TransitionAsia

ACCELERATING EAST ASIAN CORPORATE CLIMATE ACTION

FINANCING GUIDANCE FOR LOW-CARBON TRANSITION OF CHINA'S STEEL COMPANIES

Global overview and case studies of low-carbon financial instruments for the steel industry

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CONTENTS

TO MEET "DUAL CARBON" TARGETS, CHINA'S STEEL PRODUCERS URGENTLY NEED TO DECARBONISE

The steel industry is a significant contributor to energy consumption and carbon emissions. In China, the steel industry currently accounts for approximately 11% of the country's total energy consumption and 15% of its total carbon emissions, making it the country's most polluting industry[1]. Globally, China's crude steel production constitutes 50% of the world's total production[2]. This production emits approximately 2 tonnes of carbon dioxide per tonne of crude steel, and the carbon emissions intensity is second only to India[3].

China's massive production share and high carbon emissions intensity mean that its steel production has a significant impact on reducing carbon emissions globally. Therefore, decarbonisation actions taken by China's steel companies are not only crucial to achieving the country's carbon peaking and carbon neutrality ("dual-carbon") goals, but also for accelerating the global efforts to mitigate the climate crisis.

Although China's crude steel production decreased by 3.0% and 2.1% in 2021 and 2022, respectively[4], the long process production mode in blast furnaces (BF), which use the Basic Oxygen Furnace (BOF) process, still accounts for 89.4% of the country's crude steel production[5]. This production mode involves burning coal to remove the oxygen atoms from iron ore and generates substantial carbon emissions. To accelerate the steel industry's low-carbon transition, the Chinese government has developed guidelines and policies to promote energy conservation, carbon reduction, and high-quality development in the steel industry (See Appendix 1 for further details). Particularly, the "Implementation Plan for Carbon Peaking in the Industrial Sector" encourages the industry to develop short processes that use advanced steel electric furnaces; the plan aims to increase the proportion of short process steelmaking to 15% and 20% by 2025 and 2030[6], respectively. Additionally, the China Iron and Steel Association has published the "Carbon Neutral Vision and Low-Carbon Technology Roadmap for the Steel Industry." This roadmap outlines the technological transition pathway that the steel industry should take to achieve dual-carbon targets, including improving system energy efficiency, recycling resources, optimising processes, developing breakthrough smelting processes, upgrading products and utilising carbon capture and storage systems[7].

1 China Metallurgical Industry Planning and Research Institute. Energy-Saving and Low-Carbon Development Report Of China's Steel Industry. 2020. http://www.mpi1972.com/xwzx/yndt/202012/t20201224_94730.html

2 World Steel.World Steel in Figures.2022.

3 Seb Kennedy. Can 'green' steel halt EU deindustrialisation? 2022. https://www.transitionzero.org/insights/can-green-steel-halt-eu-deindustrialisation

4 NDRC. Operation of Steel Industry from January to December 2021. 2022. https://www.ndrc.gov.cn/fgsj/tjsj/cyfz/zzyfz/202201/t20220126_1313452.html. NDRC. Operation of Steel Industry from January to December 2022. 2023. https://www.ndrc.gov.cn/fgsj/tjsj/cyfz/zzyfz/202301/t20230131_1348160.html

5 Global Efficiency Intelligence. Net-Zero Roadmap for China's Steel Industry. 2023. https://static1.squarespace.com/static/5877e86f9de4bb8bce72105c/t/6400854fbe41e5254fcfd5c3/1677755746536/China+steel+roadmap-2Mar2023.pdf

6 MIIT, NDRC & Ministry of Ecology and Environment. The Implementation Plan for Carbon Peaking in the Industrial Sector. 2022. https://www.gov.cn/zhengce/zhengceku/2022-08/01/5703910/files/f7edf770241a404c9bc608c051f13b45.pdf

7 China Forum of Environmental Journalists. Carbon Neutral Vision and Low-carbon Technology Roadmap released by Steel Industry. 2022. http://www.cfej.net/news/jjzwrtq/202208/t20220822_992203.shtml

