China's Policies and Actions for Addressing Climate Change （2016）

National Development and Reform Commission

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Contents

Foreword

Climate change is a major challenge facing the human race in regard to their survival and development in the 21st century. It has become the global consensus and trend to proactively address climate change and promote the green and low-carbon development. The Chinese government attaches great importance to addressing climate change. During the 12th Five-Year Plan (FYP) period (2011-2015), China puts the green and low-carbon development as an important component of ecological civilization construction and a crucial opportunity to accelerate the shift in the country's economic development mode and promote the economic restructuring. China has made remarkable progress in combating climate change by carrying out strong policies and taking concrete actions to curb greenhouse gas (GHG) emissions and enhance national capabilities on climate change adaptation. During the 12th FYP period, the top-level design and institutional construction for low-carbon development were strengthened, while a series of major policies were issued to address climate change, including the *Work Plan for Controlling GHG Emissions During the 12th FYP Period*, the *National Plan on Climate Change (2014-2020)* and the *National Strategy for Climate Adaptation*. The development of low-carbon

pilots and demonstration and carbon trading market has also seen progress, and distinctive low-carbon development patterns have formed. The international cooperation on climate change has been gradually enhanced, playing an important role in the conclusion of the *Paris Agreement* in December 2015. Remarkable achievements have been made to promote the South-South cooperation. According to a preliminary calculation, during the 12th FYP period, China's energy-related carbon dioxide emission per unit of GDP was reduced by 20 percent, exceeding the compulsory target of 17 percent reduction previously proposed, which has laid a good foundation for achieving the goal of cutting carbon dioxide emission per unit of GDP by 40 percent - 45 percent from the year 2005 to 2020.

This annual report has been issued to enable all parties to fully understand China's actions and policies and accomplishments in addressing climate change during the 12th FYP period.

I. Mitigating Climate Change

The Chinese government, conforming to targets set in the 12th FYP period, has achieved positive results in mitigating climate change through a series of policies, including adjusting the industrial structure, optimizing the energy structure, conserving energy and improving energy efficiency, controlling GHG emissions from non-energy activities and increasing carbon sinks.

(I) Adjusting the Industrial Structure

Speeding up elimination of backward production capacity. In 2011, the Ministry of Industry and Information Technology (MIIT) and relevant ministries jointly released the *Notice of Issuing the Implementation Plan to Assess the Work of Eliminating Backward Production Capacity*, enhancing the examination and assessment of the ongoing work to eliminate backward production capacity. In 2012, the MIIT issued the *Notice of Issuing the Objectives of Eliminating Backward Production Capacity in 19 Industrial Sectors*. In 2013 and 2014, the first and second lists were issued of enterprises to be eliminated in the 19 industrial sectors. In 2013, the State Council issued the *Guidelines to Tackle Serious Production Overcapacity*, laying out the measures to deal with the problem,

including controlling the growth of new projects and eliminating outmoded capacity, improving production quality and promoting efficiency, transformation and upgrading, and low-carbon development. Thanks to the efforts of all sides, during the 12th FYP period, China eliminated backward production capacity in the following industries: iron smelting (90.89 Mton), steel production (94.86 Mton), electrolytic aluminum (2.05 Mton), cement (clinker and mill capacity, 657 Mton) and plate glass (169 million weight cases).

Promoting transformation and upgrading of traditional industries. In 2011, the National Development and Reform Commission (NDRC) released *the Guideline Catalogue for Industrial Restructuring (2011 Edition)*, revising it in 2013 in a bid to achieve China's target for conserving energy and reducing emissions by optimizing and upgrading its industrial structure. The NDRC, along with the MIIT and other relevant ministries jointly issued a series of policy documents, including the *Plan for Industrial Transformation and Upgrading (2011-2015)*, the *Guidelines on the Layout Adjustment and Transformation of Key Industries* and the *2014 Special Action Plan on Green Industrial Development*, which aimed to establish a number of pilot projects and promote the upgrade of key traditional industries. In 2015, the State Council released the *Made in China 2025*, setting forth such

strategic tasks as improving innovative design capability, enhancing energy efficiency, promoting green transformation and upgrading and resolving overcapacity in traditional industries. The MIIT promoted the green transformation pilots of industries in some regions. As many as 11 Chinese cities, including Baotou in Inner Mongolia Autonomous Region and Zhangjiakou in Hebei Province, have obtained approval for the implementation plan of pilots in a bid to explore new paths and patterns in green and low-carbon transformation.

Supporting the development of strategic emerging industries. In 2012, the State Council released the *Development Plan for National Strategic Emerging Industries During the 12th FYP Period*, highlighting key areas in seven strategic emerging industries, and then released special plans for the seven strategic emerging industries in succession. In 2013, the State Council issued the *Opinions on Accelerating the Development of Energy Conservation and Environmental Protection Industries*, which proposed significant improvement of the technology level of energy conservation and environmental protection industries. In 2015, the State Council approved the establishment of a national venture capital fund for emerging industries, with the total capital scale of RMB 40 billion, to mainly support innovative enterprises in the startup stage.

Accelerating development of the service industry. Since 2012, the State Council has released the *Development Plan for the Service Industry During the 12th FYP Period* and the *Guidelines on Accelerating the Development of Producer Service Industries to Promote Industrial Restructuring and Upgrading*, providing a better policy and institutional environment for service industry development. The *Made in China 2025* plan clearly puts forward three major tasks: promoting service-oriented manufacturing, accelerating the development of producer service industries and strengthening the construction of service function area and public service platform. *The Report on the Work of the Government* in 2015 unveiled the Internet Plus action plan, promoting the process of informatization and industrialization. In 2016, the Ministry of Finance (MOF) and other ministries issued the *Guidelines for Establishing a Green Financial System*.

Remarkable accomplishments have been achieved in industrial restructuring during the 12th FYP period. The industrial sector's contribution to GDP in 2015 dropped by 5.7 percentage points from the 2010 level, while the service industry's contribution to GDP increased by 6.1 percentage points. Industrial restructuring played an important role in meeting the national target of carbon intensity reduction.

(II) Optimizing the Energy Structure

Imposing strict control over coal consumption. In 2014, the State Council issued the *Energy Development Strategy Action Plan (2014-2020)*, including measures for reducing coal consumption and finding alternatives, reducing the proportion of coal consumption, and cutting the regional total coal consumption in the Beijing-Tianjin-Hebei-Shandong region, Yangtze River Delta region and Pearl River Delta region. In order to ensure the implementation of the *Air Pollution Prevention and Control Action Plan*, relevant ministries released the *Work Plan for Strengthening Total Coal Consumption Control in Major Air Pollution Control Cities*, proposing that the top 10 cities with the worst air quality should achieve negative growth in total coal consumption compared with the previous year. The average annual growth rate of total coal consumption was 2.6 percent during the 12th FYP period, down 4.9 percentage points from the 11th FYP period. In 2015, the total coal consumption was 3.96 Gton, down 3.7 percent from 2014.

Promoting the clean utilization of fossil fuel. The *Opinions on Promoting Safe, Green Exploration of Coal and Efficient*, *Clean Utilization of Coal* and the *Action Plan for Clean and Efficient Use of Coal (2015-2020)* were published to promote the transformation of coal development pattern, improve the exploration and utilization

performance of coal resource and promote the clean and efficient utilization of coal. In 2014, the MOF and the State Administration of Taxation (SAT) jointly issued the *Notice of Implementation of Coal Resource Tax Reform*, under which tax will be calculated ad valorem in order to promote the intensive use of resources and environment protection. In 2016, China advanced resource tax reform in a comprehensive manner and expanded the coverage of resource tax, with an intention to full play the adjustment role of taxation. During the 12th FYP period, the energy consumption per KWh of thermal power units (with capacity of 6,000 KW and above) dropped by 18 gce accumulatively, and backward thermal power units with a total generating capacity of 28 GW were eliminated. Over 1,000 backward coal mines with a total production capacity of more than 70 Mt were shut down and the use of commercial coals with poor quality was forbidden. China has improved the scale and level of natural gas utilization. In 2015, the ratio of natural gas in total energy consumption reached nearly 6 percent. The structure of natural gas utilization became more rational, and the proportion of urban gas and natural gas-fired electricity generation both increased.

Promoting the development of non-fossil energy. The MOF, the NDRC and the National Energy Administration (NEA) jointly formulated and released the *Interim Measures on the Management*

of Collection and Utilization of the Renewable Energy Development Fund and the *Interim Measures on the Management of the Additional Renewable Energy Surcharge Fund*. The NDRC issued the *Administrative Measures on Protective Full Purchase of Renewable Energy Generation*. These policies ensured the priority development of renewable energy by supporting the compensation for renewable energy fee. By the end of 2015, the national installed power capacity reached 1.525 TW, within which the capacity of hydro, nuclear power, on-grid wind and on-grid solar PV power reached 320 GW, 27.17 GW, 130.75 GW and 42.18 GW respectively, increasing by 0.5 times, 1.5 times, 3.4 times and 164 times respectively over the 2010 levels. This drove up the ratio of non-fossil fuel consumption by 2.6 percentage points. In 2015, the total power generation of non-fossil fuels, including hydro, nuclear, wind and solar, occupied 27 percent of China's total power generation.

