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Focus: Carbon Peak and Neutrality

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Focus: carbon peak and neutrality

Climate change is a global challenge confronting the mankind. The surge in greenhouse gases, the vast majority of which comes from CO2 emissions, poses a threat to life. Against this backdrop, countries around the world are agreeing on a global treaty on emissions cuts. China has proposed its carbon peak and neutrality goals. How can China embrace this historic opportunity? What other challenges are there on the path to carbon peak and neutrality? How can China harness science, technology, innovation and market means to achieve carbon neutrality? China will honor its commitment of delivering on a clean, low-carbon goal through concrete actions.

- On September 22, 2020, Chinese President Xi Jinping pointed out at the General Debate of the 75th Session of the United Nations General Assembly that China will scale up its Intended Nationally Determined Contributions by adopting more vigorous policies and measures, and China aims to peak CO2 emissions by 2030 and achieve carbon neutrality by 2060.

- On September 30, 2020, Chinese President Xi Jinping said at the United Nations Summit on Biodiversity via video link that China will actively participate in global environment governance, and fulfil its obligations as set out in relevant climate change and biodiversity conventions; China has completed its 2020 climate goals and set up

nature reserves ahead of schedule; China will, following the vision of a community with a share future for mankind, take on international responsibilities befitting its level of development and scale up its Intended Nationally Determined Contributions by adopting more vigorous policies and measures; China aims to achieve carbon peak by 2030 and carbon neutrality by 2060, making greater efforts and contribution to fulfilling the goals set out in Paris Agreement on Climate Change.

- On November 22, 2020, Chinese President Xi Jinping pointed out at the Leaders' Side Event on Safeguarding the Planet of the G20 Riyadh Summit that G20 countries could strengthen the response to climate change; G20 should continue to take the lead in tackling climate change; G20 countries 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.

- On March 5, 2021, Chinese Premier Li Keqiang said in the Report on the Work of the Government that China will strengthen pollution control and ecological conservation, and continuously improve the environment; China will continue to pursue sustainable development strategy and consolidate gains in its efforts to keep the skies blue, waters clear and soil pollution-free, and promote a transition toward a green way of production and life.

- On April 22, 2021, Chinese President Xi Jinping attended Leaders Climate Summit via video link and delivered a speech titled "For Man and Nature: Building a Community of Life Together". He said that ecological advancement and conservation have been incorporated into China's overall plan for building socialism with Chinese

characteristics; China will continue to prioritize ecological conservation and pursue a green and low-carbon path to development; China is now making an action plan and is already taking strong nationwide actions toward carbon peak; support is being given to peaking pioneers from localities, sectors and companies.

I. Formulating top-level documents on carbon peak and neutrality

On February 22, 2021, the State Council issued the guidelines on accelerating the establishment of an economic system featuring green, low-carbon, circular development. This is the first time for China to make top-level design and overall arrangements in this regard.

Main goals:

◆ By 2025, China will substantially improve the industrial structure, energy mix and transportation structure, and significantly increase the proportion of green industry, and make the infrastructure, production, and the way of production and life greener. China will allocate the energy resources more reasonably and use them more efficiently. China will continue to cut the total discharge of major pollutants, slash the intensity of carbon and continuously improve the ecological environment. China will put in place a better, market-driven green technological innovation system and a more effective system of laws, regulations and policies, and make sure a production, circulation and consumption system featuring green, low-carbon and circular development takes shape.

◆ By 2035, China will substantially boost the momentum of green development, and bring the scale of green industries to a new level. China will bring the utilization efficiency of energy resources in key industries and products up to world-class level, make the green way of production and life widely embraced, ensure carbon emissions plateau off after peak, transform the ecological environment, and basically achieve the goal of building a beautiful China.

Six systems:

- ◆ Production system
- ◆ Circulation system
- ◆ Green upgrading of infrastructure
- ◆ Consumption system
- ◆ Green technological innovation system
- ◆ System of laws, regulations and policies

Improve the production system featuring green and low-carbon development

1. Promote green upgrading of industries

- ◆ Accelerate green transformation of key industries
- ◆ Vigorously develop remanufacturing industry
- ◆ Promote clean production
- ◆ Implement pollution-discharge licensing system
- ◆ Promote green product design and develop a green building system
- ◆ Build resource utilization bases
- ◆ Improve the regulations for identifying polluting enterprises and those failing to conform to relevant policies and plans

