



國際金融論壇
INTERNATIONAL
FINANCE FORUM

Improve carbon market mechanism and institutional construction

Facilitate the coordinated development of carbon trading and carbon finance market

Innovate Climate Investment and Financing
Promote Green and Low-carbon Development

Financial Technology, Financial Security

Green Finance Innovation and Practices

Special Issue on
IFF Global Green Finance Award



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ABOUT IFF

The International Finance Forum (IFF) is an independent, non-profit, non-governmental international organisation founded in October 2003, and established by financial leaders from more than 20 countries and regions, including China, the United States, the European Union, emerging countries and leaders of international organisations such as the United Nations, the World Bank and the International Monetary Fund (IMF). The IFF is a long-standing, high-level platform for dialogue and communication and multilateral cooperation and has been upgraded to F20 (Finance 20) status.

MISSION

Upholding the spirit of "Comprehensive and sustainable development - New capital, new value, new world", since the founding in 2003, the International Finance Forum (IFF) has been committed to building itself into a world-class academic think-tank and multilateral dialogue platform with strategic insight.

GOALS

The International Finance Forum (IFF) operation based on an open, transparent and fair mechanism to ensure its independence, objectivity, foresight and inclusiveness and to facilitate global financial co-operation and exchanges. Through in-depth research on global finance, IFF is committed to promoting sustainable development of China and the world economy. Our targets include:

1. International Financial Strategic Dialogue Platform
2. International Financial Cooperation & Exchange Platform
3. International Financial Innovation & Practice Platform
4. International Financial Strategic Think-Tank Platform
5. International Financial Talents Platform



NEW CAPITAL NEW VALUE NEW WORLD
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全球金融 F20 金融服务世界
 Global Finance 20 (F20) Finance Serves the World

Foreword

Finance is a crucial pillar of global economic development, and its fluctuations influence the world's peace and progress. When finance is active, the economy thrives; when finance is stable, the economy remains steady. The economy is the body, and finance is its lifeblood, coexisting and flourishing together. "A myriad of economic strategies, three policies for peace." Finance is also a vital core competitiveness of a nation, the heart of modern economies, and the fundamental issue concerning each country's economic development and security.

The International Finance Forum (IFF) serves as a long-standing high-level dialogue mechanism and multilateral cooperative institution in the global financial domain, known as the "F20" of the financial world. Since its establishment in 2003, over 2,000 world-renowned guests and more than 100,000 global industry elites have participated in various activities organized by the IFF, including exchanges, cooperation, and academic research. While contributing their wisdom and valuable insights, they have also built the IFF into a world-class international academic think tank renowned for its high level, high standards, and internationalization. We spare no effort to collect, analyze, and interpret the latest information, data, and trends in global financial markets, meticulously editing and deeply interpreting them to showcase the panorama and development trends of the global economic and financial landscape to our audience amid the rapidly changing world.

We will continue to focus on new ideas, trends, practices, and driving forces in global financial development, concentrating on the world and China, reform and policies, academics and practices. Our commitment is to provide our audience with international, professional, and diversified cutting-edge financial content, creating an open, interactive, and deep learning platform that brings together industry professionals and scholars to explore new trends in financial industry development and promote financial innovation and cooperation.

We will uphold an objective and neutral stance, adhere to the principles of knowledge and professionalism, and base ourselves on practical issues in the global financial domain. From both macro and micro perspectives, we aim to provide our audience with high-quality information and diverse perspectives that go beyond specific stances, addressing the "questions of the era" in the financial sector and truly serving our audience and looking towards the future. We believe that through our relentless efforts and the support of our vast audience, the "International Finance Forum Magazine" will become one of the most influential media outlets in the international financial industry.



Zhang Jizhong
 CEO / Founding Secretary General
 Director of Executive Committee
 International Finance Forum (IFF)

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Message from Han Seung-soo



Han Seung-soo

Co-Chair, International Finance Forum (IFF)
Chair, Council of the Presidents of the UN General Assembly (UNCPGA)
Former Prime Minister, Republic of Korea

Distinguished Members of Global Green Finance Innovation Award Jury,
Proud Recipients of the Award,
Members of the International Finance Forum,
Ladies and Gentlemen,

On behalf of the IFF's 2022 Global Green Finance Innovation Award Jury, I would like to offer my warmest congratulations to all the awardees.

This prize is our strong recognition to the awardees who have devoted their efforts and financial resources to help solve the critical issues that the humanity has been facing, that is, climate change and other related issues.

As you may know, unfortunately, the discussions during the COP27 in Sharm El Sheikh, Egypt was not much productive.

The discussion on climate change did not lead

to the consensus on implementing mitigation actions to meet the temperature target. Regarding carbon emission reduction, there has been no progress compared to the last year's COP26.

Nonetheless, a significant step forward is an agreement in principle to support 'loss and damage' which developing countries have strongly requested for the past 30 years. However, there is a need for new funding, and the discussions on how to establish such fund will be the topics for the coming COP.

According to the IPCC report in April 2022, in order to achieve target of the 1.5°C limit, carbon emissions must be reduced by 43% compared to 2019 levels by 2030 and completely carbon neutral should be realized by 2050. Achieving this goal, the report says, would require climate investments of \$ 4



trillion per year by 2030.

This report, therefore, implies that the financial sector can no longer remain disinterested in protecting our planet. Shifting away from fossil fuel-based economy towards a transformation of our economy based on clean and renewable energy needs no belaboring.

It is an irony that while green projects are suffering from the lack of funds, billions of dollars looking for investment opportunities at the stock market are not flowing into low carbon green projects which are critical for the humanity's long-term survival. Therefore, we have to work hard to find innovations that can stimulate private funds to flow into green and climate projects for our safe and sustainable future.

This is the main reason why the IFF's Global Green Finance Innovation Award was created

three years ago. Therefore, I am very pleased to present these awards to those who have come up with innovative ideas that could help build our society climate safe and ecologically sound.

We will continue with our mission of Global Green Finance Innovation Award in order to strongly leverage private funds for investment in green projects in the future, playing a central role in strongly supporting the vision of going carbon neutral for the world.

Once again, I would like to reiterate our congratulations as well as best wishes to the awardees of this precious prize.

Thank you

Message from Jenny Shipley



Jenny Shipley

Board Member, IFF
Former Prime Minister, New Zealand
Co-chair, Silk Road International Association

Greetings to you all as we celebrate the International Finance Forum 2022 Global Green Finance Awards. I am so pleased that you are able to have this ceremony, I am very sorry I can't be with you. As I have read through the applicants for the awards, I have again been just astonished at the degree of innovation, leadership, discipline and focus that has been exercised by many participants, not only in China, but all around the world.

The list of finalists, both in the major award and in the innovation sector, are very worthy of recognition this year. That discipline and leadership and vision is having a significant impact on global markets and it's exciting to see that people are turning their mind to how to bring multi-disciplinary facets together using finance and also desired environmental and sustainability outcomes, to actually achieve meaningful goals.

It's very clear that increasingly the banking sector and other finance instruments are able to work with industry leaders, governments and other investor requirements to achieve these outcomes and all of the applicants that I read are worthy of being shared because the ability for others to see what is being thought through and how it's being applied, I think will have a secondary impact.

And so, in congratulating the award winners, I also want to encourage all the International Finance Forum team, to see that as many people as possible are able to read through the award applications and appreciate the quality of the innovation going on so they might then apply these and achieve the same potential impacts to the sectors for which they are responsible.

And so enjoy this evening tonight. I hope it's a



worthy celebration. I am just delighted to see the ways in which these awards are working and the degree to which very significantly leading institutions around the world are now seeking to have their products and processes considered by us and we are able to recognise and reward them.

Congratulations to all of the applicants and participants. Congratulations to the highest achievers and I hope that your leadership will have an impact on markets that will allow green finance to become a reality globally.

Message from Erik Solheim



Erik Solheim

Former Executive Director,
UN Environment Programme (UNEP)
Former Under-Secretary-General, United Nations

Hello everyone, Ni Hao Guangzhou, I'm so pleased to speak to all of you coming together in the great beautiful city of Guangzhou for the International Finance Forum (IFF).

I was asked to work on the global green finance award, and I have enormous pleasure to work on that because so many great suggestions came forward or people have contributed to green finance in China and in the world. And I'm at first thank all my fellow jury members and to thank the great secretariat of the International Finance Forum. You have provided so good background information about the candidates and it's a pleasure working with you.

And of course I want to congratulate all the award winners. It is great to see so many financial institutions and individuals in China

coming forward to take up the great mantle of green finance early. I would like to say you are doing great work. We should all thank you. And of course we want you to continue on this journey to do even more and even better in the future. That's how humanity developed to be a world those who do great now, but expect even better and more results than in the years and decades to come.

It has been very encouraging to follow the green journey of China over the last decade. Ten years ago, the impression of China in the worldwide was very polluted place where environment was not very high on the agenda. Now China is leading the green transformation. So many areas China is leading on every environment technology. Eighty two percent of all solar panels last year in the world made in China, seventy percent of all green batteries. And China is

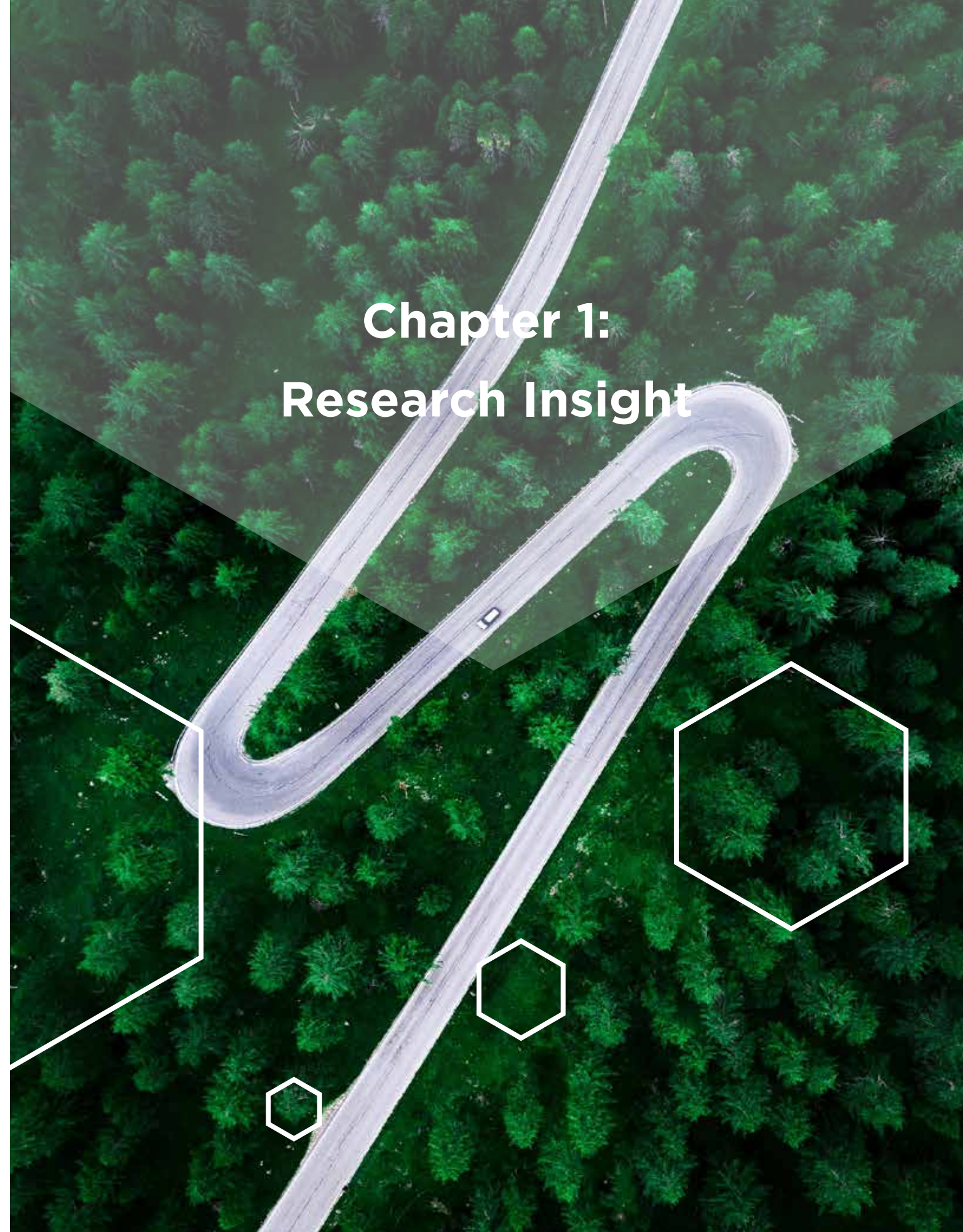


leading the green transformation in every green technology. Through the great slogan of President Xi Jinping - Beautiful China, China's also more and more leading on a green conservation of the planet. The number of giant pandas, number of snow leopards, threatened species in China in the past and are increasing. Thanks to great conservation work and China is by far without any comprehension they biggest tree planted in the world. But to succeed you need green finance added to good green policies, and that's why we wanted to award institutional lead the charge into green finance. cause a key role is played by the People's Bank of China and by the central authorities framing and guiding this process. But we also see all the great banks and financial institutions and channel coming forward, providing different concepts to green finance. We also see a

lot of innovation, new products and new ways of thinking which can drive the green change. When all these comes together, great green technologies conservation of nature and green finance, China is set to be a lead nation in providing an ecological civilization for the verb in the twenty first century. So again thank you so much to everyone at the International Finance Forum(IFF) in Guangzhou. I wish I could be there with you.

I hope to come next year and let's hope they have solved the Covid-19 problems, so that I can attend this fantastic forum in their beautiful city of Guangzhou I'm sure we can call the 2022 IFF Global Green Finance Award a success and again encourage everyone to move fast ahead with green finance and so much needed in today's world. Thank you so much!

Chapter 1: Research Insight



Improving the Carbon Market Mechanism, Coordinating the Development of Carbon Trading and Carbon Finance Markets

◆ SONG Min¹ and HUANG Xiaoqi²



After the first-year operation, China's national Emission Trading Scheme (ETS) has made a great achievement, with a trading volume of 194 million tons and a cumulative transaction value of 8.492 billion yuan. It has become the largest carbon market in operation in the world. However, due to the late start of China's ETS, it still faces a series of obstacles and challenges in terms of its trading mechanisms. All financial trading activities are based on spot transactions. In fact, we believe carbon finance market and carbon trading market should complement each other. Carbon trading, by providing a market determined carbon price, is the premise and foundation of carbon finance, and, on another hand, carbon finance is a booster for carbon trading. Therefore, from the perspectives of China's carbon trading market and carbon finance market, this article analyzes the status quo of the two markets and the development

gap between them and international carbon markets. We further attempt to find a feasible path for the coordinated development of the two markets.

● Carbon trading market

Current obstacles and challenges facing China's carbon market

First year of China's national carbon market

China's national ETS started its first compliance period on July 16, 2021. According to the statistics of Shanghai Environment and Energy Exchange (SEEE), from July 16, 2021 to July 15, 2022, China's national carbon market saw its total trading volume reaching 194 million tons, with a cumulative transaction value of 8.492 billion yuan and a compliance rate reaching 99.5%. The trading price ranged from 40 to 60 yuan.

Obstacles and challenges facing China's carbon market

China's ETS has developed rapidly, and the existing carbon pricing practices in the carbon market have yielded some positive results. However, it still faces problems and challenges, mainly including:

- (1) Vague/unclear positioning of the financial attributes of carbon market and lack of carbon finance innovations
- (2) Single and restricted access mechanism and low liquidity
- (3) The regulatory system of the carbon market lacks coordination among different agencies
- (4) The carbon pricing lacks a solid legal basis and a connection with the general policy goal
- (5) Allocations in the ETS are free and there is uncertainty on timing of mechanism that eventually will reduce the free allocations

Experiences, lessons learned and implications for China from EU ETS and other international carbon markets

The EU ETS is the world's first emission trading system, as well as the most developed and active carbon market in the world. The total amount of allowances is set by the EU. The allocation method of allowances has also gradually changed from free to paid allowance. EU ETS covers a wide range of industries and GHGs. But it also has problems such as oversupply of allowance, weak carbon price, and unfair allocation of allowance. The allocation of allowances in the Regional Greenhouse Gas Initiative (RGGI) of the U.S. is mainly auctioned, and the auction is held quarterly. In addition, RGGI has established a Cost Containment Reserve (CCR) to deal

with the imbalance of supply and demand. China's ETS must be fully aware of China's special situations, and it should learn from the experience of international carbon markets, such as improving the allocation mechanism, covering more participants in the carbon market, and setting up necessary flexible mechanisms.

● Carbon derivatives market

State quo of carbon derivatives in China

On April 12, 2022, China Securities Regulatory Commission (CSRC) issued four financial industry standards, including *Carbon Financial Products (JR/T 0244-2022)*, which is the first national industry standard in the field of carbon finance. *The Carbon Financial Products* mainly standardized the terminology and scope of application of carbon financial products, as well as the implementation process of different carbon financial products, puts forward normative guidelines and framework requirements for financial institutions to develop and implement carbon financial products, and provides a specific classification of carbon financial products.

From the perspective of regional carbon markets, the seven carbon pilot programs have carried out a series of trial practices of carbon derivatives and developed a range of products such as carbon options, carbon forward, carbon pledges and carbon repurchase. However, carbon futures have not been put into actual use in China. For example, the Shanghai Emission Allowance Forward (SHEAF), a carbon quota forward product, was officially launched in January 2017, with the carbon allowance of Shanghai as the objective. As of December 31, 2020, a

¹ SONG Min Academic Member, IFF; Dean, Economics and Management School, Wuhan University

² HUANG Xiaoqi Lecturer, School of Economics, Zhongnan University of Economics and Law



◆ Suggestions to improve China's carbon trade and carbon finance markets

First, promote the construction of a “top-level design” framework to improve the current carbon market mechanism. Specifically, the system should further standardize carbon assets, clarify the financial attributes of carbon emission rights, strengthen carbon finance supervision. Also, the system need a reasonable controlling of the total amount of allowances and allowance allocation. It should gradually expand its coverage of industries, and steadily incorporate third parties such as financial institutions to participate in carbon trading.

Second, reset and develop the Chinese Certified Emission Reduction (CCER) market to serve as offsetting mechanism for the national carbon market. CCER can add to the diversity of carbon-based transactions, increase liquidity, and motivate companies to participate in carbon trading.

Third, it is important to note critical role of carbon tax as a complement. With the development of carbon market, coordinated research on carbon market and carbon tax can be carried out, so as to give full play to the role carbon tax in developing carbon finance. At the same time, we need to pay greater attention to effective coordination of carbon finance with other environment policies.

Fourth, we need to consolidate the carbon spot market, strengthen carbon finance innovation, and further develop the carbon derivatives market. Meanwhile, we need further enhance the environmental information disclosure, the MRV system, and the risk control during carbon finance innovation.

Fifth, we need to further improve the accuracy of emission data verification and data quality, and help develop industry emission benchmarks, thereby help improve the quality, transparency, and accuracy of emission data reports in the ETS.



cumulative (bilateral) of 43,000 transactions of carbon forward products were reached in the Shanghai carbon market, with a total trading volume of RMB156 million. To summarize, China has tried out a series of carbon derivatives. But those have not been used on a large scale.

Developments of international carbon markets and their implications for China

The development of the global carbon market shows that, carbon derivatives market and carbon spot market complement each other. At present, the major types of carbon derivatives trading are: carbon forward trading, carbon futures trading, carbon options trading and carbon swap trading, among which the innovation and trading of carbon futures are the most mature market. Both EU ETS and RGGI made use of both carbon spot and derivative trading instruments such as forwards and futures in

their carbon markets, so that the spot and derivative markets can support each other. Specifically, the European Climate Exchange (ICE_ECX) and the European Energy Exchange (EEX) started trading futures and options on carbon allowances (EUAs) and certified emission reductions (CERs and ERUs) at the very beginning of the carbon market in 2005. In the U.S. RGGI carbon trading system, futures trading even predates spot trading. Currently, carbon futures are the most mature and active carbon derivatives in the global carbon market.

At present, due to the immaturity of the carbon spot market, China's carbon derivatives market is still at an early stage. The appropriate development of innovation in carbon finance as well as carbon derivatives such as carbon futures while ensuring the smooth operation of the carbon spot market may be one of the future directions for the long-term development of the carbon market.



Promoting Green and Low-carbon Development by Innovating Climate Financing

◆ Xuedu LU / Academic Member, IFF Former Lead Climate Change Specialist, Asian Development Bank

● Updates of climate finance in China and abroad

Climate finance is a “by-product” of the negotiations under the United Nations Framework Convention on Climate Change (UNFCCC). During the negotiations, developing countries required developed countries to provide support in finance, technology transfer and capacity building for developing countries so that they can participate in the international efforts in addressing climate change. Gradually, the concept of “climate finance” has been developed to refer to the finance that supports climate change mitigation and adaptation actions, including public and private sector investment and financing, as well as regional, national and international investment and financing. Climate finance is the fundamental guarantee for promoting global climate protection and adaptation to climate change.

The Paris Agreement under the UNFCCC requires parties to limit the global temperature increase in this century to Two degrees Celsius while pursuing efforts to limit the increase even further to 1.5 degrees. To achieve the goal of limiting the temperature

below 1.5 degrees, about US\$110 trillion of the cumulative investment in decarbonization of the global energy system by 2050 will be required as estimated by the International Renewable Energy Agency (IRENA). In addition, according to the Global Climate Finance Report (2021) published by the Climate Policy Initiative (CPI), the total amount of climate finance has grown steadily in the past decade, reaching US\$632 billion in 2019-2020. But there is still a big gap of about US\$2.6 trillion per year of climate finance compared with the required climate finance as estimated. A recent analysis by McKinsey informs that globally about US\$9.2 trillion in climate investment and financing annually is required to achieve the goal of limiting the temperature below 1.5 degrees by 2050.. Apparently, there is a severe shortage in climate finance.

Since 2012, the World Bank, Asian Development Bank (ADB), and other multilateral development banks (MDBs) have formulated guiding principles and implementation guidelines for climate finance accounting. They have also developed guiding principles and implementation guidelines for project-

level climate benefit accounting (including the benefits of reducing greenhouse gas emissions, CO₂ removals, adapting to climate change, etc.), including energy, transportation, agriculture, water resources, etc. Since 2012, these MDBs have jointly published their annual climate finance report, disclosing their annual climate investment and financing status to the international community. In 2018, ADB announced its climate finance goal: from 2019 to 2030, ADB’s own capital for climate change investment and financing will reach US\$80 billion. On the eve of the 26th Conference of the Parties to UNFCCC in October 2021, the ADB further announced to increase this number to US\$100 billion. The 2022 Annual Climate Finance Report by 10 MDBs^⑤ shows that in 2021, the 10 MDBs invested US\$81.717 billion of climate finance, leveraging additional investment of US\$112.038 billion of climate finance from partners. The climate finance

accounts for 34% of the 10 MDBs’ total financing of that year.

In the past several years, China has adopted a series of measures and formulated relevant policies to promote climate investment and financing. In October 2019, Chinese Society for Environmental Sciences set up Climate Investment and Finance Association (CIFA). In October 2020, five ministries and commissions headed by the Ministry of Ecology and Environment jointly issued the “Guiding Opinions on Promoting Investment and Financing to Address Climate Change”. In December 2021, nine ministries and commissions headed by the Ministry of Ecology and Environment jointly issued the “Notice on Launching Climate Investment and Financing Pilot”. On 10 August 2022, the Ministry of Ecology and Environment, together with other relevant ministries and



^⑤ The 10 MDBs refer to Asian Development Bank (ADB), African Development Bank (AfDB), Asian Infrastructure Investment Bank (AIIB), European Development Bank Council (CEB), European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB), Inter-American Development Bank (IDB), Islamic Development Bank (IsDB), New Development Bank (NDB), World Bank Group (WBG).



departments, approved 23 local pilots to explore the ways on climate investment and financing.

Under the guidance of the “dual carbon” goals (meaning the two national carbon goals: carbon emission peaking by 2030 and carbon neutrality by 2060), the demand for low-carbon technologies, products and services will continue to increase, which will drive a huge demand for investment in green and low-carbon technologies, and bring about unprecedented opportunities for promoting climate investment and financing. According to the National Centre for Climate Change Strategy and International Cooperation (NCSC), more than 139 trillion RMB of total climate investment (about 3.48 trillion RMB per year) will be needed to achieve China’s 2060 Carbon Neutrality goal. While, according to McKinsey’s recent analysis, China will need about 20 trillion RMB of climate

finance per year. It should be pointed out that it is more difficult to invest climate adaptation projects compared with carbon emission reduction projects, even climate adaptation projects may have more long-term benefits. A study report by the Global Commission on Climate Adaptation in 2019 concluded that by 2030, the world needs about US\$1.8 trillion for climate adaptation investment, including for early warning systems, climate-resilient infrastructure, improved dryland agriculture, mangrove protection, and investments in making water resources more resilient. It is estimated that such investments can generate US\$7.1 trillion benefit output, which is nearly four times that of the input.

◆ Issues facing China’s climate investment and financing

Climate investment and financing in China now faces the following issues.

First, the existing laws and regulations are not fully matched with the requirements of climate investment and financing. Although China has issued relevant regulations, policies and guiding principles for climate investment and financing, there are still large gaps to ensure a systematic operation of climate investment and financing. For example, China still lacks a series of methods, guidelines, standards, tools, etc. to guide the operation of climate investment and financing, for instance, the scope and accounting of climate finance, and accounting and reporting of climate benefits generated by climate investment and financing, etc.

Second, relevant institutions that implement climate investment and financing lack the required knowledge and skills. The operation of climate investment and financing requires large-scale training on climate investment and financing knowledge to build up the required capacity of financial institutions and operation personnel, which will require enormous efforts.

Third, the benefit of climate investment can not be realized or recognized sufficiently. For a carbon emission reduction project, to obtain carbon emission reduction benefits, investment institutions will need to make extra efforts and additional investment, and communicate with governments/society, which will bring about additional cost. For those enterprises with the compulsory responsibility of carbon emission reduction, the carbon emission reductions generated by the investment can help them meet the government requirements of carbon emission reductions, which would mean the additional investment can generate its value, or the

carbon emission reduction investment project can realize its benefit. However, for those projects that are neither required by law/governments, nor in the voluntary carbon market, the carbon emission reduction benefits would not be appropriately realized, since those benefits would not go anywhere. For adaptation project investments, the adaptation benefits are even more difficult to be quantified and recognized, and the adaption effects are noticeable only when extreme climate events occur. Thus, usually the adaptation benefits cannot be recognized and realized appropriately, then investors would not be able to obtain cash flow returns from adaptation investment. This is also why the funds currently invested in adaptation projects are basically from governments or other public organizations, and not many from private sector. Therefore, it is highly required to innovate climate investment and financing mechanism and climate benefit sharing mechanism so as to encourage all parties to invest in mitigation and adaptation to climate change, including the formulation and improvement of relevant laws, regulations and policies to ensure the benefits of climate mitigation and adaptation can be appropriately recognized and realized.

◆ Recommendations for promoting climate investment and financing in China

In view of current issues of China’s climate investment and financing and for meeting future large-scale demand for climate investment and financing, the following recommendations are proposed for discussion and consideration.

First, formulation or improvement of relevant laws and regulations so as to promote climate investment and financing. The Chinese government has released the "1+N" policy framework to achieve the dual carbon goals. The government agencies also have issued guidance on promoting climate investment and financing, and launched the first batch of pilots. On this basis, it is urgently required to further formulate new relevant laws and regulations or improve existing ones for guiding the climate finance operations and protecting the climate benefits generated by climate investment and financing. For instance, the climate benefits produced by climate investment should be legally defined to have economic value, which would lay a solid legal basis for innovating climate financial products. Also, it is very urgently needed to formulate detailed operational rules and guidelines for the climate investment and financing, such as, the definition and accounting of climate investment and financing, accounting and disclosure of the climate benefits generated by climate investment and financing projects, and etc.. Further, government may also consider setting up climate investment and financing long-term targets as national targets and the targets of commercial banks and institutions, such as, climate investment and financing targets for 2021-2025, 2026-2030 .

