxes: (1) Coal taxes. The tax is a special federal domestic tax on coal used to provide social security funds for "coal lung" patients. Open-pit mining is taxed at 55 cents a ton, while underground mining is taxed at 1.1 dollars a ton. (2) Mining tax. The tax is a consumption tax on the exploitation of natural resources, mainly oil and gas, in order to protect the natural environment by influencing the rate of extraction.

Taxes levied on urban environment and living environment pollution: (1) one-time razor and old tire tax. The environmental protection tax is levied on disposable razors, while the old tire tax is levied on production or import. (2) Garbage control tax and garbage tax. The garbage control tax is a service tax levied on products that become garbage after all business activities, such as production, wholesale and retail. The tax rate is 0.15‰ of the total income or value. In addition, about 3400 local communities in 37 states levy a tax on household waste, charging about $1–$1.50 per 30-gallon bag. (3) CFCS tax. The tax is based on the quantity of chlorofluorocarbons produced and imported. The rate was $5.35 per pound of Freon in 1995 and has increased by 45 cents a year since. The duty rate of CFCS is determined as the basic duty rate. Other ozone-depleting substances are classified according to their ozone-depleting potential. The duty rate is the product of the basic duty rate and ozone-depleting potential.

Favorable tax incentives and tax breaks for the environment. American tax incentives mainly include tax credits for clean fuels; reduce or exempt energy taxes on alternative fuels and renewable fuels; use accelerated depreciation in particular for investments in certain pollution control technologies; grant enterprises the preferential treatment of reducing or exempting income tax for research and development of new pollution control technologies and production of pollution substitutes; and grant preferential treatment of reduction or exemption of income tax on the income derived from comprehensive utilization of resources by enterprises. Tax credit and deduction for cyclic investment; The purchase of recycling equipment is exempt from sales tax. For example, under the *American Recovery and Reinvestment Act*, taxpayers can receive a $1500 tax credit for purchases of energy-efficient refrigeration and heating equipment, insulation and other products. A tax credit of up to $7500

will be given to buyers of more fuel-efficient plug-in hybrids. Another example is the use of solar and geothermal energy equipment; 10% of the equipment investment can be exempted from tax. A tax credit of $1.5 cents per kilowatt for generating electricity from renewable resources and from biomass; for owners use clean fuels such as natural gas, oil, liquefied natural gas and electricity, for ethanol fuel with an alcohol content of more than 85%, fuel costs are deducted from the total proceeds, etc.

America's green tax has three obvious advantages: First, it is targeted. Because the United States has a large area with few people and a long commute distance, automobile consumption is indispensable. If there is automobile consumption, there will be gasoline consumption. Therefore, the green tax in the United States strengthens the tax on fuel and gas-guzzling cars. Second is flexibility. The United States should give full play to the green tax initiative of the federal and state governments, and allow the states to develop their own tax systems according to their own situations on the premise of not violating the federal principles. For example, in California, the tax deduction for energy-efficient dishwashers, washing machines and water heaters ranges from $50 to $200; Arizona offers a 10% sales tax rebate to businesses that pay in installments for equipment that recycles renewable resources and controls pollution; Connecticut gives preferential loans to businesses that process renewable resources and waives state income taxes, equipment sales taxes and property taxes. Third is specificity. The green tax revenue of the United States is not only used for environmental governance, but also for the protection of residents' health. Therefore, it not only constructs a strict collection and management system, but also is strictly implemented in practice. For example, green tax is usually collected uniformly by the taxation department first and then transferred to the ministry of finance, which classifies them into general fund budget and trust fund (and then transferred to the subordinate super fund with special content of environmental protection). Superfunds are centrally managed by their competent authorities, and their management practices are highly modernized and incorporated into the federal budget. These green tax revenues have the characteristics of special fund and operation increment, because they are managed in classified management and effective operation value-added, so as to guarantee the capital demand for recovery of various environmental and health damages.

Russia

In 2001, Russia carried out a comprehensive tax reform, established a new natural resources tax system and strengthened the regulation of taxation in the exploitation and use of mineral resources and water resources.

Since January 1, 2002, the mineral resource exploitation tax has replaced the three existing taxes, namely the exploitation fee of mineral resources, the reproduction royalty of mineral raw material base and the consumption tax of petroleum and natural gas, while it has also stipulated the distribution method of tax revenue from oil and natural gas exploitation.

In order to effectively regulate the use and distribution of water resources, Russia has introduced a water resource tax and designed four taxes. The four taxes are: (1) tax on the use of groundwater resources. Taxpayers are all legal persons and natural persons who seek, explore and exploit groundwater in Russia. The maximum tax rate for the exploitation of fresh underground water is 8% of the value of the raw materials collected, and the tax for the use of groundwater resources is included in 40% of the federal budget and 60% of the main federal budget, respectively. (2) Reproduction tax on mineral raw material base for groundwater exploitation. The basis of taxation is the value of primary products obtained and sold from the actual exploitation of groundwater. (3) Industrial enterprises draw water tax from water conservancy system. The taxpayer of this tax is an industrial enterprise, which should pay taxes not only on water used for production but also on water used for other purposes. (4) Pollutant emission tax on water resources facilities. The tax is levied on the discharge of sewage containing hazardous substances exceeding the standards to water resources facilities and the discharge of sewage meeting the standards in excess of the quota. The tax rate is fixed according to the standards and discharge amount of sewage. It can be seen from the above that Russia attaches great importance to the protection of water resources and is also very careful in the design of taxes. There is a tax on groundwater resources, emphasizing the protection of groundwater; there is water collection tax to promote resource utilization of industrial enterprises; and there is water resources pollutant emission tax to prevent the deterioration of water quality, which are very worthy of China to learn with per capita water shortage.

Japan

Japan began to implement the environmental tax policy in 2007. The main goal of the environmental tax is to play the role of price guidance, publicity and financial resources. The basic approach is to implement various policies with macro-scopical and forward-looking nature by clearly stipulating in the law that power should be reasonably divided among all levels and departments, optimize the investment and consumption structure, stimulate the potential of the domestic environmental protection industry, improve its international competitiveness and strengthen the publicity to improve the national concept of green finance and taxation and environmental awareness, in order to cooperate with the national environmental protection work.

Japan's green tax is more scientific and sophisticated in tax design. For example, in order to control automobile exhaust emissions, Japan implements a "green tax system" for all types of cars and sets differential tax standards according to their fuel consumption, so as to promote consumers to actively buy cars with low fuel consumption.

Japan's green tax system attaches great importance to stimulating and guiding the development of environmental protection industry through tax reduction and exemption policies. For example, for units that reach the standard of energy conservation, the government will grant tax reduction or exemption in a certain period of time, special depreciation and tax reduction or exemption for listed energy-saving equipment, preferential treatment to the purchase of environment-friendly cars in the purchase tax. In the year of use, special tax refund will be given for the waste plastic products recycling treatment equipment at 14% of the obtained price in addition to the ordinary tax refund. The fixed assets tax will be refunded for 3 years for equipment such as waste paper deinking treatment unit, glass debris and inclusion removal, empty bottle cleaning and aluminum recycling manufacturing. Tax on fixed assets shall be reduced or exempted for public nuisance prevention facilities. In addition, there are special financial funds to guide and support the research and development of new energy technologies.

As can be seen from the above, Japan's green tax has two prominent characteristics: First, it is scientific and feasible to strengthen the tax collection link, such as determining the tax rate standard according to the level of automobile fuel consumption. The second is to strengthen the cultivation of green and environmental protection industry. For example,

a detailed list of various environmental protection industry projects is listed in the tax deduction and exemption, which provides the operating basis for the implementation of tax deduction and exemption. Japan emphasizes the scientific nature and feasibility of green taxation, which is worth learning in China.