2. Expedite green agricultural development

- Improve the certification and management of green food and organic agricultural products
- Develop eco-friendly, circular agriculture
- Strengthen the protection and improvement of farmland quality and push for the comprehensive management of degraded farmland
- Grow circular forestry economy
- Vigorously promote water-efficient agriculture
- Pursue healthy aquaculture
- Launch initiatives to reduce the use of pesticides and veterinary antibiotics and improve the environment of farming areas
- Strengthen the unified planning of aquaculture waters and tidal flats
- Improve the system of fishing ban in relevant waters
- Accelerate the integrated development of primary, secondary and tertiary industries

3. Promote greener service industry

- Cultivate a number of green market entities in the circulation
- Regulate the trading of idle resources
- Speed up the shift to a greener IT industry
- Facilitate green convention and exhibition industry
- Promote the use of raw and auxiliary materials low in VOC in automobile repair and decoration
- Discourage hotel and catering industry from providing disposable items

4. Expand green environment industry

- Build a number of national green industry demonstration bases
- Build a group of large green industry groups
- Pursue contract energy management,
- Further liberalize the competitive

contract water-saving management, third-party control of environmental pollution, and environmental trusteeship service based on pollution control effect

elements in petrochemical, electric power and natural gas fields such as energy conservation and environmental protection

- Revise the list of green industries as appropriate

5. Raise the circular level of industrial parks and clusters

- Promote the circular transformation of industrial parks and clusters

6. Develop a green supply chain

- Carry out green supply chain pilots

Improve the circular system featuring green, low-carbon and circular development

1. Develop green logistics

- Actively adjust transportation structure
- Strengthen the management of logistics and transportation
- Promote green and low-carbon means of transportation

2. Intensify the recycling of renewable resources

- Promote the integration of waste sorting and recycling and renewable resources recycling
- Accelerate the implementation of producer's responsibility extension system
- Improve the recycling of used household appliances, and spread the typical recycling practices and experience

3. Establish a green trading system

- Improve trading structure
- Enhance cooperation on green standards
- Deepen cooperation on green Belt and Road

Improve the consumption system featuring green, low-carbon and circular development

1. Promote consumption of green products

- Increase green procurement by government and gradually extend the green procurement system to state-owned enterprises
- Strengthen the management of green product and service certification and improve the supervision of the trustworthiness of certification bodies
- Promote the trading of green power certificates and ensuring that green power consumption is widely adopted
- Crack down on the practices of falsely labeling green products

2. Advocate green and low-carbon way of life

- Promote site-specific sorting, reduction and utilization of household waste
- Push forward whole-chain control of plastic pollution
- Push forward control of overpackaging
- Advocate green means of travel
- Carry out health campaigns
- Carry out green life campaigns

Accelerate the green upgrading of infrastructure

1. Spur the transition to green, low-carbon energy system

- Give priority to energy conservation and control both total energy consumption and energy intensity
- Increase the utilization ratio of renewable energy
- Accelerate the development and scale-up of large-capacity energy storage technology
- Develop clean cogeneration for central heating in northern counties
- Strictly control the new installed capacity of coal power
- Build urban and rural distribution networks and implement the intelligent upgrading initiative
- Accelerate natural gas infrastructure construction and interconnection
- Carry out demonstration of carbon capture, utilization and storage

2. Advance the upgrading of urban environmental infrastructure

- Facilitate integration of urban domestic sewage collection and treatment facilities
- Expedite the construction of municipal solid waste treatment facilities
- Strengthen the capacity for centralized treatment of hazardous waste
- Improve the emergency treatment capacity of medical waste
- Facilitate the re-use and treatment of kitchen waste

3. Make transport infrastructure greener

- Build green highways, railways, waterways, ports and airports
- Strengthen the construction of infrastructure for new energy vehicles, such as charging, battery swapping, and hydrogen refueling stations

4. Improve urban living environment

- Establish a system for evaluating beautiful cities and carry out the beautiful city pilot projects
- Develop green buildings

- Improve rural living environment

Foster a market-driven green technological innovation system

5. Encourage R&D of green, low-carbon technologies

- Launch the initiative of making breakthroughs in green technological innovation
- Build a number of innovation bases including national innovation centers on green technologies and national S&T resource sharing platforms

6. Speed up commercialization of research results

- Make use of favorable policies for first set of major technological equipment to enable dissemination of green technologies
- Publish the list of green technologies for scale-up
- Facilitate the construction of green technology trading centers