Accelerating energy reform. In 2015, China issued the *Opinions on Further Deepening the Power Sector's Reform*, which promoted the reform of electricity pricing system, power trading system, power generation and utilization plan and power sale. A series of policies such as the *Implementation Opinions on Promoting the Reform of Power Transmission* and *Distribution* and the *Implementation Opinions on Promoting the Construction of*

Electricity Market were released. In October 2014, the city of Shenzhen took the lead in launching a price reform pilot for power transmission and distribution. So far, China has entered the acceleration stage of power sector reform, with 13 provinces (autonomous regions and municipalities), such as Inner Mongolia Autonomous Region, Ningxia Hui Autonomous Region and Yunnan Province, setting up comprehensive reform pilots.

(III) Conserving Energy and Improving Energy Efficiency

Enhancing the assessment and management of energy-saving accountabilities. In 2011, the State Council issued the *Comprehensive Work Plan on Energy Conservation and Emission Reduction During the 12th FYP Period*, allocating energy conservation targets to local governments, implementing an assessment system and releasing quarterly reports on the completion of energy conservation targets in each region. In 2014, it released the *Action Plan on Energy Conservation, Emission Reduction and Low-carbon Development (2014-2015)*, which made a comprehensive arrangement for work on energy conservation, pollutant emission reduction and carbon emission reduction in 2014 and 2015. During the 12th FYP period, the NDRC, together with other relevant ministries, made an assessment of the completion of energy conservation targets by provincial governments. The results

were used as a reference to evaluate the comprehensive performance of leading teams and officials of local governments and incorporated into the government performance management system.

Improving energy efficiency standards and labeling. China further deeply advanced the implementation of the Project of Promoting One Hundred Energy Efficiency Standards and issued 221 national energy conservation standards during the 12th FYP period. The Certification and Accreditation Administration (CNCA) and the NDRC jointly released the *Certification Rules of Energy Management System*. The General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) and the NDRC jointly issued the *Management Measures for Certification of Energy-Saving and Low-Carbon Products* to promote the development of energy-saving certification industry. In 2014, seven ministries including the NDRC jointly issued the *Notice of Publishing the Implementation Plan for the Energy Efficiency Leaders Scheme*, and its scope of implementation covered end-use products, energy-intensive industries and public institutions. In 2015, China worked out the detailed implementation rules for the Energy Efficiency Leaders scheme and launched the evaluation and selection of products and enterprises as Energy Efficiency Leaders.

Promoting energy-saving technologies and products. The MIIT issued the *Industrial Energy Conservation Plan for the 12th FYP Period*, providing guidance to the promotion of green development in the industrial sectors. The *2013 Implementation Plan for the Special Action of Industrial Energy Conservation and Green Development* released by the MIIT and the *Opinions on Enhancing Energy Conservation and Emission Reduction in Internal Combustion Engine Industry* issued by the State Council greatly advanced the energy-saving transformation of the motor system and boosted the publicity and application of new energy-saving and emission-reducing technologies and products for internal combustion engines in key industries. The NDRC released the *Interim Management Measures for the Promotion of Energy-Saving and Low-Carbon Technologies*, and the fourth and fifth editions of the *Catalogue for the Promotion of National Key Energy-Saving Technologies*. The MIIT released the *Catalogue for National Key Advanced Energy-Saving Technologies for Motors* and the *Guidance Catalogue of Energy-Saving Technologies for Communications Industry*, promoting key energy-saving and emission-reducing technologies in related industries. The MIIT has compiled six editions of the *Catalogue of Recommended Energy-Saving Mechanical and Electrical Equipment (Products)*, and issued the *Catalogue of Energy Efficiency Star Products*. It has also carried out the project of bringing the benefits of

energy-efficient products to the people, and promoted the usage of energy-efficient products, such as energy-saving air conditioners, energy-saving vehicles, energy-efficient electrical machines and green lighting products.

Boosting energy conservation in building area. The Ministry of Housing and Urban-Rural Development (MOHURD) has actively promoted energy conservation in building area by issuing a series of documents, such as the *Special Energy Conservation Plan for Buildings During the 12th FYP Period* and the *Notice of Further Promoting Energy Conservation in Public Buildings*. During the 12th FYP period, heating measurement and energy efficiency renovations have been completed on one billion square meters of existing residential buildings in northern heating regions of China, and energy efficiency renovations have been carried out on 70.90 million square meters of existing residential buildings in regions with hot summers and cold winters. By the end of 2015, all new urban residential and public buildings began to follow a higher level of energy-saving design standards, and accumulatively more than 10,000 public buildings received energy audits and dynamic monitoring of energy consumption was carried out in over 8,000 buildings nationwide. A number of documents have been released to promote the implementation of the *Green Building Action Plan* and guide the development of green buildings in different regions,

including the *Development Plan on Green Buildings and Green Ecological Cities and Districts During the 12th FYP Period*, the *Management Methods of Green Building Materials Evaluation Labels*, the *Action Plan on Promoting the Production and Application of Green Building Materials*, the *Green Building Evaluation Standards*, the *Notice on Further Boosting Renewable Energy Application in Buildings* and so on. By the end of 2015, 3,979 projects nationwide had obtained green building labels, with a total construction area exceeding 450 million square meters.

Promoting energy conservation in transportation area. The Ministry of Transport (MOT) issued the *Guidelines on the Development of Green, Circular, Low-Carbon Transport* and the *Guidelines on Building Low-Carbon Transport System*, and implemented the *Guidelines on Speeding up Energy Conservation and Emission Reduction in the Civil Aviation Industry*. The MOF, together with other ministries, issued the *Notice on Preferential Vehicle and Vessel Tax Policies for Energy-Saving and New Energy Vehicles and Vessels*. The MOT monitored the energy consumption of major key enterprises, piloted natural gas-fueled vehicles and vessels, implemented fuel consumption limit standards and identified vehicle models meeting the standards, and recommended trailer models. The Ministry of Science and Technology (MOST) organized and implemented the demonstration project of promoting

the use of 1,000 energy-saving and new-energy vehicles in 10 cities. The civil aviation industry kept increasing the investment in energy conservation and emission reduction, with more than 1,200 projects carried out. In 2015, carbon dioxide emissions per unit of transport turnover in commercial vehicles and vessels decreased by 15.9 percent and 20 percent respectively compared with the 2005 level, and fuel consumption per ton-kilometer and carbon dioxide emission per ton-kilometer in the civil aviation sector were both reduced by 13.5 percent.

Promoting energy conservation in public institutions. The National Government Offices Administration (NGOA) of the State Council successively issued a series of policies such as the *Plan for Energy Conservation in Public Institutions During the 12th FYP Period* and the *Opinions on the Implementation of Promoting Energy and Resource Conservation and Boosting Ecological Progress in Public Institutions, and* the energy saving management system in public institutions was preliminarily established. The Ministry of Commerce (MOC) developed industry standards for the *Green Shopping Malls* and carried out demonstration in this regard. The average annual growth rate of energy consumption in public institutions decreased by 1.43 percentage points in the 12th FYP period compared to the previous five years, meeting the energy conservation target.

Speeding up the development of circular economy. The State Council released the *Strategy and Short-Term Action Plan for the Development of Circular Economy,* and the NDRC issued the *2014 Circular Economy Promotion Plan and the 2015 Circular Economy Promotion Plan*, steadily advancing the development of circular economy. During the 12th FYP period, the NDRC together with other ministries identified 49 national demonstration bases for Urban Minerals, 100 pilots for the demonstration of upgrading industrial parks to make their operations more circular, 100 pilot cities of recovering resources from kitchen waste and handling it safely, 101 national circular-economy demonstration cities and counties, as well as 28 national circular-economy education demonstration bases. The NDRC, the MIIT and other ministries jointly carried out the second batch remanufacturing pilots with 28 enterprises identified and the pilots of *Replacing Old by Remanufactured Product* with 10 enterprises involved. The MIIT released five editions of the *Catalogue of Remanufactured Products* to promote the use of remanufactured products.

Thanks to the efforts of all sides, energy consumption per unit of GDP was reduced by 5.6 percent year-on-year in 2015, 0.8 percentage point more compared to the 4.8 percent reduction of 2014, making the best achievement in the 12th FYP period. Energy consumption per unit of GDP during the 12th FYP period

accumulatively dropped by 18.4 percent. In 2015, China's energy consumption reached 4.3 Gtce, with an increase of 0.9 percent year-on-year. The average annual growth rate of national energy consumption was 3.6 percent during the 12th FYP period, 3.1 percentage points lower than the 11th FYP period.

