China's Policies and Actions for Addressing Climate Change

（2020）

Ministry of Ecology and Environment of

the People's Republic of China

June 2021

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Foreword

China has always attached great importance to addressing climate change and implemented a national strategy for actively addressing climate change. It took a series of measures such as adjusting industrial structure, optimizing energy structure, conserving energy and promoting energy conservation and improving energy efficiency, promoting the construction of carbon market, and increasing forestry carbon sinks. China has achieved positive results in key areas including control of greenhouse gas (GHG) emissions, formulation of strategic plans, development of institutional mechanisms, improvement of social awareness and capacity building. By the end of 2019, China's carbon dioxide (CO_2) emissions per unit of gross domestic product (GDP) (hereinafter referred to as carbon intensity) had declined by approximately 47.9% from 2005, and non-fossil energy accounted for 15.3% of total energy consumption, fulfilling its commitments to the international community for the year 2020 ahead of schedule and reversing the rapid growth trend of CO_2 emissions.

2020 was an extraordinary year for tackling climate change. Chinese President Xi Jinping announced on September 22 that China would scale up its Intended Nationally Determined Contributions by adopting more vigorous policies and measures and that China aims to have carbon

dioxide emissions peak before 2030 and achieve carbon neutrality before 2060. President Xi Jinping further announced four new measures of China regarding its nationally determined contributions at the Climate Ambition Summit in December. The 5th Plenary Session of the 19th Communist Party of China (CPC) Central Committee, the Central Economic Work Conference, and the 9th Meeting of the Central Finance and Economics Committee made important arrangements for related work. The new peaking target and carbon neutrality vision demonstrate China's firm determination to actively address climate change and pursue green and low-carbon development, and reflect China's initiative to take on the international responsibility of addressing climate change and to promote the building of a community with a shared future for mankind. They constitute great political impetus for global climate governance and are highly praised by the international community. They are a major new contribution of China to addressing global climate change.

As the largest developing country, China is facing a series of arduous tasks, such as economic development, people's well-being improvement, poverty eradication, and pollution prevention and control. It is a huge challenge and requires hard work to peak carbon emissions and achieve carbon neutrality. In the next step, we will, in accordance with the *Outline of the 14th Five-Year Plan (2021-2015) for National Economic and Social Development and the Long-Range Objectives Through the Year 2035* and the arrangements made at the Central Economic Working Conference and

the 9th Meeting of the Central Finance and Economics Committee, make even greater efforts to combat climate change by implementing more proactive and comprehensive national strategies, accelerating the process of achieving carbon peak and carbon neutrality, constructing a green and circular economic system as well as promoting the transformation and upgrading of economic, energy and industrial structure. Furthermore, we intend to integrate the work on addressing climate change and protecting ecology and environment, in order to achieve the synergy effect. In doing so, we believe the development of China's economy and protection of environment would be on a high-quality track.

This report is prepared to help the interested parties to gain a comprehensive understanding of China's policies, actions and achievements in addressing climate change since 2019.

I. Strengthening Top-Level Design

(I) Adding the Targets of Carbon Peak and Carbon Neutrality to China's Overall Plan for Ecological Civilization

At the General Debate of the 75th Session of the United Nations General Assembly on September 22, 2020, President Xi Jinping promised that China will scale up its Intended Nationally Determined Contributions by adopting more vigorous policies and measures and that China aims to have carbon dioxide emissions peak before 2030 and achieve carbon neutrality before 2060. At the Climate Ambition Summit on December 12, 2020, President Xi Jinping announced some further commitments for 2030: China will lower its carbon dioxide emissions per unit of GDP by over 65 percent from the 2005 level, increase the share of non-fossil fuels in primary energy consumption to around 25 percent, increase the forest stock volume by 6 billion cubic meters (m^3) from the 2005 level, and bring its total installed capacity of wind and solar power to over 1.2 billion kilowatts (kW). The 5th Plenary Session of the 19th CPC Central Committee and the 2020 Central Economic Working Conference made important arrangements for carbon peak and carbon neutrality. At the 9th Meeting of the Central Finance and Economics Committee, President Xi Jinping emphasized that achieving carbon peak and carbon neutrality is an extensive and profound revolution in the economic and social systems, and we must integrate the targets of

carbon peak and carbon neutrality into the overall plan for ecological civilization and put in vigorous efforts to achieve the targets of carbon peak before 2030 and carbon neutrality before 2060 on schedule.

At a time when COVID-19 swept the world and the multilateral process for addressing climate change was challenged, President Xi Jinping made and reiterated major commitments of China to address climate change on several important international occasions, and made important arrangements for the work in China on carbon peak and carbon neutrality. Such efforts demonstrate China's firm determination to actively respond to climate change and pursue green and low-carbon development, and reflect China's initiative to promote the building of a community with a shared future for mankind. These are significant new contributions of China to addressing global climate change.

Column 1 Remarks of President Xi Jinping on Carbon Peak and Carbon Neutrality

The *Paris Agreement* on climate change charts the course for the world to transition to green and low-carbon development. It outlines the minimum steps to be taken to protect the Earth, our shared homeland, and all countries must take decisive steps to honor this Agreement. China will scale up its Intended Nationally Determined Contributions by adopting more vigorous policies and measures. We aim to have CO_2 emissions peak before 2030 and achieve carbon

neutrality before 2060.

——Statement by Chinese President Xi Jinping at the General Debate of the 75th Session of the United Nations General Assembly, September 22, 2020

China takes seriously its obligations under environment-related treaties, including on climate change and biodiversity. We have hit, ahead of schedule, the targets set for 2020 for tackling climate change and establishing protected areas. As the largest developing county, China is prepared to take on international responsibilities commensurate with its level of development, and contribute its part to global environmental governance. Guided by the vision of building a community with a shared future for mankind, China will continue to make extraordinary efforts to scale up its nationally determined contributions. China will adopt even more forceful polices and measures and strive to peak carbon dioxide emissions before 2030 and achieve carbon neutrality before 2060, thus making greater efforts and contributions toward meeting the objectives of the *Paris Agreement*.

——Remarks by Chinese President Xi Jinping at the United Nations Summit on Biodiversity, September 30, 2020

Green economy represents the future of human progress. It also holds the key to promoting recovery. Both China and Europe are followers of green development, and both are committed to the implementation of the *Paris Agreement* on climate change. Not long ago, I announced China's initiative to scale up the nationally determined contributions to peak carbon dioxide emissions by 2030 and achieve carbon neutrality by 2060. Implementation plans will be drawn up accordingly. Next year, China, Europe and France will each host an international conference on biodiversity, on climate change and on nature conservation. We could take such opportunities to deepen cooperation in these fields.

——Speech by Chinese President Xi Jinping at the Third Edition of the Paris Peace Forum, November 12, 2020

Global warming will not stop due to COVID-19. To tackle climate change, we

must never relax our efforts. We need to implement the *Paris Agreement* in good faith, stick to the principle of common but differentiated responsibilities, and provide more help to developing countries, particularly the small island developing states. China is prepared to take on international responsibilities befitting its level of development, and will continue to make extraordinary efforts to address climate change. Recently, I announced at the UN China's initiative to scale up its nationally determined contributions and adopt more forceful policies and measures to strive to peak carbon dioxide emissions by 2030 and achieve carbon neutrality by 2060. You can count on China to keep its promise.

——Remarks by Chinese President Xi Jinping at the 12th BRICS Summit, November 17, 2020

G20 should continue to take the lead in tackling climate change. We need to follow the guidance of the *United Nations Framework Convention on Climate Change*, and push for the full and effective implementation of the *Paris Agreement*. Not long ago, I announced China's initiative to scale up its nationally determined contributions and strive to peak carbon dioxide emissions by 2030 and achieve carbon neutrality by 2060. China will honor its commitment and see the implementation through.

——Remarks by Chinese President Xi Jinping at the Leaders' Side Event on Safeguarding the Planet of The G20 Riyadh Summit, November 22, 2020

China has made important contributions to adopting the *Paris Agreement* and has made active efforts toward implementing it. I announced in September that China would scale up its nationally determined contributions and adopt more vigorous policies and measures. We aim to peak carbon dioxide emissions before 2030 and achieve carbon neutrality before 2060.

Today, I wish to announce some further commitments for 2030: China will lower its carbon dioxide emissions per unit of GDP by over 65 percent from the 2005 level, increase the share of non-fossil fuels in primary energy consumption to around 25 percent, increase the forest stock volume by 6 billion cubic meters

from the 2005 level, and bring its total installed capacity of wind and solar power to over 1.2 billion kilowatts.

China always honors its commitments. Guided by our new development philosophy, we will promote greener economic and social development in all respects while pursuing high-quality development. We will take solid steps to implement the targets just announced, and contribute even more to tackling the global climate challenge.

——Statement by Chinese President Xi Jinping at the Climate Ambition Summit, December 12, 2020

I have announced China's goal of striving to peak carbon dioxide emissions before 2030 and achieve carbon neutrality before 2060. Meeting these targets will require tremendous hard work from China. Yet we believe that when the interests of the entire humanity are at stake, China must step forward, take action, and get the job done. China is drawing up action plans and taking specific measures already to make sure we meet the set targets. We are doing this as a concrete action to uphold multilateralism and as a contribution to protecting our shared home and realizing sustainable development of humanity.

——Special address by Chinese President Xi Jinping at the World Economic Forum Virtual Event of the Davos Agenda, January 25, 2021

Achieving carbon peak and carbon neutrality is an extensive and profound revolution in the economic and social systems. We must integrate the targets of carbon peak and carbon neutrality into the overall plan for ecological civilization and put in vigorous efforts to achieve the targets of carbon peak before 2030 and carbon neutrality before 2060 on schedule

——Highlighted by Chinese President Xi Jinping at the 9th Meeting of the Central Finance and Economics Committee chaired by him, March 15, 2021

We must integrate the targets of carbon peak and carbon neutrality into the plan for province-based ecological conservation, and develop scientific timetables and road maps for the building of a modern China where human and nature

coexist in harmony.

——Highlighted by Chinese President Xi Jinping during an inspection tour in Fujian Province, March 22-25, 2021

The new development stage puts forward higher requirements for ecological civilization. We must make great efforts to promote green development and strive to lead in global development. We must firmly establish the concept that lucid waters and lush mountains are invaluable assets, and adhere to the path that puts ecological conservation first and seeks green development, increase forest area, improve forest quality, and increase ecosystem carbon sinks so as to make greater contributions to achieving our carbon peak and carbon neutrality targets and maintaining global ecological security.

——Highlighted by Chinese President Xi Jinping at a voluntary tree-planting event in the capital city of Beijing, April 2, 2021

Last year, I made the official announcement that China will strive to peak carbon dioxide emissions before 2030 and achieve carbon neutrality before 2060. This major strategic decision is made based on our sense of responsibility to build a community with a shared future for mankind and our own need to secure sustainable development. China has committed to move from carbon peak to carbon neutrality in a much shorter time span than what might take many developed countries, and that requires extraordinarily hard efforts from China. The targets of carbon peak and carbon neutrality have been added to China's overall plan for ecological civilization. We are now making an action plan and are already taking strong nationwide actions toward carbon peak. Support is being given to peaking pioneers from localities, sectors and companies. China will strictly control coal-fired power generation projects, and strictly limit the increase in coal consumption over the 14th Five-Year Plan period and phase it down in the 15th Five-Year Plan period. Moreover, China has decided to accept the *Kigali Amendment to the Montreal Protocol* and tighten regulations over non-carbon dioxide emissions. China's national carbon market will also start trading.

> As a participant, contributor and trailblazer in global ecological conservation, China is firmly committed to putting multilateralism into action and promoting a fair and equitable system of global environmental governance for win-win cooperation.
>
> ——Remarks by Chinese President Xi Jinping at the Leaders Summit on Climate, April 22, 2021

(II) Strengthening Related Research on Carbon Peak and Carbon Neutrality

The major decisions and arrangements of the CPC Central Committee on carbon peak and carbon neutrality were implemented, top-level design for carbon peak and carbon neutrality advanced at a faster pace, and the action plan on peaking carbon emissions before 2030 formulated. Research was carried out on the strategies to achieve carbon neutrality before 2060, covering the major areas, key technologies, key industries, important institutional arrangements and policies related to achieving carbon neutrality.

