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Policy Outlook

China's historical evolution of environmental protection along with the forty years' reform and opening-up

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ABSTRACT

Along with the 40 years of reform and opening-up, China's ecological and environmental management system has been evolving continuously. Since the start of the ecological and environmental protection in 1972, China has witnessed "great leaps" of reform on environmental management system about once every 10 years, in order to address the prominent environmental issues at different development stages, and continuously reform, innovate and develop the ecological and environmental governance systems and modes with Chinese characteristics. China adheres to solve environmental problems in the process of development, takes the improvement of the ecological and environmental quality as the core task, and gradually builds its ecological and environmental management systems conforming to the characteristics of different development stages, including a sound ecological and environmental planning & policy system, an improved ecological and environmental governance system and a complete ecological and environmental legal system. During the process of building the socialism with Chinese characteristics for a new era, we should aim at the strategic goal of building a Beautiful China, keep focused on China while stay connected with the world, adhere to green development, accomplish top-level design, build a new pattern of ecological and environmental management system, and co-construct a clean and beautiful world.

During the forty years of reform and opening-up, China has developed dramatically with great momentum. With a population of nearly 1.4 billion, it has grown from a poor and backward country into the world's second largest economy. China's ecological and environmental protection advanced with the times, moved from the previously simple control of the *Three Wastes*¹ towards the construction of ecological civilization, and gradually became one participant, contributor and pioneer of global sustainable development. Looking back on China's ecological and environmental protection history, we note that the ecological and environmental protection is closely related to the social and economic development. We face different prominent environmental problems at different development stages. The corresponding economic development stage and social needs determine our ecological and environmental management system and structure. In the meantime, the ecological and environmental governance systems and modes improve continuously along with the reform and development. Looking into the future, as the construction of modernized socialism with Chinese characteristics enters a new era, we need to comprehensively increase the ecological civilization level, realize the goal of building a beautiful China, co-construct a

clean and beautiful world, provide Chinese wisdom and make Chinese contribution to the global sustainable development.

1. Looking back on the past forty years, the reform and opening-up policy and the social and economic progress drove the evolution of ecological & environmental management system. In return, "the once every ten years leap" of the environmental management system reform provides institutional guarantee for the coordinated development between the society, economy and environment

Officially starting in 1972, China's ecological and environmental protection has a history of 47 years round. During this period, about every ten years, the ecological and environmental management system had a significant improvement and "great leap". It developed originally from a temporary agency, namely the Leading Group of Environmental Protection of the State Council and its office, to the present Ministry of Ecology and Environment (MEE). From the perspective of the development of ecological and environmental protection, this is actually a

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¹ The *Three Wastes* are waste gas, waste water, and solid waste by industrial source.

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process of the step-by-step adaptation to the reform and opening-up policy and the continuous economic and social development. It is also the result of the continuous reform of the ecological and environmental management system and governance mode in the context of constant emergence of new ecological and environmental problems [1].

1.1. The first stage (1972–1988): the “first leap” took place during this period, from the Leading Group of Environmental Protection of the State Council to the State Bureau of environmental protection, an independent organization directly subordinate to the State Council, marking that the ecological and environmental protection occupies a position in the state macroscopic management system

Before 1972, environmental pollution had already occurred in many regions, but in our country people always believed that no environmental pollution existed in socialist countries, and industrial pollution was only the result of the capitalism. In June 1972, Chinese government sent a delegation to participate in the United Nations Conference on the Human Environment held in Sweden. Since then, the concept started to change. In August 1973, the State Council convened the first National Conference on Environmental Protection. The meeting reviewed and adopted the principle for environmental protection: “overall planning, rational layout, comprehensive utilization, turning harm into good, relying on the people, extensive participation, protecting the environment, and benefiting the people”, and the first environmental protection document of our country, i.e. the *Provisions on Protecting and Improving Environment*. In October 1974, the Leading Group of Environmental Protection of the State Council was officially established.

In December 1978, the Third Plenary Session of the Eleventh Central Committee of the Communist Party of China made the great decision on the reform and opening-up policy. The central topic of the meeting was to transfer the Party’s priority to the economic construction. Hereafter, starting from the rural household contract responsibility system, the acceleration of the reform and opening-up policy greatly unleashed the productivity. China established Shenzhen Special Economic Zone in August 1980, and further established the first group of open coastal cities (14) in 1984. The coastal regions began to open to the outside world and accepted a large number of labor intensive industries transferred from Japan, Republic of Korea, Hong Kong and Taiwan. Governments at all levels, all departments, village collectives and social organizations engaged in inviting investment, running enterprises and businesses. In many places, “economic activities permeated in every village and every household” became the true portrayal of socio-economic development at that time. Correspondingly, the ecological and environmental protection was brought on the right track since the implementation of the reform and opening-up policy.

