

RDCY Eco-Financial Research Report No.18

# Carbon Neutrality: China in Action

## Analysis of policy layout and industry trends in the international context

Chongyang Institute for Financial Studies at Renmin University of China (RDCY)

Center for Eco-financial Studies, Renmin University of China

Academy of Contemporary China and World Studies



2021.09.22



# **Carbon Neutrality: China in Action**

## **Analysis of policy layout and industry trends in the international context**

Chongyang Institute for Financial Studies at Renmin  
University of China (RDCY)

Center for Eco-financial Studies, Renmin University of China  
Academy of Contemporary China and World Studies

2021.09.22



## **Chongyang Institute for Financial Studies at Renmin University of China (RDCY)**

Chongyang Institute for Financial Studies at Renmin University of China (RDCY) was established on January 19th, 2013. It is the main funding program that Shanghai Chongyang Investment Group Co., Ltd. donated to Renmin University of China and established the education fund to operate.

As a new type of think tank with Chinese characteristics, RDCY invited dozens of former politicians, bankers and renowned scholars from all over the world as senior fellows, aiming at focusing on reality, advising the country and serving the people. At present, RDCY consists of 7 departments and operates 4 research centers (the Center for Eco-Financial Studies, Global Governance Research Center, China-US People-to-People Exchange Research Center, and China-Russia People-to-People Exchange Research Center). In recent years, RDCY has gained high recognition at home and abroad in the research fields of financial development, global governance, great power relations and macro policies.

## **The Center for Eco-Financial Studies at Renmin University of China**

The Center for Eco-Financial Studies at Renmin University of China was established on November 25, 2014. It is China's first think tank project with green finance as its research content. It was donated by the Beijing Qiaonu Charity Foundation.

The center is affiliated to the operation and management of the Chongyang Institute of Finance of Renmin University of China. It mainly conducts research on the ecological financial industry and other topics, exploring how to promote the integration of the financial system with a green and sustainable economy, and financial policies and regulations to achieve the goal of ecological civilization construction. The center has established cooperative relations in the field of ecological finance with the United Nations Environment Program, the World Bank, IFC and other institutions and related think tanks in more than ten countries. It has promoted the establishment of China's only and highest-level academic research and work coordination in the field of green finance. The professional committee of the Chinese Finance Society Green Finance Professional Committee, the secretariat of the committee is located in the Chongyang Institute for Financial Studies at Renmin University of China (RDCY), and its specific functions are performed by the center.

In 2017, the center was selected as the "Top 45 Global Think Tanks of 2016" by the Internationally Recognized Global Think Tank Report launched by the University of Pennsylvania, ranking 37th.



## **Academy of Contemporary China and World Studies**

The Academy of Contemporary China and World Studies (ACCWS) is a state-level think-tank specializing in studies of contemporary China and the world, global governance, global communication strategy designing and policy planning, China's image building, international public opinion, translation and international discourse system.

The academy was formerly known as the Center for International Communication Studies under China Foreign Languages Publishing Administration (China International Publishing Group). Established in 2004, now it has more than 100 in-house researchers and dozens of guest researchers.

Renowned for its studies on practical subjects and corresponding suggestions, the academy offers more than 20 dynamic research products, launches global surveys of China's national image, publishes annual reports on the survey of Chinese enterprises' global image, and organizes the "Contemporary China and the World" think tank forums and dozens of bilateral and multilateral think tank dialogue every year in different countries and regions. The academy is also the sponsor of national journals such as *Chinese Translators Journal*, *International Communications and Contemporary China and World*.

# Carbon Neutrality: China in Action<sup>1</sup>

## Analysis of policy layout and industry trends in the international context

### Core Tip

September 22, 2021 marks the first anniversary of China's 2060 carbon neutrality goal. In the past year, China demonstrated its unprecedented power to take actions. Its ministries and commissions have issued key policies on carbon neutrality. Provinces and municipalities across the nation are including peak carbon dioxide emissions and carbon neutrality into their own 14th "Five-Year" plans. Industry-wide sectors are actively responding to the call and drawing emission reduction roadmaps, and the financial system fully open for green development.

Putting forward the concept of carbon neutrality is of great significance. Indeed, it has become the shared obligation and responsibility of all countries to reduce greenhouse gas emissions and respond to global climate change. This idea has elevated the issue of global climate change from environmental protection and resource utilization to the level of economic development models of the finest quality. This is something that is clearly accepted and highly valued by China.

Facing the world's complex carbon neutrality situation and climate and

---

<sup>1</sup> The academic version of this report can be found in the China's Policies and Promotion Status in the First Year of Carbon Neutrality—China's Development in the Context of Global Carbon Neutrality (First Part) by Wen Wang and Jintao Liu, *Financial Market Research*, May 2021, Vol. 108, pp. 1-14, and the Second Part of the paper, June 2021, Vol. 109, pp. 1-7.

environmental issues, many countries have begun to work out green development policies around 2020. These include scaling up investments in green industries, developing clean renewable energy, reiterating the importance of global green (sustainable) finance, and regarding green and low-carbon development as an important guide to international collaboration and competition. In the context of global carbon neutrality, China, as a developing country, is not far away from the world average in terms of carbon emissions per capita. However, its high carbon intensity reflects an urgent need to improve the quality of economic development before the heavy lifting of carbon emissions reduction gets worse.

Driven by two top-level targets of achieving carbon emission peak and net zero emissions, the Party Central Committee and the ministries and commissions under the State Council jointly introduced an array of carbon neutrality-oriented policies for the departments at all levels to push ahead with the emission reduction tasks according to their own characteristics. They did so by continuously and properly optimizing different mixes of energy, upgrading conventional industries into green industries, and improving resource utilization efficiency. They also focused on developing green and low-carbon technologies, and realizing low-carbon transitions plans.

In the first half of 2021, provinces and municipalities across the country actively responded to the call of the nation to make emission peak reductions, and to build a carbon-neutral society. Local governments, for instance, successively established the overall objectives of carrying out emission peak and carbon neutrality tasks while formulating and implementing emission peak action programs in their 14th Five-Year Plans. They also rolled out major strategies for the course of peak CO<sub>2</sub> emissions action in key industries of various fields. In fact, they have become the most important part of local ecological civilization campaigns



for the 14th Five-Year Plan period.

Carbon Neutrality—Industry in Action: Under the guidance and promotion of the nation's carbon neutrality policy, all sectors have fully used existing environmental conditions to scientifically coordinate the responsible parties and entities of emissions, implementation, markets, and supportive software and hardware resources to plan and implement phased emission reduction strategies.

Carbon Neutrality—Finance in Action: The People's Bank of China is taking the initiative to guide green finance to serve for the development of low-carbon economics in the 21st century. With this momentum, financial institutions are playing a more active role in green finance, contributing to the upgrading of green financial policies, services and tools that are oriented to "dual carbon" goals.

Scholars and academics from universities, enterprises and research institutes have begun to do theoretical and practical research on carbon neutrality and enrich basic scientific research for the dual carbon goals. Major domestic research institutions have issued reports on carbon neutrality from the perspective of their own fields, providing important proposals for the short-term emission peak action plan and the long-term strategies of carbon neutrality and low-carbon transition departments. The Chongyang Institute for Financial Studies, Renmin University has released the world's first "dual carbon" monitoring platform, aiming to facilitate the supervision and evaluation of national and local emission peak and carbon neutrality milestones.

Carbon neutrality is of great value to the future of China. It is not only a full-scale economic transition, but also a revolution in the concept, thought and lifestyle for the rejuvenation of China. At the macro level,

carbon neutrality will put China on the path to restructuring its social-economic-natural complex ecosystem. It will enhance its comprehensive development strength and improve its modern financial system with green as its core and orientation. At the micro level, the carbon market will bring financial opportunities for enterprises' low-carbon transition. Additionally, the low-carbon economy will create more employment opportunities, as climate and environmental factors become important objects for enterprise risk management.

This article reviews the changes that have transpired over the past year since the carbon neutrality target was proposed. China should broaden its vision of emission peak and carbon neutrality from an international perspective. In so doing, it should continuously explore sustainable financial systems and service models that are consistent with the long-term goal of carbon neutrality. It must also attach importance to potential emissions reductions in the information technology sector in the digital economy age. As it does, it should also place green and low-carbon development policies on an equal footing with national economic growth.

# CONTENTS

<b>Foreword</b>	<b>7</b>
<b>I. Concept: Advent of Carbon Neutrality and Its Deepening Process in China</b>	<b>11</b>
(I) Origin and rationale of the concept of carbon neutrality: scientific significance and social values	11
(II) Carbon neutrality and the international evolution of global climate governance: a global history of climate action	13
(III) History of Carbon neutrality concept in China: historical transition in the construction of “Ecological Civilization”	16
<b>II. World: Carbon Neutrality and the Evolution of the Global Situation</b>	<b>19</b>
(I) Analysis of global carbon neutrality and emissions situation: an integrated perspective based on per capita and intensity	19
(II) Common features of green and low-carbon economic structures across the world	23
(III) China's thinking under the international context and pressure of emission reductions	27
<b>III. Policy: Top-level Design and Local Layout of Carbon Neutrality in China</b>	<b>30</b>
(I) Inclusion of carbon neutrality into top-level design and strategic deployment	30
(II) All ministries and commissions have responded positively and issued a chain of key policies on carbon neutrality	31

(III) Provinces and cities are actively laying out local dual carbon goals during the 14th Five-Year Plan period	32
<b>IV. Industry: Carbon Neutrality-oriented Emission Reduction Dynamics by Industry and Department in China</b>	<b>53</b>
(I) Industry: Key emission industries accelerate the formulation of green transformation and low-carbon emission reduction roadmaps	53
(II) Financial community: China initiates financial upgrading across the board since the first anniversary of the carbon neutrality target	55
(III) Research community: A number of research institutions have been widely exploring carbon neutrality theories and practices	59
<b>V. Future: Value, Significance and Opportunities of Carbon Neutrality from China's Perspective</b>	<b>64</b>
(I) The value of carbon neutrality for China's macro reform: The fourth industrial upgrading revolution	64
(II) Meaning of the carbon neutrality for China's micro-transformation: A shift in enterprise production mode	67
(III) Evolution of the international landscape under carbon neutrality: A quiet global change	70
<b>Conclusion</b>	<b>72</b>

## Foreword

On September 22, 2020 at the 75th session of the United Nations General Assembly, President Xi Jinping made a solemn commitment<sup>1</sup> during the general debate to, "have CO2 emissions peak before 2030 and achieve carbon neutrality before 2060". This means that China is officially entering a critical period of new development. It shows that a new pattern and face of historical opportunity for a new round of scientific and technological revolutions and industrial transformations is underway. In this wake, the following year of 2021 can be called, "the first year of carbon neutrality". This is not only the first year of a low-carbon world competition, but also the first year of China's green development

layout with the goal of achieving carbon neutrality by 2060. In the face of environmental crises and international political and economic issues caused by global climate change, the United Nations has been urging countries around the world to take effective actions to reduce greenhouse gas emissions and strengthen their defenses against climate change.

As of the first anniversary of China's carbon neutrality goal, more than 130 countries have set the goal of reaching carbon neutrality (also known as "net-zero emissions")<sup>2</sup> by the middle of the 21st century. These are being done under the initiative of the United Nations, which has launched green development policies, actively

---

1 The Statement by President Jinping at the General Debate of the 75th Session of the United Nations General Assembly on September 22, 2020.

2 António Guterres. Carbon Neutrality by 2050: The World's Most Urgent Mission. The Climate Ambition Summit, December 11, 2020.

laid out a low-carbon economy, and drawn up effective measures for international cooperation on climate change. It can be seen that the green (sustainable) economy, as a trend and way out of global economic development in the 21st century, is being recognized and backed by a majority of countries.

Against the backdrop of a booming low-carbon economy across the world, China is stepping up the long-term layout of carbon neutrality. It is decisively putting it into concrete action as a response to these times. On the first anniversary of the carbon neutrality target, China has laid down a series of key carbon neutrality policies, and also written the work of emission peak and carbon neutrality into the "14th Five-Year" Plan nationwide. All sectors have actively responded to the call to develop emission reduction pathways. The financial system has

fully opened for green development to bolster high emission industries to carry out low carbon transition.

In February 2021, the State Council published *Guiding Opinions on Accelerating the Establishment and Improvement of Green and Low-Carbon Circular Economic Systems*<sup>1</sup>. This was done to officially deploy the green and low-carbon economy as a top-level design. In March 2021, the nationally determined contributions (NDCs) to reach emission peak in 2030 as a response to climate change and the formulation of the 2030 emission peak action plan were incorporated into the 14th "Five-Year" Plan. This maps out a steady and gradual reduction of carbon dioxide emissions after 2030 and was also included as one of the long-term goals set for 2035.

It can be foreseen that in the coming decades, China will start

---

1 Guiding Opinions on Accelerating the Establishment and Improvement of Green and Low-Carbon Circular Economic Systems (GF[2021]No. 4), released by the State Council on February 22, 2021.

all-round green transformation campaigns to upgrade its economy and society. However, carbon neutrality is a fresh new way for all countries in the world, with no successful experience to learn from. That being said, China is exploring relevant paths on its own, taking the initiative to tackle the challenges and overcome the difficulties. It is continuously seizing the development opportunities brought by the carbon neutrality target. China has demonstrated the strong action of a great power in relevant decision-making and implementation mechanisms.

From the international perspective, countries around the world are vigorously laying out a low-carbon economy. This will have a direct impact on the future direction of international political and economic

situations. The process of global carbon neutrality is accompanied by an overall reshaping of the world's industrial and financial landscapes. This will continuously present new investment and cooperation opportunities for China. In this regard, China fully realizes that it must first deploy the work of low-carbon emission reduction, which has achieved significant results over the past several years. For example, in 2019 the carbon intensity (CO<sub>2</sub> emissions per unit of GNP growth) was 48.1% lower compared to 2005<sup>1</sup>. Since the carbon neutrality target was announced, China's carbon emission reduction has shown a decisive turning point that requires it to explore safer and more reliable solutions and paths. These range from industry to departments, and from the

---

<sup>1</sup> China Achieves Remarkable Results in Addressing Climate Change and Promoting Low-Carbon Development, posted by Xuelei Li at the website of *Xinhua News Agency*, September 27, 2020.

central government to provincial and municipal governments. All are tapping potential opportunities for industrial upgrading and green transformation, They can eventually move toward a sustainable stage of high-quality and stable development.

Carbon neutrality is not only an international competition that must analyze low-carbon situation from a global perspective. It's also a domestic industrial economy-wide revolution that must be comprehensively coordinated and planned. A country's governing capacity is often reflected in its ability to govern climate and environment. A great power also plays a major role in protecting the earth from the impact of climate change and environmental degradation.<sup>1</sup> Based on the national and international situations analyzed one year after the first

anniversary of the carbon neutrality goal, China is working hard to make the roadmap and implementation plan of the dual-carbon goal.

We are actively seeking an updated development model, and injecting new momentum to green transformation and better climate governance.

---

1 Wen Tongai, Zhou Lei. International Climate & Environmental Protection Responsibilities of Developed Countries, Present Day Law Science. December 2014. Issue 01. PP. 88-95.



---

# I. Concept: Advent of Carbon Neutrality and Its Deepening Process in China

## (I) Origin and rationale of the concept of carbon neutrality: scientific significance and social values

The concept of carbon neutrality was first introduced<sup>1</sup> in 1997 by the Future Forest Company (later renamed Carbon Neutral Britain), a London-based company that provides carbon reduction services to households and individuals who purchase certified carbon credits from it to offset their own carbon emissions for environmental purposes. Due to its popularization, the concept of carbon neutrality in a broader sense has been extended to offset the carbon dioxide or greenhouse gas emissions of a

country or business over a period of time through afforestation, biologic carbon sequestration, and energy conservation and environmental protection to attain relatively "net zero emissions". This can reduce the carbon footprint to zero according to international calculation standards.

In 1999, Sue Hall founded the Climate Neutral Business Network, a nonprofit organization in Oregon that calls for potential cost savings and environmental sustainability through "carbon neutrality." Hall has worked with the U.S. Environmental Protection Agency, The Nature Conservancy and others to develop Carbon Neutral Certification and

---

<sup>1</sup> Changsong Liu. Scientific Connotation, Construction Pathways, Policies and Measures of Carbon Neutrality. *Yuejiang Academic Journal*, March 2021.

Climate Cooling brands<sup>1</sup>. After several years of promotion, the concept of carbon neutrality gradually became popular, and the term "carbon-neutral" was selected as the Word of the Year by the *New Oxford American Dictionary* in 2006. It was officially included in the new edition of the *Oxford English Dictionary* (OED) in 2007<sup>2</sup>.

The physical meaning of the concept of carbon neutrality lies in the fact that evidence and studies have shown that since the industrial revolution, the emissions of greenhouse gases, mainly carbon dioxide, have brought about pernicious consequences such as global warming and accompanying extreme weather, natural disasters and military conflicts<sup>3</sup>. These significantly affect the future survival of human civilization. According to data published by the World Meteorological Organization

(WMO), the average land surface temperature between 2011 and 2020 was the hottest on record globally, exceeding the 20th century average by 0.82 degrees Celsius.

In 2021, once-in-a-millennium extreme weather events such as floods in Australia, torrential rains in Bavaria, Germany, and floods in Henan Province, China make people around the world reexamine the disasters and crises resulted from climate change. Therefore, it has become a common obligation and responsibility of all countries to cut greenhouse gas emissions. But zero emissions are not attainable. The excess part will be offset by biologic carbon sequestration and CCUS (carbon capture, utilization and storage), and the greenhouse gases in the atmosphere can become stabilized by means of carbon neutrality.