Second, financial institutions are encouraged to develop innovative tools and products of climate investment and financing. These innovated tools and products should reflect the key characteristics of climate investment and financing, that is, the benefits of carbon emission reduction and adaptation to climate change, and ensure a reasonable return of the benefits for investors. For example, the amount

of the carbon emission reductions can be used as a condition for a project to get climate investment and financing, and the risk control requirements for innovative emission reduction technologies may be reduced, and investors can share the long-term benefits/premiums brought about by investment in adaptation infrastructure to climate change, etc.

Third, insurance instruments should be fully used to promote investment in emission reduction and climate adaptation. Plausible examples are carbon emission reduction benefit insurance for innovative low carbon technologies, insurance for extreme climate disaster, insurance for climate vulnerable area investment, etc. Insurance companies have great business potentials in the field of carbon emission reduction, and should be encouraged to be more involved.

Forth, large-scale and systematic capacity building training on climate investment and financing for financial institutions are urgently needed. The financial institutions should be trained to have the capability to carry out emission reduction and climate adaptation assessments for all financing projects in order to enhance the carbon emission reduction benefit and climate adaptation level to be financed by the financial institutions.

Technological Innovation as Critical Support for Achieving the Sustainable Development Goals

◆ SUN Hong / Chief Engineer The Administrative Center for China's Agenda 21

Scientific and technological innovation has remained essential to achieving different sustainable development goals from the Agenda 21 adopted by the United Nations Conference on Environment and Development in 1992, to the United Nations Millennium Development Goals (MDGs) formulated in United Nations Millennium Summit held in 2000, and to the 2030 Agenda for Sustainable Development adopted at the United Nations Development Summit in 2015. The supporting role of scientific and technological innovation in achieving sustainable development goals is mainly reflected in the following aspects:

First, scientific and technological innovation underpins the decision-making process for sustainable development. The 2030 Agenda for Sustainable Development spans a wide range of areas, with 17 Sustainable Development Goals (SDGs) and 169 associated targets. To achieve these goals, it is necessary to take measures, especially laws and regulations, policies, funds, technology, and standards in place, which should be systematic, coordinated and feasible. Much needs to be done to formulate the proper measures.

The key challenges to sustainable development varied at different stages. In 1994, the Chinese government promulgated the first national-level Agenda 21, China's Agenda 21: White Paper on China's Population, Environment, and

Development in the 21st Century, emphasizing on population, environment, and development. Recently, the focus is on harmony between human and nature, high-quality economic growth, and effective social governance, and today, economic recovery and health are most concerned issues. All these need to be addressed based on soft science and strategic research.

Second, scientific and technological innovation provides the critical technologies to solve the challenges of sustainable development. In recent years, the progress in science and technology has greatly promoted the coordinated development of economy, environment, and society. For instance, agricultural technological advances in breeding, cultivation and processing help to eliminate poverty and hunger and ensure food security. Especially, the recent innovations in biotechnology, information technology, new energy technology, and new material technology are transforming the modes of production and lifestyles and provide a strong impetus to the development of the environment, health, social governance, public safety, disaster reduction and prevention, and industrial development. With regard to carbon neutrality and climate change, more than 100 countries have announced various carbon neutrality goals. The paths to carbon neutrality may be different, but they all require

technological support, especially disruptive technologies, in the sectors including energy, industry, architecture, transportation, and carbon sink.

Based on the national conditions, China's pathway towards carbon neutrality relies on low-carbon, zero carbon and negative carbon technologies, and emphasis is on the inputs of R&D of substituting clean energy at the source, reducing emissions in the process, and capturing carbon at the outlet. It is also very important to develop technologies of zero carbon electricity, zero carbon non-electric energy, fuel/raw material and process alternatives, non-CO₂ greenhouse gas reduction, CCUS/carbon sink and negative emission. Technology is the key to solving the major challenges to the "dual carbon" goals and sustainable development.

Last, scientific and technological innovation drives the technological solutions and development paradigms for sustainable development. The application of technological breakthroughs needs political and financial support, especially through the sustainable development pilot programs to verify the feasibility of technologies, policies and measures.

China began comprehensive pilot programs that utilized technology to guide social development to address the economic and social development issues as early as in 1986. As of now, China has established 23 national independent innovation demonstration zones to promote the emerging industries, innovative industries, and knowledge industries, 177 high-tech industry development zones, over 200 national agricultural high-tech parks and national agricultural science and technology parks,

as well as national ecological civilization demonstration zones, national agricultural sustainable development pilot zones, and national low-carbon pilot provinces and cities.

To implement the 2030 Agenda for Sustainable Development, China has launched the Innovation Demonstration Zones for the Implementation of 2030 Agenda for Sustainable Development covering 11 cities and regions so far, including Shenzhen, Taiyuan, Guilin, Chenzhou, Lincang, Chengde, Xuzhou, Huzhou, Ordos, Zaozhuang and Hainan Tibetan Autonomous Prefecture as approved by the State Council. These innovation demonstration zones target different types of bottlenecks in pursuing sustainable development, innovate technologies, policies and institutional mechanisms, explore technological routes and systematic solutions, and provide practical experiences for implementing the 2030 Agenda for Sustainable Development.

Currently, severe challenges exist in sustainable development, and the pace of achieving the 2030 Sustainable Development Goals is also slowing down. Here are several suggestions: firstly, we need to continue increasing investment in science and technology and build the technological system for sustainable development and in particular, the carbon neutrality technology system to achieve the dual carbon goals. Secondly, we should enhance the integration of technology and finance to promote the application and industrialization of scientific and technological achievements. Last, we should strengthen international cooperation on science and technology to promote sustainable development around the world.



Chapter 2

2022 IFF Global Green Finance Award - Annual Award Winners

1. London Stock Exchange Group - LSE Group Looks Forward to Continued Cooperation with China to Help Sustainable Financial Development

◆ David Schwimmer / Chief Executive of the London Stock Exchange Group



London Stock Exchange Group HQ

It is a great honour that the London Stock Exchange Group is a recipient of the IFF Global Green Finance Award. Enabling sustainable finance is central to our purpose. LSEG is proud to be recognized for its efforts to deliver sustainability products and services to clients around the world.

The global transition to a decarbonized economy requires a massive realignment of capital, and we welcome China's role in this transformation, and its more ambitious targets for achieving carbon neutrality. Every country, government and business must be thinking about climate mitigation. For this global transformation to succeed, we need new and innovative ways of thinking, including from the financial sector.

Sustainability continues to be a key issue for investors worldwide. And we applaud the IFF for its long-standing commitment to discussing sustainable finance. We need to encourage and enable investors to direct capital to Chinese companies with strong

green credentials. This year, LSEG's FTSE Russell reported that China already has the second largest share of the global green economy at 12%. China plays a critical role in helping investors meet global sustainability goals, and continues to demonstrate great potential in green finance. Global asset allocations to green and sustainable finance are increasing each year. Investor demand for actionable, climate-related financial information continues to surge.

To meet this growing demand, LSE Group's Data and Analytics business continues to provide high quality environmental, social and corporate governance (ESG) data to facilitate the efficient allocation of capital. Recently, FTSE Russell, a member of the LSE Group, and Ping An of China have partnered to assess the performance of Chinese companies using a market-leading ESG rating index, helping Chinese companies with superior ESG performance to access more resources and investment. The more data available, the better investors will be able to identify which

issuers are prioritising ESG performance for consideration. To meet this growing demand, LSEG's data and analytics business continues to provide high-quality ESG data for driving efficient allocation of capital.

Recently, our FTSE Russell index business partnered with Ping An on the use of their market leading China-specific ESG scores to better enable investment in Chinese companies with superior ESG scores. With greater amounts of data at their disposal, investors are better equipped to discern which issuers have ESG considerations truly at the heart of their activities.

Earlier this year, we saw the listing of Chinese wind turbine manufacturer and smart energy provider Mingyang Smart Energy through the Shanghai-London Stock Connect.

This partnership between the London Stock Exchange and the Shanghai Stock Exchange provides a channel for innovative, fast-growing, and green companies to raise capital in both markets. It is an opportunity for investors outside of China to understand the companies, markets and people of this country. And it is a chance for Chinese companies to build strong financial ties around the world, expanding their global investor base and boosting liquidity while still supporting the growth of China's national exchanges and economy. LSEG is proud to be IFF's partner. We are bound by a common vision to empower the economies and to help create sustainable growth.

We are looking forward to working together to achieve the green finance goals that will benefit IFF, China and the global community.

2. China Construction Bank Corporation

- Targeted Measures to Sustain Financing Flow and Multiple Initiatives to Promote

Achieving Carbon Peaking and Carbon Neutrality is a solemn commitment of China to the world and an integral aspect of promoting high-quality development. China Construction Bank (CCB) remained committed to implementing the decision and plans of the CPC Central Committee and the State Council, and focusing closely on the dual carbon goals, it incorporated green finance into bank-wide strategy, strengthened top-level design, operation management, resource guarantee and innovation drive, and took multiple measures to mobilize the power of finance to promote carbon reduction in all aspects of the society and economy, so as to effectively serve the green transformation and development of enterprises in the real economy.

◆ Boosting carbon reduction at the source of industrial chain with innovation drive

CCB actively helped in the country's green and low-carbon technological revolution and green and low-carbon technological breakthroughs. Carbon Capture, Utilization & Storage (CCUS) is an important strategic

reserve technology for carbon reduction in China. CCB Shandong Branch attached great importance to the technology, and after learning about the financing needs of a CCUS demonstration project of carbon dioxide flooding and storage in an oil field, The company set up a task force at the first time to carefully study and analyze the project situation, and made every effort to promote the project declaration and approval. As at the end of 2022, as the exclusive financing bank, CCB Shandong Branch successfully placed a green loan of RMB450 million for the project and declared a fund of RMB270 million for the supporting tool of carbon emission reduction, with its excellent approval efficiency and high-quality comprehensive services receiving high praise from the customers. Upon the completion of the project, it is projected to help digest 700,000 tons of CO₂ per year and produce an additional 3.59 million tons of crude oil, which is equivalent to planting about 6 million trees or taking 400,000 economy cars off the road for a year, and the project will become the largest CCUS full-chain demonstration base in China and the first megaton-level CCUS commercial operation project in China, helping to achieve



CCB Shandong Branch Invested RMB 450 Million in a CCUS Project

a win-win situation for both oil production increase and carbon emission reduction. The successful implementation of this project was an important step for CCB to adopt monetary policy tools to accurately support green and low-carbon technology innovation and promote carbon reduction at the source of the industrial chain.

◆ Making good use of enterprises' "carbon accounts" to promote digital carbon management

CCB aligned the "carbon behavior" of enterprises with the dual carbon goals to realize the control over both the amount and intensity of carbon emissions. Based on the "carbon behavior" portrait of enterprises,

CCB Guangdong Branch launched the innovative "Carbon Footprint Linked Loan" product, which links the loan interest rate or comprehensive cost of enterprises with carbon dioxide emissions, with the aim to guide enterprises to actively reduce carbon emissions in the production process and encourage more enterprises to reduce loan interest rates through energy conservation and emission reduction, thus helping solve the difficulties faced by enterprises in accessing affordable financing and enabling them to enjoy the real benefits brought by energy conservation and emission reduction.

In addition, some local governments and regulatory institutions are also actively involved, together with financial institutions, to guide and promote the development of low-carbon transformation in the whole



CCB Zhejiang Branch Launches "Carbon Credit" for a "Deep Green" Carbon Emission Enterprise in Zhejiang Province

society. In 2021, the Quzhou Branch of the People's Bank of China built a carbon account index system for industrial enterprises under its jurisdiction with the two indicators of total carbon emission amount and intensity as the core, and gradually improved the data collection, accounting and rating system, dividing enterprises into four carbon emission levels of "red, yellow, light green and dark green" and forming a carbon credit report. In order to further exert the demonstration and leading role of the pilot bank of green financial reform in the process of achieving the "dual carbon" goal, CCB Zhejiang Branch proactively communicated with government departments and continuously deepened the cooperation between government and banks. Based on the government's "carbon account" system, CCB Zhejiang Branch

explored the development of carbon finance according to the four color levels, and launched the innovative "Priority Carbon Loan" product, which links loan elements with the results of carbon credit reports, classifies interest rates into "four categories and twelve levels", implements preferential interest rates for customers according to the labeling results and guarantee measures, and applies carbon credit to the whole process of credit placement, providing new viewpoints for customer access and post-lending management by account managers. Up to now, CCB Zhejiang Branch issued a total of RMB5.18 billion of "Priority Carbon Loan" to 158 customers, saving RMB20 million in interest costs for enterprises.

◆ Helping enterprises make good use of "carbon assets" through quota realization

CCB actively carried out bank-enterprise engagement, helping activate and transform the idle "carbon assets" of enterprises into real benefits through "carbon quota" pledged financing. A leading enterprise in the wooden door manufacturing industry in Chongqing has been granted environmental protection certifications such as "Ecological Origin Protection Products" and "China Environmental Labelling Products" by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China. It is also one of the key emission control enterprises in Chongqing, and was included in the city's unified carbon quota management indicating that the carbon

quotas it holds can be traded in the "local carbon market". CCB Chongqing Branch, after learning the enterprise's financing needs and problems of lacking sufficient collateral and pledges, collected and refined the enterprise's financing demands at the first time, and sorted out the Bank's environmental equity financing products. In combination with the relevant management requirements of government agencies on carbon quota allocation, trading, pledging and offset, CCB Chongqing Branch launched the innovative carbon emission rights pledged financing mode by pledging the carbon quota held by the enterprise in the local resource and environment trading center as a credit enhancement measure, providing the enterprise with loan support of RMB24 million for "quota realization". By doing this, CCB supports enterprises to adhere to a development pathway of leading



CCB Chongqing Branch Helps a Leading Wooden Door Manufacturer Realize "Carbon Allowances for Realization"

technology and environmental protection priority, continuously carry out technological improvements and environmental monitoring to ensure the products environmentally friendly, green and sustainable. With the boost of “carbon market” trading, “carbon quota”, pure environmental asset, is endowed with some functions of the financial asset, which also creates more scenarios and entrances for financial institutions to provide diversified services to enterprises.

● Guiding the demand-side low-carbon transition through green electricity use

CCB guided green power consumption through market-oriented approach, so as to promote enterprises to broaden their emission reduction pathways and accelerate

low-carbon transformation. In July 2022, the Fujian Power Trading Center issued the *Implementation Rules for Green Power Trading in Fujian Province (Trial)*. Through green power trading, power users who were willing to take more social responsibility were distinguished, and thus it became the main means of green and low-carbon transformation and the realization of the “dual carbon” goal of enterprises, making green power trading a broad market prospect. During its customer visits, CCB Fujian Branch learned that there was demand for green power trading but lacking suitable purchase channel. After learning of the customer’s needs, the Branch first visited the provincial power distribution and sales companies, sorted out the specific processes and transaction prices of green power trading in the province, and launched the innovative



CCB Fujian branch invested RMB 4.5 million in “green power loans” for a chemical company

“green power loan” product, which based on the enterprise’s green power purchase plan and electricity settlement details, provides certain interest rate concessions to enterprises that purchase green power. Through the product, the Branch successfully issued a special loan of RMB4.5 million to the customer, which was directed to the payments of green power, realizing the granting of the first green power loan in the province. The “green power loan” was highly recognized by customers for its capability to reduce financing costs by tapping into customers’ energy-saving needs.

In the next step, CCB will continue to take green as the ecological feature of new finance with a focus on the development goal of “dual carbon”. It will continue to enhance the innovation awareness, stimulate the innovation momentum, and accurately irrigate the sustained financing water into the various links of the industrial chain to reduce pollution and carbon emission, so as to contribute CCB’s wisdom and strength to promote the development of comprehensive green transformation of the society and economy.

3. Societe Generale Group - Green Cash Management Product Case Study

Societe Generale (China) Co.Ltd. (Hereinafter referred to as "SG China") was registered in Beijing and has been developing steadily in China for 41 years. In recent years, we have actively supported the Chinese government's advocacy and development of the concept of global trade in services and the construction of "two zones" proposed by the Beijing Municipal Government. Under this framework, green financial product innovation is the top priority of our strategic development.

In 2021, SG China included the practice of green finance in its 2025 strategic plan, aiming to double the scale of green finance business in the next five years. Societe Generale joined the UN Environment Net Zero Carbon Coalition in 2021 to help transform the global economy and meet the goals of the Paris Agreement. The MSCI (Morgan Stanley Capital International Global Index) ESG (Environmental, Social and Governance) rating was upgraded to AAA, ranking in the top 3% of global banks. Societe Generale China makes full use of the Group's advantages to support the green and low-carbon transformation of local clients, making unremitting efforts in product design, dividing green financial products into three categories: sustainable and positive impact financing, such as green financing and sustainability-linked financing; sustainable and responsible investments, such as ESG investment index

products; Strategic consulting, In this year's IFF Green Finance Award practices election, we will focus on our bank's "Green cash management products" as a key case.

Cash management is one of the businesses in which banks play an important role in facilitating economic transformation, as cash management not only provides deposits but also short-term loans, acting as a natural bridge between surplus capital and much-needed projects. In this context, SG China has received increasing demand for ESG-related cash management from our clients in the Chinese market and has launched and implemented a series of "green cash management products".

Sustainable cash management products are popular in the European market but are still a relatively new concept in China. Sustainable cash management tends to be less focused than project finance and other capital market products. We also note the focus on green cash management products and sustainability efforts: for example, companies are transitioning to low-carbon business models and planning to reduce CO₂ emissions from their production sites globally, and by combining surplus capital with sustainable green development, companies can use their financial resources to support ESG-related projects in the industry. In the transition to a low-carbon future, products that enable

sustainable use of surplus capital will be key to making a real difference.

In its specific business practices, SG China links the achievement of relevant green targets with investment and financing interest rates, to help further promote the vigorous development of green sustainable finance.

● Green deposits

Green deposits offer opportunities for clients with a surplus of liquidity, for example by financing green loans to support low-carbon related investment. This allows these clients to participate in the decarbonization process even if they are not directly involved in the green transition project.

As one of the first banks to launch green deposit products in the domestic market, SG China has provided relevant services to well-known companies such as Volvo Cars China.

Volvo Cars China is restructuring its product line to focus on electric and hybrid vehicles from 2025. L'Oréal China's green deposits have also been launched in SG China. L'Oréal is transitioning to a low-carbon business model and reducing CO₂ emissions from its production sites worldwide. By 2025, all L'Oréal production sites are expected to be carbon neutral. In addition, a large energy company in Beijing also entrusted SG China with its first green deposits, which is also one of the first green deposits of Chinese state-owned enterprises. The group has played an important role in adjusting Beijing's energy structure from coal-based to natural gas-based and is committed to becoming a world-class clean energy operator. Societe Generale China is committed to providing depositors with annual updates on the use of such funds and to be able to provide this service at the same level as the traditional corporate deposit



business.

◆ Green loans

Innovative solutions such as ESG Green Deposit enable banks to support companies in aligning their financing strategies with sustainability goals, while supporting the growing demand for green financing, including short-term financing for working capital.

SG China provided a US\$100 million green loan to a major power supplier listed in Beijing in Hong Kong. Under China's "dual carbon" policy, the company is investing heavily in renewable energy, and the loan will be used to support its wind and solar projects in China and overseas.

In the first half of 2022, we provided a one-year ESG loan to a financial leasing company of a large state-owned bank to support related new energy projects, which is expected to reduce CO₂ emissions by 100,000 tons per year. As one of the first two foreign banks to be included in the scope of the PBOC Carbon Emission Reduction Tool (CERT) policy by the People's Bank of China in 2022, SG China's one-year ESG loans offered to green energy project that for another financial leasing company of large state-owned bank was certified by the PBOC in the fourth quarter of 2022 and enjoyed the relevant policies of the carbon emission reduction support tool.

In the future, Societe Generale China will continue to monitor green deposit and loan projects with the help of sustainable and positive impact financial solutions teams around the world to ensure that all green

finance structures meet the definition of "green finance" in China and Europe, and continue to expand the volume of green finance deposits and loans, develop innovative green financial products, and give full play to the role of financial institutions as a bridge in the transformation of green economy.



Societe Generale wins several ESG awards

<p># Green Club</p> <ul style="list-style-type: none"> Annie Yang (Stream Lead), GBSU/TPO Carmen Lai (Stream Lead), CPLE Jeffrey Zhou, GTPS/BAN Jasmine Yan, GBSU/FTB Jennifer Lv, GBSU/FTB Gu Xin, SegILgl Sylvia Ding, SegILgl Helen Jiang, GBSU/COO/RSG Vanessa Wang, GLBA Elaine Xia, GLBA 	<p># Research</p> <ul style="list-style-type: none"> Eric Wong (Stream Lead), GLBA Richard Zhang, GTPS/PCM Lucas Fu, DFIN Leslie Chen, DFIN Yuanyuan Chen, SegILgl Sylvia Ding, SegILgl Jessie Yu, GLBA Laura Liu, Asia/CHN
<p># ESG Data</p> <ul style="list-style-type: none"> Sheena Shi (Stream Lead), IGAD Vivian Choi, GBSU/REG Leslie Chen, DFIN Richard Zhang, GTPS/PCM Yadi Chen, Asia/CHN Lillian Liu, GLBA 	<p># CSR Mkt.</p> <ul style="list-style-type: none"> Freda Wang, GLBA Jennifer Lv, GBSU/FTB Elaine Xia, GLBA Laura Liu, Asia/CHN

Energy | Water | Waste | Biodiversity | Hydropower | Hydrogen | Zero Emission

Societe Generale's Sustainability Think Tank is a staff organization with four main working groups that drive ESG activities and initiatives

4. Pricewaterhouse-Coopers Zhong Tian LLP - PwC Greenhouse Gas Emission Tracker



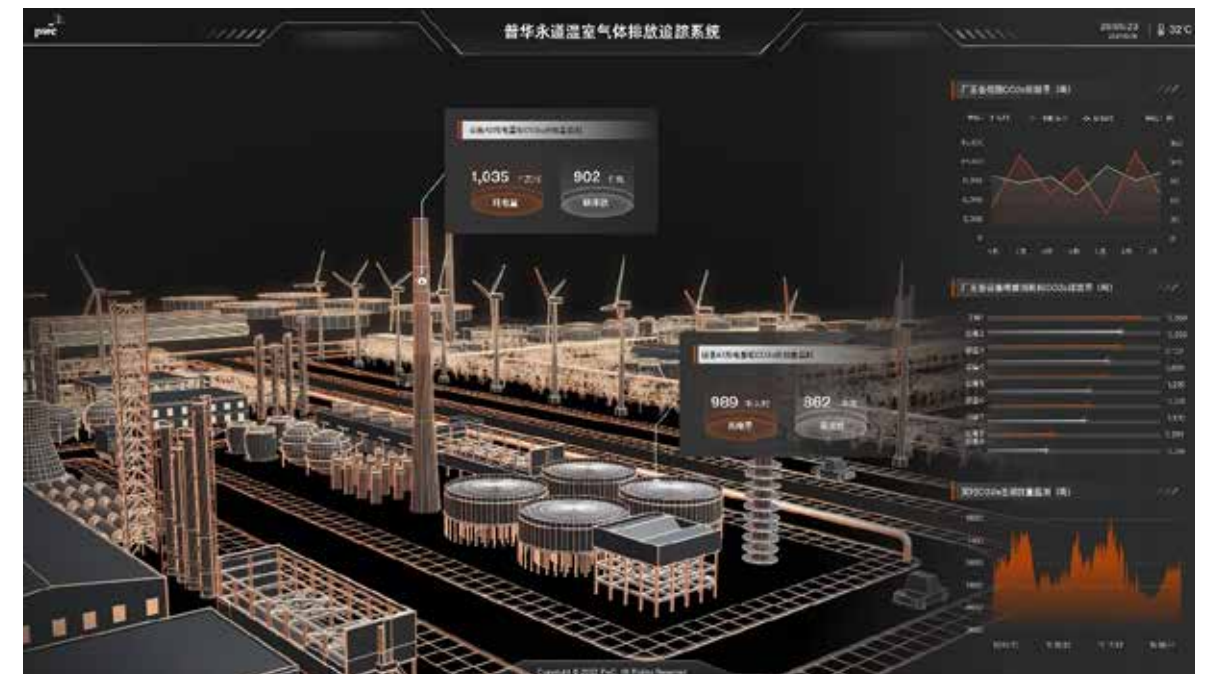
The issue of climate change is now at a critical point, and the importance of controlling greenhouse gas emissions is becoming increasingly prominent. China has raised its climate governance to an unprecedented level by putting forward the dual carbon goals. The 14th Five-Year Plan period is also a crucial period for accelerating "decarbonization".

The world is taking positive action to build a sustainable and green future, and disclosure is fundamental to achieving this goal. Greenhouse gas emission is an important quantitative information in the disclosure of ESG sustainability, and enterprises are increasingly faced with the requirements of investors, regulators and policy makers to disclose greenhouse gas emission information. Therefore, timely tracking, accurate calculation and perfect report of emission data are particularly important.

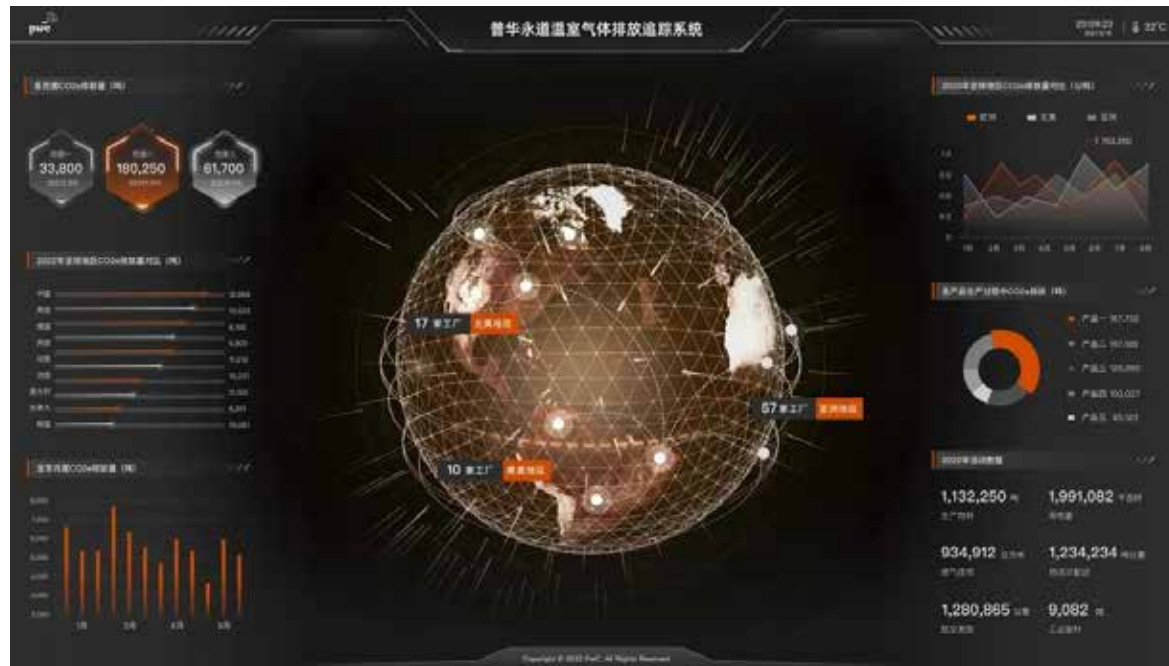
PwC Greenhouse Gas Emissions Tracker (or "the system") is an ESG digital solution independently developed by PwC China

to automate the tracking, reporting and management of enterprise greenhouse gas emissions. It aims to improve enterprises' ability to manage carbon emissions and carbon assets, also achieve synergic development of financial performance with natural environment and social benefits as well. It fully supports domestic and international accounting standards, covering not only the greenhouse gas emission accounting methods and reporting guidelines of 24 major industries issued by the National Development and Reform Commission, but also the international Greenhouse Gas Protocol and ISO 14064 greenhouse gas verification standards. Enterprises can measure and manage greenhouse gas emissions using domestic or international standard frameworks as needed, and can track, calculate and report all emissions data in scope 1, Scope 2 and Scope 3 of the accounting system.