Economic development and industrial transfer also brought about increasingly severe environmental problems which attracted the national authorities’ attention. In 1979, the formulation of the *Environmental Protection Law (Trial)* opened the establishment of the environmental legal system in China. Afterwards, the special legislation related to environmental protection was started. In August 1982, the Standing Committee of the National People’s Congress deliberated and adopted the *Marine Environment Protection Law*, followed by the *Law on the Prevention and Control of Water Pollution* and the *Law on the Prevention and Control of Air Pollution* which were adopted respectively in May 1984 and September 1987. In the meantime, our country started to strengthen the environmental management and organization construction. In May 1982, the 23rd Session of the Fifth Standing Committee of the National People’s Congress decided to combine the National Construction Committee, the State Urban Construction Administration, the State Construction Engineering Administration, the State Bureau of Surveying and Mapping and the Office of the Leading Group of Environmental Protection of the State Council, and established the Ministry of Urban and Rural Development and Environmental Protection which comprised the Environmental Protection Bureau. At the Second National Conference on Environmental

Protection in the end 1983, Li Peng, the then Vice Premier of the State Council, announced that the environmental protection would be a basic state policy we must adhere to for the long term. When the Environmental Protection Committee of the State Council was founded in May 1984, Li Peng, the then Vice Premier of the State Council, held the concurrent post of the Chairman of the Committee. Its administrative body was based in the Ministry of Urban and Rural Development and Environmental Protection (acted by the Environmental Protection Bureau). In December 1984, the Environmental Protection Bureau under the Ministry of Urban and Rural Development and Environmental Protection was changed to State Environmental Protection Bureau, but was still subordinate to the Ministry of Urban and Rural Development and Environmental Protection. It was a ministry’s subordinate body, but also the administrative body of the Environmental Protection Committee of the State Council.

In 1988, the Ministry of Urban and Rural Development and Environmental Protection was revoked and changed to the Ministry of Construction. The State Environmental Protection Bureau became a vice-ministerial level agency directly under the State Council - a functional department under the State Council for the integrated management of environmental protection, and its personnel, funds and materials were completely under its independent operation. In the same year, the Party Central Committee and the State Council conducted pilot reform of civil servants firstly in the State Environmental Protection Bureau, set up positions according to the workload of environmental protection, and recruited a large number of employees through nation-wide public examination. This reform laid a foundation for the specialized management of environmental protection in China.

1.2. The second stage (1989–1998): there was the “second leap”. During this period, the pressure of ecological and environmental protection continued increasing. The government implemented the environmental programme “33211”² and “one control and two compliances”. The State Environmental Protection Bureau was upgraded to the State Environmental Protection Administration in 1998

The speech delivered by Deng Xiaoping during his inspection in the South in 1992 drove a new round of economic boom and reform and opening-up in China. Led by the construction of Pudong New Area, the Yangtze River Delta region developed rapidly, the urban construction and industrial park thrived, nearly 10,000 economic development zones and industrial development zones were registered and constructed. However, it led to serious farmland occupation, ecological damage and environmental pollution. At that time, there was a common saying that “the water is fit to wash rice and vegetables in 1950s and for irrigating the land in 1960s, but the water quality deteriorates in 1970s, the fishes and shrimps die in 1980s, and the water is not fit to wash the toilet lids in 1990s”. The severe environmental pollution in the basins such as Huaihe River drew the attention of the whole society. At the same time, ecological damage, water and soil loss and desertification were increasingly prominent; sand storm became increasingly fierce in Beijing region; drying up of Yellow River, flood of Yangtze River and other mega ecological disasters took place frequently.

In order to solve these problems, the Standing Committee of the National People’s Congress expedited the legislation process of the ecological and environmental protection. In December 1989, the *Environmental Protection Law* was officially unveiled after amendment. In 1990s, the *Law on the Prevention and Control of Air Pollution* and the *Law on the Prevention and Control of Water Pollution* were amended; the *Law on the Prevention and Control of Solid Waste Pollution* and the *Law on the Prevention and Control of*

² The environmental pollution treatment programme “33211” refers to the pollution treatment of “33” three rivers (Huaihe River, Haihe River and Liaohe River) and three lakes (Dian Lake, Tai Lake and Chao Lake), “2” two control zones, i.e. sulfur dioxide and acid rain control zones, “11” one city (Beijing) and one sea (Bohai Sea).

Environmental Noise Pollution were formulated and enacted, thus preliminarily forming the legal system of ecological and environmental protection in China. In the meantime, the Chinese government launched the “33211” pollution control programme, which was the first large-scale pollution control action in the history of China. The “33211” programme firstly started from the pollution control of Huaihe River. According to the State Council’s plan, the waste water discharged by all key industrial enterprises in Huaihe River basin should basically meet the standards by midnight on December 31, 1997. Otherwise, the enterprises would be closed or suspended for operation. In 1995, on behalf of the State Council, Zou Jiahua, the then Vice Premier, and Song Jian, the then State Councilor, listened to the report on environmental protection, and required that by 2000 the country’s total pollutant discharge should be controlled at the level of 1995, the pollutant discharge of the environmental function zones as well as that of industrial pollution sources should comply with the standards, so-called “one control and two compliances”. During this period, the basic practice for controlling the total pollutant discharge was to strictly control the additional pollutant discharge by newly implemented projects. All additional pollutant discharged by newly implemented projects must be proportionately offset by the reduction of other pollution sources in the same region. In the meantime, the government implemented six major ecological construction projects including the conversion of cultivated land into forests.

Another important event during this period was the United Nations Conference on Environment and Development held in Brazil in 1992, which put forward the concept of sustainable development and adopted Agenda 21. China participated in this conference as a developing country, and formulated *China’s Agenda 21—White Paper of China’s Population, Environment and Development in 21st Century* in 1994, in which China established its own sustainable development goals. In 1998, the State Environmental Protection Bureau became the State Environmental Protection Administration, upgraded from vice-ministerial level to ministerial level. The functions of the Environmental Protection Committee of the State Council as well as the pollution control functions dispersed in various competent authorities of industrial sectors such as the Ministry of Power Industry were incorporated into the State Environmental Protection Administration.