3.2 Government Green Procurement

Government procurement is also called unified government procurement or public procurement. It refers to the use of financial funds by state organs, institutions and organizations at all levels to purchase goods, projects and services from the domestic and foreign markets within the catalogue of centralized procurement formulated according to law or above the standard of procurement quota by means of public bidding for the needs of daily administrative activities. Government green procurement means that the government considers the environmental protection effects of procurement comprehensively from the perspective of social and public environmental interests. By introducing environmental standards, assessment methods and implementation procedures into the existing government procurement system, relevant policies and measures such as preferential procurement and prohibition procurement are formulated to affect social investment, enterprise production, public consumption and other activities, so as to achieve the purpose of energy conservation, emission reduction and environmental protection. Generally speaking, the scale of government procurement is huge and plays a leading and guiding role in consumption and production, while the green procurement of the government can also play a leading role in green consumption and stimulate green production, which is conducive to promoting green growth. Internationally, one of the major trends in the changes in fiscal structure in recent years is that social expenditure and environmental protection expenditure account for an increasing proportion of fiscal expenditure, accounting for 50~60% or even more than 70% in many countries. The green procurement of the EU accounts for 19% of its public procurement share. Among its member states, the green procurement of Sweden accounts for 50% of its public procurement, Denmark accounts for 40%, Germany accounts for 30% and Britain accounts for 23%. The UNSTAT survey showed 84% of the Dutch, 89% of Americans and 90% of Germans would consider environmentally friendly products on shopping. At present, more than 50 countries in the world

have actively promoted green procurement, and green procurement has become a worldwide trend. Below, a few government green procurement more perfect countries are introduced.

Green Procurement Practices of Governments

The United States

The United States is the first country in the world to embark on the path of government green procurement. The green procurement system is relatively perfect, and the federal decree and presidential executive order are the legal bases for promoting government procurement. In 1991, the United States issued a presidential decree stipulating that green products should be given priority in procurement. Then, a series of green procurement plans were successively formulated and implemented, including the plan for purchasing renewable products, the "energy star" plan, the eco-agricultural products act and the procurement plan for environment-friendly products. For example, in March 1992, the Office of Federal Procurement Policy (OFPP), the Office of the President and the Office of Budget Management jointly issued a policy paper on procurement of products and services that meet environmental and energy efficiency requirements. In 1993, President Clinton signed a presidential decree stipulating that the federal government must purchase products with the "energy star" logo, which made the "energy star" logo more recognized by enterprises and promoted its development, making it an international energy standard. In 1998, the US government issued executive order No. 13101, namely *Greening the Government Through Waste Prevention, Recycling and Federal Procurement*, requiring administrative agencies to integrate waste prevention and recycling into their daily operations while requiring agencies to increase and expand the market for these products by increasing the priority and demand for recycled substances. In 1999, the *Environmental Friendly Product Procurement Guide* was published. In 2000, the executive order *Greening the Government through Leadership in Environmental Management* was issued, requiring administrative agencies to integrate the environmental management system into their daily decision-making and long-term planning processes. The number of renewable products purchased by the government increased to 54. The United States also further developed government green procurement promotion measures, such as the proposed procurement price incentives, the price of green products can be 5 ~ 15% higher than the same function of non-renewable products. Put forward the

annual procurement proportion and made it clear that the proportion of green products to be purchased every year was 50%. In addition, the US government green procurement system also attaches great importance to information disclosure. For example, product catalogs designated by the environmental protection agency (EPA) are made public and frequently updated to facilitate government and public purchase and facilitate public supervision. Strengthening training is also one of its promotion measures. For example, through classroom teaching, training, seminars and publications, the United States often conducts green procurement education and training for federal procurement policy makers and executives.

To sum up, the green procurement system of the US government has the following characteristics: First, it has relatively perfect laws and regulations as the guarantee; second, there is a detailed "green product list" to facilitate the implementation; third, there is a corresponding agency responsible for management—the us environmental protection agency (EPA) assumes the three responsibilities of management, supervision and evaluation. Fourth, there is a positive policy to promote. Fifth, the disclosure and timely update of green purchasing information. Sixth, strengthening guidance and training for government procurement personnel.

Canada

Green procurement by the Canadian government is part of the federal government's "government green initiative", which is led by the federal environment ministry and began to develop many implementation guidelines for various departments after 1992. The environmental management guidelines of the Canadian government set out policies for sustainable development in all sectors and measures to be implemented. The government's "green operation" practice will be whether the procurement of environmental signs included in the assessment object in order to guide departments on how to adopt best practices for seven projects to achieve environmental objectives, including green procurement, waste management, water resource use, building energy use, official vehicle use, land use management and human resource management. In 1995, the Canadian government issued the *Green Government Guide*, requiring each government department to develop its own sustainable development strategy and specific plans, and incorporate them into the daily affairs and decision-making of the government, including government procurement. In addition, the "environmental specifications for office

furniture" drawn up by the ministry of the environment lists in detail the items to be assessed by procurement personnel in each life cycle stage, such as bidding qualification, product design, product materials, manufacturing process, product packaging and marketing, product use and product waste disposal.

Germany

Germany is the first country in the world to carry out environmental label certification and also the first country to carry out green procurement. In 1979, the green label system was introduced, mainly represented by the "Blue Angle Mark" system. It stipulated that government agencies should give priority to the procurement of green label products and explicitly prohibited waste. The products must be durable, recyclable, maintainable and easily disposed of. Chapter 37 of the *Circular Economy Act*, adopted on 27 September 1994, sets out the principles for government procurement of circular economy products and clearly stipulates that the relevant agencies of the federal government should formulate work plans for the procurement and use of relevant goods, draw up the construction plan, purchase and use environment-friendly products and services that meet the requirements of durability, maintenance guarantee and reusability.

The green procurement of the German government has played a leading and exemplary role in the purchase of green products by consumers, improved the public's awareness of environmental protection, promoted voluntary adjustment of product structure by enterprises and increased the share of production and consumption of green products. By the end of 1999, the categories of products with environmental mark certification had reached 100, covering motor vehicles, building materials, interior decoration, IT technology, office supplies, horticulture and other fields. By 2005, there were more than 7500 environmental labeling products in Germany, accounting for 30% of the total number of goods sold in the country.

Britain

In its 1990 white paper, the British government required all government departments to complete the implementation of good management practices (GH) by the end of 1992, including environmental planning in green procurement, energy efficiency, waste management and other aspects. The UK government drives procurement primarily

through the department for environment, transport and regional affairs (DETR). The DETR is responsible for providing green sourcing guidance to purchasers and suppliers, setting procurement requirements for each product and providing environmentally superior information products. The guidelines also remind government procurement personnel to pay attention to the green product bidding process and require government agencies to formulate corresponding green procurement policies and formulate specific procurement plans. In the implementation of the procurement policy, the lowest price or the bidder who can provide the most economic benefits shall be given according to the provisions of the British government procurement law. The purchasing unit can make the final decision by taking into account the factors of product quality, technical superiority and price. The government procurement law also provides some examples, such as emphasizing its concern on the environmental advantages of products purchased from the perspective of product life cycle environmental cost and requiring enterprises to provide explanations in bidding documents for the reference and decision of procurement personnel.

Japan

In 1994, Shiga prefecture of Japan took the lead in formulating the green procurement policy and started the organized green procurement activities in Japan, which was also regarded as the landmark event of the Japanese government's green procurement. In 1995, Japan formulated and implemented the first "government-operated green action plan", which set out the goal of green procurement and required it to be completed by the year 2000. In February 1996, the Japanese government and various industrial groups jointly established the green procurement network (GPN), which formulated a series of systems for government green procurement, including the guiding principles of green procurement, procurement guidelines, the establishment of product database, the provision of procurement center information, certification and the issuance of "green procurement certificate", etc., which indicates that the Japanese government's independent green procurement activities are carried out nationwide. GPN, a green purchasing group and alliance jointly formed by government departments, enterprises and social organizations, is different from the procurement of governments in the United States, Canada, Britain and other countries. However, it plays a very good role in promoting the concept of green purchasing among

governments, enterprises and consumers, providing green purchasing information and exchanging information among members. By 2000, the Japanese government had made green procurement more standardized and promulgated the *Green Procurement Law* and the *Law on Promoting the Purchase of Recycled Products*. The *Green Purchasing Law* came into full force on April 1, 2001. The law stipulates that government agencies must take the lead in purchasing products with low environmental load. Government agencies can adopt the third-party certification system or the green product information system as the reference criterion for purchasing green products; draw up the annual green procurement plan, report regularly the actual procurement situation and its implementation results, and will encourage local governments and civil society to take an active part in green procurement. The *Procurement for Recycled Products Act* promotes the active purchase of environmentally friendly recycled products by international agencies and local authorities, while maximizing green procurement information.