---

1 Ellison, Katherine, Burn Oil, Then Help a School Out; It All Evens Out. CNN Money, July 8, 2002.

2 Carbon Neutral: Oxford Word of the Year. *OUPblog*, November 13, 2006.

3 Shijin Liu & Yongsheng Zhang from the Development Research Center of the State Council (DRC). Global Greenhouse Gas Emission Reduction: Theoretical Frameworks and Solutions. *Economic Research Journal*, Vol. 4, 2009, pp. 4-13.

The socio-economic significance of the concept of carbon neutrality is that it raises the issue of global climate change from environmental protection and resource use to the level of economic development—focused on high quality<sup>1</sup>. In the past, the external costs of pollution emissions were not given sufficient attention. This left countries and people around the world to stand the losses caused by climate change. Addressing climate change essentially requires addressing the worse elements of production in the course of industrialization. Only by improving the efficiency of resource use and production, and lowering the pollution loads the emissions can we fundamentally improve the global climatic environment.

## (II) Carbon neutrality and the international evolution of global

### climate governance: a global history of climate action

Prior to the rise of the concept of carbon neutrality, international climate governance issues were dominated by the reduction of greenhouse gas emissions<sup>2</sup>. In June 1972, the first United Nations Conference on the Human Environment was held in Stockholm, Sweden. At this meeting, governments around the world discussed environmental issues together for the first time and proposed to underline environmental issues caused by excessive industrial greenhouse gas emissions<sup>3</sup>. In 1988, the Intergovernmental Panel on Climate Change (IPCC) set up by the World Meteorological Organization (WMO) and the United Nations Environment

---

1 Junfeng Li and Guang Li. Carbon Neutrality Opportunities and Challenges for China's Development Transition. *Environment and Sustainable Development*, Vol. 1, 2021, pp. 50-57.

2 Yun Fu, Yonghuan Ma, Yijun Liu & Wenyuan Niu. Research on the Development Model of Low Carbon Economy. *China Population, Resources and Environment*, Vol. 3, 2008, pp. 14-19.

3 Hongyuan Yu. Study on the Connotation and Trends of Global Environmental Governance. Shanghai People's Publishing House, September 2018.

Programme (UNEP)<sup>1</sup> first published its Climate Change Assessment Report<sup>2</sup> in 1990. It detailed the warming brought about by carbon dioxide and greenhouse gas emissions in the age of industrialization. In June 1992, the United Nations Conference on Environment and Development (UNCED) was unveiled in Rio de Janeiro, Brazil, where the *United Nations Framework Convention on Climate Change* (UNFCCC)<sup>3</sup> was adopted. This required member countries to take ownership of greenhouse gas emissions controls based on the principle of, "common but differentiated responsibilities"<sup>4</sup>.

In 1997, the IPCC assisted its member states to draft the *Kyoto Protocol*<sup>5</sup> in Kyoto, Japan, with the goal of reducing global greenhouse gas emissions by 5.2 percent in 2010 compared to 1990 levels.

In the following two decades, the *Kyoto Protocol* did not show the desired effect, and the principle of "common but differentiated responsibilities" did not give full play to its binding effect. By 2010, the total global emissions had increased nearly 46%,<sup>6</sup> albeit EU member states generally reached peak greenhouse gas emissions<sup>7</sup> around 1990. On December 12,

---

1 Jianying Ma. *Domestic Structure and Institutional Impact: A Study of the Impact of International Climate Regimes in China and the United States (1990-2010)*. Fudan University, 2011.

2 Liang Dong & Haibin Zhang. *How the IPCC Influences International Climate Negotiations—Analysis based on Cognitive Community Theory*. *World Economics and Politics*, Vol. 8, 2014, pp. 64-83 + 157-158.

3 John W. Ashe, Robert Lierop, Anilla Cherian. *The role of the Alliance of Small Island States (AOSIS) in the negotiation of the United Nations Framework Convention on Climate Change (UNFCCC)*. *Natural Resources Forum*, 1999, 23(3).

4 Xia Wan. *Post-Kyoto and the Principle of Common but Differentiated Responsibilities*. *Foreign Affairs Review*, Vol. 2, 2006, pp. 93-100.

5 Lee Chung Lau, Keat Teong Lee, Abdul Rahman Mohamed. *Global Warming Mitigation and Renewable Energy Policy Development from the Kyoto Protocol to the Copenhagen Accord—A Comment*. *Renewable and Sustainable Energy Reviews*, 2012, 16(7).

6 Junfeng Li and Guang Li. *Carbon Neutrality Opportunities and Challenges for China's Development Transition*. *Environment and Sustainable Development*, Vol. 1, 2021, pp. 50-57.

7 Jing Wu, Shiqi Wang & Zheng Wang. *The Evolution of Major Countries' Climate Negotiating Stance and Analysis of Future Emission Reduction Targets*. *Advances in Climate Change Research*, Vol. 3, 2016, pp. 202-216.

2015, the 195 UN member states passed the *Paris Agreement* to replace the *Kyoto Protocol*<sup>1</sup> at the 2015 United Nations Climate Change Conference. This urged the member states to limit the rise in average global temperatures to no more than 2 degrees Celsius above pre-industrial levels (preferably to 1.5 degrees Celsius), and to meet global carbon neutrality targets by 2050-2100<sup>2</sup>. Since then, carbon neutrality as a national-level development concept has been widely accepted around the world.

However, the implementation of the *Paris Agreement* over the past five years have not met the expectations of the United Nations. Some countries have failed to honor their emission reduction commitments or the emission reduction plans they formulated

do not meet the established temperature control targets. We are not going in the right direction.

To this end, on the fifth anniversary of the *Paris Agreement* in December 2020, the UN, along with the UK and France, convened the Climate Ambition Summit 2020, where UN Secretary-General António Guterres called on all leaders worldwide to, "declare a state of climate emergency in their countries until carbon neutrality is reached". Guterres encouraged leaders take more aggressive measures to reduce emissions and put the sustainable development goals (SDGs) into practice by writing them into concrete policies<sup>3</sup>.

The call for carbon neutrality has been echoed by hundreds of countries around the world, further increasing its scope and

---

1 Wei Li. From "Kyoto Protocol" to "Paris Agreement": The Reform and Development of International Climate Law. *Journal of Shanghai University of International Business and Economics*, Vol. 5, 2016, pp. 62-73+84.

2 Bo Li. A Study of China's Role in Global Climate Governance. Shandong University, 2020.

3 António Guterres. Carbon Neutrality by 2050: The World's Most Urgent Mission. The Climate Ambition Summit, December 11, 2020.

scale of influence. International organizations and business communities related to carbon neutrality have been set up in recent years. These include the Carbon Neutrality Coalition (CNC)<sup>1</sup> established in 2017 by 16 countries and 22 cities, and the Leaders for Climate Action<sup>2</sup> entrepreneurial community founded in Berlin in 2019 to promote carbon neutrality among the international community as a national development concept.

### (III) History of Carbon neutrality concept in China: historical transition in the construction of “Ecological Civilization”

On July 20, 2007, the China Green Foundation established China Green Carbon Fund<sup>3</sup>. It aimed to

actively implement forestry carbon sink projects<sup>4</sup> such as afforestation and forest protection for the purpose of increasing forest energy storage to mitigate the impact of climate change. This was the first time that the concept of carbon neutrality was presented at the official level in China.

During his visit to France on June 30, 2015, Premier Li Keqiang announced China's pledge to reduce emissions, and the Chinese government has submitted documents to the UNFCCC Secretariat describing China's action target for 2030: CO2 emissions to peak around 2030 and striving for early realization; CO2 emissions per unit of GDP to fall by 60-65%<sup>5</sup> compared to

---

1 Resilience Intel: One Planet Summit: Transformational Commitments, November 14, 2017.

2 An entrepreneurial community that drives climate action published at the official website of Leader for Climate Action.

3 Weiwei Li. Jia Qinglin Attends and Speaks at the Inauguration of China Greening Foundation's China Green Carbon Fund. Xinhua News Agency, July 20, 2007.

4 Carbon sink refers to the process of reducing the concentration of carbon dioxide, the main greenhouse gas, in the atmosphere by absorbing carbon dioxide from the atmosphere through measures such as afforestation and revegetation.

5 Qiaoting Lin. Interpreting China's 2030 Low-carbon Commitment: Cumulative Emissions Lower than Those of Europe and the United States May Need 40 Trillion Dollars, published at Chinanews website, July 1, 2015.

2005. China's 2030 target sets a milestone step for its emissions reduction process.

On September 22, 2020, President Xi Jinping announced at the 75th General Debate of the UN General Assembly that China would achieve carbon neutrality<sup>1</sup> before 2060. President Xi further set out four nationally determined contribution targets<sup>2</sup> for 2030 at the Climate Ambition Summit held in December 2020. These included bringing down the share of fossil energy and increasing forest stock and installed wind and solar power capacities. With the introduction of the two goals, carbon neutrality has officially become a national commitment, demonstrating to the world China's responsibility to reduce emissions and its role as a

great power.

The government report for 2021 and the 14th Five-Year Plan both point out that China will develop an action plan to reach a peak in carbon dioxide emissions before 2030<sup>3</sup>. It will further carry out related work and initiatives as earlier as possible, as was emphasized in the 9th meeting of the Central Committee for Financial and Economic Affairs<sup>4</sup> held on March 15. China has formally included the concept of carbon neutrality into the layout of its “Ecological Civilization” project. This demonstrates its high policy efficiency, strong enforcement, and clearer and more definite timetables—far more ahead of the game than many countries. It has been one year since the carbon

---

1 The Statement by President Jinping at the General Debate of the 75th Session of the United Nations General Assembly on September 22, 2020.

2 Building on Past Achievements and Launching a New Journey for Global Climate Actions by Xi Jinping At the Climate Ambition Summit on December 12, 2020.

3 Report on the Work of the Government Delivered at the Fourth Session of the 13th National People's Congress of the People's Republic of China by Premier Li Keqiang on March 5, 2021.

4 Meng Li. Xi Jinping Hosts Ninth Meeting of the Central Committee for Financial and Economic Affairs. Xinhua News Agency, March 15, 2021.

neutrality target was proposed and incorporated into the top-level design. China is now launching all-round green and low-carbon transformation and upgrading programs. These focus on the combination of governments and markets, production and consumption, real economy and financial systems.



---

## II. World: Carbon Neutrality and the Evolution of the Global Situation

### (I) Analysis of global carbon neutrality and emissions situation: an integrated perspective based on per capita and intensity

According to Guterres' speech at the Climate Ambition Summit 2020, more than 110 countries worldwide made carbon neutrality commitments by the end of 2020, generally to be fulfilled around 2050. He called on these countries to take more effective and aggressive actions to meet their commitments. By the first half of 2021, over 130 countries made their commitments. Among them, Bhutan and Suriname have already become carbon neutral or even carbon negative. Over 80% have 2050 as the carbon neutrality

target node, for example, and all EU member states except Poland have agreed upon the EU official commitment to the 2050 carbon neutrality plan. Several countries, including Japan and South Korea, have taken the lead from the government level to develop and implement a series of emission reduction measures to boost environmental protection, clean energy and other green industries in their countries. Others, like the European Union and South Africa, have submitted an emission reduction plan aiming for carbon neutrality to the United Nations<sup>1</sup>. In the face of the increasingly complex international low-carbon situations, the analysis of the evolutionary characteristics of

---

<sup>1</sup> Tong Qian. Global Accelerated Embrace of the 'Decarbonization' Era. *Economic Daily*, March 22, 2021.

carbon neutrality at home and abroad (and the synthetic form) in 2021 is of great significance and reference value for China to outline its carbon reduction action.

The global climate governance landscape has reopened with carbon neutrality pledges made by the above-said countries in the 2020s and the return of the United States to the *Paris Agreement*. The UN Emissions Gap Report 2020 reveals that global greenhouse gas emissions in 2019 were about 52.4 billion metric tons of carbon dioxide equivalents<sup>1</sup> (each greenhouse gas is uniformly converted into carbon dioxide according to the size of the greenhouse effect). Of this, China occupies 27%, namely 14 billion MtCO<sub>2</sub>e of the total sum. Carbon dioxide is the main component of greenhouse gases, and its emissions account for roughly 65%-80% of the total greenhouse gas emissions equivalents in terms of emission effects (there are differences among countries and

regions); China's carbon dioxide emissions were about 10.8 billion tons in 2019.

Carbon emissions vary widely by country. In order to visually analyze the international carbon neutrality situation, in this article, a carbon neutrality chart (noting countries and regions with low carbon emissions or low populations are not considered; the UK is excluded from the EU) is drawn for major countries and regions with the GDP per capita in 2019 (in US dollars) as the horizontal axis. The same year's CO<sub>2</sub> emissions per capita (comprehensive estimates for some countries, are only CO<sub>2</sub> calculated) as the vertical axis. The scatter colors are used to distinguish the recently announced time nodes of carbon neutrality targets (including legislations or official commitments, but excluding revealed intents), whereas the scatter areas are used to describe the population size of a country, as shown in Figure 1.

---

1 The Emission Gap Report 2020 issued by The United Nations Environment Programme on December 9, 2020.

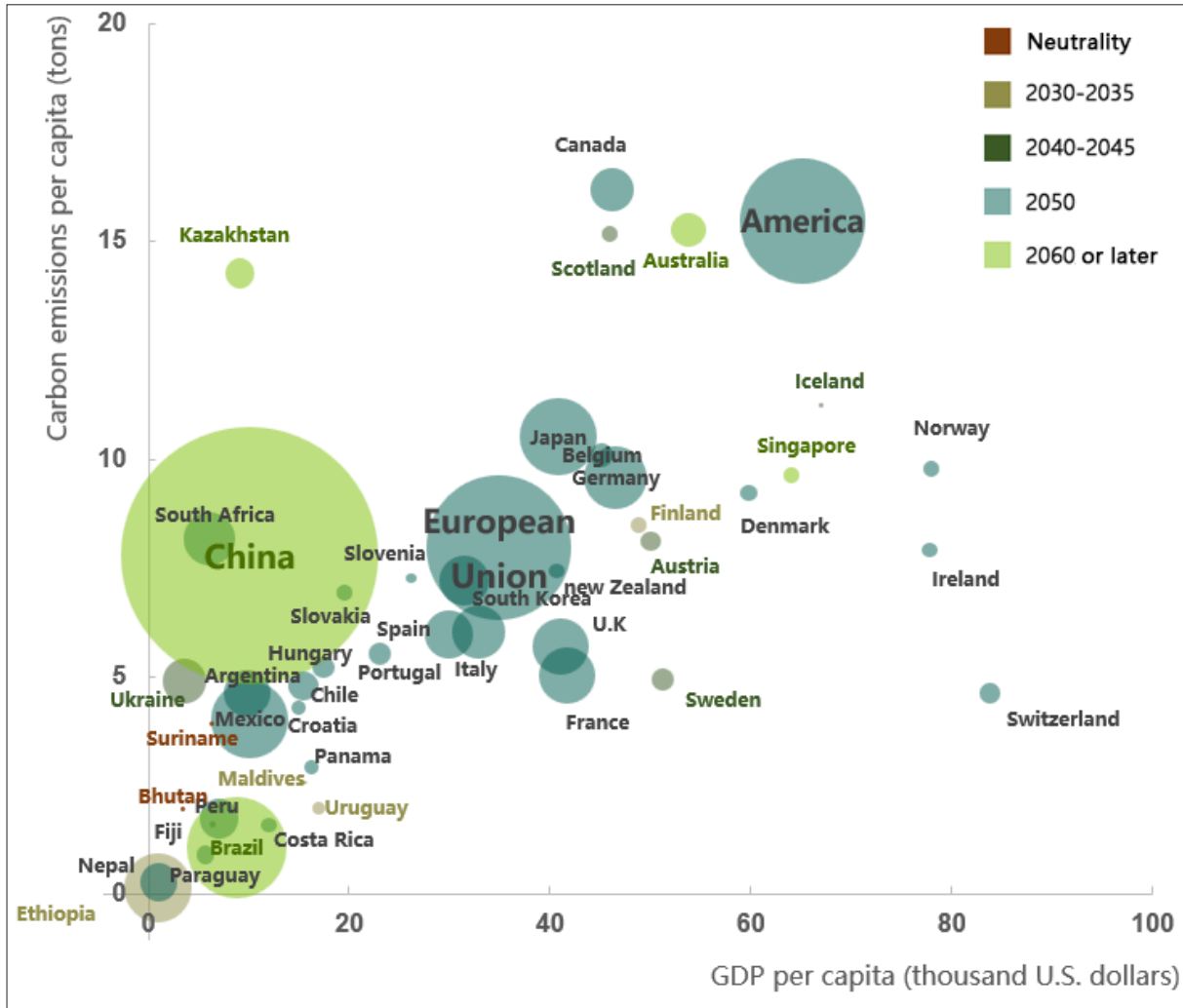


Figure 1 Comprehensive carbon neutrality situation in key carbon emitting countries and regions

Total carbon emissions do not objectively reflect a country's emission level, especially for China that has the world's largest population. It lacks fairness to developing countries. Therefore, carbon emissions per capita should also be included in the evaluation criteria. Through relevant data provided by the United Nations, the global carbon emission level

per capita in 2020 is calculated to be about 4.35 tons, which has dropped slightly under the impact of the Sars-CoV-2 pandemic. At the same time, considering the disparity in the level of economic development among countries, carbon intensity (carbon dioxide emissions consumed per unit of GDP) should also be used as an important reference indicator to

analyze the relationship between economic development and carbon emissions in each country. The slope of the line connecting each country to the origin in Figure 1 reflects carbon dioxide emissions per unit of GDP.

