Chapter 12
Government Actions in China's Green Development

Sanlin Jin, Jiancong Zhou and Fei Yang

During the 11th *Five-Year Plan* period, Chinese government paid great attention to green development and proposed ecological civilization for the first time, focusing on building a resource-conserving and environment-friendly society as a way to accelerate the transformation of the pattern of economic development. Over the past 5 years, governments at all levels continued to increase their investments in green development and acquired remarkable results, such as more improvements in infrastructure and environmental governance. During the 12th Five-Year Plan period, the Chinese government will promote a further integration of economic development with environmental protection in order to accelerate the pace of green development.

12.1 Green Economic Development and Government Function

12.1.1 The Economic Theory of Government Policies on Propelling Green Development

Green development is a development process characterized by conserving resources and protecting environment, in which "development" is the goal and "green" is both constraint and direction. The core is to correctly balance between development and environment. Environment is a public good with non-excludability and non-rivalry, whose property right is not easy to define. In the circumstance of no external restraints, manufacturers tend to excessively use the environment to make the private cost lower than the social cost to pursue extra profits at the expense of environmental pollution. Therefore, there are market failures in environmental protection which need to be remedied by government interventions in both micro and macro levels.

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12.1.1.1 Micro-Interventions Include Direct Administrative Regulation, Indirect Economic Instruments of Regulation, and the Emission Rights Trading Market

Direct administrative regulation is a compulsory emission standard set by the government. Enterprises must construct environmental protection facilities and use environmental protection technologies to ensure their products meeting the emission standard. Indirect economic instruments of regulation are mainly taxation and fees levied by the government for environmental pollution activities. When taxes exceed the marginal cost of controlling pollution emissions, enterprises will choose to eliminate pollution emissions to avoid taxes. The emission rights trading market is a market where the government issues tradable emission permits and allows them to be traded among enterprises of different pollution emissions levels.

Government should impose constraints and make the producers' external costs internalized, which is the core of micro-interventions. However, the restraints of the government are influenced by the government's efforts to increase regulation, its ability of law enforcement, the public sense in environmental protection, and the right of public acquisition for environmental protection. Generally speaking, because of information advantage, local governments play a key role in supervising environmental protection. If local governments' supervision is not strict, governmental failures may occur, and then the constraints on producers will be invalid.

12.1.1.2 Macro-Interventions Include Economic Policies that Affect Output Size, Industry Structure and Emission Efficiency

From the macro point of view, the lager the scale of economic activities is, the more resources will be consumed and the greater damage will be caused to the environment; the higher the proportion of low-pollution industries is and the better the industry structure is, the less damage will be caused to the environment. The higher the emission efficiency is, the less pollution will be produced per unit of output and the less pressure will be imposed on the environment.

Through fiscal, financial and industrial policies, the government can restrict the output scale of a particular industry or the economic scale in a specific area; it can restrict the development of high-pollution industries, encourage the development of low-pollution industries, and promote the optimization of the industrial structure; it can promote the adoption of clean technologies, clean management or environment-friendly products, reduce environmental depletion in unit inputs and outputs, and improve the discharge efficiency. The core of applying economic policies is to harmonize relationships among all relating parties' economic interests, to organically combine the goal of environmental protection and the behaviour of enterprises, and to prevent firms' economic activities from external diseconomies.

Generally speaking, a higher level of pollution in developing countries is mainly due to the higher implementation cost of environmental supervision and pollution standards, and the manufacturing industry's rising share in the process of industrialization. Therefore, the environmental protection in developing countries needs more governments' micro-regulation instruments combined with the use of macroeconomic policy.

12.1.2 Summary of Green Development Policies in Developed Countries

From global perspective, the understanding of development and environmental issues for international community has experienced a deepening process roughly through five stages, which can be summarized as follows. The first stage: taking the environmental pollution as a negative impact from economic growth. Polluters think that the environmental protection is an unnecessary measure taken by administrative authority fussily. Thus, enterprises have a resistance to the environmental regulation. At this stage, the measure of controlling pollution emission is the "End-of-Pipe Treatment", and may increase production cost from a general view. The second stage: taking the environmental pollution as one part of production costs. In this period, the polluters begin to realize that reducing pollution may be beneficial; therefore, they start to take measures to reduce the waste emissions in the production process. The third stage: taking the environment as one of the factors considered in decision-making process. When considering a new investment project, polluters must take environmental factors into account, and are forced to take measures to protect the environment in production and consumption process. The fourth stage: the environment is extremely important. When the polluters optimize the economic activities, they adopt different system designs, that is, to take measures to protect the environment systematically. The fifth stage: taking the environment as one of the goals of development. Environmental issues are considered as the goal of social and economic policies, which leads to the changes in production and consumption patterns, and changes people's attitudes to the environment.

At the same time, environmental protection policies are also changed from negative to positive policies. Many countries begin to take into account the environmental factors, economic factors and energy factors simultaneously, making long-term policies to develop the social economy and to protect the environment. Different countries have different situations and different concrete policies; however, the general trend is the same, which is to strengthen government supervision, and to emphasize more on introducing market incentives, public participation, and the role of justice. In addition, increasing government investment, encouraging social investment, and improving infrastructure condition are also important experiences of promoting green development in developed countries.

12.1.2.1 The Economic Regulation Instruments Adopted by Countries are Mainly Environmental Rules and Regulations, Environmental Taxes, Emission Rights Trading and Subsidies to Repeal or Application Mortgage, etc.

First, environmental rules and regulations, commonly used by various governments, mean that the governments set up relevant "standard", "ban", "license" and "quota" to control the pollution activities directly, which are common practice in all countries. Second, the environmental taxes (or fees on polluters) are important ways to internalize environmental costs and prevent "market failure". Currently, there are hundreds varieties of environmental taxes all over the world, such as taxes on petroleum and polluting products, etc. Third, the emission rights trading is another system designed to control the total amount of pollution emissions by using market mechanisms. Governments can set a limit on annual emissions or resource consumptions by issuing tradable emission permits, which can be traded in the emission rights trading market, and the price of which is determined by supply and demand. Fourth, the cancellation or the implementation of subsidies is to cancel the subsidies bad for environmental protection and implement subsidies on environment-friendly technologies. For example, subsidies on energy-saving products are very successful in the US. Fifth, application mortgage means that the government first collects guarantee deposits on the products that may cause pollution. It then returns the deposits when these products are brought back to the appointed place or treatment plant. Sixth, some countries try to accumulate funds for environmental protection through compensation, liability insurance and other methods.

12.1.2.2 In Developed Countries, Developing Circular Economy and Environment-Protection Industries and Promoting Enterprises' Environment-Protection Behaviors are also the Focuses of Government Actions

In the 1970s, enterprises began to explore new modes of production and vigorously developed the circular economy after OECD countries implemented the environmental protection policy "Polluters Pay". For example, since the late 1980s, Dupont has taken "Reduce", "Reuse" and "Recycle" as guiding principles to organize internal material recycling and created "3R Manufacturing Method" that greatly reduced waste emissions and costs. This has been supported and promoted by government with great efforts.