In order to significantly reduce the carbon emissions intensity of steel production, Chinese steel companies must prioritise the promotion of green steel production technology while improving energy utilisation efficiency. This will require a considerable amount of financing. A study has revealed that China's steel industry needs to invest almost 3.5 trillion yuan before reaching its carbon peak[8] and around 20 trillion yuan to achieve carbon neutrality[9]. The majority of the demand for green investment comes from investment in low-carbon steel production technology, along with the corresponding raw materials and energy supply, including hydrogen metallurgy-blast furnace smelting with carbon capture technology, direct reduced iron-electric furnace smelting with carbon capture technology, and scrap steel-based electric arc furnace (EAF) smelting[10].

The current policy is focused on transitioning from the "coal-blast furnace-converter" mode (long process mode) to the "scrap steel-renewable electric furnace" mode (short process mode), which is the main focus but also the most difficult aspect. Steel companies will face premium pressure for green steel production, whether it is investing in new EAF or the cost of obtaining scrap steel and renewable electricity. Transition Asia's preliminary calculation of China's green steel premium shows that in 2022 the unit cost of steel produced using China's short process mode (carbon intensity is about 0.22 tonnes per tonne of steel) is around US$100 higher than that of long process mode (carbon intensity is more than 2 tonnes per a tonne of steel) per a tonne of steel[11].

To ensure that companies follow a reliable and scientific transition path, policymakers, investors and steel companies need to use low-carbon transition financing tools to bridge the funding gap in the low-carbon transition of China's steel companies and improve their competitiveness. However, this requires navigating common challenges of avoiding various risks caused by the transition being too slow or too fast. This guidance aims to assist China's steel companies in expounding the characteristics of various financing tools and developing their own low-carbon transition and financing plans based on their development targets, by identifying various low-carbon financing tools and providing case studies.

THE SHIFT TO GREEN STEEL: FINANCING TOOLS AND CASE STUDIES COMPARED

In the field of green finance, a variety of financing tools and products are currently available, including loans, bonds, equity, and insurance. To expand and diversify financing sources, more steel companies need to participate in financial markets, such as by issuing bonds, revitalising stocks and optimising assets through securitisation, reducing leverage levels through equity financing, and improving their long-term capital

8 Zhao Yucheng et al. Research on Green Financial Policy Helping Steel Industry's Low-carbon Transition under "Dual Carbon" targets. 2022. http://qikan.cqvip.com/Qikan/Article/Detail?id=7107193153

9 Climate Bonds Initiative et al. Transition Finance in China. 2020. https://www.climatebonds.net/files/reports/cbi_trans-finchina_cn_01e.pdf

10 CICC. Steady growth: From Concentrated Development to Diversified one. 2022. https://research.cicc.com/frontend/recommend/detail?id=2704

11 Transition Asia. Green Steel Premium: Pricing and Market Development in China. 2023.

utilisation ability[12].

1.LOAN FINANCING

Bank loans are still the primary choice for corporate financing; Green loans are currently the largest source of funds for domestic and foreign steel companies to finance a low-carbon transition. In foreign countries, green loans have already supported companies in developing hydrogen metallurgy projects with significant emissions reduction effects. For China's steel companies, green loans are mainly invested in general environmental protection renovation projects. With China's need to eliminate excess capacity, banks have set more restrictions on loans to steel companies which has raised the threshold for these companies to obtain loans from banks and other financial institutions. However, with the advancement and implementation of financial standards for transition, more companies in the industry are expected to receive loan support.

CASE 1: SUPPORTING HYDROGEN METALLURGICAL STEELMAKING - THE TECHNOLOGY WITH THE MOST PROMISING POTENTIAL FOR EMISSIONS REDUCTION