Now the Japanese administrative organs have developed the green procurement policy, there are 166 kinds of items identified as the government's priority purchase items, among which the raw material is 100% waste paper and copy paper with less than 70% whiteness identified as the most priority purchase items. In 2001, the proportion of government purchases of specific goods has reached 92.6%. The proportion of recycled copy paper in the whole specific purchase has increased from 11.6% in 2000 to 23% in 2001. 6%. In 2005, all the central government departments in Japan implemented green procurement, 100% of 47 local governments and 12 designated cities implemented green procurement, and 68% of the 700 cities also implemented green procurement systematically (Cheng Yongming 2013).

Australia

A conference on green procurement was also held in Australia in November 2004. One of the most notable was the announcement of the ecological procurement plan for Victoria. The scheme has been a great success in attracting local governments to participate, greatly increasing the procurement of recycled and environmentally friendly products. On the basis of this plan, Australia will develop membership and establish a national green procurement network. Membership of the network requires the signing of a memorandum, the appointment of a responsible person as a liaison with the association, the establishment of a green

procurement working group, the formulation of green procurement policies, the formulation of implementation plans, the continued promotion of green procurement and the submission of an annual green procurement report each year.

Inspiration from Green Procurement of Governments
(1) Improve green government procurement legislation. For example, the *Green Procurement Act* promulgated by the Japanese government and the presidential decree signed by the US government. (2) Develop detailed procurement guidelines. Governments such as the United States have developed detailed environmental friendly product procurement guidelines, including product catalogs. (3) Strengthen the assessment and training of government green procurement personnel. The government has not only formulated green product procurement guidelines, but also strengthened the assessment and training of green procurement management personnel, among which the governments of the United States and Canada are the representatives. (4) Strengthen product environmental labeling certification. For example, the "energy star" logo of the United States, the "blue angel" environmental protection logo of Germany, and the "ecological logo" of the Japanese government. (5) Communication with industry (enterprises). For example, Japan has strengthened ties with various industrial groups to establish green procurement network organizations.

3.3 The Green Budget System

Green Fiscal Expenditure Practices Abroad
The United States
Environmental finance is part of the US budget system. The budget system of the United States includes three links, namely budget formulation, implementation and review. In the budget-making process, the department budget prepared by the US Federal Environmental Protection Agency (EPA) needs to be submitted to the Office of Budget and Management directly under the President, and the Audit Department is responsible for the audit. The budget is then submitted to the Congressional Budget Committee for review, which, if approved, would authorize funding for the EPA as required. Finally, after the budget is completed, the agency is subject to a review by the General

Accounting Office to see if the agency's financial activities are limited to those approved by congress. The budget system of the United States is highly transparent and quite strict. The budget needs to be detailed into the expenditure of each project and released to the public in a certain way. Any expenditure on environmental protection must be carried out in strict accordance with the requirements of the budget. Financial expenditure on environmental protection mainly includes five areas: Clean air and global climate change, clean and safe water, land conservation and restoration, healthy biological communities and ecosystems, and related service functions and environmental benefits (see Table 1).

The fiscal expenditure on environmental protection in the United States is not generated consciously, but gradually increases its share with the continuous occurrence and increasingly serious environmental problems and finally forms the current result. The first large-scale environmental spending occurred in the early twentieth century to restore

Table 1 Structure of federal environmental finance expenditure in the United States

Objectives	*Clean air and global climate change*	*Clean water and safe water*	*Soil conservation and restoration*	*Healthy biocenose and ecosystem*	*Relevant service functions and environmental benefits*
Content	• Healthy outdoor air • Healthy indoor air • Protect ozone layer • Reduce radiation • Reduce Greenhouse gas emission • Strengthen scientific research	• Protect human health • Protect water quality • Strengthen scientific research	• Protect land • Restoration of land • Strengthen scientific research	• The harm of chemicals and pesticides to communities • Restoration and protection of endangered ecosystems • Strengthen scientific research	• Achieve environmental protection objectives by strengthening compliance with environmental regulations • Improving environmental performance by preventing pollution and encouraging innovation • Improving Indian health and the environment • Improve the capacity of sustainable society through scientific research

Sources Wu Jiang, Jia Lei, Shi Lei, et al. The Development Process of Environmental Finance in the United States and its Enlightenment to China. *Environmental Protection*, 2012 (20): 74–76

natural resources. The second, in the 1930s, was designed to take the last environmental movement further. The third was in the 1970s, when special investments in environmental protection appeared in the US budget. According to the statistics released by the environmental protection agency of the United States, in the 1972 budget of the United States, the investment in pollution control and environmental control was 26 billion dollars, accounting for 1% of the gross national product. In 1989, special budget expenditures for environmental protection reached 120 billion US dollars, accounting for 2.8% of the GDP. Between 1972 and 1994, except for the first three years, from 1975 to 1994, the GDP of environmental expenditure in the United States stabilized at 1.7~1.8%. Since then, the United States has continued to invest in environmental projects. As stated in the US environmental finance budget system, these funds are strictly used for environmental pollution control and to encourage the development of environmental technologies. For example, in the resource protection plan of the United States, in order to protect the environment in the ecologically fragile areas, the United States plans to invest 1.5 billion dollars every year to encourage the landholders in these areas to transfer their production activities, build vegetation in the transferred areas and restore the ecological balance. In addition, in the annual budget, the US government sets up a large amount of special funds for environmental protection projects. For example, $490 million annually is earmarked to encourage the export of clean energy and promote the development of clean energy programs worldwide. A $1.6 billion budget was used to develop low-carbon energy to reduce greenhouse gas emissions and prevent climate change. In the 2001 budget, $85 million was spent to create a new clean air partnership fund to help pay for air pollution and greenhouse gases. The US government also invests a lot of money in the green high-tech industry, usually through direct investment in research and development, which accounts for almost half of the US government's investment in scientific research.

Japan

Due to geographical factors and the lack of resources, Japan has always attached great importance to environmental protection, and its financial input has always been great. In the decade of the 1970s alone, Japanese government spending on environmental protection soared from 0.62% of GDP in 1970 to 1.65%. By the 1990s, it was over 1.8%.

Japan's budget expenditures on environmental protection mainly focus on strengthening environmental protection inspection, investment in public hazard prevention and control projects, relevant public utilities, victim protection and other environmental protection expenditures. At the same time, Japan attaches great importance to the financial input of energy conservation. In 1994 alone, the financial investment related to energy increased by 390 billion Yen compared with that in 1993.

The European Union

European Union countries spend a lot on environmental protection, and Switzerland's public finance accounts for 2% of its total fiscal expenditure on environmental protection. Finland's central government's environmental budget reached 2% in 2000. Under the ten-year transport plan, the government has invested 180 billion in modernizing transport, doubled spending on energy efficiency in 2002–2003 and spent 1 billion on home efficiency programs.

Inspiration from Foreign Green Fiscal Expenditure Practices

First, we will strengthen green fiscal spending and budget legislation.

The fund demand of environmental protection investment management is big but the effect is slow, is easy to be marginalized in the financial expenditure. Therefore, in the fiscal budget expenditure, we should make clear its position, subject, responsibility, scope and proportion.

Second, establish a strict management system. According to the major environmental problems of people's livelihood that need to be solved in each period, the scope and contents of key environmental finance expenditures in each period are clearly listed, and a set of environmental finance expenditure system consisting of budget, audit, publication, implementation, supervision and audit is established to ensure that every sum of money is really and effectively used for the governance or protection of environmental resources.

Third, ensure stable and high investment in environmental protection. The governance and protection of environment and resources requires long-term efforts and capital investment, so it is necessary to ensure stable and relatively high investment in environmental protection. In many countries, when preparing budgets, environmental protection expenditure is included in the budget. Generally, the proportion of public finance expenditure is set at 2%, and the mechanism for stable growth of government investment in environmental protection is determined.

In view of China's future haze and other environmental problems will continue for a long time, environmental protection investment should also be stable in 2 ~ 3% of the proportion of public financial expenditure.