It is another important form of circular economy to build Eco-Industrial Parks, in which enterprises can connect to each other through waste exchange businesses. From the experiences in Canada, USA and other countries, we learn that comprehensive utilization of obsolete petroleum products and organics contribute to the development of ecological industry chain and Eco-Industrial Parks.

Many countries also advocate standard certifications of environmental management ISO14000. Lots of enterprises actively apply for the ISO14000 certification. Once approved, the enterprise will get high social reputation, and the competitiveness of their products can also be strengthened in the market.

All nations attach great importance to developing environmental protection industries. For example, in the USA and Canada, market with diversified investors plays an important role in environmental protection. The environmental industry has become an important rising industry.

12.1.2.3 Developed Countries have Established a Complete Legal System and Independent Monitoring System to Guarantee Policy Effects and Advocated the Public Participation

In countries like US and Canada, etc., governments at all levels have built a complete legal system in environmental protection, in which the laws can not only be applied to enterprises, but also used to guarantee the independence of monitoring institutions and the right of public acquisition for environmental protection. Take "Environmental Protection Law" in Canada as an example, it says that the heads in environmental protection agencies are nominated by government but not controlled by government. He has independent power of law enforcement. Moreover, there is a special law *Ontario Environmental Bill of Rights* to protect the right of public acquisition for environmental protection.

12.2 Government Actions in Green Development During the 11th Five-Year Plan Period: Policies, Achievements and Problems

12.2.1 Major Actions in Promoting Green Development During the 11th Five-Year Plan Period

During the *11th Five-Year Plan* period, Chinese government took various kinds of measures to promote green development due to the serious eco-environment degradation.

12.2.1.1 Further Improve Laws and Regulations

By the end of the *11th Five-Year Plan* period, China had formed a complete legal system, which was based on *Constitution of the People's Republic of China* and took *Environmental Protection Law of the People's Republic of China* as the main body. It met the requirements of constructing ecological civilization and played an

important role in promoting green development. During the *11th Five-Year Plan* period, Chinese government further completed relevant laws and regulations, which provided a better legal basis for building the resource-conserving and environment-friendly society.

First, Chinese government promulgated and amended a number of laws targeting the new situation. The government promulgated *Circular Economy Promotion Law of the People's Republic of China* in 2008, which clearly stated the principle of "reduction, reuse and recycling" and made a circular economy step into the stage of legal system. In 2007, the government promulgated *Urban and Rural Planning Act of the People's Republic of China*, and amended *Energy Conservation Law*, *Law of the People's Republic of China on the Prevention and Control of Water Pollution* and *Renewable Energy Law* to meet the new requirements in the green development.

Second, the government promulgated many rules and regulations, which mainly included *Regulations Concerning the Prevention and Cure of Pollution Damage of Marine Environment by Seashore*, *Regulation on National General Survey of Pollution Sources*, *Energy Saving Regulations for Civil Constructions*, *Planning Environmental Impact Assessment Regulations*, *Regulation on the Defense against Meteorological Disasters*, *Regulations on Administration of Collection and Disposal of Waste Electronic Products*, *Regulations on Energy Sufficiency of Public Institutions*, *Hydrology Regulation of the People's Republic of China*, etc.

Third, relevant authorities also promulgated a number of administrative regulations to normalize industry management. State Environmental Protection Administration promulgated *Standard for Sector-specific Eco-industrial Parks* (*on trial*) (2006), *Measures for the Supervision and Inspection of National Nature Reserves* (2006), *Measures for Supervision of Prevention and Control on Pollution Environment from Electron Wastes* (2007), *Environmental Monitoring Management Measures* (2007); Ministry of Commerce and other five ministries promulgated *Administrative Measures for the Recovery of Renewable Resources* (2007); Ministry of Housing and Urban–Rural Development of the People's Republic of China promulgated *Green Building Evaluation Mark Management Approach* (2007); National Development and Reform Commission promulgated *Energy Saving Emission Reduction Plan* (2007); State-owned Asset Supervision and Administration Commission promulgated *Interim Measures for the Supervision and Management Concerning Energy Conservation and Emission Reduction in Central Enterprises* (2007).

12.2.1.2 Increase Investments in the Treatment of Pollution, Especially in Some Key Areas

Green development highly depends on investment in environmental protection. During the 11th *Five-Year Plan* period, Chinese government took a series of measures to further broaden financing sources in environmental protection, which promoted investments in the treatment of pollution, especially in some key areas.

Table 12.1 Investments in the treatment of pollution

Indicator	Unit	2005	2006	2007	2008	2009
The total funds in the treatment of pollution	100 million	2,388.0	2,566.0	3,387.3	4,490.3	4,525.3
Investment in urban environmental infrastructure	100 million	1,289.7	1,314.9	1,467.5	1,801.0	2,512.0
Investment in the treatment of industrial pollution sources	100 million	458.2	483.9	552.4	542.6	442.6
Investment in "three simultaneous" project	100 million	640.1	767.2	1,367.4	2,146.7	1,570.7
Investment in pollution treatment to GDP	%	1.30	1.22	1.36	1.49	1.33

Note Investments in "Three Simultaneous" project are actual investment funds, and "Three Simultaneous" means that the facilities for pollution prevention and the treatment of pollution must be designed, constructed, and put into operation at the same time with the main project
Source National Bureau of Statistics of China (2011)

As Table 12.1 shows, in 2009 the total amount spent in the treatment of pollution was 452.5 billion, which increased by 89.5 % from 2005, and its share in GDP changed from 1.30 % in 2005 to 1.33 % in 2009. Among the total funds, investments in urban environmental infrastructure were 251.2 billion, which increased by 94.8 % from 2005; also investments in urban gas, central heating, drainage, landscaping and environmental sanitation increased by 27.9, 67.4, 98.3, 122.4 and 114.1 % respectively; actual investments in "Three Simultaneous" were 157.07 billion, which increased by 150 % from 2005.

12.2.1.3 Strengthen Law Enforcement and Government Regulation

During the 11th *Five-Year Plan* period, governments at all levels strengthened law enforcement and government regulation.

First, they took measures of "Regional Restrictions" and "Industry Restrictions" which effectively prevented environmental violations. Environmental protection departments made 813 illegal items, which were worth of over 2.9 trillion RMB, inadmissible, disapproved or suspended. They also set insurmountable "firewall" to items of "heavy energy consumption, heavy pollution and resource-related", low-level repeating building and overcapacity. Besides, they organized assessments on the key industries in energy chemical areas in Bohai Rim, the west coast of the strait, Beibu Gulf, chengdu-chongqing zone and the middle or upper reaches of the Yellow River.

Second, they strengthened pollution prevention efforts in key areas. Environmental protection departments and other departments took effective measures to

further promote rehabilitation of rivers and lakes and comprehensively established water quality assessment system in key valleys of provincial sections. They also carried out vigorous supervisions on regional environmental law enforcement, and put great efforts to build a regional mechanism of joint prevention and control for air pollution, which included "unified planning, unified monitoring, unified supervising, unified assessing, unified coordinating," to achieve the air quality goals for the Shanghai World Expo and Guangzhou Asian Games.