Hydrogen metallurgical steelmaking technology, with its huge potential for emissions reduction, can attract significant loan support from overseas. For example, the Hydrogen(H2) Green Steel project in Sweden has received support from a number of financial institutions to build the Boden hydrogen smelting steel plant in northern Sweden. This support includes a conditional commitment on senior debt worth 3.3 billion euros from banks including AB Svensk Exportkredit (SEK) and BNP Paribas, the European Investment Bank's 750 million euros in senior debt financing and another 500 million euros in subordinated debt support[13]. Some of the banks participating in the financing of H2 Green Steel are also members that jointly released the Sustainable Steel Principles in September 2022. The H2 Green Steel project plans to produce 5 million tonnes of green steel by 2030, which can reduce 95% of CO_2 emissions compared to traditional steel production. H2 Green Steel will provide capital for the Boden plant through a combination of equity and debt financing. The project has obtained large-scale loans from many banks due to its remarkable emissions reduction effect and has been supported by market demand from many downstream clients, such as automobile manufacturers, major appliance brands, and construction companies, laying a solid foundation for the expansion of green steel's production scale.

CASE 2: FACILITATING IMPROVEMENT OF OVERALL ENVIRONMENTAL STANDARDS AND RELOCATION OF PRODUCTION SITES

Green loans have long been instrumental in supporting environmental upgrades and relocation of steel companies. For instance, in Tangshan City, loans provided to steel companies increased from 76.77 billion yuan to 97.33 billion yuan between 2017 and 2020. The loans are comprised of liquidity loans and project loans, with the former used to supplement liquidity capital and the latter supporting relocation and environmental upgrades of companies. With China's dual-carbon targets, the financing needs of steel companies in Tangshan City will shift from short-term financing to medium- and long-term financing for the technological transition, energy efficiency, and consumption reduction, in addition to corporate mergers

12 Wang Ning. Survey on Financial Support for Green and Low-carbon Transition of Steel Industry under "Dual Carbon" Targets. 2021. https://h5.drcnet.com.cn/docview.aspx?version=gov&docid=6331418&leafid=14062&chnid=3594about:blank

13 Hydrogen and the Future. H2 Green Steel Obtains Debt Financing From European Banks. 2022. https://h2weilai.com/cms/index/shows/catid/28/id/7085.html

and restructuring[14].

Moreover, for large-scale projects with significant financing needs, syndicates can be formed to provide substantial financing. For example, eight banks, including Bank of China's Jiangsu Branch, and the Export-Import Bank of China's Jiangsu Branch, formed a syndicate to provide 17 billion yuan in financing for Zenith Steel Group's Green Fine Steel project, which has a production capacity of 20 million tonnes[15]. It is a demonstration project implemented by the Jiangsu Provincial Party Committee to relocate and upgrade the steel production to the coast, and its wastewater, exhaust emissions and solid waste will be disposed of in accordance with stricter environmental protection standards. However, there is little disclosure of energy saving and emissions reduction benefits as of now.

In comparison to the H2 Green Steel project loan case study, green loans in China's steel industry are primarily invested in general environmental protection upgrades, and their specific emissions reduction effects remain unclear. This is partly due to the lack of concrete methods for carbon auditing for steel projects and their financing portfolios, and partly due to the lack of concrete requirements and information disclosure for a loan's project finance emissions reduction indicators, leading to deficiencies in standardised assessment and transparency reports for China's steel green loan projects. Going forward, China's steel companies can reference the Sustainable Steel Principles to strengthen the carbon auditing of financing projects and obtain more loan support through the disclosure of quantified energy saving and emissions reduction effects.

2. BOND FINANCING

Steel companies in China have faced various pressures in recent years, including production capacity regulation, an ultra-low emission transition, the need for energy saving, increased carbon reduction, and technological upgrading. This has made continuous investment a burden to the industry. In addition, the rising prices of raw materials and strict control of loans in high-carbon industries from banks have made it more difficult for companies to obtain endogenous financing. To break out of this dilemma, external financing, such as issuing bonds, has gradually become one of the avenues for steel companies to fill the gap in funding the transition.

Many steel companies in China have already started to raise funds for their transition and facility upgrades by issuing green bonds, certified sustainability bonds and transition bonds. These bonds are based on green and low-carbon development commitments and practical actions or projects. They closely follow domestic and foreign policy trends and are easier to be recognised and favoured by investors. The funds raised by these bonds can not only satisfy short-term needs but also increase medium and long-term capital reserves and demonstrate the strength of the companies to the market and investors, thereby relieving short-term debt repayment pressure.