The system adopts RPA (Robotic Process Automation) technology, which can track



Carbon emission management for industrial park



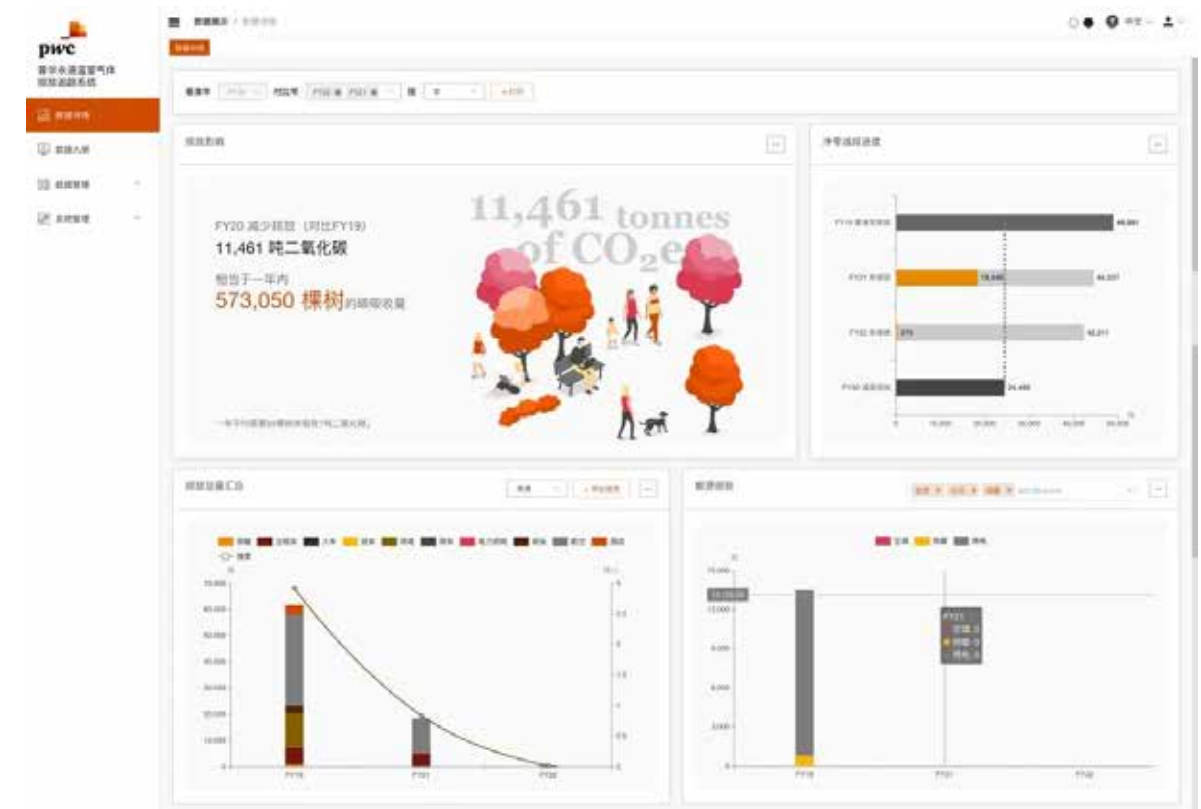
PwC Greenhouse Gas Emission Tracker Desktop

and calculate emissions data in real time, is compatible with multiple formats of data import, supports the docking with enterprise ERP and other data systems, and establishes a transparent and traceable greenhouse gas emissions monitoring and management system. In addition, the system's interactive visualized data dashboard clearly presents data dynamics, enabling operators to understand and grasp real-time emissions information more easily. Through visualized data dynamics, more in-depth analysis and insight can be obtained to help enterprises manage the implementation of emission reduction measures and net zero strategies.

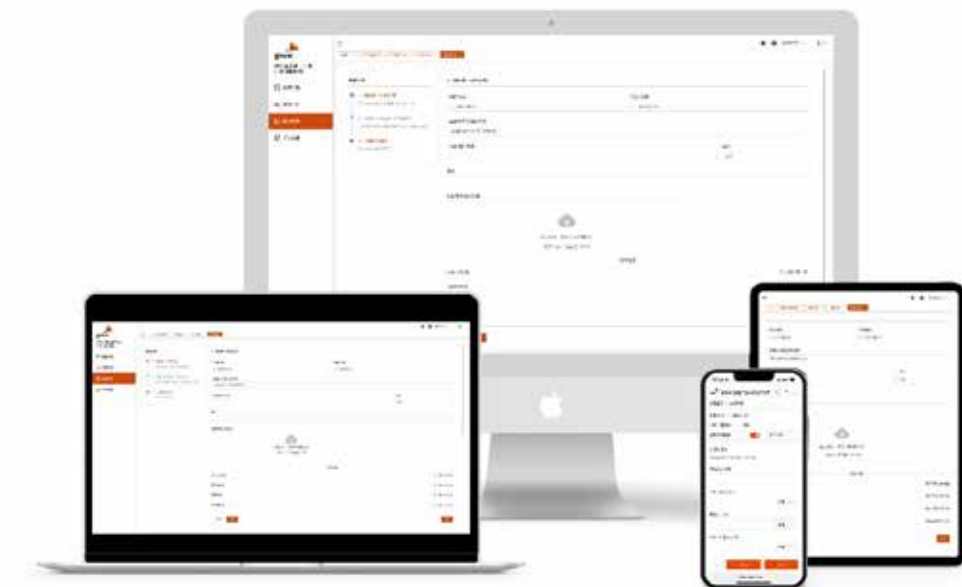
In addition to providing digital solutions, PwC also provides customers with customized end-to-end services, and gives full play to its advantages as a professional service organization to provide enterprises with services related to sustainable development

strategy, low-carbon transition, climate change, ESG reporting and assurance, and improve their ESG performance.

The system has been successfully applied to multiple customers in multiple industries. Take the example of a client of a leading global component manufacturer, which has received increasing requests from downstream customers and regulatory authorities to disclose its organizational carbon footprint. By participating in global projects such as the Scientific Carbon Target Initiative (SBTi) and CDP, the client is also looking to enhance its ESG performance, enhance its competitiveness in the ESG sector, and enhance its global impact to set a global benchmark. In addition, since the customer's production bases are spread all over the world, and the production management systems of each production base are different and there is no unified



Data display



Multiple devices adaption

data source, the customer needs to rely on the system to manage the company's carbon emission reduction and carbon neutral key performance indicators and identify emission reduction opportunities.

PwC ESG & Sustainability team starts from the actual production process of customers, and according to the requirements of the international greenhouse gas accounting system, carries out a comprehensive sorting of the sources of greenhouse gas activities, helps customers to establish monitoring and analysis of the greenhouse gas accounting methodology of different regions and their customers, and forms the core carbon assets. At the same time, the PwC Greenhouse Gas Emission Tracker has been successfully connected with the client's internal system, enabling automatic data interaction, and establishing a transparent and traceable greenhouse gas emissions monitoring and management system, covering several of the client's plants around the world. The system's interactive visualized data meter clearly presents data dynamics and increases customer stakeholder engagement and transparent and informed dialogue with them; Through precise management of relevant data, we can identify opportunities for rapid emission reduction and help customers reduce greenhouse gas emissions.

Through this digital system, PwC helps customers improve the timeliness and accuracy of carbon emission management data, assists managers to identify emission reduction opportunities, and helps customers become benchmarking enterprises in the carbon neutral industry. Meanwhile, carbon disclosure and product carbon footprint are

used to enhance brand benefits and build global trust.

In the future, the PwC Greenhouse Gas Emission Tracker will enable more industry clients to quickly implement the digital transformation of ESG, helping to achieve the country's "dual-carbon" goal.



5. China Asset Management Co., Ltd. - Construction of the new ESG investment ecosystem

Founded on April 9, 1998, China Asset Management Co., Ltd. (ChinaAMC) is one of the first fund management companies approved by the China Securities Regulatory Commission (CSRC). Headquartered in Beijing, ChinaAMC has presence in Shanghai, Shenzhen, Chengdu and Nanjing, and subsidiaries in Hong Kong, Shenzhen and Shanghai. ChinaAMC is positioned as a comprehensive and versatile asset management company, with mutual funds and institutional business as the core investment management service. It has built a diversified asset class management platform with services covering multiple asset classes, industries, and regions through ChinaAMC (Hong Kong), China Capital Management and China Wealth Management.

Since its inception, ChinaAMC has always adhered to the philosophy of "Our Performance Your Trust", providing investors with high-quality investment products and services, to increase clients' wealth and improve their quality of life. At the same time, ChinaAMC aspires to promote the healthy development of the capital market, create value for society, and contribute to economic growth. Over the past 25 years, the company upheld the principles of "integrity, respect, innovation, and sharing" in its quest to become

an influential and respected asset management company in the global capital market.

As of December 31, 2022, ChinaAMC managed assets of USD 255 billion (including its subsidiaries), serving 200 million retail clients and 110,000 institutional clients, including national social security fund, corporate annuity, segregate accounts and overseas institutional clients such as sovereign funds, central banks, pension funds, banks, asset management companies and securities companies from Europe, America and Asia.

ChinaAMC was the first in the industry to put forward the investment philosophy of "Research Creates Value". ChinaAMC's investment team is one of the largest among Chinese fund managers. The firm's more than 280 investment professionals conduct 3,000 visits to listed companies annually, providing in-depth coverage on up to 80 percent of total market capitalization of China's stock market. The average length of employment of investment managers and fund managers exceeds 12 years.

ChinaAMC is an ESG pioneer in the Chinese asset management industry. ChinaAMC was the first full-service Chinese asset management firm signed up to the Principles

for Responsible Investment (PRI) in 2017. ChinaAMC was awarded the global highest rating of A+ in the "Strategy and Governance" module of the annual evaluation report of the PRI signatories in 2020, becoming the first asset manager in China to receive this honor.

ChinaAMC established an ESG team in 2017, as the first to consolidate ESG professionals into investment teams. ChinaAMC has integrated environmental, social and corporate governance factors into the entire investment process, and frequently engage with listed companies to improve sustainable performance. ChinaAMC established a multi-dimensional and localized ESG evaluation system, as the first to practice international ESG investment philosophy and methodology in China's equity market.

ChinaAMC was also the first Chinese fund manager to establish a company-level ESG

committee led by the CEO in 2020 and formulate responsible investment policies. ChinaAMC is committed to implementing the "carbon peaking and carbon neutrality" strategy in the operation and investment management, announcing that it will achieve "carbon neutrality" in its operations from 2021, as the first mutual fund manager in China to announce a concrete timeline and roadmap for carbon neutrality. The company also gradually strengthens its portfolio carbon emission measurement and plans to complete the portfolio carbon emission baseline measurement and target setting by 2025.

With respect to international cooperation on sustainable investment, ChinaAMC also maintains its top position in China's asset management industry. In 2018, ChinaAMC signed a strategic cooperation agreement with NNIP and jointly launched world's first cross-



China Asset Management Co., Ltd. Sustainable Development Field Achievement Showcase

border responsible investment product that invests in Chinese equity market domiciled in Europe, setting a milestone for the internationalization of Chinese mutual funds. As of December 31, 2022, the fund achieved a return of 30.21% since inception, outperforming the benchmark index by 2.5%; obtained an MSCI ESG rating of BB, outperforming the benchmark index by one grade, presenting solid performance in both profitability and sustainability.

ChinaAMC continuously enriches the green investment product line, adding low-carbon and environmental protection-related thematic funds, ETFs, and ESG sustainable investment funds. More ESG-themed fund products are expected to be launched in the future.

ChinaAMC implements shareholder activism. Since 2018, the ESG team has conducted in-depth exchanges on ESG with more than 50 listed companies, assisting them to improve their sustainability. All listed companies have given positive feedback, and some of them have received upgrades in third-party ESG ratings.

Meanwhile, ChinaAMC leverages shareholder activism to improve corporate climate information disclosure and practices

by participating in communication with international organizations and independent dialogs with listed companies. For example, through participation in corporate communication of international initiatives such as Climate Action 100+ (CA100+), ChinaAMC provides climate information disclosure advice to local companies in efforts to achieve the Paris Agreement climate goals.

ChinaAMC participates in a number of sustainable development initiatives led by international organizations. In September 2019, ChinaAMC signed on to the *Investor Statement on Deforestation and Forest Fires in the Amazon* initiated by the UN PRI, becoming the only Chinese investor among all the 230 global investors making the commitment. ChinaAMC also became the first Chinese asset manager to sign up the CA100+ initiative in 2018 and serves on its Asia Advisory Group. ChinaAMC is a supporter of the Task Force on Climate-related Financial Disclosures (TCFD) as well as one of the only two Chinese asset managers participated in the pilot work on climate and environmental information disclosure among Chinese and British financial institutions. In 2021, the People's Bank of China (PBOC) released the official version of *Guidelines for Environmental Information Disclosure of*



China Asset Management Co., Ltd. Sustainable Development Field Achievement Showcase

Financial Institutions, based on the experience of the pilot institutions, and ChinaAMC assisted in drafting the asset manager section.

ChinaAMC actively participates in the green finance actions of the government, regulators, and industry associations. In 2021, as the only representative of fund managers, ChinaAMC attended the Green Finance Symposium held by the PBOC, and proposed the data analysis and development direction for the "carbon peaking and carbon neutrality" target. ChinaAMC has also provided industry ESG research materials and company practices cases to CSRC, SSE, and SZSE, and was appointed by the CSRC to participate in the Sustainable Information Disclosure Global Symposium held by International Organization of Securities Regulatory Commissions (IOSCO) as a representative of Chinese financial institutions. ChinaAMC is also a member of the Green and Sustainable Investment Committee of the Asset Management Association of China (AMAC), leading the second task force to promote the establishment of ESG investment and product standards in China.

ChinaAMC and China Alliance of Social Value Investment have released the "White Paper on ESG Development and Innovation in China" for two consecutive years. ChinaAMC also helps raise the ESG awareness of the public through public service advertisements and forums.

ChinaAMC also actively undertakes social responsibility. In 2021, its Huaxiaren Charitable Foundation donated more than RMB 590,000 to the flood victims in Henan, and also donated aids worth more than RMB 2 million to help the rebuilding in the aftermath of the flood. In addition, the Foundation has long funded

education in under-developed areas. So far, the beneficiaries include 449 less fortunate students and 22 outstanding rural teachers.

With the deepening development of capital markets in China, it is expected that the ChinaAMC ESG team will continue to improve the existing research framework, enhance the sustainability of the portfolios, and provide investors with stable long-term excess returns.

6.China Energy Conservation and Environmental Protection Group

- Introduction of the Green Finance of CECEP Hundred Technical Service (Beijing) Co., Ltd.

In recent years, the green finance business of CECEP Hundred Technical Service (Beijing) Co., Ltd. (hereinafter referred to as "CECEP Hundred" or "the company") has been committed to its Two-Three-Four Development Strategy, which means, "two field" of green finance and climate investment and financing; "three services" of green research, green certification, and green technology; "four endeavors" of research innovation, market expansion, technology empowerment, and brand enhancement. For one thing, CECEP Hundred provides research services for investment and financing activities; for another, its services for investment and financing activities can support its research work. In so doing, "Research innovation" and "investment and financing services" support and reinforce each other in the green finance business.

● Ride on the "Tide" of the Industry through Research Innovation

The green finance business follows closely the national strategies of reform for promoting ecological progress and green financing. Through bold exploration and innovation under the arrangements made to achieve the goals of "carbon peaking and carbon neutrality" and the overall framework of

green finance and climate investment and financing in the country, CECEP Hundred has provided more than 20 policy research results and nearly 10 standards and specifications for the National Development and Reform Commission ("NDRC"), the Ministry of Ecology and Environment ("MEE"), the People's Bank of China ("PBC"), China Banking and Insurance Regulatory Commission and other ministries and commissions. These achievements fill four gaps in the country and enable the company to ride the "tide" of the industry. Entrusted by the PBC and as the most important supporter, CECEP Hundred completed the research for the *Green Bond Endorsed Projects Catalogue (2021 Edition)*. As the only standard for green bond issuance in China, the *Catalogue* was jointly issued by the PBC, the NDRC, and China Securities Regulatory Commission to promote the development of the trillion-scale green bond market in China. The *Guiding Opinions on Promoting Investment and Financing to Address Climate Change*, which was drafted with the company's deep involvement, was jointly issued by five ministries and commissions including the MEE. It fills the policy gap in the field of climate investment and financing and charts the course for the development of climate investment and financing in China. CECEP Hundred also developed and published

Guidance on Taxonomy of Climate Investment and Financing Projects, the first voluntary climate investment and financing taxonomy standard in China, which fills the gap in climate investment and financing standard and defines the business boundaries and scope of climate investment and financing activities in China. Entrusted by the MEE Department of Climate Change, CECEP Hundred completed the Research on the Criteria for Inclusion in Nationally Determined Contributions Project Library, helping China summarize and demonstrate the positive results of its response to climate change to the outside world. CECEP Hundred also developed and completed the Research on Standards and Financial Support Model for Green Development of Agriculture in China, which won the “Second Prize of Excellent Development Research Achievement in the Chinese Banking Industry” and was highly recognized by Agricultural Development Bank of China, with which in-depth cooperation was promoted. Research on Environmental Performance Evaluation System of Bond Issuers, completed under the company’s leadership, filled the gap in the ESG evaluation system of bond issuers and was unanimously acclaimed by China Central Depository & Clearing Co., Ltd. and bond investors.

◆ Support Green Development through Business Practice

The green finance business of CECEP Hundred focuses on major regional development strategies of the country and reinforces the important role of market expansion in sustainable business

development. At present, CECEP Hundred has expanded the green finance business to more than ten provinces and several countries along the Belt and Road. So far it developed green certification methods for seven regions (cities and counties), including Guangzhou City and Lanzhou New District, and provided certification services for more than 5,000 projects/enterprises. The company offered green finance consulting services to more than 100 banking and financial institutions, including China Development Bank and China Construction Bank. The total investments of the projects that the company has served amount to more than RMB 300 billion. In addition, the company it worked deeply with more than ten international organizations, including the World Bank (WB), the Asian Development Bank (ADB), the Agence Française de Développement (the French Development Agency, or AFD), and the German Corporation for International Cooperation GmbH (GIZ); it also provided green finance consulting services for a number of “Belt and Road” partner countries, including the People’s Republic of Mongolia, Kazakhstan, and Pakistan.

◆ Promote Innovation in Business Products through Technology Empowerment

In recent years, CECEP Hundred has accelerated the application and transformation of financial research results, actively built a financial technology empowerment system that integrates theory with information technology development, effectively improved the efficiency and success rate of the transformation of green



Lecture on “Climate Investment and Financing Policies and Practices under the carbon peaking and carbon neutrality goals” by Liao Yuan, Chairman of CECEP Hundred Technical Service (Beijing) Co., Ltd.

finance research results, opened up the “last mile” in the transformation of finance technology results, and “preemptively” seized the opportunity for green finance business. Through the collaboration between the Information Technology Department and the Green Finance Department of the company, the Green Credit Management Information Systems 1.0, 2.0 and 3.0 have been developed and iterated; three utility software kits for carbon accounting, carbon disclosure and carbon evaluation of financial institutions have been created; the green financial service platform of Guian Pilot Zone for Green Financial Reform and Innovation in Guiyang has been launched; an ESG evaluation system and database has been established; an industry-financing platform for climate investment and financing has been developed. These initiatives have further

stimulated the drivers of technological innovation for CECEP Hundred, encouraged it to become more specialized in the R&D of green finance theories and more flexible in R&D management and control, and laid a solid foundation for the company to empower the real economy with financial technology and to support the high-quality development of green finance.

◆ Build the “Highland” of Influence through Communication and Cooperation

Taking advantage of the platform of Climate Investment and Finance Association, CECEP Hundred worked with a number of research institutes such as the Institute of Strategic Research of the Chinese Academy of Sciences and a range of international organizations



presentation on the innovative practice of green bonds

such as GIZ in carrying out research projects, and it continuously publishes important views and articles in the field of green finance and climate investment and financing; in collaboration with local financial regulators and industry associations in many provinces such as Guangdong Province, Guizhou Province, Gansu Province and Hunan Province, CECEP Hundred provided green finance training for financial institutions in these provinces and thus greatly enhanced its visibility in the industry; it actively joined ICMA and other green finance international alliances to discuss hot issues on green finance with domestic and foreign institutions; in the meanwhile it had frequent communications and cooperation with prestigious media such as Xinhua Finance and Economics and China Finance, during which it widely promoted its achievements in the field of green finance and climate investment and

financing, strengthened communication and connection, promoted win-win cooperation, and built a "highland" of influence in the industry.

In 2023, CECEP Hundred will still adhere to the general principle of "making steady progress", implement the new development concept completely, accurately and comprehensively, support the building of a new development paradigm, promote high-quality development, focus on ensuring stable growth, strengthen technological innovation, prevent and resolve major risks, give full play to the leading role of Party building, focus on key tasks, forestall risks, tackle and strengthen weaknesses, and seek practical results, and make new contributions to the realization of the carbon peaking and carbon neutrality goals, the advancement of ecological development, and the building of Beautiful China.



7. Bank of Beijing Co., Ltd. - Exemplifying Carbon Finance Innovation

Established in 1996, Bank of Beijing has seized the opportunities of the times and achieved breakthroughs in investment attraction, listing, cross-regional development, etc. successively. The bank has over 640 branches business units in not only over 10 major domestic cities including Beijing, Tianjin, Shanghai, Xi'an, Shenzhen, Hangzhou, Changsha, Nanjing, Jinan, Nanchang, Shijiazhuang and Urumchi but also Hong Kong Special Administrative Region and the Netherlands. The bank has established a classic pattern for innovation-driven development of small and medium-sized banks. In this new era, the bank has, with a focus on the three tasks of "serving the real economy, preventing financial risks and deepening the financial reform", strengthened the guidance of Party building, conducted business in accordance with laws and regulations, sped up digital transition and upgrading, enhanced comprehensive risk control, and steadily promoted high-quality development of all business segments of the Bank.

As at the end of September 2022, Bank of Beijing's total assets reached RMB 3.18 trillion and the bank realized a net profit of RMB 19.361 billion in the first three quarters. Cost-to-income ratio recorded 23.69%, NPL ratio 1.59%, provision coverage ratio 200.25%, and capital adequacy ratio 14.62%. The bank achieved outstanding performance internationally regarding all business indicators. The bank holds a brand value of RMB 76.9 billion, ranking No. 50 on the latest Top 1000 World Banks list by tier 1 capital, and was on the top 100 list for nine years in a row.

● Representative Cases

Bank of Beijing has always adhered to its mission of serving the high-quality development of the real economy. Firmly following the national green finance policy against the backdrop of carbon peak and carbon neutrality, the bank is contributing its bit to the development of green industries and the low-carbon upgrading of traditional areas.

In 2021, the bank further raised the strategic positioning of green finance business. It held the “Press Conference on Supporting the Development of Green Finance of Beijing & Releasing the Green Finance Action Plan of Bank of Beijing”, launched the green financial service brand “Green Finance+”, and established the comprehensive service system covering green loans, green bonds, green supply chains and green finance ecosystem. Meanwhile, the bank set up the management office of full-time green finance personnel in the Head Office to make overall planning for the operation and development of green finance business across the bank.

To support the national strategic goals of carbon peak and carbon neutrality and realize green, low carbon economic development, Bank of Beijing has constantly pushed for green adjustment of the investment and financing structure. The bank took the lead in carrying out carbon finance innovation to fully mine the carbon market value of enterprises. In September 2021, the bank launched the first carbon-emission-quota-pledged loan

in Beijing against the backdrop of carbon peak and carbon neutrality. In March 2022, the Bank rolled out the first CCER-pledged loan in Beijing. In March 2023, the Bank released “Bank of Beijing Carbon E-Loan”, a carbon finance product based on quantifiable environmental benefits.

◆ Major Measures

The first carbon-emission-quota-pledged loan in Beijing against the backdrop of carbon peak and carbon neutrality

Bank of Beijing developed the carbon-emission-quota-pledged loan, an innovative carbon finance product. With the carbon emission quota allocated by the Ministry of Ecology and Environment as the pledge, the Bank grants loans to eligible market entities, and encourages enterprises to use the loans first to improve their technologies for energy conservation, low carbon and clean production, and pollution control, and then in their production and operation. In September 2021, the bank granted the first carbon-emission-quota-pledged loan

in Beijing against the backdrop of carbon peak and carbon neutrality, which further enriched the green finance product line and effectively expanded the financing channels for enterprises.

Bank of Beijing built a team to take charge of the whole process of the transaction. Through the green channel, the team completed business review and approval within only seven working days and assisted the enterprise in completing the registration of the pledge of its carbon emission quota in the Unified Registration and Publicity System for Movable Property Financing of the Credit Reference Center of the People’s Bank of China. The subject of the pledge is the enterprise’s carbon emission quota assets in the carbon trading account this enterprise opened at China Beijing Green Exchange (CBGEX). Meanwhile, Bank of Beijing and this enterprise jointly submitted the Application for Freezing Carbon Emission Quota to the CBGEX and signed the Assets Freezing Service Agreement with the CBGEX, thus completing the pledge procedures of the enterprise’s carbon emission quota. After all relevant agreements were signed and the pledge freezing procedures were completed, the innovative loan was successfully disbursed.

The first CCER-pledged loan in Beijing

Bank of Beijing has innovated in credit business centering on carbon-asset-pledged loans to inject financing into Beijing’s pursuit of carbon peak and carbon neutrality. In early 2022, Bank of Beijing fully communicated with the CBGEX to explore the feasibility of CCER-pledged loans from the perspectives of market value, freezing operation and development prospects. In March 2022, to

meet the financing needs of enterprises, Bank of Beijing designed an exclusive financial service solution. With the professional support of the CBGEX, the Bank granted a loan that uses the historical average transaction price of CCER in November and December 2021 published on the Beijing e-Trading Platform of Chinese Certified Emission Reduction as the basis and the CCER held by the enterprise as the pledge. The bank enriched the types of collateral for traditional working capital loans and made better use of the enterprise’s stock carbon assets.

Bank of Beijing opened up an exclusive green channel and assigned special personnel for review and approval for efficient implementation of the transaction; assisted the enterprise in completing CCER pledge registration with the Unified Registration and Publicity System for Movable Property Financing of the Credit Reference Center of the People’s Bank of China; and signed the tripartite CCER freezing agreement with the enterprise and the CBGEX to lock the collateral and successfully granted a RMB 3 million loan to the enterprise with a term of two years, which will be all used to support the development of the forestry carbon sink project of the enterprise. The loan is the first CCER-pledged loan in Beijing.

Bank of Beijing Carbon E-Loan, a carbon finance product based on quantifiable environmental benefits

Bank of Beijing constantly deepens innovation in carbon finance products. In March, 2023, it launched “Bank of Beijing Carbon E-Loan”, a carbon finance product based on quantifiable environmental benefits. The product is



“Bank of Beijing Carbon E-Loan” Product Launch

based on the enterprise carbon account and green project database system launched by the CBGEX. This system, applying FinTech means like Internet of Things, big data, AI and blockchain, can realize intelligent monitoring and dynamical calculation of carbon emissions and serve a variety of green investment and financing needs. “Bank of Beijing Carbon E-Loan” targets projects in the green project database of the CBGEX. Based on the carbon accounting by the enterprise carbon account and green project database system, the product links loan interest rates and the system’s evaluation results and provides all-round supporting measures including preferential interest rates, quick review and flexible loan repayment for the green projects. Bank of Beijing provides differentiated financing interest rates and credit lines to projects with different carbon emission intensities based on the carbon emissions of projects automatically calculated by the system. Such difference in financial services can help guide enterprises to actively take energy conservation and emission reduction measures, apply for green projects, and energize the carbon trading market.

Implementation Effect

The successful launch of the first carbon-emission-quota-pledged loan in Beijing against the backdrop of carbon peak and carbon neutrality has played a good exemplary role for key emission enterprises to fully mine the financial attribute value of carbon assets and make better use of carbon assets. It is an important move for Bank of Beijing to implement the strategy of carbon peak and carbon neutrality, and also a solid practice of Bank of Beijing to

embrace the green development philosophy and build a new ecosystem of green finance. Through such loans, the bank has effectively helped small and medium-sized enterprises enrich the content of collaterals, solved the difficulties faced by enterprises who seek energy conservation and emission reduction in accessing affordable financing, facilitated green transition and development of financing enterprises, and created both environmental and economic benefits.