1.3. The third stage (1999–2008): the “third leap” took place during this period. Major achievements include containing the rapid growth of the total quantity of main pollutants discharge, implementing total quantity control, promoting the development of circular economy and the construction of “resource-conserving and environment-friendly society”, and establishing the ministry of environmental protection (MEP)

After its accession to WTO in December 2001, China witnessed rapid social and economic development. The share of heavy & chemical industries such as energy, steel, chemical engineering increased continually. Their production capacity and output were among the highest in the world. The resource and energy consumption grew rapidly, and the total quantity of main pollutants discharge also increases greatly. Among the main targets in the 10th Five-Year Plan, the control of total discharge of sulfur dioxide did not fall but increased, alerting our government to implement stricter energy conservation and emission reduction policies for the control of total discharge. During the period of the 11th Five-Year Plan, the control of total quantity of main pollutants discharge and the decrease of energy consumption per unit of GDP, as binding indicators, were incorporated into the outline of the 11th Five-Year Plan, and broken down in the plans of all the provinces, autonomous regions and municipalities.

During the period of the 11th Five-Year Plan, the nationwide construction scale of environmental infrastructure and power plant desulfurization facilities exceeded the sum of those from the founding of the People’s Republic of China to the eve of the 11th Five-Year Plan. For this purpose, two policies played the core role: firstly, strict evaluation of the binding indicators for energy saving and emission reduction drove the construction of local major environmental projects; secondly, environmental economic policies particularly the desulfurization power price

boosted the construction of desulfurization projects in power industry. China has built the world largest clean coal power system so far.

New progress was also achieved in the legislation and law enforcement of ecological and environmental protection. In order to further improve the ecology & environment, we re-amended the *Law on the Prevention and Control of Air Pollution*, the *Law on the Prevention and Control of Water Pollution*, the *Law on the Prevention and Control of Solid Waste Pollution and the Marine Environment Protection Law*; and formulated the *Law on the Prevention and Control of Radioactive Pollution*, *Environmental Impact Assessment Law*, *Cleaner Production Promotion Law* and *Circular Economy Promotion Law*. With regard to environmental management organization, in order to solve the problems of difficult enforcement and local administrative intervention, the State Environmental Protection Administration established six inspection centers in the Northeast, North, Northwest, Southwest, East and South China as its local agencies in 2006. In July 2008, the State Environmental Protection Administration was upgraded to the MEP (ministerial level), and became a department of the State Council.

1.4. The fourth stage (2009–2018): there was the “fourth leap”. During this period, the construction of ecological civilization was incorporated into the five-sphere Integrated Plan³. we adhered to improving ecological and environmental quality as the core task, advanced the green development, firmly declared war against pollution, and established the Ministry of Ecology and Environment (MEE)

Since the 18th National Congress of the Communist Party of China, the Party Central Committee with Xi Jinping as the core has paid high attention to the ecological civilization construction and ecological and environmental protection, incorporated the ecological civilization construction into the Five-sphere Integrated Plan [2]; served upholding harmony between human and nature as one of the basic strategies for persisting and developing socialism with Chinese characteristics in new era, and green development as one of the new development concepts; firmly declared war against pollution; unveiled and implemented the three action plans⁴ for air, water and soil respectively; unveiled the *Master Plan of Ecological Civilization System Reform*, and established a series of important systems, such as central environmental inspection. According to the new requirements for ecological civilization construction, significant amendments were made to various laws, including the *Environmental Protection Law*, the *Law on the Prevention and Control of Air Pollution*, the *Law on the Prevention and Control of Water Pollution*, the *Law on the Prevention and Control of Solid Waste Pollution* and the *Marine Environment Protection Law*. The *Environmental Protection Law (revised in 2014)*, which is regarded as a law “with teeth”, has increased the quality of legislation and the deterrent effect significantly. With the adoption of the *Law on the Prevention and Control of Soil Pollution* by the National People’s Congress in 2018, China established a relatively complete legal system of ecological and environmental protection, and started to spearhead the construction of ecological civilization in the world.

In October 2017, the 19th National Congress of the Communist Party of China was convened successfully. The meeting proposed that the socialism with Chinese characteristics entered a new era, and the principal contradiction facing Chinese society has evolved to *the contradiction between unbalanced and inadequate development and the people’s ever-growing needs for a better life* [3].

As China entered a new era of socialism, significant changes also occurred to the demands for ecological and environmental management system: firstly, the institutional arrangement formed under certain development stage and the governance concepts shall change

³ The Five-sphere Integrated Plan is to promote coordinated economic, political, cultural, social, and ecological advancement.

⁴ The three action plans refers to the *Action Plan on Prevention and Control of Air Pollution*, *Water Pollution*, and *Soil Contamination* individually.

from “growth first” to “protection first”, which means that the competent authorities related to resources, ecological and environmental protection must play a more important role. Secondly, the functions of ecological and environmental protection need to move gradually from the previously dispersed management of resources and environment elements towards the conservation of the integrity and authenticity of ecosystem and the integrated management of ecology & environment. Thirdly, there was an evolution from ambiguous responsibilities between the owner and the regulator and the undivided role of “athlete” and “referee” to the separation of execution and supervision and the balanced roles. Fourthly, there was an evolution from ambiguous central and local administrative powers and unreasonable match of finance powers to clear delineation of rights and obligations, continuous optimization of administrative and financial allocations, and establishment of relatively independent monitoring, evaluation and regulation systems.