Third, they were focusing on serious environmental issues that harmed people's health. Besides, they carried out environmental investigations on the source of drinking water in cities and towns above county level, drew up and published the planning for protecting source of drinking water in cities, and strengthened the preventions and inspections for heavy metal pollution. Since 2006, the total number of law-enforcement officers was over 11 million. More than 140,000 environmentally illegal enterprises were investigated and more than 2,000 enterprises that discharged sewage illegally was shut down, which were good examples of punishment on the environmental violations.

12.2.1.4 Improve Incentive and Restraint Policies

During the 11th *Five-Year Plan* period, the government introduced a series of incentive and restraint policies on industry, finance, tax, banking, consuming, etc., which gradually formed a policy system in favor of resource conservation and environmental protection.

In terms of industry policies, the government strengthened regulation and control on high energy-consuming and high pollution industries, like iron and steel, coal, electricity, chemicals, etc. Ministry of Land and Resources and National Development and Reform Commission jointly enacted *Limited Project Directory with Land* and *Banned Project Directory with Land*, which restrict or prohibit land use in those projects that are not conductive to resource conservation and environmental protection. National Development and Reform Commission issued official *Notice on Advocating the Restructuring in Electric Power Industry for Healthy Development*, *Notice on Shutting down Small Thermal Power Plants*, etc. to supervise energy saving and emission reduction in electric power enterprises.

In terms of tax policies, the government took incentive tax instruments to promote energy saving and emission reduction. The new Law on Corporate Income Tax, which was passed in 2007, clearly defined that the income tax of environment-friendly activities could be reduced or exempted. In 2006, the Ministry of Finance and the State Environmental Protection Administration issued official *Notice on Adjustments and Improvements in Consumption Tax Policy*, which added some new taxation items such as disposable wooden chopsticks and wooden floor. It also reduced tax on some low-emission passenger cars, and increased tax on large-emission passenger cars.

In terms of credit policy, the government guided enterprises to increase green investments through financial means. In 2007, the People's Bank of China

announced *General Guidance of Improving Financial Services in Energy Saving and Environmental Protection Field*, which proposed that we should make more progress in providing financial services targeting energy-saving fields. In July of 2007, the State Environmental Protection Administration, People's Bank of China and China Banking Regulatory Commission joined together for the first time to announce *Guidance of Carrying Out Environmental Policies and Regulations and Avoiding Credit Risk*, which stated that environmental protection departments at all levels should investigate and punish behaviors of construction prior to approval or leapfrog behavior. During the 11th *Five-Year Plan* period, over 40,000 environmental illegal issues and over 7,000 projects information concerning environment assessments was entered into the banks' credit management system. And, more than 10 insurance companies introduced new insurance products with environmental pollution liability.

12.2.1.5 Implement Important Special Projects

The 11th *Five-Year Plan* on environmental protection proposed ten environmental protection projects, including project of environment monitoring capacity, project of hazardous waste and medical waste disposal, project of chromium slag pollution control, project of urban sewage treatment, project of water pollution prevention in key watersheds, project of urban waste disposal, project of gas desulfurization of sintering machines in coal-fired power plants and steel industry, project of important ecological functional region and nature reserve construction, project of nuclear and radiation safety, and project of environmental protection in rural areas. Other ministries and commissions also brought forward "connect every village" project, the rural drinking-water safety project and other important projects, which aimed to improve people's wellbeing through green actions.

Among these projects, the rural drinking-water safety project, which was implemented jointly by the National Development and Reform Commission, the Ministry of Water Resources and the Ministry of Health, was a key project during the 11th *Five-Year Plan* period. It aimed to solve the problem of drinking-water safety for 160 million rural residents (about 150,000 administrative villages), reduce half of the populations who had no safe drinking-water, increase the percentage of people who benefit from centralized water supply to 55 %, and improve water quality during the 11th *Five-Year Plan* period. To better implement the project, related ministries and local governments made many innovative mechanisms according to local circumstances to expedite the settlement of rural drinking-water safety problem, such as centralized water supply, decentralized water supply, urban water supply networks extending to the rural areas, etc. During the 5 years, central government spending on this project totaled 59 billion (5 times as much as the investments during the 10th Five-Year Plan period), local governments and private spending on it was 44.3 billion, and non-government funds were 1.22 billion, so the total funds spending on this project were 104 billion. 210

million rural people got safe drinking-water during the 5 years, which exceeded the target proposed by the 11th *Five-Year Plan* to ensure that 160 million have safe drinking-water.

12.2.1.6 Enhance International Cooperation

It needs international cooperation to protect environment and develop green economy, as there is no boundary for pollution. During the 11th *Five-Year Plan* period, the Chinese government actively took measures to enhance international cooperation to strengthen global environmental governance.

First, the Chinese government actively undertook international obligations and fulfilled environmental-protection commitments. In 2007, the Chinese government formulated *National Program on Response to Climate Change*, which stated clearly the specific objectives, basic principles, focus areas and policies for response to climate change till 2010. In September of 2009, Hu Jintao attended the United Nations Summit on Climate Change and delivered an important speech on "Join Hands to Address Climate Challenge". Wen Jiabao promised in the Copenhagen Climate Summit that carbon dioxide emissions per unit of GDP would decrease by 40–50 % in 2020.

Second, the Chinese government actively participated in international organizations and promoted global environmental cooperation. China's related authorities communicated and cooperated with more than ten international (global) inter-governmental organizations, like UNEP, GEF, and almost ten international non-government organizations, such as IU-CN, WWF and so on.

Third, the Chinese government vigorously promoted bilateral environmental cooperation between countries. Environmental cooperation between China and the United States was raised to the strategic level; China and Russia set up a mechanism to improve environmental cooperation. Through carrying out cooperation projects with Sweden, World Bank, Asian Development Bank and so on, China gradually established a legal system to assess project program's environmental impacts, and made positive achievements in practice.

12.2.2 The Major Achievements in Government Green Actions During the 11th Five-Year Plan Period

During the 11th *Five-Year Plan* period, China's green development took a new step, in which environmental protection was constantly intensified, the investment of pollution control kept relatively fast growth, infrastructure projects increased, the release of major pollutants was under control, and environmental pollution control made a progressive achievement.

Table 12.2 Major industrial pollutant emissions (2005–2009) (Unit: 10,000 tons)

Index	2005	2006	2007	2008	2009
Volume of SO_2 emission by industry	2,168.4	2,234.8	2,140	1,991.4	1,865.9
COD discharge from industrial waste water	554.7	541.5	511.1	457.58	439.68
Ammonia Nitrogen discharge from industrial waste water	52.5	42.5	34.1	29.69	27.35

Sources National Bureau of Statistics of China (2006–2010)

12.2.2.1 The Effectiveness of Environmental Governance was Enhanced Significantly

First, the task of reducing pollution and emission was over-fulfilled. In the circumstance of economic growth and energy consumption exceeding the schedule, the target of reducing SO_2 emission was reached a year ahead of schedule, and the goal of reducing chemical oxygen demand was achieved half a year ahead of the schedule, so the task of reducing pollution emission was over-fulfilled. According to an initial calculation, in 2010 the emission of chemical oxygen demand in China decreased by 12 % comparing to that in 2005, while the emission of SO_2 decreased by about 14 %, which both exceeded the emission target.