Improve the system of laws, regulations and policies

Strengthen legal support	Intensify oversight of law enforcement
Improve the green pricing mechanism	Improve the sewage treatment charging policy; improve the household garbage treatment charging system; improve electricity pricing policy for energy conservation and environmental protection
Increase financial and tax support	Introduce tax incentives, tax resources and pilot water resource taxes to replace fees
Develop green finance	Strengthen the evaluation of performance of financial institutions in green finance; unify the green bond standards; support the IPO by qualified green enterprises; harmonizing international standards for green finance
Improve green standards, green certification system and statistical monitoring system	Carry out top-level design and systemic planning for green standard system; foster a number of professional green certification institutions; strengthen the statistical monitoring of energy conservation, environmental

	protection, clean production, clean energy and other fields, and increase the sharing of statistical information
◆ Foster green trading mechanisms	Improve the trading mechanisms for pollution rights, energy rights, water rights, and carbon emission rights

II. The Ministry of Science and Technology of China (MOST China): an action plan on science and technology under development to achieve carbon peak and neutrality

Science, technology and innovation is the key to achieving economic and social development and carbon peak and neutrality. Taking the issue very seriously, the Chinese Ministry of Science and Technology is preparing an action plan on science and technology to peak carbon emissions by 2030 and achieve carbon neutrality by 2060. The action plan aims to promote innovation, achievements demonstration, base construction, personnel training and international cooperation in various fields, create an innovation-friendly environment, and promote the research output and its commercialization. It aims to fully leverage the role of science, technology and innovation to achieve carbon peak and neutrality.

✧ A conference of top scientists agreed that improving strategies is the key to cutting carbon emissions without compromising development.

In the middle of April 2021, MOST China organized a conference on science, technology and innovation paths for carbon neutrality. Nearly 100 academicians and top experts from energy, industry, transport, construction and other fields discussed the paths for achieving carbon peak and neutrality through science, technology and

innovation. They believed that innovation must be harnessed as the main driver in delivering that goal. Energy storage and smart grid technologies should be developed to pursue green, low-carbon development, and a clean, low-carbon, safe and efficient energy system must be put in place. Substitutes for raw materials and fuels and improved processes should be developed to promote zero carbon recycling of production processes in high carbon industries such as steel, cement, chemical industry and metallurgy. Negative emission technologies such as carbon sink and CCUS should be developed, and in the long run, non-CO2 GHGs-cutting technologies should be developed as well. Efforts should be made in the integration and coupling of industrial technology integration and disruptive technology innovation. Resource constraints should be taken into account in the development of carbon neutrality technology routes.

(Source: Ministry of Science and Technology of China)

✧ *Action Declaration of Carbon Peak and Carbon Neutrality of High-tech Zones*

The Chinese Ministry of Science and Technology unveiled the *Action Plan for Green Development in National High-tech Zones* on January 29, 2021.

According to statistics, energy consumption per 10,000 yuan of industrial enterprises in national high-tech zones stood at 0.464 tons of standard coal in 2019, better than relevant indicators of national eco-industrial demonstration parks and the national average. The annual PM2.5 concentration in 136 national high-tech zones was

less than 50μg/m for more than 200 days; the forest coverage rate of 86 national high-tech zones exceeds 25%. As the core carrier of developing high-tech industries and promoting innovation, China's national high-tech zones have the responsibility to pursue green development. They have taken active steps to study and formulate roadmaps and concrete action plans around the goal of achieving carbon peak and carbon neutrality.

On June 8 of 2021, the Torch High Technology Industry Development Center of Ministry of Science and Technology, together with a slew of national high-tech zones, launched the *Action Declaration of Carbon Peak and Carbon Neutrality of High-tech Zones*, which put forward six goals: first, to stay committed to green development philosophy; second, to step up R&D on green and low-carbon technologies; third, to accelerate commercialization of green and low-carbon technologies; fourth, to foster and support green and low-carbon sci-tech enterprises; fifth, to improve financial system in support of green and low-carbon technological innovation; sixth, to promote cluster and international development of green and low-carbon technologies.

(Source: Ministry of Science and Technology of China)

✧ Suzhou High-tech Zone: mapping out new vision with science and technology

Having started to lay out a new generation of green and low-carbon high-tech industries years ago, such as information technology, medical equipment and biomedicine, high-end manufacturing and big data, Suzhou High-tech Zone is

included in the first batch of green industry demonstration bases in Suzhou, creating a green technology town in Hushuguan ... Suzhou High-tech Zone has so far fostered a multifaceted green industry covering wide-ranging areas, including solar PV industry cluster represented by Canadian Solar Inc., GCL and Goodwe, green household appliance industry represented by LEXY and EUP Electric, new energy industry represented by Phylion Battery Co. Ltd. and Lishen Battery, environmental protection industry represented by New District Environmental Protection and Sujing Environmental Engineering. Co. Ltd., and resource recycling industry represented by Tonghe, Weixiang and China Rubber Renewable Resources. Emerging industries account for 60% of the total output value of industrial enterprises above designated size, and the added value of green industries accounts for more than 30% of the total, making Suzhou High-tech Zone among the first batch of green parks and national circular economy demonstration zones in China. The construction of "China-Japan Green Industry Innovation Demonstration Zone" is well under way.