The first CCER-pledged loan in Beijing is another achievement in innovation made by Bank of Beijing in exploring the opportunities of the CCER trading market. With the CCER-pledged loans, the bank provided service and support to a domestic forestry carbon sink project, further mined the value of ecological products and empower and increase value for green industries, and created more precious carbon sink resources for the domestic carbon trading market. It is not only a beneficial attempt of Bank of Beijing to support the strategic goals of carbon peak and carbon neutrality but also another innovative cooperation with the CBGEX in the carbon asset pledge field after the Environmental Rights Financing Tools was implemented.

“Bank of Beijing Carbon E-Loan” marks another step forward on the basis of the two existing carbon finance products. It is a bold move for Bank of Beijing to employ its professional capabilities in green finance to provide differentiated value-added services to enterprises seeking emission reduction. With a focus on the three core capabilities of carbon quantification, carbon pricing and carbon finance, the product provides services to more enterprises in the real economy.



“Bank of Beijing Carbon E-Loan” Product Launch

It offers differentiated financing interest rates and loan limits based on quantifiable environmental benefits, providing a boosting mechanism for enterprise transition from the financial perspective and guiding enterprises to actively take energy conservation and emission reduction measures, thus driving green transition and development.

Overall, these carbon finance product innovations are successful examples of Bank of Beijing in building the green financial service brand “Green Finance+” and supporting the strategic goals of carbon peak and carbon neutrality of Beijing, and are also important means to promote carbon emission control and reduction by market-based ways. First, Bank of Beijing has given full play to the role of carbon trading in connecting financial capital and the real economy, which not only promoted capitalization of carbon assets but also, through allocation of financial assets, guided the real economy to pursue green development. Second, the bank provides differentiated financial services to enterprises

of the real economy based on quantifiable environmental benefits directly via a digital and intelligent carbon finance platform, linking carbon finance and digital technology and building a sustainable ecosystem for enterprise transition. Third, using the synergy of the ecosystem, the bank has provided comprehensive services that integrate financing and intelligence. In future, Bank of Beijing will, in cooperation with professional institutions, scientific research institutes and trading platforms, provide integrated carbon neutrality finance and value-added services centering on corporate and personal carbon accounts that include carbon accounting, carbon neutrality strategy consulting and carbon neutrality pathway planning, green financing and information disclosure, to fully improve the energy conservation and emission reduction effects produced by green financing and jointly enrich and refine the carbon finance ecosystem of the capital city.

8. Shenwan Hongyuan Group Co., Ltd. - Pushing forward Green and Low-Carbon Development with Professional Financial Services, Promoting the Effective Integration of Climate Change Management and “Carbon Peaking, Carbon Neutrality” Practice and Business

The report to the 20th CPC National Congress states that, to advance the Beautiful China Initiative, we must take a holistic and systematic approach to the conservation and improvement of mountains, waters, forests, farmlands, grasslands and deserts, carry out coordinated industrial restructuring, pollution control, ecological conservation, and climate response, promote concerted efforts to cut carbon emissions, reduce pollution, expand green development and pursue economic growth, and prioritize ecological protection, conserve resources and use them efficiently, and pursue green and low-carbon development. In recent years, Shenwan Hongyuan Group devoted to identify, assess and respond to the risks and opportunities brought about by climate change, and promoted the effective integration of climate change management and “Carbon Peaking, Carbon Neutrality” practice and business. The philosophy of green development was further applied to promote green and low-carbon development with professional financial services, while the philosophy of responsible investment was incorporated in the investment decision-making process to enhance the environmental and social

benefits of investing activities.

◆ Build a climate change management system and comprehensively enhance the risk prevention competence

Shenwan Hongyuan resolutely implements the national strategic plans for achieving the goals of “Carbon Peaking, Carbon Neutrality” and climate change response. With reference to the framework of the Task Force on Climate-related Financial Disclosures (TCFD), the company has identified, assessed and responded to the risks and opportunities brought about by climate change, and continued to promote climate change management and make climate information disclosure to address the concerns of regulators, capital markets and other stakeholders and comprehensively enhance its ability to forestall risks.

Shenwan Hongyuan set up “The Strategy and ESG Committee of the Board of Directors” at the board level is responsible for studying ESG-related plans, objectives, policies and significant matters, including “addressing

climate change”, providing advice to the Board of Directors and supervising and inspecting the implementation of relevant work.

The company are continuing to strengthen the analysis, judgment and early warning of climate risks under the “Carbon Peaking, Carbon Neutrality” strategy. The Industry Risk Analysis under Carbon Neutrality report was compiled in 2022 to highlight the industry and enterprise risks requiring special attention and make climate risk management more forward-looking, meanwhile, Shenwan Hongyuan is building a “carbon” financial service system, and promoting climate change management and the integration of “Carbon Peaking, Carbon Neutrality” practices and businesses activity by financial means such as issuing low-carbon bonds, supporting green enterprises’ IPOs and investing in low-carbon industries.

In view of the identified climate change risks, the company closely tracks the policy trends including environment and climate-related risks, updates the due diligence items for its investees or customers where necessary, requires the business lines, risk control function and investment research function to closely monitor the climate-related risk management of the investees or customers and properly addresses the extreme weather events in a timely manner.

To promote the effective integration of climate change management and “Carbon Peaking, Carbon Neutrality” practices with business activities, the company created an integrated service system for “carbon” finance focused on “research, products, financing, investment, trading, cross-border and risk control” and formulated an action plan to serve the national strategy of “Carbon Peaking, Carbon Neutrality”. SWS Research



Shenwan Hongyuan Underwriting Sponsor Helps Penyao E.P. Complete Refinancing

was elected a Co-Chair Member.

◆ Promoting green development financial services

Shenwan Hongyuan continued to deepen the philosophy of green development, created a “carbon neutral” industries team for investment banking, channeled capital into green industries by supporting equity and debt financing of green enterprises, continuously explored financial service models for “Carbon Peaking, Carbon Neutrality” and promoted green and low-carbon development through professional financial services.

In 2022, in terms of equity financing, the company completed 7 projects in the green industries with total financing of RMB3.978 billion. In terms of debt financing, there were a total of 22 green bonds and carbon neutral

bonds with an underwriting size of RMB8.652 billion, up 35.60% from last year.

In May 2022, the “China Huaneng Group Co., Ltd. 2022 Renewable Corporate Bond Publicly Offered to Professional Investor (Low-carbon Transition-linked Bond) (Series 1)”, lead-underwritten by Shen Wanhongyuan Securities, was successfully issued with a size of RMB2 billion. It was the first low-carbon transition-linked bond in the exchange market. This low-carbon transition-linked bond, linked to the KPI of “new installed capacity for renewable electricity,” effectively promotes the low-carbon transition of carbon-intensive energy enterprises, representing a useful exploration to help boost green and sustainable development of real industries.

Shenwan Hongyuan stepped up green research and exchanges, promoted green finance development of itself and the larger industry by publishing ESG research

reports, developed ESG-related indexes and participated in compiling the standards for ESG information disclosure and evaluation. In 2022, SWS Research published 18 research reports on ESG and was invited to jointly compile two ESG standards, namely, *General Rules for ESG Information Disclosure of Enterprises and General Rules for ESG Evaluation of Enterprises*. The two standards were issued in Beijing on June 25, which is of great significance in promoting the standardization of ESG information disclosure of Chinese enterprises.

In the 2022 China Bloomberg Hackathon held by Bloomberg in November 2022, Shenwan Hongyuan Jinchuang Quant Team won the championship with the “Business Cycle-based Sector Rotation ESG Enhanced Index Strategy”. In this competition, Shenwan Hongyuan Securities developed ESG indicators to incorporate enterprises’ contribution to environmental protection and social responsibility into investment decision making, and developed the “Business Cycle-based Sector Rotation ESG Enhanced Index Strategy” to further broaden the financing channels for carbon-neutral enterprises and projects. After comparing with many competitors, the index strategy was unanimously approved by judges and won the 2022 Bloomberg Hackathon championship.

On December 30, 2022, Shenwan Hongyuan Securities and China Bond Pricing Center jointly issued the China Bond-Shenwan Hongyuan Securities ESG Green Credit Bond Select Index. The constituent bonds are credit bonds publicly issued by issuers with good performance confirmed in China Bond ESG evaluation or green bonds that meet relevant

standards. The constituent bonds also meet the following conditions: China Bond Market Implied Rating (MIR) AA+ or above, remaining maturity of 1 to 3 years and satisfaction of the internal credit rating requirements of the company. By launching the China Bond-Shenwan Hongyuan Securities ESG Green Credit Bond Select Index, the company actively explored and innovated in the bond investment strategy R&D, design of distinctive financial products and over-the-counter derivatives customization under the philosophy of green finance and sustainable development. Such moves have effectively served “Carbon Peaking, Carbon Neutrality” industries, channeling financial precisely into the green finance system.

◆ Practicing responsible investment

Shenwan Hongyuan keeps track of the developments in responsible investment at home and abroad, gradually embedding the concept of responsible investment into its investment decision-making process. It is committed to reducing investment risks while improving the environmental and social benefits of investment activity. In the investment research business, the company actively applies responsible investment strategies such as positive screening, negative screening, convention-based exclusion and sustainability-themed investment, incorporating social and environmental impacts of investee assets in investment decision-making.

The company actively participates in green investment and impact investment. While investing in green bonds and impact



Shenwan Hongyuan as lead underwriter anchored the successful issuance of 2023 Green Financial Bonds of Zhejiang Wenling Rural Commercial Bank Co.



Shenwan Hongyuan Underwriting Sponsor Helps Sainz E.P. IPO and Listing on the SSE STAR MARKET

bonds such as “Carbon-Neutral Bonds”, “Rural Revitalization Bonds and Poverty Alleviation Bonds” with its own funds, the company provides advice on ESG investment to customers in the investment advisory business, guiding capital into areas where greater environmental and social benefits will be created. In 2022, the company’s participation in green bond investments stood at RMB7,250 million, exceeding the annual target by 45%. The asset management business line newly invested in 30 green bonds with a total size of RMB1,268 million. The participation in impact investments such as rural revitalization bonds totaled RMB405 million, with proceeds used for relocation, demolition and centralized resettlement of local people. In the investment advisory business, the company guided RMB487

million of customer funds toward green bond investments.

SWS MU, a subsidiary of the company, joined the United Nations-backed Principles for Responsible Investment (UNPRI) on December 7, 2022. It is committed to integrating the philosophy of responsible investment into its corporate investment research system in an all-round way following the PRI requirements. SWS MU set up a management framework for responsible investment. The management led an Environmental, Social and Governance (ESG) Committee to promote the incorporation and implementation of ESG in investment research, product creation and management. The ESG Committee has an ESG Working Group responsible for implementing the specific ESG work.

SWS MU makes continuous improvements in its management framework, policies and procedures for responsible investment. The *Administrative Measures for ESG Investment* was formulated in 2022, incorporating the ESG investment research function into the duties of specialist jobs. In addition, SWS MU has taken steps to create a distinctive ESG investment research system, formulate ESG investment strategies, strengthen ESG risk management, refine the information system for ESG and foster talent in ESG investment research.

The drums are beating and the tide of spring is swelling. A thousand sails are competing for the first one. Looking ahead to the new year, we will adhere to the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics in the New Era, fully utilize our intermediary function and professional

comparative advantages, actively serve and integrate into the new development pattern, continue to work hard towards the goal of building a first-class integrated financial service provider, and strive to make better achievements that are worthy of the times, the country, the people, the customers and the shareholders. We will demonstrate and implement the primary task of Chinese modernization construction with practical work and results, and make a new chapter in the process of financial support for high-quality development !



Shenyuan Hongyuan Underwriting and Sponsoring Helps Lixin Energy's IPOffering and Listing on the Main Board of Shenzhen Stock Exchange

9. Ping An Bank Co., Ltd. -Establishing multi-level green finance product system

Ping An Bank actively integrates social responsibility into the development strategy, operation and management. Closely monitoring national economic and financial situation and fully embracing national strategic deployment, Ping An Bank focuses on green finance to lead green development. We have improved capability in financial service to support the realization of carbon-peak and carbon-neutralization goals, met new development needs, cultivated "green" momentum, and built a multi-level green finance product system including green credit, green bonds, green credit cards, green wealth management, providing diversified and comprehensive financing channels for enterprises, and integrating ecological environment protection in finance service with expanded coverage.

◆ Outstanding achievements in green finance

Green Credit

Ping An Bank set priorities on 15 sub-sectors spanning six fields, namely, clean energy, environmental protection, transformation of carbon-intensive industries, green transportation, green buildings and green services. Building on comprehensive financial, technological and ecological advantages, we broaden the financing channels for enterprises for low-carbon transformation,

create tailored credit policies for green industries and projects, and provide accurate and comprehensive financial services for enterprises.

Green Bonds

We give full play to the role of the bond market in supporting sustainable development, actively build a framework for green bonds, and promote the development of green bond issuance, underwriting, and investment. In 2021, we underwrote green bonds totaling RMB 5.2 billion, among which four green bonds have obtained green bond certifications according to the International Capital Market Association (ICMA) standards.

Green Credit Cards

As a bank in full transition to retailing-oriented, we actively develop green retailing business. In 2021, innovative green credit card products such as "Low-carbon Home" and "Safe Xpeng Card" were designed, aiming at guiding the environment-friendly and low-carbon lifestyle and promoting the "carbon peak and neutrality" development on part of consumers by incentivizing them for their low carbon actions and contributions to public welfare, rewarding them in the form of card bonus.

Green Investment

Adhering to the concept of sustainable



Low-carbon Home is personal carbon account service of Ping An Bank.

development, we increased investment in green bonds and provided financial support for the green and low-carbon development of enterprises. By the end of 2021, balance of investment in carbon neutrality, carbon peak and green development related industries was RMB 5.225 billion.

Ping An Wealth Management, a wholly-owned subsidiary of the Bank, actively develops green finance and ESG investments. It incorporates green finance and ESG products into its overall plan, and develops ESG-themed products. In 2021, Ping An Wealth Management supported green finance and ESG investments of nearly RMB 13 billion, including 56 green bond investments with a **total amount of RMB 2.685 billion.**

◆ Ping An Bank's innovation in green finance

Ping An Bank gives full play to the full

license advantages of Ping An Group's comprehensive finance, uses a variety of financial products such as M&A loans, bonds, supply chain finance, bill integration, targeted real estate investment trust (targeted REITs), syndicated loans, carbon emission reduction support tools, etc., innovates business combinations and strategic tactics, and builds three business models of "commercial bank + trading bank", "commercial bank + investment bank" and "commercial bank + investment bank + complex investment and financing". Ping AN Bank is doing its best to meet the differentiated, diversified and comprehensive financing needs of various enterprises in realizing green transformation and upgrading and low-carbon development, further promote the high-quality development of enterprises.

As a capital and technology intensive industry, new energy entails heavy assets,

Environmental benefit	Data
Annual savings of standard coal (10,000 tonnes)	47.42
Annual emission reduction of carbon dioxide equivalent (10,000 tonnes)	103.86
Annual chemical oxygen demand emission reduction (tonnes)	4,094.42
Annual ammonia nitrogen emission reduction (tonnes)	21.46
Annual total nitrogen emission reduction (tonnes)	22.88
Annual total phosphorus emission reduction (tonnes)	2.27
Annual sulfur dioxide emission reduction (tonnes)	10,469.41
Annual NOx emission reduction (tonnes)	1,779.81
Annual savings of water (10,000 tonnes)	1,408.33

Note: Considering the data availability and calculation method, some unquantifiable environmental benefits are not included.

(See details on P29-P32 of PING AN BANK-ENVIRONMENTAL INFORMATION DISCLOSURE REPORT IN 2021)

large investment, long capital recovery period and high market risk. This is especially true for photovoltaic and wind power projects. They have a great demand for capital inputs and development loans in the construction and development stage. However, financial capability of the new energy enterprises, availability of financial resources on the market and the macro-economy environment make it difficult to get enough financing; therefore, new energy projects mainly rely on indirect financing such as fixed assets mortgage loans with limited financing channels, far from enough to meet the needs for large-scale, low-cost and long-term capital. To ease the financing strain of a central enterprise group in the new energy field, we innovated business model, joined hands with insurance company and trust company to create an investment model of "bond underwriting, equity direct investment and credit" (RMB 2 billion equity direct

investment, RMB 4.75 billion low-cost debt underwriting and USD 200 million green credit). At the same time, with the help of offshore finance and supply chain finance, we provided enterprises with financing schemes with better pricing compared with domestic RMB loan, and revitalize the green business development of the group, and supported the national goal of carbon neutrality.

◆ Ping An Bank's green finance business generates good economic, social and environmental impacts

1. In line with the Guidelines for Measuring Energy Conservation and Emission Reduction of Green Credit Projects (hereinafter referred to as the Guidelines) issued by China Banking and Insurance Regulatory Commission, Ping An Bank calculated and measured

the environmental benefits generated by green credits with key data from the project feasibility study report and relevant approval documents. As of December 31, 2021, Ping An Bank delivered remarkable environmental benefits through green credits.

2. Through the WeChat public account of "green finance of Ping An Bank", we update and share industry trends, research views and achievements in green finance to our employees and the public, including 12 in-depth industry research reports, 25 issuances of green finance biweekly and comments on green finance updates, so as to promote employees' understanding and capacity in green finance.

3. In 2021, Ping An Bank, together with Ping An Securities, wrote the White Paper on Green Finance Helping High Quality Development (2022), which was released on January 6, 2022. This book is the first white paper on green finance in China's banking industry, and also a summary of the bank's latest innovation and practice in the field of green finance. Through more than 400

pages of detailed information, the book systematically analyzes and discusses China's green finance related industries from the perspective of banking industry for the first time, focusing on the industrial transformation in the new era of low carbon, the industrial trend under the carbon neutral strategy, the system of green finance, opportunities and challenges, and the forward-looking prospect of green finance. It also briefly introduces the green finance practice of Ping An Bank, aiming to further disseminate the concept of green finance to the whole society and promote the development of green finance.

◆ Conclusion

Aiming at the long-term development of green finance as an industry, Ping An Bank continue to improve the structure, system and process of green finance. We provide a series of resource support including credit policies, special quotas, incentives and subsidies, and constantly develop the green finance industry to forge a warm finance.





10. UBS Group AG - Establishing a global ESG platform

UBS convenes the global ecosystem for investing, where people and ideas are connected and opportunities brought to life, and provides financial advice and solutions to wealthy, institutional and corporate clients worldwide, as well as to private clients in Switzerland. UBS offers investment solutions, products and impactful thought leadership, is the leading global wealth manager, provides large-scale and diversified asset management, focused investment banking capabilities, and personal and corporate banking services in Switzerland. UBS strives to play a leading role in green finance and create long-term value for stakeholders, focusing on driving positive change for clients, employees and society.

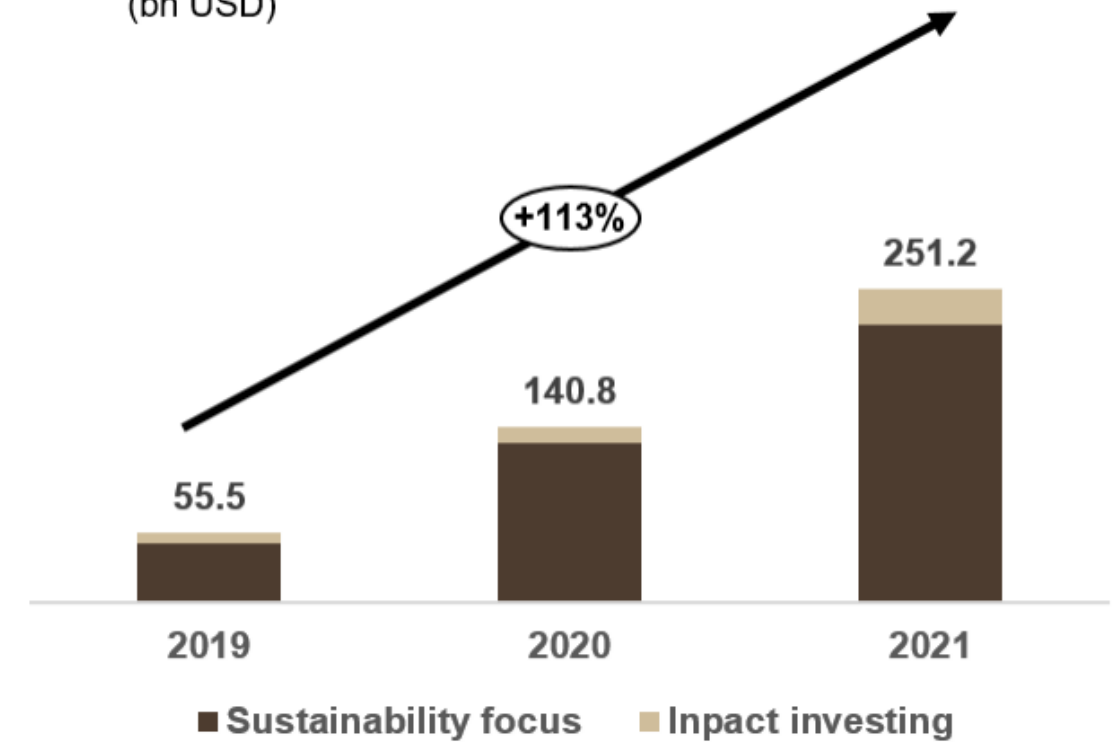
◆ Contributions to Green Finance

UBS has built a unique ESG (Environmental, Social and Governance) platform to support green finance development. Our ESG platform differentiates from that of their

peers by integrating sustainability into our global mainstream offerings across the investment bank, wealth management, asset management, research and philanthropy, aiming to create a positive effect on environment and society.

Our three key global achievements in green finance in 2021 include: First, they have made sustainability a priority for the Group Executive Board (the GEB), and all GEB members should have ESG-related objectives. Second, they have anticipated the ever-increasing demand in sustainable investments by making them the preferred solution for our private clients investing globally, and continuing to broaden our offerings. Overall, sustainability-focus and impact investments at UBS increased significantly in 2021, reaching USD 251 billion, up from USD 141 billion a year ago. Third, they have announced, and are implementing, the ambition to achieve net-zero greenhouse gas emissions across all operations by 2050.

UBS Sustainable Investment (bn USD)



Scale of UBS Sustainable Investment

In Asia Pacific, UBS has invested heavily in our ESG platform recently. UBS initiated a cross-divisional Sustainable Finance (SF) network within Asia to harness the bank's efforts on green finance more coherently and effectively to deliver as one firm in the region. A regular forum comprising about 40+ members was established for information sharing, transparency, innovation and collaboration across boundaries to coordinate and synergize efforts as part of the network. UBS also set up a dedicated SF Office in APAC to partner with the Business Divisions to accelerate revenue growth in green finance and capture the potential of this mega trend.

In China, UBS have set up the China ESG

workforce with members mainly from Global Banking division since Jan. 2020 and it has been expanded as an integrated China ESG platforms with representatives from all businesses. China ESG workforce collaborates closely with SF office and has held multiple events in the past year and will actively participate in ESG related activities in the future. UBS aim to further enhance our leadership in creating innovative green financing solutions to support clients in China.

◆ Contribution to Global and China Sustainable Development through Green Finance

UBS want to be the financial provider of choice for clients who wish to mobilize capital towards the achievement of the 17 United Nations Sustainable Development Goals and the orderly transition to a low-carbon economy. They strive to maximize positive effects in global sustainable development and to minimize negative impact on society and the environment. As a group, UBS have achieved below achievements in 2021:

- USD 161 million donations raised and USD 108 million grants committed by UBS Optimus Foundation
- Almost 680,000 beneficiaries reached through strategic community impact activities
- USD 3.4 billion invested in social, green and pandemic bonds as part of Group Treasury high-quality liquid asset portfolios with 87% yoy growth
- USD 251 billion of sustainability focus and impact investments group-wide (78% increase compared with USD 141 billion in 2020)
- We are a leader in sustainable investing (SI), with a global footprint and a network of resources to deliver a wide range of research, advisory and product capabilities that continue to grow. USD 11.6 billion client assets have been directed to SDG-related impact

investments, surpassing our commitment of USD 5 billion

- Our Investment Bank (IB) continues to shape client dialogue, integrating ESG in research and investor conferences. In 2021, 134 ESG research reports were published, in collaboration with 202 analysts. 22 of the IB's key conferences featured relevant ESG content. IB has supported 146 green, social, sustainability or sustainability-linked bond issuance since 2021 with total deal value of US\$74.1bn.
- Set decarbonization targets for 2030 for financing of the real estate, fossil fuel and power generation sectors
- 140 companies across sectors engaged in climate topics
- 92% total reduction of our greenhouse gas footprint from the 2004 baseline year

UBS is fully committed to its purpose of sustainability in China by actively conducting a number of green finance projects and working closely with clients and partners to build a comprehensive sustainable investment ecosystem. We offer wealth management clients in China with ESG solutions. They also issue green bonds for Chinese companies, and since 2021, UBS has helped issuers in Greater China complete more than \$20 billion issuance in ESG-related bonds. In terms of equity, they actively help ESG-themed companies get listed and carry out green finance equity financing. UBS helped a number of companies with carbon-neutral concept to complete overseas financing successfully, including CATL's 45bn RMB

A-share non-public offering, Tianlun Gas' \$54mn top-up placement, FTXT's RMB 900mn Series A-share private placement, Ganfeng Lithium's US\$628 million new share placement in Hong Kong, China Gas's US\$1.5 billion top-up placement, Li Auto's US\$1.52 billion dual primary listing in SEHK and US\$863 million convertible bond issuance, BYD's US\$3,860m primary placement, and so on. Among them, China Gas's placement is the largest new share issuance project ever issued by natural gas utility company listed in mainland China and Hong Kong, and Li Auto's US\$863 million convertible bond is the largest single batch of convertible bonds for a Chinese company to issue in US market since the beginning of 2021. We are committed to connecting capital with ESG through financing and transformation consulting, therefore we can support our clients on their journey to sustainability.

◆ Innovation in Green Finance

UBS group has always been committed to innovation, providing sustainable financial services across sectors on a global scale, and we have a series of innovative initiatives, including:

- UBS Wealth Management: Managing portfolios in accordance with a 100% sustainable investment approach, UBS is the first major global financial institution to recommend sustainable solutions rather than traditional solutions for the investment of global private clients. We help our clients assess, manage and protect their assets from climate-related risks by offering innovative products and services in investment, financing and research and by providing

transparency on climate risk exposure.

- UBS Asset Management: has developed a suite of products, named Climate Aware, to help investors align their portfolios toward a low-carbon future. Today, the Climate Aware strategies have grown to USD 23.4 billion in investments. They are supported by Asset Management's climate engagement program.
- UBS Investment Banking: UBS continued to leading the way in pushing the boundaries for innovation in sustainable finance via sustainability-linked bonds since 2021. Having brought the first ever SLB to Asia via New World Development's US\$200m 10 year SLB in January 2021 as a Joint Structuring Adviser and Global Coordinator, UBS followed up with a US\$400m SLB offering for Shui On Land in June 2021 which was the first ever SLB offering from a Greater China corporate with operations in Mainland China and Towngas Smart Energy's US\$200m 5 year SLB offering in April 2022 which was the first ever USD-denominated SLB from a non-property Greater China corporate.
- Commitment to Philanthropy: UBS Optimus Foundation is committed to addressing social and environmental issues. UBS has continued innovation in philanthropy. UBS Optimus Foundation has partnered with a specialist to create and launch a pioneering initiative which aims to invest USD 100 million in 15 to 20 SDG-aligned outcomes-based programs, working with governments and philanthropic donors to design and invest in projects that support vulnerable children and adults in developing countries in areas such as education, health, employment and the environment.

2022 IFF Global Green Finance Award - Annual Award Winners



2022 IFF Global Green Finance Award - Innovation Award Winners



Chapter 3: 2022 IFF Global Green Finance Award - Innovation Award Winners

1. Bank of China - Green Bond Innovation

Closely following the goals of carbon peaking and carbon neutrality, Bank of China issued a number of remarkable green bonds, established an innovative and professional brand image, and gradually consolidated the foundation of green finance, which facilitates to building green finance into a new business card of the Bank.

◆ Overview of Green Bond Issuance

Since 2016, Bank of China has issued green bond every year, involving a wide range of issuers and multiple currencies. By the end of 2022, a total of 15 rounds of green bonds has been issued in domestic and overseas market, with the amount equivalent to US\$23.3 billion, ranking first among Chinese banks. Most of the green bonds issued through Bank of China overseas branches are characterised by diversified corresponding green asset pool, which are welcomed by international investors.