In March 2018, the First session of the Thirteenth National People’s Congress adopted the institutional reform scheme of the State Council. MEE was established, by integrating the pollution control functions of relevant elemental departments, adding the functions for climate change and marine environmental protection, and unifying the responsibilities for regulating ecology and urban and rural pollutants discharge. The institutional reform achieved the following results: firstly, according to the idea of super ministry system reform, we basically realized the super ministry system for unified regulation in the fields of pollution control, ecological protection and nuclear and radiation protection, thus laying an institutional foundation for solving fragmentation problem. This was also the highlight and characteristic of this reform. Secondly, we separated the construction and management responsibilities of the natural resources owner, and the regulators’ supervision and law enforcement responsibilities, to some extent, meeting the separation requirements of system design for execution and regulation. Thirdly, the unity and authoritative of ecological and environmental protection increased remarkably, so that the relevant departments can uniformly exercise the regulation and administrative law enforcement for ecology and various pollutants discharge in urban and rural areas, therefore practically perform the regulatory responsibilities. Certainly, a series of problems need to be solved so as to give full play to the efficacy of ecological and environmental management system reform. The ecological and environmental protection undertaking and management system reform stood at a new historical position and starting point, and strode towards the goals of building a moderately well-off society in an all-round way and constructing beautiful China.

The above review demonstrates that the forty years’ reform and opening-up in China is also the forty years’ continuous reform and great strides in the ecological and environmental management system.

2. Summarizing the forty years’ reform and opening-up, we focused on the needs of solving prominent environmental problems in different development stages, continuously reformed, innovated and developed the ecological and environmental governance system and mode

Our country established corresponding management systems in response to the prominent environmental problems in different periods, and adopted targeted governance mode which was proved really effective. There are many experience and lessons worth to be summarized. Following are the three main aspects.

2.1. Persist in solving environmental problems in the development, and build the ecological and environmental protection system suitable for the development stage with the mutually supportive theory and practice

In essence, the environmental issues are the development issues. They are generated from the development and need to be solved in the development. We should not only solve the problems step by step, but

also innovate the development concept. Since the reform and opening-up, China has continuously developed and put forward the concept of striking the balance between economy and environment as the guidance for ecological and environmental protection. In the first stage, we put forward the requirements for the Three-Synchronization and Three-Unification,⁵ requiring the whole society to pay attention to environmental protection in their economic, urban and rural construction activities. In the second stage, in the process of improving the environment of major basins and regions, we vigorously advanced the adjustment of economic structure, firmly closed the “Fifteen types of Small-size”⁶ industrial enterprises with heavy pollution such as small paper-making factories, and took actions to promote the realization of healthy economic development and environmental protection. In the third stage, we strictly implemented the system of total quantity control of pollutant discharge, and ensured the coordinated relationship between environment and economy at the macro level. In the fourth stage, we vigorously advanced the ecological civilization, advocated *lucid waters and lush mountains are invaluable assets*, and fundamentally integrated the relationship between economic development and environmental protection. Since entering the 21st century, China has put forward many new concepts, such as the circular economy (2003), the construction of resource-conserving and environment-friendly society (2004) and the low carbon development (2009). The report of the 18th National Congress of the Communist Party of China put forward the “Five-sphere Integrated Plan” including the ecological civilization construction (2012). All of these concepts reflect the continuously deepening understanding on the relationship between environment and development in China. The concept of each stage is not only the objective judgment on the social principal contradiction and national circumstances at that time, but also the continuity and development of the existing concept. The environmental problems together with the social and economic development drive the concept innovation, and the concept development in return provides the guidance for the ecological and environmental protection practices, thus building the ecological and environmental management system conforming to the characteristics at different development stages.

Since the early 1980s, China has established environmental protection as a fundamental state policy, put forward the Three-Synchronization and Three-Unification as strategic policies for environment and development, and has been striving to build an independent and authoritative environmental agency. However, due to the limitations of the specific development stage, there was a lack of awareness of the environmental management and environmental construction theory, and implemented a strategy of “development first”. The primary stage of socialism decided that our country should focus on economic construction. In some regions, the one-sided emphasis of “development is the absolute principle” led to compelling function of economic development and relatively weak function of environmental protection which lack authoritative in the government functions and management system. This was determined by the stage of economic development. However, with the change of situation, the government management concept of the ecological and environmental protection developed steadily. We gradually defined the differences between government environmental management and enterprise environmental treatment, and the differences between environmental management and environmental construction.

⁵ Three-Synchronization and Three-Unification (of national environmental protection guideline) are: to plan, implement and develop economic, urban and environmental construction simultaneously; and to realize the integration of economic, social and environmental benefits.

⁶ The Fifteen types of Small-size enterprises are 15 specified kinds of industries with heavy environmental pollution, or small-size factories that damage resources, have poor product quality and backward technical equipment, and fail to meet the conditions of safe production (including paper making, leather making, dyestuff, bleaching and dyeing, electroplating, pesticide, coking, oil refining, gold dressing, and the sulfur, arsenic, mercury, lead zinc, asbestos products or radioactive product manufacturing industries).