According to two important indicators of emissions per capita and carbon intensity, Nordic countries currently have lower carbon intensity and higher GDP per capita. By contrast North America, represented by the United States, has notably higher emissions per capita than other countries. The EU countries' per capita carbon emissions are higher than the world average and have not improved remarkably over a long period of time. This suggests that climate governance has waned in some measure since the *Paris Agreement*<sup>1</sup>. China currently emits about 7.76 tons of carbon per capita and has a carbon intensity

of about 7.69 tons per US\$10,000 GDP. China's emissions per capita are not too far from the world average and are far lower than those of developed countries such as the United States, Canada and Australia. Despite that, China, as a developing country, has a high carbon intensity, which reflects the urgent need to improve the quality of economic development. Indeed, it will face a more serious situation in terms of emissions reduction and the contradiction and dilemmas with the emission reduction characteristics of developing countries in terms of economic growth and environmental governance.

From another perspective, Figure 1 also reflects the fact that carbon intensity and per capita emissions largely coincide with the timing of the country's carbon neutrality plan. In terms of the transition period between peak and neutrality, the

---

1 Jingna Kou & Rui Zhang. Who Will Continue to Lead Global Climate Governance after the Epidemic: EU's Decline and Fightback. *Journal of China University of Geosciences (Social Sciences Edition)*, Vol. 1, 2021, pp. 87-104.

UK and Germany among other European countries achieved peak carbon emissions in the 1970s and 1980s, so did the US in 2007. China, on the other hand, has taken 2030 as the target year of peak carbon emissions, and 2060 as the target year of carbon neutrality, which undoubtedly puts pressure on emissions.

## **(II) Common features of green and low-carbon economic structures across the world**

In the face of complex international carbon neutrality situations and global climate and environmental issues, countries across the world began laying out their green development policies around 2020. This included setting up green funds, carrying out green project preferences, promoting clean energy and electrified transportation, and stepping up efforts in ecological protection and biodiversity conservation.

Comprehensive analysis uncovers the following characteristics:

**First, the share of sustainable economics continues to increase, and countries worldwide are ramping up investments and supporting green industries.**

The layout of carbon neutrality policies in each country is generally based on providing tax incentives and financial aids to the businesses involved. Developing nations use green industry funds to divert green finance to green industries. Supports at the government level facilitate enterprises to take the initiative in green transformation, continuously increase the share of sustainable economics in the national economy while creating green employment opportunities. It also provides jobs with the help of green industry growth. The fundamental purpose of each country's proposing the "carbon neutrality" policy is to control total emissions and mitigate global climate change. It also must implement a comprehensive transformation and upgrading of

industrial economics for sustainable development.

However, the strength of green recovery in countries after COVID-19 is still inadequate. The investment in green industries, despite the remarkable growth, has not met the expectations of the United Nations. In the long-term recovery plans made by various countries, there are only about US\$341 billion (18% of long-term economic recovery expenditures) project spendings that currently meet the green standards<sup>1</sup>. Low income countries in particular fall short of the conditions for green transformation and upgrading, green industry investment, green technological innovation, to name a few. They spend less than 10% on post-pandemic green recovery in their economic recovery plans. They do not make long-term green investments that adequately respond to the impact and loss

produced by changes in global climate and environment.

**Second, clean and renewable energy have become the mainstream of the energy market, and the international energy picture has begun to change.**

The wide applications of renewable energy is the core of sustainable development. Carbon neutrality strategies of the countries around the world generally focus on reducing the proportion of fossil energy generation and coal consumption while continuously increasing the proportion of clean energy generation, including wind power, hydropower, photovoltaic, hydrogen, and biomass. This has led to the gradual transformation of the world's conventional oil energy landscape.

If we want to get rid of high

---

<sup>1</sup> Are We Building Back Better? Evidence from 2020 and Pathways for Inclusive Green Recovery Spending, a report issued by The United Nations Environment Programme on March 10, 2021.

emission productions and decadent lifestyles in the national economy as soon as possible, we must start from both the energy supply side and the energy consumption side. We need to gradually realize the transition and replacement from fossil energy to clean renewables. For one thing, in the green recovery policies made by different countries, investment in clean energy is one of the most effective and safest ways for post-pandemic economic recovery and stimulus plans. For another, the development of clean energy accompanied by the new growth point in the new energy vehicle industry is prompting countries such as the UK<sup>1</sup> and Japan<sup>2</sup> to announce plans to ban the sales of fuel vehicles. Many countries are allowing for new energy vehicles with green attributes like digitalization, intelligence, new

infrastructure, and low emissions to get more market development opportunities.

**Third, the international green financial market is maturing, with green finance becoming increasingly important.**

Although there are differences and similarities among countries in the concept definition and system construction of green finance, the important concept of leveraging financial resources to support the development of green and sustainable industries and respond to global climate and environmental changes has become a consensus. Financial resources are dominated by credit, policy, regulation, institution, market and instrument resources. These together form an integrated system to boost green industry project financing and

---

1 The UK Announces Early Implementation of Fuel Vehicle Ban: Where Should the Automotive Industry's Decarbonization Transition Go?. G:HUB, No. 276.

2 Qian Yang. In order to Promote Environmental Protection, Japan Proposes to Ban the Sales of Fuel Cars in 2035. www.china-cbn.com, December 4, 2020.

services. Countries are actively developing green finance to drive the recovery of green economy after the pandemic. At the same time, they are adding important attributes to green finance to back low-carbon emission reductions in the context of sustainable economic development in the carbon neutrality target. Many are also accelerating the shift in government spending and capital flows in the market. New green financial centers have emerged globally, such as London and Leeds, two global green finance and investment centers<sup>1</sup>. These have been explicitly set up in the UK and other countries will gradually establish their own green financial information centers, carbon financial trading centers, green derivatives centers, etc.

**Fourth, green and low-carbon development has become an important guide for international**

**cooperation and an emerging battlefield for international competition.**

As a top-level strategic goal set by nearly 100 countries, carbon neutrality will provide long-term opportunities for international cooperation on low-carbon economics in the implementation and execution stage. This will be done in respect to green capital flows, jobs, green industries, and renewable energy venture investment and financing. Taking the "green diplomacy"<sup>2</sup> carried out by Germany, Denmark and other countries as an example, inter-regional green international aid will also become a vital area for developed and developing nations to explore the direction of cooperations.

International carbon-neutral technology exchange, negotiation, discussion and cooperation

---

1 Wenjia Fan. UK to Build New Global Green Finance and Investment Centers in London and Leeds. <https://finance.sina.com.cn>, February 19, 2021.

2 Country Profile of Denmark updated by the Ministry of Foreign Affairs in September 2020.



programs (as typified by the China-EU High-level Forum on Green Cooperation) will be carried out on a larger scale and among more member states. This can lead to the establishment of international clubs for carbon neutrality by industry, field and region.

International carbon-neutral and green competition kicked off with the U.S. returning to the *Paris Agreement* in 2021<sup>1</sup>. Several major economies, which are also the largest contributors to carbon emissions, have officially made an entrance. The Biden administration intends to reinvigorate the U.S. economy through the development of clean energy, and is eager to join various international organizations to demonstrate its intention to regain influence and leadership on global climate change. The 26th United Nations Climate Change Conference (COP26)<sup>2</sup>, which is

expected to be postponed until November 1, 2021, will hold climate negotiations on global low-carbon economics in a totally different way. This can further upgrade and deepen the concept of carbon-neutral development. The early issues of global environmental protection and climate change have repeatedly expanded to international low-carbon governance. Indeed, intense international negotiations and struggles will continue to arise with respect to the setting of carbon neutrality standards, resource supplies, approaches to cooperation, and benefits to distribution.

### **(III) China's thinking under the international context and pressure of emission reductions**

In combination with the above four major carbon-neutral policy

---

1 Can We Beat the "Green" Competition? *Sankei Shimbun*, February 18, 2021, headline translated from Japanese.

2 The 26th UN Climate Change Conference of the Parties (COP26) due to COVID-19. UN News, 2 April 2020.

trends, the key initiatives launched by countries around the world manifest three major issues.

First, the general direction of carbon emission reduction policies in each country is basically right, such as the development of clean energy and green finance. But the effectiveness and efficiency of specific measures in detail needs time to test. Some of the policies will prove to be effective while others may not achieve expected results. While more than 130 countries have now set out the aim of carbon neutrality, a considerable number of countries will fail to reach their emission targets and meet their commitments by around 2050. At this date, it will become an international issue that cannot be ignored. This is foreseeable.

Second, in the first year of global carbon neutrality, most countries, albeit their ceaseless exploration, innovation and attempts, are yet not been able to find out a sustainable and instructive national development

model and roadmap for carbon neutrality. Different countries and regions are at different stages of economic development and have unique demographics, resources, environmental conditions and industrial types. This means that their low-carbon development directions and policies do not fit into each other's conditions.

Third, some countries have not yet fully clarified the intricate linkage between green development and carbon neutrality. Some non-peak emissions countries have not yet distinguished the difficulties and differences in achieving the goals of emissions peak and carbon neutrality in different periods of time. Short-term policies aiming at reducing carbon emissions may not be applicable to long-term sustainable development with carbon neutrality as the ultimate goal. How carbon neutrality can be integrated into conventional green development and used as a new function and orientation to initiate new upgrades also needs to be

probed at a higher level.

With the background of international carbon neutrality getting more and more complicated, China has taken the emissions stress peculiar to developing countries. After the formal introduction of the carbon neutrality target, it should objectively analyze the international green development context from a global perspective. This can provide a basis for action to choose the timing and mode of domestic carbon emission reductions. It can gradually blaze a new trail of carbon neutrality development with Chinese characteristics to address the new round of international green and low-carbon competitions and challenges.

---

## III. Policy: Top-level Design and Local Layout of Carbon Neutrality in China

### (I) Inclusion of carbon neutrality into top-level design and strategic deployment

Since December 2020 when the Central Economic Work Conference first made "reaching peak carbon emissions and carbon neutrality" a key task<sup>1</sup>, the central government has taken the construction of an "Ecological Civilization" in the new phase seriously by making scores of top-level guidelines, including the government work report and the 14th Five-Year Plan that underlines the importance and necessity of achieving emissions peak and carbon neutrality as scheduled (see Table 1). It further incorporates

the dual carbon goals into the new development concept, truly delivering the aim of planning for China's future economic and social development from a new height of harmony between humanity and nature.

This shows that the inclusion of the dual carbon goals in the top-level design means that the Party and the State have placed ecological progress in an outstanding position in the overall work plans. They are an important goal for the completion of socialist modernization, and deeply related to the promotion of global sustainable development and the co-building of a community with a shared future

---

1 Chao Zhao, Weiwei Chen, Bei An, Jiaxin Yu, Wenjing Yu & Youling Wang. Set the Tone for 2021 China's Economy: Interpreting the Task Deployment of the Central Economic Work Conference. Xinhua News Agency, December 9, 2020.

for human beings. Under the top-level guidance of the central government, the administrations, commissions and governments at all levels have clarified and assumed the major responsibility for ecological progress, and taken a set of measures to ensure that the central government's decisions and deployments on the construction of ecological civilization are implemented in a bid to curb emissions and become carbon neutral on schedule.

## **(II) All ministries and commissions have responded positively and issued a chain of key policies on carbon neutrality**

In the face of the global situational landscape of carbon neutrality, China has made some progress in terms of carbon emission reduction. But it is still in the early stages of exploring the upgrading and transformation of carbon-neutral industries. This is because regional developments and resource endowments are uneven and the difficulty in emission

reduction varies by industry. During the first anniversary of the carbon neutrality target, ministries and commissions under the State Council have actively responded to the top-level design and strategic deployment of the central government on the double carbon goals. They have formulated and introduced a series of key policies oriented to carbon neutrality to drive the orderly implementation of emission reduction in different fields. Key policies and instructions are detailed in Table 2.

On July 24, 2021, at the Global Asset Management Forum 2021 Beijing Summit themed "Global Green Recovery and ESG Investment Opportunities," China Special Envoy for Climate Change Xie Zhenhua said that, "The Party Central Committee and the State Council have jointly set up a leading group of emissions peak and carbon neutrality, which is now formulating a timetable and roadmap for the dual carbon goals and will release one "1+N" policy

system after another, of which "1" means the guideline for emissions peak and carbon neutrality, and "N" includes the action plans for CO<sub>2</sub> emission to peak by 2030 and the policies, measures and actions in key areas and industries. It involves the policies and measures aiming for emissions peak and carbon neutrality nationwide in all fields and all industries."

Under the guidance of the top-level design, the layout of carbon neutrality policies carried out in succession by various ministries and commissions will give impetus to all industries. They will drive each sector and department to do its own emission reduction work according to the top-level guidelines, and continuously optimize the energy mix in a proper way, promote the green upgrading of conventional industries, improve resource utilization efficiency, and facilitate green and low-carbon technology innovation and low-carbon transformation of service trade. This shows

that carbon neutrality in China is a comprehensive top-down green transformation involving all professions and trades. It illustrates not only macro-strategic deployment at the central level, but also all-round cooperation from nearly all sectors, including energy, industry, transportation, environment, science and technology. It means more work for matching green financial resources provided by the financial system.

### **(III) Provinces and cities are actively laying out local dual carbon goals during the 14th Five-Year Plan period**

In the first half of 2021, all provincial-level administrative regions rolled out outlines of their 14th Five-Year Plans for National Economic and Social Development and the Vision 2035. The 14th Five-Year Plan period is a historic turning point in China's new journey of building a modern socialist country after building a moderately prosperous society. It is also a critical period in history after

the carbon neutrality target was proposed; this directly determines whether the emissions peak can be achieved by 2030 as scheduled and whether the carbon neutrality roadmap can be scientifically planned and designed by 2060. For this reason, provinces and municipalities across the country actively responded to the call of the nation to make emission peak and build a carbon-neutral society. Local governments, for instance, successively established the overall objectives of carrying out emission peak and carbon neutrality tasks while formulating and implementing emission peak action programs in their 14th Five-Year Plans. They rolled out major strategies for the course of peak CO<sub>2</sub> emissions action in key industries of various fields. These have become the most important part of local ecological civilization during the 14th Five-Year Plan period.

The key targets and responses in the 14th "Five-Year" Plan of each province and municipality in

terms of the emissions peak and carbon neutrality targets reflect the commonalities and local characteristics of the dual carbon goal at the local level.

The commonality of the dual carbon goals lies in the fact that in the main economic and social development indicators in the 14th "Five-Year" Plan, all provinces and municipalities have basically established goals to reduce energy consumption and carbon dioxide emissions per unit of GDP. They are being done to meet the obligatory target set by the State and to achieve "double control" of total emissions amount and intensity. In the meantime, they promise to formulate emissions peak action plans in the 14th "Five-Year" Plan period to make substantive progress in achieving the dual carbon goals. The local characteristics of the dual carbon goals state that regional key countermeasures and pathways have certain local features. For instance, Shanghai relies on its

advantages as a financial center to improve the carbon trading market and carry out a national pilot climate investment and financing project; Shanxi accelerates the green, clean and efficient development and utilization of coal; Hainan energetically studies and promotes marine carbon sinks; Inner Mongolia, Gansu and Qinghai remarkably increase the production and consumption of clean energy. All this will help to carry out regional emission reduction according to local conditions and jointly promote a virtuous cycle of green development nationwide.

It follows that governments, and provinces and municipalities at all levels are carrying out different emission reduction strategies as the main implementation entities of the dual carbon goals. After the top-level design of carbon neutrality is proposed at the national level, and each department and industry explore implementable action

plans and paths to reach them, specific work will be implemented in each province and city. China's economic development varies a lot from region to region; likewise its resource endowment, energy mix, and industrial policies have regional characteristics and historical features.

Specifically, from the perspective of carbon emissions, the quality and efficiency of industrial and economic development in the central and western regions are inadequate, and the binding force of local environmental policies is not strong. This, coupled with the "pollution transfer" of some enterprises from the east to the west, makes the carbon intensity in the central and western regions much higher than in the developed eastern regions. In addition, there is also a striking urban-rural gap in carbon emissions, with cities currently contributing more than 80% of them<sup>1</sup>, and their total and

---

1 Zhu Liu. China's Carbon Emissions Report 2015. May 2015.



per capita emissions are much higher than those of rural areas. With regional differences, the 14th "Five-Year" Plan of each province and city reveals that China's approach to carbon neutrality is based on the principle of "adjusting measures to local conditions"<sup>1</sup>, whereby the first place brings along the second one in the short term, pushing for nationwide carbon neutrality in the long term.

In the international environment of carbon neutral and green competition, the whole of the Chinese nation is actively engaged in healthy competition for getting emissions peak and emissions reduction. China has started to move from developed coastal areas to central and western regions and drive "green development in the west", manifesting the regional execution power under the double carbon goals.

---

1 Jiaying Xiang. Many Provinces and Cities to Highlight Layout of Carbon Emissions Peak in 14th Five-Year Plan. *Economic Information Daily*, January 19, 2021.