(Source: Ministry of Science and Technology of China)

✧ Hefei High-tech Zone: focusing on low-carbon policy and technological innovation

Relying on world-class high-tech parks, Hefei High-tech Zone has issued 10 policies in supporting pollution and carbon reduction technologies, green production, environmental protection, contract energy management, breakthroughs in low-carbon technologies and application, etc. It has set up "Environmental Protection

Encouragement Award" and "Environmental Protection Technological Innovation Award", giving reward of up to 5 million yuan. To date, a total of 33 million yuan of incentive funds for environmental protection have been realized. Leveraging research institutes and universities such as University of Science and Technology of China, Hefei High-tech Zone aims to be a global carbon-neutral innovation hub by supporting leading enterprises on application-oriented collaboration among businesses, academia and research, focusing on frontier technological research in photovoltaic, hydrogen energy, energy storage, CCUS, and building a number of national enterprise technology centers around zero-carbon, carbon-reducing and negative-carbon technologies. The application scenario of carbon neutrality has been laid out, and building material enterprises in the science park have taken the lead in using CCUS in the plat glass industry with a total investment of RMB 50 million.

(Source: Ministry of Science and Technology of China)

✧ Jinan High-tech Zone: leading in green development for carbon neutrality

Jinan High-tech Zone has introduced the Institute of Atmospheric Physics (IAP) of the Chinese Academy of Sciences (CAS) to set up the IAP Carbon Neutrality Research Center in Jinan. It has also established comprehensive cooperation with the Institute of Earth Environment, Aerospace Information Research Institute, Research Center for Eco-Environmental Sciences, Guangzhou Institute of Geochemistry, Lanzhou Institute of Chemical Physics, Institute of Process Engineering, Institute of Geographic

Sciences and Resources Research, and Chongqing Institute of Green Intelligent Technology.

In the industrial chain, research and development in key technologies for carbon reduction is conducted in eight key areas: power, transportation, industry, new materials, construction, agriculture, negative carbon emissions, information and intelligence. A batch of high-tech green emerging enterprises have been fostered. A host of high-quality green scientific and technological achievements of CAS, including completely degradable ecological plastics, new polymer materials for environmental protection, intelligent atmospheric detection technology, soil detection, were transferred to key enterprises in the field of carbon neutrality.

Green industry alliance has been set up to expand the scale of industrial cluster. The IAP Carbon Neutrality Research Center, Jinan Municipal Government, Shandong-CAS Coordinated Innovation Center of Industry and Technology have joined hands to create the "Six Ones" model -- one research center, one carbon neutrality company, one engineering laboratory, one green fund, one city demonstration, and one green finance research institute.

(Source: Ministry of Science and Technology of China)

✧ Wuxi High-tech Zone: developing zero-carbon industry to explore green technological innovation

In recent years, the Wuxi High-tech Zone has adhered to green and low carbon path of development which gives priority to ecological preservation. Efforts have been

galvanized to optimize industrial structure towards green development, forming a "6+2+X" modern industrial cluster with Internet of Things, integrated circuits and biomedicine as the core. By the end of 2020, the proportion of the output of strategic emerging industries, advanced manufacturing industries and high-tech industries in the gross output of industries above a designated scale increased to 49.7%, 52.5%, and 68.5%, respectively. The Wuxi High-tech Zone has made remarkable achievements in green development, especially in zero-carbon industry. In 2020, the energy consumption per unit GDP was 0.205 tons of standard coal/10,000 yuan. Zero-carbon industry started to take shape, with more than 300 enterprises in zero-carbon field registering main business income more than 60 billion yuan. A number of demonstration projects adopting photovoltaic, energy storage, micro-grid technologies and covering multiple application scenarios have been built. By 2020, the installed capacity of distributed power stations in Wuxi High-tech Zone has reached 160 MW. In addition, Wuxi High-tech Zone has played a leading role in the development and utilization of hydrogen energy. In April 2021, Wuxi took the lead in opening the first "hydrogen" bus line in Wuxi High-tech Zone, and the first batch of five hydrogen energy buses have been put into use.