We established the State Bureau of Environmental Protection which was directly subordinate to the State Council and no longer managed by the Ministry of Urban and Rural Development and Environmental Protection, which is primarily responsible for construction and development, thus reflecting the relative independence between development and environment with regard to institutional arrangement.

Since entering the new century, under the guidance of a series of development concepts, China's ecological and environmental management system has obviously expanded the functions of integrated management, planning and policy coordination, in the context of the emergence of huge environmental costs resulted from the rapid social and economic development with a concept of growth as the top priority. In around 2003, the former State Environmental Protection Administration formulated *National Environmental Safety Strategy Report*, which pointed out that, in our country, the environmental costs paid for economic development in many regions have offset the benefits of economic growth. The report called upon to understand the importance of ecological and environmental protection in the national development from the perspective of "safety", which was profound and forward thinking at that time. More and more people realized that the environmental issues are indeed the economic issues, and the ecological and environmental protection requires the economic development pattern transition and comprehensive decision-making. Such concept influenced the reform direction of national institutional framework for environmental management. It was not only reflected by the upgrading of the State Environmental Protection Administration to MEP, a ministerial-level department of the State Council with deliberation power, but also by the augmented involvement of various economic departments into the ecological and environmental protection, through playing an important role in energy conservation and emission reduction, circular economy and low carbon development.

With regard to the circular economy, at the Second Assembly of the Global Environment Facility in 2002, Jiang Zemin, the then President of China, pointed out that the sustainable development goal can only be realized by the circular economy based on the most efficient use of resources and environmental protection. By learning the experience of German and Japan and on the basis of the results of local pilot projects, our country promulgated the *Circular Economy Promotion Law* in 2008 implemented the circular economy policies for minimization, recycling and resource recovery, so as to realize the "from cradle to cradle" whole-process circular economy development. Besides, the energy consumption intensity, carbon emission intensity and resource output rate were incorporated into the planning outline of 12th Five-Year Plan. At present, focusing on solving the municipal waste problem, our government further advocates the construction of "urban mine", designs a special fund for the development of circular economy, launches the pilot implementation of "zero-waste city", and fosters resource recycling industries.

With respect to the low carbon development, the carbon emission control is deemed as a major environmental issue internationally. In China, it is always an important issue of development transition. Therefore, China's low-carbon transition is an intrinsic requirement for realizing sustainable development and a basic path towards the ecological civilization. In the past few years, taking improvement of energy efficiency, reduction of carbon dioxide emission intensity, development of non-fossil energy and increase of forest stock as the binding indicators, we have promoted the transformation of development pattern and the adjustment of industrial structure and energy structure, and achieved remarkable results for energy conservation, emission reduction and climate change response. In 2017, the carbon dioxide emission per unit of gross domestic product (GDP) of our country decreased by 46% compared with that in 2005, equivalently a reduction of 4.1 billion tons of carbon dioxide emission, which has exceeded the upper limit goal of reducing the carbon emission intensity by 40–45% by 2020 that China committed openly. The institutional reform in 2018 transferred the climate change response from comprehensive economic department to

MEE, showing that the Party Central Committee's understanding on this issue was brought to a new height.

Since the 18th National Congress of the Communist Party of China, the ecological civilization construction has been upgraded as a concept of the ruling party. China transforms gradually from "growth first" to "protection first". It significantly promotes the consciousness of ecological and environmental protection, and adds new momentum to the reform of ecological and environmental management system. In 2015, the Party Central Committee and the State Council issued the *Opinions on Accelerating the Promotion of Ecological Civilization Construction*. This is a summary of more than 40 years' ecological and environmental protection experience and an integrated innovation of policies and systems. The ecological environmental protection is incorporated into the "Five-sphere Integrated Plan" together with politics, economy, society, culture and ecological civilization, while the internationally accepted sustainable development concept mainly refers to the sustainability of economic, social and environmental dimensions. According to the institutional reform scheme of the State Council in 2018, on the basis of the principle that one duty should be dealt with by one department, and the owner should be separated from the regulator, our government established MEE. This greatly enhanced the authoritativeness of this department. And we started to build the institutional system of "strict control at source, strict management in process, strict punishment for infringement, and investigation for responsibility". The ecological and environmental protection was embedded into every link of production, circulation and consumption, forming a long-term mechanism of ecological and environmental protection optimizing the economic development with incentives and restrictions of equal importance.

2.2. Place the improvement of ecological and environmental quality at the core, adopt comprehensive measures and continuously strengthen the people's sense of fulfillment as they contribute to and gain from environment

Since the implementation of the 13th Five-Year Plan, according to the goal requirements centered on environmental quality, we have implemented the transition of environmental management, which was essentially the transition of management with total quantity control as the core in the periods of the 11th Five-Year Plan as well as the 12th Five-Year Plan. Reviewing in a longer history, our government has always been emphasizing that environment is people's livelihood. We should place the environmental quality improvement at the core, and realize satisfactory environmental quality by using both incentive and restriction policies and measures.

During the implementation of the "33211" environmental programme in the early days, we developed the "one control and two compliances" system which focused on regions, basins and cities and on the basis of environmental function division.⁷ The enterprises' discharge shall meet the standards. The local governments shall realize satisfactory environmental quality according to the environmental function division. In case that the enterprises meet the discharge standards but the regional environmental quality doesn't meet the standards, the total quantity control of discharge will be applied in this region. This reflects the organic connection between the goals and the means of environmental quality improvement.