Table 1 Summary of Top-level Design and Strategic Deployment on the First Anniversary of Carbon Neutrality

Time	Meetings or Documents	Carbon Neutrality Related Top-Level Strategic Deployment
December 16 to 18, 2012	The Central Economic Work Conference was held.	"8. We will take steps toward the targets of emissions peak and carbon neutrality. We aim to have our CO2 emissions peak before 2030 and achieve carbon neutrality before 2060. We will lose no time in drawing up carbon emissions to peak by 2030 and back up places with conditions to take the lead in reaching the peak. We will accelerate the adjustment and optimization of the industrial structure and energy mix, achieve peak coal consumption as early as possible, vigorously develop new energy, expedite the construction of national markets for trading energy-use rights and carbon emission rights, and improve the system to control the total amount and intensity of energy consumption. We will continue to fight the battle of pollution prevention and control, and realize the synergistic effect of pollution alleviation and carbon reduction. We will launch the Go Green campaign across the country and enhance the carbon sink capacity of the ecosystem."
February 22, 2021	The State Council released <i>Guiding Opinions on Accelerating the Establishment and Improvement of Green and Low-Carbon Circular Economic Systems</i> .	It requires to "fully act on Xi Jinping's ecological civilization thought, conscientiously implement the Party Central Committee's and the State Council's decisions and deployments, unswervingly carry out the new development idea, practise green planning, green design, green investment, green construction, green production, green circulation, green living, and green consumption on every side and throughout the course of development based on the efficient use of resources, stringent protection of ecological environment, and effective control of greenhouse gas emissions; overallly promote high-quality development and high-level protection, and build a sound economic system of green, low-carbon and cyclic development to ensure the achievement of emissions peak and carbon neutrality goals and push China's green development to a new level."
March 5, 2021	The 2021 government work report was released.	"We will take solid steps toward the goals of achieving peak carbon dioxide emissions and carbon neutrality. We will draw up an action plan for carbon emissions to peak by 2030. China's industrial structure and energy mix will be improved. While promoting the clean and efficient use of coal, we will make a major push to develop new energy sources, and take active and well-ordered steps to develop nuclear energy on the basis of ensuring its safe use. We will expand the catalog of corporate income tax credits for environmental protection and the conservation of water and energy, and promote the development and application of new types of energy-efficient and eco-friendly technologies, equipment and products, and the cultivation of energy-saving and environmental protection industries to ensure the conservation and efficient use of resources. We will accelerate the development of national markets for trading energy use rights and carbon emission rights, and improve the system to control both the total amount and intensity of energy consumption. We will introduce special policies on providing financial aids for green and low-carbon development, devise instruments for supporting the reduction of carbon emissions, and enhance the carbon sequestration capacity of ecosystems."

<p>March 2021</p>	<p>The <i>Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of the People's Republic of China</i> was published.</p>	<p>Under the Vision 2035, "Eco-friendly work and lifestyle will be advanced to cover all areas of society. Carbon dioxide emissions will steadily decline after reaching a peak, and there will be a fundamental improvement in the environment after the goal of building a Beautiful China is met." To cope with climate change, "We will make sustained efforts to achieve the objectives of China's Intended Nationally Determined Contributions 2030 and formulate an action plan to reach the peak of carbon emissions by 2030."</p>
<p>March 15, 2021</p>	<p>General Secretary Xi Jinping presided over the ninth meeting of the Central Committee for Financial and Economic Affairs.</p>	<p>Xi stressed that "achieving emission peak and carbon neutrality is a broad and profound systemic economic and social transformation. We need to integrate the two goals into the plan of ecological progress and work hard to reach peak by 2030 and become carbon neutral by 2060 as scheduled."</p>
<p>April 30, 2021</p>	<p>In the afternoon, the Political Bureau of the CPC Central Committee organized the 29th collective study on the new situation to beef up the construction of ecological civilization.</p>	<p>"We will unremittingly push ahead with green and low-carbon development, establish and consolidate the green, low-carbon, and cyclic economic system, and promote the green transformation of economic and social development across the board". It reiterated that "to peak the emissions and go carbon neutral is a solemn commitment made by China to the world, and also a broad and profound economic and social transformation which can never be achieved easily. Party committees and governments at all levels should take the bull by the horns, set a clear time frame, and draw up roadmaps and construction plans to promote economic and social development based on the efficient use of resources and green and low-carbon development."</p>
<p>May 26, 2021</p>	<p>The first plenary meeting of the leaders group for carbon emissions to peak and carbon neutrality was unveiled.</p>	<p>"While fully implementing Xi Jinping's ecological civilization thought, we will, based on the new development stage, carry through new development ideas, foster new development patterns, and take solid steps toward the construction of ecological civilization to ensure the timely achievement of the dual carbon goals."</p>

Source: Reports published by the central government.

**Table 2 Summary of Key Policies Made by State Council Ministries and Commissions in the Field of Green Development on the First Anniversary of Carbon Neutrality**

<b>Ministries and Commissions</b>	<b>Meetings or Documents</b>	<b>Published Key Policies and Instructions on Carbon Neutrality</b>
People's Bank of China	On January 4, 2021, the People's Bank of China (PBOC) held a work conference for 2021.	"Implementing the major decision and deployment on reaching peak carbon dioxide emissions and carbon neutrality, and improving the policy framework and incentive mechanism of green finance", and continuously directing financial resources to green development areas.
	On February 9, 2021, the State Council Information Office gave an advance briefing on green finance.	The State Council Information Office expressed that it would deploy the carbon neutrality strategy by ramping up the following efforts: improving the top-level design of financial supports for green and low-carbon transformation; improving green financial standards and encouraging financial institutions to do carbon accounting; and developing carbon financial products and instruments such as carbon futures and other derivatives in an orderly manner.
	On March 7, 2021, PBOC Vice President Chen Yulu answered reporters' questions.	Initially, the policy thinking of "three functions" and "five pillars" for green finance development has been established to guide and leverage financial resources to low-carbon projects, green transformation projects, carbon capture and storage projects, and other green innovation projects.
	On April 15, 2021, PBOC President Yi Gang spoke at a high-level seminar on Green Finance and Climate Policies.	Yi said that "The central bank plans to introduce carbon emission reduction support tools to provide a portion of low-cost funds for carbon emission reduction; the central bank will also step up efforts to bolster green finance through channels such as business credit ratings, deposit insurance rates, and the collateral framework for open market operations."
	On July 30, 2021, a work conference was held by the People's Bank of China for the second half of 2021.	It proposed to promote carbon emission reduction support tools to take effect, provide low-cost funds to eligible financial institutions, guide financial institutions to offer preferential interest rates for financing in majors areas with significant emission reduction effects, and advance the disclosure of carbon emission information and evaluation of green finance.

National Development and Reform Commission	<p>On January 19, 2021, the first news briefing of the National Development and Reform Commission (NDRC) was kicked off.</p> <p>On May 18, 2021, the NDRC press conference was held.</p>	<p>It announced to conduct "six aspects of work" towards the medium and long-term goals of carbon neutrality: vigorously adjusting the energy mix, accelerating the transformation of the industrial structure, striving to improve energy utilization efficiency, expediting the R&amp;D and promotion of low-carbon technologies, improving the system and mechanism of low-carbon development, and putting efforts to increase ecological carbon sinks.</p> <p>The NDRC stated that it was "working on the preparation of the action plan for CO2 emission peak by 2030, studying and formulating the implementation plans for getting emissions peak in the industries and fields of electricity, iron and steel, non-ferrous metals, petrochemicals and chemicals, building materials, construction, transportation, etc., heartily planning for tackling hard-nut problems in green and low-carbon science and technology, consolidating and improving carbon sink capacity, and further clarifying the timetable, roadmap, and construction plan of the dual carbon goals."</p>
Ministry of Industry and Information Technology	<p>On December 28, 2020, the National Industry and Information Technology Work Conference 2021 was unveiled.</p> <p>On January 5, 2021, the Ministry of Industry and Information Technology (MIIT) answered reporter's questions.</p> <p>On July 20, 2021, the videophone conference was convened by the leaders from the industry and information technology departments in charge.</p>	<p>"Centering on the nodes of emissions peak and carbon neutrality goals, we will implement industrial low-carbon actions and green manufacturing projects, and resolutely cut crude steel production to ensure a year-on-year decline in crude steel production."</p> <p>It revealed that in 2021, industrial low-carbon actions and green manufacturing projects will be implemented, and a roadmap for peak CO2 emissions in key industries such as steel and cement will be developed.</p> <p>At the meeting, it proposed to "implement the emissions peak and carbon neutrality deployment requirements, strengthen overall planning, explore new pathways, accelerate the development of key implementation programs in the industrial sector, and promote green and low-carbon transformation and industrial structure optimization and upgrading."</p>
Ministry of Ecology and Environment	<p>On May 29, 2019, the Ministry of Ecology and Environment (MEE) issued the <i>Implementation Guidelines for Carbon Neutrality of Large-scale Events (Trial)</i>.</p>	<p>The document was introduced to guide all walks of life to "offset the greenhouse gas emissions from large scale activities by means of carbon quotas, carbon credits or by generating carbon sinks from new forestry projects."</p>

<p>Ministry of Ecology and Environment</p>	<p>On December 25, 2020, the MEE passed the <i>Measures for the Administration of Carbon Emissions Trading</i> (Trial).</p> <p>On January 13, 2021, the MEE issued the <i>Guiding Opinions on Coordinating and Strengthening Efforts in Climate Change Response and Ecological Environmental Protection</i>.</p> <p>On January 23, 2021, the 2021 National Conference on Ecological Environment Protection was held.</p> <p>On March 18, 2021, the MEE organized a symposium on basic research on emissions peak and carbon neutrality.</p> <p>On July 14, 2021, the State Council Information Office (SCIO) held a routine briefing on the launching of a national carbon emissions trading right market, and MEE Vice Minister Zhao Yingmin answered reporters' questions at the meeting.</p> <p>On July 26, 2021, the MEE held a regular press conference.</p>	<p>It aimed to normalize the national carbon market and announced that the national market for trading carbon emission rights would be open from February 1, 2021.</p> <p>"Local governments should put forward positive and clear emissions targets and formulate implementation plans and supporting measures to peak the emissions."</p> <p>It proposed "to implement the general requirements of 'pollution reduction and carbon reduction', to plan, deploy, promote and assess the synergy of pollution reduction and carbon reduction as a whole, and to further strengthen the rigid initiatives to reduce carbon emissions."</p> <p>"Actively promoting the construction of a national trading system for carbon emission rights, accelerating the formulation of a national action plan to achieve CO2 emissions peak by 2030, and partnering with the international community in response to climate change."</p> <p>The SCIO noted that "building a national market for trading carbon emission rights is a major institutional innovation to use market mechanisms to control and cut greenhouse gas emissions and promote green and low-carbon development, and it is also an important policy tool to achieve the goals of peak CO2 emissions and carbon neutrality as well as intended nationally determined contributions (NDCs)".</p> <p>It is the first time to include the dual carbon goals in the Central Inspection of Ecological and Environmental Protection (CIEEP).</p>
<p>Ministry of Natural Resources</p>	<p>On June 1, 2020, the Ministry of Natural Resources (MNR) issued the <i>Green Mine Evaluation Index</i>.</p>	<p>"Energy conservation and emissions reduction" are one of the six important evaluation indexes.</p>

<p>Ministry of Transport</p>	<p>On November 27, 2017, the <i>Opinions on the Comprehensive and In-depth Promotion of Green Transportation Development</i> were released.</p> <p>On March 24, 2021, Wang Yang, chief planner of the Ministry of Transport and director of the Department of Comprehensive Planning, answered reporters' questions at a press conference held by the State Council Information Office on the in-depth implementation of the 14th Five-Year Plan to accelerate the construction of country with strong transportation network.</p>	<p>The main development goal is to "effectively control pollutions and emissions" and promote the continuous reduction of CO<sub>2</sub> emission intensity in transportation.</p> <p>"The Ministry of Transport gives impetus to the research on peaking transportation CO<sub>2</sub> emissions, facilitate the green and low-carbon transformation of transportation across the board, strengthens the synergistic prevention and control of carbon emissions and pollution, accelerates the popularization and application of new energy and clean energy, increases the energy efficiency of operating vehicles and vessels, heightens the implementation of the vehicle emission inspection and maintenance system, and further promotes the implementation of ship emission control zones."</p>
<p>Ministry of Commerce</p>	<p>January 7, 2021, the Ministry of Commerce (MOC) issued a <i>Notice on Promoting the Green Development of E-Commerce Enterprises</i>.</p> <p>On February 8, 2021, the MOC published a <i>Notice on the Creation of Green Shopping Malls in 2021</i>.</p>	<p>It proposes to continuously push e-commerce enterprises to improve low-carbon and environmental protection levels.</p> <p>The Notice is intended to guide commerce and circulation businesses to improve green and low-carbon development and promote green consumption.</p>
<p>Ministry of Housing and Urban-Rural Development</p>	<p>April 9, 2019</p> <p>On January 5, 2021, it issued a <i>Letter on the Experimental Work of Green Construction</i>.</p> <p>On March 22, 2021, Technical Guide to Green Construction (Trial) was prepared.</p> <p>In April 2021, the MOHURD interpreted the <i>Technical Guide to Green Construction (Trial)</i>.</p>	<p>The Ministry of Housing and Urban-Rural Development (MOHURD) approved the <i>Standard for Calculation of Carbon Emissions from Buildings</i>.</p> <p>The MOHURD decided to carry out the experimental work of green construction in Hunan Province, Shenzhen City of Guangdong Province, and Changzhou City of Jiangsu Province.</p> <p>It proposes to "effectively lower the consumption of resources and the impact on the ecological environment throughout construction, reduce carbon emissions, and improve the overall decarbonization level of construction activities."</p> <p>It requests to "integrate the concept of green development into the whole element and process of engineering construction, comprehensively improve the level of green and low-carbon development in the construction industry, and promote the full implementation of the national major decisions on emissions peak and carbon neutrality in the construction industry."</p>

Ministry of Science and Technology	<p>On March 4, 2021, the first meeting of the Ministry of Science and Technology's Leading Group on Emissions Peak and Carbon Neutrality Science and Technology ("Dual Carbon" Group) was held.</p> <p>On April 12, 2021, Wang Zhigang, head of the Ministry of Science and Technology, delivered a speech at the Xiangshan Science Conference on the Selection of Carbon Neutrality Science and Technology Innovation Pathways.</p>	<p>It studies the work related to using science and technology to help fulfill the dual carbon goals, which focuses on three tasks: to study and develop an <i>Action Plan for Reaching Emissions Peak and Carbon Neutrality by Means of Scientific and Technological Innovation, facilitate the preparation of the Carbon Neutrality Technology Development Roadmap</i>, and promote the establishment of the key and special projects termed "Carbon Neutrality Key Technology Research and Demonstration".</p> <p>Wang said that "In the future, we will systematically design the architecture of carbon neutrality science and technology innovation, and draw a blueprint and 'four beams and eight pillars' for science and technology supported and led emissions peak and carbon neutrality; adhere to the problem-oriented approach under the goal-oriented approach, analyze science and technology needs, and clarify the idea and focus of science and technology innovation; in addition, vigorously make great efforts to cultivate young scientific and technological talents to provide sustainable personnel guarantee and support for achieving the goal of carbon neutrality in the next 40 years."</p>
Ministry of Agriculture and Rural Affairs	<p>On July 2, 2018, the Technical Guide to <i>Agriculture Green Development (2018-2030)</i> was released.</p> <p>On March 2, 2020, the <i>Work Priorities of Agriculture Green Development in Rural Areas in 2020</i> were issued.</p> <p>On August 23, 2021, the symposium on carbon neutrality in agriculture and rural areas was held.</p>	<p>The "basic establishment of a green development system and low-carbon model" was proposed as one of the main targets in 2030.</p> <p>It requires to boost quality and green agriculture and continuously strengthen the guiding role of green development for rural revitalization according to the first policy statement released by central authorities each year (Central Document No. 1).</p> <p>It proposes "to improve the program for carbon dioxide emissions to peak in agriculture and rural areas as soon as possible, and study and develop policies and measures for CO2 emissions reduction and sequestration in agriculture and rural areas in line with the central government's decisions on and deployments of emissions peak and carbon neutrality."</p>



<p>Ministry of Finance</p>	<p>On December 16, 2019, the Ministry of Finance (MOF) issued <i>Interim Provisions on Accounting Treatment Related to the Trading of Carbon Emission Rights</i>.</p>	<p>It is introduced to normalize the accounting treatment related to the trading of carbon emission rights.</p>
	<p>On August 5, 2021, the MOF responded to the comments made by the deputies to the National People's Congress.</p>	<p>The MOF said that it is "taking the lead in drafting the <i>Guidance on Financial Support for Carbon Neutrality Efforts</i>, and intends to enrich and improve a series of financial and taxation supporting policies to actively build a financial and taxation policy system that strongly promotes green and low-carbon development, give full play to the basic and important pillar role of finance in national governance, and guide and use more policies and social funds to bolster green and low-carbon development."</p>
<p>National Energy Administration</p>	<p>On December 22, 2020, the National Energy Conference 2021 was held.</p>	<p>It proposed "to concentrate efforts on improving the level of energy supply, speeding up the development of wind power and photovoltaic, steadily promoting the construction of hydropower and nuclear power, and vigorously enhancing the capacity of new energy consumption and storage."</p>
	<p>On March 9, 2021, the spokesperson of the National Energy Administration (NEA) answered reporters' questions.</p>	<p>The spokesperson indicated that the NEA will take multiple measures to accelerate the work of reaching emissions peak and carbon neutrality, i.e., accelerating the development and utilization of clean energy, upgrading energy consumption patterns, and optimizing and improving the construction of power grids.</p>
	<p>On March 30, 2021, Zhang Jianhua, director of the National Energy Administration, spoke at the press conference of the State Council Information Office.</p>	<p>Zhang said that "the National Energy Administration will take actions chiefly from three aspects to expedite the attainment of emissions peak with effects: first, vigorously develop non-fossil energy; second, devote major efforts to promote green energy use patterns; third, formulate and implement more powerful and effective policies and measures."</p>

Source: Reports issued by ministries and commissions across the country.