4 China's Green Finance Practices and Problems

4.1 Green Tax Practice and Problems

Taxes

At present, China's tax categories directly related to resources and environment, such as resource tax, fuel oil tax, farmland occupation tax, land use tax, deed tax, vehicle and ship use tax and so on, play a direct role in reducing resource consumption and protecting resources to a certain extent, but due to the lack of system, the protection ability is relatively weak. However, the indirectly related VAT, enterprise income tax, export tax rebate and other design is not reasonable, there are a lot of "green" potential to dig. To sum up, China's green tax system mainly has the following problems:

First, the green tax system has yet to be formally legalized. At present, the effectiveness of green tax documents is too low. For example, tax breaks or other preferential policies that stimulate green production or consumption are almost all issued by the state council or its functional departments in the form of documents, which are somewhat arbitrary. This is contrary to the principle of tax legality and high seriousness, and cannot well play the incentive role of green tax system. From the perspective of strengthening national ecological civilization construction and legal system construction, the green tax system should be clearly confirmed by relevant laws, and be specialized, systematized, standardized and institutionalized in the form of special legal documents to improve its authority and influence.

Second, the green tax system lacks a holistic design. From the perspective of tax structure, green tax system cannot rely on a single tax, but should be targeted at all fields that need to curb consumption and protect resources and environment. Everything involved in the tax should be a comprehensive "green" treatment and a large and systematic system of green tax system. From the perspective of tax design, it is not only for the production link, but also for the consumption link, but also for the disposal link after use, such as the collection of waste

and sewage treatment fees, the collection of cigarettes and other health care fees that can produce harmful gases. From the point of view of tax design, it not only emphasizes increasing the intensity of tax collection and restraining consumption, but also studies how to carry out scientific design and carry out effective regulation. From the perspective of tax revenue management, although it has been incorporated into the unified management of public finance, it lays more emphasis on the management of special accounts and special use. However, the current tax system still lacks the design of this overall concept, which is reflected in the following aspects.

One is that the scope of the current tax on environmental protection is too narrow, which does not really play a role in protecting the environment. Apart from the fact that there is no comprehensive "greening" of value-added tax and enterprise income tax, the resource tax directly levied on natural resources is limited to some mineral resources and does not include water, forest, grassland and other resources that have been seriously damaged. Consumption tax is also the same; the main role of consumption tax is to guide consumers to green consumption, but the scope of the current levy of consumption tax is too narrow. At present, it mainly includes tobacco, wine, cosmetics, ornaments, jewelry, jade, firecrackers, fireworks, gasoline, diesel, motorcycles, cars, batteries, paint, etc., and it does not completely cover biological products with high pollution, high energy consumption and great damage to the ecological environment in the development. Some rare traditional Chinese medicine products, such as saussurea involucrate and cordyceps sinensis, are scarce in quantity at present. However, large quantities of them have damaged the ecological environment and aggravated the extinction of species. A strict protection system should be established to impose heavy taxes on these rare products.

Second, the design of levy basis is extensive and unscientific, which cannot play the role of effective punishment and policy guidance. For example, the current resource tax is linked to the price of resources after several reforms. Although it has the advantages of convenience and easy operation for the collection of resource tax, it is not related to the mining behavior. In fact, the recovery rate of resources is closely related to the degree of resource waste. "Urban mineral resources" is conducive to the recovery and utilization of mineral resources and can greatly reduce the depletion of resource reserves and environmental damage caused by the primary development of non-renewable resources, but

China's resource tax has not been involved in this area. If subsidies are effectively used, such as "negative resource tax" and other preferential tax policies, they can promote the reuse of recyclable metal minerals in cities and reduce urban environmental pollution.

Third, the lack of resources after the use of waste management taxes cannot use these taxes for effective special environmental governance. For example, although the emission of municipal solid waste is increasing and some cities cannot find suitable landfill sites, the garbage tax has not been launched yet, let alone the special environmental governance with the garbage tax revenue.

Third, green tax management means are relatively backward. There are many defects in the current preferential tax policies on environmental protection, which have not played their due role in promoting environmental protection. Under the existing tax system, the tax incentives related to environmental protection are mainly reflected in the VAT and enterprise income tax preferences. The preferential means are direct tax reduction or exemption, which is less targeted and flexible than the internationally popular preferential means such as accelerated depreciation, reinvestment tax rebate and deferred tax payment. One of the problems reflected in this is that the research and design of green tax in China lags behind as a whole, leading to the fact that green tax preferential means are still very simple and there are few effective promotion measures.

Fourth, green tax collection and management and income distribution are not reasonable. There are two purposes for green tax collection. First, through taxation, resource development and resource consumption are inhibited, so as to achieve the purpose of resource protection and environmental pollution reduction. The second is to raise funds to fund the government's resource and environmental governance. The problem of resource and environment is an external one with strong spatial and temporal transference. Therefore, the collection and management of green tax and income distribution is a problem that needs to be jointly negotiated and solved by relevant stakeholders. However, the local management of resource and environment tax in China is quite serious, and there is no special management and reasonable distribution of income, which makes the environmental governance in large regions that need joint improvement, lack of strong subject and sufficient capital guarantee. In view of the particularity of the subject of resource and environment problems, the commonality of interests and the far-reaching influence, the collection and management and income distribution of

green tax should be deeply reformed in the future, and the collection and management power and tax income of related subjects should be reasonably distributed.

Fees and Charges

China's pollution charging system began in 1979, when the *Environmental Protection Law of the People's Republic of China* (trial) stipulated the principle of charging for excessive pollution. In 1982, the state council formulated the *Interim Measures on the Collection of Pollutant Discharge Fees*, which stipulates the purpose, scope, standards, conditions for surcharge and reduction, fee management and methods of use for the collection of pollutant discharge fees, which has started to charge industrial enterprises for discharging wastewater, waste gas and waste residues that exceed standards. In January 2003, the state council promulgated the *Regulations on the Administration of the Collection and Use of Pollutant Discharge Fees*. In 2003, the State Planning Commission, the Ministry of Finance, the State Environmental Protection Administration and the State Economic and Trade Commission jointly promulgated the *Standard Administrative Measures on the Collection of Pollutant Discharge Fees*, which greatly reformed the pollutant discharge fee system.

The main changes of this reform are: (1) The expansion of the object of levy. The scope of the levy will be extended from enterprises and institutions to all units and individual businesses that discharge pollutants directly into the environment. (2) Strengthen the charging standard. The charge standard is changed from the original out of limits charge to pollutant discharge charge and out of limits charge in parallel; out of limits single factor charges will be changed to total multi-factor charges. (3) Special financial management of sewage discharge fees. In respect of the management and use of sewage fees, the *Regulations on the Administration of the Collection and Use of Sewage Fees* stipulates that all sewage fees shall be used exclusively for the prevention and control of environmental pollution, and no unit or individual may intercept, occupy or divert them for other purposes. The pollutant discharge fees must be incorporated into the financial budget and included in the special funds for environmental protection for administration, and shall be mainly used for the prevention and control of major pollution sources, regional pollution prevention and control, the development, demonstration and application of new technologies and techniques for pollution prevention

and control, and other pollution prevention and control projects as stipulated by the state council, as appropriation subsidies or discount interest loans. This is more specific and targeted than "The environmental protection subsidy funds shall be jointly arranged and used by the environmental protection department and the ministry of finance". The subsidy funds for environmental protection shall be mainly used for subsidizing key units that discharge pollutants to control pollution sources and for comprehensive measures to control environmental pollution" stipulated in the *Interim Measures on the Collection of Pollutant Discharge Fees*. At the same time, according to the *Interim Measures on the Collection of Pollutant Discharge Fees*, the environmental protection subsidy funds may be used to subsidize the purchase of monitoring instruments and equipment by environmental protection departments, but may not be used for the administrative expenses of environmental protection departments themselves, as well as non-operational expenses such as the construction of office buildings and dormitories. The *Regulations on the Administration of the Collection and Use of Sewage Charges* stipulates that the collection and use of sewage charges must strictly follow the "two lines of revenue and expenditure". The fees collected shall be turned over to the finance department, and the funds needed for environmental protection and law enforcement shall be included in the budget of the department, which shall be guaranteed by the finance department at the corresponding level.