At the specific development stage, the pollution control project implemented in China in the mid-1990s played a role of containing the pollution deterioration trend. The environmental quality in some major basins and regions improved obviously. During the periods of the 11th Five-Year Plan and the 12th Five-Year Plan, China implemented the energy conservation and emission reduction strategy centered on total

⁷ Environmental function division refers to defining and dividing different levels of environmental quality standards according to the social environment, social function, natural environmental condition and environmental self-purification capacity of the region.

quantity control. The underlying logic was that the discharge quantity of major pollutants has exceeded the environmental capacity at that time, and the environmental quality was declining constantly. In this context, our government determined to restrain the constantly declining trend of environmental quality through reducing the total quantity of pollutant discharge. For this purpose, we established a complete set of management systems for reducing total quantity of discharge, including the establishment of the Total Quantity Control of Pollutant Discharge Department in the environmental protection agency. Up to now, the total quantity control has achieved remarkable progress. Based on the observation data of NASA (USA) satellites and meteorology aircraft, some studies show that China's sulfur dioxide emission dropped by more than 70% from 2005 to 2016.

Since the execution of the 13th Five-Year Plan, China has implemented the environmental governance model centered on improvement of ecological and environmental quality, and deeply advanced the action plans for air, water and soil. Air quality, water quality and other indicators closely related to the people's livelihood were for the first time incorporated into the planning outline of the 13th Five-Year Plan, and became binding indicators. In order to strengthen the work for environmental quality improvement, MEP established three departments for air, soil and water in 2017, replacing the original Pollution Control Department and Total Quantity Control Department. The responsibility of managing these three environmental media with clear quality requirements fell upon the core business departments. In 2018, the Central Committee of the Communist Party of China and the State Council issued *Opinions on Comprehensively Strengthening Ecological and Environmental Protection and Firmly Winning the Battle against Pollution Control*, establishing the overall goal, namely, by 2020, the ecological and environmental quality improves generally, the total discharge quantity of major pollutants decreases significantly, the environmental risks are effectively controlled, and the ecological civilization construction level matches the goal of building a moderately well-off society in an all-round way [4].

2.3. Adhere to establishing and improving the ecological and environmental governance system led by the party committee, dominated by government, driven by market, implemented by enterprises and participated by the public; properly implement the principles of "party and government sharing same responsibilities, and one position bearing two responsibilities"; promote joint management and public mobilization to maximize the efficacy

Looking back the forty years' history of environmental protection, before 2012, we stressed to strengthen the environmental protection with government leadership, corporate governance and unified regulation, but imposed insufficient requirements on enterprises for the entity responsibilities. While the emphasis was placed on the principal role of government's regulation and administrative management, we had inadequate market driving mechanism, and both under-participation and over-participation problems for the public participation in the environmental protection due to a lack of effective guidance. Therefore, in the future, we need to further give play to the role of market in resource allocation, strengthen the construction of economic incentive mechanism, and gradually form a "collaborative governance" pattern with mutual support and supervision between the government, the enterprises and the public.

In this pattern, it is vital to establish a working mechanism that pays high attention to comprehensive coordination between various departments with clear division of responsibilities, and promotes joint management. Since the establishment of the national ecological and environmental organization, its main duty is to coordinate various departments, committees, offices and bureaus to implement the environmental protection strategies and tasks. "Party and government sharing same responsibilities" and "one position bearing two responsibilities", especially the latter, have their historical origin. Since the establishment of the Environmental Protection Work Leading Group Office of the State Council, we have implemented the joint management by various

departments and "one position bearing two responsibilities" as the management mode. From 1984 to 1998, the State Council established the Environmental Protection Committee, the Chairman of which was concurrently assumed by the Vice Premier in charge. During this period, the State Council convened all departments to discuss the environmental protection every quarter. The State Bureau of Environmental Protection was responsible for coordinating all departments to implement the environmental protection tasks and instructions. All departments had the corresponding responsibilities for environmental protection, and reported at the conference of Environmental Protection Committee periodically. This was the embryo of "one position bearing two responsibilities" we actively propose at present.

In 1998, while the State Environmental Protection Administration was established, the Environmental Protection Committee of the State Council was revoked. The status of the national environmental competent authority itself was lifted, but the capability of comprehensive coordination was affected to some extent. In order to highlight the importance of the environmental protection, the government decided to, in the name of the Party Central Committee and the State Council, hold a high-level "Central Symposium on Population, Resources and Environment" once every year. The Symposium is chaired by the General Secretary of the Central Committee of the Communist Party of China, and participated by all ministers, secretaries of provincial Party Committees and provincial governors. It produced good effect in certain period.

We persist in mobilizing the local authorities to proactively advance environmental protection through the management system with both restrictions and incentives. In the aspect of restrictions, since the 11th Five-Year Plan, we have pushed forward to perform the environmental protection responsibilities at regional level through the binding indicators of energy conservation and emission reduction. After the 18th National Congress of the Communist Party of China, China put forward the requirement of "party and government sharing same responsibilities" for ecological and environmental protection, and advance this requirement through the central environmental inspection system. In the aspect of incentives and encouragement, the typical cases include the construction of national environmental protection model city and the construction of ecological province, city and county. The national environmental protection model city was proposed during the period of the 9th Five-Year Plan. The first batch of environmental protection model cities were awarded in 1997, including Zhangjiagang and Dalian. Afterwards, there were nearly 100 cities successively applying for the nomination of environmental protection model city. The construction of environmental protection model city greatly enhanced cities' enthusiasm for environmental protection, their capability and management level. Its advantages were low cost, good effect, high local enthusiasm and sustainability. On the basis of national environmental protection model city, we further implemented the construction of ecological province, city and county.