(Source: Ministry of Science and Technology of China)

III. Provincial roadmaps of carbon peak for energy transformation and low-carbon demonstration

✧ Shanxi: promoting carbon peak and neutrality by accelerating energy revolution

As one of the biggest energy resource developers in China, Shanxi Province has embarked on a path of energy transformation in shifting its structural focus from high carbon fossil energy to carbon neutral, low carbon and non-carbon energy. First, coal consumption and carbon emissions are capped. It has worked faster to address source pollution, including small boilers, industrial kilns, coal for metallurgy, building materials and chemical industry, promote clean and efficient utilization of coal, and strive to intervene and promote technological innovation of carbon capture, utilization and storage (CCUS). Second, transformation and upgrading of coal-fired power industry is accelerated. On the basis of strictly controlling total scale, Shanxi coal-fired power should pursue clean, efficient and flexible development, shifting from the dominant supply of power to supplement of power capacity, so as to ensure power supply and system security and continuously reduce carbon emissions. Third, comprehensive energy services are enhanced, which can help improve energy efficiency of production and utilization and reduce energy consumption per unit GDP. Through energy internet, it will greatly improve the utilization efficiency of clean energy and alleviate dependence on fossil fuels.

(Source: Ministry of Science and Technology of China)

✧ Qinghai: building a new power system to promote carbon peak and neutrality

Qinghai will speed up the building of a new power generation system in combination with regional characteristics, improve utilization of clean energy, strengthen cross-provincial transportation of clean energy, further enhance the capacity of receiving and delivering clean energy, and comprehensively promote clean and low-carbon transformation of Qinghai's power system by achieving breakthroughs in science and technology and building a digital economy platform.

New energy base in the Tibetan Autonomous Prefecture of Hainan, Qinghai Province

(Source: Ministry of Science and Technology of China)

✧ Shandong: hydrogen energy demonstration project to reduce carbon emission

As a major energy producer and consumer, Shandong has “two highs”: high share of coal in energy consumption and high proportion of coal-fired power generation.

Shandong is a populous province with sound infrastructure. It has an annual output of 2.6 million tons of hydrogen on average, ranking first in China. The hydrogen energy demonstration project aims to promote integration of innovation chain and industrial chain of hydrogen energy through terminal demand, diversify application scenarios, achieve substantial reduction in carbon emission, and accelerate the building of a replicable, scalable and highly recognized demonstration model for comprehensive utilization of hydrogen energy. Shandong Province enjoys a full-fledged industrial chain of hydrogen fuel cell, covering hydrogen production, storage and transportation, key fuel cell materials, fuel cell vehicles and supporting industries, involving more than 120 enterprises (research institutions).

(Source: Ministry of Science and Technology of China)

✧ Zhejiang: financial support for carbon peak and neutrality

In May 2021, Hangzhou Central Sub-branch of the People's Bank of China, together with Zhejiang Banking and Insurance Regulatory Bureau, Zhejiang Provincial Development and Reform Commission, Department of Ecology and Environment and Department of Finance of Zhejiang Province, issued the *Guiding Opinions on Financial Support for Carbon Peak and Carbon Neutrality* (hereinafter referred to as the Guiding Opinions), which took the lead in introducing 25 measures in 10 aspects of financial support for carbon peak and carbon neutrality in China. According to the Guiding Opinions, annual increase of green loans is set to reach more than 400 billion yuan in 2021, issuance of green debt financing instruments and green bonds will

increase by more than 50% year-on-year, the share of green loans to the total loan balance will increase by 1 percentage point every year from 2021 to 2025, and issuance of green debt financing instruments and green bonds by 2025 will quadruple compared with that in 2020. In addition, the Guiding Opinions clearly set a positive list of credit support for green and low-carbon industries, support low-carbon projects of provincial pilot institutes and industrial parks, and facilitate low-carbon transformation of carbon-intensive enterprises. Direct financing channels for green and low-carbon enterprises are broadened to support qualified enterprises to issue green debt financing tools such as carbon neutral bonds. The Guiding Opinions also set out to establish provincial green and low-carbon project libraries, foster regional trading markets for environmental rights, promote the construction of carbon markets, and improve trading mechanisms for environmental rights, such as emission rights, energy use rights and water use rights. In addition, a digital information sharing mechanism will be established to share green and low-carbon information, regularly collect and update green information such as corporate carbon accounts, green and low-carbon project libraries and environmental credit information, and establish an information notification mechanism for financial institutions at the provincial, municipal and county levels.

(Source: http://www.gov.cn/xinwen/2021-05/25/content_5611488.htm)