(III) Advancing the Preparation of Plans for Addressing Climate Change

The Ministry of Ecology and Environment (MEE) carried out special research on climate change plans during the 14th Five-Year Plan (FYP) period, studied the guidelines for formulating special plans for addressing

climate change, and drafted an outline for the preparation of special climate change plans during the 14th FYP period. The Ministry of Natural Resources (MNR) studied and compiled the *Outline of the Plan for the Territorial Space Nationwide (2021-2035)*, and carried out special research on climate change topics. It formulated and issued the *Guidelines for the Preparation of City-Level Master Plans for Territorial Space (for Trial Implementation)*, requiring that the impact of climate change and other factors on space development and protection and the countermeasures should be studied in such city-level master plans to promote the construction of low-carbon cities and integrate the share of new energy and renewable energy utilization in the indicator system of the plans. The National Forestry and Grassland Administration (NFGA) formulated and issued the *2019 Plan for the Key Work Arrangements and Division of Labor of on Addressing Climate Change in the Forestry and Grassland Sector*, and initiated research on the key points of action to tackle climate change by forestry and grassland sector during the 14th FYP period. The Civil Aviation Administration of China (CAAC) advanced the preliminary research and preparation of the 14th FYP for the green development of civil aviation. The Railway Administration (NRA) actively incorporated the work on tacking climate change into railway-related development plans, compiled the *Outline of the Action for Building a Railway Power* and the *14th Five-Year Plan for Railway Development*, improved the technical standards and criteria of the railway sector, and strengthened environmental protection and energy conservation. To establish sound technical standards and assessment

systems for environmental protection in the railway sector, it formulated several special standards including design standards for environmental protection in railway works, design standards for energy conservation in railway works, and assessment standards for green railway passenger stations. The Ministry of Industry and Information Technology (MIIT) organized the compilation of the *Medium-term and Long-term Development Plan for the Shipbuilding Industry (2021-2035)*, proposing to adopt green and low-carbon guidelines, vigorously promote green shipbuilding, and deeply participate in the formulation of international rules and standards for reduction of GHG emissions from the shipbuilding sector.

(IV) Initiating the Preparation of the National Climate Change Adaptation Strategy 2035

MEE established a leading group and an office of the leading group for the preparation of the *National Climate Change Adaptation Strategy 2035*; an expert advisory committee was set up to provide advice on important issues involved in the preparation process. For areas greatly affected by climate change, respective tasks were put forward in terms of enhancing adaptability in areas of nature, economic resilience as well as society for better climate change adaptation.

II. Climate Change Mitigation

Since 2019, the Chinese government has achieved significant results through a series of measures including adjusting the industrial structure, conserving energy and improving energy efficiency, optimizing the energy structure, controlling GHG emissions from non-energy activities, increasing carbon sinks, strengthening coordinated control of GHG and air pollutants, and promoting low-carbon pilots and local actions. In 2019, China's carbon intensity fell by 3.9% year on year, and declined by 17.9% from 2015.

(I) Adjusting the Industrial Structure

Continuing the resolution of surplus capacity and speeding up green and low-carbon transition of industries. The petrochemical, electric power, coal, steel and other industries accelerated their transformation and upgrading, and vigorously eliminated outdated production capacity with high energy consumption and substandard environmental performance. The Inter-ministerial Joint Conference on Overcapacity and Development of Steel and Coal Industries issued the *Notice on Effective Resolution of Overcapacity in Key Fields in 2020*, clarifying the task of resolving overcapacity in steel. Since 2016, China has continued to strictly control the expansion of energy-intensive industries, eliminated outdated capacity in accordance with laws and regulations, and accelerated the resolution of overcapacity. By the end of 2018, over 150 million tons of overcapacity of

steel had been resolved, over-fulfilling the 13th FYP target two years ahead of schedule. The National Development and Reform Commission (NDRC) and other relevant departments issued the *Implementation Opinions on Creating a Better Development Environment for Supporting the Healthy Development of Private Energy-saving and Environmental Protection Enterprises* and promoted the implementation of the *Green Industry Directory (2019 Edition)*, nudging policies and limited funds to the industries that are critical to promote the green development. Moreover, they also stimulated the development of energy conservation and environmental protection industries, and supported qualified green industry enterprises in raising funds through green bonds. Industries including construction, power grid, communications, transportation, building materials, and equipment manufacturing actively promoted green and low-carbon development by improving industry green standards as well as working to improve the ability to supply green products and build green brands.

Energetically developing service industry and supporting strategic emerging industries. In 2019, the overall development of China's service industry saw improvements. The added value of the tertiary industry was CNY 53.5371 trillion, with an increase of 7.2%, the proportion of which was 54.3%. The contribution rate of final consumption expenditure to GDP growth for the whole year was 58.6%. The operating revenue of service industry enterprises above designated size increased by 9.4% over the

previous year, and the operating profit increased by 5.4%. New growth drivers maintained rapid development. Among the industrial enterprises above designated size in the whole year, strategic emerging industries witnessed an increase in added value by 8.4% over the previous year, and high-tech manufacturing saw an increase in added value by 8.8%, accounting for 14.4% of the added value of industrial enterprises above designated size. In the service enterprises above designated size in the whole year, strategic emerging service enterprises saw an increase in operating revenue by 16.1% over the previous year. The investment in high-tech industries for the year increased by 17.3% over the previous year.

In 2019, China's economic structure was further optimized. The added value of the three industries accounted for 7.1%, 38.6% and 54.3% of GDP respectively.

(II) Promoting Energy Conservation and Improving Energy Efficiency

Advancing energy conservation in industry and information technology. MIIT organized special energy conservation inspections for major national industries. From 2019 to 2020, it inspected 8,067 energy-intensive enterprises in steel, nonferrous metals, petrochemicals, chemicals, and building materials, and key energy-consuming data centers with the purpose of driving enterprises to use energy rationally and in line

with the relevant laws and regulations. It launched diagnostic services for industrial energy conservation by organizing more than 400 institutions to provide diagnostic services to 14,000 industrial enterprises for energy conservation. It accelerated the promotion and application of high-energy-efficiency equipment and products, organized energy efficiency improvement actions for general equipment such as motors and transformers, and published two batches of catalogues on national industrial energy-saving technology and equipment, and on energy efficiency star products, recommending more than 700 advanced energy-saving equipment and products to the society, nudged policies and limited funds to the industries that are critical to promote the green development. Moreover, they also stimulated the development of energy conservation and environmental protection industries, and supported qualified green industry enterprises in raising funds through green bonds. It standardized industrial energy conservation and green development by supporting the formulation and revision of 140 industrial energy conservation standards since 2019, including the *Guidelines for Energy Conservation Technology in the Steel Industry.* It implemented the energy efficiency "leader" action by selecting and granting 91 energy efficiency "leader" enterprises in key industries such as steel, electrolytic aluminum, and cement so as to guide other industry enterprises in those industries to benchmark against them. It carried out a special action on demand-side management of electric power in the industrial sector. In July 2019, MIIT issued the *Guidelines for Power Demand Side Management in the Industrial Sector* to guide industrial

enterprises (parks) to optimize power consumption structure, adjust power consumption structure mode, optimize resource allocation, and continue to improve the energy efficiency per unit of industrial added value. In March 2020, it published the third batch of catalogue on power demand-side management reference products (technologies) in the industrial sector to promote typical applications. According to preliminary calculations, the added value of CO_2 emissions per unit of industrial added value in 2019 was approximately 17.9% lower than in 2015.

Advancing energy conservation in buildings. The Ministry of Housing and Urban-Rural Development (MOHURD) revised the *Regulations on the Management of Energy Conservation in Civil Buildings* and promoted the implementation of the *Energy Conservation Standards for Residential Buildings in Severe Cold and Cold Areas* and the *Technical Standards for Buildings of Near-Zero Energy Consumption*. The program of renovating dilapidated houses was carried out in rural areas. From 2019 to 2020, the central government allocated a total of CNY 45.2 billion in subsidies to support the renovation of the dilapidated houses of 1.63 million registered poor households across the country, and guided the relevant provinces to carry out demonstrations of energy conservation in buildings in conjunction with the renovation of rural dilapidated houses. The energy conservation demonstration households in rural areas of Northeast China, North China, Northwest China and Tibet region can have their annual energy consumption for heating reduced by 0.5 tons of coal. Six departments

including MIIT and MOHURD jointly issued the *Notice on the Development of Smart Photovoltaic Pilots and Demonstrations*. By the end of 2019, the total built-up area of energy-saving buildings across the country exceeded 19.8 billion square meters (m^2), accounting for more than 56% of the existing urban building area. Seven departments, including MOHURD, NDRC and the PBOC, issued the *Action Plan for the Development of Green Buildings*.

Advancing energy conservation in transport. Aircraft auxiliary power unit (hereinafter referred to as APU) alternatives have reduced CO_2 emissions by nearly 1.3 million tons since 2019. By the end of 2019, the number of new energy buses nationwide was 410,000, accounting for 59% of buses. In 2019, China's railway freight volume was 4.39 billion tons, an increase of 700 million tons over 2017, an increase of 19.0%. The Ministry of Transport (MOT) conscientiously implemented the *Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution* and other legal requirements, and actively promoted the use of shore power by ships calling at ports. It formulated and revised the *Measures for the Administration of Ports and Shore Power for Ships*, the *Regulations for the Management of Port Construction Works* and other departmental regulations, as well as mandatory industry standards such as the construction and testing of shore power facilities at ports. It set up a multi-departmental coordination mechanism with NDRC, the Ministry of Finance (MOF), the National Energy Administration (NEA), the State Grid

Corporation of China (SGCC) and other departments, and promulgated a financial support policy and a supportive tariff policy under which shore power at ports is charged at the tariff for major industrial users and exempted from capacity (demand) tariff.

Column 2 Policies and Actions in the Transport Sector to Address Climate Change

In September 2019, NDRC, MOT and other departments issued the *Guiding Opinions on Accelerating the Construction of Special Railway Lines*, focusing on the construction of 127 special railway lines.

Nine departments including MOT and NDRC issued the *Notice of Nine Departments Including the Ministry of Transport on Implementing the Three-Year Action Plan for Promoting Transport Structure Adjustment (2018-2020) Issued by the General Office of the State Council* to help achieve positive results from the adjustment of transport structure. By the end of 2019, 25 projects of special railway lines included in the action plan for Beijing-Tianjin-Hebei region and the surrounding areas had been completed (Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia, Liaoning, Henan, and Shandong); for 17 ports including the main coastal ports in the Circum-Bohai Sea region, Shandong Province and the Yangtze River Delta region, as well as Tangshan Port and Huanghua Port, the transport of all coal containers had been changed to railway and waterway transport, and the road transport of bulk cargo at coastal ports decreased by about 240 million tons in total.

River-sea direct transport and multimodal transport were developed, with three batches of 70 multimodal transport demonstration projects carried out. Civil aviation accelerated the improvement of the electrification level of airport operations. At the end of 2019, the airport new energy vehicles (NEVs) in China accounted for about 7.5%, and the growth rate of airport gasoline and diesel

consumption was effectively controlled.

APU alternatives basically achieved widespread application. Since 2019, they have saved more than 400,000 tons of aviation fuel and reduced CO_2 emissions by nearly 1.3 million tons. In 2019, about 373,000 flights used temporary routes, shortening the flight distance by 15.7 million kilometers (km), saving 85,000 tons of fuels and reducing carbon emissions by about 267,000 tons.