Second, the major industrial pollutant emissions were greatly reduced. Table 12.2 shows, in 2009 the SO_2 emissions were 1,865.9 million tons, which decreased by 302.5 million tons comparing to 2005, with a decrease of 13.95 % and an average annual rate of 3.68 %. There was a sharp decrease of chemical oxygen demand discharge from industrial waste water from 2005 to 2009. Chemical oxygen demand discharge from industrial waste water in 2009 was 439.68 million tons, which decreased by 115.02 million tons comparing with 2005, with a decrease of 20.74 % and an average annual rate of 5.64 %. Ammonia nitrogen discharge from industrial waste water also decreased year by year, which was 27.35 million tons in 2009, decreased by 25.15 million tons comparing with 2005, with a decrease of 47.91 % and an average annual rate of 15.04 %.

Third, there was a whole descending in the number of environmental accidents. As Fig. 12.1 shows, in 2009 the number of environmental accidents dropped to 418 times, reduced 988 accidents comparing with 2005, with a decrease of 70.27 % and an average annual rate of 26.16 %.

Fourth, the treatment efficiency of industrial "three wastes" was improved year by year. During the 11th *Five-Year Plan* period, the proportion of industry waste water meeting discharge standards, proportion of industry SO_2 meeting discharge standards, proportion of industry soot meeting discharge standards, proportion of industry dust meeting discharge standards, and ratio of industrial solid wastes utilized all showed an increasing trend year by year.

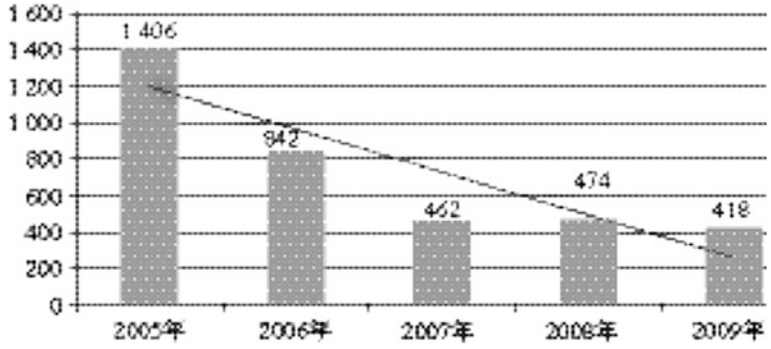

Fig. 12.1 Number of environmental accidents, 2005–2009. *Source* National Bureau of Statistics of China (2006–2010)

12.2.2.2 The Support Ability of Infrastructure to Green Development was Further Enhanced

First, urban green investment in fixed assets had a steady growth. Table 12.3 shows, from 2005 to 2009, the urban funds for maintaining construction in China increased by 12.3 %, with an average annual growth rate of 12.1 %, and the investment in fixed assets of municipal utilities and facilities increased from 560.22 to 1,064.15 billion Yuan, almost twice as much as before, with an average annual growth rate of 19.53 %. Among them, the investment in urban environmental infrastructure was 251.2 billion Yuan, increased by 94.8 % comparing with 2005, and the growth rate of investments in city gas, central heating, drainage, landscaping and city appearance and environmental sanitation were 27.9, 67.4, 98.3, 122.4 and 114.1 % respectively.

Second, urban water supply and wastewater treatment capacity were greatly improved. Table 12.4 shows by the end of 2009 urban water access rate in China reached 96.12 %, a 5.5 % increase over 2005, so the urban water supply capacity was improved significantly. At the same time, the treatment capacity per day of waste water treatment plants reached 90.52 million m^3, a 58.1 % increase over 2005. Besides, urban waste water treatment rate increased from 52.0 % in 2005 to 75.3 % in 2009.

Third, urban environment sanitation facilities in China have been improved constantly. Table 12.5 shows in 2009 the number of harmless treatment plants of urban garbage was 567 units, 96 units more than that in 2005, and the harmless treatment capacity per day of urban garbage reached 356,130 tons, while the urban proportion of harmless treated garbage was 71.4 %, which increased by 19.7 % over 2005. Besides, the green coverage rate improved significantly, from 32.6 % in 2005 to 38.2 % in 2009, and park green land per capita also increased by 2.7 %.

Fourth, urban road and public transportation facilities developed rapidly in China. Table 12.6 shows by the end of 2009 the length of operating routes of urban public transportation in China reached 209,249 km; and motor vehicles for public

Table 12.3 Investment in fixed assets in urban area in China (2005–2009) (Unit: 100 million)

Index	2005	2006	2007	2008	2009
Urban funds for maintaining construction	5,275.7	3,349.5	4,247.3	5,008.3	5,927.1
Investment in fixed assets of municipal utilities and facilities	5,602.2	5,765.1	6,418.9	7,368.2	10,641.5
Investment in urban environmental infrastructure	1,289.7	1,314.9	1,467.5	1,801.0	2,512.0

Sources Ministry of Housing and Urban–Rural Development of the People's Republic of China (2006–2010), National Bureau of Statistics of China (2011)

Table 12.4 Indicators of urban water supply and waste water treatment capacity in China (2005–2009)

Index	Unit	2005	2006	2007	2008	2009
Urban total water supply	100 million m^3	502.1	540.5	502.0	500.1	496.8
Urban water access rate	%	91.1	86.67	93.8	94.7	96.1
Urban population with access to water supply	10,000	32,723.4	32,304.1	34,766.5	35,086.7	36,214.2
Urban daily household water consumption per capita	Litre	204.1	188.3	178.4	178.2	176.6
Urban length of drainage pipes	10,000 km	8.5	26.1	29.2	31.5	34.4
Urban waste water discharged	100 million m^3	359.5	362.5	361.0	364.9	371.2
Urban waste water treatment plants	Unit	792	815	883	1,018	1,214
Treatment capacity	10,000 m^3/day	5,725.2	6,366	7,146	8,106	9,052
Quantity of waste water treated yearly	100 million m^3	186.8	202.6	227.0	256.0	279.4
Waste water treatment rate	%	52	55.7	62.9	70.2	75.3

Source National Bureau of Statistics of China (2006–2010)

transport per 10,000 population reached 11.1 standard units, an increase of 2.5 standard units over 2005; while volume of passenger transport in urban public transport reached 67.7 billion person-times, which was 39.92 times as much as that in 2005.