(IV) Controlling GHG Emissions from Non-Energy Activities

Strengthening the management of non-carbon-dioxide GHGs. In 2015, the NDRC together with other ministries carried out key actions on Hydro Fluorocarbons (HFCs) control and issued the *Notice on Carrying out HFCs Disposal and Related Work*. The Ministry of the Environmental Protection (MEP) formulated the management plan under the *Montreal Protocol* to accelerate Hydro Chlorofluorocarbons (HCFCs) phase-out. The NDRC actively organized and carried out researches on non-carbon-dioxide GHGs management policies and other related issues.

Controlling GHG emissions from agricultural activities. The Ministry of Agriculture (MOA) launched the Campaign to Achieve Zero Growth of the Use of Chemical Fertilizer by 2020 and the Campaign to Achieve Zero Growth of the Pesticide Use by 2020, vigorously promoting the technologies for their less use and more efficient use, and promoting the wider use of formula fertilizers

through the cooperation between farmers and firms. The ministry also pushed forward the upgrading use of biogas in rural areas, enhanced the comprehensive use of straw, promoted the use of firewood-and coal-saving furnaces, stoves and *kang* (heatable brick beds), developed solar energy and micro hydropower in rural areas, and carried out eco-friendly tilling, so as to reduce GHG emissions from the agriculture sector.

Controlling GHG emissions from waste disposal. The State Council issued the *Plan on Building Facilities for Urban Sewage Disposal and Reuse During the 12th FYP Period* and the *Plan on Building Facilities for Harmless Treatment of Urban Household Refuse During the 12th FYP Period*, actively controlling methane emissions from urban sewage and waste disposal. The standard of identifying urban waste was improved, the charging system was introduced for the disposal of household refuse, the use of more advanced waste incineration technologies was promoted, and the incentive policy of promoting the recycling of landfill gas was formulated.

(V) Increasing Carbon Sinks

Increasing forestry carbon sinks. The State Forestry Administration (SFA) published the *Instruction Opinions on*

Advancing the Forestry Carbon Sink Trade. The *Outlines of National Forestation Plan (2011-2020)* was fully implemented. All citizens were encouraged to plant trees voluntarily. Afforestation was promoted in major areas, including arid areas and the Beijing-Tianjin-Hebei Region. Great efforts were made in continually pushing forward major forestation projects, such as returning farmland to forests, the comprehensive management of stony desertification, the control over the sources of sandstorms affecting Beijing and Tianjin, the construction of key shelter forests in northeastern, northern and northwestern China and the Yangtze River drainage area, and the protection of natural forest resources. Forest management was comprehensively enhanced. The *Plan on National Forest Management (2016-2050)* and the *Plan on Training Experts for National Forest Management (2015-2020)* were launched, the regulations on forest cultivation were revised, and the construction of national model bases of forest operation was steadily carried out. Work in building a measuring and monitoring system for nationwide forestry carbon sinks was vigorously promoted, and the measuring and monitoring work in land usage change and forestry carbon sinks was carried out, covering 25 provinces, autonomous regions and municipalities directly under the central government, Xinjiang Production and Construction Corps, as well as the country's four biggest forest industry groups by the end of 2015. A basic database of forestry carbon sinks was

built up. A total of 450 million *mu* of forest was created and 600 million *mu* of forest was cultivated nationwide during the 12th FYP period, with increases of 18 percent and 29 percent respectively from the 11th FYP period. The national forest coverage rate was raised to 21.66 percent, and forest stock was raised to 15.137 billion cubic meters, achieving the national goal of increasing forest stock in 2020 ahead of schedule and topping the world in terms of forest growth during the same period. The total carbon storage in forest vegetation increased from 7.811 Gton during the seventh national forest resource investigation (2004-2008) to 8.427 Gton during the eighth investigation.

Increasing grassland carbon sinks. The work in protecting grassland ecology was vigorously promoted. The national vegetation fractional coverage of grasslands reached 54 percent in 2015, with an increase of 3 percentage points from 2011. By the end of 2015, husbandry on a total of 1.53 billion *mu* of grassland was prohibited or suspended, 2.56 billion *mu* of grassland reached a balance between grass stock and livestock, and a total of 3.53 billion *mu* of prime grassland was identified.

II. Adapting to Climate Change

During the 12th FYP period, China strengthened its top-level

planning in adapting to climate change, successively issued and the *National Strategy for Climate Adaptation* and the *Urban Action Plan for Climate Adaption,* enhancing climate change adaptation capabilities in key areas, building fundamental capacities in adapting to climate change, and mitigating the negative effects of climate change on national economic growth and social development.

(I) Agricultural Sector

The MOA and other ministries jointly released the *Opinions on Promoting Water-Efficient Agricultural Development* and the *Notice on Promoting Dry Farming Techniques*, continued its work on such areas as farmland construction, soil fertility improvement and pest prevention and control, and firmly promoted technologies to adapt to climate change, including the adapting technologies for water-saving irrigation, dry farming, drought resistance and moisture conservation, as well as eco-friendly tilling. The infrastructure construction was enhanced in grassland improvement, grass forage bases and grassland livestock husbandry industry. Cooperation between farming and stockbreeding areas was encouraged, long-distance fattening was promoted, the species and intensity of aquaculture were adjusted, and fishing infrastructure and equipment were improved. Major projects such as returning

grazing land to grassland, managing the sources of sandstorms affecting Beijing and Tianjin and promoting the settlement of nomads were carried out. The grassland management and protection system was further implemented, and the production mode of grassland husbandry was transformed.

(II) Water Resources

The State Council issued the *Opinions on Implementing the Strictest Water Resources Management System* in 2012, and carried out an assessment of the system for three consecutive years. The goal of controlling total national water usage during the 12th FYP period was met. Water conservation was promoted in the agricultural, industrial and service sectors, water quotas and planned management were emphasized, and 100 water-saving society construction pilots at national level and 200 pilots at provincial level were carried out. The Ministry of Water Resources (MWR) released the *Opinions on Accelerating Progress in Water Ecological Construction* and launched 105 pilot cities of water ecological construction across the country. Assessment of the water quality of major rivers and lakes nationwide was launched. Connections among rivers, lakes and reservoirs were facilitated, and the water ecological environment of rivers and lakes was improved. Water allocation was strengthened in the Yellow River, Heihe River and the South-to-North Water

Diversion project to ensure water supply security and ecological security in key cities. Capacity building in regard to national water resource monitoring was carried out, and three monitoring systems covering key water users, key water functional areas and provincial sections of major rivers were fundamentally built up. The construction of key river management projects was enhanced, and the flood control and disaster reduction system for major rivers was improved. Water resource allocation in water basins and different regions was improved. A total of 38 billion cubic meters was added to the water supply capacity, and both urban and rural areas saw a marked increase in their supply capacity. Large-scale farmland hydrological construction projects were carried out, auxiliary facilities were built and water-saving devices were updated in large and key medium-sized irrigation areas, and the development of highly-efficient water saving irrigation was accelerated to save water and increase grain output in northeast China, to save water and curb excessive exploration of groundwater in north China, and to save water and increase efficiency in northwest China. The comprehensive management of water loss and soil erosion was strengthened, with a total of 266,000 square kilometers of affected land tackled during the 12th FYP period.

(III) Forestry and Ecosystem

The SFA published the *Action Plan for Forestry to Adapt to Climate Change (2016-2020)*, and implemented forests adaptation to climate change pilots. The SFA continued to carry out wetland protection and restoration projects to strengthen the ecological adaptive capacity in wetlands, and launched pilot programs in building national desert parks. Evaluation of the influence brought by climate change on biodiversity was enhanced. The MEP put forward an indicator system to evaluate the interplay between biodiversity and climate change, and carried out evaluation in typical regions, such as northeast China and the Qinghai-Tibet Plateau. The SFA beefed up efforts in building ecology observation and research platforms, and the number of national land ecosystem observation and research stations reached 166.

(IV) Marine Sector

The State Council approved the *National Plan for Marine Functional Zones (2011-2020)* and coastal provinces' plans in this regard, making a comprehensive arrangement for the development and environmental protection of maritime areas under China's jurisdiction. The State Oceanic Administration (SOA) released the *Plan on Promoting Marine Ecological Progress*, expanded the

scope of marine ecological redline regions, and strengthened the restoration of marine ecology in coastal areas. It also drafted the *Plan for National Marine Economy Development (2016-2020)* and the *Plan for National Island Protection During the 13th FYP Period*. Liaoning, Hebei, Shandong, Jiangsu, Zhejiang, Fujian and Guangdong provinces and Guangxi Zhuang Autonomous Region formulated their own island protection plans. The SOA preliminary established the system for monitoring carbon dioxide exchange in offshore sea-air surfaces, enhanced the marine disaster observation, warnings and prevention and reduction. It also implemented the sea level change monitoring and impact evaluation, and monthly publishes the *Sea and China's Climate Outlook*. The SOA also strengthened precise forecast for key guaranteeing targets in the coastal areas, improved the service system for guaranteeing marine fishing environment safety, and enhanced capacity building in marine disaster prevention. It annually publishes the *China Sea Level Bulletin* and *China Marine Disasters Bulletin*, and carries out marine disaster risk evaluation and zoning pilots at national, provincial, city and county level.