CASE 1: GREEN BONDS USED IN ULTRA-LOW EMISSION TRANSITION, WASTE HEAT UTILISATION AND CLEAN ENERGY PROJECTS

Green bond financing is now mainly used for projects that comply with the green taxonomy. Steel companies with reserve projects can obtain financing by issuing green bonds if they are

14 Wang Ning. Survey on Financial Support for Green and Low-carbon Transition of Steel Industry under "Dual Carbon" Targets. 2021. https://h5.drcnet.com.cn/docview.aspx?version=gov&docid=6331418&leafid=14062&chnid=3594about:blank

15 Zenith Steel. Introduction to Zenith's Green Fine Steel Demonstration Project. 2022. http://www.zt.net.cn/index.php?m=-content&c=index&a=show&catid=11&id=11659

focused on the ultra-low emission transition, energy saving efforts, and emissions reductions, such as waste heat utilisation, and scrap steel recycling and reuse, such as scrap steel lending and recycling.

For example, Bao Gang United Steel Co. Limited successfully issued their 2021 green corporate bonds (first phase) on the Shanghai Stock Exchange in March 2021, totaling 500 million yuan[16]. The bond has a term of 5 years, and the coupon rate is 6%. No less than 70% of the funds raised in this issue of bonds (after deducting issuance expenses) will be used for the construction of waste pressure and gas energy saving and emissions reduction power generation projects, and no more than 30% will be used to supplement liquidity capital. The project supported by this issuance of green bonds aims to comprehensively utilise waste heat resources generated in the production processes for power generation and heat supply, which can improve resource utilisation and reduce business costs. According to the independent evaluation report of the bond, after the project is put into operation, it can save about 131,900 tonnes of standard coal per year. It also reduces about 88,400 tonnes of CO2 emissions per year while reducing about 2,176 tonnes, 2,058 tonnes, and 1,266 tonnes of sulfur dioxide, nitrogen oxides, and dust emissions per year, respectively. The successful issuance of this bond can increase the issuer's current ratio and enhance short-term solvency. Meanwhile, fixed-rate corporate bonds also help the group lock in financial costs and avoid the risk of loan interest rate fluctuations.

Baoshan Iron and Steel Co. Ltd issued a green corporate bond totaling 500 million yuan on the Shanghai Stock Exchange in May 2022. The bond has a 3-year term and a coupon rate of 2.68%, and it aims to support the adoption of hydrogen metallurgy technology. This is the first green corporate bond for the low-carbon transition in China[17], and the project that it supports is China's first million-tonne hydrogen-based shaft furnace[18]. This project represents a significant step for Zhanjiang Iron and Steel Co. Ltd, a subsidiary of Baoshan Iron and Steel Co. Ltd, in building a low-carbon metallurgical pilot demonstration zone and a zero-carbon pilot plant. The total investment required for the project is nearly 1.8 billion yuan, which will be used to replace conventional BFs with hydrogen-based shaft furnaces and replace them with clean energy[19]. The project also uses coke oven gas, a by-product of the coking process, to enable resource recycling. An independent evaluation institution has calculated that, based on the proportion of funds raised to total investment, the project can save 93,700 tonnes of standard coal and reduce 135,700 tonnes of emissions per year after it is put into operation.

CASE 2: TRANSITION BONDS SUPPORTING CAPACITY REPLACEMENT AND TECHNOLOGICAL UPGRADING PROJECTS

Although transition bonds can support capacity replacement projects that cannot be financed by green bonds, the overall issuance size of such bonds is still relatively small. For example, the 2022 first phase of medium-term notes (transition) issued by Shandong Iron

16 Huafu Securities. Prospectus for Bao Gang United Steel Co. Limited 's 2021 Public Issuance of Green Corporate Bonds. 2021. https://pdf.dfcfw.com/pdf/H2_AN202103301478430568_1.pdf?1648319706000.pdf

17 The Paper. Baoshan issued the first low-carbon transition green corporate bond in China: 3-year term, size 500 million in 3-year term. 2022. https://www.thepaper.cn/newsDetail_forward_18243334