Bank of China keeps strengthening innovative research on green bonds. In terms of transaction structure, Bank of China innovatively issued the first green asset-backed bond among Chinese banks, targeting

at promoting the interconnection of domestic and overseas green bond markets; In terms of the fund application, Bank of China innovatively issued the first-ever biodiversity-themed green bond offered by financial institution, and the first blue bond offered by commercial institution, for supporting the development of green loan segments. In terms of climate transition, Bank of China innovatively issued the first publicly offered transformational bond by financial institution in global market, and accumulated experience for future issuances of transformational bonds in domestic market.

Bank of China's green bond issuance has been widely recognised by both domestic and overseas professional institutions, and has been successively awarded the Global Green Finance Innovation Award by the International Finance Forum (IFF), Best Green Bonds for Financial Institutions by *The Asset*, and *Global Awards on Outstanding Leadership in Blue Bond* by *Global Capital*, Asia-Pacific Green Financing Transactions by *the Banker*, and so on.

◆ Green Bond Issuance in 2022

With the rapid development of the green

bond market, Bank of China fully support the development of green finance by leveraging its impacts in both domestic and overseas market. In 2022, Bank of China issued domestic green bonds in two phases, totalling 60 billion yuan, and overseas green bonds totalling 3.54 billion U.S. dollars. This marks Bank of China the largest green bond issuer among Chinese banks in both domestic and overseas market by volume in 2022. Adhering to the pioneering and innovative spirit, Bank of China has successfully launched two landmark transactions, the first-ever green bond that aligned with the updated version of China-EU *Common Ground Taxonomy - Climate Change Mitigation* (hereinafter referred to as the "CGT") and the first USD-denominated biodiversity bond issued by financial institution. Among them:

(1) The First Green Bond Aligned with the Updated Version of CGT

In November 2021, the first version of the CGT was released and opened for global consultation. The CGT is designed by the International Platform on Sustainable Finance (IPSF), a joint effort of the People's Bank of China (PBoC) and the European Commission, which analysed the similarities and differences between China's *Green Bond Endorsed Projects Catalogue* and the EU taxonomy for Sustainable Activities. The CGT selected a list of green economic activities recognized by both China and the EU, with the purpose of promoting China-EU cooperation in green investment, and optimize comparability of global sustainable finance frameworks. In June 2022, IPSF released an updated version of the CGT on its official website. Compared with the initial version, the updated version has integrated various feedbacks from public



Bank of China HQ



Bank of China HQ

consultation, improved the contents by adding 17 economic activities that are jointly recognised by Chinese and European experts, and thus included a total of 72 economic activities that contribute significantly to climate change mitigation.

In June 2022, Bank of China issued the first green bond under the updated version of the CGT, with the issuance amount of US\$500 million. The corresponding loan pool included projects belonging to economic activities newly added in the updated version of the CGT, and they varied by types of economic activities and geographic locations. Firstly, this issuance selected 14 projects in 5 industries, namely electricity generation from wind power, storage of electricity, construction and operation of public transportation system in urban and

rural areas, the of energy-saving pumps and vacuum equipment manufacturing, and energy-saving transformers manufacturing, among which manufacturing projects of energy-saving transformers are categorised to the new types of economic activities in the updated version of the CGT and applies more stringent and/or detailed Chinese criteria. Secondly, the bond issuance selected projects located in both China and Europe. Thirdly, the corresponding green projects covered various scenarios in the updated version of CGT, for example, areas with clear overlaps (Scenario 1), and China criteria are more stringent and/or detailed (Scenario 3). The project selection followed common or stricter criteria under each scenario.

"Bank of China issues green bond under the updated version of the CGT and explores

the development path of the international sustainable finance market through its own financial practice to attract wider groups of market players to understand and use the updated version of the CGT," said Zhou Quan, General Manager of the Assets and Liabilities Management Department of the Bank of China, "the successful issuance of this bond marks a new step in the comparability, compatibility and interoperability of the international sustainable finance taxonomy, and will help the development and the construction of international sustainable finance Market."

(2) The First Dollar-Denominated Biodiversity Bond Issued by Financial Institution

In November 2022, Bank of China, through its Paris branch, successfully issued the first USD-denominated biodiversity-themed green bond offered by financial institution, which is also the first biodiversity-themed green bond in Europe. The bond issuance has been actively subscribed by international investors. Over 10% of total subscription was from super-sovereign and sovereign investors, and the bond issuance successfully attracted the active participation of professional investors in the green and sustainable fields, marking a broad investor base.

The bond is three-year and fixed-rate, with the issue amount of US\$400 million. The bond proceeds would be used for various projects with biodiversity protection benefits, such as precious plant protection, natural landscape ecological restoration, national forest reserves, water environment management, ecological water environment restoration, ecological water network construction, and

lake ecological environment protection.

Before the opening of the second phase of the COP15 meeting, Bank of China issued another biodiversity-themed green bond. Zhou Quan indicated, "this issuance aims to promote ecological development by leveraging financial services, attract more international market participants to pay attention to biodiversity-themed green bonds, and encourage more institutions to inject financial vitality into biodiversity protection."

In the Group's 14th Five-Year Plan, Bank of China promotes green finance as one of the key development directions. Bank of China will continue to implement the strategy of ecological civilization, firmly fulfil the responsibilities and obligations of a large state-owned bank, build a green financial service brand, and become the bank of choice for green financial services.

2. LONGi-Sunflower (PV Loan) Project

In recent years, with the continuous development of household photovoltaic towards "financialization", various financial investment models in the photovoltaic industry have also emerged. At present, there are four main investment models for household photovoltaic in the market: full payment model, financing lease model, roof rental model, and photovoltaic loan model.

The investment model of household photovoltaics has gradually evolved from the initial high investment and high return "full payment installation" model to the "operating lease model" aimed at users who lack cash but want to install photovoltaic power stations; Then to the zero down payment "photovoltaic loan model" in cooperation with major local banks; And the low risk and low return "rental roof model" where users do not invest and only provide roofs. In the constantly changing and developing investment models, the financial investment market for household photovoltaic has basically achieved full coverage of the needs of different users.

The "Sunflower 2.0" launched by LONGi this year is a cooperation with Ping An Bank to jointly build a safe and reliable "green finance" model. The product features of "zero down payment, multiple rights, low threshold, and support of up to 200000 yuan" directly hit

the pain points of the household photovoltaic market. Satisfy users and distributors' operational, site building, and maintenance needs with a "one-stop" service.

Green finance revenue model: LONGi's green finance model in Sunflower 2.0, after completing the station construction procedures and grid connected power generation, the ownership of LONGi distributed household power stations will be owned by farmers, and all revenue generated by the power stations will also be owned by individuals. The commercial feature of LONGi's "Sunflower 2.0" product is that all proceeds from selling photovoltaic systems are owned by farmers, except for repaying bank loans. This approach not only provides a sustainable source of income for farmers, but also helps to reduce energy consumption and carbon emissions.

Main measures: LONGi Sunflower has established its product positioning as a "one-stop digital household photovoltaic solution" since its inception. Namely, LONGi Sunflowers will provide one-stop services to meet the business and usage needs of users and distributors, as well as the construction and maintenance needs of the station. At the same time, it can also improve the business development and operational efficiency of distributors through digital business systems

and operational platforms. Such a product has epoch-making significance in China. The common people can truly build their own power stations through "financial leverage" such as low-cost and low interest funds from banks, reducing the entry threshold for wide power stations, and selling the electricity generated by the power stations to the power grid to obtain profits.

Relying on strong digital and platform advantages, LONGi, together with Ping An Bank, innovatively launched a 10-15 year green finance product for farmers, creating a sunshine bank on the roof for farmers.

Different from the traditional photovoltaic digital loan products, the green finance products jointly launched by the two parties this time mainly have the following three innovations:

One is low threshold and multiple rights.

Farmers who apply at a low threshold can enjoy support for the construction fee of up to 200000 yuan; At the same time, Ping An Bank will also provide exclusive rights and interests to farmers through rural revitalization financial services and carbon account platforms, achieving long-term assistance and benefits to farmers;

The second is wide coverage and long term. Based on scientific calculations of regional lighting, power generation income, repayment per installment, and user income, this product can cover regions with different lighting conditions and adjust the loan term according to the actual situation of regional lighting, with a maximum of 15 years. The electricity fee is distributed after deducting the principal and interest, and farmers can obtain stable income during the use cycle of photovoltaic equipment;



LONGi Sunflower (PV Loan) Project

The third is online and intelligent. The Ping An Digital Pocket Bank APP will add relevant functional modules and integrate them with the Longji Sunflower mini program to achieve online, modeled, and automated operation of the entire photovoltaic digital loan business process. Farmers can place orders to grid connected power generation in as little as 7 days; The overall project can use IoT technology to remotely monitor the project's operation in real time, achieve sensorless intelligent post loan management, and comprehensively improve the user experience of farmers.

This "green finance" mode allows users to truly become the owners of their own power stations, and truly enjoy the benefits brought by household photovoltaic policies and power generation. As a huge commercial innovation,

Longji sunflowers can benefit millions of farmers, truly integrating our country's agricultural policies with photovoltaic development.

Partner information and cooperation mode: In this mode, Ping An Bank of China, as one of the leading financial institutions in China, provides loan support to farmers for installing photovoltaic power generation systems. Through the preferential loan policies provided by banks, farmers can obtain lower loan interest rates and enjoy more flexible repayment methods, reducing financial pressure.

Meanwhile, as one of the leading photovoltaic enterprises in China, LONGi provides advanced technology and equipment support to ensure that farmers can obtain first-class photovoltaic power generation systems.



LONGi Sunflower (PV Loan) Project



LONGi Sunflower (PV Loan) Project

LONGi's professional technical team can provide comprehensive technical support and training to farmers, ensuring their interests.

Specific example: Taking Song, a villager from Pingzhengtun Village, Changyi City, Weifang City, Shandong Province, as an example, he installed a 21.6KW Longji Sunflower Power Station. The estimated annual power generation hours are 1350 hours, and the annual power generation is about 29160 kilowatt hours. Calculated based on the Shandong regional grid electricity price of 0.3949 yuan/kilowatt hour, the annual electricity sales revenue is about 11515 yuan. The initial construction cost of the power station is 86000 yuan, and the total electricity revenue for the 25th year is 287882 yuan. For the environmental protection part, the electricity generated by the power station is equivalent to saving 9.58 tons of standard

coal per year, reducing CO₂ emissions by 21.22 tons per year, and equivalent to planting 4225 trees per year.

Green finance security measures: LONGi and Ping An Bank also innovatively launched the financial security mechanism of repayment impoundment period, repayment reservoir and repayment security fund. Due to the influence of seasonal and weather changes on distributed photovoltaic power generation, the revenue of power generation varies greatly in different seasons and weather conditions, which can easily lead to user repayment risks, and known repayment risks pose a threat to user credit security. Therefore, LONGi Sunflower has cooperated with Industrial and Commercial Bank of China and Ping An Bank to establish a repayment storage period and a repayment guarantee mechanism for the repayment reservoir. The repayment storage

period refers to the first 3-6 months after the photovoltaic power plant is connected to the grid and begins to generate electricity, without repayment. This part of the electricity generation income is used as a guarantee for future repayment by users. The meaning of the repayment reservoir is to establish a pool for storing power generation income, such as reserving two installments for repayment in the pool. This part of the power generation income is kept in the user's card, but the user cannot directly withdraw it, and the bank is not used to repay the loan. This part of the power generation income serves as a guarantee for future repayment, ensuring that the known risks mentioned above do not pose a threat to the user's credit, and avoiding the uncontrollable weather and seasonal changes risks with product solutions.

The "Sunflower 2.0" product launched by LONGi and Ping An Bank of China is a very innovative and forward-looking green finance service. By integrating the resources of banks, photovoltaic enterprises, and farmers, a complete full chain service model has been formed, promoting the development of green economy in rural areas of China. This "win-win" cooperation model not only promotes economic growth in rural areas, but also helps to promote China's greater contribution to the 3060 dual carbon target.

3. ICBC-Green Shipping Loan aligned with the Poseidon Principles



parties have determined through international bidding to order two custom river and ocean LNG carriers from Hudong-Zhonghua Shipbuilding (Group) Co., Ltd., the only comprehensive manufacturer of equipment on the whole LNG industrial chain in China, and select a leading international shipping companies as the operation manager of the carriers of the project. The parties concerned have jointly established a single ship company to specifically implement the supporting LNG long-term agreement of the ship lease, and the single ship company has submitted a financing application to its shareholders' long-term partners ICBC and a Japanese commercial bank.

ocean LNG carriers independently designed and built by Hudong-Zhonghua and are new members of Hudong-Zhonghua's G4 "Changxing" series LNG carriers. They adopt X-DF low-speed dual-fuel diesel engine direct propulsion system and burn LNG. Compared to traditional carriers, their carbon dioxide emissions can decrease by 15%, nitrogen oxide emissions by 85% and sulfur oxide and PM emissions by 99%. After learning SN Group's positioning of a "forerunner in low-carbon development", based on shipping and energy customers' need of purchasing green carriers, ICBC has jointly designed the Poseidon Principles-linked international syndicated loan service solution for green energy carriers. The Japanese commercial bank and ICBC took the lead in setting up the international syndicate, and invited domestic and overseas commercial banks to participate in the syndicate. The loan uses carriers as the pledge in addition to 80% equity pledge and

◆ Solution Design

Based on the application of the single ship company, ICBC and the Japanese commercial bank have designed a ship financing solution for it. The carriers of the project are river and



Green Shipping Loan aligned with the Poseidon Principles

◆ Introduction

Through continuous hard work and steady development, ICBC has become one of world's leading banks, with a quality customer base, a diversified business structure, strong innovation capability and market competitiveness. With services as our foundation, we have been creating value through services. We provide abundant financial products and quality financial services to over 10 million corporate customers and 720 million personal customers around the world, and serve the high-quality economic and social growth with our own high-quality development. We consciously incorporate social responsibility into our development strategy and operating and management activities. We have been widely praised in developing inclusive finance, assisting in rural revitalization, promoting green finance, supporting public welfare programs, etc.

In the process of business development,

the Bank has always adhered to integrating economic responsibility with social responsibility, attached greater importance to the development of green finance and support for ecological civilization in the Group's development plan, and made clear that the Bank will "lead the way in practicing green development and develop into a world-leading green bank with a good international reputation" to boost the high-quality development of the real economy with green finance.

◆ Project background

To ensure energy supply security in Shanghai and surrounding regions in the middle and lower reaches of the Yangtze River, the SN Group, a Shanghai-based large state-owned energy enterprise, has signed a long-term purchase agreement of liquefied natural gas with an overseas liquefied natural gas (LNG) company. LNG will be supplied to the Shanghai LNG Terminal in the long term. To facilitate the transportation of LNG, the two



Green Shipping Loan aligned with the Poseidon Principles

transfer of interests. Within five working days after drawdown is completed, ICBC obtains the confirmation letter of transfer of insurance interest issued by the insurance company after the registration for the pledge of the carriers is completed and relevant insurance of the carriers becomes effective.

● Performance

In terms of innovation features, the project is based on the Poseidon Principles, and uses the carbon emission intensity of shipping as a key consideration in the evaluation of the loan offer. The Poseidon Principles are an industry standard established by international mainstream financial institutions based on IMO's 2018 "climate deal", which requires cutting the carbon emissions of some ships by 40% by 2030 compared to 2008. Financial institutions evaluate whether a shipping project meets the objectives of the climate deal based on the Poseidon Principles, so as

to urge customers to cut carbon emissions to obtain loan support. During the project term, the borrower shall disclose to the lender the fuel consumption data of the carriers of the project before June 30 every year. The lender calculates the carbon emission intensity of the carriers using the fuel consumption data, quantifies its climate impact and gives a score, so as to judge whether the decarbonization of the carriers of the project meets IMO's carbon emission reduction objectives.

In terms of replicability, the project has opened up an innovative path to provide green finance services to enterprises under the "Going Global" strategy. With the deepening of the Belt and Road Initiative and the "Going Global" strategy, a large number of Chinese-funded enterprises have made investments overseas, but Chinese-funded banks lack relevant experience in providing green financing to overseas projects. Meanwhile, when providing financial services to domestic

enterprises' overseas entities, domestic banks are subject to regulatory requirements that are different from those applied to foreign banks. In this project, loans are granted by remitting loan funds to an overseas correspondent bank via ICBC's free trade zone accounts. Meanwhile, ICBC engages an international law firm to issue professional opinions on the preconditions for using the loans and on the international laws involved in the financing, so as to meet domestic and overseas regulatory requirements.

In terms of contribution to the sector, in recent years, a large number of Chinese-funded enterprises under the "Going Global" strategy have made investments overseas, generating the demand for credit financing. As the overseas companies set up by domestic Chinese-funded enterprises have no credit record or settlement record in overseas banks, it makes it difficult for overseas banks to assess their risks. In this project, as an intermediary liaison of the international syndicate, ICBC has prompted the international syndicate to provide more preferential financing cost and financing conditions to the borrower, and worked with overseas banks to deal with the difference between domestic and overseas regulatory requirements with an innovative mode. We have strengthened risk control in credit business, offshore entity credit and business structure and expand the depth and breadth of cross-border financial services.

In terms of profitability and sustainability, the project is one medium-sized river and ocean LNG carrier. It has the shallowest design draught among carriers of the same level. It can enter the Yangtze River during the dry

season and it has strong handling capacity. Currently, China has Shanghai Wuhaogou LNG Terminal, Dongguan Jovo LNG Terminal and Shenzhen Hua'an LNG Terminal, which have created a specific demand market for medium-sized LNG carriers. Moreover, there are a few upstream LNG uploading projects/sellers available. Currently in Asia, there are only Singapore LNG Terminal, Malaysia LNG Terminal and Brunei Lumut Terminal. Therefore, once a trade contract is signed, the buyer will perform contract obligations according to schedule and will not easily break it. The LNG shipping market segment can create long-term, stable LNG transportation demand.

In terms of contribution to the society, the preconditions for the international syndicated loan are set according to the requirement that Hudong-Zhonghua collects payments first and then delivers carriers. A preferential loan interest rate is provided, to support Hudong-Zhonghua rolling out the first of such LNG carriers. The project has demonstrated Hudong-Zhonghua's design capability and excellent shipbuilding capability, and promoted it to build the international brand of "intelligent manufacturing in China". The carriers of the project are the world's largest fourth-generation LNG carriers on shallow waterways and they can enter inland rivers. The project has further implemented the *Suggestions on Promoting Coordinated and Stable Development of Natural Gas of the State Council* and promoted the "Upgrade Cargo Ships Along the Yangtze River" strategy. Meanwhile, the project has actively responded to Shanghai's LNG supply guarantee demand, the "Upgrade Cargo Ships

Along the Yangtze River” strategy and the goals of carbon peak and carbon neutrality. The project has ensured stable transportation of imported LNG, not only sufficiently improving Shanghai’s natural gas security and emergency capacity and peak load regulation capacity but also solving phased imbalance between supply and demand of natural gas. The project has thus provided an effective measure and means to achieve a supply-demand balance of natural gas.

In terms of environmental benefits, the subjects of the project are river and ocean LNG carriers. Equipped with X-DF dual-fuel (marine fuel and LNG) engine direct propulsion system, the LNG carriers can emit 15% less carbon dioxide, 85% less nitric oxide, and 99% less sulfur oxide and PM compared to carriers with traditional marine engines. Meanwhile, the carriers of the project can directly meet the IMO Tier III requirements under any mode, indicating reduction of nitric oxide emissions.

● Overview

The financing solution is based on the Poseidon Principles, and uses the carbon emission intensity of shipping as a key consideration in the evaluation of the loan offer. During the project term, the borrower shall disclose to the lender the fuel consumption data of the carriers of the project before June 30 every year. The lender calculates the carbon emission intensity of the carriers using the fuel consumption data, quantifies its climate impact and gives a score, so as to judge whether the decarbonization of the carriers of the project meets IMO’s carbon emission reduction objectives.

The project pays close attention to the needs of shipping and energy customers and supports high-end advanced manufacturing. By aligning itself to the international industry standard, the Poseidon Principles, the project has learnt how to track carbon footprint and motivate relevant enterprises to continue carbon emission reduction activities through financing products. In this project, it’s the first time a Chinese-funded bank participates in international ship financing under the Poseidon Principles, opening up an innovative path to provide green finance services to enterprises under the “Going Global” strategy, and accumulating precious experience for innovation in ship financing service.

4. GD Power Development Co., Ltd. - Carbon-Finance-Link System Development & Application

Guodian Power Development Co., Ltd. (hereafter as “GD Power”) is a core listed company of the CHN Energy Group. GD Power was officially established in 1992 and mainly engages in the production and sales of electricity and heat. Its projects are distributed in 28 provinces, cities, and autonomous regions across the country. As of the end of June 2022, the company’s total assets reached 412.434 billion yuan, with a total installed capacity of 100.3864 million kilowatts, and a total share capital of 17.836 billion shares. Its thermal power installed capacity was 76.17% of the total installed capacity, with 76.46 million kilowatts; hydropower installed capacity accounted for 14.9% of the total installed capacity, with 14.9566 million kilowatts; wind power and photovoltaic installed capacity accounted for 8.94% of the total installed capacity, with 8.9698 million kilowatts. GD Power’s main economic and technical indicators rank among the top comparable companies, and have been selected for the Forbes list of the World’s Most Trusted Companies and awarded the top 100 listed companies in China and the National May Day Labor Award.

● Digitalization of green assets management through Carbon-Finance-Link System

In recent years, many companies have vigorously developed carbon reduction projects such as renewable energy to promote sustainable development, respond to climate change, and serve the national dual carbon goals. However, due to the involvement of many professional technologies such as carbon reduction accounting, green finance product management and external certification, and carbon asset management, most companies lack professional technical capabilities and management systems, which leads to increase in management costs and brings obstacles to financial institutions for green finance investment, urgently needing a comprehensive solution.

Based on the above needs, GD Power has collaborated with a green finance technology service provider (iGreenBank (Guangzhou) Information Technology Co., Ltd.) to jointly develop the “Carbon-Finance-Link System - carbon finance digital management system” (hereafter as the “Carbon-Finance-Link

System”), which helps enterprises to achieve carbon reduction project management, green finance product intelligent management, certification and MRV (monitoring, reporting, and verification), carbon asset management, and other functions, building an efficient and low-cost enterprise green finance and carbon asset digital management system.

● The Introduction of Carbon-Finance-Link System

The *Carbon-Finance-Link* System aims to use digital technology such as blockchain to build a digital management platform that links carbon reduction projects, carbon assets, and green finance businesses. The *Carbon-Finance-Link* System provides digital information to GD Power through SaaS, mainly including four core functions: (1) Carbon reduction project (library) management and certification, which provides enterprises with carbon reduction project information management, operational data management (including carbon reduction accounting, environmental benefits measurement and MRV), carbon account management, and intelligent green certification services; (2) Green loan management and verification, which provides enterprises with online green loan management, online intelligent verification, online reporting, loan tenure monitoring and verification, and related data statistics services; (3) Green bond management and certification, which provides enterprises with online green bond management, intelligent verification, bond duration monitoring and verification, and related data statistics services; (4) Carbon asset management, which provides

enterprises with carbon accounting, real-time carbon trading quotations, carbon asset development support, carbon asset management, and related data statistics services.

By the end of 2022, GD Power has used the *Carbon-Finance-Link* System to manage more than 200 renewable energy projects such as wind power and solar photovoltaic power generation online, to set up a total carbon account for the enterprise, the carbon credit account for each project and carried out carbon reduction accounting. Based on the uploaded data archived with blockchain, the system is available to conduct intelligent verification and MRV for green bonds, green loans, and other green finance products.

● Outstanding Achievements of Carbon-Finance-Link System

Based on technologies of blockchain and smart contracts, the *Carbon-Finance-Link* System can achieve carbon asset management, carbon reduction project verification management, green finance product intelligent management, MRV and certification, building a high-efficient and low-cost system for enterprise green finance and carbon asset digital management. Through *Carbon-Finance-Link* System, GD Power's online management of renewable energy projects involves a green bond financing scale of more than 6 billion yuan, a green loan financing scale of more than 5 billion yuan, an annual carbon reduction of about 15 million tons, and an annual carbon asset value of more than 800 million yuan.



Zhoushan Offshore Wind Power Project

In terms of scalability the project types currently included mainly consist of renewable energy projects such as wind power and photovoltaic power generation, and can be expanded to various types of green projects in the future. The types of financial products that the *Carbon-Finance-Link* System can diversely serve for green bonds, carbon neutral bonds, climate bonds, blue bonds, sustainable-linked bonds, green loan etc., and can be further connected to leasing financing, funds and insurance products. With the applicability to abundant types of projects and financial products, the *Carbon-Finance-Link* System has large space for horizontal and vertical expansion of the system, strong adaptability and inclusiveness of the system, showing its promotability.

In terms of industry contribution, the *Carbon-Finance-Link* System is the first of its kind

in China, and undoubtedly will effectively serve the national “dual carbon” strategy for related enterprises. By using digital technology to efficiently link corporate carbon emission reductions and carbon assets with green finance, it can improve corporate management efficiency and reduce management costs, while laying the foundation for further innovation in carbon finance. At the same time, it makes full use of digital technology advantages to realize intelligent management, certification, and MRV of carbon emission reduction projects and green finance products for corporate groups, regional companies, and project companies, which improves management efficiency and reduces management costs. The innovative digital credit mode provides a solution to the problems of “greenwashing”, carbon data falsification and errors that have plagued green finance. In addition,



Inner Mongolia Onshore Wind Power Project

the *Carbon-Finance-Link* System helps reconstruct the operation mode of the entire industry ecosystem, greatly improves efficiency, and reduces management costs for all parties, thus promoting the high-quality development of the entire industry ecosystem.

In terms of profitability, GD Power has already and will continue to use the *Carbon-Finance-Link* System to issue green bonds, green loans, and other green finance products. The economic benefits achieved as follows: First, by using the intelligent verification of the System to save large amount of verification and MRV costs. It is estimated that GD Power can save about 1 million yuan in verification costs per year. Second, the issuance cost of certified green bonds is 15bps lower than that of non-green bonds, saving about 10 million yuan in bond financing costs per

year. Third, the certified green loans can apply for the carbon-reduction supporting tool of the People's Bank of China, saving about 10 million yuan in loan financing costs per year. Fourth, the *Carbon-Finance-Link* System will provide effective support for the development of carbon assets, thereby increasing GD Power income. It is expected that 15 million tons of carbon assets will be developed each year, achieving about 800 million yuan in annual sales revenue. Moreover, the *Carbon-Finance-Link* System will save management costs for GD Power by improving management efficiency.

In terms of promoting social benefits, the *Carbon-Finance-Link* System is committed to using digital technology such as blockchain to prevent "greenwashing" and ensure the "integrity" of green finance and carbon asset management, which has a positive

promoting effect on the efficient operation of enterprises and the establishment of a new type of credibility system in society. Overall, the *Carbon-Finance-Link* System achieves the unity of economic benefits and social benefits. Project owners reap the benefits of low financing costs brought by the development of green projects, while the whole society enjoys the benefits of reduced carbon emissions and a better ecological environment.

In terms of innovation, the *Carbon-Finance-Link* System has established carbon accounts at two dimensions of enterprise and project to measure carbon emissions reductions respectively. This achieves full-system carbon emissions reduction project management across enterprise groups, regional companies, and project companies, improving the efficiency of carbon asset management. In the meantime, by using digital technology to efficiently connect enterprise carbon emissions reduction and carbon assets with green finance, it provides enterprise management efficiency and reduces management costs, laying the foundation for further carbon finance innovation. In addition, through the *Carbon-Finance-Link* System, green finance products implement intelligent management and verification, and achieve multi-standard consensus.

◆ Summary

The *Carbon-Finance-Link* System is nationally originated and undoubtedly, it will effectively serve the national goal of "carbon peaking and carbon neutrality" goals for enterprises. By using digital technology of blockchain and other means to provide technical support for

sustainable development, it is regarded as a major green finance technology innovation and will bring tremendous contributions to the industry. As a large state-owned listed energy enterprise, GD Power takes the lead in developing and supporting innovative green finance and carbon asset digital management system for renewable energy development, strengthening its social responsibility, and providing a good practice reference for counterpart large energy enterprises in China.