MOT issued the *Measures for the Administration of Ports and Shore Power for Ships* and the *Plan for Arranging Shore Power at Ports*. Together with MOF, NDRC and other departments, it issued the *Notice on Further Promoting the Use of Shore Power by Ships Calling at Ports*. Up to the end of 2019, more than 5,400 sets of shore power facilities have been built at the ports across the country, covering more than 7,000 berths. Pilot Programs and demonstrations of the application of liquefied natural gas (hereinafter referred to as LNG) in the water transport industry were continued. At present, 20 LNG filling stations for inland vessels have been built, and more than 290 LNG-powered vessels have been built.

MOF, MOT and other departments issued the *Notice on Supporting the Promotion and Application of New Energy Buses*. The law on vehicle purchase tax was implemented, which exempted the purchase tax on public automobile and electric vehicles purchased by urban public transport enterprises. Up to the end of 2019, the number of new energy buses nationwide was 410,000, accounting for 59% of buses.

MIIT, as the coordinator of the working mechanism of the inter-ministerial joint meeting on energy conservation and development of NEVs industry, issued together with the relevant departments the 2020 key work plan and the division of departmental tasks for the promotion and application of NEVs. Twelve departments including MIIT and the Office of the Central Finance and Economics Committee prepared the *Development Plan for the New Energy Vehicle Industry (2021-2035)*. In conjunction with MOF, the Ministry of Commerce (MOC), the General Administration of Customs (GAC), and the State Administration for Market Regulation (SAMR), it revised the *Passenger*

Car Corporate Average Fuel Consumption (CAFC) and NEVs Credit Regulation to better promote energy conservation and the high-quality development of the NEVs industry.

MOT and other departments issued the *Green Travel Action Plan (2019-2022)* and the *Action Plan for Promoting Green Travel*. MOT, in conjunction with the Ministry of Public Security (MPS), the National Government Offices Administration (NGOA), and the All-China Federation of Trade Unions (ACFTU), organized the 2020 green trip publicity month and bus trip publicity week. The strategy of prioritizing the development of urban public transport was implemented in a deep-going manner, with 87 cities nationwide carrying out national demonstration projects on building public transport cities. By the end of 2019, 190 urban rail transit lines had been opened and operated in 41 cities across the country, and the operating mileage of urban rail transit exceeded 6,100 km. Together with MPS and MOC, MOT carried out demonstration projects of green cargo transport and distribution in cities. By the end of 2019, a total of 38,000 new energy logistics and distribution vehicles had been added in 46 demonstration cities across the country, making the number of the vehicles exceed 122,000. The average daily mileage travelled per vehicle was increased by 10%, which greatly promoted energy conservation and emission reduction in the freight industry. The electronic toll collection (ETC) system was promoted among vehicles for fast traffic on expressways without the need for stopping. According to preliminary calculations, from January to December 2019, a total of about 182,200 tons of vehicle fuels were saved, and about 433.05 tons of nitrogen oxide emissions, 1,443.49 tons of hydrocarbon emissions, and 54,200 tons of carbon monoxide emissions were reduced.

Advancing energy conservation in public institutions. NGOA issued the Statistical Investigation System for Energy Resource Consumption in Public Institutions, the Implementation Rules for the Compilation and Promotion of Demonstration Cases of Energy Resource Conservation in

Public Institutions, the Reference Standards for the Evaluation of Domestic Waste Classification in Public Institutions, and the Action Plan for Building Conservation-minded Public Institutions. Additionally, it launched the work on the establishment of conservation-minded public institutions as demonstration units and the selection of energy efficiency leaders. It promoted the implementation of a mandatory procurement system for energy-saving and environment-friendly products. It issued the Guidelines for Evaluation of Green Data Centers in Public Institutions and the Advanced Solutions Applicable to Green Data Centers in Public Institutions, and together with MIIT and other departments, it organized the recommendation of national green data centers (2020). It organized the "5 clouds" energy conservation publicity activity for the 2020 national publicity week for energy conservation in public institutions, which saw the participation of about 7 million cadres and employees through online platform. In 2019, the per capita comprehensive energy consumption of public institutions nationwide was 333.81 kilograms of coal equivalent (kgce), the energy consumption per unit of building area was 18.89 kgce, and the per capita water consumption was 22.29 tons, a decrease of 9.96%, 8.08%, and 12.07% respectively from the 2015 levels. Fourteen departments including MIIT and MOF issued and implemented the Action Plan for Promoting the Electrification of Vehicles in the Public Sector, which clearly requires that "Party and government agencies and public institutions should give priority to the use of new energy vehicles", and this requirement also applies to the renewal or use of vehicles in government

office, public institutions and organizations that are wholly or partly funded by the government.

Promoting energy conservation technologies and products. MOF, NDRC, MEE, and SAMR issued the Notice on Adjusting and Optimizing the Implementation Mechanism for Government Procurement of Energy-saving Products and Products with Environmental Labelling. NDRC and the State Administration for Market Regulation published the 15th batch of catalogue of products with energy efficiency labels and the related implementation rules. NDRC and the Ministry of Science and Technology (MOST) advanced the implementation of the Guiding Opinions on Building a Market-Oriented Green Technology Innovation System and selected and released the second batch of best energy-saving technologies and best energy-saving practices. SAMR and NDRC jointly organized demonstration activities on energy resource measurement services. Since 2019, MIIT, in conjunction with the State Taxation Administration (STA), has issued a total of 18 batches of Catalogue of Energy-saving New Energy Vehicles Enjoying Reduction and Exemption of Vehicle and Vessel Taxes, covering 5,318 vehicle models; 18 batches of Catalogue of New Energy Vehicles Exempted from Vehicle Purchase Tax, covering 5,077 vehicle models; 29 batches of Catalogue of New Energy Vehicles for Promotion and Application, covering 5,318 vehicle models. At present, nearly 100 colleges and universities across the country have built a digital energy regulation system, installed charging piles for NEVs, and

increased the proportion of NEVs in school buses.

(III) Optimizing the Energy Structure

Controlling total energy consumption and energy intensity. In the first four years of the 13th FYP period, energy consumption per unit of GDP dropped by 13.1%, and total energy consumption in 2019 was controlled at 4.87 billion tce. The survey and evaluation of coal-bed methane resources were completed, and the targets of reducing coal production capacity and eliminating outdated coal-fired power capacity for the 13th FYP period were over-fulfilled. The installed coal power capacity was controlled within 1.1 billion kW. In the first four years of the 13th FYP period, a total of approximately 600 billion kWh of alternative electricity was added, which exceeded the planned target in advance.

Pushing ahead the clean utilization of fossil energy. Coal-fired power generation was developed in a clean and orderly manner. By the end of 2019, the total installed capacity of coal-fired generation power was 1.04 billion kW, the cumulative energy-saving transformation was over 750 million kW, and the cumulative capacity of ultra-low-emission coal-fired power generation units reached 890 million kW, Therefore, it became the world's largest clean coal power supply system. In 2019, China's coal consumption for thermal power generation was 306.4 gce/kWh; the nationwide natural gas consumption was 306.4 billion m^3, an increase of 8.6%

year on year.

Effectively promoting clean heating in northern areas. In 2017, ten departments including NDRC and MEE jointly released the *Plan for Winter Clean Heating in Northern Areas (2017-2021)* and deployed clean heating work in a coordinated manner. Since 2017, MOF, together with MEE and other departments, has implemented the policy for clean heating pilot in winter in norther China, promoted the use of clean heating in pilot cities instead of burning bulk coal for heating, and guided residents in rural areas to establish a green lifestyle and consumption pattern. In 2019, five departments including NDRC, MOF, MEE, MOHURD, and NEA jointly released the *Notice on Further Promoting Clean Heating* to guide all provinces to further work on clean heating. NDRC and NEA took the lead in establishing a clean heating inter-ministerial joint meeting mechanism, a coordination mechanism for the supply and transportation of coal, electricity, oil and gas as well as transportation during the heating season, and a scheduling mechanism for ensuring the days of natural gas supply. NEA organized special regulatory actions on clean heating in winter in the northern areas. Each year, MEE would guide the Beijing-Tianjin-Hebei region and the surrounding areas, as well as cities of the Fenhe Plain and the Weihe Plain to formulate proper bulk coal control plans according to local conditions, and make the related arrangements through the comprehensive action plan on air pollution in key areas in autumn and winter; Before the heating season of each year, it would organize a special inspection to ensure

the supply of clean heating. After entering the heating season, it would establish an on-site verification and supervision mechanism to address issues regarding the supply of clean heating to ensure residents stay warm through the winter. While guiding northern rural areas to carry out clean heating, MOHURD simultaneously advanced energy-saving renovation of buildings by guiding local governments to optimize the planning and construction of urban heating pipelines, and to intensify the renovation of heating facilities such as old heating pipelines and heat stations. By the end of 2019, the clean heating rate in the northern areas was 55%, about 140 million tons of bulk coal (including coal for low-efficiency small boilers) were replaced, and about 20.8 million households completed the "coal-to-gas (electricity)" transformation; clean heating rate in northern rural areas was 31%. The Beijing-Tianjin-Hebei region and the surrounding areas, as well as the Fenhe Plain and the Weihe Plain had cumulatively completed the replacement of bulk coal for approximately 18 million households.

Energetically developing non-fossil energy. In 2019, non-fossil energy consumption accounted for more than 15%, and the transition to clean and low-carbon energy was accelerated. The annual new installed capacity of renewable energy accounted for more than 50% of the total new installed capacity. By the end of 2019, the country's installed capacity of renewable energy power reached 794 million kW, a year-on-year increase of 9%; among them, hydropower installed capacity was 356 million kW, wind power installed capacity was 210 million kW, Photovoltaic Power (PV)

power installed capacity was 204 million kW, and biomass power installed capacity was 22.54 million kW, a year-on-year growth of 1.1%, 14.0%, 17.3% and 26.6%, respectively. For the first time, the installed capacity of wind power and that of PV power exceeded 200 million kW. The installed capacity of renewable energy generation accounted for approximately 39.5% of the total installed capacity of electricity, a year-on-year increase of 1.1 percent points (pps). The scale of installed renewable energy capacity continued to expand. By the end of 2019, the scale of in-service nuclear power units was 48.74 million kW, ranking third in the world, and the scale of nuclear power units approved and under construction was 17.173 million kW, ranking first in the world. The utilization rate of renewable energy power increased significantly. In 2019, the country's average wind power utilization rate reached 96%, the utilization rate of PV power reached 98%, and the utilization rate of water energy in major river basins reached 96%. Biomass energy was vigorously developed, biomass-based heat and power cogeneration advanced in an orderly manner, and biomass boilers for central heating using agricultural and forestry biomass as well as biomass molded fuel rationally promoted. In non-key areas for the air pollution control, household biomass-fueled stove heating was promoted according to local conditions. At present, the area of clean heating by biomass energy has reached 300 million m^2. More than 7,700 large-scale biogas and biological natural gas projects have been built, with an annual gas output of 1.37 billion m^3, supplying gas to more than 478,000 households. More than 2,300 agricultural molded fuel plants and processing points have been built,

with an annual output of nearly 11 million tons; a total of 28.63 million units of energy-saving stoves has been promoted. MIIT organized the implementation of the *Specification Conditions for the Photovoltaic Manufacturing Industry* to guide the orderly development of the industry and provide high-quality and high-efficiency PV products. During the 13th FYP period, China provided more than 453 gigawatts (GW) of solar cells worldwide. During the 13th FYP period, about 26 million kW of PV poverty alleviation power stations were built, benefiting about 60,000 poor villages and 4.15 million poor households, rated as the country's "Top Ten Targeted Poverty Alleviation Projects". In June 2019, the world's first wave energy aquaculture platform "Penghu" was delivered for use, with a total installed capacity of 120 kW. Zhejiang's modular large-scale ocean tidal power generating units continued to operate stably, with a cumulative grid-connected power generation of more than 1.8 million kWh. In the Qinghai Gonghe Basin and its periphery, 18 hot dry rock exploration and development target areas have been delineated, with a total area of 3,092 square kilometers (km^2), and high-efficiency drilling and fracturing technologies for high-temperature hard rock have been initially formed.