(V) Meteorology Sector

China strengthened the monitoring and early warning for extreme weather and climate events and the management of meteorological

disaster risks, and achieved automatic matching of state-level early warning information. The satellite FY-2G has been put into operation, and the comprehensive observation system has seen a higher level of automation, standardization and intensification. The *Plan on Building a Meteorological Disaster Information Management System* was formulated, a national meteorological disaster information database built up, and the *Guide to Typhoon Disaster Risk Zoning Technology* compiled. A rainstorm and flood risk survey and warnings on urban water logging risk were promoted, and urban water logging risk warning pilots have been launched in eight cities. The national climate service system construction was promoted, and the monitoring and assessment services for agro-climatic resources, agro-meteorological disaster risk zoning and ecological meteorology were carried out. Environmental meteorological forecasting and early warning have been enhanced, static weather index and other assessment indexes were improved, and the quantitative assessment of meteorological conditions of air pollution diffusion and pollution reduction effect were carried out. The *China Climate Bulletin* and *China Climate Change Bulletin* are published every year.

(VI) Disaster Prevention and Mitigation

China carried out all-round implementation of the *National*

Comprehensive Disaster Prevention and Reduction Plan (2011-2015) and the *National Meteorological Disaster Defense Plan (2009-2020)*. Flood control projects in China's seven great water basins, national mountain torrent prevention project, as well as the construction project of national disaster relief reserves have been prioritized. The project of constructing command system on national natural disaster rescue and the project of investigating comprehensive risk of national natural disaster have been actively promoted. The disaster management system and its institutions have been improved, the disaster warning system has been complete and the disaster prevention and reduction infrastructure has been improved. Community-based disaster reduction work has been enhanced all over China, with a total of 6,551 model communities of disaster reduction being established nationwide. The disaster prevention and reduction capability in urban and rural areas has been enhanced. The Ministry of Civil Affairs (MCA) has carried out more than 140 major research projects related to disaster reduction to strengthen national technological capabilities in coping with disasters. The National Commission for Disaster Reduction and the MCA together launched 158 times of disaster emergency responses during the 12th FYP period. The State Council issued the *Measures for the Management of National Emergency Early Warning Information Release System*. Ministries and departments involved in civil affairs, water resources, agriculture, meteorology,

forestry, seismology and marine have further enhanced the construction of disaster monitoring and warning system, improved monitoring stations and network of river flooding, drought, rainstorms, forest fire and marine observation, and enhanced the timeliness and accuracy of warning and forecast. The projects of preventing mountain torrent disasters, mapping flood risks, building drought-resistant emergency water supply and national commanding system for flood control and drought relief have also been carried out. The State Council approved the flood defense schemes in the Yangtze River, the Yellow River and the Songhua River. A total of 2,058 county-level mountain-torrent disaster monitoring and warning systems and mass prediction and prevention systems were built and the number of flood information stations increased to 97,000, effectively coping with frequent and repeated flood and drought disasters and enhancing the capability to prevent floods and droughts and reduce disasters. The State Flood Control and Drought Relief Headquarters and the MWR together launched 70 emergency responses to prevent floods and droughts during the 12th FYP period.

III. Low-Carbon Pilots and Demonstration

During the 12th FYP period, China thoroughly carried out pilots of

low-carbon provinces and cities, low-carbon city (towns), low-carbon industrial parks and low-carbon communities and conducted the pilots and demonstration in relevant areas including transport area. These efforts played a positive role in addressing climate change and promoting low-carbon development.

(I) Deepening Low-Carbon Province and Low-Carbon City Pilots

The NDRC launched low-carbon province and low-carbon city pilots in six provinces and 36 cities to explore the green and low-carbon development pattern. Each pilot province or city formulated its own implementation plan, explored to establish an accountability scheme for meeting the GHG emission controlling target, speeded up the establishment of low-carbon industry, buildings, transport and energy systems, strengthened the basic capacity building for the GHG emissions accounting and inventory preparation, and advocated green and low-carbon lifestyle and consumption pattern. These efforts have yielded positive results in promoting nationwide green and low-carbon development. The assessment of the fulfillment of carbon intensity targets during the 12^{th} FYP period showed that the decrease of carbon intensity in the pilot provinces and cities was significantly higher than the national average.

(II) Carrying out Low-Carbon Industrial Park, Community and City (Town) Pilots

Carrying out national low-carbon industrial park pilots. In 2013, the MIIT and the NDRC jointly issued the *Notice on Carrying out National Low-Carbon Industrial Park Pilots*, and initiated relevant works. In 2014, the aforementioned authorities reviewed and published a list of such national low-carbon industrial parks, and made research on the evaluation index system and supporting policies. In 2015, they approved the pilot action plans of 51 national low-carbon industrial parks. These pilot parks implemented various low-carbon measures to promote low-carbon industries, low-carbon enterprises, low-carbon products, low-carbon infrastructure and services in the park, aiming to explore a low-carbon management mode fitting China's national conditions for industrial parks and take the lead to drive the low-carbon transformation and development of industrial sectors.

Carrying out low-carbon community pilots. In 2014, the NDRC issued the *Notice on Carrying out Low-Carbon Community Pilots*, and henceforth initiated relevant works all over the country. In 2015, the NDRC issued the *Guidelines for Low-Carbon Community Pilot Construction* and organized and conducted relevant studies on

carbon emissions accounting methodology and evaluation index system for low-carbon communities, provided guidance for the establishment of low-carbon communities in different regions and conducted the selection of low-carbon communities across the country. China planned to build around 1,000 low-carbon community pilots nationwide and among them, selected a batch of national exemplary low-carbon communities, in order to formulate a batch of distinctive low-carbon communities with various regional features, at different development levels and with clear characteristics that can provide guidance and examples for effectively controlling GHG emissions in urban and rural residential areas.

Carrying out national low-carbon city (town) pilots. In 2015, the NDRC issued the *Notice on Accelerating National Low-Carbon City (Town) Pilots*. It selected the following eight national low-carbon city (town) pilots in the first batch: the International Low-Carbon City in Shenzhen, Guangdong Province; Hengqin New Area in Zhuhai, Guangdong Province; Sino-Germany Ecopark in Qingdao, Shandong Province; Guantang Low-Carbon New City in Zhenjiang, Jiangsu Province; Sino-Sweden Low-Carbon Eco-City in Wuxi, Jiangsu Province; Chenggong Low-Carbon New Area in Kunming, Yunnan Province; Huashan New Eco-City in Wuhan, Hubei Province; and Sanming New Eco-City in Fujian Province.

The NDRC organized eight pilots to study and draft pilot implementation plans and approved them, guiding them to explore their own development modes featuring regional characteristics, with the focus on the integration between industrial development and urban construction, rational space distribution, intensive and comprehensive use of resources, low-carbon and environmental-friendly infrastructure, low-carbon and high-efficiency production, as well as low-carbon and comfortable life. The NDRC also arranged expert consultation of the pilot plans to provide guidance on low-carbon development for these city (town) pilots from the perspective of planning.

(III) Promoting Low-Carbon Pilots and Demonstration in Other Sectors

Promoting Carbon Capture, Utilization and Storage (CCUS) experiments and demonstration. In 2013, the NDRC issued the *Notice on Advancing the Experiments and Demonstration of CCUS.* The MOST issued the *Special Plan for Development of CCUS Technologies During the 12th FYP Period* and drafted a roadmap accordingly for its technological development. In 2013, the MEP issued the *Notice on Strengthening the Work for Environmental Protection in Experiments and Demonstration of CCUS* to guide the environmental risk management for CCUS projects. In 2016, the

MEP issued the *Technical Guidelines for CCUS Environmental Risk Assessment (Trial)*. The Ministry of Land and Resources (MLR) conducted the work on geological investigation and researches to address the global climate change and conducted researches on the assessment of carbon storage potential and engineering demonstration. The MOST made efforts to carry out CCUS cooperation projects such as the China-EU Near Zero Emission Coal Project and China-Australia Geological Storage of CO_2 Project.

Carrying out the pilots of low-carbon transport system construction. The MOT piloted the construction of low-carbon transport systems in 26 cities, and gathered practical experience on them. Efforts have been made to carry out green transportation pilots, which involve 4 green transportation provinces, 27 green transportation cities, 11 green ports and 20 green highways. The MOT also launched a total of 130 ministerial-level demonstration projects, in six batches, for energy-saving and emission reduction, and promulgated their experiences and materials in the transport sector. It conducted in-depth implementation of the special low-carbon transportation actions in around 1,000 enterprises of vehicles, vessels, highways and ports.

IV. Strategic Planning and Institutional Construction

During the 12th FYP period, the Chinese government strengthened efforts on planning and strategic research, improved the management scheme and working mechanism for addressing climate change, advanced the institutional construction for low-carbon development, promoted legislation for combating climate change and reinforced construction in the standard system, all of which further consolidated a sound work basis for addressing climate change.