12.2.2.3 Rural Environmental Protection and Infrastructure Condition were Greatly Improved

First, toilet improvement in rural areas progressed smoothly. Table 12.7 shows, by the end of 2009, investment of toilet improvement in rural areas reached 11.44 billion Yuan, of which state investment was 4.25 billion Yuan, an increase of

Table 12.5 Environmental sanitation facilities construction in China (2005–2009)

Index	Unit	2005	2006	2007	2008	2009
Harmless treatment plants of urban garbage	Unit	471	419	460	509	567
Harmless treatment capacity of urban garbage	ton/day	256,312	258,048	271,791	315,153	356,130
Urban proportion of harmless treated garbage	%	51.7	52.2	62.0	66.8	71.4
Urban green coverage rate	%	32.6	35.1	35.3	37.4	38.2
Urban park green land per capita	m^2	7.9	8.3	9.0	9.7	10.7

Source National Bureau of Statistics of China (2006–2010)

Table 12.6 Urban road and public transportation facilities construction in China (2005–2009)

Index	Unit	2005	2006	2007	2008	2009
Length of operating routes	km	–	125,857	140,801	147,349	209,249
Number of public transport vehicles (year-end figure)	Unit	313,296	315,576	347,969	371,822	370,640
Motor vehicles for public transport per 10,000 population	Standard unit	8.6	9.05	10.2	11.1	11.1
Volume of passengers transport in public transport person-times	10,000	4,836,930	4,659,247	5,546,439	7,029,996	6,767,589
Operating number of rail transit (year-end figure)	Unit	2,364	2,764	3,480	4,530	5,479
Volume of passengers transport in rail transit person-times	10,000 person-times	181,599	220,582	337,390	365,770	–

Source National Bureau of Statistics of China (2006–2010)

330 % over 2005. The access rate to rural sanitary toilets increased from 55.3 % in 2005 to 63.2 % in 2009, which made the households of using sanitary toilets reach 160.56 million.

Second, rural energy structure was constantly optimized, and the use of renewable energy increased significantly. Table 12.8 shows, in the end of 2009, the production of rural methane was 13.08 billion m^3, an increase of 79.4 % over 2005. At the same time, water heaters using solar energy was 4,997.1 m^2, an increase of 55.8 % over 2005, and the solar kitchen ranges was 1,484,271 units, an increase of 53.8 % over 2005.

Third, traffic conditions in rural China were further improved, and the "11th Five Year" goal about rural road construction was achieved. With the implementation of "village to village road project", by 2010, the length of highways in rural China (including the County Road, Township Road, Village Road) reached

Table 12.7 Toilet improvement in rural China (2005–2009)

Index	Unit	2005	2006	2007	2008	2009
Investment of rural toilet improvement	100 million Yuan	47.3	69.5	72.9	93.9	114.4
State investment	100 million Yuan	12.8	20.8	25.5	37.6	42.5
Proportion of state investment in total	%	27	30	35	40.1	37.2
Accumulative households using sanitary toilets	10,000 households	13,740	13,873	14,442	15,166	16,056
Access rate to sanitary toilets	%	55.3	55.0	57.0	59.7	63.2

Source National Bureau of Statistics of China (2006–2010)

3,506,600 km. And the township (town) with highways accounted for 99.97 % of total townships (town) in China, and the administrative villages with highways accounted for 99.21 % of total administrative villages in China, which increased by 6.33 % and by 22.3 % respectively compared to the end of the "10th Five Year". Basically, all the towns where conditions mature had asphalt (cement) roads, all the eastern and central administrative villages had asphalt (cement) roads, and some western administrative villages where conditions mature also had asphalt (cement) roads.

12.2.3 The Main Problems of China's Green Development and Its Reasons

12.2.3.1 The Main Problems of Green Development in China

First, the deterioration of environmental quality was curbed, but it was not completely stopped. During the second half of the "11th Five Year Plan", the momentum of improvement in environmental quality appeared, because of the increase in state investment, strengthened supervision, and the slowing down in economic growth. Nevertheless, during the "12th Five Year Plan" and even before 2020, the overall environmental situation is still "locally improved, but not overall curbed, and facing a continually increasing pressure". In China, the pressure on environment will be bigger than in any other country in the world, the resource and environmental issues will be more serious than in any other country, and the solutions to these issues will be more difficult. First of all, during this period, China's economy will still maintain a rapid growth, and the pressure of pollution emission is still large. Second, the power plant desulfurization and other relatively easy environmental protection measures were taken during the "11th Five Year Plan" period, so the environmental protection will be more difficult during the "12th Five Year Plan" Period. Table 12.9 shows, comparing to before, the proportion of industrial waste water meeting discharge standards, the treatment rate of

Table 12.8 Energy use in rural China (2005–2009)

Index	Unit	2005	2006	2007	2008	2009
Production of rural methane	100 million m^3	72.9	83.6	101.7	118.4	130.8
Water heaters using solar energy	10,000 m^2	3,205.6	3,941	4,286.4	4,758.7	4,997.1
Solar kitchen ranges	Unit	685,552	865,238	1,118,763	1,356,755	1,484,271

Source National Bureau of Statistics of China (2006–2010)

Table 12.9 Indicators relating to environmental protection technology in China (2000–2009) (Unit: %)

Years	Proportion of industrial waste water meeting discharge standards	Treatment rate of urban household waste water	Proportion of industry SO_2 meeting discharge standards from process of fuel burning	Proportion of industry SO2 meeting discharge standards from process of production
2000	82.1	–	–	–
2001	85.6	18.5	62.8	51.0
2002	88.3	22.3	72.9	55.1
2003	89.2	25.8	75.4	59.3
2004	90.7	32.3	78.6	59.4
2005	91.2	37.4	80.9	71.0
2006	92.1	43.8	82.3	81.0
2007	91.7	49.1	87.4	81.8
2008	92.4	57.4	89.3	86.5
2009	94.2	63.3	–	–

Source Collated according to the relevant years' *National Environmental Statistics Bulletin*

urban household waste water, and the proportion of industry SO_2 meeting discharge standards from process of fuel burning had been on a relative high level since 2006. Therefore, it is very difficult to make a sharp rise in the future. Besides, the industrial emissions started to decline absolutely or the growth rate was declining relatively, however, the emissions of urban residents are now increasing. The accelerating urbanization has an increasingly obvious impact on the environment. As the emissions of urban residents are still increasing, the emissions of waste water and other pollutants will continue to grow.

Second, small and medium enterprises become the focus of pollution treatment. During the "11th Five Year Plan" period, as the environmental supervision was more stringent in China, large enterprises' environmental protection facilities and investment were greatly promoted and their emissions decreased significantly. But, comparing with large enterprises, the proportion of emissions from small and medium enterprises was rising. Reasons for this situation are as follows. Small and medium enterprises developed fast, the proportion of which in the total economy increased rapidly. Besides, technical equipments of small and medium enterprises were on a relatively low level, while emissions per unit of output were high. With the increase of emission day by day, since the small and medium enterprises lag

behind the large enterprises in pollution treatment capability, they had a rapid rise in the proportion of the whole industrial pollution. Currently, the key problems of improving small and medium enterprises' pollution treatment conditions are the cost of pollution treatment and environmental supervision. However, because the small and medium enterprises are too scattered and their treatment and supervision costs are too high, these two factors are also difficulties in environmental protection.