At present, the main problems of sewage discharge fees are as follows:

First, the low charging standard makes it difficult to effectively curb pollution emissions. According to Pigou tax theory, the collection of sewage charges can effectively curb pollution and provide funds for pollution control. However, from the perspective of China's practice, the effect of pollutant discharge fees in restraining pollution emission is low, which is also insignificant compared with the pollution control fund. Although China has strengthened the collection of pollutant discharge fees since 2003, the discharge of industrial waste water and industrial sulfur dioxide did not decrease significantly, and only after 2011 did they show a strong downward trend (see Fig. 2). This shows that only by charging the sewage charge itself the effect of its emission reduction effect is weak. The main reason is that the charging standard of China's sewage charge is low, and enterprises prefer to choose pollution rather than invest in pollution control. According to calculations, China's

Fig. 2 Emission of industrial sulfur dioxide and industrial waste water in China from 1995 to 2013 (*Data source* National environmental statistics bulletin 1995–2013)

current standards for the collection of sewage charges are much lower than the current pollution control costs, only about 50% of the operating costs of pollution control facilities, and some projects even less than 10% of the cost of pollution control. A typical example is: At present, China's sulfur dioxide emissions charging standard is 0.63 Yuan/kg, and the average cost of thermal power plant flue gas desulfurization treatment is 4 ~ 6 Yuan/kg. Therefore, enterprises prefer to choose pollution rather than investment funds for pollution control, and pollution control enthusiasm is not high. The proportion of investment in pollution control in GDP is very low. From 2001 to 2013, the average investment in pollution control was only 1.39% of GDP (see Fig. 3).

Second, the pollution collection coverage is narrow, and the pollution control fund gap is huge. Although the total amount of sewage charges collected and paid in China has increased to a certain extent since 2003 (see Fig. 4), the gap is still large compared with the demand for pollution control funds. Since 2007, the proportion of pollutant discharge fees in the fiscal expenditure on environmental protection has become lower and lower, accounting for 6.00% in 2013 (see Fig. 5). The main reason for this is that the scope of pollutant discharge fee levy in China is

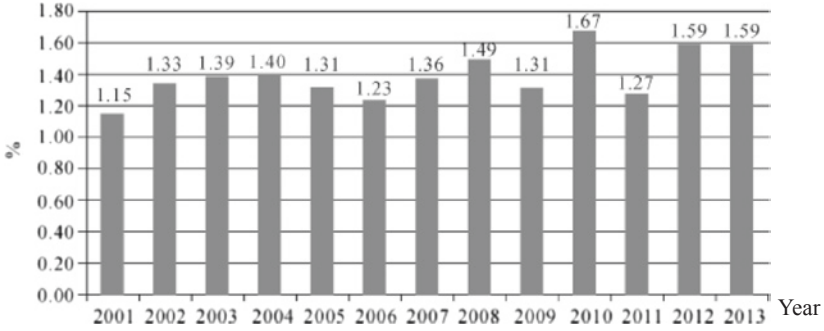

Fig. 3 Proportion of total investment in pollution control in China's GDP from 2001 to 2013 (*Data source* National environmental statistics bulletin 2001–2013)

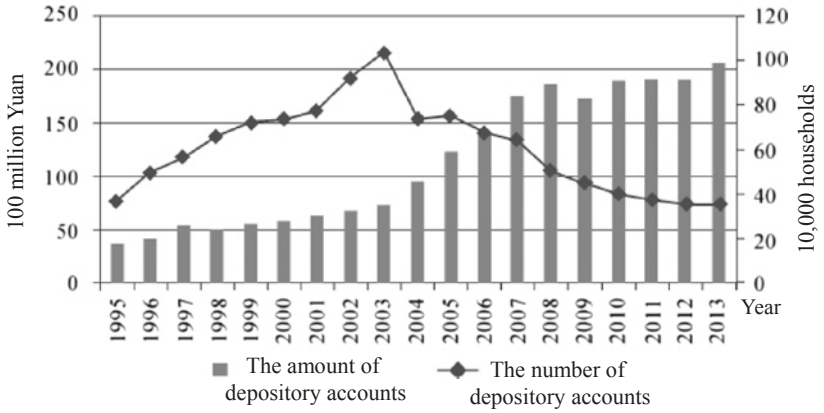

Fig. 4 Number and total amount of the pollutant discharge fee paid in deposits from 1995 to 2013 (*Data source* National environmental statistics bulletin 1995–2013; *Note* In 2003, the number of depository accounts was calculated by adding the first half and the second half of the year, which may be overlapped and tends to be high)

too narrow, which is reflected in the following aspects: (1) The pollutant discharge fee is mainly levied on the production field, while the levy is very weak on the consumption field, especially the consumption of ordinary residents. (2) Sewage charges are mainly collected by enterprises in

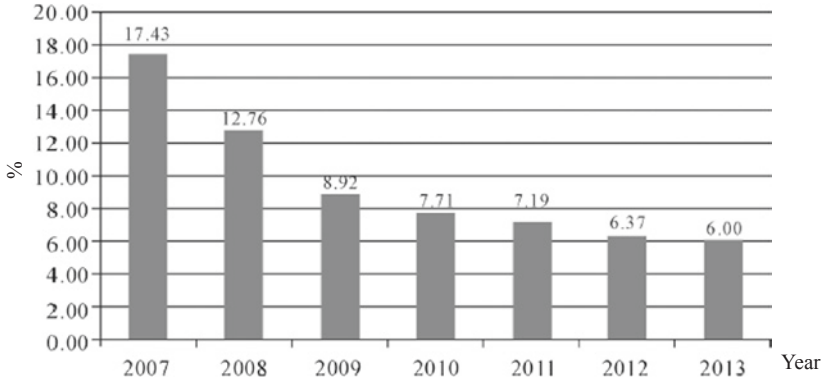

Fig. 5 Proportion of China's sewage discharge fees in financial environmental protection expenditure from 2007 to 2013 (*Data source* National environmental statistics bulletin 2007–2013)

large- and medium-sized cities, while charges for the tertiary industry, township and street enterprises are only implemented in some regions. (3) The pollutant discharge fee is only levied on some pollution items and does not include carbon monoxide, carbon dioxide, Freon, radioactive materials and other pollutants. For this reason, with the closure of some high-polluting enterprises, the number of deposit accounts in China has been greatly reduced in recent years (see Fig. 4).

Third, the current sewage charges belong to local administrative charges and are not rigid enough. First, this is reflected in the arbitrariness of the declaration. The calculation basis of the pollutant discharge fee collection amount is reported by the enterprise itself and approved by the environmental protection department. This may be due to "rent-seeking" and "bribery" and make the enterprise declare less and pay less. Second, regulatory capacity varies. Regulation relies on the establishment of systems and equipment, both of which are related to the level of local economic development. Due to the great difference in regional economy, the regulatory capacity is uneven. Third, the phenomenon of fund misappropriation, taking up and occupation is serious. At present, sewage discharge fees are collected by local governments and incorporated into local finance, but their use is not open to the public. They are not transparent and dedicated, and misappropriation, taking up and occupation occur from time to time.

4.2 Government Green Procurement Practices and Problems

Government Green Procurement Practices

Although China's government green procurement started late, it has developed rapidly in recent years, and a series of rules and regulations related to government green procurement have been formulated. The *Government Procurement Law of the People's Republic of China* (hereinafter referred to as the government procurement law), which came into effect in 2003, stipulates that government procurement shall protect the environment. In 2004, the ministry of finance and the national development and reform commission jointly issued China's first specific policy on promoting energy conservation and environmental protection through government procurement, namely the *Implementation Opinions on Government Procurement of Energy Saving Products*. In 2006, EPA and the Ministry of Finance jointly issued the *Opinions on the Implementation of Government Procurement of Environment-Labeled Products* and the first batch of *Government Procurement List of Environment-Labeled Products*, which requires state organs, institutions and organizations at all levels to give priority to the procurement of environment-labeled products and products listed in the procurement list and will be fully implemented from January 1, 2008. On July 30, 2007, the General Office of the State Council issued the *Notice of the General Office of the State Council on Establishing the System of Mandatory Government Procurement of Energy Saving Products*. This is China's first mandatory policy on government green procurement. In December 2007, China submitted an application to the WTO to formally start the negotiations on joining the *Agreement on Government Procurement* (GPA). In 2011, China's 12th five-year plan was included government green procurement in the country's medium-and long-term development plan for the first time, which clearly proposes to improve the compulsory procurement system, gradually increase the proportion of energy-saving and water-saving products and renewable products, so that it becomes one of the important means to build a resource-conserving and environment-friendly society. On August 21, 2012, the General Office of the State Council issued the *National Environmental Protection* 12th *Five-Year Plan > Key Work Division Plan*, which proposes to promote green government procurement, gradually increase the proportion of green products and study the implementation of green government procurement services. Since March 1, 2015, the *Regulations*