18 Sina Finance. "Zero Carbon" Baoshan Zhanjiang started construction of the first million-tonne hydrogen-based shaft furnace in China. 2022. https://finance.sina.com.cn/money/future/indu/2022-02-16/doc-ikyakumy6273295.shtml

19 Baoshan Iron & Steel Co., Ltd. Baoshan Iron & Steel Co., Ltd. Public Issuance of Green Corporate Bonds (Phase I) (Low-carbon Transition) Prospectus Summary to Professional Investors in 2022. 2022. https://pdf.dfcfw.com/pdf/H2_AN202205191566499729_1.pdf?1652962693000.pdf

and Steel Group Co. Ltd had a bond size of 1 billion yuan, a term of 2+N years (perpetual bonds), and an interest rate spread of 1.7%. The bond's issuance rate hit a record low in the history of perpetual bond issuance by Shandong Steel, helping the company save more than 40 million yuan in capital costs[20]. All the funds raised will be used for low-carbon transition projects such as capacity reduction and replacement. The project is a major construction project in Shandong Province[21], primarily involving BF ironmaking and bottom-blowing combined-blown converter steelmaking system. Clean production technology and equipment will be used to enhance the energy efficiency in the steel production process and replace the original high-energy consuming production line. The project is expected to save 325,200 tonnes of standard coal annually and reduce 784,900 tonnes of CO_2 emissions. The expected energy saving and carbon reduction performance of the project is designed according to the benchmark set by China's steel industry, and the core performance indicator is the energy consumption per unit of product. According to an independent evaluation report of the bond in this phase[22], the energy saved in the capacity replacement project is higher than several national standards.

CASE 3: SUSTAINABILITY-LINKED BONDS ALIGNING SPECIFIC PERFORMANCE TARGETS FOR CORPORATE-LEVEL FINANCING

Sustainability-linked bonds enable the bond's terms to be linked with the issuer's sustainable development goals, without being tied to specific projects, and can provide financing at a company-wide level. However, different steel companies may use different key performance indicators (KPIs).

For instance, Liuzhou Iron and Steel's 2021 first-term medium-term note (sustainability-linked) employs "nitrogen oxide emissions per unit product" as their performance indicator[23]. The company aims to reduce the emissions to 0.935 kg/tonne of product in 2022; If it fails to achieve this target, the coupon rate will increase in the bond's third year. The independent evaluation of the bond found that the chosen target is in line with the company's goal of completing an ultra-low emission transition by 2023.

Meanwhile, Shandong Iron and Steel Group Co. Ltd.'s 2021 first-phase medium-term notes (sustainability-linked) use "comprehensive energy consumption per tonne of steel" as their key operating indicator. The company aims to achieve an energy consumption level no higher than 592 kg of standard coal per tonne of steel by the end of 2022. If the target is not met, the call provision will be triggered, and all notes will be redeemed on the second interest payment date. The bond attracted 17 institutional investors during the subscription period, with a subscription volume of 2.1 times. The final issue price was significantly narrower than the subscription range. The bond's proceeds will be used to repay the company and its subsidiaries' interest-bearing debts.

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20 Shanghai Securities News. Shandong Steel successfully issued the first batch of transition bonds, the largest amount in the country. 2022. https://stock.cnstock.com/stock/smk_zq/202207/4914095.htm

21 21st Century News. China's Transition Financial Instruments Landed, First Batch Of 5 Transition Bonds Successfully Issued. 2022. http://www.21jingji.com/article/20220624/herald/d9289f70ba9eca58e16e38946c6866f7.html

22 China Chengxin International. Shandong Iron and Steel Group Co., Ltd. 2022 First Phase Medium-term Notes (Transition) Credit Rating Report. 2022. http://file.finance.sina.com.cn/211.154.219.97:9494/MRGG/BOND/2022/2022-6/2022-06-17/17416915.PDF