5. China CITIC Bank - CITIC Carbon Account

◆ CITIC Bank Credit Card Center

CITIC Bank Credit Card Center is a business department set up by CITIC Bank in Shenzhen for unified management, centralized operation and independent accounting of credit card business. It is the national headquarters of CITIC Bank's credit card business and the first branch-level franchise. Since the card was officially issued at the end of 2003, it has always adhered to the cost and risk control strategy of "being invincible", adhered to the development policy of "customer-centered", practiced "product leadership, customer intimacy, channel as king, operation excellence", constantly innovated products and services, and strived to cultivate business characteristics and management advantages. Promote the coordinated development of efficiency, quality and scale of business.

At present, CITIC Bank Credit Card Center has been established for 20 years. Since the "first year" of China's credit card development, CITIC Bank Credit Card Center has taken root in Shenzhen, relying on the tide of reform and opening up, resonating with the development of China's social economy, creating a "credit card with temperature", and has achieved great development by leaps and bounds, becoming the leading domestic card issuing scale of "100 million". Become the leader

of CITIC Bank's "new retail" development strategy, and practice the bank's brand proposition of "let wealth have temperature".

◆ Project Background

Lucid waters and lush mountains are invaluable assets, and it is the common responsibility of the whole society to build an earth home where man and nature live in harmony. With the proposal of "30.60" double-carbon target in China, CITIC Bank Credit Card Center responded positively to the government's call, and in April 2022, CITIC Carbon Account, a personal carbon inclusive platform based on CITIC Bank's green financial system, was officially launched, which was the first personal carbon account launched by domestic banks and centered on the city. Individual carbon emission reduction is accumulated by scientific measurement method, so that green consumption behavior can be digitized, visualized, traceable and measurable, thus guiding the transformation of green consumption of social citizens.

Since its launch, "CITIC Carbon Account" has gained great attention and recognition from all walks of life, and has been successfully selected as the benchmark case of the first "Eco-Brand Development Report (2022)", and the bank has been awarded the eco-brand certification. With its outstanding performance in green financial innovation

and practice, it won the first "Green Finance Pioneer Innovation Award" at the "Dawan District Green and Sustainable Finance Summit" in Shenzhen. According to the 2022 annual performance report of CITIC Bank, as of December 31, the number of "CITIC Carbon Account" accounts was 681,000, with a cumulative emission reduction of 536.52 tons.

At present, the path of carbon emission reduction in China is mainly through the production side, but the various products produced by the production side produce emissions because of consumption. The emission reduction of the consumption side not only has great potential, but also has a huge traction effect on the production side. Encouraging consumers to actively participate in carbon emission reduction actions, thus driving the production side to carry out carbon emission reduction, is of great strategic significance for the green and

low-carbon transformation of the economy and society.

◆ "CITIC Carbon Account" Project

As a "green account" for measuring individual carbon emission reduction, CITIC Carbon Account has received the attention and guidance of the Ministry of Ecology and Environment, Shenzhen Bureau of Ecology and Environment, Shenzhen Banking and Insurance Regulatory Bureau, Shenzhen Financial Bureau and other units from research, development to formal launch. CITIC Bank Credit Card Center has carried out in-depth cooperation with Shanghai Environmental Energy Exchange, Shenzhen Emission Rights Exchange and other institutions in this project, and jointly carried out research and development with China Huixin Carbon Asset Management Co., Ltd.,



"CITIC Carbon Account" Project Wins Green Finance Pioneer Award



CITIC Carbon Account interface display

a third-party professional organization in China. The "CITIC Carbon Account" project was officially launched on World Earth Day on April 22, 2022.

"CITIC Carbon Account" is a "green life business card" tailored for the vast number of users, accurately reaching the low-carbon behavior data in various life scenarios, so that users can get a fast and smooth new experience of green life. At the same time, CITIC Bank announced the launch of the "Green Xinhui" ecological platform, jointly with multi-party ecological partners, so that users' green low-carbon behavior can be measured and traced, so that green consumption behavior can be digitized, visualized, capitalized and valued, thus giving full play to the synergistic effect of the industrial chain and the ecological circle.

(1) Main developments since the launch of the "CITIC Carbon Account" project:

1. Tree Planting Day on March 10, 2022: the

release of five highlights of "Green Paper on Low Carbon Life 2022" and the launch of the internal test version of "CITIC Carbon Account"

On the eve of Arbor Day on March 10, CITIC Bank launched the internal test version of "CITIC Carbon Account" and released the highlights of "Green Paper on Low Carbon Life" to build a "double perspective" of news with "double events", to stabilize the industry's first position, and to establish the bank's leading edge in personal carbon accounts. This stage has received reports from leading party and government media including People's Daily, Xinhua News Agency, China Daily, Guangming Net and Global Network, as well as key financial and ESG media reports such as China Net Finance and Economics, Sina Finance and Economics, China Securities Daily and 21st Century Economic Report. China Environment Network (news unit directly under the Ministry of Ecology and Environment), China Development Network (news unit in charge of

the Development and Reform Commission), Carbon Neutralization Commission, China Banking Association, China Energy Conservation Association and other key ministries and professional associations have paid close attention to forming a strong and positive endorsement to build a positive public opinion environment for the listing of "CITIC Carbon Account".

2. International Forest Day, March 21, 2022: the official release of the full version of the Green Paper on Low Carbon Life in 2022

On March 21, International Forest Day, CITIC Bank Credit Card, together with IPSOS and Sina Finance ESG Rating Center, released the full version of the Green Paper on Low Carbon Life 2022 for the industry, which once again gained further attention from the industry

with extensive audience research, detailed research conclusions and rich industry insights. During the same period, China News Weekly and other mainstream media jointly disseminated on the official micro-blog, which won wide attention from the official micro-blog @ Shandong Environment (Shandong Ecological Environment Department), @ Eco-China Network (official micro-blog of China Forestry Ecological Development Promotion Association), @ 922 Green Travel (China Urban Planning and Design Institute) and other regulatory units and industry associations, paving the industry's leading edge.

3. World Earth Day, April 22, 2022: [Green Start, Low Carbon New Future - CITIC Carbon Account Cloud Press Conference] was held, "CITIC Carbon Account" was



"CITIC Carbon Account" Project Wins 2022 IFF Global Green Finance Awards - Innovation Award



officially launched, and "Luxinhui" low-carbon ecological platform will be launched at the same time.

On April 22, on the occasion of the 53rd World Earth Day, a "Green Start, Low Carbon New Future-CITIC Carbon Account-Cloud Conference" was held, inviting government regulators including the Shenzhen Municipal Committee, the Shenzhen Local Financial Supervision and Administration Bureau, the Shenzhen Bureau of Ecology and Environment, and the National Center for Strategic Research and Cooperation on Climate Change of the Ministry of Ecology and Environment. Representatives from Shanghai Energy and Environment Exchange, China Automobile Circulation Association, Air China, Xiamen Airlines, Haihang, Tencent, Jingdong, Huawei, Tianyin Science and Technology, CITIC Academy, CITIC Digital Media, Dachang Bank and other partners, as well as senior banking card organizations such as China UnionPay, Visa and MasterCard, a total of 15 industry partners attended, with

more than 80 media. They witnessed the official release of "CITIC Carbon Account" and officially launched the "Green Xinhui" low-carbon ecological platform at the conference, which won wide attention from the industry.

The cloud conference was broadcast live on the four platforms of CITIC Bank Credit Card Official APP "Moving Card Space", Sina Weibo, Sina Finance APP and CITIC Bank Credit Card Official Video Number, with more than 800000 viewers. The cloud conference takes the form of online paperless to fulfill the green low-carbon commitment with practical actions.

From the release of the Green Paper on March 10 to the official release of "CITIC Carbon Account" on April 22, the dissemination of this listing has received 2,650 news reports, 7928 positive public opinions on the whole network, and the total reading volume of original topics on social media has exceeded 71.06 million, realizing the leap from "zero" to "hot" product awareness. At the same time, "CITIC Carbon Account" has aroused

widespread concern from all walks of life in the emerging field of personal carbon emission reduction, and actively advocated and practiced green low-carbon life.

4. August 8, 2022: the expansion of the ecological platform through cooperation based on "CITIC Carbon Account"

In order to give full play to the alliance effect of CITIC's "LuXinHui" low-carbon ecological platform and join hands with multi-partners in the industrial chain to achieve two-way empowerment, on August 8, CITIC Bank Credit Card Center and Visa jointly announced the formal signing of a memorandum of strategic cooperation on sustainable business, and the two sides will implement the concept of financial responsibility and green finance. Jointly carry out business exploration related to sustainable business and carbon accounts.

5. In May and November, "CITIC Carbon Account" was upgraded and low-carbon scenarios were further expanded

Since November, the financial low-carbon behavior of CITIC Bank debit card users can accumulate carbon emission reduction through the "CITIC Carbon Account", which covers four carbon emission reduction scenarios, including the opening of media-free debit card, online transfer, credit second loan processing and credit second loan repayment. During the same period, the newly upgraded "CITIC Carbon Account", whether it is CITIC Bank debit card, credit card users or other bank card users, can be registered and opened through CITIC Bank mobile banking APP and mobile card space APP to support the opening of accounts by the whole people, so that more consumers' green low-carbon

behavior can be measured and traceable, and promote the wide integration of green low-carbon into people's lives.

6. In 2022, "CITIC Carbon Account" was highly regarded and won multiple awards

In 2022, "CITIC Carbon Account" won the "Global Green Finance Award-Innovation Award" of the International Finance Forum (IFF); It was successfully selected as the benchmark case of the first Eco-Brand Development Report (2022), and the bank was awarded the Eco-Brand Certification. With its outstanding performance in green financial innovation and practice, it won the first "Green Finance Pioneer Innovation Award" at the "Dawan District Green and Sustainable Finance Summit" in Shenzhen.

According to the 2022 annual performance report of CITIC Bank, as of December 31, the number of "CITIC Carbon Account" accounts was 681,000, with a cumulative emission reduction of 536.52 tons.

(II) Main Functions and Innovations of "CITIC Carbon Account" Project

1. Systematic design of "CITIC Carbon Account"

"CITIC Carbon Account" is a sustainable development system designed by fully integrating the internal and external resources of CITIC Group, referring to the carbon inclusive development system, and combining with the pressures and challenges faced by individual carbon inclusive. "CITIC Carbon Account" system has strong core competitiveness, mainly including the bank's own account and wind control capabilities, covering rich consumer life scenarios, strong



CITIC Carbon Account interface display

financial technology capabilities, and open and unbounded cooperation platform.

"CITIC Carbon Account" as the first personal carbon emission reduction account led by domestic banks, its carbon reduction accounting adopts the carbon emission reduction methodology recognized by the third-party authority, and is approved by experts organized by Shanghai Environmental Energy Exchange, which ensures the scientificity and authority of the accounting, and automatically collects individuals through user authorization. And through scientific measurement methods to accumulate personal carbon emission reductions, to provide each user with a strong proof of the practice of green low-carbon life, to create a unique "green life card".

2. CITIC Carbon Account Function

"CITIC Carbon Account" has realized basic

functional applications, including carbon account opening, carbon emission reduction records, carbon value social sharing, low-carbon science popularization, low-carbon knowledge questions and answers, carbon emission calculator and other functional modules. Electronic credit card application, electronic bill, online life payment (including water, electricity, gas, etc.), electronic debit card, online transfer, online loan and online repayment are nine special financial scenarios for carbon emission reduction accounting. The user is authorized to open a carbon account without manually uploading any data or information. The system automatically collects the emission reduction behavior data of the user in the green scenario, calculates in real time, and feeds back in real time in the personal carbon account interface. The user can query the source of each carbon value and exchange the corresponding rights and interests. Users can share their carbon

achievements on social platforms and attract more friends to participate. Through the carbon account platform, users can also learn about low-carbon related popular science knowledge, participate in question-and-answer game interaction, and measure their carbon footprint to experience a richer low-carbon life.

"CITIC Carbon Account" has been launched in Mobile Card Space APP, CITIC Bank Mobile Banking APP and CITIC Financial Holding Fortune Plaza, covering more than 100 million consumer users of CITIC Bank and CITIC Group. Bank card users of other banks can also register and open accounts to support the whole people.

3. Innovation of the Project

As the first personal carbon account launched by joint-stock commercial banks, "CITIC Carbon Account" is designed to be more scientific and developmental. Its main innovations are as follows:

(1) Measurable and traceable

Under the guidance of the competent authorities of the national government and in cooperation with third-party professional institutions in China, CITIC Bank has developed the first set of carbon emission reduction methodologies for green financial scenarios, innovatively realized accurate accounting of carbon reduction in financial scenarios, and promoted the standardization of carbon account financial scenarios.

(2) Multi-scene and interoperable

CITIC Carbon Account fully integrates the resources of CITIC Group's internal and

external partners to jointly build a green ecosystem. CITIC Carbon Account adopts AaaS open ecosystem to achieve rapid and seamless access of green partners, reduce the access threshold, and create a green and open financial ecosystem with CITIC carbon account as the service core. Build rich green low-carbon emission reduction scenarios for users, so that users can continue to practice low-carbon behavior in all aspects of clothing, food, housing and transportation.

(3) Neutralizable and tradable

Through cooperation with government authorities, CITIC Carbon Account is calculated and measured by a third-party professional organization in strict accordance with the methodology approved by the Carbon Exchange, which ensures the scientific and authoritative nature of carbon emission reduction accounting, as well as the asset value attribute of carbon emission reduction, laying a solid foundation for carbon neutralization and carbon trading of future users, enterprises and cities.

◆ Social Value

"CITIC Carbon Account" is a positive measure taken by CITIC Group and CITIC Bank to implement the "dual carbon" strategy.

In 2020, in order to improve global environmental governance, actively respond to climate change and build a community of human and natural life, China proposes to strive to achieve carbon peak by 2030 and carbon neutrality by 2060. The proposal of double-carbon target marks that the construction of ecological civilization in China has entered a critical period of comprehensive

green transformation of economic and social development and improvement of ecological environment quality from quantitative change to qualitative change.

CITIC Group has a wide range of real industries, and knows that under the current situation, achieving the goal of "double carbon" is the way to integrate into the future global industrial chain reform. The industrial sectors of the Group will actively integrate into the green low-carbon reform, develop both industry and finance, and help achieve the goal of "double carbon" by enlarging the low-carbon effect of the industrial chain and the ecological circle. As a central enterprise, CITIC Group has been adhering to the implementation of the central decision-making and deployment, earnestly fulfilling the mission of state-owned enterprises, actively grasping the trend of green low-carbon transformation, and unswervingly taking the road of green low-carbon development.

On the basis of the green and low-carbon development strategy formulated by the Group, CITIC Bank fully recognizes the great significance of the construction of "green bank", bases itself on the new development stage, implements the new development concept, vigorously promotes the construction of green financial system, explores and formulates green financial solutions, and supports the high-quality development of national green economic transformation with practical actions.

At the same time, CITIC Bank attaches great importance to the common sustainable development with its partners and all sectors

of society, and integrates the sustainable development concept of "devoting itself to becoming a green bank, a humanistic bank, a caring bank, an honest bank, a value bank and a brand bank" into its strategy and culture. It has achieved remarkable results in green credit, carbon footprint management, inclusive finance, customer service, supplier management and other aspects.

In order to help China's 30.60 double carbon target and improve the urban carbon inclusive construction mechanism, CITIC Bank actively exerts its synergistic advantages and continuously promotes the innovation of green financial products. The release of "CITIC Carbon Account" is the first personal carbon account launched by domestic banks in response to the call of the government, focusing on the construction of the city's carbon inclusive mechanism, so that users' green low-carbon behavior can be measured and traceable, and promote the wide integration of green low-carbon into people's lives.



6. SUAEE - Low-carbon consumption scenario development and carbon account system of China UnionPay green low-carbon theme card

Carbon Asset Pledge Project

(I) Overview of the case

In order to serve China's "Carbon Peak and neutrality" strategy, deeply practicing ESG principles and fully unleashing the financing potential of carbon assets, "Shanghai Environmental And Energy Exchange (SEEE), a subsidiary unit of Shanghai United Assets And Equity Exchange (SUAEE), has launched a 'Carbon Asset Pledge' Project based on carbon spot trading. The aim is to assist trading participants (including Shanghai municipal enterprises under centralized management and institutional investors) in Shanghai Pilot Carbon Market in unleashing the value of carbon assets and solving short-term financing problems through this financing tool. Meanwhile, laying the groundwork for promoting carbon asset pledge business in China's National Carbon Market.

(II) Major Initiatives

1. launching supporting business rules and exploring collaborative supervision.

SEEE has been taking a "business rules" oriented approach, with the support of Shanghai Municipal Bureau of Ecology and Environment and Shanghai Municipal Financial Regulatory Bureau. SEEE has successively launched "Assistance in Handling CCER Pledge Business Rules" and "Shanghai Carbon Asset Pledge Registration Business Rules" and related supporting documents to regulate carbon asset pledging business and maintenance of legitimate rights and interests of both parties in pledge. At the same time, SEEE is exploring collaborative regulatory mechanisms between carbon market regulatory authorities and financial institutions in the implementation of carbon asset pledge business.

2. Launching Extended Business Based on Carbon Asset Pledge Business.

At the end of December 2020, SEEE introduced the Shanghai Carbon Allowance Pledge Registration Business, and in parallel with the further development of carbon allowance pledge business, collaborated with banks and insurance companies to explore the combination of carbon allowance and CCER (Chinese Certified Emission Reduction) pledge business, as well as the carbon allowance pledge loan guarantee insurance financing business with "Carbon Allowance + Pledge + Insurance".

(a.) Carbon Allowance and CCER Combination Pledge Loan Business

In May 2021, SEEE partnered with Shanghai Pudong Development Bank (SPDB) to facilitate the first carbon allowance and CCER combination pledge loan for Shenergy Carbon Technology Co., Ltd. The implementation of this transaction fully

leveraged the interconnectedness of carbon assets between financial capital and the real economy to enhance the flexibility of carbon asset financing, and represents an innovative measure by financial institutions to support the development of climate finance in the context of achieving "carbon peak" and "carbon neutrality" goals.

(b.) "Carbon Allowance + Pledge + Insurance" Business

In November 2021, SEEE collaborated with China Pacific Insurance(group) Co.,Ltd, Bank of Communications Co., Ltd. BOCOM and Shenergy Carbon Technology Co., Ltd. to launch the first "Carbon Allowance + Pledge + Insurance" business at The 4th China International Import Expo. This business not only maintenance of legitimate rights and interests of both parties in pledge (financing party), but also significantly enhances the

value of carbon assets, providing a new approach for insurance services in the carbon market.

(III) Result of Implementation

1.The initial scale of carbon asset pledge business has achieved broad market recognition

With the support of SEEE, multiple financial institutions including BOC, BCM, ABC, CCB, SPDB, CIB, BOB, Bank of Shanghai, Shanghai Rural Commercial Bank, BOJS, and Bank of Nanjing etc. have actively collaborated with local and foreign-funded enterprises and institutional investors to explore new pathways of pledge financing with carbon assets as collateral. As of now, SEEE has facilitated over 20 carbon pledge transactions, unlocking nearly 2 million tons of carbon assets and financing of nearly 60 million yuan.

The introduction of carbon asset pledge business has fully leveraged the value of carbon assets, improved the management efficiency of carbon assets, and expanded green financing channels for enterprises and institutional investors. The close cooperation between SEEE and financial institutions has better served the green economy transformation of the real economy, further promoting the construction of Shanghai International Carbon Financial Center.

2.Recipient of the Financial Plus Excellent Case Award in the demonstration zone of green and integrated ecological development of the Yangtze River Delta

In May 2021, with the support of SEEE, BOC completed the first Shanghai Carbon

Emissions Allowance (SHEA) pledging transaction with CINIC (Shanghai), one of the exemplary enterprises in Qingpu District, in the demonstration zone of green and integrated ecological development of the Yangtze River Delta. This case represents a beneficial attempt to implement the development concept of "ecological, green, and sustainable" in the demonstration zone of green and integrated ecological development of the Yangtze River Delta. It was awarded the "Financial Plus Excellent Case Award" at the "2023 Special Promotion Meeting for Financial Support to the Integrated Development of The Demonstration Zone of Green and Integrated Ecological Development of The Yangtze River Delta & Annual Meeting of Financial Urbanization Service Innovation Development Alliance" held in March 2023.

China UnionPay Green Low Carbon Theme Card Project

(I) Overview of the case

On August 20, 2021, SEEE and China UnionPay Co., Ltd. (UnionPay) jointly released the China UnionPay Green Low Carbon Theme Card. This product, aimed at individuals and enterprises, is centered around the concepts of low carbon and environmental protection. Leveraging transaction data from bank networks, it provides individuals and enterprises with low carbon lifestyle service benefits and carbon reduction purchasing rights, and introduces the innovative concept of UnionPay Carbon Credits in collaboration with professional institutions.



UnionPay Green Low Carbon Themed Bank Card Product Launch



(II) Major Initiatives

1. Comprehensively meeting the green and low-carbon demands of various types of enterprises and individuals, issuing China UnionPay Green Low Carbon Theme Card, (divided into enterprise cards, small and micro enterprise cards and rural revitalization cards) to strongly support the green development of different types of enterprises. Developing a series of themed and rich-benefit green and low-carbon themed credit and debit cards for individuals.

2. Collaborating with professional organizations, innovatively launching carbon reduction algorithms for green and low-carbon scenarios, issuing low-carbon certificates to cardholders, enabling cardholders to truly understand the significance of carbon reduction, and

motivating them to practice green and low-carbon lifestyle through both material and spiritual rewards.

3. Digitally issuing virtual cards as the main form, with the option to choose environment-friendly material physical cards, and enjoying paperless online services such as electronic bills provided by the bank.

(III) Result of Implementation

1. The project covers 12 personal green and low-carbon lifestyle scenarios, guiding users towards adopting a green and sustainable lifestyle.

Currently, there are 12 personal green and low-carbon scenarios covered, including public transportation such as buses, subways, high-speed railways, biking, electric vehicle

charging stations, utility bill payments, online movie tickets, online car ticket purchases, electronic government services through UnionPay, walking, Online account management between different banks, and repayments/transfers through UnionPay etc. These scenarios are guided by mechanisms of entertainment, interaction, and dynamic feedback to encourage users to adopt a green and low-carbon lifestyle.

2. By researching and developing low-carbon scenarios, gradually build a carbon-inclusive ecosystem to promote sustainability.

Through research on scenario development and accounting system within China UnionPay Green Low Carbon Theme Card, aimed to further promote the popularization of low-carbon lifestyle concepts domestically. In the future, according to build a more diverse and multi-level of the Inclusive Carbon-emission-reduction Benefit Mechanism (ICBM) scenario, while improving and upgrading existing scenarios, to assist Shanghai in laying a solid foundation for the ICBM platform and establishing a standardized and orderly operating system for ICBM initiatives. SEEE will continue to explore the development of a sustainable and vibrant ICBM ecosystem through commercial incentive mechanisms, with clear rules and rich scenarios.

3. The project has strong scalability and replicability, leading the comprehensive green-economy transformation and sustainable development of the economy and society.

As of the end of March 2022, this project has facilitated 30 commercial banks to launch 40 green and low-carbon card products, with a

total issuance exceeding 1.5 million cards.

In March 2023, based on this project and with the support of SEEE, UnionPay and China Merchants Bank jointly launched a carbon-neutral credit card. The greenhouse gas emissions generated throughout some parts of the lifecycle of this credit card, from production to distribution, have been offset through the cancellation of CCER, achieving carbon neutrality.



7. China Southern Asset Management - ESG Comprehensive Information Platform

With the support of China's national strategic dual-carbon goals (carbon dioxide emissions peak by 2030 and carbon neutrality by 2060), the concept of green financial development has received wide attention. The ESG investment concept, as an important part of green finance, includes the three dimensions of environmental, social and corporate governance, and in recent years an increasing number of market institutions have started to incorporate ESG factors into investment research and decision making.

As one of the earliest asset management institutions entering the ESG field in China, Southern Asset Management has been exploring the development path of ESG investment in the domestic market and the construction and application of ESG rating systems since joining the United Nations Principles for Responsible Investment (PRI) in 2018. Through long-term exploration and practice, Southern Asset Management has discovered that ESG investment in China mainly faces key issues such as lack of data, the need to test investment effectiveness, and inadequate localization of ESG ratings. To effectively solve these issues, from the perspective of ESG development and localization practices in the Chinese market,

Southern Asset Management has integrated the artificial intelligence technology in financial technology and the ESG investment concept under the development of green finance, and independently built the Southern Asset Management ESG Comprehensive Information Platform, thus providing stable support for the company's ESG investment practice and development.

Case Overview

Attaching great importance to the research and practice of ESG investment, Southern Asset Management continues to explore multi-dimensional promotion of ESG integration and to reshape the cornerstone of value creation. In order to strengthen the application and integration of ESG in the investment and research process, Southern Asset Management has built its own ESG rating system that combines the three traditional dimensions of environmental, social, and corporate governance with controversial events to provide researchers with ESG research and practice. On this basis, Southern Asset Management has built an ESG Comprehensive Information Platform consisting of a data module, a model module, and an application module, thus providing our

ESG research with localized and intelligent solutions for continued deepening of the application and practice of ESG investment in China.

Major Measures

Southern Asset Management's ESG Comprehensive Information Platform is a cloud-based digital solution for ESG research. It consists of three modules: a data module, a model module, and an application module, and it includes multi-dimensional ESG information modules such as ESG ratings, underlying data, climate database, research report system, controversial events, and vote tracking. Deeply incorporated into the company's comprehensive investment research platform and through detailed data information and a visualized interface, it promotes ESG business in terms of ESG ratings, climate investment and financing management, product innovation and risk management.

1. Data module - Adopting financial intelligence technology to enhance multi-

source data integration

Southern Asset Management uses AI financial big data analysis technology to mine ESG data, combining data provided by data suppliers, data captured by AI algorithms, and data from analyses by researchers to achieve multi-source data integration. On the basis of data, the company captures effective ESG indicators from those data to form a unified ESG factor database, which provides an extensive data foundation for ESG rating model research so as to solve the critical problem of data deficiency in the current process of ESG development in China.

2. Model module - Evaluating factor effectiveness through quantitative models

Southern Asset Management has built an ESG factor evaluation system, adopting scientific evaluation models to evaluate and test the effectiveness of factors and quantitatively selecting material impact indicators for promoting the localized practice of ESG investment.

3. Application module -- Integrating multi-



Southern Asset Management ESG Comprehensive Information Platform



carbon intensity) that is consistent with the PCAF methodology, allowing research teams to learn about carbon emissions of various industries in the absence of sufficient quantity and quality of climate disclosure, and to adjust portfolio asset allocation for high-polluting enterprises in order to achieve portfolio decarbonization and emission reduction and provide carbon-neutral solutions. Southern Asset Management's carbon emission database mainly adopts a gradient boosting decision tree model to capture complex nonlinear relationships, which can effectively deal with missing values and categorical variables for diverse carbon emission forecasting scenarios. It uses regularization techniques to calibrate the models in order to solve the problems of forecast variance and sample noise.

Implementation Effect

Southern Asset Management's ESG Comprehensive Information Platform has provided effective support for the company to promote the ESG investment concept and to achieve deep integration for the operations, investment research, and product positioning:

1. One of the rating systems with the widest coverage of investment targets

Southern Asset Management's independently developed rating system includes 17 themes, 39 sub-themes and 115 sub-category selection indicators. It has extended effective support to the implementation of the ESG investment concept and brought about ESG's deep integration with the Chinese investment logic. As of the end of 2022, the company's ESG rating system covered 4,381 A-share listed

companies and 6,484 bond issuers.

2. Success in carbon emission data measurement

Southern Asset Management is the first mutual fund company in China that carries out carbon emission data measurement for all equity targets in its investment portfolios. It has innovatively combined external data collection with independent research, and has completed the construction of a carbon emission database based on machine learning and on the global financial industry carbon accounting standards set by the PCAF, and has carried out evaluations of carbon emissions of its investment portfolios. As of 2022, the carbon emission data score of Southern Asset Management has reached the international standard level 2-3 (the levels are from 1 to 5, with a smaller number representing a higher data quality).