Third, environmental pollution are moving to central and western regions and rural areas. In the 1970s, China's environmental pollution showed dot distribution; in the 1980s, river pollution and air pollution were serious; in the 1990s, the pollution had a trend of regional expansion; and after the 21st century, the pollution had a trend of accelerating expansion. Especially labor-intensive and resource-intensive industries in coastal areas are transferred to the central and western regions quickly. Enterprises, located in provincial development areas, mostly experienced environmental assessment, whose pollutants meet the basic emission standards. Enterprises, located in county and township areas, had many serious pollution problems, which made rural pollution in central regions worsen and lead to some group events. As the environmental protection facilities in rural areas and farmers' environmental awareness are very poor, the pollution has been very serious, so the pressure on environmental protection in rural areas grows increasingly.

Fourth, more and more environmental pollutions are transferred to China through international trade and investment. International trade and investment affect the China's environment by influencing the domestic structure of production activities. A country which has less stringent environmental regulation may have the comparative advantage in polluting industries. Therefore, the pollution may be transferred from developed countries to less developed countries through international trade and investment. This trend also appears in China. Not only the high-pollution projects are accelerating the transfer to China, but also highly polluting commodities as well as environment waste are exported to China. Meanwhile, the export of domestic products is encountering more and more green barriers. Internationalization is adding new difficulties to China's environmental protection.

12.2.3.2 Deep Reasons for Restricting Green Development in China

From the macroscopic point of view, there are two reasons for environmental problems: the first is rapid economic growth, and the second is pollution emissions intensity (emissions per unit of output). From the micro perspective of view, environmental problems are mainly due to excessive emissions from enterprises, and the reason for excessive emissions is the weakness of the existing policies and institutions.

First, the objective basis for China's environmental problems is the particular stage of industrialization and urbanization.

Looking at the history of developed countries, environmental problems emerged because of industrialization, became serious because of the acceleration of industrialization and urbanization, and are being solved because of the great progress in industrialization and urbanization. For example, in the United States, from 1900s to 1970s, emission volume of sulfur dioxide per year increased from 9 to 28 million tons, but declined year by year after that. In 1990, the emission volume of sulfur dioxide in the United States was 20.935 million tons, which was 74.4 % of 1970. In 2005, it was 13.348 million tons, which was 47.5 % of 1970. Therefore, the process of industrialization and urbanization is the objective basis for the emergence and also the solution to environmental problems.

Generally speaking, since the "10th Five Year Plan" period, China entered a rapid development period of heavy industrialization and urbanization. Table 12.10 shows, after 2003, China's heavy industrialization accelerated significantly, the growth rate of heavy industry was obviously higher than that of light industry, and the pressure on environmental protection continued to increase. Looking at the data from the "10th Five Year Plan" period, waste water and chemical oxygen demand in waste water were mainly affected by urbanization, while sulfur dioxide and dust were mainly related to industrialization. In the discharge of waste water and chemical oxygen demand, the proportion of urban life had always been more than 50 % and increased year by year. In the sulfur dioxide emission, the proportion of industry had always been more than 80 % and continually increased, while declined slightly in 2008 and 2009. In the dust emission, the proportion of industry declined from 81.8 % in 2000 to 71.3 % in 2009, while the proportion of life emissions had been in ascendant trend.

Second, direct reasons for China's environmental problems are insufficient capital investment, backward technology, underdeveloped environmental protection industries and environmental protection market.

The first obstacle is insufficient investment in environmental protection. Investment in environmental protection in developed countries usually accounts for 2 % of GDP, while in China during the "7th Five Year Plan" period and the 8th *Five Year Plan* period the proportion was only 0.8 %. Although during the 9th *Five Year Plan* period Chinese government increased the investment in environmental protection, it only accounted for 1 % of GDP. During the 10th *Five Year Plan* period, the investment in environmental protection had an annual growth rate 17.6 %, but the highest proportion of investment in environmental protection of GDP was only 1.4 % (2004), an average of only 1.32 %, and the proportion was still very low. During the 11th *Five Year Plan* period, Chinese government increased the investment in environmental protection greatly, and the growth speed of investment in 2007 and 2008 were over 30 %. So, the proportion of investment in environmental protection in GDP was increasing. However, in 2009 the proportion was 1.33 %, not only lower than that in developed countries, but also in descendant trend.

The second obstacle is the relatively backward environmental technology. China lacks environmental protection facilities; most of which are at the international level between 1970s and 1980s, and environmental protection technology

Table 12.10 Industry distribution of main pollutant emissions in China (2000–2009) (Unit: %)

Years	Waste water		Chemical oxygen demand		Sulfur dioxide		Dust	
	Industry	Urban life	Industry	Urban life	Industry	Urban life	Industry	Urban life
2000	46.8	53.2	48.8	51.2	80.8	19.2	81.8	18.2
2001	46.9	53.1	43.2	56.8	80.4	19.6	79.4	20.6
2002	47.1	52.9	42.7	57.3	81.1	18.9	79.4	20.6
2003	46.2	53.8	38.4	61.6	83.0	17.0	80.7	19.3
2004	45.8	54.2	38.1	61.9	83.9	16.1	81.0	19.0
2005	46.3	53.7	39.2	60.8	85.1	14.9	80.2	19.8
2006	44.7	55.3	37.9	62.1	86.3	13.7	79.4	20.6
2007	44.3	55.7	37.0	63.0	86.7	13.3	78.2	21.8
2008	42.3	57.7	34.6	65.4	85.8	14.2	74.4	25.6
2009	39.8	60.2	34.4	65.6	84.3	15.7	71.3	28.7

Source Ministry of Environmental Protection (2010)

already falls behind. What's more, most enterprises are small, which have no capacity to develop environmental technology or to introduce new scientific and technological achievements. The professional environmental technology services are very weak and the low level of socialization results in poor transmission of technical and market information. Environmental technologies are not market-oriented and intermediate service agencies are not yet complete, which further restrict the improvement of China's environmental protection technology.

The third obstacle is that the environmental protection industry lags behind. China's environmental protection industry mainly focuses in two fields: one is producing environmental protection products; the other one is making use of "three wastes", while other fields, such as the production of low-pollution products, environmental technology services and ecological protection, are still very backward. Even in the traditional environmental protection industry, the level of development is low. For example, although the recycling rate of industrial water increased from 69.6 % in 2000 to 85.0 % in 2009, it is still lower than the average international level, and the growth rate is declining. Besides, the comprehensive utilization of industrial solid waste was only 67.0 % in 2009, far below the average international level. Meanwhile, the environmental protection industry in China develops highly unbalanced, and is very weak in central and western regions.

Third, the basic reason for China's environmental problems is lack of supervision and lax enforcement, which leads to the facto government failure and can't make the environmental costs fully internalized.