Table 3 Summary of the “14th Five-Year” Dual Carbon Goals Planning and Major Strategies Made by 31 Provincial-level Administrative Regions of China

Provinces	"14th Five-Year" Ecological Progress and Dual Carbon Goals Overall Planning	Major Strategies for Dual Carbon Goals in the Period of the "14th Five-Year" Plan
Beijing	Carbon dioxide emissions will steadily decline after reaching the peak, and Beijing will set an example in responding to climate change by taking solid steps toward carbon neutrality.	It will build a safe and efficient resource support system to promote green, low-carbon and intelligent energy transformation; solidly advance green and low-carbon cyclic development, release a roadmap for implementation of the carbon neutrality schedule; improve the mechanism for realizing the value of ecological products, and perfect the system and mechanism for ecological and environmental governance.
Tianjin	It will take solid steps toward the goals of achieving peak CO2 emissions and going carbon neutral, work out and implement the action plan trying to reach the peak ahead of time, launch emissions peak campaigns in major industries, and drive iron & steel, electric power and other industries to be the first to reach the peak.	It will strengthen the efforts to implement clean production in key industries; accelerate the construction of a pilot market for trading carbon emission rights in Tianjin; innovate the building of net-zero emission zones, and quicken the implementation of recycling, energy conservation and low-carbon transformation in industrial parks; vigorously promote green and low-carbon travel until the green ways to travel reaches more than 75% of means of transport by 2025.
Hebei	It will include the dual carbon goals into the overall layout of ecological civilization, strengthen policy design, accelerate green and low-carbon development in key industries and key areas, strive to be among the first to peak the carbon dioxide emissions, and lay a solid foundation for going carbon neutral.	It will popularize the green and low-carbon city construction model; explore ecological resource pricing and trading mechanisms for carbon emission rights; improve the resource-saving standard and system; reinforce the policy design of peak emissions and net zero emissions; make renewable energy substitutes for non-renewable resources; carry out key industry pollution and CO2 reduction activities; and promote low-carbon development in critical fields.
Shanxi	It will radically improve the ecological environment, further enhance the quality and stability of the "two mountains and seven rivers, and one watershed" ecosystem, build a Yellow River-Beijing-Tianjin-Hebei ecological barrier, foster an ecological civilization system, realize steadily decline in carbon dioxide after reaching the peak, and showcase a beautiful Shanxi in all aspects.	It will accelerate the green, low-carbon, clean and efficient development and utilization of coal; build a green and low-carbon consumption system, speed up the formation of green development and lifestyles; quicken the transformation, demonstration and application of green and low-carbon technological innovation results; optimize green technological innovation environment; implement the dual carbon goals and the Shanxi action, and develop and implement the 2030 emissions peak target and the 2060 carbon neutrality action plan.

Inner Mongolia	It emphasizes both mitigation and adaptation while carrying out emissions peak actions. It will actively adjust the industrial structure, optimize energy mix, improve energy use efficiency, increase carbon sinks in forest and grassland ecosystems, and effectively control greenhouse gas emissions.	It will establish and improve the carbon emission rights trading mechanism; explore the roadmap for emission peaks in key industries, and energetically build a low-carbon energy system; form a diversified energy supply mode, and implement energy-saving transformation of coal-fired power plants; promote the "new energy + electric vehicles" intelligent cooperative and interactive system; strengthen the control of the total amount and intensity of energy consumption to push ahead with the transformation and upgrading of the industrial structure.
Liaoning	It will take actions to peak the emissions, actively respond to climate change, develop an emissions peak action plan, and further control total greenhouse gas emissions.	Also, it will further strengthen the synergistic reduction of air pollution and greenhouse gas emissions; promote the safe and green development and clean and low-carbon utilization of traditional energy sources; focus on limiting carbon dioxide emissions in industry, transportation, and construction; carry out large-scale afforestation events, increase the capacity of carbon sinks like forests and wetlands, and make energetic efforts to develop ocean carbon sinks; promote the construction of a market system for trading carbon emission rights, and support Shenyang City in cultivating an international carbon trading center.
Jilin	Eco-friendly work and lifestyle will be advanced to cover all areas of society. Carbon dioxide emissions will steadily decline after reaching a peak, and there will be a fundamental improvement in the environment. After the eco-friendly work and lifestyle become popular, the use efficiency of resources and energy will continue to improve, the total emissions of major pollutants will further reduce, the ecological environment will be increasingly improved, and the ecological security pattern will become better. The province will make great efforts to cut the emissions, and set out and carry out the emissions peak action plan.	By 2025, the proportion of non-fossil energy consumption in the province will go up to 12.5% and the proportion of coal consumption will go down to 62%. Jilin will promote market-based transactions of pollution discharge, energy use, water use, CO2 emission rights, and try to build a mechanism for trading the rights and interests of resources and environment; create a national new energy production base and a green energy demonstration area, and drive the green development of the manufacturing industry.
Heilongjiang	It will implement the national action plan for achieving emissions peak before 2030 by formulating a provincial action plan to promote the clean, low-carbon, safe and efficient use of coal and other energy sources, vigorously develop renewable energy, and reduce the carbon intensity.	It will carry out green architecture ushering actions to set up a green and low-carbon transportation network; control the total amount and intensity of energy consumption, largely weaken the energy consumption intensity, and rigidly control the growth rate of total energy consumption; carry out large-scale land afforestation campaigns and implement the forest chief scheme to enhance the carbon sink capacity of the ecosystem; and build a practice base to turn snowy land into invaluable assets.

Shanghai	It will make a city-wide emissions peak action plan, control the total amount and intensity of energy consumption, put forth efforts to drive energy conservation and carbon reduction in key areas and key energy use organizations such as electricity, iron and steel, and chemical to ensure the realization of CO2 emissions peak before 2025, and reduction in energy consumption and carbon dioxide emissions per unit of GDP.	It has introduced a general implementation plan for carbon GSP (Generalized System of Preferences) to galvanize the public to save energy and limit CO2 emissions, and take the lead to create low-carbon development practice areas and low-carbon communities; study and promote low-carbon product certification and carbon labeling systems; advance the construction of a national trading system of carbon emission rights, further improve the local carbon trading market, and strive to make national experiments on climate investment and financing; and fully implement the government procurement system for green products.
Jiangsu	It will make the emissions continue to decline after reaching the peak ahead of schedule, fundamentally improve the ecological environment, build a model province of beautiful China that initially shows a modernization picture, and pushes the construction of a "strong, rich, beautiful and advanced" Jiangsu province to a new high; implement "double control" over the total carbon emissions and carbon intensity, formulate an action plan to peak the CO2 emissions before 2030, and back up places with conditions to take the lead in reaching the peak.	At the same time, it will promote collaborative reduction and integrated control of air pollutants and greenhouse gas emissions, and carry out the pilot policy system of collaborative emission reduction; improve regional low-carbon innovation and development systems, develop greenhouse gas emission standards per unit of products in key industries; promote carbon emission rights trading; increase the carbon sink capacity; and construct emissions peak demonstration areas.
Zhejiang	It will basically realize the modernization of harmonious coexistence of humanity and nature, healthy ecological environment, and intensive use of resources and energy; build a beautiful and wealthy province that meets the national and international advanced standards, steadily lower CO2 emissions after reaching the peak, and become the large pastoral and artistic garden and the first demonstration area of beautiful China; lay down and implement the action plan for carbon dioxide emissions to reach the peak, and encourage the regions and industries with conditions to take the lead in reaching the peak.	It will carry out the "carbon-free" system as a pilot project to implement the trading system of carbon emission rights and the collaborative management of pollutants and greenhouse gas emissions; adjust energy mix, promote industrial low-carbon, popularize low-carbon living, optimize building energy use, boost green transportation, and develop forest carbon sinks.

<p>Anhui</p>	<p>It will actively respond to climate change, and in accordance with the requirements of carbon emissions peak and energy quality development, make and perform the province's action plan to reach carbon emissions peak by 2030, and achieve the synergistic effects of pollution alleviation and carbon reduction.</p>	<p>It will further implement the "5-100" special action (expand 100 energy conservation and environmental production enterprises, promote 100 energy conservation and environmental advanced technologies, generalize 100 energy conservation and environmental equipment and products, implement 100 energy conservation and environmental key projects, and cultivate 100 energy conservation and environmental service companies), and use energy-saving and low-carbon environmental technologies to transform conventional industries; expedite the adjustment of energy mix, increase the ratio of non-fossil energy consumption; in public institutions, carry out carbon-neutral pilot projects; and deeply implement the national afforestation action by planting trees near houses, villages, waters and roads, along highways and river banks, and around residential quarters, cities and towns, and scenic areas to increase the ecosystem carbon sink capacity.</p>
<p>Fujian</p>	<p>It aims to continually lessen the carbon intensity, make energy resources allocation are more rational, greatly improve energy use efficiency, facilitate the creation of simple, moderate, green and low-carbon living and working modes, continually cut the total discharge of major pollutants, and reduce the total energy consumption per unit of gross regional product to meet the national targets.</p>	<p>It will support the R&amp;D and application of carbon popularization, utilization and sequestration technologies; build a research and development platform for marine carbon sinks; establish a clean and low-carbon energy supply structure, develop renewable energy according to local conditions; accelerate the greening of industrial parks and energy-saving and low-carbon transformation, and create green development demonstration areas; prepare and implement action plans to achieve peak CO2 emissions, and adjust and optimize the energy mix and industrial structure as fast as possible.</p>
<p>Jiangxi</p>	<p>It will rigidly implement the national energy conservation and emission reduction binding indexes, formulate and perform the province's action plan to peak the emissions by 2030, encourage key areas and major cities to reach the peak as early as possible; significantly lessen the energy consumption intensity, effectively control the incremental energy consumption, and earnestly check whether energy conservation regulations and standards and other monitoring policies are met.</p>	<p>It will quickly adjust the industrial structure and energy mix, and further promote energy-saving and low-carbon transformation in energy, industry, construction and transportation; continually lower the proportion of coal in energy consumption across the province; strictly implement the "double control" system for total energy consumption amount and intensity; try to establish a statistical accounting system for greenhouse gas emissions, and set up an integrated "space-ground-air" ecological meteorological observation system to improve the ability to address extreme weather and climate events.</p>

Shandong	Eco-friendly work and lifestyles will be advanced to cover all areas of society. Carbon dioxide emissions will steadily decline after reaching a peak, and there will be a fundamental improvement in the environment after the goal of building a Beautiful Shandong for harmonious coexistence of humanity and nature is basically met. An action plan to reach the emissions peak will be made.	It will promote key industries such as electric power, iron and steel, building materials, non-ferrous, and chemical to set emissions peak targets; strengthen research on low-carbon development technologies and pathways, construct low-carbon pilot cities and communities and net-zero emission zones; galvanize Qingdao West Coast New Area to carry out pilot climate investment and financing.
Henan	Eco-friendly work and lifestyles will be advanced to cover all areas of society. Carbon dioxide emissions will steadily decline after reaching a peak, and there will be a fundamental improvement in the environment; the advantages of ecological economy will be manifested, and the modernization of the harmonious coexistence of humanity and nature will be basically realized. It will make an action plan to reach emissions peak to implement the system that focuses on intensity control with the help of total amount control, aiming for achieving the rigid targets of peaking emissions and going carbon neutral as scheduled, and support the places with conditions to take the lead in reaching the peak.	It will drive the low-carbon, recycling and intensive development of industrial clusters and construct safe and green parks; increase the ratio of clean and low-carbon energy as soon as possible; promote the synergistic reduction of air pollutants and greenhouse gas emissions; accelerate the R&D and industrialization demonstration of low-carbon technologies in key fields; explore the new technologies and new modes of carbon capture and utilization and sequestration (CCUS); build a low-carbon and efficient energy supporting system; and create an economic system of green, low-carbon and circular development.
Hubei	It will accelerate the construction of an ecological economic system with industrial ecology and ecological industrialization as the mainstay, comprehensively improve resource utilization efficiency, advocate a simple and moderate, green and low-carbon lifestyle, and explore new paths to collaboratively promote ecological priority and green development; study the path to emissions peak and carbon neutrality, determine the timeline and roadmap for emission peak, and support the places with conditions to reach the peak in advance.	It supports Wuhan to build a national first-class science&technology financial innovation center, carbon financial center, and financial back-office services base; help form a green and low-carbon urban construction and operation model; establish and improve the enterprise environmental management system with the pollutant discharge licensing system as the core, and start the integrated pilot projects of pollutant discharge permission and environmental assessment.
Human	It will reduce the carbon intensity, implement the national emissions peak action plan, promote the construction of the net-zero emissions demonstration area in Malanshan, and actively create national pilot projects for climate investment and financing.	It will build a guaranteed, clean, low-carbon and moderately advanced energy supply system; facilitate an energy revolution, and build a clean, low-carbon, safe and efficient energy system; promote eco-environmental, energy-saving, and low-carbon transformation of industries and parks; and develop green buildings and green low-carbon transportation.

Guangdong	<p>It will take the lead in achieving emissions peak and steadily reduce CO2 emissions after peaking, do all it can to enhance the energy use efficiency to the world's advanced level, fundamentally improve ecological environment, and basically build a beautiful Guangdong. The control levels of energy consumption per unit of gross regional production and CO2 emissions per unit of gross regional production will stay at the forefront of the country, and regions with conditions will take the lead in achieving emissions peak; the action plan for emissions peak will be formulated in time.</p>	<p>Guangdong will build a smart and low-carbon energy Internet; explore the potential for cooperations in finance, education, and low-carbon environmental protection; support the normalized development of carbon emission rights exchanges, fix reasonable prices for carbon emission rights, and establish a carbon emission rights trading market in the Guangdong-Hong Kong-Macao Greater Bay Area; promote carbon trading pilot projects and actively foster a carbon market in the Guangdong-Hong Kong-Macao Greater Bay Area, and further promote carbon GSP (Generalized System of Preferences) pilot projects.</p>
Guangxi	<p>Guangxi will establish and improve the green, low-carbon and cyclic eco-economic system, innovate the "ecology+" development model, promote the management of total resources, scientific allocation, overall conservation, and recycling, striving to turn ecological advantages into development advantages; meanwhile, it will make an action plan to reach emissions peak.</p>	<p>The province will expand carbon finance businesses and broaden green financing channels for enterprises; continue to promote low-carbon transformation of the industrial system, energy system and consumption areas, and spur on the reduction of greenhouse gas emissions in industry, construction and transportation; take active part in the construction of a national carbon emission rights trading market; continue to increase carbon sinks in forests and ecosystems; explore the trading mode of forestry carbon sinks; and build a pollutant discharge right trading system.</p>
Hainan	<p>The national eco-civilization pilot zone and Hainan national pilot project of tropical rainforest park system will be implemented at a faster pace; the total discharge of major pollutants, total amount of energy consumption, and carbon intensity will be controlled according to the State's requirements; and an action plan will be made to reach CO2 emissions peak ahead of time.</p>	<p>Hainan Province supports eligible projects to conduct CCUS, and try to be the first to study how to reach CO2 emissions peak; actively participate in the national carbon emission rights trading market; study and advance ocean carbon sequestration work; push forward the construction of net-zero emissions demonstration areas; strengthen basic capacity building such as preparation of greenhouse gas inventories; and carry out climate risk assessment and analysis.</p>
Chongqing	<p>Chongqing will actively explore new paths of green development, promote industrial ecology and ecological industrialization, and accelerate the formation of green production methods and lifestyles.</p>	<p>Chongqing will popularize the clean and efficient development and utilization of fossil energy, accelerate the construction of a clean, low-carbon, safe, efficient and modern energy system; try to establish a total carbon emissions control system, and take emissions peak actions and strong measures to achieve the goal of emissions peak before 2030; cultivate a carbon emission rights trading market, and increase forest areas and other ecosystem carbon sinks.</p>

Sichuan	<p>It will pursue a significant enhancement of environmental governance, a more rational allocation of energy resources, a substantial improvement in utilization efficiency, and a sustained reduction in the total emissions of major pollutants. Green and low-carbon production and lifestyle will be basically formed, the quality of atmosphere, water bodies and soil as well as urban and rural habitat environment noticeably improved, and the ecological security barriers in the upper reaches of the Yangtze River and the Yellow River further consolidated.</p>	<p>Sichuan will take orderly actions to make CO2 emissions peak by 2030, reduce the carbon intensity, advance clean energy substitution, bolster the control of non-carbon dioxide greenhouse gases; improve the total emission control system; underpin climate change risk assessment; promote climate investment and financing, launch carbon asset enhancement activities, promote forestry and grassland carbon sink development and trading; conduct experimental work on emissions reduction and CCUS; and innovate and popularize carbon disclosure and carbon labeling projects.</p>
Guizhou	<p>Guizhou will take the lead in the construction of ecological civilization, make a breakthrough in construction of national ecological civilization pilot areas; limit the energy consumption per unit of gross regional production (GRP) and the CO2 emissions per unit of GRP within the target set by the State; and formulate an action plan for achieving the 2030 emissions peak goal.</p>	<p>It will focus on building a green, low-carbon, safe, efficient and modern energy system, apply for the construction of a national new-type and comprehensive energy strategy base; reduce the carbon intensity, accelerate the low-carbon transformation of energy, industry, construction, transportation and other fields; promote the transactions of pollutant discharge rights, energy use rights, and carbon emission rights on the market, and establish and implement compulsory liability insurance for environmental pollution.</p>
Yunnan	<p>Yunnan will further implement the sustainable development strategy, continually promote the green transformation of the industrial structure, energy mix, transportation structure, and agricultural structure, advocate green lifestyle, improve the green and low-carbon development policy and system, and comprehensively promote green and low-carbon economic and social development.</p>	<p>It will launch market-based transactions of pollutant discharge rights, energy use rights, water use rights, carbon emission rights, carbon sinks, etc.; strengthen scientific and technological innovation in ecological civilization, support green technology innovation and application; promote low-carbon, safe and efficient use of energy; promote energy-saving and low-carbon transformation of key industries, and further reduce the proportion of coal consumption; deepen the reform of the environmental protection investment and financing system.</p>
Tibet	<p>The quality of ecological environment will remain at a leading level in the country; the important national ecological security barrier will be increasingly consolidated; all cities and counties across the province will reach the standard of national ecological civilization demonstration cities and counties; a beautiful Tibet will be built as a national and even international ecological civilization highland, which will take the lead in achieving emissions peak and carbon neutrality.</p>	<p>Tibet will improve the energy supply and consumption structure, and regard the development of clean, low-carbon, safe and efficient energy as the main direction of adjusting the energy mix; promote the construction of a green, low-carbon and cyclic economic system; actively participate in the national market for trading energy use rights and carbon emission rights, and improve supporting policies and measures.</p>