(IV) Controlling Non-CO_2 GHG Emissions

Agricultural sector. The Ministry of Agriculture and Rural Affairs (MARA) continued to promote the reduction and efficiency enhancement of chemical fertilizers and the utilization of livestock and poultry manure to reduce

methane and nitrous oxide emissions in the agricultural sector. Demonstrations of fertilizer reduction and efficiency enhancement were carried out in 300 counties, and advanced fertilizer-saving technologies such as deep fertilization by machinery and integration of water and fertilizer were promoted. Soil testing and formula fertilization were vigorously carried out, and formula fertilizer has accounted for more than 60% of the total application of fertilizer to the three major food crops. By 2019, the utilization rate of chemical fertilizers for the three major food crops of rice, wheat, and corn in China had reached 39.2%, an increase of 4 pps over 2015, and the number of chemical fertilizers used had experienced a negative growth for three consecutive years. The utilization of livestock and poultry manure was advanced, with actions taken in 603 counties to make use of livestock and poultry manure. The nationwide comprehensive utilization rate of livestock and poultry manure has reached 75%.

Waste sector. After getting the approval at the 15th meeting of the Central Committee for Deepening Overall Reform, 12 ministries and commissions including MOHURD jointly issued the *Several Opinions on Further Promoting the Classification of Domestic Waste*. The classification of domestic waste progressed steadily and orderly. 46 key cities have basically completed a domestic waste classification system for classified disposal, classified collection, classified transportation, and classified treatment. Other cities above the prefecture level have started the classification of domestic waste. By the end of 2019, the domestic waste classification in 46

key cities had covered 104,000 communities and more than 57 million households, a coverage rate of 67.8%; more than 8,900 kitchen waste collection trucks and more than 1,500 hazardous waste collection trucks were equipped, with a kitchen waste daily handling capacity of 59,200 tons. The *Implementation Plan for Strengthening the Weaknesses in Urban Domestic Waste Classification and Treatment Facilities* was implemented with active efforts. The construction of domestic waste incineration facilities was accelerated to make up for the shortcomings in the treatment facilities of kitchen waste and hazardous waste. By the end of 2019, the annual collection of urban domestic waste in the country was 242 million tons, the safe treatment capacity was 867,700 tons/day, the safe treatment rate was 99.2%, and the incineration treatment capacity had exceeded 457,600 tons/day, accounting for more than 52.5% of the total treatment capacity. MOC revised and issued the *Regulations for the Construction and Management of Recyclable Resources Green Sorting Centers* as an industry standard, which added the function of recyclable resource handling after classification of domestic waste and provided separate regulations on the management of the waste gas emission, dust prevention and general industrial solid waste at the sorting center so as to tighten the environmental protection and quality management in the process of construction and processing, and to improve the capacity of the sorting center in serving the comprehensive environmental governance in cities.

Industrial sector. To promote the construction of a green manufacturing

system, MIIT published the fourth batch of green manufacturer list in September 2019, encouraging green manufacturing companies to publish corporate green and low-carbon development reports. In conjunction with MOHURD, MOT, MARA, NEA and the State Council Leading Group Office of Poverty Alleviation and Development, it issued the *Action Plan for the Development of the Smart Photovoltaic Industry* to carry out pilots and demonstrations of smart PV applications and promote the innovation and upgrading of the PV industry and unique industry applications. The control of fluorine-containing gases with high global warming potential was continuously organized. In June 2019, six departments and commissions including NDRC and MEE jointly issued the *Green and High-efficiency Refrigeration Action Plan* to actively promote the reuse and safe treatment of refrigerants and strictly control the leakage and discharge of refrigerants by refrigeration product manufacturers in the production process. MEE initiated the revision of the *Regulations on the Management of Substances that Deplete the Ozone Layer* in 2019, and released the *Regulations on the Management of Substances that Deplete the Ozone Layer and Hydrofluorocarbons (Draft Amendment for Public Comments)* in May 2020 for public comments. It also actively promoted the ratification of the *Kigali Amendment to the Montreal Protocol*. In March 2020, MEE released the *Notice on Carrying out Disposal Work for Hydrofluorocarbons in 2019*, organized the 2019 Hydrofluorocarbons (HFCs) disposal verification, and published the results of the verification of the destruction of trifluoromethane in 11 enterprises in May 2020. Quota-based subsidies

were also given to the enterprises according to the verification results. MEE worked with major domestic oil and gas corporations, Shanxi Province and other partners to advance methane emission control, study and draft methane emission control action plan, and promote research on the control of emissions of nitrous oxide, sulfur hexafluoride and other GHGs. In 2019, SGCC recovered 162.2 tons of sulfur hexafluoride, equivalent to reducing 3.88 million tons of CO_2.

(V) Increasing Carbon Sinks in Ecosystems

Increasing forestry and grassland carbon sinks. The General Office of the CPC Central Committee and the General Office of the State Council issued the *Guiding Opinions on Establishing a Natural Reserve System Dominated by National Parks*. NFGA established a leading group for the work of the natural reserve system. The "Green Guardian 2019" special law enforcement action was carried out. Central government subsidized forest tending projects and a batch of demonstration projects for precision improvement of forest quality. The pilots of "Internet plus voluntary tree planting by all" were continuously expanded. In 2019, a total of about 7.1 million hectares of afforestation and about 7.6 million hectares of forest tending were completed nationwide; 34 forest tree species were reviewed (certified), 27 million kilograms (kg) of seeds were produced, and 37.7 billion seedlings were produced; 7,586 national forest villages were recognized for the first time, and 28 cities including the Yanqing District of

Beijing were awarded the title of "National Forest City"; about 3.1 million hectares of grassland was improved through grass planting; about 2.2 million hectares of desertified land was improved, and about 248,570 hectares of stony desertification was improved; 8 sandy land areas were newly closed for protection, the newly added area of closing was about 80,400 hectares, and the total closed area was about 1.7 million hectares. The total number of national desert (rock desert) parks has reached 120; 1 new site was recognized as a world natural heritage site, 2 world geological parks and 8 national geological parks were newly established.

Increasing other carbon sinks such as wetlands. MNR and NFGA jointly carried out a peat swamp carbon pool survey, completing the survey of 568 patches in the Three Northeast Provinces, Qinghai, Yunnan, Sichuan, and Inner Mongolia, and continued to advance the supplementary survey of peat in Inner Mongolia and Gansu. They deepened the investigation and research of geological storage and utilization of CO_2, and implemented the full-process project of multi-well group large-scale CO_2 displacement of water and oil, as well as geological storage of CO_2.

Increasing farmland soil carbon sinks. MARA launched the action to replace chemical fertilizer with organic fertilizer, piloting the replacement in 233 key counties. In 2019, the area of organic fertilizer application exceeded about 37 million hectares, an increase of about 50% over 2015. It implemented the action plan on black soil conservation farming in the

northeast, and promoted the application of conservation farming technologies that focus on returning crop straws to the field and planting with minimal tillage. It advanced the comprehensive utilization of straws by initiating such actions in 351 counties. The comprehensive utilization rate of straws nationwide reached 86.7%.

(VI) Strengthening the Coordinated Control of GHG and Air Pollutants

In 2019, MEE issued the *China Environmental Status Bulletin 2018*, which included data and information related to the control of GHG emissions. From June to July 2019, MEE issued the *Comprehensive Control Plan for Volatile Organic Compounds in Key Industries* and the *Comprehensive Control Plan for Air Pollution from Industrial Kilns and Furnaces* to coordinate the control of GHG emissions while advancing air pollution control. In addition, MEE issued the *Guiding Opinions on Coordinating and Strengthening the Response to Climate Change and Ecological Environment Protection* to promote the realization of co-benefit between climate change tackling and ecological environment governance. NEA actively implemented the construction of 12 key power transmission channels mentioned in the *Air Pollution Prevention and Control Action Plan*. In November 2019, all 12 power transmission channels for air pollution prevention and control were completed and put into operation. Since the introduction of the environmental protection tax, both taxation

governance abilities and environmental governance capabilities have been improved, effectively helping with the fight against pollution and climate change. In 2019, the nationwide environmental protection tax revenue was CNY 22.117 billion, of which CNY 19.711 billion was levied on air pollutants, accounting for 89.1%. At the same time, the environmental protection tax policy provides two-tier tax reductions for low-standard emissions to guide enterprises to upgrade their environmental protection equipment, improve their production technology, and reduce their pollutants emissions so as to help reduce the emissions of major air pollutants. The emissions of two key air pollutants declared by taxpayers, sulfur dioxide and nitrogen oxide, fell by 14.3% and 3.3% respectively year-on-year in 2019, on the basis of significant reductions in 2018.

(VII) Low-Carbon Pilots and Local Actions

Continuing to advance low-carbon pilots and demonstrations. By June 2020, 34 low-carbon pilot provinces and cities have compiled a total of 36 low-carbon development plans for the 13th FYP period (26 of which have been published). They integrated the low-carbon development into the regional development plans, clarified the main targets, key tasks and safeguard measures for low-carbon development in the corresponding region, and aimed to guide the process of urbanization and the optimization of urban areas with the concept of low-carbon development. 17 low-carbon pilot provinces and cities conducted studies on carbon emissions peaking

targets and corresponding implementation roadmaps to improve decision-making support. Research was carried out for the evaluation and promotion of experience in low-carbon pilots. Localities were encouraged to explore and develop near-zero carbon emission demonstration projects. The relevant pilot provinces and cities were organized to share their experiences in constructing low-carbon pilots. Positive results were achieved in promoting low-carbon development.

Independent innovations for low-carbon development in localities. Shenzhen took the lead in achieving 100% buses electrification in the world, and basically realized 100% taxis electrification. A total of 220,000 new energy vehicles were promoted. Green standard was adopted for all new civil buildings. Taiyuan City has basically built a green transportation system dominated by battery electric taxis, battery electric buses and public bicycles, which can reduce CO_2 emissions by more than 230,000 tons each year. Chenzhou City used the ever-cold water resources (8.13℃) of the Dongjiang Lake as a natural cold source for cooling in the big data center it built. For most of the time, there is no need to start the air conditioning unit in the computer room, and the power usage effectiveness has long been below 1.2. Compared with electric cooling, this method can save 5.2 billion kWh of electricity a year, resulting a reduction of CO_2 emissions by 5.54 million tons.

III. Climate Change Adaptation

Since 2019, China has regarded proactive adaptation to climate change as an important part of its national strategy to actively respond to climate change, and strived to improve the adaptability, actively participated in and facilitated international cooperation on climate change adaptation, and achieved positive results in many fields.

(I) Agriculture

Pushing forward the development of high-standard farmlands. Targeting at functional areas for food production and protected areas for production of major agricultural products, the main construction content includes land leveling, soil improvement, irrigation, drainage and water-saving facilities, etc., with a view to strengthen the construction of high-standard farmlands and water conservancy works, and improve the agricultural comprehensive production capacity. In 2019, about 5.4 million hectares of high-standard farmlands was newly developed nationwide, and about 1.3 million hectares of efficient water-saving irrigation was coordinated promoted. The effective irrigated area of farmland in China increased from 55 million hectares in 2005 to 68.3 million hectares in 2019.

Promoting dry-farming and water-saving agricultural technologies. 220 high-standard dry-farming and water-saving agricultural demonstration

areas were established in dry farming areas in North China and Northwest China, to demonstrate and promote dry-farming and water-saving agricultural technologies, such as water storage and soil moisture conservation, rainwater harvesting and supplementary irrigation, ridge tillage and furrow irrigation, soil moisture-based on-demand irrigation, water-saving irrigation, water and fertilizer integration, and drought and stress resistance, etc., and improve water resource efficiency.

(II) Water Resources

Strengthening the construction of water conservancy infrastructure. Since 2019, 24,000 km of small and medium-sized rivers have been improved, more than 6,700 small-sized dilapidated reservoirs reinforced, drainage capacity building organized for 9 key waterlogged areas and 53 flood-prone areas in the middle and lower reaches of the Yangtze River. A number of major water conservancy projects was constructed, with the completion and operation of those project, the security of river basins has been effectively improved.