In theory, environmental protection particularly needs the government to play its role. The source of deterioration of environmental quality is the existing government failure, which shows in the following three aspects:

The first is lack of supervision. China's penalties for environmental violations are not severe and not introducing the criminal liability. More importantly, due to the influence of local protectionism, many local management institutions in

Table 12.11 Growth of investment in "three simultaneous" projects in China's environmental protection (2001–2009)

Years	Investment in pollution treatment projects		Investment in "three simultaneous" projects for environmental protection engineering		Proportion of investment in "three simultaneous" projects (%)
	Total (100 million Yuan)	Growth rate (%)	Total (100 million Yuan)	Growth rate (%)	
2001	1,106.6	–	336.4	–	30.4
2002	1,363.4	23.2	389.7	15.8	28.6
2003	1,627.3	19.4	333.5	−14.4	20.5
2004	1,908.6	17.3	460.5	38.1	24.1
2005	2,388.0	25.1	640.1	39.0	26.8
2006	2,567.8	7.5	767.2	19.9	29.9
2007	3,387.6	31.9	1,367.4	78.2	40.4
2008	4,490.3	32.6	2,146.7	57.0	47.8
2009	4,525.2	0.8	1,570.7	−26.8	34.7

Sources The relevant years' *National Environmental Statistics Bulletin*; Ministry of Environmental Protection (2010)

environmental protection have lax enforcement, even administrative omission, leaving the low cost of violating the law and high cost of obeying the law for the enterprises. In fact, this phenomenon encourages the enterprises to discharge more pollutants. For example, Under Chinese law, environmental protection facilities should be designed, constructed and put into operation simultaneously (three simultaneous) with the principal part of the project. But this institution has not been well implemented. Table 12.11 shows the investment in "three simultaneous" projects accounting for the investment in pollution treatment projects had been declining from 2001 to 2004. Although it had a rapid growth after that, it declined greatly in 2009 again, to only 34.7 %. Moreover, many investment projects in small and medium enterprises didn't accomplish the "three simultaneous".

The second is the policy deviation. China's present environmental policy is "Polluter Pays", but under fixed technical conditions, pollution treatment needs better economies of scale. The larger the pollution treatment is, the lower the cost is. To most individual small and medium-size enterprise (SMEs), there is a large gap between its pollution emission scale and the economy of scale for treatment. At the same time, SMEs don't have enough funds and it's very difficult and costly for them to raise funds to construct pollution treatment facilities. Therefore, pollution treatment is rather costly for SMEs, which has led to invalid pollution control. When someone comes over for inspection, they treat pollution only superficially or hand in some fines, in which there are always potential "rent-seeking" activities. Also, the price regulation and subsidy policies about waste disposal, water treatment and energy, are in fact encouraging enterprises and residents to discharge pollutants.

The third is strategic distortions. In China, taking the economic development as the center has been distorted as taking the GDP growth as the center. And the

government has not paid much attention to environmental protection. Therefore, extensive ways of industrialization and urbanization haven't been improved, leaving much pollution emissions all the time. Some regions, whose ecological environment had been fragile already, still carried out industrial projects that exceeded the environmental capacity, even pollution-intensive heavy industry projects, which have made the environment worse.

12.3 Government Green Actions During the 12th Five-Year Plan Period: Planning and Prospect

12.3.1 The New Requirements for Government Green Actions During the 12th Five-Year Plan Period

The 12th *Five-Year Plan* puts forward that economic and social development during the 12th Five-Year period should take the scientific development as the theme, take accelerating the transformation of economic development pattern as the main thread, deepen the reform and opening up, ensure and improve people's wellbeing, consolidate and expand upon the success of our efforts to respond to the impact of the global financial crisis, promote long-term, steady and rapid economic development and social harmony and stability, and lay a solid foundation for building a moderately prosperous society in all respects. This guideline has new requirements for green development during the 12th *Five-Year Plan* period.

12.3.1.1 New Positions: New Requirements for Building a Resource-Conserving and Environment-Friendly Society

The 12th *Five-Year Plan* put forward clearly that taking building a resource-conserving and environment-friendly society as the focal point for accelerating the transformation of economic development mode. Thoroughly implement the basic national policy of resource conservation and environmental protection, save energy, reduce the intensity of greenhouse gas emissions, develop the circular economy, promote low-carbon technologies, actively respond to global climate change, and help the economy and society develop harmoniously with population, resource and environment in a sustainable way.

12.3.1.2 New Objective: New Requirements for Green Development's Results

The 12th *Five-Year Plan* put forward some specific objectives, such as "reducing energy consumption per unit of GDP by 16 % and reducing carbon dioxide

emissions per unit of GDP by 17 %; reducing chemical oxygen demand and sulfur dioxide emissions respectively by 8 %; improving the forest coverage to 21.66 %, and increasing the forest volume by 600 million cubic meters".

12.3.1.3 New Deployment: New Requirements for Measures of Promoting Green Development

The 12th *Five-Year Plan* put forward some deployments for accelerating green development and building a resource-conserving and environment-friendly society from these aspects, such as positive response to global climate change, strengthening resource saving and management, vigorously developing circular economy, stepping up efforts for environmental protection, promoting ecological protection and restoration, etc. (Table 12.12).

12.3.2 Government Strategic Measures in Green Development During the 12th Five-Year Plan Period

Synthesizing the viewpoints of the 12th *Five-Year Plan* and relating departments' plan, the basic goal of government green action during the 12th Five-Year Plan period is to promote the integration of economic development and environmental protection: the government will, on one hand, continue to adopt the tight and stringent macro-environment policy, and on the other hand, implement the strategic guideline of environmental priority in special areas and fields.

12.3.2.1 Make Full Use of the Role of Environmental Protection in Accelerating the Transformation of the Pattern of Economic Development

Assess various *Plans*' environmental impacts actively, such as hydropower exploitation, development zones, and industrial parks; and apply these assessments' results in time, especially in the five regions of China. Deepen environmental assessment on construction projects, control strictly redundant projects of high energy-consuming and high emission, accelerate mergers and acquisitions, and eliminate backward production capacity. Launch the Special Action of Environmental Protection on remediating the illegal emission enterprises, and keep the supervision of environmental law enforcement in a high-pressure situation. Improve the mechanism of environmental risk prevention and emergence management, focus comprehensively on the treatment in chemical factories near rivers and lakes, and avoid frequent environmental accidents in chemical industries. Strengthen the overall capability to prevent emergency. Implement the

Table 12.12 Key projects for environment protection in the 12th Five-Year Plan

	Key projects for environment protection
01	*Projects for constructing treatment facilities for sewage and garbage in urban areas* Accelerate the construction of treatment facilities for sewage, sludge and garbage, and construct sewage collection pipe network, garbage removal facilities at the same time
02	*Projects for water environment treatment in major river valleys and regions* Strengthen the comprehensive treatment in "three rivers and three lakes", Songhua River, the Three Gorges reservoir area and upper reaches, Danjiangkou reservoir area and upper reaches, the upper and middle reaches of the Yellow River and other key marines, increase the water pollution prevention efforts in the middle and lower reaches of the Yangtze River, Pearl River and ecologically fragile highland lakes, and promote the comprehensive treatment in Bohai and other key sea areas
03	*Projects for desulfurization and denitrification* Build plants of desulfurization and denitrification for newly built coal-fired units, and install denitrification plants with efficiency no less than 60 % for newly built cement production lines, and denitrification plants for steel sintering machines and petrochemical industry
04	*Projects for heavy metal pollution prevention and control* Strengthen heavy metal pollution prevention and control in key areas, key industries and key enterprises; make key enterprises' emissions meet discharge standards; and make heavy metal pollution prevention and control in Xiangjiang River and other rivers or regions achieve significant results

Source "12th *Five-Year Plan* for National Economic and Social Development" http://www.gov.cn/test/2011-03/16/content_1825941_7.htm,2011-03-16

Heavy Metal Pollution Prevention Plan comprehensively, and put more efforts on remediating environmental law issues in key controlling areas and industries. Continue to promote environmental management of chemicals, implement the persistent organic pollutants (pops) and mercury pollution prevention plan, and complete indicators for standardized management of hazardous waste.