2.4. Gradually establish and form a complete legal system of ecological and environmental protection, clearly define the legal responsibilities of the government, the enterprises and the public for protecting the ecology & environment, and establish a management system relatively conforming to the circumstances of environmental protection in China

During the forty years' reform and opening-up, China has successively revised and formulated the Constitution, the *General Principles of the Civil Law*, the *Property Law*, the *Tort Liability Law*, the *Criminal Law* and some other fundamental laws. These basic laws comprise a series of legal norms related to resource utilization and ecological and environmental protection. For example, the *General Principles of the Civil Law* and the *Property Law* stipulate relatively comprehensive norms for the ownership and various usufructs of natural resources. The *Tort Liability Law* has a particular chapter to stipulate the tortious liabilities for environmental pollution damage. The *Criminal Law* has a distinct chapter to stipulate the "crime of vandalizing environment and resource conservation". A series

of basic legal norms were formulated in order to protect the ecology and environment, and promote the rational utilization of resources.

In the meantime, many other laws related to industrial promotion, energy transition and the spatial planning of national land, such as the *Cleaner Production Promotion Law*, the *Circular Economy Promotion Law*, the *Urban and Rural Planning Law* were successively formulated, to certain extent, laying legal foundation for promoting green economy transformation and rational spatial planning of national land. Furthermore, we successively formulated more than 10 laws related to ecological and environmental protection and pollution prevention and control, including the *Environmental Protection Law*, the *Marine Environment Protection Law*, *Law on the Prevention and Control of Water Pollution*, *Law on the Prevention and Control of Air Pollution*, *Law on the Prevention and Control of Solid Waste Pollution*, *Law on the Prevention and Control of Environmental Noise Pollution*, *Law on the Prevention and Control of Soil Pollution*, *Law on the Prevention and Control of Radioactive Pollution*, *Environmental Impact Assessment Law*, *Wild Animal Conservation Law*, *Soil and Water Conservation Law*, *Law on Preventing and Controlling Sand*, and *Island Protection Law*, thus forming a relatively complete environmental legal and regulatory system. At every major link of ecological and environmental protection and pollution prevention and control, we gradually established and formed corresponding administration system and technical specification. In the aspect of the permission project construction, we established the environmental impact assessment (EIA) system and the Three Simultaneous system.⁸ In the aspect of regulation and inspection, we established the systems relating to pollutants discharge license, total quantity control, on-site inspection, accident emergency, time-bound treatment, compulsive phase-out and administrative compulsive measures. In the aspect of responsibility investigation for environmental pollution and damage, we have formed the systems of administrative, civil and criminal legal responsibilities. In the meantime, we gradually expanded the application of environmental economic means, such as extending the collection scope of pollutant emission charges, increasing the standards, and putting into practice on pilot basis the environmental insurance and emission trading systems in various regions. The social management system began to be part of environmental protection management. The environmental information disclosure and public participation gradually became institutionalized and routinized.

3. Gather the achievements of reform and opening-up, construct ecological civilization and beautiful China, co-build a clean and beautiful world, provide Chinese wisdom and make Chinese contribution to the ecological civilization and sustainable development in the world

The 19th National Congress of the Communist Party of China established the strategic goal of constructing beautiful China and set the beautiful vision of co-building a clean and beautiful world [3]. By 2035, the quality of ecology and environment will be essentially improved, the goal of beautiful China will be realized basically. In the middle of this century, a prosperous and strong, democratic, civilized, harmonious and beautiful socialist modernized country will be built. The realization of this goal will not only build China into a modernized industrial, economic and ecologically civilized powerful country, but also produce enormous influence and contribution to the world. The Chinese concept, Chinese wisdom and a Chinese approach will provide more beneficial reference for the vast developing countries to pursue the modernization road with green development and economic and social prosperity.

⁸ The Three Simultaneous system refers to the Article 41 of the *Environmental Protection Law* that “the facilities for pollution treatment in construction projects shall be designed, constructed and put into use simultaneously with the main works”.

3.1. Deeply advance the reform of ecological and environmental management system in new era, and build a new pattern of ecological and environmental management system suitable for constructing beautiful China

The reform of ecological and environmental management system in our country cannot be accomplished overnight, neither be done once and for all. We need to further comprehensively deepen the reform by focusing on transforming functions, improving efficiency, strengthening mechanism innovation and capacity building.

Firstly, we should accelerate the transformation of functions and clearly define the responsibilities, and improve the ecological and environmental management system to match the modernization of governance system and governance capacity. In this aspect, we should further straighten out the responsibility relations among government departments with an emphasis on ecological protection regulation, climate change response, natural protected area regulation, regional basin institutional framework, and balance of financial resources and tasks at central and local levels, which demand prompt solution and improvement.

Secondly, we should accelerate the integration and transformation of related functions within departments. Aiming at continuously improving the environmental quality, we should further define the coverage and relationship of various systems, and highlight the role of core systems; establish a collaborative mechanism for controlling conventional pollution and tackling climate change; pay attention to the responsibility consolidation and capacity improvement of local authorities to cope with institutional reform; accelerate the building of natural protected area system with national park as the main entity; and promote the institutional reform of the national park.