Optimizing the allocation of water resources. With regard to national water conservation actions, NDRC and the Ministry of Water Resources (MWR) issued the *National Water Conservation Action Plan* and relevant division schemes. As of June 2020, 30 provinces (autonomous regions and municipalities) had issued provincial plans for implementing national water

conservation actions, comprehensively strengthened the control of the "three red lines" of water resources management, and implemented dual control actions on the cap and intensity of water resources consumption. The construction of water-saving cities was carried out. A total of 96 cities across the country were established as national water-saving cities, with about 5 billion m3 of water saved annually, equivalent to 10% of city annual water supply. Continued efforts were made to strengthen the transformation and construction of farmland irrigation and drainage facilities. As of the end of 2019, the effective coefficient of farmland irrigation water utilization of China had registered 0.559. Since 2019, seawater desalination has been widely applied in high water-consuming industries in coastal cities suffering severe water shortages such as Dalian, Tangshan, Zhoushan, and Rizhao. The daily water output of newly completed seawater desalination projects registered nearly 400,000 tons.

Enhancing conservation and restoration of water ecosystems. MWR issued the *Guiding Opinions on Defining and Guaranteeing the Ecological Flow of Rivers and Lakes* and released targets for inter-provincial key rivers and lakes in two batches. In 2019, 21 rivers and lakes in the groundwater overexploitation control area in North China were ecologically replenished by 3.49 billion m^3 of water. The largest river with water was 1,100 km long, forming a maximum water surface area of 403 km^2. In the case of low rainfall, the decline of groundwater level in the control area would significantly slow down. In 2019, 66,800 km^2 of water and soil erosion

comprehensive control areas were newly added nationwide.

Further implementing the river and lake chief systems. The localities identified a total of more than 300,000 river and lake chiefs at the provincial, municipal, county and township levels, and more than 900,000 village-level river and lake chiefs. A series of special campaigns were organized, including the special cleanup campaign to regulate illegal riverside occupation, construction, mining and waste; remediation on the shoreline utilization project at the mainstream of the Yangtze River; solid waste cleanup in the Yangtze River Economic Zone; and remediation on sand mining in the Yangtze River.

Improving the informationization of water conservancy. In 2019, MWR issued and implemented the *Overall Plan for Smart Water Conservancy* and launched the *Three-year Action Plan for Improving the Level of Water Conservancy Network Information (2019-2021)*. A number of informatization projects were basically completed, including those with regard to national groundwater monitoring, water resources monitoring capabilities, Phase II of the Flood Control and Drought Relief Command System, and water conservancy work safety supervision.

(III) Forestry and Other Terrestrial Ecosystems

Strengthening resource protection and restoration. NDRC and MNR issued the *National Master Plan for Major Project on Key Ecosystem*

Protection and Restoration Projects (2021-2035). To implement the ecological civilization concept of "mountains, waters, forests, farmlands, lakes and grasslands are part of a community of life" proposed by General Secretary Xi Jinping, the central government arranged funds to support 10 pilot ecological protection and restoration projects for mountains, waters, forests, farmlands, lakes and grasslands in Wuliangsuhai Basin in Inner Mongolia, Xiong'an New District in Hebei, and Lhasa River Basin in Tibet, etc. The pilot projects carried out holistic protection, systematic restoration, and comprehensive remediation to improve the quality and stability of the ecosystem by integrating various elements of the natural ecology. The construction of about 133,000 hectares shelter forest bases in the Ziwuling, Shaanxi and the Hulun Buir Sandy Land, Inner Mongolia, as well as the pilot project on ecological restoration of degraded grassland by artificial grass planting were launched. The *Plan for Natural Forest Conservation and Restoration System* was issued. In 2019, the central government invested CNY 43.4 billion in natural forest protection. 130 million hectares of natural forests was remediated nationwide, and 18.8 million hectares of forests and grasslands completed pest control.

Promoting the protection and restoration of wetlands. NFGA issued the Provisions on the Designation and Release of the List of National Important Wetlands and compiled the Implementation Plan for Wetland Protection and Restoration in the Yellow River Basin. In 2019, 387 wetland protection and restoration projects were implemented, about 20,000 hectares of

farmlands returned to wetlands, and about 73,000 million hectares of degraded wetlands restored. 160 national wetland parks passed the acceptance, national wetland parks totaled 899, and the national wetland protection rate reached 52.19%.

Improving ecosystem service functions. Intensified efforts were made in the delineation of ecological protection red lines, and the integration and optimization of natural reserves. Combined with the preparation of territorial spatial plans at municipal and county levels, ecological protection red lines were delineated and implemented in a targeted way.

(IV) Coastal Zones and Coastal Ecosystems

Carrying out coastal ecological restoration. The central government arranged funds to support local governments in carrying out the "Blue Gulf" rectification campaign, supporting the comprehensive management of the Bohai Sea, advancing the protection and restoration of mangroves, implementing coastal protection and restoration projects, and improving the quality of the marine ecological environment. *The Special Action Plan for Mangrove Protection and Restoration (2020-2025)* was formulated. Efforts were made to explore the blue carbon sink research and pilot work, organize the mangrove carbon sink monitoring, and guide the carbon sink pilot trading of mangrove ecological restoration.

(V) Urban Area

Summarizing progress in the construction of pilot climate-resilient cities. MEE and MOHURD jointly issued the *Notice on Reporting the Progress in the Construction of Pilot Climate-resilient Cities.* The progress in the construction of the first-batch 28 pilot climate-resilient cities was systematically summarized and reported.

Improving urban ecological restoration and functions. In conjunction with urban renewal actions, efforts were made to promote the construction of green cities, restore damaged and occupied urban water systems, mountains and woodlands, and improve the ecosystem; optimize the urban layout structure, improve the urban municipal facilities and public service facilities, support urban function mixing and building compound utilization, and foster the intensive and compact development of cities; and develop urban slow traffic systems to support green travel.

Vigorously developing prefabricated buildings. In November 2019, the *Development Guide for Prefabricated Concrete Building Technology System (Residential Buildings)* was issued to further improve the prefabricated building technology system. In 2019, the newly started prefabricated building area nationwide reached 420 million m^2, accounting for 13.4% of the newly built building area.

Pushing forward the construction of sponge cities. 30 pilot sponge cities

completed more than 4900 sponge city construction concept projects. Shenzhen, Zhuhai, Pingxiang, Ningbo, Kunshan, and Xixian New Area, etc. implemented the sponge city concept and effectively alleviated urban waterlogging disasters by taking comprehensive measures such as "seepage, retention, storage, and drainage".

Further advancing urban landscaping. Localities were guided to continuously expand the urban green space. As of the end of 2019, the green space in urban built-up areas across the country had reached 2.285 million hectares. The network of urban and rural greenways was improved. About 80,000 km of greenways was built nationwide, which has enhanced the ecological carrying capacity and livability of cities, and effectively improved the urban and rural ecology and living environment.

Effectively guaranteeing energy security. The independent energy security capacity was higher than 80%, 14 UHV DC transmission channels were built and put into operation, national large power grids were basically in on-line operation, the West-to-East Power Transmission Project had a capacity of 240 million kW, and the four major oil and gas import channels basically took shape.

(VI) Human Health

Carrying out health impact monitoring and response. Monitoring and risk assessment of the impact of air pollution (haze) on human health were

continuously carried out, and 164 monitoring points for the impact of air pollution (haze) on human health were set up in 84 cities, 31 provinces across the country. Health emergency work plans for natural disasters such as floods, droughts and typhoons were formulated, to respond to natural disasters and extreme weather events, strengthen the monitoring and prevention and control of vector-borne diseases under climate change, and carry out investigation and treatment of parasitic diseases in climate-sensitive areas.

Organizing health impact studies. Studies on the impact of extreme weather events on human health, and on the impact of climate change on the spread of parasitic diseases were carried out, and investigation bases were set up nationwide to carry out special investigations on regional population weather-sensitive diseases, conduct research on climate change related health risk assessment strategies and technologies, and strengthen assessment on the impact of climate change on the risk of spreading parasitic diseases.

(VII) Comprehensive Disaster Prevention and Mitigation

Finalizing the *Implementation Plan for Resolving Weak Links in Flood Control during the 14th Five-Year Plan Period*. Targeting at the weak links of flood control such as large rivers and major tributaries, small and medium-sized rivers, dilapidated reservoirs and mountain torrent-induced

disaster control, the main tasks of remediation and construction were proposed to improve flood control and disaster reduction capabilities.

Making all-out efforts to prevent floods and droughts. In 2019, the national average precipitation was 1% higher than normal. 616 rivers experienced floods above the warning water level, of which 120 rivers exceeded the guaranteed water level and 35 rivers broke the records. Through active prevention and control, the threats of flood disasters were successfully tacked. None of the large and medium-sized reservoirs and small (I) reservoirs across the country was collapsed, and none of the major river embankments breached. Positive progress was achieved in the prevention and control of urban waterlogging: successful response was made to Typhoon "Lekima" and regional heavy rainfall, which has ensured the safe operation of cities. Through scientific regulation, 2,690 secondary large and medium-sized reservoirs (lakes) across the country impounded a total of 151.8 billion m^3 of floodwater, minimizing the impact and losses of flood disasters.

Improving marine disaster prevention and response capabilities. China organized and completed marine disaster risk assessment and zoning in 16 districts and counties, and completed the first-round check and assessment on warning sea levels; prepared and issued the *China Marine Disaster Bulletin 2019* and *China Sea Level Bulletin 2019*. In 2020, China compiled and completed the *First National Assessment Report on Ocean and Climate*

Change, assessing the changes in China's marine environment and the basic conditions of sea level, and forecasting future trends of ocean and climate change. In addition, sea level change monitoring and impact investigation and assessment were completed, and assessments of the impact of sea level rise on coastal works, shoreline resources, etc. were carried out.

Continuously strengthening capacity of meteorological disaster risk management and adaptation. The campaigns to strengthen the foundation of grassroots meteorological disaster prevention and mitigation were fully implemented in 1,027 counties across the country, initially completing the construction of the Phase I Monitoring and Management Platform for National Meteorological Disaster Prevention and Mitigation, and establishing the national and provincial disaster prevention and mitigation information sharing channels.

Steadily pushing forward the development and utilization of climate resources and climate feasibility demonstration. 352 climate feasibility demonstration projects for urban planning, national key construction projects, and major regional economic development projects were accomplished; 2 climate feasibility demonstration standards were completed while credit evaluation and licensing for the first batch of 11 climate feasibility demonstration institutions were also completed. Nationwide fine solar resource assessments with a resolution of 1 km were carried out to facilitate the site selection and forecast services for 1,147 wind

farms and solar power stations.

Reinforcing the comprehensive prevention and control of geological disasters. China formulated and issued the *Technical Requirements for Geological Hazard Risk Investigation and Evaluation (Trial)* and *Technical Guide for Geological Disaster Special Group Combined Monitoring and Early Warning (Trial)*, with remote sensing identification technology methods for hidden geological hazards preliminarily formed. Detailed 1:50,000 risk surveys, and 1:10,000 risk surveys were carried out in 543 and 287 counties, respectively. 2,512 universal monitoring and early warning pilot sites were set up, and the early warning of geological disasters and meteorological risks was expanded from 24 hours to 72 hours. The engineering controls on 3,777 hidden danger points of geological disasters was completed, and 84,000 people threatened by 5,200 hidden danger points of geological disasters were relocated. Local natural resources authorities at all levels dispatched a total of 290,000 experts and professional and technical personnel to respond to more than 20,000 disasters in emergency situations.

(VIII) International Cooperation on Climate Change Adaptation

Actively carrying out international cooperation on adaptation to climate change. In June 2019, the Global Center on Adaptation (GCA)

established its first regional office (China Office) in Beijing. In September 2019, GCA launched its flagship report *Adapt Now: A Global Call for Leadership on Climate Resilience* in Beijing.