Shaanxi	The ecological environment will be basically improved, and the goal of building a beautiful Shaanxi will be basically achieved; energy consumption per unit of GDP will be reduced to the national average, and total carbon emissions will be steadily cut down after reaching the peak by 2030.	Shaanxi will promote the efficient, intensive and green development of coal, oil and gas; construct a base for secure and adequate supply of clean energy; vigorously develop wind power and photovoltaic, increase the proportion of clean energy; support the establishment of green financial business departments or green banks in financial institutions across the province; expedite the development of green buildings; further accelerate the revolution in energy production and consumption; guide consumers to buy energy-saving and environment-friendly low-carbon products, and generalize green packaging.
Gansu	Ecological civilization will make significant achievements, and green production and lifestyle will be advanced to cover all areas of society; after the national target of emissions peak is fully implemented, the ecological environment will be totally improved, the ecological security barrier will be further consolidated, and the goal of building a beautiful Gansu will be basically completed; the action plan for the national target of achieving emissions peak by 2030 will be formulated and implemented.	To build a clean, low-carbon, safe and efficient energy system, Gansu Province will promote the construction of large-scale affordable wind and solar power bases, largely increase the proportion of clean energy production and utilization; push coal consumption to peak as early as possible; make great efforts to build an important national-level integrated modern energy production base, reserve base, output base, and strategic channels.
Qinghai	The ecological civilization system and mechanism will get improved, and the national ecological security barrier will become more solid and stable. A green industry system will be completed, ecology, production and life will be developed at the same time, and great efforts will be made to first reach the emissions peak. It will research and formulate an action plan for CO2 emissions peak.	Qinghai Province will initiate the transaction of water rights and carbon emission rights; promote green, low-carbon and cyclic urban development, and encourage the creation of "carbon-free towns" in national parks; improve the emissions offset mechanism based on the national voluntary trading mechanism of greenhouse gas emission reduction; do researches on carbon accounting, carbon storage, carbon sinking, emissions peak, and carbon neutrality, and build carbon trading centers; and make every effort to build a green, low-carbon and cyclic development demonstration area in the Qaidam Basin.
Ningxia	It aims to make the pollutants discharge intensity reach the national average and the carbon dioxide emissions fall steadily after peaking; form widespread green living and working styles, and realize fundamental transformation and sustained improvement of ecological environment, and complete, stable and efficient ecosystem; and make an emissions peak action plan to promote the collaborative reduction of pollutants and carbon dioxide emissions.	Ningxia will accelerate the market-based trading of pollutants discharge rights and carbon emission rights, and implement a mandatory liability insurance system for environmental pollution; enhance the carbon sink capacity of the ecosystem, and build a green, shared, harmonious and beautiful ecological space; further control the growth rate of total energy and resource consumption, significantly improve utilization efficiency, and accelerate green and low-carbon economic development.

Xinjiang	<p>Energy and water consumption, construction land, total carbon emissions will be effectively controlled; ecological protection and restoration mechanisms are basically formed, ecological environment will continue to improve, and ecological security barriers will become more solid; urban and rural living environment will be significantly improved; an action plan will be made in response to the emissions peak, the control of greenhouse gas emissions will be strengthened, and the carbon intensity will be reduced.</p>	<p>Xinjiang will accelerate the integrated demonstration of coal, oil, gas, and solar power storage, and build a clean, low-carbon, safe and efficient energy system; carry out timely transactions of pollutant discharge rights, water use rights, energy use rights, and carbon dioxide emission rights; advance pilot and demonstration programs of low-carbon cities, low-carbon parks, low-carbon communities, and low-carbon enterprises; implement the forest chief scheme, organize large-scale land greening campaigns, and enhance the carbon sink capacity of the ecosystem.</p>
----------	---	--

Source: The original outlines of local 14th Five-Year Plans for National Economic and Social Development and the Vision 2035

## IV. Industry: Carbon Neutrality-oriented Emission Reduction Dynamics by Industry and Department in China

### (I) Industry: Key emission industries accelerate the formulation of green transformation and low-carbon emission reduction roadmaps

Under the guidance and impetus of the national carbon neutrality policy, various industries and departments are actively exploring emission reduction pathways based on their carbon emission share and the baseline emission reduction scenario of the 2060 carbon neutrality according to the double carbon goals. Based on the statistical analysis reports of carbon emissions issued by a wide range of research institutions, the carbon emission share and market expectations of emission reduction pathways by industry and department on the first anniversary

of carbon neutrality (Table 4) can basically reflect the current low-carbon emission reduction progress made by different industries in China.

According to regional and industrial situations, it is technically feasible in China to achieve the dual carbon goals. The country has the fundamentals to meet the emission reduction target in terms of the policy, industrial and economic environments. The targets are generally manageable.

After the first anniversary of the carbon neutrality target, various sectors have made full use of the existing environmental conditions to scientifically coordinate the entities of emissions, implementation, markets, and a wealth of supporting

software and hardware resources to plan and implement phased emission reduction strategies.

Specifically, the power sector is currently the largest source of carbon emissions in China, with the thermal power-based power sector currently accounting for about 40% of total emissions (43% in 2019<sup>1</sup>). Meanwhile, industrial and manufacturing production activities are the second largest source of carbon emissions, contributing a combined 70%-80% of China's total carbon emissions with the power sector. Although China has reduced its carbon intensity by 48.1% in 2019 compared to 2005, ahead of the 40%-45% target proposed in 2015, the high-emission industries, mainly electric power and industry, are still facing a serious situation in terms of emissions reduction; especially in the context of the overall limited overcapacity-slashing goal. They will likely run into the bottleneck on the road

to carbon neutrality if further transformations and upgrades are not carried out.

To this end, on the first anniversary of the carbon neutrality target, China is accelerating the formulation of industrial climate change targets and industrial low-carbon action plans, and will enter the practical stage during the 14th Five-Year Plan period. This will see urgent changes to important emitting industries as they quickly make emissions peak roadmaps in combination with their own industrial structures, green and low-carbon innovative technologies. This will influence carbon emission rights trading models and develop advanced emissions reduction technologies in key emitting industries that can be widely used and promoted among enterprises of different scales with controllable costs and considerable benefits in the early stage of the 14th "Five-Year" Plan period. Moreover, to

---

<sup>1</sup> China Achieves Remarkable Results in Addressing Climate Change and Promoting Low-Carbon Development, posted by Xuelei Li at the website of *Xinhua News Agency*, September 27, 2020.

continually optimize the energy mix, China has followed the international trend of clean energy development and significantly increased the proportion of renewable clean energy in total power generation over the past decade, with an average annual growth of over 1% in recent years. In this sense, China is leading the world in terms of the total installed capacity of new non-water renewable energy. China has established a renewable energy industry cluster with Chinese advantages, and gradually formed its own energy mix optimizing approaches.

### **(II) Financial community: China initiates financial upgrading across the board since the first anniversary of the carbon neutrality target**

From the perspective of carbon neutrality execution, the most important resource for green and low-carbon development in the long term is financing. According to relevant policies released by the PBOC since the first anniversary

of the carbon neutrality target, financial resources are gradually tilting to the green and low-carbon field. The PBOC will take the initiative to guide green financial services for the development of the low-carbon economy in the 21st century. More policy tools related to green development and low-carbon emissions reduction will be introduced. The enthusiasm and initiative of financial institutions to participate in green finance will continue to rise, opening up a green financial upgrading in response to the dual carbon goals. The following aspects are involved:

### **First, carbon neutrality drives credit resources further toward green projects.**

By the end of the second quarter of 2021, China's green loan balance in domestic and foreign currencies came to RMB13.92 trillion, up 26.5% on a year-on-year basis and higher than the growth rate of various loans by 14.6 percent points. Among them, the loans invested in projects with direct

and indirect emission reduction benefits were RMB6.79 trillion and RMB2.58 trillion, respectively. These together account for 67.3% of green loans, indicating that with the work related to the dual carbon goals officially entering the fast track, green financial aids for low-carbon emission reduction have shown a massive leap forward; the green credit balance has nearly doubled compared to the end of 2013.

Analysts have previously forecasted that China would issue over US\$200 billion green bonds and have more than US\$1 trillion green bond balances in the first half of 2021. In April 2021, the PBOC, NDRC, and China Securities Regulatory Commission (CSRC) jointly released the *Green Bond Support Project Catalogue* (2021 edition), which came into force on July 1, 2021. The new catalog has reinforced the focus on supporting low-carbon emission reductions based on improving the internationalization and

standardization of green bonds. For example, it no longer includes projects such as clean utilization of fossil energy like coal in the scope of supports. It instead enhances the compatibility of green bond financing with the emissions peak and carbon neutrality targets.

Thus, it can be seen that since the first anniversary of the carbon neutrality target, financial and credit resources in China are gradually flowing to businesses and projects in the green sector under the strong promotion of the central bank. This is promoting the development of green industries from the root, and continuously acting as a go-between for green investment and green industries.

**Second, financial institutions are continuously scaling up green finance businesses.**

The dual carbon goals have brought a new mission and opportunity for green finance in China. Domestic financial institutions have continued to increase their enthusiasm to

explore and carry out green finance businesses on their own.

Since the initial development of green finance in 2015, several nationalized banks have actively practiced the concept of green development and made great efforts to accelerate the green transformation of the economy by means of financial development. After the carbon neutrality target was announced, the subjective initiative of banking-type financial institutions to grow green financial business and instrument innovation has been further enhanced. By the end of 2020, the green loan balance of the Industrial and Commercial Bank of China (ICBC) had reached 1.85 trillion yuan, an increase of 220 billion yuan from the beginning of the year, ranking first among major banks in terms of green credit scale. It also widely invested in areas such as clean energy and green transportation. The China Construction Bank (CCB), on the other hand, has leveraged its dominant position

in the field of capital construction financing to divert credit funds into clean transportation and green infrastructure projects; the Agricultural Bank of China (ABC) has taken the initiative to explore the development path of "green bank" by continuously improving the green credit policy and index system, establishing a green credit appraisal and evaluation mechanism, and maintaining a very low rate of 0.3% with a green credit balance of over one trillion yuan. The Bank of China (BOC) has given full play to its influence in the international arena to successfully issue climate bonds and green bonds in multiple currencies overseas. The BOC has also raised funds for various clean power generation projects and green and low-carbon infrastructure projects.

**Third, the national carbon market is officially launched, boosting the dual-carbon process and driving innovation in the carbon finance market.**

On December 25, 2020, the

*Measures for the Administration of Carbon Emissions Trading (Trial)* was adopted by the Ministry of Ecology and Environment, and formally enforced on February 1, 2021. After months of preparation, the national carbon emission rights trading market was officially launched online on July 16, 2021. The market players in the first group of key emitters include more than 2,000 companies from the electric power industry.

The establishment and official operation of the national carbon market is of historical and strategic importance. It is not only helping achieve the goal of emissions peak and carbon neutrality by stage in the long term, but also promoting the reasonable pricing of pollutant discharge rights during the 14th Five-Year Plan period. This is being done in order to realize the price discovery function of green finance. More important, the establishment of a national carbon market will bring big investments and financing opportunities for enterprises and

other institutional investors which have been included in the goal of carbon emissions. The business prospects of carbon financial services associated with the trading of carbon emission rights cannot be ignored.

The starting of the carbon finance business is conducive to the upgrading of financial services provided by financial institutions in carbon trading activities. It is also helping bridge a role between banks and high-emission companies in credit financing for green business. More importantly, its bringing opportunities for innovation in green investment and financing tools in the banking industry. These entail short-term loan products for carbon emission rights pledge financing for enterprises or asset management companies holding or mandating CCERs (China Certified Emission Reductions). The latter must have fully exploited the financial attributes of carbon emission rights.

Thus, nearly a year after the carbon



neutrality target was proposed, the launch of the national carbon market has become the core driver of dual carbon goals. It has simultaneously promoted the control of total carbon emissions nationwide, the phased emission reductions of polluting enterprises, and the innovation and upgrading of green financial businesses.

### **(III) Research community: A number of research institutions have been widely exploring carbon neutrality theories and practices**

As an important top-level guideline for China's socialist modernization, the goal of carbon neutrality has been highly valued by academics, think tanks and industry associations. Scholars from universities and corporate research institutes have initiated theoretical and practical research

on carbon neutrality, and important results are growing exponentially. While statistics are still incomplete, analysts can still gauge that since the first anniversary of the carbon neutrality target, nearly 1,000 papers have been published in Chinese academic journals on the topic of carbon neutrality. These cover a wide range of research directions such as energy transition, low-carbon buildings, green finance, and carbon emission scenario analysis, continuously enriching and replenishing basic scientific research under the dual carbon goals.

At the same time, famous domestic research institutions including Global Energy Interconnection Development and Cooperation Organization (GEIDCO)<sup>1</sup>, Deloitte Management Consulting (Shanghai) Co., Ltd.<sup>2</sup>, Sequoia

---

1 Study Report on China's 2060 Carbon Neutrality Target published by Global Energy Interconnection Development and Cooperation Organization on March 2021.

2 2030 Emissions Peak, 2060 Carbon Neutrality: Reinventing Corporate Sustainability Innovation, released by Deloitte Management Consulting in June 2021.

Capital China<sup>1</sup>, Institute for Sustainable Development Goals of Tsinghua University (TUSDG)<sup>2</sup>, Hillhouse Capital Group, Institute of Finance and Sustainability<sup>3</sup>, etc. have also published professional research reports on carbon neutrality from their own perspectives. They have carried out scientific and in-depth discussions on how to integrate green and low-carbon transition into sustainable and high-quality development, and provided important advice for recent emissions peak action plans and long-term carbon neutrality and low-carbon transition strategies. They have become first-hand sources of information for reference by various sectors.

In addition, in July 2021 the Ministry of Ecology and Environment included the dual

carbon goals into the Central Inspection of Ecological and Environmental Protection (CIEEP) for the first time. It issued a notice to carry out pilot environmental impact assessment of carbon emissions, promote the study on carbon emissions accounting methods and the development of environmental impact report preparation specifications, and bring prospects and opportunities for the establishment of relevant carbon emissions digital monitoring platforms.

In this regard, on July 11, 2021 at the main forum of the Eco Forum Global Guiyang, the Chongyang Institute for Financial Studies, Renmin University introduced the first national emissions peak and carbon neutrality monitoring and management platform (dual-

---

1 Towards Carbon Free—Green Revolution based on Technology Innovation released by Sequoia Capital China in April 2021.

2 Study on China's Long-term Low Carbon Development Strategy and Transformation Path, released by Institute for Sustainable Development Goals of Tsinghua University (TUSDG) in October 2020.

3 Towards 2060 Carbon Neutrality—Focusing on Opportunities and Challenges on the Road to Decarbonization released by Institute of Finance and Sustainability in March 2021.

carbon supervision platform) jointly developed with BONCLOUD. This will help promote the monitoring and evaluation of national and local emissions peak and carbon neutrality milestones. It also highlights the initiative and strong execution of the financial, scientific and technological circles whom are actively addressing climate change practices and explorations.

**Table 4 Carbon Emission Compositions and Emission Reduction Pathways by Industry and Department in China under the Double Carbon Goals**

Industries	Emissions%	Main Reduction Pathways under Baseline Scenarios	Countermeasures and Suggestions	
Power sector	40%–45%	Power generation sector	Increasing the installed capacity of clean energy such as photovoltaic and wind power on the power generation side to ensure that the share of non-fossil energy in primary energy consumption increases 1% each year before the 2030 emissions peak is met.	The share of clean energy supply should be raised to 80% in 2060, with the remaining portion neutralized through carbon capture and other means.
		Power grid transmission	Building a smart grid and energy Internet on the transmission side to accelerate the synchronization of clean energy to the grid.	
		Electricity consumption sector	Accelerating the replacement of coal, oil and gas by industrial electricity on the electricity consumption side, increasing clean energy consumption, steadily reducing electricity prices, and developing green certificate trading.	
Industry and manufacturing	25%–35%	Equipment upgrading	Carrying out the upgrading and replacement of production equipment with low-carbon and high-efficiency features, and reforming the depreciation rules.	Striving to peak carbon emissions from iron & steel by 2025 and the petrochemical industry by 2022, and achieving 70%–80% reduction in industrial carbon emissions by 2060 compared to 2020.
		Production and processing	Increasing the ratio of electric energy consumption in the production process and developing green industrial parks to strengthen green industry chain and supply chain linkages.	
		Metal smelting	First cutting iron & steel overcapacity to achieve peak crude steel production, and promoting electrosmelting equipment and hydrogen smelting technology.	
		Petrochemical	Decarbonizing on the upstream and downstream industrial chains of petroleum products and popularizing carbon capture, utilization and storage (CCUS) projects simultaneously.	
Transportation	7%–9%	Public transport	All cities increase the urban bus and tram coverage to 90%–95% before getting the emissions peak.	Driving the automobile and transportation sectors to reach the emissions peak ahead of schedule by 2028 and achieving full coverage of new energy vehicles and supporting facilities in core urban areas by 2060.