12.3.2.2 Take Comprehensive Measures to Actively Promote Pollution and Emission Reduction

Focus more on structural emissions reduction, continue to intensify emissions reduction from projects and the management of emissions, increase and implement strictly the emissions standard in industries like paper, textile, leather, chemicals and so on, comprehensively start the construction of sewage treatment plants in counties, vigorously carry out the project construction of agricultural water pollution abatement, continue to work on desulfurization and denitrification in coal-fired power plants, control tightly exhausting pollution of motor vehicles, carry on in-depth studies on denitrogenation in urban sewage treatment plants and other key technologies, promote an effective and stable operation of pollution control facilities, and vigorously conserve energy and reduce emissions in transportation sectors to achieve a 1.5 % decrease in emission volume of four major pollutants.

12.3.2.3 Step Up the Treatment of Water Pollution in Major Rivers and the Treatment of Sea Pollution

Implement comprehensively *Environmental Protection Plan for Drinking Water Sources in cities all over the country*, carry out assessments for drinking water sources in cities at prefecture level or above, and develop a technology and management system for assessing ecological safety in key lakes and rivers. Take the Beijing-Tianjin-Hebei Economic Band, the Circle of the Yangtze River Delta and the Pearl River Delta as the key areas, accelerate the new mechanism of joint prevention and control in all areas, put more efforts in pollution prevention for particles and volatile organics, and control tightly exhausting emissions from motor vehicles. Strengthen the management of urban environment and the prevention for industrial pollution, improve the verification system of public firms for environmental protection, and deepen the building of national environment protection model cities.

12.3.2.4 Focus on Solving Environment Problems Concerning the People's Wellbeing

Pursue the idea of putting people first and protecting environment for people, ensure the construction of drinking water projects; strengthen the treatment of heavy metal pollution, hazardous wastes pollution and soil pollution to safeguard people's interests. Improve the fundamental work and tighten the supervision of enterprise environment; increase the law reinforcement and take tight measures to punish illegal enterprises; implement the regulation of information publicity and accept people's supervision. At the same time, prevent environmental risks actively and ensure the safety of economy and environment to make all the people have clean drinking water, clean air, safe food and beautiful living environment.

12.3.2.5 Vigorously Promote Green Development in Rural Areas

Deepen the policy of "governing by rewards" constantly, and carry out contiguous improvement in rural environment and environmental evaluations. Promote the trials of goal responsibility system for comprehensive improvement of the rural environment, and prepare well for soil pollution investigations in key areas all over the country. Protect and recover biological diversity; and intensify supervision for activities concerning developing and constructing natural reserves. Build green energy villages and accelerate developing renewable energy in rural areas. Strengthen investments in rural infrastructure and direct the focus from "construction" to "both construction and management".

12.3.2.6 Deepen the Reform of Investment and Financing System, Increasing Investment in Green Development

Let the industrial policy play an important role in guiding investments to areas such as ecological development, environmental protection and resource conservation, etc.; Grasp the implementation of government investment regulations, enterprise investment project approval and filing regulations, and figure out management regulations for direct investment projects with central budget as soon as possible, further simplify the approving process of corporate bonds. Strengthen policy supports in planning guidelines, finance and tax, accelerate the construction of urban public facilities, prevent and treat "city diseases". We should continue to strengthen the foundations in monitoring, early warning, emergency and information to improve government management ability in green economy.

12.3.2.7 Further Improve Environmental Taxation and Market Policies

Consumer tax should be further improved to include products that can easily produce environmental pollution and consume large amounts of resources and some high-end luxury goods. The management system should be completed for collection and usage of pollution charges. The rate of pollution charges should be increased, and the trials of setting "Environmental Protection Tax" can be launched in an appropriate time and be expanded gradually. The trading mechanism of environmental property right should be established and improved to promote the compensable use and trading of emission rights.

References

Classic China-glorious 60 years: environmental protection achievements (in Chinese). Available at: http://env.people.com.cn/GB/146189/168051/

Ministry of Environmental Protection (2010) Annual statistical report on environment in China 2009. China Environmental Science Press, Beijing (in Chinese)

Ministry of Housing and Urban–Rural Development of the People's Republic of China (2006–2010) China urban construction statistical yearbook 2006–2010. China Building Industry Press, Beijing (in Chinese)

National Bureau of Statistics, Ministry of Environment Protection (2006–2010) China statistical yearbook of environment 2006–2010. China Statistical Press, Beijing (in Chinese)

National Bureau of Statistics of China (2006–2010) China statistical yearbook 2006–2010. China Statistics Press, Beijing (in Chinese)

National Bureau of Statistics of China (2009): Achievements report 17 in economic and social development during the 11th *five-year plan* period: great progress has been made in environmental protection (in Chinese). Available at: http://www.stats.gov.cn/tjfx/ztfx/qzxzgcl60zn/t20090928_402590846.htm

National Bureau of Statistics of China (2011) Achievements report 14 in economic and social development during the *11th five-year plan* period: great progress has been made in

environmental protection (in Chinese). Available at: http://www.stats.gov.cn/tjfx/ztfx/sywcj/t20110310_402709535.htm

Shi Y-d, Li C-y (2010) An analysis on the reform of chinese urban infrastructure investment and financing mechanism. J Cent Univ Finan Econ 2010(7) (in Chinese)

The State Council of the People's Republic of China (2011) The twelfth five-year plan for national economic and social development (in Chinese). Available at: http://news.xinhuanet.com/politics/2011-03/16/c_121193916.htm

Xia G (2010) Concept innovation on environmental protection planning in *11th five-year plan*. China Economic Times, 2010-05-19 (in Chinese)

Xia G (2010) Environmental protection and green development in *11th five-year plan*: target and policy. China Economic Times, 2011-03-22 (in Chinese)

Zhang S-h (2010) Establish and perfect the legal system of energy saving and emission reduction. Science-Technology and Law 2010(8) (in Chinese)

Zhou S (2010) China will actively explore new ways to protect environment during the 11th *five-year plan* period (in Chinese). Available at: http://news.ifeng.com/gundong/detail_2010_11/27/3247041_0.shtml

Zhou S (2010) Review of the 11th *five-year plan*—outlook on the twelfth five-year plan (in Chinese). Available at: http://news.xinmin.cn/rollnews/2010/11/29/7985458.html

Zhou S (2011) In the new starting point: accelerate the environment protection (in Chinese). Available at: http://www.gov.cn/gzdt/2011-01/07/content_1780051.htm

Zhou S (2011) Efforts to achieve a good start in environment protection in the first year of twelfth five-year plan (in Chinese). Available at: http://www.gov.cn/gzdt/2011-01/17/content_1786489.htm