Thirdly, we should strengthen the mechanism construction and innovation, integrate the functions for ecological civilization construction, and strengthen the system operation efficacy. The super-ministry system of ecological environment can deal with the coordination of all elements inside the environment, but it's necessary to further straighten out the mechanism to handle the relations between the ecology & environment and natural resource management as well as economic development. It is suggested establishing the central ecological civilization construction steering committee in due time, and formulating China's green transformation strategy and its roadmap, schedule and priority.

Fourthly, we should strengthen the building of modern ecological and environmental governance system. The tasks include gradually forming a “collaborative governance” pattern with mutual support and supervision between the government, enterprises, society and public, so that the government's unified management of natural resources conservation and independent regulation of environmental protection can be truly effective; further improving the market system of ecological and environmental protection and stimulating enterprises' vitality; further improving the management and supervision mechanisms for the social organizations and the public to participate in the ecological and environmental protection.

Fifthly, we should comprehensively strengthen the capacity building of natural resources and environment departments. In this aspect, we may continuously improve the investigation, monitoring, statistics and assessment systems of the natural resources and ecology & environment departments, especially strengthen the guidance to local government agencies and improve their capacity, so as to accomplish the increasingly management tasks.

3.2. Aim at the strategic goal of constructing beautiful China, accomplish top-level design, and conceive strategic roadmap, schedule and implementation path

More than forty years of experience shows that the ecological and environmental protection covers a wide range of areas and faces complicated and changeable situations which vary with different regions. If there is no explicit strategic goal, the ecological and environmental protection will be fragmented and cannot form a combined force. In the past, through seven national environmental protection conferences and

national ecological and environmental protection conferences, five-year environmental protection plan and a series of action plans, we clearly defined the environmental strategic goals and orientations of various stages, and implemented with specific work steps. On this basis, we focused on key problems, reformed the institutions and mechanisms, improved policies and systems, and continuously enhanced the ecological and environmental protection work. In retrospect, this should also be the basic idea for promoting the modernization of governance system and governance capacity in the field of ecological environment.

With the goal of constructing beautiful China by 2035 and by the middle of this century, we should take into account the change of the principal contradiction facing Chinese society in new era, under the guidance of Xi Jinping Thought on Ecological Civilization, adhere to the principle of *giving high priority to conserving resources, protecting the environment and promoting its natural restoration*, properly handle the problem of coordination between high quality development and high-level protection, adhere to ecology first and green development, continuously enhance the capacity of supplying high quality ecological products, and satisfy the people's increasing demands for sound ecology and environment.

We should set a long-term vision and systematically conceive the main objectives and primary tasks for the areas including ecological protection, environmental governance, resource and energy safety, climate change response; push forward collaborative control, collaborative protection and collaborative governance; fight against pollution in a coordinated manner; clearly define the medium and long-term goals and the important phased tasks for 14th Five-Year Plan, 15th Five-Year Plan, by 2035 and by the middle of this century; realize the substantial improvement of ecological and environmental quality by 2035 and holistic enhancement of ecological civilization by 2050.

3.3. Keep focused on China while stay connected with the world, adhere to green development, proactively tackle climate change, contribute Chinese wisdom, and co-construct a clean and beautiful world

China's construction of ecological civilization and ecological and environmental protection are crucial contributions to the global ecological and environmental protection. The ecological and environmental protection accomplishment achieved over forty years, especially since the 18th National Congress of the Communist Party of China, demonstrate that China has the ability and availability to pursue a brand new green development path with harmony between human and nature.

China actively participates in the climate change negotiations, promotes the conclusion of the *Paris Agreement*, actively spearheads the post negotiation process of the *Paris Agreement*, promotes the establishment of a fair and reasonable, cooperative and win-win global climate governance system, and pushes forward the *building of a community with a shared future for mankind*. China will also work together with other countries to strengthen the South-South cooperation and the construction of the green Belt and Road,⁹ and strengthen the cooperation with international organizations and multilateral financial institutions, so as to build consensus, take actions, undertake win-win cooperation, and contribute a *Chinese approach* for tackling the global climate change.

China will unswervingly fulfill its commitments to make greater contribution to green and low-carbon development in the world. We need to clearly understand the relations among climate, environment and economy, dealing with the reduction of carbon emission and environmental pollution in the overall situation of socio-economic development. We should mobilize the whole society, so as to realize the goal of carbon emission peak in 2030 and the goal of building beautiful China with

substantial improvement of ecology and environment in 2035, contribute Chinese thought, Chinese wisdom and Chinese approach to the world, and co-construct a clean and beautiful world [5].

Through forty years' reform and opening-up, China has achieved unprecedented economic performance, but also faces a series of prominent substantive problems. At present, the construction of ecological civilization and ecological and environmental protection enter the critical period, tough-fight period and window period, the Party Central Committee established the strategic goal of constructing beautiful China. The mission is glorious, the challenge is huge and the task is arduous. It requires the whole nation especially the environmental professionals to take continuous efforts. We expect to ultimately realize the goal of building a beautiful China through the joint efforts of several generations, and usher in the era of global ecological civilization.

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⁹ This is under the overall Silk Road Economic Belt and 21st Century Maritime Silk Road Initiative.