on the Implementation of the Government Procurement Law of the People's Republic of China (hereinafter referred to as the *Regulations on the Implementation of the Government Procurement Law*) has been officially implemented. Article 6 of the *Regulations on the Implementation of the Government Procurement Law* provides that: "The financial department of the state council shall, in accordance with the state's policies on economic and social development, formulate policies on government procurement jointly with relevant departments of the state council. Through the formulation of procurement demand standards, reserve procurement shares, price review preferences, priority procurement measures, it shall achieve energy conservation, environmental protection, support for underdeveloped areas and ethnic minority areas, promote the development of small and medium-sized enterprises and other goals." It puts forward the energy conservation and environmental protection requirements for government procurement, and legally confirms the principle requirements for government green procurement. The *Opinions on the Implementation of Government Procurement of Environment-Labeled Products*, which has been implemented nationwide since January 1, 2008, has promoted the production of green products. In the past eight years, the Ministry of Environmental Protection and the Ministry of Finance have issued 14 copies of the *Government Procurement List of Environmental Labeled Products*. The product category increased from the original 14 categories to 42 categories. The number of enterprises increased from 81 to more than 1318. The number of product models also increased from more than 800 to more than 86,628.

Problems in Government Green Procurement

Laws and regulations need to be improved. The *Government Procurement Law*, which came into effect in 2003, the *Regulations on the Implementation of the Government Procurement Law*, which came into effect in 2015, and other systems mention that government procurement should be conducive to resource conservation and environmental protection. However, so far, there has not been a systematic and specialized legal document on government green procurement, which makes many problems in the actual operation quite vague and is not conducive to the real implementation of government green procurement.

For example, how to favor environment-friendly enterprises in government procurement, how to clarify the responsibilities of procurement supervision departments and procurement agencies, how to unify and

standardize procurement methods and procedures, and how procurement personnel deal with some special problems have not been specifically involved, so green procurement is not standardized in practical operation.

Green procurement is smaller. According to statistics, the scale of government procurement reached 1.40 trillion Yuan in 2012, but the scale only accounted for 2.7% of the national GDP of 51.93 trillion Yuan and 11.11% of the national public finance expenditure of 12.60 trillion Yuan. In Western countries, where the government procurement system is relatively complete, the scale of government procurement is generally 10% of GDP or about 30% of fiscal expenditure. It can be seen that China's actual government procurement scale is still small. However, due to imperfect system, limited binding force and smaller procurement scale, China's government green procurement plays a limited role in promoting green consumption and green production. In the future, the proportion of green procurement must be increased as much as possible on the basis of regulating government procurement.

Green procurement standards are low. Since January 1, 2007, the *Opinions on the Implementation of Government Procurement of Environmental Labeled Products* has been officially implemented in the central and provincial budget units (including city specifically designated in the state plan), and has been fully implemented nationwide since January 1, 2008. The *List of Government Procurement of Environmental Labeled Products* shall be formulated by the Ministry of Finance and the Ministry of Environmental Protection. Products entering the list shall meet the following conditions: (1) the product belongs to the product category listed in the environmental protection list; (2) the product belongs to the environmental labeled product certified by the national environmental labeled product certification authority and has the valid environmental labeled product certification certificate, and the time of obtaining the certificate conforms to the regulations; (3) the product manufacturer shall submit relevant materials as required by the public notice; (4) product manufacturers shall meet the requirements of government procurement legal system for government procurement suppliers. Compared with other countries where the government green procurement system is relatively complete, China's green procurement standard is relatively low, making it difficult to play a positive role in green procurement (see Table 2). For example, the selection method of green environmental protection products in the United States is the

Table 2 Comparison of public green procurement standards of major countries in the world

	Green environmental protection product selection of methods	*Adoption of standards*	*Ease of implementation*	*Professional requirement of environmental protection on procurement personnel*
America	EPP principles + tools + database + successful cases		★★★★★	Very high
European Union	GPP standard	GPP standard		Higher
Japan	Green purchase law specific procurement items	Green purchase law specific procurement items	★★☆	Medium
South Korea	Follows the requirements of the green purchasing law	Environmental label certified product or equivalent/good recycling of green certified products or equivalent/other products conforming to MOE standards	★★	General
China	Environmental labeling certification products	Environmental labeling standards	★	Low

Source Liu Juan, Chen Yiqun, Zhang Xiaodan. Comparative Study on Government Green Purchasing Standards at Home and Abroad. *Environment and Sustainable Development*, 2014 (6): 87–90

principle of EPP (buy environment-first products) + tools + database + successful cases. It requires a high degree of professional environmental protection for purchasing personnel, and it is also difficult to implement. But our country request is very low. It only requires compliance with environmental labeling standards and access to the environmental protection list range.

Green purchasing information is not developed. Before making a green purchasing decision, the government must obtain detailed information about green products available in the market and make evaluation and comparison. Detailed information must be collected on the environmental impacts of different product and service life cycles, the environmental performance of different products and services, and the environmental costs of different products and services. And this massive information is usually dispersed in the hands of numerous suppliers, which requires the establishment of a perfect green product supply information platform. However, there are many irregularities in China's government procurement, not to mention the specialized green product supply information platform. This makes it impossible for the government to truly achieve "good quality and low price" when purchasing green products and services, and is not conducive to stimulating the production of real green product suppliers. It may even lead to the "lemon market".

Green procurement supervision is not in place. Green procurement first requires standardized operating procedures, which depend on the improvement of the legal system, while green procurement also involves relevant technical confirmation issues. This requires the development of green purchasing standards for different products, engineering and services in different categories. The supervision of procurement personnel requires not only the warning and prevention of relevant systems in advance, but also the green procurement performance evaluation to check whether the procurement personnel are conscientious and how to improve relevant systems. However, China's green procurement is still in the "notification requirements", far from evaluation and accountability, with weak binding force.

4.3 Green Fiscal Expenditure

In terms of system construction, a special financial expenditure system for environmental protection has been preliminarily established. Before 2007, there was no "class" special expenditure on environmental protection in the classification of government revenue and

expenditure, but only "section" related to environmental protection. Some financial expenditures related to environmental protection work were also scattered in other subjects, which indicated that at that time our government did not give enough attention to environmental protection and sufficient financial support. Until January 1, 2007, China began to fully implement the "2007 government revenue and expenditure classification subjects" published by the ministry of finance, in which the "environmental protection" category was newly established. Under the "environmental protection" category, there are 10 sections, including "environmental protection and management affairs, environmental monitoring and supervision, pollution prevention and control, natural ecological protection, natural forest protection, returning farmland to forests, desert management, returning grazing land to grassland, returning cultivated grassland to grassland and other environmental protection expenditures", including 46 items in total. Since then, the Chinese government has set up three levels of special expenditures for environmental protection, namely "category, section and item", so as to ensure the financial security for environmental protection. Later, some subjects were added and simplified according to actual needs.

In terms of expenditure, the input increased year by year, but the proportion of expenditure is still low. Since the special category of "environmental protection" was set up in China's fiscal expenditure in 2007, fiscal expenditure on environmental protection has increased year by year, but the proportion of total expenditure is still low (see Fig. 6).

From 2007 to 2013, China's total fiscal expenditure on environmental protection reached 1584.3 billion Yuan, but the proportion of annual fiscal expenditure was still not high, below 3.00%, among which the highest was 2.72% in 2010. In general, China's special fiscal expenditure system for environmental protection has not been established for a long time.