3. Enriching the ESG product system and expanding green investment

With the ESG Comprehensive Information Platform as a foundation, Southern Asset Management has launched various innovative products to guide capital flow to green industries. By the end of 2022, green investments at Southern Asset Management had reached 218.058 billion yuan.

4. Integrating into the company's whole risk management process

The ESG Comprehensive Information Platform is combined with the internal risk control system to take ESG factors into full account in various cross-asset investments, research and risk management, monitor and identify ESG risks in the daily investment research process,

module ESG data information

Take the ESG rating system and carbon emission database that have been incorporated into Southern Asset Management's ESG Comprehensive Information Platform as an example:

1) Southern Asset Management's ESG Comprehensive Rating System

By scientifically grasping the characteristics of the capital markets, Southern Asset Management has independently developed an ESG rating system and database with Chinese domestic characteristics and in line with international standards, and continues to optimize and upgrade it as ESG investment methodology improves. In this rating system, through in-depth research into industry characteristics, Southern Asset Management

differentiates and assigns weights to the ESG rating system indicators based on the materiality of the industry, thereby adjusting the indicators and weights of the ESG rating system to enhance the materiality of indicators and the validity of evaluation results. In addition, the rating system includes not only traditional ESG scores but also combines controversial event scores, which takes the ESG performance of investment targets into more comprehensive account, making the rating system more suitable for effectively utilization in the Chinese domestic market.

2) Carbon Emission Database

Southern Asset Management has built its own carbon emission database (including direct emissions, indirect emissions and

and analyze the risk exposure of ESG factors through stress testing and performance attribution in order to prevent long-term ESG investment risks and safeguard the company's sustainable value creation capabilities.

External Recognition

Southern Asset Management has incorporated ESG investment into the whole investment research chain through the ESG Comprehensive Information Platform, the built-in ESG rating system, and other tools such as the carbon emission database covering the entire pre-investment, during-investment and post-investment process. We have been highly recognized by all parties domestic and abroad:

1. International Finance Forum (IFF) Green Finance Innovation Award

In 2022, the "ESG Comprehensive Information Platform" project of Southern Asset Management was honored with the IFF "Global Green Finance Innovation Award", and was highly recognized by major financial officials and scholars domestically and abroad.

2. PRI Responsible Investment Award

On December 1st, the UN PRI announced the list of 2022 PRI Awards. As the only representative of Chinese-funded institutions, Southern Asset Management's "Facilitating the climate transition - Application of a carbon emissions database" project was the winner for "ESG incorporation initiative of the year" and "Emerging markets initiative of the year". This marks the first time that China Mutual Funds won the PRI Award.

3. Shenzhen Green Finance Pioneer Innovation Award

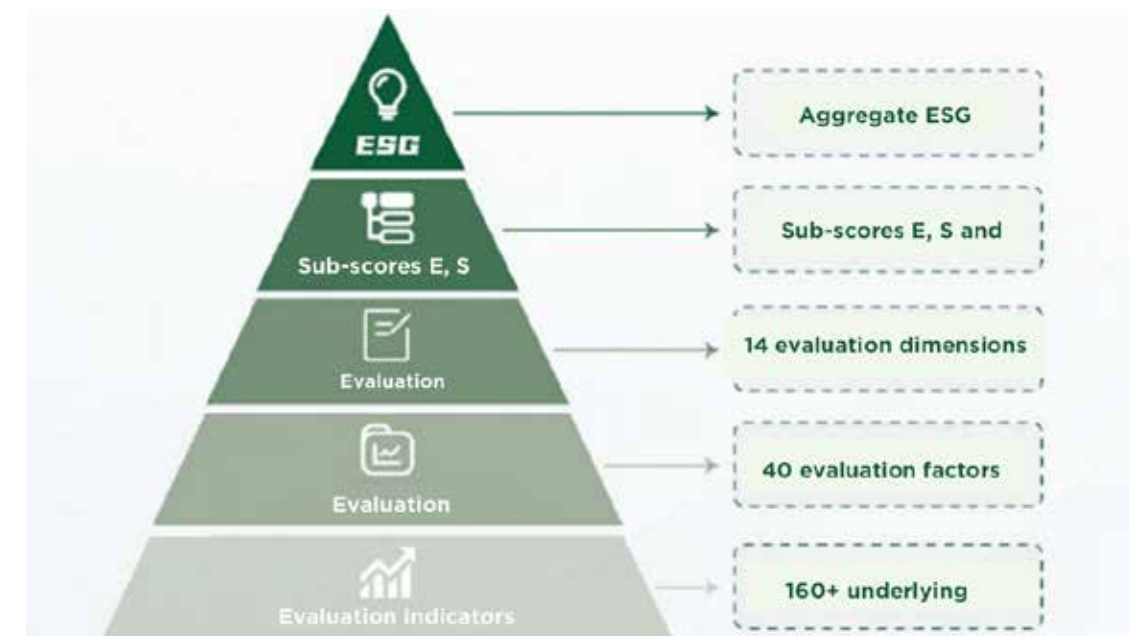
The "Southern Asset Management - Carbon Emission Database" was awarded the Shenzhen Green Finance Innovation Award by the Financial Society of Shenzhen Special Economic Zone, and the company's ESG rating system and carbon neutrality practice were also selected for participation in the Shenzhen Green Finance Regulations Excellent Cases Exhibition.

8. ChinaBond Pricing Center - ChinaBond ESG Series Products

Since the concept of ESG was first put forward, its practice has gradually become an effective way of promoting sustainable development and a global trend. China has always been an advocate, participant and promoter of global sustainable development. Guided by policies, China's ESG practice is in the ascendancy. More and more enterprises and financial institutions have incorporated environmental and social benefits into their business objectives, striving to achieve long-term sustainable development with win-win results for all parties.

China Central Depository & Clearing Co., Ltd. (CCDC) is a centrally administered state-

owned financial infrastructure funded by the State Council. Actively responding to the national "14th Five-Year Plan" and the strategic goal of "carbon peaking and carbon neutrality", CCDC is committed to the new development concept; it has established its foundation in the financial infrastructure services and has incorporated green development into its company strategy and daily operations. Building a green financial information disclosure system, releasing a series of green-themed pricing products, developing innovative green bond collateral management services, optimizing green bond life cycle services, and establishing a professional think tank for green financial



ChinaBond ESG Evaluation System

research are all part of the company's plan to promote the quality growth of China's green bond market and aid in the development of financial infrastructure services.

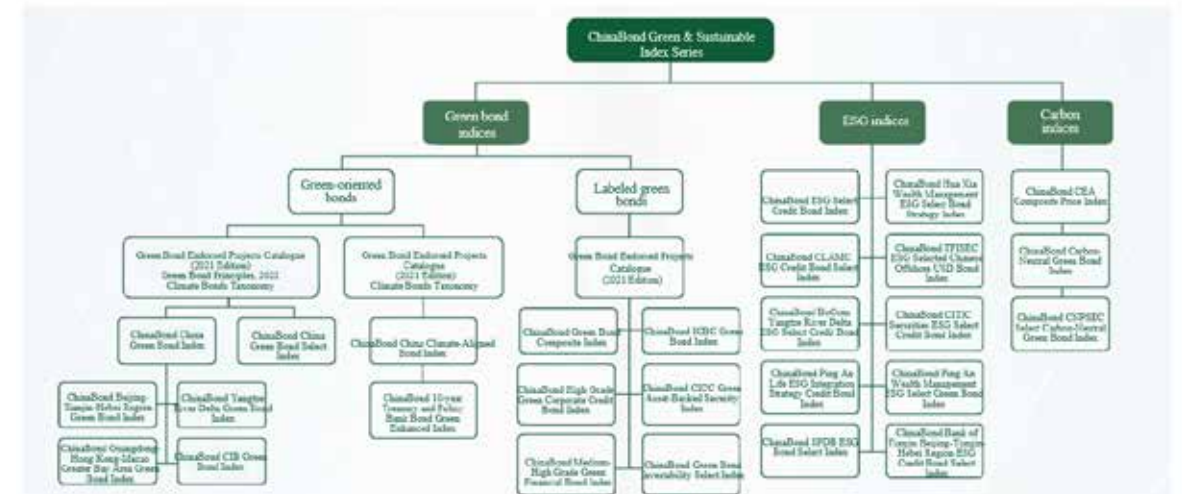
China Bond Pricing Center Co., Ltd. (CBPC) is a pricing benchmark service platform for China's financial market that CCDC built, keeping in mind the central depository institution's neutral status and professional advantages over the past 20 years. Through the ESG evaluation system, the ESG concept can be developed into a useful management tool and decision-making basis, and the capital market's capability to support national strategy and the real economy can be significantly enhanced.

In response to the national policy, CBPC kick-started the ESG evaluation research in 2018. In 2020, CBPC launched the first ESG evaluation system that comprehensively covers the issuers of publicly offered credit bonds in China's bond market. In 2021, the system further expanded to fully cover A-share listed companies in the domestic market. By being the first of its kind, ChinaBond ESG review fostered the high-quality growth of China's financial market and included all of the country's bond issuers and listed enterprises.

Independently designed by ChinaBond Pricing Center, the ChinaBond ESG Evaluation System combines international mainstream framework methodologies with a thorough incorporation of China's regulatory landscape, national development conditions, and capital market peculiarities. The ChinaBond ESG evaluation system has the following four characteristics: **First**, the system development comprehensively

leverages international mainstream methods and experience, referring to the environmental standard system of the International Organization for Standardization (ISO), "Sustainability Reporting Guidelines" of the Global Reporting Initiative (GRI), "Principles of Corporate Governance" of the Organization for Economic Cooperation and Development (OECD), and other important regulatory documents and international academic research results, and the evaluation method is consistent with the international mainstream evaluation framework. **Second**, key subjects including rural revitalization and bond investor protection provisions are established in the index design, which takes into account China's current macro environment and the development features of the capital market. Listed corporations and bond issuers can both make use of the ESG evaluation system. **Third**, more than 90 of the industries included in the national economic classification are taken into account, and their unique characteristics are accounted for through the formation of over 60 sets of industry evaluation indicators tailored to their respective stages of development and technological processes. **Fourth**, the ChinaBond ESG database leverages robust data capabilities by integrating a plethora of unstructured data and alternative data via financial technology. The database, which dates back to 2018, includes over 20 data sources and over 400 data elements.

Based on ESG evaluation, CBPC has launched diverse products/services such as ESG database, ESG indices, ESG reports and ESG consulting services. CBPC has also collaborated with several leading financial



ChinaBond Green & Sustainable Index Series

institutions on consulting projects. This allows CBPC to offer comprehensive solutions to the market across a variety of dimensions, including data, evaluation systems, and methodologies, thus meeting investors' need for investment strategy formulation, credit risk management, risk measurement assessment, and in-depth ESG research. Currently, around 50 financial institutions of varying types, including commercial banks, commercial bank wealth management, securities firms, funds, insurance asset management, and international institutions, have used ChinaBond ESG products to conduct related businesses.

From the **investment application** perspective, ChinaBond's ESG scores and databases are used by institutions in investment strategy formulation and analysis frameworks to identify companies with strong sustainable development capabilities, thereby effectively boosting the portfolio's ESG performance. In this way, ESG investing strategies complement conventional financial or factor

strategies to boost the portfolio's overall return on investment. More than 10 ESG-themed bond indices were issued by CBPC in partnership with external agencies. These indices include the first ESG bond index for the insurance asset management business and the first domestic ESG-themed Chinese dollar bond index. The results give domestic and international players in green and sustainable finance with a diversified set of ESG investment performance benchmarks and tracking criteria. From the **risk control application** perspective, ESG information is an effective supplement to the financial information-based traditional credit rating framework. Many market institutions have begun to use ChinaBond ESG indicators as the observation dimension of investment risk, as shown by research from the CBPC, which found a correlation between ChinaBond ESG evaluation and ChinaBond market implied rating and an early warning effect on corporate credit risk.

ChinaBond ESG series products have won



ChinaBond ESG Awards

multiple financial innovation awards since their release, including the "Green Finance Pioneer Innovation Award" in Shenzhen's 2020 Excellent Green Finance Case Selection, the 2020 Shanghai Financial Third Prize in the Innovation Achievement Award, The Asset magazine's 2021 "Best ESG Index Provider", Environmental Finance magazine's 2022 "Asian ESG Supplier of the Year" Award, the 3rd International Finance Forum (IFF) "Global Green Finance Innovation Award".

In 2022, CCDC and the International Capital Market Association (ICMA) jointly composed the "White Paper on ESG Practices in China—Observations Based on Bond Issuers and Listed Companies" (hereinafter referred to as "White Paper"), which is the

first cooperation between an important financial infrastructure institution in China and an authoritative international industry association in the field of sustainable finance. The White Paper presents the development and implementation outcomes of China's ESG system development from an international perspective, demonstrates the exploration of business entities and financial market innovation, and serves as a case reference for advancing sustainable development around the world.

Consistent with its mission to serve the real economy, CBPC is dedicated to advancing the state-of-the-art in ESG evaluation system methodologies, developing cutting-edge ESG product service models, and facilitating the

widespread adoption of ESG principles. In 2022, Companies traded on the Beijing Stock Exchange and the Science and Technology Innovation Board are as new entities to be evaluated for their social and environmental impacts as part of ChinaBond's ESG process. Furthermore, Public opinion data and carbon emission data have been assimilated into the evaluation system in full, and the assessment dimension has been continually refined and improved in accordance with the most up-to-date regulatory criteria for domestic environmental information disclosure. With the official release of the ChinaBond Carbon Neutral Database, market institutions now have a centralized resource for accessing, analyzing, and acting upon data concerning the carbon emissions of bond issuers and publicly traded companies for use in a wide variety of contexts, including carbon-themed

investment and carbon risk management. To encourage reform and the ongoing improvement of ESG practices, corporations now have access to ESG reports that evaluate their sustainable development capabilities.

CBPC also actively promotes the declaration of financial national standards for the "Environmental, Social and Governance Evaluation System of Bond Issuers" draws attention the leading and exemplary role of financial infrastructure and continues to serve the competent authorities. CBPC is committed to working together with all market participants to advance healthy and sustainable financial growth in the future.



"White Paper on ESG Practices in China"

9. Sinopec - Green Energy Geothermal (Carbon Neutrality) ABS



Development History and Advantages of the Company

Development History

Established in November, 2006, Sinopec Green Energy Development Co., Ltd., hereinafter referred to as “SGE”, is a Sino-Icelandic joint venture set up by Sinopec Star and Arctic Green Corporation. It specializes in geothermal development & utilization, energy-saving technologies & services, GHG emission reduction, etc. with headquarters located in Xiong’an New Area of Hebei province. For 17 years, SGE has been following the development philosophies of “overall planning, phased execution, comprehensive utilization and sound development” and “priority in resources, advancement in technology, and protection of environment”, and sticking to the principle of “deep & shallow combination, heating & cooling combination, comprehensive utilization and integrated development”, with projects executed in provinces or cities such as Tianjin,

Hebei, Shaanxi, Shanxi, Shandong, Jiangsu, Zhejiang, etc. To date, SGE has signed strategic cooperation agreements with over 50 cities, counties or districts, with a heating capacity of nearly 70 million sqm, which is capable of replacing 1.7 million tons of standard coal and reducing 2.5 million tons of carbon dioxide annually. With its geothermal businesses growing bigger and better from scratch, SGE has become the largest middle- and deep-layer geothermal development and utilization enterprise in China.

Technological Advantages

Based on Sinopec Group’s advantages in resources exploration and development and the platform of Sino-Icelandic Geothermal R&D Center, SGE has not only introduced and absorbed advanced technologies and concepts from Iceland, but strengthened independent R&D, thus forming 6 core geothermal development technologies. It is a “Geothermal Development and Utilization Demonstration Unit” of the previous Ministry of Land and Resources (now Ministry

of Natural Resources) and “Geothermal Research and Experiment Demonstration Base” of Chinese Academy of Sciences, and has registered its geothermal district heating projects in the Clean Development Mechanism of the United Nations.

Xiong’xian Model

Together with Xiong’xian government, SGE has set up a geothermal heating “Xiong’xian Model” featuring “government-enterprise cooperation, market-oriented operation, comprehensive development, technological advancement, environmental protection and people’s benefits”. Xiong’xian geothermal heating project has been listed by IRENA for as showcase for global promotion. Upgraded from “Xiong’xian Model” to “Xiong’an Model”, it will help Xiong’an New Area build a model case of highly-developed geothermal industry, and lay a solid foundation for the development of geothermal industry during the “14th Five-Year Plan”.

Corporate Responsibility

SGE has integrated itself with cities along

“Belt and Road Initiative” and Xiong’an New Area development, and strived to supply green and clean energy. Following the instructions of CPC Central Committee to “develop mixed-ownership economy, and foster world-class enterprise with global competitiveness”, SGE has advanced mixed-ownership reform to add new driving forces to development. It is also actively integrated into Sinopec Group’s “One Foundation, Two Wings and Three Pillars” development pattern and Sinopec Star’s “Geothermal Energy, Green Hydrogen, Wind Power and Solar Photovoltaic” industrial system, which has laid a firm foundation for high-quality development. With the target of securing clean, safe and economic energy supply, SGE will make sustained efforts to consolidate its leading position in the industry of geothermal heating and waste heat utilization, and make a greater contribution to the target of Carbon Emission Peak by 2030 and Carbon Neutrality by 2060.

◆ Projects in Xiong'an New Area

Xiong'an New Area was established on April 1, 2017. During an enlarged meeting of the Leading Party Members' Group of Sinopec on April 5, 2017, it was pointed out that an active part shall be played in implementing the CPC Central Committee's strategic arrangement on Xiong'an New Area development. On April 26, 2018, a strategic cooperation framework agreement was signed between Sinopec and Hebei provincial government on the investment, construction, operation of heating & cooling businesses in Xiong'an New Area. Under such backdrop, SGE rapidly responded to the call of the state and Sinopec Group, and moved its headquarters to Xiongxian of Xiong'an New Area. A series of key projects have been pushed forward as follows.

In July, 2018, a 600k-sqm project to replace

coal with geothermal was executed in the coal-free areas of Xiongxian, and corresponding geothermal heating franchise was obtained; In April, 2019, the heating project for Xiongxian No.3 Senior High School, which is the first permanent building since Xiong'an New Area establishment, was executed; In July, 2020, the consortium consisting of SGE, Beijing Gas Group and North China Petroleum Administration Bureau won the bidding of Rongdong Area Heating & Cooling Construction, Operation, Management and Service Project (12 million sqm). The consortium has been registered as Hebei Guolian Clean Energy for project operation and management. The phase-I project, which is 6 million sqm, has been in smooth operation, offering stable heating services in winter for the first group of relocated households of Xiong'an New Area.

In October, 2020, as part of the Beijing-Xiong'an Intercity Railway Project which

is a key project of Xiong'an New Area, an agreement was signed to supply clean heat sources for Xiong'an Bullet Train Maintenance Administration; in June, 2021, Xiongxian geothermal heating project was listed by IRENA as a showcase for global promotion; in September, 2021, the bidding of "Geothermal Heating Franchise Project in Anxin Rural Communities in 2021" was awarded with a heating area of 550k sqm; in January, 2023, the mining rights in Xiongxian Daying Specialty Town (20.79 km²) and Xiongxian Chengnan Area (7.34 km²) were obtained. As of now, totally 5 geothermal mining rights have been obtained in Xiong'an New Area, securing 70.24 km² franchised areas; efforts have been made in raising the level of intelligence and digitalization for geothermal development, with nearly RMB 15 million invested in a dynamic data acquisition and monitoring system for geothermal wells, which is the first system of the kind in Xiong'an New Area and even in Hebei province; endeavors have been made to advance the study and formulation of geothermal standards in Xiong'an New Area. Totally 87 standards or execution programs covering 6 professions such as geothermal resources exploration and evaluation have been formulated.

◆ Significance of Xiong'an New Area's First Green Carbon Neutrality ABS

On March 18, 2022, SGE issued Xiong'an New Area's first green Carbon Neutrality ABS on Shanghai Stock Exchange, with a size of RMB 300 million and a period of 3+2 years. Use of proceeds is to strengthen

geothermal development and utilization as well as R&D in relevant areas. This Carbon Neutrality ABS has integrated the concepts of "Carbon Neutrality" and "Xiong'an New Area Development", and marks the first green bond issued by a geothermal enterprise in China. It serves as a showcase for geothermal enterprises to expand their financing channels and obtain low-cost and long-term funds, and echoes with President Xi's instruction to "promote the large-scale and high-efficiency development of new energy and clean energy", where geothermal is an extremely competitive new energy and is of great value for social publicity. It will help capital market and the public have a better understand of geothermal industry and its future development. Besides, use of proceeds to development new geothermal projects and R&D, which will facilitate the rapid and healthy development of geothermal industry. It not only enabled financing in the capital market, but is also fairly priced. With this green bond, the public can enjoy more benefits of decarbonization that are facilitated by geothermal heating. Multiple benefits have been achieved in society, environment and economy. It helps reduce air pollution in areas where geothermal projects are executed, and is of great significance for improving the air quality in Beijing-Tianjin-Hebei Region and North China, safeguarding public health, and building an ecologically civilized society. This green bond not only serves as the debut of Sinopec's geothermal business in the capital market, but also represents Sinopec's efforts to promote Xiong'an New Area development. It has offered an innovative approach to support the growth of geothermal industry in Xiong'an New Area through green financing.



Geothermal Project site photo

Upon issuance, the green bond was highly welcomed by investment institutions and actively subscribed by various investors. It has the lowest interest rate as compared with other securities of the same rating in Shanghai Stock Exchange.

During the “14th Five-Year Plan”, SGE will adhere to the development philosophy of “priority in resources, innovation as driving force, corporate governance by law, and mutual benefits through cooperation”, and take mixed-ownership reform as an opportunity to vitalize growth, deepen core technologies R&D, and improve market competitiveness. Based on its clean energy integration businesses with “geothermal (waste heat) +” as the core, SGE will speed up the pace in becoming a geothermal enterprise that is “world-renowned and best in China”.

◆ The World Geothermal Congress

World Geothermal Congress, known as the “Olympics of global geothermal community”, is the premier global geothermal event that spreads and shares geothermal technologies and innovations. The 1st WGC was held in Firenze of Italy in 1995, and totally 6 WGCs have been held since then. In 2019, China won the right to host the 7th WGC, which is the 1st time ever. The 7th WGC will be held in Beijing from September 4 to September 6, 2023. Themed on “Clean Geothermal, Green Earth”, the 7th WGC is inviting fellows from political, industrial, academic and research communities to get together in Beijing, join various topics such as encouraging policy, advanced technology, business cooperation and environment protection, and promote the

development of global geothermal industry hand in hand.

As one of the major organizers of the 7th WGC, Sinopec will stick to the principles of green, safety and transparency in preparing the event, and ensure that it will be hosted with both Chinese characteristics and global standard. As a showcase of international geothermal cooperation and a field trip co-organizer of the 7th WGC, SGE will fully demonstrate its geothermal technologies, concepts and achievements to the world as well as the role of geothermal energy in fulfilling China’s Dual Carbon target. It will strive to obtain good performances in this “Olympics of global geothermal community” and shoulder more responsibilities in bringing China’s geothermal industry to the world.



10. SynTao - Carbon Neutrality Database and Climate Risk Scenario Analysis Platform

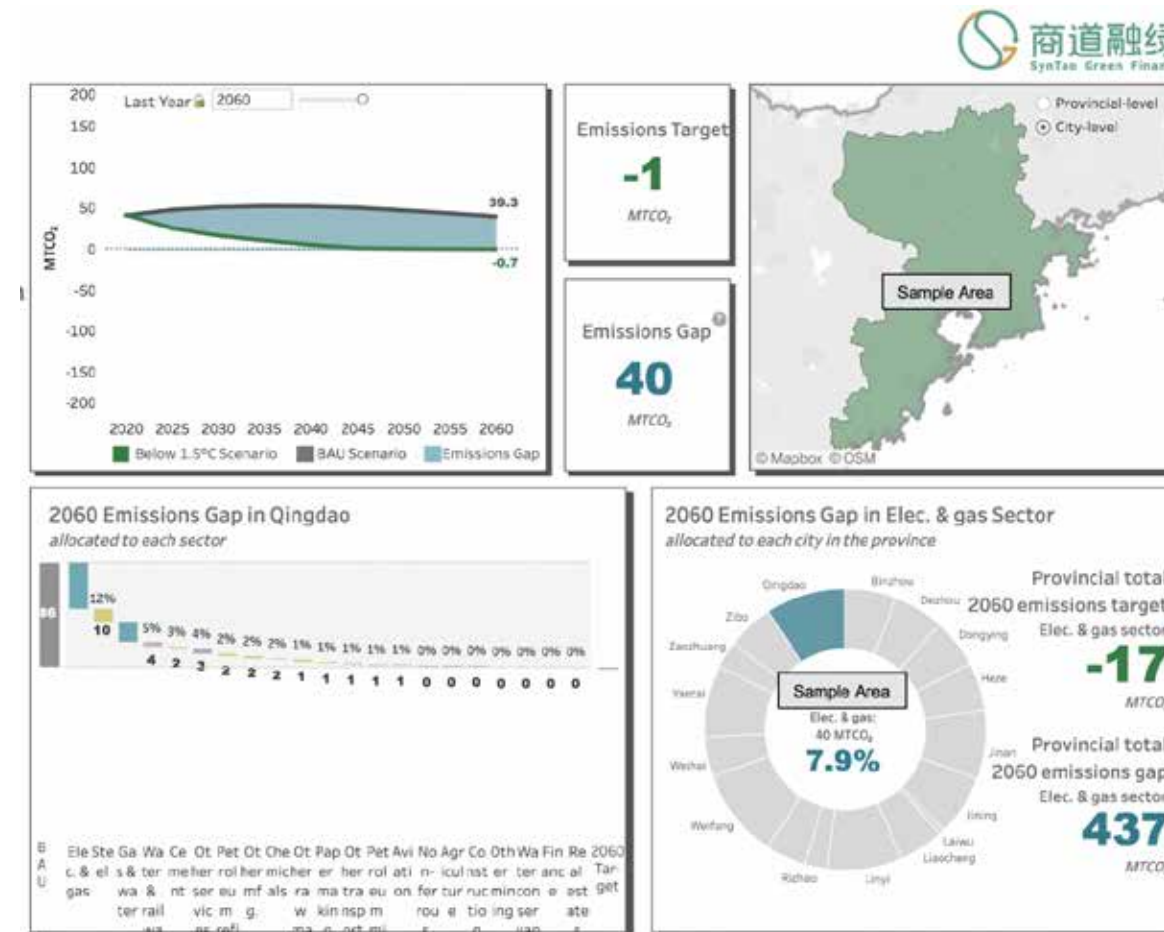
◆ Project overview

The SynTao Green Finance (STGF) PANDA Database and Climate Scenario Analysis and Stress Testing platform is built based on the international practical experiences and methodologies of carbon footprinting and climate risk scenario analysis, using authoritative climate scenario modeling data at home and abroad and incorporating China’s localized emissions factors and climate policy trends. This project has actively advanced the academic research and industrial practice of corporate carbon footprinting and climate risk analysis, and generated practical impact and value on the economy, society, and environment. The Orient Securities Carbon Neutrality Index developed based on the PANDA Climate Database provides investment institutions with investment targets focused on carbon neutrality contributions, which could help diversify investment options, alleviate climate risks, and obtain long-term investment value. For listed companies, the index provides benchmarks for carbon neutrality and facilitates the low-carbon transition of listed companies in the entire industry. The climate

risk scenario analysis and stress testing services provided to financial institutions can help these institutions quantify and understand the impact of climate risks to their asset portfolios. Results can help financial institutions better identify the direction and path of asset structure adjustment, as well as develop a solid low-carbon transition path. Hence, this project helps financial institutions improve the efficiency of assets’ climate risk management, promotes the accounting and disclosure of green projects’ environmental and climate performance, and makes funds more channeled to economically, societally, and environmentally beneficial industries.