(I) Strengthening Planning and Strategic Research

Strengthening the guiding role of planning. In 2011, the State Council issued the *Work Plan for Controlling GHG Emissions During the 12th FYP Period*, which laid out the deployment of relevant work during the period. All ministries and local governments subsequently issued their own action plans or programs on controlling GHG emissions. In 2013, the NDRC and other ministries jointly issued the *National Strategy for Climate Adaptation*, which clearly stated China's main objectives, key tasks, regional differences and safeguarding measures of climate change adaptation and provide guidance for the coordination and implementation of adaptation work. In 2014, the NDRC published

the *National Plan on Climate Change (2014-2020)*, which illustrated the country's guiding principles, targets and requirements, policy guidance, key tasks and safeguarding measures in tackling climate change. Most provinces (autonomous regions and municipalities) issued their own special plans on provincial level respectively to address climate change, and incorporate the work of addressing climate change into their plans for economic and social development. Each major ministry made its respective plan or program to tackle climate change. In 2015, the Chinese government submitted to the United Nations (UN) the *Enhanced Actions on Climate Change: China's Intended Nationally Determined Contributions*, in which it declared that China will achieve the peaking of carbon dioxide emissions around 2030 and making best efforts to peak early, and lower carbon dioxide emissions per unit of GDP by 60 percent to 65 percent from the 2005 level, which provides a medium to long-term direction for China's work in combating climate change.

Conducting key strategic researches. Since 2012, the NDRC has made efforts in carrying out China Low-carbon Development Macro-strategy Program to systematically study China's overall low-carbon development strategy and the detailed road maps in different time periods and areas by 2050. This comprehensive research program included the overall thinking of the

macro-strategy for China's low-carbon development, the general report on the macro-strategy of China's low-carbon development as well as 37 special projects. The NDRC has conducted two high-level seminars on low-carbon development strategy and is currently working on the release and publication of the project results. The 37 special projects are conducted from four perspectives including the basic theory, key areas, policy system and practical cases of low-carbon development and they clearly bring forward basic principles, strategic tasks and policy measures for low-carbon development of industrial sectors, energy production and consumption, building, transport, energy conservation, urbanization, forestry, agriculture and consumption respectively. They further put forward key policy suggestions for low-carbon development in terms of legal system, institutional system, policy instrument, key sectors, pilots and demonstration, capacity building, public participation and international cooperation. They provided vital support for decision-making on advancing China's low-carbon development and active participation in international negotiations.

(II) Improving the Management Scheme and Working Mechanism

Strengthening the construction of governing bodies. The National Leading Group to Address Climate Change changed its

members by adding new functional departments. A total of 10 provincial Development and Reform Commissions have specially set up the Climate Change Department. The personnel composition of the National Climate Change Experts Committee has been further improved to expand its expertise area and coverage so that they can contribute wisdom and suggestions to the work on addressing climate change from various perspectives. In 2012, the NDRC established the National Center for Climate Change Strategy and International Cooperation (NCSC) to provide professional support for the policymaking on climate change. Professional research agencies for climate change and low-carbon development were successively established at the provincial level and hence gradually expanded the research team for climate change. The AQSIQ approved the establishment of 23 national urban energy measurement centers, built public platforms for energy measurement data, service platforms for energy measurement and testing technologies, research platforms for energy measurement technologies, as well as training platforms for the energy measurement and testing staff, in order to provide comprehensive energy-measurement-related technological support for low-carbon economic development.

Improving the working mechanism. The coordination and liaison office has been set up within the framework of the National

Leading Group to Address Climate Change to enhance the interdepartmental coordination and communication and promote the interdepartmental synergy for addressing climate change. All provinces (autonomous regions and municipalities) have established a leading group to address climate change headed by the provincial administrative chief, along with the mechanism for the division and coordination of work within the province. Under the unified leadership of the National Leading Group to Address Climate Change and the sole management of the NDRC, and with relevant ministries and local authorities sharing responsibility and the entire society's extensive participation, the management scheme and working mechanism for addressing climate change has been improved.

(III) Enhancing Institutional Construction of Low-Carbon Development

Preliminarily establishing the evaluation and accountability system for controlling GHG emissions. The NDRC issued the *Measures for Performance Evaluation and Accountability for the Target of Lowering Carbon Dioxide Emissions per Unit of GDP*, and carried out the evaluation and accounting of the fulfillment of targets for 2013, 2014 and the entire period of the 12th FYP period in 31 provinces (autonomous regions and municipalities). All

provinces, based on their own annual targets, conducted respective evaluation to track and analyze the local progress of reducing carbon intensity, preliminarily developed the provincial government-led evaluation and accountability system for carbon intensity reduction target fulfilment, and gradually formed the routine working mechanism for the annual evaluation and accounting of carbon dioxide emissions and carbon intensity targets on regional level.

Carrying out carbon emission trading pilots. In 2011, the NDRC selected seven provinces and cities, i.e. Beijing, Tianjin, Shanghai, Chongqing, Guangdong, Hubei and Shenzhen, to carry out carbon emission trading pilots, exploring market-based mechanisms to control GHG emissions. The seven provinces and cities actively conducted pilots. They strengthened the top-level design for carbon emission trading pilots, introduced local enactments and government regulations, established carbon emission measurement, report and verification systems, finalized the allocation method for carbon emission quota, trading rules and the mechanism for fulfilling responsibilities, and established carbon emission trading platforms and registration system, which gradually formed the institutional arrangement that fits local conditions. Carbon emission trading markets that are characteristic of complete institutional elements and local features have begun to take shape in these pilot

provinces and cities. The local governments carried out the work on the monitoring and supervision over the carbon markets, the fulfilment of responsibilities and the law enforcement. In June 2013, the first carbon emission trading market was launched in Shenzhen. As of the end of 2015, seven pilot carbon emission trading markets were launched, involving over 20 sectors and more than 2,600 key-emission enterprises, with a total quota of 1.24 Gton carbon dioxide equivalent (CO_2e) was imposed each year. The enterprises that involved in carbon emissions trading markets in Beijing, Tianjin, Shanghai, Guangdong and Shenzhen have completed two rounds of fulfilment of responsibility. The seven pilot carbon emissions trading markets have accumulatively completed the trading of quota of around 67 Mt CO_2e, with an accumulated trading volume up to around RMB 2.3 billion.

Launching the formulation of national carbon emission trading market-based mechanism. In 2014, the NDRC set out to launch the establishment of national carbon emission trading market and made researches on the system design. It probed into the total carbon quota and its allocation methods, and explored the possibility of establishing the national registration system for carbon emissions trading. In 2014, the NDRC issued the *Interim Measures on the Management of Carbon Emissions Trading*, making clear the framework for the establishment of national

carbon emissions trading market. It strengthened basic capacity, studied and worked out the accounting method and reporting guideline for GHG emissions in 24 key industries, established the direct reporting system for corporate GHG emission data, and registered third-party verification agencies and trading agencies.

Establishing the trading system for voluntary GHG emission reduction. In 2012, the NDRC issued the *Interim Measures on the Management of Trading of Voluntary GHG Emission Reduction*, and the *Guide to the Approval and Verification of Projects of Voluntary GHG Emission Reduction*. It launched the construction of the methodology system, verification agencies, registration system and trading platforms in this regard. As of the end of 2015, the NDRC had recorded and published around 180 methodologies for voluntary GHG emission reduction. Seven trading agencies are put on record as the trading platforms for GHG emission reduction and 10 verification agencies are put on record to be capability of approving and verifying projects of voluntary emission reduction trading. In total, the NDRC had publicized over 2,000 approved projects and 700 recorded projects of voluntary GHG emission reduction. Some 200 projects are recorded with emission reduction and the accumulated recorded emission reduction volume amounted to more than 50 Mt CO_2e.

Improving the green procurement scheme. The MOF continued to improve the policies on green government procurement, adjusted and expanded the scope of energy-saving and environmental-friendly products for government procurement, and enlarged the scale of green government procurement. Through implementing procurement policies on mandatory and prioritized purchasing of energy-saving and environmental-labelling products, the government has played a positive and exemplary role in boosting green consumption, promoting low-carbon development and combating climate change.

(IV) Enhancing laws, regulations and standards for addressing climate change

Promoting climate change related legislation. In 2011, a leading group was established for the drafting of *Climate Change Law*, consisting of the Environment and Resources Protection Committee of the Standing Committee of the National People's Congress (NPC), the Legislative Affairs Commission of the Standing Committee of the NPC, the Legislative Affairs Office of the State Council and 17 ministries. The NDRC took the lead to conduct the researches and investigations on legislation and the drafting of law, and solicited opinions widely from stakeholders in this regard. The legislation process for the *Climate Change Law* and the *Regulation*

on the Management of Carbon Emission Trading was accelerated. The governments of Shanxi, Qinghai, Shijiazhuang and Nanchang launched the legislation on climate change and low-carbon development at local level.