From the point of view of expenditure structure, expenditure is limited and competition among various items is fierce. In recent years, China's environmental expenditure mainly focuses on natural ecological protection, renewable energy development and energy conservation (see Fig. 7). From 2008 to 2013, the annual growth rates of "natural ecological protection", "renewable energy" and "energy conservation and utilization" ranked the top three, with 48.38, 37.88 and 37.84%,

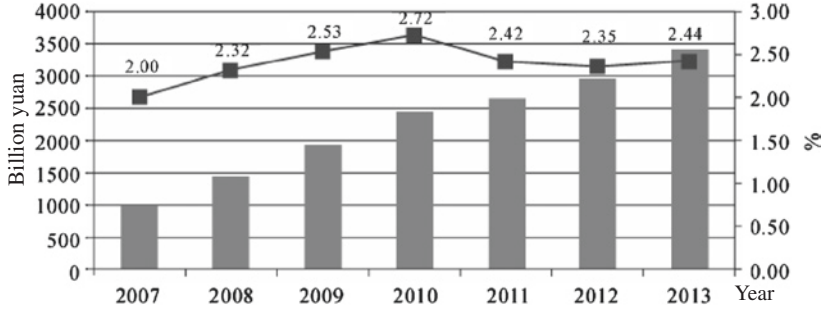

Fig. 6 Proportion of China's environmental protection expenditure in the total fiscal expenditure from 2007 to 2013 (*Data source* China statistical yearbook 2008–2014)

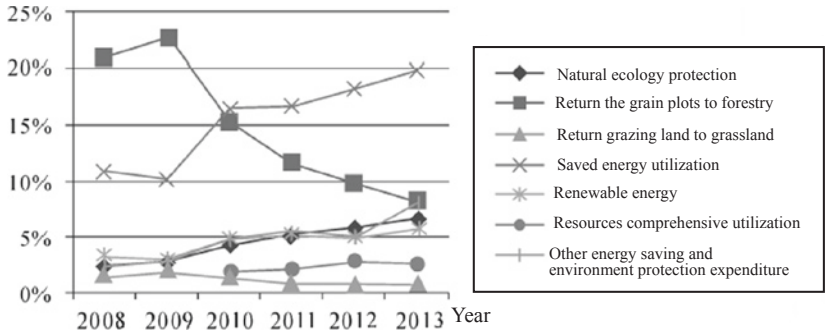

Fig. 7 Change of proportion of environmental protection expenditure from 2008 to 2013 (*Source* Wu Yang. Analysis on the changes of Environmental Protection Expenditure in the Classification of Government Revenue and Expenditure and Final Accounts. *Modern Economic Information*, 2014 [20])

respectively. At the same time, the expenditure of "returning farmland to forest" and "returning grazing land to grassland" decreased significantly, the former dropped from 21.14% in 2008 to 8.28% in 2013, and the latter also dropped from 1.35% in 2008 to 0.71% in 2013. On the one hand, it can be seen from this that ecological environmental protection, energy conservation and the development of new energy are increasingly urgent and need to continue to invest funds; On the other hand, it can also be seen that the financial fund for environmental protection

in China is relatively tight, and the competition for various projects is very fierce. In the long run, if we want to improve the environment condition of our country continuously, we need to broaden the source of funds, increase the fiscal expenditure; if necessary, we should establish the minimum expenditure management system for some special important projects.

5 The Construction of Green Finance System in China

5.1 Construction of Green Tax System

In order to better use the tax system to promote the construction of ecological civilization and green transformation and development in China, the tax reform in the new period can be summarized as the legalization of the effective status, the greenness of the overall design, the scientization of the regulation design, the advancement of the management means, the rationalization of the collection and management and the reform and evolution of the sewage charge.

Legalization of Status of Effectiveness

In view of the drawback of low overall effectiveness level of China's tax legal system, we should further accelerate the legislative process in China and improve the legislation of various taxes and explicitly include a series of goals related to green transformation and development, including resource conservation, pollution control, environmental governance and ecological civilization construction, into the relevant tax law. In the tax management system related to the above-related objectives, the management principles and methods should be clarified, so as to make green tax have laws to abide by and further improve its legal status.

Greening of Overall Design

It includes three aspects: The first is to strengthen the design of taxes directly related to resources and environment and further improve the design of existing green taxes. For example, resource tax should be extended to a wider range of natural resources. All natural resources that need to be protected and can be collected and managed should be included in the scope of tax and a reasonable tax rate should be set.

The same is true for consumption tax. Goods and services that are prone to environmental pollution and those that need to be restricted in order to protect resources and the environment are subject to consumption tax as far as possible. Second, strengthen the "green" design of other related taxes and strengthen the overall promotion function of taxation. For example, in the aspect of value-added tax, the major energy-saving and environmental protection equipment and products should be included in the scope of the reduction and exemption of value-added tax, the tax deduction should be made for the units or individuals who buy environmental protection equipment, and the conditions for the deduction of input tax for waste and used materials business units should be relaxed to encourage the reuse of waste and used materials. In terms of income tax, the preferential scope of enterprise income tax will be extended to all environmental protection industries, including environmental protection equipment manufacturing, environmental protection engineering, environmental protection technology and other fields. Special preferential tax policies will be set for industries that develop new energy and new technologies that are conducive to environmental protection. In terms of export tax rebate and tariff, we should adjust import and export tax policy and implement green tariff. Third, introduce new environmental taxes. For example, in view of China's large resource consumption, low resource utilization rate, waste disposal difficulties and other problems, it can accelerate the research and design of urban waste tax, and introduce and implement it in a timely manner.

Scientific Design of Regulation and Control

Green taxes are different from traditional taxes, which are mainly levied on wealth, while green taxes are mainly levied on behavior. Therefore, the scientific regulation of behavior determines the effectiveness of tax design. Since green tax is a new type of tax that regulates people's behavior, it needs to strengthen the research on people's behavior and the interaction between people's behavior and the environment, which requires high scientific, technical and specialized levels. In the future, it is necessary to study the interaction mechanism between human behavior and the environment around several key issues of resource and environmental governance, such as resource conservation and protection in mineral development, energy consumption and harmful gas emission control, so as to lay a foundation for the scientific design of green tax in China.

Advanced Management Methods

With the green transformation of the traditional tax system and the increasing influence of green tax, the traditional tax management means also need to keep pace with The Times and be updated in a timely manner. In this regard, some green tax developed countries, such as Sweden, Denmark, Finland and other EU countries, as well as the United States and Japan, have relatively advanced management methods and relevant experience and practices, with a high degree of modernization and information management. In the future, China should make full use of the green tax management experience of these countries to improve the management efficiency, reduce the management cost and increase the feasibility of green tax.

Rationalization of Collection and Management Distribution

The most important of these is the "three distributions": First, the distribution of the power of collection and management; second, the distribution of tax revenue; and third, the distribution of governance responsibilities. From China's current situation, in the collection of administrative power distribution, it is necessary to emphasize centralization and authority of the central government, to fully mobilize local initiative and creativity and to consider the participation and cooperation of relevant regions. The exact allocation of power will also depend on the environment and the extent of its impact. In terms of tax revenue distribution and governance responsibility distribution, according to the principle of the equivalence of financial power and administrative power, the distribution of the two among related subjects should be reasonably divided. From China's situation, sharing tax is one of the major trends. In a word, since the boundary of environmental problems is not clear and the overall responsibility is relatively vague, the collection, management and distribution of green tax should be the result of consultation, collaboration and coordination, rather than the traditional tax mainly determined by the regional boundary and the relationship between the upper and lower levels.

Evolution of Sewage Charge Reform

A progressive and selective fee-to-tax reform. Although there is a strong call for the sewage fee to be changed into a sewage tax, there is no unified form of sewage fee or sewage tax. In practice, it is generally determined according to the characteristics of the levy object, the difficulty of levy management and the ability of the levy unit. In view of the fact that

the current sewage charge in China is a local administrative charge with low legal effect and the effect of pollution control and emission reduction will be weakened due to various interference in the implementation process, it is suggested to adopt the form of gradual reform. That is to say, for the pollution sources with large emission, relatively standard collection and low cost; first of all, it is changed into pollutant discharge tax, which is levied and distributed according to unified standards. For locally distributed pollution sources or those with a smaller amount of pollution, the pollutant discharge fee will be temporarily adopted, and will be changed into the pollutant discharge tax when conditions are mature.

We will appropriately expand the scope of collection of pollutant discharge taxes (fees). In view of the current narrow scope of pollutant discharge fee collection, the scope of pollutant discharge fee collection should be appropriately expanded, mainly as follows: Increase the emission levy in the consumption field; increase the tax collection of towns and rural areas; expand the collection of hazardous substances other than conventional hazardous substances, such as carbon tax, according to actual needs.