◆ Project background

Among the major global challenges facing human beings, climate change has been paid greater attention by more countries and market economic entities. The physical and transitional risks posed by climate change will have an increasingly substantial impact on all types of assets around the world. In September 2020, President Xi Jinping announced that China will “aim to have CO₂ emissions peak before 2030 and achieve carbon neutrality before 2060”, which results



STGF sectoral- and city-level projected emissions scenario data, online data explorer

hypothetical climate scenarios, with the aim of better adjusting asset pricing, setting low-carbon transition paths, and strengthening the quality of information disclosure. In climate scenario analysis module, users can input their portfolio data and the model will generate asset-level and portfolio-level future emissions profile and the level of exposure to various climate risks. The climate stress testing module offers users a granular view of the extent to which their portfolios experience financial losses resulting from climate risks (e.g., carbon value-at-risk, probability of default changes), and how aligned portfolios

are with the Paris Agreement goals.

Project performance

By providing professional carbon and climate-related data services to financial institutions and corporates, this project has important value in terms of innovation, scalability, industry contribution, profitability, and promotion of public welfare.

In terms of innovation, STGF is the first institution in China that developed a ready-to-use tool to evaluate a given asset portfolio's exposure to climate risks by utilizing our

STGF PANDA Climate Database

in both constraints and opportunities for companies and financial institutions in low-carbon economy transitions.

In the process of advancing China's dual carbon goals, it is critical to quantify corporates' carbon footprint and climate risk exposure level. However, the ability of domestic financial institutions and companies to use scenario analysis and stress testing to assess climate risks is still weak. Practically, institutions face difficulties such as lack of climate scenario data and emissions data. Climate-related data disclosed by domestic A-share listed companies has problems such as lack of disclosure details and different scopes of emissions, which has created tons of obstacles to accurately analyze and understand the transition and physical risks companies face.

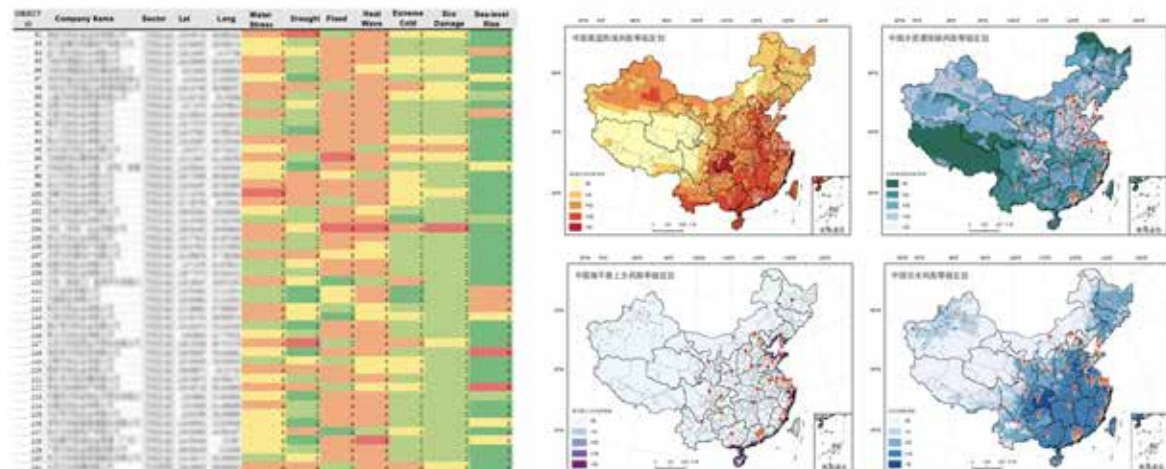
Project content

(1) **STGF PANDA Climate Data Platform** is a professional database that evaluates listed companies' response to climate change from

the perspectives of both corporate internal management and external climate risk exposure level. The database contains 4 data categories: **1) Climate Management:** based on TCFD's 4 dimensions of governance, strategy, risk management, metrics and targets, assessing the ability and performance of the target corporates to address climate change. **2) Corporate Carbon Footprint:** employs the STGF Corporate Carbon Footprint Measurement model to quantify the target corporates' total carbon emissions and emissions intensity. **3) Climate Risk Exposure:** reflects the target corporates' physical and transition risk exposures in the context of climate change and carbon neutrality. **4) Climate Opportunities:** measures the target corporates' opportunities in the context of climate change and carbon neutrality.

(2) **STGF Climate Scenario Analysis and Stress Testing Platform** helps financial institutions and companies quantify financial impacts of physical and transition risks through simulation and analysis of

STGF Physical Risk Sample Analysis



STGF physical risk sample analysis

own proprietary China sectoral- and city-level carbon emissions projection model combined with clients' asset-side data. Our model combines top-down forecast data on sectoral- and city-level emissions gaps and carbon price, with bottom-up asset-side data, using assets' geographic location, sector, business and product characteristics, and other dimensions to assess future emissions profile until 2060, carbon-related costs and profits, carbon value-at-risk, and implied temperature rise of a given asset portfolio.

In terms of scalability, the project has a wide range of application scenarios for various financial institutions and corporates. For financial institutions, carbon footprinting for credit or investment portfolio, development of carbon-neutral themed financial products, net-zero transition roadmap setting can be done using results generated from this project; for corporates, benchmarking of low-carbon transition industries, corporate carbon management improvement and other relevant analyses can be carried out.

In terms of industrial contributions, this project has actively advanced the academic research and industrial practice of corporate carbon footprinting and climate risk analysis. STGF's corporate carbon footprint and climate risk assessment models are consistent with leading climate risk evaluation methodologies. Our models allow various financial institutions and companies analyze their portfolios' current and future emissions level, climate risk exposures, and associated financial loss in a scientific, comprehensive, and straightforward way. Regulators have put forward increasingly clear and strict requirements for financial institutions to disclose climate-related information. More institutions are using the TCFD framework for information disclosure, which lists specific requirements for disclosing both the procedure and result of conducting climate scenario analysis and stress test. Thus, the quantitative and comprehensive modeling results generated from our model will help financial institutions improve the quality of climate-related financial information disclosure.

In terms of project profitability, a few domestic asset management institutions have purchased STGF PANDA Climate Database, which provides basic data inputs required for corporate carbon footprinting. The yield of Orient Securities Carbon Neutral Index, which is built based on the PANDA database, showed a high potential for continuous growth. According to the data in its July report last year, in terms of historical performance, the index has outperformed the CSI 300, the Shanghai Composite Index, and the Hang Seng Composite Index over the long term.

In terms of public welfare promotion, first, STGF translated a series of UNEP FI's TCFD pilot project progress reports, which introduced the progress of global climate risk disclosure requirements and summarized the mainstream climate risk assessment methodologies. These reports not only provide a wealth of tool references for financial institutions to conduct climate risk analysis and implement TCFD disclosure recommendations, the release of the Chinese version of these reports has also contributed

to the academic exploration of climate risks by domestic financial institutions, scholars, and researchers. Second, STGF PANDA Climate Database provides a comprehensive dataset for conducting climate-related data analyses such as carbon accounting and climate scenario analysis that offer insights on how to revise future business plans to achieve carbon neutral goals. Third, the Orient Securities Carbon Neutrality Index allows regulators and government agencies to evaluate the capital market's recognition of the concept of carbon neutrality and formulate more effective carbon neutrality-related policies. The release of the index also makes the public, media, and other stakeholders more aware of these carbon-neutral-themed companies' performance in terms of their low-carbon contributions.



Bank-Transition Risk | Bank-Physical Risk | Asset Management-Scenario Analysis | Climate Risk Landscape

A series of UNEP FI's TCFD pilot project progress reports, translated by STGF

Chapter 4: Special Features

1. Supporting Green Finance to Align with a Net Zero Future - Carbon Trust Green Finance Cases

◆ Opening

Net Zero targets have been widely adopted globally by both the public and private sectors. They are a key step towards tackling climate change, with the number of organisations setting targets growing constantly¹. Financial institutions are not immune to these dynamics. This megatrend of low carbon transition impacts them, both in terms of returns and the risks they face. However, proactive actions on decarbonisation and Net Zero can also bring opportunities.

The Carbon Trust is a global climate consultancy established in 2001 and driven by the mission to accelerate the move to a decarbonised future. We have supported over 3,000 organisations globally with their climate action planning, collaborating with more than 200 partners in setting science-based targets, and supporting cities across five continents on their journeys to Net Zero. Through a dedicated green finance team, we help financial institutions navigate the risks and opportunities created by climate change. We provide expert advice and assurance to ensure that green and sustainable finance flows deliver genuinely green outcomes. The following case studies demonstrate how we

have supported financial institutions on the road to Net Zero, from footprinting, to target setting, and from green finance product development to impact assessment.

◆ Theme 1: Measuring Portfolio Carbon Footprints

Financial institutions have a key role to play in facilitating necessary shifts by directing capital flows to support decarbonisation efforts. Portfolio carbon footprinting is a critical step for financial institutions to quantify and understand the Green House Gas (GHG) emissions stemming from their loans and investments. Based on the information, they can better identify and manage risks, navigate emissions reduction goals, disclose progress towards targets, and act to reduce their portfolio climate impact. This understanding can then trigger and underpin internal discussions, and engagement with stakeholders, to identify concrete actions that help lower financed emissions.

Carbon Trust joined the development of the GHG Protocol's guidance for the measurement of Scope 3 emissions. We leveraged our sectoral expertise and deep understanding of best-practice methodologies to create effective methods to quantify meaningful

financed emissions footprints. We take the view that it is better to have an imperfect footprint than no footprint at all. With the data quality and availability challenge, we introduce high-quality proxy data to fill gaps. All our assessments include data quality scoring and recommendations for improvements in future iterations. We look to transfer knowledge to the financial institutions we work with, allowing them to understand not just the results, but the process. We seek to empower our clients to update their footprint calculations themselves and take action on data quality improvements.

Case Study: Portfolio footprinting and risk assessment for AfricInvest²

AfricInvest is a pan-African investment platform active in multiple alternative asset classes including private equity, venture capital, private credit, blended finance and listed equities. Founded in 1994, AfricInvest has invested in over 200 companies across 35 African countries in a variety of high growth sectors.[1]AfricInvest is seeking to become a Net Zero private equity investor by setting a baseline quantification for their financed emissions, reevaluating the risks across its portfolio and developing comprehensive and climate-friendly strategies to tackle them.

To help AfricInvest achieve these goals, we have supported them in compiling a comprehensive GHG inventory for the firm's operations (i.e. Scope 1, 2, and material Scope 3³) according to the GHG Protocol Corporate Standard. We have also devised

carbon footprint tools to help AfricInvest estimate their financed emissions (Scope 3 Category 15 - Investments) in alignment with the methodologies of the Partnership for Carbon Accounting Financials' (PCAF) Global GHG Accounting and Reporting Standard for the Financial Industry. The aim of this exercise is to create a baseline for AfricInvest's decarbonisation journey.

Elsewhere, we assessed AfricInvest's practices against the TCFD recommendations and designed a tool to support AfricInvest to examine the climate risks and opportunities of current and potential investee companies. Finally, we provided capacity building sessions and held awareness raising workshops for a range of stakeholders within the firm to support the integration of the tools and best practices. This helped to build a broad base of support for the firm's Net Zero ambitions.

Through a thorough analysis of the firm's organisational and financed emissions, alignment with TCFD and identifying the climate risks and opportunities that exist, we were able to support AfricInvest's journey to integrating climate considerations as a key pillar in their investee engagement strategy.

Theme 2: Developing Net Zero Targets and Strategy

As public awareness of the need to reach Net Zero emissions at the global level has grown, the number of financial institutions committing to Net Zero targets has increased

rapidly. At COP26 in 2021, over 450 financial institutions, with more than US\$130 trillion in assets under management, committed to reaching Net Zero before 2050.⁴ Voluntary initiatives like the Glasgow Financial Alliance for Net-Zero (GFANZ), alongside sector initiatives are driving more collective action and financial institutions making high-level Net Zero commitments.

Commitment is just a starting point and concrete actions are needed to turn commitment into reality. According to the SBTi's Guidance for Financial Institutions, setting a science-based target includes the following steps: i) establish the boundary of coverage; ii) calculate baseline emissions; iii) calculate a target in line with commitments; and iv) develop emissions reduction approaches and timelines. These steps are usually the most challenging and time consuming for organisations. However, they

are also necessary for ensuring the target is feasible and to guide subsequent action.

Case Study: Science-based target setting for an UK Asset Management Firm

The UK Asset Management Firm is an independently managed investment company based in London and a signatory of the Net Zero Asset Managers Initiative. As a signatory to the NZAMI, they have committed to setting an interim science-based target covering over 90% of their total asset- under-management (AUM) on a 2030 timeline. This will be further aligned with a longer-term Net-Zero target.

To support this commitment we helped the UK Asset Management Firm develop interim targets for their public equity portfolio. Leveraging the relevant SBTi guidance for financial institutions, we first modeled the target trajectories using the temperature

OUR MISSION

To accelerate the move to a decarbonised future.



² This project is majority funded by KfW DEG.

³ Scope 1, 2, and 3 emissions are a way of categorizing business emissions. Scope 1: direct GHGs emissions from a business; Scope 2: indirect GHGs emission from purchased energy; Scope 3: GHGs emission from upstream and downstream value chain.

⁴ Net-zero for financial institutions - Science Based Targets



rating methodology for their Scopes 1, 2 and 3 emissions. We then developed an aggregate portfolio temperature rating with Scope 1, 2 and 3 temperature heatmaps. The insight provided by the heatmap analysis helped with the Asset Management Firm's decision-making and was particularly useful in terms of developing a more specific engagement strategy at the country and sector levels. To determine the effect of engaging with priority portions of its portfolio, we further developed various scenarios to identify investee companies that would most benefit from engagement activities.

This project helped this firm create a credible 1.5-degree pathway with targets that meet SBTi's criteria. More importantly, this exercise provided insights for their portfolio carbon footprint management, portfolio company engagement and decarbonisation of its exposures. This effort, together with other work the Asset Management Firm undertook

on sustainability, helped to channel more assets towards the green economy.

Expanding financing for a decarbonized economy

Massive investment is needed to achieve net zero emissions by 2050, the financial sector can play a critical role in supporting this journey, either by diverting capital away from carbon-intensive activities or scaling up investment in clean energy and other green activities. Emerging economies are no exception. With rapid urbanization, population growth and the corresponding increase in energy demand, emerging markets and developing economies often encounter more challenges in tackling climate change. Accompanying such growth is an urgent need to accelerate the transition towards decarbonisation and climate resilience to avoid the consequences of environmental degradation.

The ASEAN region has some of the fastest growing economies in the world. However, sustainable finance markets in the region are currently underdeveloped. A report by Bain & Company and Temasek estimated that the region's green sector will be worth USD 1 trillion in economic opportunities by 2030, but only USD 15 billion has been invested since 2020. There are sizeable gaps in sustainable financing⁶. Therefore, urgent action is needed to scale up sustainable financing to bridge these gaps and support meeting the national climate commitments.

Case Study: The First Sustainable Loan Framework from a Vietnamese bank

At COP26, Vietnam made significant national climate commitments, most notably setting a target of Net Zero emissions by 2050. The Bank for Investment and Development of Vietnam (BIDV), the largest commercial bank in the country, was identified as a key partner for the government to promote the sustainable financing needed to achieve the country's climate goals.

Carbon Trust supported BIDV with the development of their Sustainable Loan Framework. This collaboration was made possible under the ASEAN Low Carbon Energy Programme (LCEP), a £15 million development programme funded by the UK Government. This Framework outlines qualifying activities to guide the development and issuance of thematic

loans and sustainability-linked loans. Thematic loan products such as green and social loans, are dedicated to projects that have a positive impact on the environment or society. In addition, sustainability-linked loans refer to loan facilities which are structured to incentivise borrowers to achieve predetermined Sustainability Performance Targets measured by predefined Key Performance Indicators. With our advice, this framework was developed in accordance with the following international Principles, including (i) Green Loan Principles (GLP); (ii) Social Loan Principles (SLP); and (iii) Sustainability Linked Loan Principles (SLLP).^{6,7} Their large network of customers can, therefore, leverage the bank's sustainable finance products for their green and sustainable projects.

Through this project, BIDV became the first commercial bank in Vietnam to announce the comprehensive framework for their customers. As Mr. Le Ngoc Lam, BIDV's CEO said, "the development and issuance of a Sustainable Loan Framework will help BIDV provide sustainable financial products in accordance with international standards to domestic enterprises, and at the same time serve as a basis for BIDV to strengthen cooperation with international partners in the field of sustainable development in Vietnam". This also positions BIDV as a credible partner to support the implementation of

⁶ World Bank and Institute of Finance and Sustainability (2022) "Unleashing Sustainable Finance in Southeast Asia (November), World Bank, Washington, DC. Retrieved on 31 March 2023, from: <https://openknowledge.worldbank.org/server/api/core/bitstreams/7ff934ad-de0a-5fd0-bed1-42e1de4f5717/content>

⁶ These principles are jointly produced by the Loan Market Association (LMA), the Loan Syndications and Trading Association (LSTA), and the Asia Pacific Loan Market Association (APLMA)

⁷ BIDV - First Vietnamese bank to issue Sustainable Loan Framework



the Vietnamese Government's Sustainable development strategy. BIDV's example demonstrates that financial institutions in emerging markets are stepping up through their financing decisions and this, in turn, can accelerate the broader move to a Net Zero future.

◆ Theme 4: Assessing the Impact of Green Finance

With the rapid growth of green and sustainable finance, the issue of greenwashing is increasingly drawing more attention, which could hinder capital flows. As such, financial institutions must ensure they remain transparent about the real impacts of their green investments. Through robust and transparent impact reporting, the industry can build trust from asset owners and encourage

capital to flow into an increasingly sustainable global economy.

We have advised a wide variety of financial institutions, bond issuers and both public and corporate borrowers on understanding and measuring the climate impact of their financial engagements, including developing credible impact assessment frameworks and methodologies, and quantifying the environmental impact of financial products and portfolios. Recently, we were commissioned by the UK Treasury and Debt Management Office to develop a pre-issuance report on the impact and alignment of the UK's sovereign green financing programme.⁹

Case Study: UK Green Gilt Pre-issuance Report

The Green Financing Programme is a green

sovereign bond issuance programme, which includes a world-first green retail savings bond via the UK Government's retail savings arm, NS&I. In addition to the core purpose of financing green and sustainable projects, the programme will also finance or refinance projects and schemes for much needed infrastructure, create jobs, and support biodiversity, as well as mainstream green financial products. The programme seeks to innovate in its approach to reporting on impact to provide markets with a best-practice example.

In support of the programme, we reviewed the proposed activities eligible for finance and the proposed impact metrics. These were assessed against both established reporting metrics and the feasibility of data collection. Afterwards, a shortlist of likely available metrics comprising environmental (including nature-based), and social metrics were produced for the UK government to report against. We also examined a range of UK Government policies in the context of the programme. The major ones are overarching goal of achieving Net Zero by 2050 and the Climate Change Committee's (CCC) Sixth Carbon Budget, which provided the best representation and description of activities and associated allocation of GHGs to achieve Net Zero. Through the assessment, the programme's categories and the allocations align sensibly with the policies, which demonstrate how this programme could contribute materially to reaching Net Zero by 2050.

This publicly-available pre-issuance impact

report for the UK Government Green Financing Programme provides the likely approach to be taken for reporting, the metrics to report against, and an upfront assessment of the allocation and alignment of the likely financed activities with the government's sustainability related policies. It also highlights how the green financing programme supports the climate goals and commitments of the wider UK government.⁹

Engaging at such an early stage for impact assessment helped the UK Government mobilise resources and processes to enable robust impact reporting throughout the duration of the Green Finance Programme and consider impact more holistically. It further contributed to the desired level of transparency and the government's aim to push the green finance agenda forward.

⁹ BIDV - First Vietnamese bank to issue Sustainable Loan Framework

⁹ Pre-Issuance Impact Report on the UK Government Green Financing Programme (windows.net)

2. Huang Dafei: Carbon Trading Promotes Financial Products Innovation



Since China announced commitments to peak carbon dioxide emissions before 2030 and achieve carbon neutrality by 2060 (also known as the 'dual carbon goals'), the "1+N" policy framework has been formulated at the central level to provide guidance for China's response to climate change and green and low-carbon development. Carbon emissions trading scheme, a market-based approach to reducing greenhouse gas emissions, is one of the key policy tools adapted to support the achievement of China's dual carbon goals.

● The status quo of China's carbon emissions trading scheme

On 16 July 2021, the national carbon emissions trading scheme was officially launched. By 31 December 2021, the end of the first compliance period, the cumulative trading volume was 179 million tonnes, delivering a

total trading value of 7.661 billion RMB. The market closed at RMB 54.22 per tonne^① at the end of the trading period. Overall, the market launch was smooth. The main product traded in the national carbon emissions market is the carbon emission allowance.

The other product of the national carbon emissions trading scheme is the China Certified Emission Reduction (CCER). The Measures for the Administration of Carbon Emissions Trading (Trial 2021), specifies that compliance entities may use CCERs to offset their carbon emission allowances each year, with a 5% ceiling. The offset mechanism is an important part of the carbon trading market. According to statistics, approximately 34 million tonnes of CCERs were used in the first compliance period of the national carbon emissions trading market. These CCER offsets reduced the compliance costs for the enterprises, they also leveraged around RMB 2

① Carbon emission allowances' volume, turnover and average price from the official website of the Shanghai Environment and Energy Exchange.

billion of financing to the underlying voluntary greenhouse gas emission reduction projects^②, making positive contributions to promoting green and low-carbon transition development. The CCER system was launched in 2012, since then supplying CCERs to the pilot markets. However, to prioritize the launch of the compliance scheme, the policymaker put the CCER system on suspension in 2017. With the national market sailing into its second compliance period, the CCER system is expected to be re-launched in 2023.

● International carbon trading markets and trends

The European Union Emissions Trading Scheme (the EU-ETS) is the most mature carbon trading market globally. The EU-ETS has been the cornerstone of the EU's climate policy, covering around 40% of the EU's greenhouse gas emissions. It is legally binding and has clear financial attributes that are crucial to the EU in achieving its carbon reduction targets. The EU-ETS trading value reached 751.4 billion in 2022.^③ The EU continues to push for market reforms, including raising its emissions reduction targets coverage by the EU-ETS and tightening allowance supplies, in order to push the EU to meet its emissions reduction targets.

The global voluntary carbon market (VCM) has bloomed in recent years. With the signing of the Paris Agreement, the global consensus on climate actions has reached

an unprecedented level. Large corporates have pledged climate targets and zero-carbon strategies, driving zero-carbon transition in the value chains and fueled the VCM development. The VCM trading value reached 1.3 billion USD in 2022, nearly tripled compared to the 2020 level.^④

● Carbon finance innovation

In April 2022, the China Securities Regulatory Commission (CSRC) issued Carbon Financial Products Standard (the Standard), which for the first time official definitions are provided for carbon financial products in China. The carbon finance products are categorized in three types, including carbon financing, trading and market support instruments. The Standard also provides framework guidelines for implementation and transactions. As the market continues to find carbon price formation, carbon finance products are expected to expand, for example carbon assets pledge, carbon repurchase, carbon-linked bonds, carbon-linked loans and carbon funds etc.. These climate finance instruments have important roles to play in channeling capital and resources to the green sectors, promoting the low-carbon transition of the economy.

Carbon has been an innovative ingredients in the domestic and international climate finance markets. The carbon-linked bond is one of the examples. In May 2014, China Guangdong Nuclear Power Corporation (CGNPC) issued the medium-term note of CGN Wind Energy

② China Beijing Green Exchange and EDF co-hosted a roundtable discussion on "The Future of the Voluntary Emission Reduction Market under the Carbon Peaking and Carbon Neutrality Goals".

③ LSEG Refinitiv, Carbon Market Year in Review 2022

④ Trove Research

Limited, which is the first tranche of bonds linked with carbon revenue in the China's domestic bond market. The coupon consisted of fixed and floating rates, with the floating rate linked to the carbon asset revenue of CGNPC's five wind power projects over the life of the bond and a floating rate band [5BP, 20BP]. In the international market, the International Finance Corporation (IFC) listed the world's first Forests Bonds on the London Stock Exchange in 2016, with an issuance size of \$152 million and a maturity of 5 years, to fund forest conservation and deforestation reduction projects. The Forests Bonds are innovative in introducing carbon credits as one of the coupon payment methods, giving investors the flexibility to choose to pay the coupon with carbon credits generated from the underlying projects or in cash.⁵

The recent launch of the national carbon emissions trading market has created conditions for further innovation of domestic carbon finance products. In November 2022, State Power Investment Corporation (SPIC) Jiangxi Electric Power Co., Ltd. issued the country's first carbon emission allowances green asset-backed bonds in the interbank market. The issuance size was RMB 130 million, with a maturity of 180 days and a coupon rate of 10-15 BP lower than the issuer's general financing cost, and the pledge was for a total of 2.88 million tonnes of China Emissions Allowance (CEAs) held by power plants under SPIC Jiangxi Electric Power Co.,Ltd. The coverage ratio of principal and interest is approximately 125%. The use

of proceeds are used to supplement SPIC Jiangxi Electric Power Co.,Ltd's working capital and to retrofitting the turbine units.⁶

The CSRC's Standard provides a clear definition of carbon-linked bonds. Carbon-linked bond is not only an innovation in linking the carbon market to the capital market but also is an important breakthrough in the development of domestic carbon derivatives. For issuers, carbon bonds can be used to raise funds for projects with emission reduction benefits, lowering interest cash payments, i.e. lowering financing cost. The investors get access to potential carbon credits, which may be used to offset their own operational carbon emissions or sold for investment returns.

● The importance of carbon finance development

The carbon market is a widely used carbon pricing tool worldwide. An effective carbon market can generate price signals that reflect the policy commitment and the market's supply and demand, effectively guiding resource allocation to support emission reduction and green investment.

Carbon finance promotes low-carbon transition of China's economic development. The eight key emitting sectors account for more than 80%⁷ of the national emissions, among which the power sector accounts for the highest carbon emissions, reaching more than 40%⁸. The power generation sector's

restructuring is critical to China's dual carbon goals. The carbon price will need to play a role in driving the power generation sector restructuring.

Carbon finance broadens financing channels for green projects. Renewable energy, forestry carbon sinks, methane utilization are a few examples of the sectors that have potential for carbon credit development. Broadening the financing channels for low-carbon green projects through voluntary emissions reduction mechanisms such as CCER and enhancing the financial market's role and capacity in carbon assets evaluation will support China's important agenda in ecological product value realization.

Carbon trading provides opportunities for financial products innovation and contributes to promoting ESG investment. ESG investment is becoming mainstreamed for financial institutions to manage risks, including the physical and transitional risks posed by climate change. Carbon finance adds to the ESG investment product spectrum, channeling investment to low-carbon fields. It also provides investors opportunities to fulfill their environmental and social responsibilities while having a more sustainable long-term investment strategy.

⁵ Data source: IFC website

⁶ SPIC JIANGXI ELECTRIC POWER CO.,LTD.'s 2022 First Tranche of Carbon Emission Rights Green Asset-Backed Debt Financing Instrument Prospectus

⁷ Carbon Emissions Accounts and Datasets for Emerging Economies (CEADs)

⁸ CEADs

Appendix

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International Finance Forum (IFF)

The International Finance Forum (IFF) has been publishing the Global Finance Development Report (Report) during the IFF Annual Meeting since 2021. Based on a wide range of international data, the Report tracks and researches on major global issues to promote the role of finance services in supporting economic recovery and sustainable development. It analyzes and forecasts global economic trends and outlook, offers in-depth analysis on financial development and innovation, and discusses global challenges and policies.

IFF Global Green Finance Award

The IFF Global Green Finance Award was launched in 2020 by the International Finance Forum (IFF) and is judged by a committee of more than 20 globally influential and authoritative financial leaders and elites from the financial and environmental sectors. It aims to recognize and reward institutions that have made outstanding achievements and innovative solutions in the field of global green finance, especially in the areas of climate investment and finance and biodiversity finance, in order to promote global climate governance and sustainable development. The award has been highly commended by the United Nations and several international organizations, and it is open to any organization worldwide that has achieved outstanding performance in promoting green transition, addressing climate risk and achieving SDGs.

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The International Finance Forum (IFF) is an independent, non-profit, non-governmental international organisation founded in October 2003, and established by financial leaders from more than 20 countries and regions, including China, the United States, the European Union, emerging countries and leaders of international organisations such as the United Nations, the World Bank and the International Monetary Fund (IMF). The IFF is a long-standing, high-level platform for dialogue and communication and multilateral cooperation and has been upgraded to F20 (Finance 20) status.



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