Strengthening standards, labeling and guidelines. In 2015, the Standardization Administration of China (SAC) released 11 national GHG management standards for key sectors such as electricity, iron and steel, civil aviation, chemicals and cement industry, providing technical support for enterprises to achieve low-carbon transformation. Ministries including the MOT, the National Railway Administration（NRA) and the SFA, released their own sectoral standards for low-carbon development. The SAC approved the establishment of the National Technical Committee for Carbon Emission Management Standardization, responsible for establishing the national standard system and framework for GHG management and formulating and revising national standards on carbon emission management. In 2015, the NDRC and AQSIQ jointly released the *Management Measures for Certification of Energy-Saving and Low-Carbon Products* and established the unified certification system low-carbon products. The NDRC, AQSIQ and CNCA released the *Catalogue of Certified Low-Carbon Products* in two batches. The NDRC published three batches of GHG emission accounting methods and reporting

guidelines for enterprises in 23 key sectors and 1 other industrial sector. It also conducted the training to build the capacity of local development and reform commissions and their technical support units in 31 provinces (autonomous regions and municipalities) and the Xinjiang Production and Construction Corps. The CNCA accelerated the integration of different product evaluation systems such as environmental protection, energy-saving, water-saving, recycling, low-carbon, renewable and organic products. Efforts have been made to establish a unified certification (accreditation) system of China Green Product that covers the entire life cycle of products and meets the requirements for environmental protection, resource saving and consumer friendly.

V. Capability Building

By strengthening scientific and technological support, enhancing the construction of GHG statistics and accounting system and strengthening the personnel and team training, China has further improved basic capabilities to address climate change.

(I) Enhancing the GHG Statistics and Accounting System

Improving the basic statistics system. The NDRC and the National Bureau of Statistics (NBS) promulgated the *Opinions on*

Enhancing Statistical Work of Addressing Climate Change, whereby the statistical indicator system was set up to include basic GHG emissions indicators into the government statistical indicator system and the basic statistics system serving for GHG inventory compilation has been set up and improved. In 2014, a leading group for climate change statistical work was established involving a total of 23 ministries including the NDRC and the NBS, and a working mechanism is now in place with the government's comprehensive statistics at its core and relevant ministries cooperating with each other. Efforts have been made for capability building of basic statistical team for addressing climate change.

Carrying out GHG inventory compilation and accounting work on a regular basis. In 2012, the Chinese government submitted to the UN the *Second National Communication on Climate Change of the People's Republic of China*, and has now initiated the related work for the compilation of 2010 and 2012 national GHG inventory. The data management system for national GHG inventory has been improved, providing technical support for formalization and standardization of the inventory compilation. The accounting of carbon dioxide emission and the analysis of the fulfillment of carbon intensity reduction target have been intensified. In 2011, the NDRC released the *Notice on Issuing the Guidelines (Trial) for Provincial GHG Inventory Compilation*. By the end of 2014, China

completed the compilation of the 2005 and 2010 GHG inventories for 31 provinces (autonomous regions and municipalities) and the Xinjiang Production and Construction Corps. A standard assessment template and a joint review indicator system were created for provincial GHG inventory. The assessment and joint review of 2005 and 2010 provincial inventory reports have been completed up to now. In 2015, the NDRC released the *Notice on Launching Provincial GHG Inventory Compilation in the Next Phase*, making arrangements for the compilation of the 2012 and 2014 GHG inventory at the provincial level. The NDRC also organized and conducted relevant capacity building projects to improve personnel capabilities on the inventory compilation from different angles and at different levels, and the inventory compilation capacity at the local level has been improved continuously.

Preliminarily establishing the GHG emission reporting system. In 2014, the NDRC released the *Notice on Reporting GHG Emissions of Key Enterprises and Public Institutions*. A platform was established for reporting and accounting GHGs of key enterprises and efforts have been put on building the reporting capability at the enterprise level. The local governments of seven carbon emission trading pilot regions, namely Beijing, Shanghai, Tianjin, Chongqing, Guangdong, Shenzhen and Hubei, all

promulgated local regulations and institutions for GHG emission reporting, developed their own GHG emission accounting methods for key sectors and enterprises involving in the pilots, and established their own GHG reporting and submitting platforms. The local governments of 19 non-pilot provinces and cities, such as Jiangsu, Zhejiang, Hunan and Yunnan, also launched the construction of local reporting platforms and conducted the reporting and submission of GHG emission data of key enterprises and public institutions.

Improving GHG emission measurement and metering system. China has conducted researches and developed national standards on the tracing of emission source related to the laboratory measurement of GHGs emitted from concentrated sources, carried out researches on various metering standards and precise measurement methods, such as the inversion modeling technology of urban emissions, as well as developed 10 metering standards related to climate change. China has developed more than 100 standard gas products for the composition measurement of GHGs, such as carbon dioxide, Chlorofluorocarbons (CFCs) and volatile organic compounds. The country has participated in 21 international comparisons on GHG measurement and gained 80 internationally recognized calibration and measurement qualifications.

(II) Strengthening Scientific and Technological Support for Addressing Climate Change

Launching fundamental scientific research. The MOST supported fundamental scientific researches in climate change area by implementing the National Key Basic Research Program, the Special Scientific and Technological Project on Climate Change and the National Key Scientific Research Program on Global Change during the 12th FYP period. A total of 16 ministries, including the MOST, the Ministry of Foreign Affairs (MFA) and the NDRC, jointly formulated the third *National Assessment Report on Climate Change* to systematically review China's latest academic achievements in this field. The China Meteorological Administration (CMA) has nominated experts to participate in the formulation of the fifth assessment report of the Intergovernmental Panel on Climate Change (IPCC) and organized the formulation and review of the report. The Chinese Academy of Sciences (CAS) has launched several strategic scientific and technological researches, such as the Carbon Budget Authentication and Relevant Issues for Addressing Climate Change. The Chinese Academy of Engineering (CAE) has launched and organized researches on the climate change impacts on major engineering projects. Relevant ministries and local governments have also initiated various

research projects and made major progress.

Accelerating R&D and application of low-carbon technologies. In 2012, 16 ministries, including the MOST, the MFA and the NDRC, promulgated the *National Scientific and Technological Development Plan for Addressing Climate Change During the 12th FYP Period*, providing guidance to government departments at national and provincial levels to carry out scientific and technological work on climate change. The NDRC also organized the work of collection, selection and evaluation of low-carbon technologies. Two batches of the *Catalogue of Key National Promoted Low-Carbon Technologies* were released in 2014 and 2015 respectively to accelerate the promotion and application of low-carbon technologies. The MOST compiled and released the *List for the Commercialization of Academic Achievements and the Promotion and Application of Energy-Saving and Low-Carbon Technologies (First Batch)* to accelerate the commercialization of low-carbon technology achievements and support the technology upgrading of key emission industries. The MOT organized two batches of submission and selection of key energy-saving products (technologies) in highway and waterway transportation to be promoted nationwide during the 12th FYP period. The MOHURD organized the research and demonstration of innovation projects for addressing climate change, and has organized and implemented the

Demonstration Projects of Innovation and Industrialization of Low-Carbon Technologies in Building Area since 2013. In 2016, the MOC launched the selection and formulation of the *Catalogue for the Promotion of Energy-Saving and Environmental Protection technologies and Products in the Commodity Circulation Area*, in order to promote the green sale.

(III) Enhancing Personnel and Team Training and Disciplinary Construction

Enhancing disciplinary construction on climate change. The Ministry of Education (MOE) encouraged colleges and universities to set up majors related to climate change according to the demands of economic and social developments and their capabilities, in order to accelerate the cultivation of relevant qualified people as required. Secondary and higher schools enhanced the education on environmental protection and climate change, gradually built up relevant majors, and strengthened the construction of education and scientific research bases on climate change, which greatly contributes to the cultivation of personnel with professional knowledge on climate change. By 2015, China has set up majors related to atmospheric sciences were set up in 22 colleges and universities, majors related to environmental sciences and engineering in 719 colleges and universities, majors related to new

energy in 367colleges and universities and majors related to energy saving and environmental protection in 242 colleges and universities. Several colleges and universities qualified to confer academic degrees, such as Peking University, Nanjing University and the Chinese Academy of Agricultural Sciences, independently set up 222 secondary disciplines related to climate change and environmental protection, cultivating a large number of personnel with professional knowledge on climate change.

Enhancing personnel and team training. Several ministries and departments organized training activities on climate change to improve the overall working capabilities of handling climate change issues in different areas. For instance, the NDRC successively held seven training workshops on climate change for its subordinate departments and institutions, and organized a number of Sino-Germany training courses on climate change. The NGOA held many training courses for personnel responsible for energy-saving work of public institutions and colleges and universities from all over the country. The Civil Aviation Administration held training courses on the quantitative management of energy saving and emission reduction for airplane companies. The MOST organized training courses on capacity building for addressing climate change. Many scientific research organizations and colleges and universities established research institutions for climate change and low-carbon

development, such as the China Center for Low-Carbon Development Research in Peking University, the Climate Policy Initiative in Tsinghua University, and the Low-Carbon Research and Education Center in Beijing Jiaotong University, in order to improve their technical support capabilities and academic research levels.