		Family cars	Increasing the market share of new energy passenger cars by 0.5–1% a year, updating battery technology to reduce average power consumption, and re-optimizing the layout of new energy charging piles in cities.	
		Logistics and transportation	Gradually substituting new energy transport vehicles for fuel trucks, and increasing the coverage of green and recycling packages in the express delivery industry.	
Construction industry/sector	10%–15%	Building materials	Improving the standard and classification of green building materials and establishing a logo management system.	Striving for 70%–90% coverage of green buildings in urban commercial areas by 2060, the year of carbon neutrality.
		Building and construction	Ensuring that green building areas increase by 70%–90% before reaching the peak, and promoting low-carbon renovation of the building stocks that meet the useful life in an orderly way.	
		Building occupation	Generalizing the application of photovoltaic equipment in commercial buildings, and introducing an energy-saving and low-carbon circulating system.	
Agriculture	3%–7%	Agricultural production	Reducing the use of chemical fertilizers, improving the level of soil carbon sequestration, increasing the installed capacity of clean energy agricultural machinery, and developing new-type green agricultural production cooperatives.	Offering natural carbon sink contributions during the carbon neutrality period and establishing a carbon sink market system.
		Forestry carbon sink	Ensuring that the forest stock grows by more than 100 million m <sup>3</sup> per year on average before reaching the peak in 2030, and sustaining operation-based carbon sinks and afforestation-based carbon sinks.	

Source: Public reports and materials

---

## V. Future: Value, Significance and Opportunities of Carbon Neutrality from China's Perspective

### (I) The value of carbon neutrality for China's macro reform: The fourth industrial upgrading revolution

As the concept of carbon neutrality deepens internationally, it is no longer limited to reducing greenhouse gas emissions. In fact, it has been upgraded to both an economic development and international political issue. The three industrial revolutions (the first industrial revolution, the second industrial revolution, and the third technological revolution) from modern times to the present all have the commonality of changing production modes and

enhancing productivity. Countries with leading advantages in each industrial revolution have been at the forefront of the world. Carbon neutrality is expected to become the fourth industrial revolution and an important turning point in the history of human development.

Therefore, for China, carbon neutrality is not only an overall economic transformation, but also a revolution of concepts, ideas and lifestyles for the “renaissance” of China. Against the backdrop of the EU's weak climate governance<sup>1</sup> and the long time it will take for the US to make up for its previous disadvantage after returning to the

---

1 Jingna Kou & Rui Zhang. Who Will Continue to Lead Global Climate Governance after the Epidemic: EU's Decline and Fightback. *Journal of China University of Geosciences (Social Sciences Edition)*, Vol. 1, 2021, pp. 87-104.

*Paris Agreement*, if China grasps the opportunities brought by the fourth carbon neutrality revolution, it will give China an advantage to compete with developed countries on the same stage. China can then update and upgrade the definition of modernization in the process of building a modern powerful socialist country. China can expand the construction goals of socialism from the perspective of ecological civilization programs and development quality.

**First, in terms of society, carbon neutrality will enable China to reconfigure its socio-economic complex system with green (sustainable) as its core and orientation.**

According to the important opinions on the economic systems of green, low-carbon and cyclic development listed in Table 1, carbon neutral has formally become a top-level design. It will upgrade and reshape the socio-economic development pulse from top to bottom, and implement green transitions

from the aspects of development policies, hardware and software facilities, industry standard setting, production technology research and development, production equipment upgrading, production regulation and control specifications, efficiency assessment and evaluation methods, and social entity responsibilities and obligations. Moreover, it will improve the overall efficiency of economic operation, and usher in unprecedented new opportunities for green industry investment and financing.

China will take “green” as the future's core direction to underpin synergistic development and synergistic emission reductions effect among industries. It will fully and organically combine the increase of clean energy consumption with the application of low-carbon technologies among industrial enterprises. Therefore, in the course of implementing its carbon neutrality targets, China's socio-economic system will

gradually be reconfigured. It will see improvements of production efficiency and development quality as being regarded as the fundamental characteristics of the fourth industrial revolution. According to the situation and paths of emission reductions in different industries shown in Table 4, more and more experiences will prove their validity. These can help China build a low-carbon internal cycle and develop a double-cycle strategy using green concepts.

**Second, in terms of development, both national and local governments will take advantage of carbon neutrality opportunities to enhance their comprehensive development strength.**

The historic opportunity of carbon neutrality is rare. China is making every effort to qualify to join the international competition for carbon neutrality in the 21st century by focusing on improving its technological strength in emission reductions and its ability to set

international green standards to reduce the carbon intensity and improve the green development efficiency of GDP, and prepare itself for the international green and low-carbon battle.

On the basis of tapping strengths and experience worthy of reference in the complex international situation and the policies in different countries, China is seeking new development and transformation opportunities nationwide in the new stage. Along with the gradual deepening of the international low-carbon concept, it is introducing more green and low-carbon evaluation indicators in the evaluation of national and regional economic development other than using GDP as the only criterion. After all, lucid waters and lush mountains are invaluable assets.

The introduction of new economic development evaluation indicators will directly push those regions that originally had deficiencies in resource distribution, industrial structure, and economic growth to



improve their green development levels and comprehensive quality. This will ultimately enhance their comprehensive strength, and revival in the low-carbon economy era.

**Third, in terms of finance, driving the mature and stable development of green finance will improve the modern financial system.**

Since starting in 2016, green finance has undergone only five short years of development in China. While it continues to improve and upgrade, the critical attributes of the carbon neutrality targets were added in 2021. China is actively seeking mature green finance development models. These include investment and financing and service models that will gradually improve the financial system, and promote the introduction of relevant new financial standards ranging from industrial classification to carbon market trading, environmental information disclosure, etc.. The

also stand to provide opportunities to participate in the development of international standards in all aspects, using unified standards to improve the international mobility of green funds and domestic and international low-carbon market openness. Combined, these can phase out investment barriers.

The carbon neutrality target will bring about significant changes in the production mode of the national economy, giving rise to upgrades and the general reshaping of the modern financial system to match it.

**(II) Meaning of the carbon neutrality for China's micro-transformation: A shift in enterprise production mode**

From a micro perspective, carbon neutrality is a fundamental supply-side structural reform that pushes enterprises to carry out green transitions in emission reductions, gradually changing from increasing output to improving quality and efficiency. As small- and medium-sized enterprises

with high emissions, high energy consumption and low efficiency gradually withdraw from the market, big businesses with the conditions and technology to carry out emission reductions and upgrading will focus on taking the advantages brought by carbon neutrality. This will lead them to carry out green transitions in dynamic ways.

**First, in terms of markets, the carbon market development model creates financial opportunities for enterprise low-carbon transition.**

The national construction of the carbon market provides an important way and means to achieve carbon neutrality goals. It also offers businesses the most important financial instruments in the field of carbon emission reductions.

The financial opportunities for enterprises' green and low-carbon transition brought by the launch of the national carbon market are mainly reflected in the all-

round expansion of financial market businesses and products. These include cultivating talents in carbon finance, increasing financial employment opportunities, doing disciplinary research, and serving for enterprises' low-carbon transition. They also involve developing carbon asset trustees and businesses, and widely carrying out third-party carbon financial services for enterprises, including accounting, auditing, legal services, etc. They will boost the carbon finance ecosystem, i.e., carbon emission rights trading market, carbon finance derivatives market, carbon assets auction market, carbon trading margin and leverage market, and carbon finance information disclosure and information center. In so doing, this will help to continuously improve asset liquidity, add the mortgage and pledge attributes of carbon emission rights, and provide financing convenience for enterprises. Diversifying carbon finance products and adding carbon neutral-oriented attributes,

and providing opportunities for product innovation are other benefits. This will collectively draw on the experience of traditional financial products, drive the innovation potential in the era of digital economy, and further develop climate finance products to unfold a new era of corporate climate financing.

In the meantime, the development of the carbon market is also pushing China to select some regions with better low-carbon development pathways to set up carbon neutrality-centered carbon finance pilot areas. These aim to better serve local enterprises and bring into play the regional radiation mechanisms of trading carbon emission rights. With reference to the EU, there are also opportunities to explore transnational links and interoperability of emission rights trading to provide overseas climate investment and financing services for multinational companies. The shift in the international landscape brought about by the development

of the global clean energy market may also cause the original status and importance of the world's oil finance markets to be overtaken by the carbon finance market.

**Second, at the level of people's livelihoods, a low-carbon economy will create more employment opportunities.**

One of the major issues arising from the topic of carbon neutrality is improved employment opportunities. Obviously, the development of green and low-carbon industries should increase national employment rather than stifling it. The promotion of employment and re-employment is in accordance with the important feature of "sustainability" in high-quality development.

New green industries generated by carbon neutrality will provide an incalculable number of jobs and talents for China. In the process of big businesses exploring emission reduction paths and methods on their own and leading SMEs to form

emission reduction alliances, they need management personnel in the field of carbon emission reductions. They also require professional and technical talents. Green start-ups are required for green technology innovation, but will bring more options for mass innovation & entrepreneurship.

**Third, in terms of risks, climate and environmental factors will become an important object of enterprise risk management.**

In the era of low carbon economy, the risks and uncertainties in the international political economy have started to change. The risks produced by global climate and environmental factors will gradually occupy an important position. In the era of the global low-carbon economy, environmental risk management will be paid more and more attention by enterprises; especially by multinational companies and international joint ventures.

Climate and environmental risks

mainly come from two aspects. On the one hand, there are the subjective risks brought about by the enterprises' low-carbon green transition, including transformation costs, policy changes, credit approval, etc.. On the other hand, there are objective risks caused by the general environment encountered by enterprises' participation in climate investment and financing. Therefore, the shift in the risk dimensions will drive businesses to gradually improve their risk management capabilities. These can further promote the establishment of specialized climate management and departments to take charge. They will ultimately enhance environmental risk-resilience and international climate defense for the whole of the industry.

**(III) Evolution of the international landscape under carbon neutrality: A quiet global change**

As carbon neutrality becomes an important international climate issue, countries have put forward

carbon neutrality targets and related policies. The international industrial landscape will change rapidly of what will take the leading positions. Arguably, these will include new international green industrial and value chains that mainly constructed by low-carbon industries, such as raw material supply, international logistics, low-carbon technology licensing, green patent transfer, and software licensing and hardware supply in the green and digital economy,

In 2021, carbon neutrality will become an important turning point in reshaping international relations. Countries with weak political ties will have the opportunity to re-establish mutual trust in international cooperation under the new pattern of carbon neutrality. There will also be international political issues such as developed countries transferring polluting industries to developing countries. They may even use carbon emission reductions as a political bargaining chip for international

pressure. At the same time, the acceleration of clean energy development by countries has also led to changes in the international political and economic system originally based on trade in oil resources. This means changing the existing international energy pattern and pushing some countries to re-make their energy development plans.

In 2020, China actively engaged in international climate dialogues and local cooperation on climate investment. It seized international cooperation opportunities in the changing international carbon-neutrality political and economic landscapes. In doing so, it took the lead in the development of international green industries. It grasped the importance of the green and low-carbon outer cycle to promote the rational, efficient and safe flow of resources.

---

## Conclusion

On the first anniversary of the carbon neutrality target, this article has teased out the important actions carried out in 2020 and the first half of 2021 across China by the governments. It includes sectors at all levels under the dual carbon goals. At the same time, after tracing the international deepening of the carbon-neutral development concept and its evolution in China, this paper also uncovers many development opportunities for China in the era of global competition for carbon neutrality. It does so through a comprehensive analysis of the complex international carbon neutrality situation and the domestic low carbon and emission reductions landscapes.

In the process of setting China's future long-term carbon emission reductions (from the past emission reductions to the present emissions peak and to the future carbon neutrality), the target requirements and promotion modes are different in different stages.

China's per capita carbon emissions are higher than the world average, and its low per capita GDP leads to a high carbon intensity, making the improvement of economic development quality the most important issue that needs to be addressed as soon as possible. As a developing country, China's commitment from emissions peak to going carbon neutral is only 30 years. This is

---

1 Chao Zhao, Weiwei Chen, Bei An, Jiaxin Yu, Wenjing Yu & Youling Wang. Set the Tone for 2021 China's Economy: Interpreting the Task Deployment of the Central Economic Work Conference. Xinhua News Agency, December 9, 2020.

far less than the transition period of about 50 to 60 years set by developed countries such as the UK and France. Carbon neutrality in China is still in its infancy, and the way to success is yet to be explored, tried and tested. It is not wise to copy and mix the policies and experience of foreign countries. Instead, the domestic low-carbon economic development and potential should be fully considered. Carbon neutrality strategies with Chinese characteristics should be scientifically formulated to tell a Chinese story of carbon neutrality. For this purpose, this paper gives the following four pieces of advice for China's carbon neutrality path after analyzing the changes in the situation in the past year since the carbon neutrality target was proposed.

**First, China should broaden its vision of emissions peak and carbon neutrality to an international perspective.** The issue of international carbon neutrality is not only related

to greenhouse gas emissions and global climate change, but also closely associated with the issues of world food security, health, and economic stability and development, to name a few.

China should consider the historical significance of carbon neutrality from an international perspective for the benefit of all humanity by continuously increasing its intended NDCs and laying down more initiatives with long-term sustainable development characteristics on top of improving its own green economic development level. Moreover, it should play a major role in the transformation of the international political and economic landscapes caused by carbon neutrality, upgrade and establish more friendly international low-carbon cooperation relations, and actively participate in the formulation of international standards. It should further join various international green organizations and seminars, issue sovereign green bonds,

drive the development of the international green financial market, and establish a new international green financial center to compete with London and other places at an early date.

**Second, China needs to explore a sustainable financial system and service model that are consistent with the long-term goal of carbon neutrality.**

The carbon neutrality industry brings opportunities for green industry investment and financing in China. At the same time, this can result in delivering a huge demand for capital. However, the existing development progress of green finance can hardly meet this gradually increasing capital gap. The current situation of green finance also has problems such as less diversified products, unbalanced markets, and imperfect systems. Moreover, it has not fully adapted to the development requirements of carbon neutrality, and the low-carbon and emission reduction

attributes are not obvious enough. China needs to continuously promote the diversification of green financing, and subdivide financial products according to specific industrial characteristics. These involve developing green financial instruments which are dedicated to carbon emission reductions, environmental pollution control, climate risk management, and other directions. It needs to accelerate the integrated development of third-party green services, establish a comprehensive service model of green finance that meets the requirements of carbon neutrality, and facilitate the structural optimization of monetary policies.

**Third, in the low-carbon process of energy and industries, emphasis should be placed on emission reductions in potential areas in the era of digital economy era.**

Although carbon emissions from sectors such as electric power and industry currently account for a significant part of total



emissions from all walks of life, emissions reduction efforts in other sectors should not be neglected. First, along with the increasing share of the digital economy in the national economy and the booming and scaled-up digital industries and related enterprises, the influence of the information and communication technology (ICT) industry<sup>1</sup> in the field of carbon emissions will gradually become prominent. It will show a tendency to surpass conventional industries and holds the potential to become a key emission sector. In this regard, China should encourage the internet industry to actively explore carbon neutrality pathways, and formulate emission reduction strategies as early as possible to take a leading position internationally.

**Fourth, China should place green and low-carbon development on the same level of importance as national economic growth.**

With the rising demand of economic development, GDP is not sufficient to evaluate the quality of regional economic development. More green and low-carbon related indicators should be gradually introduced to evaluate the economic development of countries and regions. It will take value-added green industrial development, the percentage of green financial businesses, and the carbon intensity as reference indicators for comprehensive evaluation. This will be used to motivate each region to carry out green development activities in order to form a virtuous cycle of economics and sustainability without sacrificing environmental quality. This requires further improving green industry catalogs, and scientifically assessing the economic benefits of carbon emission reductions. At the same time, evaluation needs data support and disclosure work. Therefore, the disclosure of carbon

---

<sup>1</sup> Yuanfeng Wang. Don't Ignore the Role of the Information and Communication Industry in Achieving Carbon Neutrality! *Global Times*, February 22, 2021.

assets and carbon footprints should be added to the present environmental disclosure work to make enterprises value the display of carbon assets on the balance sheet and add carbon trading to active disclosure.

Finally, setting out the aim of getting CO<sub>2</sub> emissions peak and going carbon neutral is China's solemn commitment to implement the *Paris Agreement*. It is a major decision made by the Party Central Committee with Comrade Xi Jinping at the core after deliberations.

This is related to the sustainable development of the Chinese nation and the building of a community with a shared future for human beings<sup>1</sup>.

Carbon neutrality is a protracted battle and a historical process of reshaping the economic and social development pattern. Since the first

anniversary of the carbon neutrality target, Chinese governments at all levels and all walks of life have attached great importance to it by actively exploring action plans and quickening the pace of making roadmaps. They are laying a solid foundation for achieving the long-term goals of emissions peak and carbon neutrality. In this regard, China is clearly taking firm steps towards building an ecological civilization with green development.

---

1 Xie Zhenhua Details the Development of 1+N Policy System as a Timetable and Roadmap for Achieving the Double Carbon Goals. China Wealth Management 50 Forum (CWM50), July 27, 2021.