23 Guangxi Liuzhou Iron and Steel Group Co., Ltd. Prospectus for 2021 First Tranche of Medium-Term Notes (Sustainability-linked). 2021. https://www.chinamoney.com.cn/dqs/cm-s-notice-query/fileDownLoad.do?mode=open&contentId=1952390&priority=0&ut=G%2BvJMki71WbFDxutzoaqnK/ZJ8zmOb3baBIGQuQ%2BrYzbwMPjQ%2BCHEx//ZfCHc/qyEH1JD%2BLrF/c0%0A4mCioHUJXJGEWTjYdSiXIEqzBC42mQUqxg9eTZ1PBtumW2AieLv9VRlbpRz3Z3hODgIZ0OKwoIDP%0ApfFUVVZh0M331q9mBAc=%0A&sign=0/d8solfMh3GOoMI5WmGUaZA1ukiCp05sMwap9ByMZnt4tsJZeSkX6Wq1v3IRrKsnQLcWdAPun00%0ALsYa5AtcTZpCs2CvuKf8xTKL5JKkAphGIlEbpsADAhjeg2dCZIBVMUOFd2LaiLvRLJLML9AfJTc/%0AI44XV2MvFkyyEBuTLsA=%0A

Issuing sustainability-linked bonds has higher requirements on project reserves and low-carbon performance management compared to traditional bonds. Additional information disclosure, such as disclosing the actual progress and performance of the project, or conducting certification and evaluation of corporate-level transition performance after issuance, is required (see Appendix 2 for details). Moreover, companies must actively communicate with external stakeholders and obtain the key benefits of the bonds through independent evaluation and auditing by reputable institutions to improve recognisability and reliability.

3. EQUITY FINANCING

Highly leveraged companies and small and medium-sized enterprises, which may find it difficult to obtain loans and issue bonds, can attract more investment through equity financing instruments like stock issuance, allotment, debt-for-equity swap, or the establishment of equity investment funds that support the transition and develop more green funding sources.

CASE 1: ISSUING GREEN STOCKS

After green bonds, green stocks are expected to become one of the core assets of green finance. Swedbank first proposed and put into practice the concept of green stocks. In 2021, Nasdaq launched the "Green Equity Designation" programme for issuers in the Nordic market[24] and designated CICERO and Moody's ESG as evaluation service providers for the programme. Nasdaq requires that green-labelled companies derive 50% or more of their turnover from activities considered green (with no more than 5% of profits from fossil fuels) and have more than 50% of their investments in green activities. The core part of the green stock evaluation framework is the green evaluation of the companies' turnover and investment. CICERO categorises business activities into five shades of green: "dark green", "medium green", "light green", "yellow" and "red" and quantifies the proportion of green income in a company's total revenue and the proportion of total investment. This will help investors understand the green value of companies in the low-carbon transition and reduce the risk of greenwashing" The best practices released by CICERO, however, do not include steel companies. For instance, Boliden AB, a metal mining, smelting and recycling company, received the "medium green" label from CICERO after its investment was primarily used in low-carbon zinc production and other energy efficiency improvements and pollution prevention measures, resulting in a significant reduction in greenhouse gas (GHG) emissions[25].

CASE 2: ESTABLISHING EQUITY INVESTMENT FUNDS

Companies can also expand financing for their low-carbon transition by setting up equity investment funds, in addition to obtaining a green stock certification. For instance, the Baowu Carbon Neutral Equity Investment Fund, which is the largest carbon-neutral fund in China's domestic market, was jointly established by Baowu and the National Green Development Fund Co. Ltd. It has a total size of 50 billion yuan, with a first phase

24 Yicai. The development prospect of "green stocks" and opportunities in China. 2022. https://m.yicai.com/news/101452907.html.