VI. Broad Participation

Since 2011, through the guidance by government, broad propagation by diverse medias and active participation of enterprises and the public, the awareness on addressing climate change and low-carbon development has been greatly enhanced. A low-carbon development mode featuring the common concern and full participation of the whole society has gradually taken shape in China.

(I) Enhanced Government Guidance

Since 2013, the NDRC and relevant ministries have held a series of National Low-Carbon Day activities, such as themed exhibitions on climate change and low-carbon promotional activities in communities and schools, to enhance the low-carbon propagation. During the National Energy Conservation Week and the Low-Carbon Day, various publicity activities were held by local governments according to their own conditions to improve public awareness of energy conservation, environmental protection and green and low-carbon development among the public. The activities of Low-Carbon Walk in China were organized to invite journalists, academicians and experts to make site visits and investigations,

attend the low-carbon themed activities in Beijing, Shanghai, Chongqing, Guangzhou, Hangzhou, Baoding and several other cities, and put forward suggestions on low-carbon development in local regions. A series of publicity events including side events in China Pavilion were held during sessions of the UNFCCC to show China's policies and accomplishments of addressing climate change to the international community. A series of forums, such as the Shenzhen International Forum on Low-Carbon City, International Forum on Ecological Civilization in Guiyang, Sino-US Climate-Smart/Low-Carbon Cities Summit and Forum on Low-Carbon Energy Cities, were held to highlight the concept of green and low-carbon development, propose the initiative of practicing low-carbon concept in the whole society, in a bid to expand the public basis and social influence of addressing climate change and advocating low-carbon development. Entrusted by the NDRC, the CMA made a TV series and brochures entitled *To Address Climate Change - China in Action* to showcase China's efforts and actions in mitigating and adapting climate change. On World Environment Day, Earth Day and other occasions, the MEP organized media to report news and themes about climate change and also held activities such as the International Youth Green and Low-carbon Practice and Communication Camp. The CMA organized the propagation of scientific knowledge on climate change in the activities of World Meteorological Day. The MCA

handed out 160 million brochures and held 45,000 training sessions and lectures during the National Day for Disaster Reduction and the International Day for Disaster Reduction, so as to improve people's awareness of disasters prevention and reduction. The MWR held week-long themed publicity activities during the World Water Day to enhance public awareness of water conservation and protection. The MOHURD promoted car-free days in various cities with a theme of *Green Transportation, Urban Future*. The MOT organized several conferences to share the experiences gained in the pilots of low-carbon transportation system. The NGOA organized the nationwide Public-Institution Energy-Saving Publicity Week and the SOA annually organized the propagation of scientific knowledge on ocean and climate change during the World Oceans Day. The MOE organized social practice activities and scientific and technological competitions on energy saving and emission reduction in colleges and universities. The MOC organized energy-saving publicity activities in the commodity circulation area.

(II) Extensive Media Publicity

Xinhua News Agency, People's Daily, China Central Television, China Radio International, China Daily, China News Service and other mainstream and internet medias placed great emphasis on reporting the important news and events in climate change area,

including the UN Climate Summit, the UN Climate Change Conference, the release of the US-China Joint Announcement on Climate Change, the release of China's Intended Nationally Determined Contributions, as well as used various reporting means, including photos, texts and videos, to make an extensive report on them. They timely reported and deeply interpreted important strategic plans, policies and documents in the low-carbon development area to arouse people's concern and created a good atmosphere for public opinion. The domestic media compiled and published a series of scientific popularization brochures on climate change and meteorological disaster prevention, made documentaries such as *Facing Climate Change*, *The Warming Earth, Climate Change: A Global Concern*, *Warm and Cold*, *We Share Together*, and produced and broadcasted a public-interest advertisement during the National Low-Carbon Day. Jointly organized by the CMA and the People Daily Online, a series of interviews activities entitled *Green Camera, Discovering China* were held to report the country's exploration and practices of promoting ecological civilization in all regions and provide public support in opinion for advancing ecological construction nationwide. The China Economic Herald together with other organizations held the activities of selecting top 10 news stories on addressing climate change and promoting low-carbon development for many years to promote the green and environmental concept.

The All-China Environment Federation (ACEF) and the Beijing People's Broadcasting Station produced a broadcasting program entitled *Advocating Low-Carbon Lifestyle, Promoting Energy Conservation and Emission Reduction*. The Beijing Daily together with other organizations held a large-scale environmental protection advocacy campaign entitled *Green Beijing, Low-Carbon Transport*.

(III) Proactive Enterprise Actions

Chinese enterprises have proactively fulfilled the concept of green and low-carbon development and implemented national policies related to energy conservation, emission reduction and carbon mitigation. The petroleum and petrochemical industry has proactively explored new low-carbon transition technologies. For instance, the China National Petroleum Corporation has promoted efficient use of natural gas and the quality upgrading of gasoline and diesel and the China Petrochemical Corporation implemented a special action plan to double energy efficiency. The energy industry has actively advanced the low-carbon development and transition. For instance, the State Power Investment Corporation accelerated the construction of new energy bases, and the State Grid Corporation of China supported the construction of large-scale sustainable energy bases and the innovative development of distributed energy. The transportation industry has promoted the

energy conservation and carbon reduction through low-carbon transport means. For instance, China COSCO Shipping Corporation Limited optimized its fleet structure and carried out an accountability system on energy conservation and emission reduction and the China Railway Corporation stepped up its R&D into emission-reduction technologies and the recycling use of energy resources. The household appliance industry has also promoted the green lifestyle, conducted LED refitting for energy saving and deepened the technological innovation. Internet enterprises have also put the low-carbon concept into action. For instance, Ant Financial, an online financial service provider, offered carbon accounts for 450 million Alipay users so as to build a trading and sharing platform for low-carbon life.

(IV) Extensive Public Participation

With the development of relevant education, training and publicity work on addressing climate change, the public has proactively and voluntarily chosen low-carbon lifestyle such as low-carbon transport, low-carbon eating and drinking, low-carbon housing and purchasing energy-saving and low-carbon goods. Across such areas as government departments, schools, communities, army and enterprises, 1,000 youth ambassadors for environmental protection were selected to advocate low-carbon lifestyle and green

consumption values to public. The Cool China - National Low-Carbon Action Campaign was held in Shanghai, Chongqing, Tianjin and other cities to promote simple and low-carbon lifestyles. The China Low Carbon Alliance organized an activity to select low-carbon enterprises and individuals to create a favorable social environment concentrating on and practicing of low carbon development at all levels. The China Association for NGO Cooperation, the Guangzhou Public Service Organization Development and Cooperation Association, the Shijiazhuang Low-Carbon Association and other organizations co-organized training programs on climate change for middle school teachers across the country. The World Wide Fund for Nature initiated the Earth Hour initiative and many cities across China joined the blackout for one hour to show their concern for the environment. The China Youth Climate Action Network held the 7th International Youth Summit on Energy and Climate Change. The ACEF launched a national campaign entitled *Protecting Blue Sky and Clear Water*.

VII Actively Promoting International Negotiations

During the 12th FYP period, the Chinese government paid great attention to the global climate change issue, exercised a positive

and constructive role in international climate change negotiation, and put strong efforts to push mutual understanding among various parties and build a broad consensus on the issue, making a positive contribution to building a fair and reasonable international climate regime.

(I) Proactively participating in International Negotiations Under the UNFCCC

The Chinese government actively participated in the negotiation process under the UNFCCC, firmly upholds the principles and framework of the UNFCCC, adheres to the principle of common but differentiated responsibilities, equity and respective capability, and abides by the multilateral rules of openness and transparency, inclusiveness, consensus and party-driven, with an aim to enhancing the full, effective and sustained implementation of the UNFCCC.

In 2015, China formulated and submitted the *Enhanced Actions on Climate Change: China's Intended Nationally Determined Contributions* to the UNFCCC, becoming the first developing country to submit such a document. Chinese President Xi Jinping attended the 21st session of the Conference of the Parties (COP21) in Paris and elaborated China's plans for global climate governance

in his keynote speech, which contributed historically to the success of COP21. China prompted various parties to reach a consensus in COP21 negotiation, actively introduced its policies and actions to address climate change, played positive and constructive roles and made an outstanding contribution to the success of COP21. The COP21 eventually was successful and led to a series of accomplishments centered on the Paris Agreement. The Paris Agreement set the framework for international cooperation on climate change after 2020, and became the milestone of the UNFCCC process. In 2016, China actively participated in various negotiation meetings under the UNFCCC and enhanced communications and exchanges with other parties, aiming to push forward the enforcement and effective implementation of the Paris Agreement as soon as possible and construct an equitable, rational, cooperative and win-win global climate governance system after 2020. In May 2016, the UNFCCC meeting in Bonn officially launched detailed negotiations and discussions on the specific arrangements for the fulfillment of the Paris Agreement. In November 2016, the 22nd session of the Conference of the Parties (COP 22), the 12th session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP 12), and the 1st session of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA 1) will be held in Marrakech. China will continue doing well relevant work for

upcoming international negotiations on climate change.