5.2 Construction of Green Government Procurement System

Improve Government Green Procurement Regulations

Amend the *Law of the People's Republic of China on Government Procurement* and the *Regulations for the Implementation of the Law of the People's Republic of China on Government Procurement*, clarify the status and principles of green procurement and stipulate that the government must fulfill the obligation of priority procurement of environmentally friendly products. On this basis, a more systematic and perfect government green procurement law is formulated to further clarify various specific issues in practical operation, such as standardized green procurement procedures, green procurement standards and procurement proportion of all kinds of products, the responsibility and authority of procurement personnel, green procurement supervision mechanism and evaluation system.

Standardize Government Green Procurement Procedures

In order to improve the performance of government green procurement, ensure the performance of government procurement personnel and stimulate the enthusiasm of enterprises for green products, a

relatively standard government green procurement procedure should be established. Such as the the government releases green product demand information—qualified enterprises respond to bidding-comprehensive evaluation of third-party green products (performance, price, etc.)—consultation between the two sides of supply and demand-information release of the winning bid- supervision by all parties in society-contract signing between the two side of supply and demand—tracking evaluation and information release of product use-rewards and penalties for suppliers and procurement personnel, etc. The whole green procurement process of the government is subject to social supervision, and all eligible enterprises participate in fair competition. Follow-up evaluation of products and purchasing personnel and corresponding rewards and penalties will be carried out to promote the standardization, efficiency and transparency of the whole green procurement process of the government.

Promulgate Green Purchasing Standards

In order to facilitate the procurement personnel and promote the scientific and technological progress of the industry, procurement standards for different items should be formulated according to the characteristics of different procurement items and the characteristics of the items themselves. In terms of environmental protection objectives, they are mainly conducive to energy conservation, emission reduction and comprehensive utilization of resources, as well as waste reduction, resource recovery and innocuity. In terms of technology, it mainly considers the most advanced technical progress and development trend at home and abroad in various industries, and dynamically adjusts technical standards to be among the same advanced level in the same industry in the same period. And, without affecting national economic development and impeding national security, appropriately raise technical standards, exert pressure and promote rapid technological progress in different industries in the country. In terms of standard mark certification, we will provide the support of people, finance and materials, reduce the cost of certification and management, and make more enterprises willing to improve standards and join the certification.

Establish Green Purchasing Network

Two aspects of network construction are included: First is the supply information network of goods or services; second is the relations network of the government agencies-suppliers-trade associations-social public. In terms of the supply network of goods or services, it is mainly to establish a

nationwide information network for the supply of goods or services. The central government and local government release demand information on it, while supply enterprises release supply information on it. The two sides establish a smooth and transparent connection, and require national enterprises to compete fairly to prevent local protectionism and "black box operation" of some enterprises. As China joins the international government green procurement, in the aspect of procurement network information, the supply information in the international market should be appropriately increased without affecting the national economic development and national security, so as to create effective competitive pressure and promote the domestic technological progress. In terms of network construction, the government should keep close contact with enterprises, industries and the public, timely communicate information, and jointly promote the production and consumption of green goods and the progress of green technology.

Some new demand of the public is timely fed back to the government, and the government procurement information reflects this new demand of the public and transmits to the supplier through the green procurement information platform. Suppliers cooperate with industry associations to obtain new technical progress in line with the demand, develop new products and release new product supply information to the government, and then purchase the products for the public to use; the public will provide feedback of the product performance, use situation and technical innovation desire to the government. Through government green procurement, the whole society has formed a relatively close cooperation network of green product research and development, production and consumption with multi linkage in this cycle.

Formulate Green Purchasing Policies

The formulation of green purchasing policy refers to the formulation of policies that conform to the development law of green industry and contribute to the production of green products, for example, the price, give green products or services a better price and priority procurement. In terms of technical requirements, we should encourage innovation, especially the unique innovation of small- and medium-sized enterprises. In the purchase order, we not only give priority to purchase, but also give certain share guarantee; in fiscal, taxation and finance, green technology innovation-oriented enterprises can be appropriately exempted or deducted from taxes, and can obtain preferential loans such as low interest or interest-free loans.

5.3 Establishment of a Green Fiscal Budget System

Continue to Improve the Management of Environmental Protection Subjects in the Preparation of Budget Expenditure

It is mainly the actual environmental protection needs and the amount of disposable financial environmental protection funds, timely improve and adjust related subjects, to ensure that some important environmental protection projects have capital investment. In view of tight financial resources and fierce competition among environmental protection projects, minimum investment standards and priority investment guarantee mechanism should be established for some special important projects to ensure the governance effect of these projects and the sustainability of the improvement of governance effect.

Clarify the Responsibility of Environmental Expenditure of Governments at All Levels

The environmental protection responsibilities and financial rights of governments at all levels and regions should be reasonably defined. On this basis, the environmental protection expenditure responsibilities of governments at all levels and regions should be determined and their expenditure structure should be optimized. In view of the fact that most environmental protection affairs are affairs with strong externality and publicity, neither governments at any level nor governments in a certain region can solely and completely undertake them. Therefore, governments at all levels and regional governments must strengthen cooperation, share the benefits of environmental protection and share the responsibility of expenditure. According to the principle of "benefit and burden equivalence", environmental public goods are divided into three levels: The central government is responsible for providing environmental public goods that benefit the whole country; local governments at all levels mainly provide environmental public goods at the local level. As for the environmental public goods intersecting with the beneficiary regions, they should be negotiated by the relevant local governments or coordinated by the central government, jointly provided by the beneficiary regions or provided by the central government. At present, the power of environmental affairs between the central and local governments is not clear.

The central government has often invested heavily, while local governments have been less enthusiastic. Therefore, it is necessary to clarify the environmental benefit sharing and environmental expenditure

responsibility of governments at all levels as soon as possible, and mobilize the enthusiasm of local governments to participate in ecological environmental protection and environmental pollution control. At the same time, the central government must strengthen the macro-control and transfer system of environmental protection. In terms of environmental protection cooperation in relevant ecological regions, it is necessary to strengthen regional ecological compensation legislation and formulate reasonable compensation standards and implementation systems, such as a standardized horizontal regional transfer payment system.

Strengthen the Management of Funds Invested in Environmental Protection

We will further clarify the responsibilities of the government and ensure that funds for environmental protection are truly used to fight pollution and protect the environment. In terms of the investment in environmental protection projects, we should pay attention to the tracking and management of the projects to ensure that the environmental protection funds are really invested in projects that are conducive to environmental protection. In the process of project construction, problems found should be dealt with in a timely manner. If any behavior that does not meet the requirements of environmental protection is found, it must be improved in a timely manner and the subsequent appropriation should be stopped when necessary. In addition, a transparent and fair project selection and management system should be established. We must analyze the costs and benefits of government-invested environmental protection projects, and select projects that are truly conducive to environmental protection. Projects that are not conducive to environmental protection will never be launched.

Establish a Performance Evaluation System for Environmental Expenditure

In order to strengthen the budget project performance management of environmental protection departments in China, it is necessary to construct the whole process financial expenditure performance evaluation system of environmental protection departments. First, improve the system of policies and regulations. It is suggested that according to the latest policies issued by the ministry of finance, the performance evaluation management measures of environmental protection departments should be promulgated as soon as possible. Second, improve the organizational management system. It is suggested to set up an independent

performance evaluation institution to undertake long-term performance evaluation, carry out long-term research on departmental budget projects, overall departmental expenditure, financial budget evaluation and special environmental protection projects, and be responsible for formulating performance evaluation policies and organizing performance evaluation. Third, improve the technical system of performance evaluation. It mainly includes three aspects: First, the scientific classification of departmental budget items. Second, China's financial expenditure project declaration level needs to be further improved. It is suggested that the project declaration should contain quantified and measurable long-term goals, annual performance goals and project output, and continuous projects should contain specific requirements for project monitoring and evaluation, arrange certain monitoring and evaluation budget, and ensure the smooth implementation of monitoring and evaluation. Third, further refine the performance evaluation index system. Based on the common indicators of project performance evaluation of the ministry of finance and the scientific classification of projects, the budget performance evaluation indicator systems of different types of environmental protection departments are formulated, including: the performance evaluation principles, performance evaluation indicators and explanations, the weight or percentage value of evaluation indicators, the scoring criteria of evaluation indicators, and the effect indicators combining quantitative and qualitative analysis reflect the actual effect of project implementation. Fourthly, combine the results of performance evaluation with the budget, optimize the allocation of resources and improve the efficiency of budget funds. Timely release of project performance evaluation results to increase public understanding and support for environmental protection.

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