# 人大重阳“宏观形势”系列研究报告

1. 设立战略新兴产业板的探讨和政策建议 .2014年10月28日 .中国北京
2. 中国金融改革与中小企业发展：以创业创新激发增长潜力（中英文）.2015年8月2日 .中国北京
3. 保障大众民生：行动前瞻 .2015年11月8日 .中国北京
4. 大相变：世界变局与中国应策 .2017年1月5日 .中国北京
5. 大数据时代的智慧城市治理——深圳市宝安区智慧城市治理研究报告 .2017年9月22日 .中国北京
6. 中国相变期：“高架路式”转型升级 2012-2017.2017年10月19日 .中国北京
7. 大接替：国际金融危机10周年来的世界经济动能转换 .2018年1月19日 .中国北京
8. 新时代中国的南极战略——基于实地调研的考察与思考（中英文）.2018年6月12日 .中国北京
9. 防疫情、促经济，两手抓两手硬的八点政策建议 .2020年2月7日 .中国北京
10. 疫情影响世界的评估报告 .2020年2月25日 .中国北京
11. 暴跌！暴跌！暴跌！暴跌！暴跌！ .2020年2月29日 .中国北京
12. 警报！前方“黑洞”！世界经济陷入“迷航”！ .2020年3月6日 .中国北京
13. 全球化病危！怎么办？ .2020年3月13日 .中国北京
14. 龙卷风！一夜间，新一轮“大萧条”要来了吗？ .2020年3月16日 .中国北京
15. 中国须适应“逆风”崛起 .2020年3月23日 .中国北京
16. 若这是场“文明兴衰级”的全球萧条，中国防波坝在哪？ .2020年3月24日 .中国北京
17. 全球化“触底”，中国须“抄底” .2020年4月15日 .中国北京
18. 紧迫的全球团结（中英文）.2020年6月1日 .中国北京
19. 疫情 2.0 颠覆人们十大生活方式 .2020年6月1日 .中国北京
20. 世界抗疫从遭遇战步入持久战——如何应对最坏疫情？ .2020年7月7日 .中国北京
21. 数字中国社会发展演进，现状评价与未来治理 .2020年9月5日 .中国北京
22. 未来五年，改变中国与世界的五大奇点（中英文）.2020年11月2日 .中国北京
23. 后疫情时代全球“蝶形”风险及防范 .2021年2月5日 .中国北京
24. 治愈“后遗症” 后疫情时代的风险评估与展望 .2021年4月27日 .中国北京
25. 培养全球视野的中国接班人——“十四五”视野下的“90后”与中国改革 .2021年5月10日 .中国北京
26. 中高速可实现——后疫情时代我国经济增长前景（中英文）.2021年7月30日 .中国北京

# 人大重阳“宏观经济”系列研究报告

1. 走向核心国家——中国大金融战略与发展路径 .2013年5月25日 .中国北京
2. 大金融理论背景下的金融综合监管报告 .2014年3月12日 .中国北京
3. 人民币国际化动态与展望 .2014年3月31日 .中国北京
4. 人大重阳国际惯例研究系列报告之一：“走出去”：国际商务反腐败规则研究 .2014年5月13日 .中国北京
5. 人大重阳国际惯例研究系列报告之二：供应链金融技术的标准定义 .2015年9月28日 .中国北京
6. 经济金融化与均衡杠杆率：美国经验与中国启示 .2015年10月14日 .中国北京
7. 人大重阳国际惯例研究系列报告之三：2016年版《ICC/ESOMAR 市场、观点、社会调查和数据分析国际准则》.2016年12月29日 .中国北京
8. 中国财政可持续性研究——建立结构性财政平衡 .2017年2月28日 .中国北京
9. 建立现代增值税制——“营改增”改革效果评价报告 .2017年3月7日 .中国北京
10. 改善电商征管环境 构建良性竞争的电子商务税制 .2017年5月26日 .中国北京
11. 缩小政府预算偏离 打牢国家治理的财政基础 .2017年10月13日 .中国北京
12. 兼顾生态效益与经济效益 发挥财政作用促进退耕还林工程持续发展 .2017年11月2日 .中国北京
13. 大接替：国际金融危机10周年来的世界经济动能转换 .2018年1月19日 .中国北京
14. 中国2017年度财政预算执行报告 .2018年3月1日 .中国北京
15. 中国的金融战略：历史经验、理论指引与未来布局 .2018年7月13日 .中国北京

16. 区块链十周年：发展现状、趋势与监管政策研究 .2018 年 8 月 25 日 . 中国北京
17. 中国各地区财政发展指数 2018 年报告 .2018 年 12 月 27 日 . 中国北京
18. 中国购买力大崛起：改革开放 40 年来的进口侧结构性升级（中英文）.2018 年 12 月 27 日 . 中国北京
19. 中国购买力大布局：“一带一路”与全球市场转型（中英文）.2018 年 12 月 27 日 . 中国北京
20. 中国购买力大塑造：中国进口侧改革与人类命运共同体构建（中英文）.2018 年 12 月 27 日 . 中国北京
21. 我国人均 GDP 排名变动情况及人均 GDP 预测 .2019 年 1 月 28 日 . 中国北京
22. 中国企业税收负担报告——基于上市公司数据的测算 .2019 年 7 月 9 日 . 中国北京
23. 为世界创造价值：大变局时代的中国经贸升级之路（中英文）.2019 年 10 月 16 日 . 中国广州
24. 降低疫情对经济冲击的九条务实提醒 .2020 年 2 月 16 日 . 中国北京
25. 疫情拐点，高度警惕地方“乱作为”风气蔓延 .2020 年 2 月 17 日 . 中国北京
26. 化解“金融铁幕”：美国金融制裁演变与中国应策 .2020 年 8 月 28 日 . 中国北京
27. 以“双循环”逻辑，对冲全球大萧条 .2020 年 9 月 1 日 . 中国北京
28. 新全球链的开启：RCEP 时代的深度影响与中国机遇 .2020 年 12 月 18 日 . 中国北京
29. 防范“灰犀牛”——来自美国、日本、德国房地产发展的借鉴与中国防范系统性风险的政策建议 .2021 年 1 月 21 日 . 中国北京
30. 百年变局视野下的“全球新型货币战争” .2021 年 2 月 24 日 . 中国北京

## 人大重阳“一带一路”系列研究报告

1. 建设丝绸之路经济带——愿景与路径（中英文）.2014 年 6 月 28 日 . 中国北京
2. “一带一路”国际贸易支点城市研究报告（中英文）.2015 年 6 月 18 日 . 中国北京
3. 坚持规划引领 有序务实推进——“一带一路”建设三周年进展报告（中英文）.2015 年 9 月 26 日 . 中国北京
4. 促进互联互通 共建贸易繁荣——在“丝绸之路经济带”城市国际论坛（2016）上发布的报告（中英文）.2016 年 11 月 14 日 . 中国义乌
5. 中巴经济走廊实地调研报告 .2016 年 12 月 20 日 . 中国北京
6. “造血”金融：“一带一路”升级非洲发展方式 .2017 年 5 月 3 日 . 中国北京
7. 穿越喜马拉雅——中尼铁路可行性与中尼共建“一带一路”调研报告（中英文）.2017 年 5 月 5 日 . 中国北京
8. “一带一路”背景下的中国与中东欧合作：机遇与挑战 .2017 年 8 月 16 日 . 中国北京
9. 美国对接“一带一路”：案例研究与行动指南（中英文）.2017 年 8 月 25 日 . 中国北京
10. 柬埔寨：“一带一路”建设的新样板——关于深化中柬合作的实地调研报告 .2018 年 1 月 10 日 . 中国北京
11. “一带一路”的战略地图 .2018 年 3 月 25 日 . 中国北京
12. 去欧洲，向北走：中俄共建“冰上丝绸之路”支点港口研究（中英文）.2018 年 4 月 17 日 . 中国北京
13. 构建一带一路学：全球丝路学派的理论溯源与时代呼唤 .2018 年 6 月 1 日 . 中国北京
14. “一带一路”五周年：政策视角下的回顾与展望 .2018 年 9 月 17 日 . 中国北京
15. 树立“金融强国”意识，完善“一带一路”金融服务 .2019 年 2 月 26 日 . 中国北京
16. 数字丝绸之路进展、挑战与实践方案 .2019 年 5 月 27 日 . 中国北京
17. 为“一带一路”倡议导航 .2019 年 7 月 11 日 . 中国北京
18. “一带一路学”：现实迫切与理论必要 .2019 年 10 月 25 日 . 中国北京
19. 扬帆向南：中国与太平洋岛国共建“一带一路”的机遇与挑战 .2019 年 11 月 14 日 . 中国北京
20. 新时代的战略大对接：中俄“一带一路”倡议与“欧亚经济联盟”对接的现状、问题及思考（中俄文）.2019 年 11 月 29 日 . 中国苏州
21. 展望“一带一路”七周年 开启高质量发展新阶段（中英文）.2020 年 4 月 24 日 . 中国北京
22. 逆势增长——疫情一周年“一带一路”进展评估 .2021 年 3 月 10 日 . 中国北京
23. 突围前行，高质发展——疫情期“一带一路”进展评估与“十四五”展望 .2021 年 5 月 22 日 . 中国泉州
24. G7 全球基础设施建设计划与“一带一路”比较与中国对策 .2021 年 7 月 16 日 . 中国北京

# 人大重阳“智库国际影响力”系列研究报告

1. 重塑全球金融治理：G20 面临的挑战及应对——在“大金融与综合增长的世界：第二届 G20 智库论坛”发布的研究报告（中英文）.2014 年 9 月 4 日 . 中国北京
2. A Summit of Significant, Selective Success: Prospects for the Brisbane G20.2014 年 11 月 13-14 日 . 中国北京
3. 2016 年 G20 峰会筹备风险评估报告 .2015 年 5 月 15 日 . 中国北京
4. 为增长而合作：构建全球经济协调体系——在 G20 智库论坛 (2015) 发布的研究报告（中英文）.2015 年 7 月 30 日 . 中国北京
5. 全球治理新格局——2016 年 G20 总结及 2017 年展望（中英文）.2016 年 12 月 22 日 . 中国北京
6. 重塑欧亚空间：来自中国、俄罗斯和哈萨克斯坦智库的共同观点（中英文）.2017 年 5 月 16 日 . 中国北京
7. 培育中俄复兴增量——两国智库关于中俄经济金融合作的共同研究（中英文）.2018 年 7 月 16 日 . 中国北京
8. “对冲”与“楔子”美国“印太”战略的逻辑与中国应对之策 .2018 年 8 月 13 日 . 中国北京
9. 走向成年，行以致远——中非合作论坛（FOCAC）十八年进展与前瞻（中英文）.2018 年 8 月 20 日 . 中国北京
10. 巴塞尔协议 III 改革、风险管理挑战和中国应对策略 .2018 年 9 月 16 日 . 中国北京
11. 新型智库、科学决策与国家治理现代化 .2018 年 10 月 10 日 . 中国北京
12. 培养全球栋梁之才：来华留学事业 70 年进展、潜力与建议 .2019 年 5 月 29 日 . 中国北京
13. G20 机制 20 年：演进、困境与中国应对 .2019 年 6 月 23 日 . 中国北京
14. 全球大变局下的华商历史、现状与未来（中英文）.2019 年 10 月 21 日 . 英国伦敦
15. 偷师中国？：近年俄罗斯对华认知心态的新变化及其前景展望 .2019 年 11 月 11 日 . 中国北京
16. 智库建设的新长征路 中国特色新型智库七年评估及传播、绩效研究报告——在中国智库国际影响力论坛（2019）开幕式发布的主题研究报告 .2019 年 12 月 17 日 . 中国北京
17. 调动“百万大军”，讲好中国故事——中国智库提升国际影响力的困境剖析与务实建议（第三届中国智库国际影响力论坛（2020）开幕式发布使用，不做对外传播），2020 年 12 月 5 日，中国北京；调动“百万大军”——论中国智库对外传播的进展、困境与政策建议（公开发布）.2021 年 3 月 4 日 . 中国北京
18. 中外学者看中国共产党百年（中英文）.2021 年 7 月 21 日 . 中国北京
19. 博鳌亚洲论坛全球新冠疫苗应用图景报告（中英文）.2021 年 7 月 29 日 . 中国北京
20. “美国第一”？！美国抗疫真相（中英法西）.2021 年 8 月 9 日 . 中国北京

# 人大重阳“生态金融”系列研究报告

1. 如何在中国发行绿色债券 .2015 年 3 月 24 日 . 中国北京
2. 关于构建我国绿色金融体系的建议 .2015 年 4 月 10 日 . 中国北京
3. 中国绿色公共采购：效益量化 .2015 年 4 月 20 日 . 中国北京
4. 绿色公共采购如何推动中国可持续发展 .2015 年 10 月 28 日 . 中国北京
5. 绿色金融理论、技术研究与实践进展及前景分析 .2016 年 4 月 23 日 . 中国北京
6. 2016 中国绿色金融发展报告 .2017 年 4 月 15 日 . 中国北京
7. “一带一路”与全球绿色基础设施投资的未来 .2017 年 6 月 18 日 . 中国北京
8. 特朗普政府的能源与气候政策及其影响：中国的历史机遇 .2017 年 11 月 7 日 . 中国北京
9. 绿色金融中国标准的建设及其国际化路径 .2017 年 12 月 21 日 . 中国北京
10. 全球旗手：中国绿色金融发展评估 .2018 年 1 月 29 日 . 中国北京
11. 金融助力绿色“一带一路”：进展、评估与展望 .2019 年 8 月 21 日 . 中国北京
12. “一带一路”倡议下中国对外投资的绿色化进程：进展与建言 .2019 年 8 月 21 日 . 中国北京
13. “一带一路”绿色投资标尺和绿色成本效益核算 .2019 年 8 月 21 日 . 中国北京
14. “碳中和”中国城市进展报告 2021（春季）.2021 年 2 月 3 日 . 中国北京
15. “碳中和”元年与金融业的绿色升级 .2021 年 3 月 21 日 . 中国北京
16. 后疫情时代中国经济绿色复苏的契机、困境与出路 .2021 年 7 月 11 日 . 中国贵阳

17. 纠正运动式“减碳”：来自欧美国家的教训与启示 .2021年9月25日 . 中国北京
18. 碳中和：中国在行动——基于国际形势下的政策布局与行业动态分析（中英文）.2021年9月22日 . 中国北京

## 人大重阳“中美人文交流”系列研究报告

1. 特朗普财产评估报告（中英文）.2017年4月17日 . 中国北京
2. 特朗普内阁财富与政治政策走向 .2017年12月24日 . 中国北京
3. 特朗普政府决策小圈子的财富背景与决策特征 .2018年2月1日 . 中国北京
4. WTO的优等生——中国履行WTO承诺评估报告（中英文）.2018年8月29-31日 . 美国纽约、华盛顿
5. 共享繁荣仍是可能：中美经贸关系全景报告（中英文）.2018年8月29-31日 . 美国纽约、华盛顿
6. 为大国合作筑牢“地基”：中美人文交流四十年的历程、经验与前景 .2019年1月23日 . 中国北京
7. 基于博弈视角的中美国家实力消长评估报告 .2019年3月10日 . 中国北京
8. 为“一带一路”倡议导航 .2019年7月11日 . 中国北京
9. 大国缠斗白热化，中国须养精蓄锐 .2020年5月20日 . 中国北京
10. 问卷调查百名中国学者，九成中国学者相信 中国能应对好美国“新冷战”攻势（中英文）.2020年7月7日 . 中国北京
11. 从地缘政治经济看中美贸易摩擦及对策 .2020年9月 . 中国北京
12. 美国能把中国怎么着？——2017年来特朗普政府对华打压的实际效果评估 .2020年9月20日 . 中国北京
13. 美国“财务僵尸化” 疫情期美元潜在破产危机的评估（中英文）.2020年10月24日 . 中国北京
14. 美国“新冷战”政策误区论析（中英文）.2020年11月7日 . 中国北京
15. 中美两国三份清单 .2020年12月1日 . 中国北京
16. 半脱钩，半紧钩：中美人文交流受阻的利弊评估与重塑之道 .2021年2月25日 . 中国北京
17. 不纠错，必失败：拜登政府对华经贸政策评估与前瞻——多边主义治理中美经贸 .2021年3月24日 . 中国北京
18. 2/3相似：拜登百日执政对华政策评估与特朗普比较 .2021年4月30日 . 中国北京
19. 美国税改与中国影响：评估与展望 .2021年7月5日 . 中国北京

## 人大重阳“全球治理”系列研究报告

1. 全球治理的十字路口：2017年G20研究报告 .2017年7月2日 . 中国北京
2. 再全球化：“共商·共建·共享”理念下的全球治理——中国与全球治理年度报告（2017）（中英文）.2017年9月30日 . 中国北京
3. 乘风破浪 行稳致远：上海合作组织十七年进展评估（中英文）.2018年5月21日 . 中国北京
4. “一带一路”与上海合作组织：关联、实践与走向 .2018年6月6日 . 中国北京
5. 换骨的世界：911事件二十年来的全球变局 .2021年9月10日 . 中国北京





人大重阳  
RDCY

## 中国人民大学重阳金融研究院

Chongyang Institute for Financial Studies, Renmin University of China (RDCY)

网址：<http://www.rdcy.org>

电话：010-62516305

公众微信号：rdcy2013

新浪微博：@人大重阳

地址：北京市海淀区中关村大街59号文化大厦6层

Add: 6th Floor, Wenhua Building, No.59 Zhongguancun Street,

Haidian District, Beijing 100872 P.R.China



微信二维码



微博二维码