Promoting the key tasks of international cooperation on adaptation to climate change. MEE and GCA together prepared the *Work Framework of the GCA China Office* and the *Plan for Work Priorities 2020*. In 2020, MEE participated in international teleconferences organized by Global Commission on Adaptation to promote global resilient recovery in post-epidemic period, which would help maintain the good momentum in international cooperation on adaptation to climate change.

IV. Improvement of Systems and Mechanisms

Since 2019, the Chinese government has achieved positive results in system improvements, legislation and standard formulation for addressing climate change, and accelerated construction of the national carbon trading market.

(I) Promoting Legislation and Standard Formulation

MEE organized research on the relevance of climate change and legal systems for environmental protection, and further improved the draft law on climate change; mobilized local governments to carry out legislation on climate change, and supported the addition of addressing climate change in

the revised ecological and environmental protection regulations in Shenzhen Special Economic Zone; explored to improve the standard system related to climate change, and strengthen its integration with the existing standard system of MEE; organized the revision of national standards, such as accounting methods and reporting guidelines for GHG emissions; and studied to formulate carbon emission standards for passenger cars, etc., and guide the low-carbon transformation of related industries.

(II) Advancing Green System Building

Fostering the building of a green finance system. To strengthen the three functions of finance in supporting green and low-carbon development: resource allocation, risk management and market pricing, PBOC and other relevant departments made continued efforts in fostering the building of a green finance system and international cooperation, and achieved positive results. First, accelerating the establishment of a green finance standard system. The standard setting fully considered international concerns and national conditions, focusing on the three areas of climate, pollution control and energy conservation. In 2019, the ISO/TC322 established the sustainable finance terminology proposed by China as its first international standard project. The national standard *Green Finance Terminology* completed the project defense, and 5 industrial standards: *Environmental Equity Financing Instruments*, *Specification for Green Bond Credit Rating*,

Environmental Information Disclosure Guidelines for Financial Institutions, *Carbon Financial Products*, and *Basic Requirements for Green Private Equity Funds* completed the project approval, with 4 standards piloted in 6 national green finance reform and innovation pilot zones in 2020. Second, strengthening supervision and information disclosure requirements for financial institutions. Financial institutions, securities issuers, and public departments were guided to improve the standardization and transparency of environmental information disclosure. The pilot work of environmental information disclosure by Chinese and British financial institutions continuously achieved outcomes. PBOC, in conjunction with relevant departments, expedited the study of the feasibility of including listed companies and bond issuers in the scope of mandatory environmental information disclosure. PBOC Credit Department and MEE established a corporate environmental information sharing mechanism. As of the end of 2019, the credit system had collected 127,500 pieces of environmental penalty information, involving 88,300 enterprises, and collected 192,100 pieces of environmental permit information, involving 66,900 enterprises. Third, further improving the system of policy incentives and constraints by combining points with areas. Since 2017, the State Council has approved PBOC to lead green finance reform and innovation pilots in 9 pilot zones, 6 provinces (regions) including Huzhou, Zhejiang. At present, the share of green loan balance in total loans in the pilot zones is 4 percentage points higher than the national level. Fourth, further developing green financial products and market systems. As of the end of 2019, China had CNY 10.22

trillion of green loan balance; and CNY 1.1 trillion of green bonds were issued accumulatively. Fifth, deepening international cooperation on green finance. The Central Banks and Supervisors Network for Greening the Financial System (NGFS) initiated by PBOC had 83 full members and 13 observers. China and Europe and other economies jointly launched the International Platform on Sustainable Finance (IPSF) to promote the harmonization of global green finance standards.

Propelling climate investment and financing. MEE, together with NDRC, PBOC, the China Banking and Insurance Regulatory Commission (CBIRC), and the China Securities Regulatory Commission (CSRC), jointly issued the *Guiding Opinions on Promoting Investment and Financing to Address Climate Change*; in conjunction with CBIRC, revised the *Statistical Table of Green Financing* in relation to the low-carbon economy and climate financing, and adjusted relevant statistical caliber; organized and carried out research on key issues of climate investment and financing, such as the design of the database of Nationally Determined Contributions (NDCs) key projects and the evaluation criteria for NDCs key projects; together with the CBIRC, more than 20 top universities and more than 10 authoritative academic journals at home and abroad, jointly organized the Global Call for Papers on Climate Investment and Financing 2020; organized and solicited key policy research papers on climate investment and financing, and published a special issue: *Create New Horizons in Addressing Climate Change through Innovations in Climate*

Investment and Financing in the *Environmental Protection* magazine; and organized preparations for climate investment and financing pilot projects, with pilot work plans formed for Chongqing, Shandong, and Shaanxi.

Improving tax policy support. In April 2019, MOF, together with STA, NDRC, and MEE, issued the *Announcement on Issues Concerning the Income Tax Policy of Third-Party Enterprises Engaged in Pollution Prevention and Control*. The *Vehicle Purchase Tax Law of the People's Republic of China* was officially implemented on July 1, 2019. In April 2020, the MOF, together with the STA, MIIT, issued the *Announcement on Policies Concerning the Exemption of Vehicle Purchase Tax on New Energy Vehicles*, clearly extending the implementation period of the policy for exempting new energy vehicles from vehicle purchase tax to December 31, 2022.

Formulating and revising green product certification and standards. SAMR and the Standardization Administration of China (SAC) approved and issued 18 national standards on evaluation of green products such as wood-based panels and wood floors, coatings, and sanitary ceramics. SAMR, the General Office of MOHURD, and the General Office of MIIT jointly issued the *Implementation Plan for Certification of Green Building Material Products*, guiding certification bodies to carry out pilot project certifications for carbon footprint, carbon neutrality, and carbon reduction based on the certifications of existing 7 low-carbon products. Delegates

were sent to participate in the UN Climate Change Conference to disseminate Chinese approach to the international community.

(III) Accelerating the Construction of National Carbon Trading Market

Accelerating the construction of the national carbon trading market. The MEE quickened the construction of the national carbon trading market, established a sound institutional system, consolidated the carbon emission data foundation, promoted the construction of foundational support systems and strengthened capacity building; drafted the *Interim Regulations on the Administration of Carbon Emission Trading (Draft for Comments)* and solicited public opinions, studied and formulated relevant institutional documents for carbon emissions trading; organized the formulation of the Monitoring, Reporting and Verification plans for carbon emission data 2018 and 2019; organized various provinces and municipalities to submit the lists of key emission units in the power industry for verification; conducted in-depth research on the base value of quota allocation in the power industry, and organized trial calculations for quota allocation in the power industry; steadily promoted the construction of the registration system and trading system for national carbon emission rights, organized the optimization and evaluation, as well as expert demonstrations on the construction schemes of the two systems, and promoted the establishment of the administrative bodies of the two systems; and organized large-scale capacity building

training activities for local climate change work teams and key emission units in the power industry.

Operating pilot carbon markets smoothly. Carbon emission trading pilots in Beijing, Tianjin, Shanghai, Chongqing, Guangdong, Hubei and Shenzhen, etc. maintained smooth market operation, which has played a positive role in the completion of the GHG emission reduction targets in the pilot areas. MEE accelerated the establishment of a joint organization for the registration system and trading system for national carbon emission rights; pilot carbon markets continued to improve policy standards on carbon emission accounting, reporting and verification, etc., optimize the carbon market management process, strengthen market supervision, and innovate Carbon Generalized System of Preferences (carbon GSP) and other business forms, so as to ensure the operational efficiency of pilot carbon markets. Pilot carbon markets generally maintained previous good momentum. As of December 31, 2019, the quota spot trading volume in 7 pilot carbon markets had totaled about 368 million tons of CO_2, involving an accumulative trading value of about CNY 8.128 billion.

Carrying out the reform of the voluntary GHG emission reduction trading mechanism in an orderly manner. The MEE improved the voluntary GHG emission reduction trading mechanism and revised the *Interim Measures for the Administration of Voluntary GHG Emission Reduction Trading*. The Chinese Certified Emission Reduction (CCER) has

played an important role in fulfilling emission reduction obligations in pilot carbon markets. As of December 31, 2019, CCER trading had showed a steadily increasing trend, with an accumulative trading volume of more than 200 million tons, and an accumulative trading value of more than CNY 1.64 billion.

V. Strengthening Basic Capability

Since 2019, the Chinese government has continuously improved the basic capabilities to address climate change by further enhancing the construction of the GHG statistical and accounting system, and strengthening scientific and technological support and discipline construction.

(I) Strengthening the Construction of GHG Statistical and Accounting System

SAMR has issued the requirements of GHG emissions accounting and reporting for key sectors such as ceramics, chemicals, cement and plate grass since June 2019, and solicited public opinions on the draft of the *Guidelines of the Greenhouse Gas Emissions Accounting for Crops* in May 2020. In August 2019, NGOA promulgated the *Statistical Survey System for Energy and Resources Consumption by Public Institutions* (2019), contributing to a sound statistical information system of energy and resources consumption by public institutions, and enhancing the ability to

manage the statistics and monitoring of public institutions. The State-owned Assets Supervision and Administration Commission of the State Council (SASAC) actively guided GHG statistics and accounting among central enterprises, and some central enterprises have established carbon asset management information systems and gradually improved their carbon asset management systems, statistical and accounting systems, and GHG emissions information disclosure systems. MOT released 68 standards, which cover energy efficiency, CO_2 emissions, energy consumption limits and online monitoring of commercial passenger and freight vehicles, during the 13th FYP period. CAAC organized and completed the audit of monitoring plans, the construction of emissions reporting system, and the audit of airlines' reports on CO_2 emissions from flight activities in 2019 and verification reports; additionally, it completed the formulation of a report on CO_2 emissions from China's civil aviation in 2019 in conjunction with civil aviation authorities of Hong Kong and Macao, and completed the accreditation of six institutions qualified for aviation emissions verification in partnership with the Certification and Accreditation Administration of the PRC (CNCA). NFGA developed and unveiled the *Work Plan for the Construction of the National Forestry Carbon Sink Metering and Monitoring System 2019*, with the results of the second national forestry carbon sink metering and monitoring being summarized and analyzed, formulated a technical proposal for optimization of the third national forestry carbon sink metering and monitoring, and introduced the *Technical Regulations for Carbon Accounting of Bamboo Forest* and other industry

standards.

(II) Strengthening Scientific and Technological Support

Conducting basic scientific research. Since 2019, the Ministry of Education (MOE), MOST, MNR, MWR, the Chinese Academy of Sciences (CAS), the Chinese Academy of Engineering (CAE), China Meteorological Administration (CMA) and NFGS have conducted a great deal of work around basic scientific research on climate change, with research results yielded in comprehensive observation of global change, data assimilation and big data platform construction and application, and global change facts, and completed a series of assessment and research reports on climate change.

Column 3 Basic Research on Climate Change

MOE has achieved the following research results: first, the Nanjing University developed new approaches to uncertainty analysis of aerosol indirect effects on climate and to diagnosis of aerosol-cloud interactions, making new headway in the research on aerosol effects on climate. Second, the Sun Yet-Sen University, together with well-known experts at home and abroad, published the China global Merged Surface Temperature (CMST), a new benchmark dataset of global surface temperatures since 1854, which has been widely applied to important documents such as the *Fourth National Assessment Report on Climate Change* and the *China's Climate and Eco-environmental Evolution: 2021*. The dataset has been included as "the fifth" benchmark dataset of global land and

surface temperatures in the websites of top academic institutions alongside existing classical datasets, and cited or evaluated by a series of academic papers and assessment reports.

MOST, CAS, CAE and CMA, jointly with other authorities concerned such as the Ministry of Foreign Affairs (MFA) and MEE, organized the formulation of the *Fourth National Assessment Report on Climate Change*, further implemented the special project titled "Global Change and Response" under the National Key R&D Program of China, and conducted research on comprehensive observation of global change, data assimilation and big data platform construction and application, global change facts, research on key processes and dynamics mechanisms, R&D, forecasting and estimation of Earth system models, assessment of global change impacts and risks, global change mitigation and adaptation, and sustainable transformation, with a range of research results obtained. For example, homemade satellite remote sensing products for chlorophyll fluorescence have grown out of nothing, technological constraints on the satellite-based chlorophyll fluorescence retrieval algorithm have been addressed, and the algorithm has been successfully applied to the first carbon satellite in China, with the first global chlorophyll fluorescence retrieval map obtained from the carbon satellite.