(II) Extensive Participation in Other Multilateral Process

Actively participating in the relevant international processes of climate change negotiation. Chinese leaders actively participated in multilateral diplomatic activities, delivered important speeches and remarks on several occasions, and reached a consensus with other countries' leaders to push forward the multilateral process. In September 2014, Zhang Gaoli, Chinese Vice Premier, attended the UN Climate Summit as Special Envoy of Chinese President Xi Jinping, and gave an important speech to introduce China's climate change goals and made a political statement on the actions of addressing climate change after 2020. In November 2015, Chinese President Xi Jinping attended the COP21 and made a comprehensive statement regarding China's plans for global climate governance at the opening ceremony, which contributed historically to the success of COP21. In September 2016, before the G20 Summit was held in Hangzhou, the leaders of China and the United States jointly presented the legal document of joining the Paris Agreement to UN Secretary General, Ban Ki-Moon. As a major economic entity and the largest developing country in the world, China took the lead in ratifying and depositing its legal document of ratification, which will strongly promote the enforcement process of

the Paris Agreement, sent out positive signals to the international community that China will transit to green and low-carbon development as well as showed China's liability as a responsible big country.

Enhancing discussions and dialogues with various countries. China paid great attention to continuing solidifying and strengthening communications and coordination with the BASIC (Brazil, South Africa, India and China) and the likeminded developing countries (LMDC). China hosted and participated in the ministerial meetings of the BASIC and LMDC. In 2015, China issued joint announcements on climate change with India and Brazil respectively. China kept engaging in dialogues with small island states, the least developed countries and African group to actively maintain the interests of developing countries. Meanwhile, China furthered communications and exchanges with developed countries to enhance understanding and enlarge consensus. Leaders of China and the United States took joint statements three times on climate change in November 2014, September 2015 and March 2016 respectively, and two governments released the Sino-US cooperation achievement documents on climate change during the G20 summit held in Hangzhou in September 2016. Besides, China conducted dialogues and discussions on climate change with the EU, South Korea, Russia and other countries in 2016 and held bilateral

meetings on climate change cooperation scheme, further enhancing the policy dialogue and deepening the pragmatic cooperation.

Actively pushing forward negotiations and discussions outside the UNFCCC. China actively participated in climate change discussions such as the Major Economies Forum on Energy and Climate, the Petersburg Conference and the informal discussion of achievements of Marrakech Conference, and the UN High-Level Conference on Climate Change. China actively participated in relevant climate change negotiations and discussions under the Montreal Protocol, the International Civil Aviation Organization and the International Maritime Organization, as well as relevant climate change negotiations under international systems such as the Universal Postal Union and the International Organization for Standardization. China continued to pay attention to relevant discussions in the G20, the APEC, the East Asian Leaders Meeting and the United Nations General Assembly.

(III) China's Basic Position on the Marrakech 2016 UN Climate Change Conference

Climate change is a common challenge facing humanity and requires the joint efforts of each country to deal with. The Marrakech Conference in 2016 will be the first conference of parties since the achievement of Paris Agreement. CMA 1 will be held in this conference and strongly concerned by all parties. It should be attached importance in the Marrakech Conference to fulfil relevant mechanism arrangements determined by the Paris Agreement and the following work should be done well. Firstly, making a good arrangement of relevant work for the enforcement and implementation of the Paris Agreement and coordinating the meetings of Ad Hoc Working Group on the Paris Agreement with the meetings of the Parties to the Paris Agreement. Secondly, making a good arrangement of the ensuing negotiations of the Paris Agreement and trying hard to launch the substantial negotiations on the implementation of the Paris Agreement to build a good basis for the implementation of Paris Agreement. Thirdly, continuing enhancing pre-2020 actions to lay a good foundation for post-2020 actions. Each party should put its pre-2020 commitments into place and further enhance actions. Developed countries should in particular substantially enhance the pre-2020 emission reduction

ambitions and fulfil the timetable and roadmap to provide the financial support of USD 100 billion per year to developing countries by 2020, thus laying the foundation of mutual trust for the following negotiations. Fourthly, paying more attention to appeals and demands from developing countries and making positive progress on the key issues concerned by developing countries, including adaptation, funding, technologies, and capability building.

China will continue to follow the principles and rules of the UNFCCC, adhere to the principle of equity, common but differentiated responsibilities and respective capability and abide by the multilateral negotiation rules, and will offer its full support to the Morocco presidency for the success of the Marrakech Conference.

VIII. Strengthening International Exchanges and Cooperation

During the 12th FYP period, the Chinese government actively participated in and promoted pragmatic cooperation with all governments and international institutions according to the principles of mutual-benefit and win-win as well as pragmatic and effective, and play a positive and constructive role to boost global cooperation to address climate change.

(I) Promoting Exchanges and Cooperation with International Organizations

China extensively conducted pragmatic cooperation with international organizations and actively participated in relevant international conferences and initiatives. It continued working with multilateral organizations such as the World Bank, the Asian Development Bank and the Global Environment Facility, as well as participated in the relevant meetings held by the UN Foundation and the Secretariat of the Global Alliance for Clean Cookstoves and implemented pilot activities domestically. Seminars and on-site investigation on carbon capture, utilization and storage technologies

were conducted in cooperation with the Global CCS Institute and other organizations. China participated in the relevant meetings of the Green Climate Fund, the Climate Change Adaptation Fund and the Technology Executive Committee under the UNFCCC and participated in the multilateral activities organized by multilateral organizations such as the Global Methane Initiative and the Regional Climate Action Group (R20).

(II) Strengthening Exchanges and Cooperation with Developed Countries

China continued to enhance dialogue and cooperation with relevant parties in climate change area and made plentiful and substantial achievements. It held bilateral cooperative mechanism meetings on climate change with the United States, the European Union, South Korea and Russia, and held the second session of the Sino-US Climate-Smart/Low-Carbon Cities Summit. The NDRC signed the cooperative memorandum of understanding on climate change with the Ministry of Environment and Energy of Sweden, worked with Germany under the Framework of the International Climate Initiative to conduct the cooperation in areas of urban and regional low-carbon economy, the energy-saving retrofit of building, climate financing and transportation demand management, and conducted the pragmatic cooperation with the United Kingdom in areas of

climate change adaptation, carbon market, low-carbon development, as well as carbon capture, use and storage. China pushed forward policy experience exchanges as well as pragmatic cooperation in areas of carbon market, energy efficiency and climate change adaptation with the European Union, Canada, Japan and Australia. It also strengthened joint R&D of low-carbon technologies with developed countries.

(III) Deepening South-South Cooperation on Climate Change

The Chinese government actively pushed forward the South-South cooperation in addressing climate change. It provided aids of material and equipment to other developing countries, including small island developing states, the least developed countries and African countries, and provided strong support for them regarding their participation in the international climate change negotiation, policy planning and personnel training. The NDRC, together with other ministries such as the MFA and the MOC, actively promoted the signing of MOUs with some developing countries and donated materials for addressing climate change according to their own requirements, such as energy-saving lamps, clean cook stoves and so on. Some ministries such as the MOST and the SFA actively promoted the pragmatic cooperation with developing countries in line with their roles and functions. China actively carried out regional dialogues and exchanges

in East Asia and participated in and paid great attention to the East Asia Low-carbon Growth Partnership, and implemented technology cooperation with developing countries in Africa, Latin America, and South Pacific in areas of emergency disaster relief, agricultural drought resistance and clean energy development. During the 12th FYP period, over 40 training seminars on climate change South-South cooperation were held to help more than 2,000 officials and experts in climate change area from other developing countries. Since 2015, China has further enhanced the South-South cooperation. In September 2015, Chinese President Xi Jinping announced at the High-level Roundtable on South-South Cooperation jointly held by China and the UN that in the next five years China will provide 100 projects on ecological protection and climate change for developing countries, and the implementation of these projects has achieved periodical progress. In December 2015, Chinese President Xi Jinping announced at the Paris Conference to establish a South-South Climate Cooperation Fund with the scale of RMB 20 billion, and launched *Ten, Hundred, Thousand* Project, namely launching 10 low-carbon demonstration zones, 100 mitigation and adaptation projects and the cooperation projects containing 1000 personnel training quota in developing countries. Currently the implementation plans of those projects have been made and will be gradually launched. Moreover, China donated USD 6 million to the UN to support the Secretary General of the UN to advance the South-South cooperation on climate change.

Conclusions

During the 12th FYP period, China made comprehensive progress in tackling climate change, laying a solid foundation for actively addressing climate change and promoting the low-carbon development in the future. The successful conclusion of the Paris Agreement indicated that global climate governance will enter into a new phase and sends a positive signal of green and low-carbon transformation to the world, which will further make green and low-carbon development a major trend. The 13th FYP period is the decisive stage for China to comprehensively build a moderately prosperous society in all respects and the key period to achieve GHG emissions controlling targets in 2020 and 2030, and thereby China will encounter new situation, new tasks and new requirements when dealing with climate change. China will pursue innovative, coordinated, green, open and shared development, treat the tackling of climate change as a significant opportunity to transform the development mode, as well as continue to explore and take the low-carbon development path in line with China's national circumstance.