MNR implemented climate prediction and research on ocean and climate change, forecasts of global and regional sea level changes in different socio-economic scenarios, and survey and assessment of the impacts of sea level changes.

MWR compiled and completed a progress and action report on climate change in the field of water resources; established a research innovation team for addressing climate change through water conservancy, and conducted major studies such as hydrological-ecological multi-process interaction mechanism and simulation amidst climate change, assessment of climate change impacts and risks on multiple factors and processes of water conservancy, and evolution of terrestrial hydrological cycle and its role in global change.

CAS and CMA jointly led the preparation of the scientific assessment report

China's Climate and Eco-environmental Evolution: 2021.

CMA organized the formulation of the second regional assessment report on climate change, formed the second regional assessment report on climate change and a summary for policymakers, sorted out research results concerning climate change in different regions across the broad, and objectively reflected the latest progress in China's regional climate change research, thus providing scientific support for regional response to climate change.

NFGA organized research projects including the "Policies, Mechanisms and Pathways of Forestry Carbon Sink Compensation", completed the analysis of research results concerning climate change mitigation and adaptation of grasslands in China, met milestones in research projects such as natural and anthropogenic factors of grassland degradation in the Qinghai-Tibet Plateau, and continuously carried out the R&D of climate system models and comprehensive impact assessment models.

CAS made new breakthroughs in the Category A strategic leading science and technology project "Transformative Key Clean Energy Technologies and Demonstration", obtained positive results in the test run of the world's first large-scale "liquid sunshine" demonstration project, enabled the heating mode of China's first 3,000 m3 small seasonal heat storage experimental system and started the construction of the world's largest seasonal heat storage system (with a capacity of 300,000 m3). With independently manufactured hydrogen fuel cell stacks, which have reached the international advanced level, rolling off the production line for application, CAS built the first proprietary automatic production line with a capacity of 10,000 metal plate hydrogen fuel cell stacks per year with a technology license. Moreover, it made new progress in the integration, promotion and application of ecosystem restoration technologies in key ecologically fragile areas, established an evaluation index system for the overall performance in ecological restoration in key ecologically fragile areas, completed the division of ecological regions and sub-regions in China's key ecologically fragile areas, monitored and assessed ecological restoration performance under different modes of restoration and degrees of disturbance,

optimized integration and brought forward 39 ecological restoration technology models for key ecologically fragile areas.

Strengthening the research & development (R&D) and application of low-carbon technologies. MOST, MIIT, MEE, MOT, CMA, NFGA, and central enterprises have all pushed forward the R&D, promotion and application of relevant low-carbon technologies, effectively raising the level of technology R&D and application in response to climate change.

Column 4 R&D and Application of Low-carbon Technologies

In May 2019, MOST issued the *Roadmap for Carbon Capture, Utilization and Storage Technology Development in China (2019)* and basically completed the third List of Energy-saving, Emission Reduction and Low-carbon Technologies for Transformation and Promotion, with the total installed wind and solar capacity in 2019 both exceeding 200 million kW, wind and PV power generation costs dropping due to technological advances and average costs per kW of onshore wind and PV power generation projects declining by about 30% and 75% respectively over the past decade.

MIIT organized the research on engineering application of systems such as green intelligent inland ships and hydrogen fuel cells for ships, cell power for ships and hybrid power for ships.

MEE organized initial evaluation and re-evaluation of the draft of the fourth Catalogue of Key Low-carbon Technologies Promoted by the State. It tracked and assessed the implementation of the *Guidelines for Implementing Carbon Neutrality in Major Events (Trial)*, provided support and guidance for the Organizing Committee of the Beijing Olympic Winter Games in deepening and improving the Work Plan for Low-Carbon Management of Beijing 2022 Olympic Winter Games and Winter Paralympic Games, and launched the

WeChat mini program "Low Carbon Winter Olympic".

MOT issued a catalogue of key energy-saving and low-carbon technologies for promotion in 2019 in the transport sector, which covers 38 technologies, included requirements such as emission limits for marine diesel engines and ship-borne devices for shore power systems in technical regulations on international ships, domestic seagoing vessels and inland vessels, and published 68 transportation standards on energy conservation and consumption reduction, new energy promotion and application, and multimodal transportation during the 13th FYP period.

CMA completed five advisory reports, including the *Suggestions on Accelerating the Construction of a Carbon Market in China*.

NFGA released the *100 Key Scientific and Technological Achievements in Forestry and Grassland for Promotion in 2019*.

Central enterprises developed state-of-the-art ultra-supercritical coal-fired generating units.

Advancing prospective studies on the impacts of climate change on financial risks. PBOC organized and completed an in-depth study on the pressure transmission paths of high-carbon enterprises to the real economy and banks, encouraged approved venture capital sub-funds to increase investment and financing support for R&D of low-carbon technologies, with a total investment of CNY 3.67 billion made in environmental protection and low-carbon enterprises during the 13th FYP period. It undertook green technology transfer and transformation projects in the Yangtze River Delta, including the construction demonstration project of an ultra-low energy consumption data center, and built a professional service

network oriented towards technology transfer and transformation.

Actively participating in international cooperation in climate change sciences. MOST, MNR, MWR, PBOC and CMA, in consultation with organizations such as the United Nations Development Program (UNDP), the International Union for Conservation of Nature (IUCN), the Intergovernmental Panel on Climate Change (IPCC), the Climate Change Committee (CCC) and the Indian Council for Research on International Economic Relations (ICRIER), assisted scientific international cooperation on climate change by completing meetings holding, government review and report writing.

Column 5 Scientific International Cooperation on Climate Change

MOST and the UNDP jointly founded the "Center for South-South Cooperation on Technology Transfer" for cooperative research among developing countries on technology transfer and capacity building in response to climate change.

MNR and the IUCN worked together on research projects such as "Ecosystem-based Adaptive Governance" and "Nature-based Solutions".

MWR attended the 2019 UN Climate Summit, organized international conferences such as the first technical meeting and the third group work meeting of the World Meteorological Organization Global Hydrological Status and Outlook System (WMO-HydroSOS) and the China-Germany Seminar on Climate Change, participated in the World Water Week, the Asia International

Water Week, the International Water Exhibition and other activities, and introduced China's policies and experience in addressing climate change through water conservancy.

PBOC initiated the NGFS, organized the development and release of the *Overview of Environmental Risk Analysis by Financial Institutions* and the *Case Studies of Environmental Risk Analysis Methodologies* in consultation with over 30 financial institutions, advisory bodies, NGOs and academic institutions worldwide to help prevent environmental and climate change risks.

CMA organized and completed the annual tasks of the IPCC by organizing nearly 100 experts to complete the government review of three reports, including the methodological report for the *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventory*, the *Climate Change and Land*, and the *Ocean and Cryosphere in a Changing Climate*, submitting 90 pieces of advice from the Chinese government to the IPCC, which were all adopted, and producing two decision analysis reports on the two special reports, the *Climate Change and Land* and the *Ocean and Cryosphere in a Changing Climate*; it completed and published the *UK-China Cooperation on Climate Change Risk Assessment: Developing Indicators of Climate Risk* in partnership with the CCC, and held the "China-India Expert Dialogue on Climate Change" together with ICRIER; moreover, it stepped up its efforts to promote the Belt and Road construction in respect of meteorological satellite services and provided international users with free-of-charge carbon satellite data, strongly supporting international scientific research on carbon cycle.

(III) Strengthening the Construction of Relevant Disciplines

Promoting the provision of climate change-related programs. Climate change-related undergraduate programs have been added to the *Catalogue of Undergraduate Courses of General Higher Education*, with a number of

colleges and universities involved, and new climate change-related courses added to Environmental Science and Engineering, and majors concerning nature conservation, ecology and environment. In the work on the "Double 10,000 Plan" under the First-class Undergraduate Program 2019, 87 climate change-related majors of 81 colleges and universities, including Peking University, Tsinghua University, Nanjing University and Tianjin University have been identified as pilot national first-class undergraduate majors.

Enhancing the setup of online open courses. In recent years, MOE has encouraged the setup of over 100 various climate change-related online courses by colleges and universities, and launched these courses on online course platforms such as "Chinese University MOOC" and "xuetangX", which are available to colleges and universities and social learners nationwide. Quality online courses such as China's Perspective on Climate Change of Tsinghua University, Air Pollution Control of Tianjin University, Air Pollution Control Engineering of Huazhong University of Science and Technology, and Climate Change and Human Society of Nanjing University of Information Science and Technology, were included in the first batch of national first-class undergraduate courses by MOE in 2020.

VI. Mobilizing All Sectors of Society

Since 2019, the Chinese government has strengthened guidance, given play to the role of media communication and encouraged enterprises and citizens

to take active actions, resulting in improved public awareness of climate change and a green and low-carbon development pattern featuring broad social involvement.

(I) Active Government Guidance

NDRC, MOE, MEE, MOHURD, MWR, the National Health Commission (NHC), CMA and the NFGA carried out a variety of publicity and education activities around climate change to make the concept of addressing climate change widespread.

Column 6 Governance Guidance on Addressing Climate Change

On June 29 through July 5, 2020, NDRC, in conjunction with 16 ministries and units such as MOE, MOST, MIIT and MEE, held the 2020 National Energy Conservation Publicity Week under the theme of "Energy Conservation and Efficiency Improvement for Lucid Waters and Lush Mountains".

In 2020, MOE and NDRC jointly issued the *Notice of the General Office of the Ministry of Education and the General Office of the National Development and Reform Commissionon Issuing the Action Plan for Construction of Green Schools*, extensively organized publicity and education activities for energy conservation and emission reduction close to the life of teachers and students in schools of all kinds, and popularized relevant laws and regulations, garbage classification knowledge and energy conservation cases through thematic

campaigns such as the National Energy Conservation Publicity Week and the National Low Carbon Day.

MEE organizes a series of activities for the "National Low Carbon Day" every year. In 2020, the MEE organized the online main event of the National Low Carbon Day themed "A Green, Low-carbon Well-off Society" and organized several charrettes and published a series of expert interpretation articles following General Secretary Xi Jinping's announcement of China's vision for carbon emissions peaking and carbon neutrality, while MEE leaders took media interviews and published signed articles in the media such as the People's Daily and the Guangming Daily. The MEE organized the compilation of capacity building training materials, with five training materials drafted, including "Causes of Climate Change", "International Progress in Climate Change", "Climate Change Policies, Actions and Technologies", "Carbon Market and Greenhouse Gas Emissions Reporting and Accounting" and "Climate Investment and Finance", held a training session for bureau-level cadres, with 38 local cadres trained, and a training session for cadres at the division level or below, with 95 local cadres trained. The MEE also published climate change policies and relevant media reports via new media platforms such as Weibo and WeChat. In 2020, the MEE team of new media for government affairs opened a column *Addressing Climate Change*.

MOHURD and other five ministries jointly released the Action Plan for Building Green Communities to make arrangements for green communities building, integrate the concept of green development into community design, construction, management and services, and promote the building and improvement of the living environment of communities in a simple, moderate, green and low-carbon manner, thereby further popularizing the idea of ecological civilization and maximizing resources saving and environmental protection in communities. In May 2019, the MEE organized a campaign themed "Develop a Good Habit of Water Saving and Establish a Green New Fashion" for the National Urban Water Saving Publicity Week.

In 2019, MWR sponsored the first national water saving knowledge contest,

organized water conservation and protection campaigns on the World Water Day and during China Water Week to popularize knowledge about water conservation in society at large, enhance the public water saving awareness and capacity, and shape a water-saving society.

NHC carried out health publicity and education, intensified health education pertaining to climate change to improve the public awareness of self-protection and skills of climate change adaptation.

CMA actively pushed forward science popularization and education & training on climate change, completed the 16th International Seminar on Climate System and Climate Change, successfully held the 15th Session of the Forum on Regional Climate Monitoring, Assessment and Prediction for Asia (FOCRAII), and compiled the Climate Change Developments: Madrid Echo, the Issue 45 of the Climate Change Developments.

NFGA organized and implemented the training plan of 2019, adding courses regarding "addressing climate change in the forestry and grassland sector" in the legal training for civil servants, held training sessions on how to tackle climate change in the forestry and grassland sector and the 13th national training session on climate change policy management in the forestry and grassland sector, compiled and published the *A Collection of Key Documents on Addressing Climate Change in the Forestry and Grassland Sector* and the *Knowledge about Addressing Climate Change in the Forestry and Grassland Sector*; organized the publicity of the important role of China's forestry and grassland construction in promoting global response to climate change through a variety of important events and activities.

(II) Extensive Media Publicity

In 2020, MEE and the People's Government of Beijing jointly sponsored the online main event of the National Low Carbon Day themed "A Green,

Low-carbon Well-off Society", which was organized by the Department of Communications and Education of the MEE, the *China Newsweek* of China News Service and Beijing Municipal Ecology and Environment Bureau, and publicized in an all-round manner through a combination of traditional and new media such as TV interviews, live streaming, solicitation of climate-related articles, posters and public welfare short message services. In March 2020, MEE convened a policy briefing titled "Actively Responding to Climate Change". MNR formulated and published four issues of *Newsletter on Addressing Climate Change in the Marine Sector* and seven issues of *Climate Change and Sea Level Rise Research*. Amidst epidemic prevention and control, it organized different units to carry out science popularization activities for the National Disaster Prevention and Reduction Day on May 12 through online lectures and micro-videos, and published press releases on the website of China Oceanic Information Network and the Natural Resources News. NFGA updated information on ecological construction and climate change response in the forestry and grassland sector on its website, people.cn, xinhuanet and other websites, and via its official accounts on people.cn and sina.com, and broadcast the large documentary feature programme titled "We Are Walking on the Broad Road: Lucid Waters and Lush Mountains are Invaluable Assets" on CCTV. CMA incorporated the achievements in addressing climate change into the large theme activity "Magnificent 70 Years of Struggle for a New Era", organized a visit to Youyang, Chongqing for "Addressing Climate Change: Records in China" of 2019, where more

than 30 leading central and local media carried out field surveys and science popularization, and strengthened the publicity and coverage of the Sixth Assessment Report and the UN Climate Change Conference.

(III) Active Social Action

MOE has actively implemented talent training projects through enterprise-university cooperation, with the government providing a platform, enterprises offering support and universities synergizing for shared growth. In 2019, a total of 1,005 undergraduate colleges and universities, in partnership with 446 enterprises, launched nearly 15,000 projects, to which enterprises gave financial and hardware & software support of roughly CNY 4.6 billion. Many enterprises, colleges and universities, and research institutes worked together on enterprise-university-research cooperation projects in climate change-related areas. The 5th "Handle Climate Change Film Festival" was held in Shenzhen to publicize the idea of tackling climate change through the power of images.

VII. Actively Engaging in International Exchanges and Cooperation on Climate Change

Since 2019, the Chinese government has played a positive and constructive role in international negotiation of climate change with a highly responsible

attitude and by firmly upholding multilateralism, and made great contributions in promoting the building of a fair and reasonable global climate governance system with win-win cooperation by actively engaging in dialogue, exchange and pragmatic cooperation on climate change and green, low-carbon development with parties concerned, and energetically promoting South-South cooperation on climate change.

(I) Promoting Multilateral Processes under the UN Framework

Constructively pushing forward the negotiation process under the United Nations Framework Convention on Climate Change (UNFCCC). China adheres to "common but differentiated responsibilities (CBDR)" and other UNFCCC basic principles, upholds multilateralism and preserves the overall interests of developing countries to push forward multilateral processes. During the Madrid UN Climate Change Conference in December 2019, China took an active part in the negotiations on different topics and pressed ahead with all parties the negotiations on remaining issues concerning the implementation rules of the *Paris Agreement*.

Taking an active part in relevant online activities under the UNFCCC. In 2020, international climate negotiations and consultations were hampered by the COVID-19 outbreak globally. China actively supported the UNFCCC Secretariat and Presidency in carrying out information exchange activities not legally binding and involving no decision-making

on the premise of ensuring the Parties-driven and transparent organization and fair participation, so as to maintain the momentum of global climate governance. China also energetically participated in series online activities such as "June Momentum" and "Climate Dialogue", where it exchanged views with all parties on a number of important issues such as NDCs, market mechanisms, transparency, climate change adaptation, climate finance, technology and capacity building, progress and intensity of implementation of pre-2020 commitments and global review, and completed the second round of Facilitative Sharing of Views (FSV) under the UNFCCC to introduce and promote "Chinese experience" in addressing climate change. Moreover, China attended a series of video conferences on key issues held by the COP Presidency, and internal coordination meetings among negotiating groups such as BASIC (Brazil, South Africa, India, and China), "Like-Minded Developing Countries" and "Group of 77 and China", bringing forward constructive proposals for promoting multilateral climate processes.

(II) Participating in Other Multilateral Climate Negotiations and Cooperation

Actively organizing and engaging in other climate-related multilateral meetings and consultations. In 2020, Mr. Xie Zhenhua, the then special advisor on Climate Change Affairs of MEE, joined the UN Secretary-General's high-level advisory group on climate action and

attended the first video conference of the group. China co-organized the online Fourth Ministerial Conference on Climate Change and actively participated in multilateral events such as the 11th Petersburg Climate Dialogue, the second meeting of the Executive Board of the GCA, the teleconference of the Global Commission on Adaptation to promote post-pandemic resilient recovery, the Fourth Mission Innovation Ministerial (MI-4), the Global Climate Leaders' Roundtable on Small-scale Climate Action, the ministerial meeting on the Online Platform for Sustainable and Resilient Recovery from COVID-19, the 40th OECD (Organization for Economic Cooperation and Development) Roundtable on Sustainable Development, the "Group of 77 and China" Ministerial Meeting on Climate Change and the Track 1.5 "Trans-Pacific Climate Dialogue"; China also engaged in discussions and consultations on climate change under the IPCC, the Group of 20 (G20) and other channels, and contributed "China's wisdom" to multilateral climate processes outside the UNFCCC. Meanwhile, China took part in negotiations on GHG emissions reduction under the framework of the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO), successfully including CCER in the list of the first batch of emission reduction units recognized by the ICAO, facilitating the formulation of an international preliminary strategy for reduction of GHG emissions from ships by the IMO and putting forward a constructive operational energy efficiency rating mechanism for ships.

Making "China's contributions" to international climate cooperation

initiatives and projects. China actively participated in international multilateral cooperation, such as G20, BRICS, Clean Energy Ministerial (CEM) and GCA, and enhanced pragmatic cooperation on climate change with multilateral and bilateral international organizations including the World Bank, the Asian Development Bank (ADB), the Asian Infrastructure Investment Bank (AIIB), the New Development Bank (NDB), the Global Environment Facility (GEF), the Green Climate Fund (GCF), the French Development Agency (AFD) and the Kreditanstalt Für Wiederaufbau (KFW). China accelerated the implementation of the *G20 Energy Efficiency Leading Programme* (EELP) released in 2016, and developed and published international double Top-10 lists (the List of Top 10 Energy Conservation Technologies and the List of Top 10 Energy Conservation Practices) with countries concerned. China took an active part in international multilateral mechanisms, for example, the Asia-Pacific Network for Global Change Research (APN), and in "Maritime Technology Cooperation Center (MTCC)" projects and the "Green Voyage 2050" project for capacity building and training on contract fulfillment in connection with these projects. China acceded to the IPSF as a founding member and co-organized the "China-EU-Southeast Asia" tripartite expert cooperation initiative on climate change with the EU Climate Action. Beyond this, China, together with the United Nations International Children's Emergency Fund (UNICEF), held the World Children's Day 2020 theme activity themed "Climate Change, Youth Action".

Organizing the government review of the IPCC report. By upholding

equity, transparency, science-based and rules-based principles, China organized departments concerned at home to conduct the government review of the Sixth IPCC Assessment Report, so that the IPCC Assessment Report could comprehensively and objectively reflect scientific understanding of climate change.

(III) Strengthening Bilateral Dialogue on Climate Change

Addressing climate change has become an important part of bilateral high-level diplomacy between China and foreign countries. In February 2020, Chinese President Xi Jinping phoned British Prime Minister Boris Johnson, reaching a consensus on supporting each other in holding the 15th meeting of the Conference of the Parties (COP15) to the *Convention on Biological Diversity* and the 26th session of the Conference of the Parties (COP26) to the *UN Framework Convention on Climate Change*. China also held bilateral talks with the UN Deputy Secretary-General, Special Adviser to the UN Secretary-General on Climate Action, UNFCCC Executive Secretary, the Executive Director of the International Energy Agency (IEA), the Director-General of the International Renewable Energy Agency (IRENA), the First Vice-President of the European Commission, and ministerial officials of the EU, Germany, France, Britain and Norway. MEE held the 10th meeting of the China-Germany Working Group on Environment and Climate Change, participated in the "China-EU High-level Forum on Green Cooperation" interview, attended the informal roundtable titled "China-Germany-EU Paths to New Climate Targets", the

China-EU high-level video dialogue on carbon pricing, and the video dialogue "Environment, Climate and Post-pandemic Green Recovery" in partnership with California, USA.

Fruitful results have been yielded in bilateral cooperation on climate change. Over the past two years, China has actively maintained communication and dialogue with all parties on climate change issues, written climate change into various solidified consensuses such as statements, memorandums of understanding and outcome documents, and achieved important bilateral cooperation results, including the *Joint Statement of the People's Republic of China and the Russian Federation on Developing a Comprehensive Strategic Partnership of Coordination for a New Era* and the *China-Arab States Cooperation Forum (CASCF) Execution Plan for 2020-2022*. MEE continued to push forward bilateral cooperation on energy efficiency with Germany, Russia, Japan, the EU and the IEA.

(IV) Deepening South-South Cooperation on Climate Change

New breakthroughs have been made in South-South cooperation in building low-carbon demonstration zones. In 2020, the ministers of environment of China and Laos attended the "cloud signing" ceremony of the cooperation document on a low-carbon demonstration zone in Laos and signed the cooperation document, marking the official launch of the low-carbon demonstration zone project in Laos. As the first overseas

low-carbon demonstration zone aided by China, Seychelles Low-carbon Demonstration Zone completed bidding and procurement in 2020 and then started the formulation of a plan for the low-carbon demonstration zone, an important step in the implementation of the project. The construction of the low-carbon demonstration zone in Cambodia has been commenced in full swing, with the first batch of aid supplies already delivered in Cambodia. Material assistance for South-South cooperation has opened up new horizons. The China-aided electric bus project in Chile, which was delivered in 2020, has for the first time included low-carbon transportation in the scope of South-South cooperation on climate change, providing a boost to the development of low-carbon transportation in Chile. The microsatellite project for Ethiopia was also delivered in 2020, with the delivery ceremony attended by relevant representatives of China and Ethiopia. This is not only the first satellite project of China to address climate change, but also the first foreign aid satellite; and it is not only the first satellite of Ethiopia, which helps the country realize its "space dream" for the first time, but also the first remote sensing satellite witnessing China-Africa cooperation, which is highly appreciated by Ethiopia. Additionally, China has delivered the project in Bangladesh, completed bidding and procurement for the projects in Cuba and Botswana, steadily implemented the projects in Uruguay, Iran and Egypt, and actively advanced consultations on the projects in Ghana, Mongolia, Fiji and Burkina Faso, all while exploring the possibility of South-South cooperation in the field of climate change with related UN agencies.