25 CICERO. Best practices 2022. https://static1.squarespace.com/static/5bc5b31a7788975c96763ea7/t/63242b300e-b7766a40e9228c/1663314746055/CICERO_Green_Best_Practices_2022.pdf

> of 10 billion yuan, and invests in areas like clean energy, energy conservation, and green technology. At least 50% of the investment is in Baowu's carbon-neutral industry chain, with no less than 60% of the funds invested in key provinces along the Yangtze River. However, equity financing is affected by the price-earnings ratio and is difficult to become the main source of capital to support the low-carbon transition of listed steel companies in the short- to medium-term.[26]

Although green financing in China has great potential to be an important supplement for companies' low-carbon transition capitals, the country still lacks unified concepts and standards in green stocks, green funds, and ESG investment, as well as clear definitions of green activities of capital at the corporate level, which may lead to greenwashing. To enhance investor confidence, it is recommended that steel companies follow the CICERO green stock evaluation framework, increase their investment in green technology and transition tactics, increase their operating income from green activities, actively disclose environmental information and establish reasonable environmental governance structures, policies and climate targets.

Despite the efforts made by China's steel companies in exploring the use of green financial instruments, the overall rate of utilisation remains low[27]. Going forward, green loans and green bonds will still be important sources of capital to facilitate the low-carbon transition of the industry.

ACTION LIST OF FINANCING FOR LOW-CARBON TRANSITION OF CHINA'S STEEL COMPANIES

A low-carbon transition is integral to China's steel industry's development goals. During the "13th Five-Year Plan," the industry aimed to reduce excess capacity, transition to ultra-low emissions and promote energy conservation and emissions reduction. At the same time, the financing focus was on reducing the corporate asset-liability ratio and supporting green development through innovative financial instruments, such as resolving excess capacity. Steel companies also carried out energy saving and environmental protection through process transitions and product upgrades. The "14th Five-Year Plan" era brings about a critical period where old and new transition requirements coexist. Despite facing challenges such as limited technology, inconsistent standards, and high transition costs[28], China's steel companies can reference current financing practices from both China and foreign countries to expand transition financing through multiple channels. Our analysis suggests that companies take actions and raise resources through the following three-pronged approach:

1. CREATE DIVERSIFIED FINANCING CHANNELS

To meet the capital needs for medium-term emissions reduction technologies and pilots using advanced technology, steel companies need to create diversified financing channels and mobilise more resources during this critical transition period. Loans,

26 China Metallurgical News. Baowu Carbon Neutral Fund: Aim to Help the Steel Industry Achieve Carbon Neutrality. 2022. http://www.csteelnews.com/qypd/qydt/202205/t20220512_62750.html

27 He Wenbo: Join Hands to Build a More Efficient Green Steel-Green Energy-Green Finance Industry Collaborative Ecosystem. http://www.cbminfo.com/mobile/_470515/_1577052/7214405/index.html

28 Modern Bankers. Problems and Financing Responses in Low-carbon Transition of Steel Industry. 2021. https://www.sohu.com/a/506057731_121123919

bonds and equity financing with green and low-carbon elements can provide funds for various types of low-carbon transition activities of steel companies and improve their recognisability in the investment market. Based on project reserves, development targets, and financing plans, companies can choose low-carbon financing tools. Additionally, besides green loans, they can consider the feasibility of transition bonds, which can be used for capacity replacement projects, and sustainability-linked bonds, which require corresponding sustainable development targets and action plans but do not require actual corresponding projects. Steel companies can also explore the use of green equity financing.

2. FORMULATE SCIENCE-BASED, RELIABLE LOW-CARBON TRANSITION TARGETS AND ROADMAPS

Green financial instruments often stipulate specific requirements associated with the companies' environmental or transition performance or the types of projects looking to raise capital. Companies are often required to regularly comply with information disclosure standards, including the disclosure of climate progress and performance at the project or corporate level (see Appendix 2 for details). To effectively use low-carbon financing tools, steel companies need to establish clear transition targets, roadmaps and core performance indicators at the group level, which will guide the determination of reasonable financing plans and pace. These will also be important criteria for investors and financial institutions to evaluate the investment potential of companies. The People's Bank of China (PBOC) plans to issue a financial catalogue for sectoral transitions, including for the steel industry[29], which will become an important reference for financing. Steel companies can also refer to international steel industry transition technological pathways and standards (see Appendix 3 for details), including technical standards from the Science Based-Targets Initiative (SBTi) and the Climate Bonds Initiative (CBI).

3.ACTIVELY PROMOTE CARBON EMISSIONS AUDITING AND MANAGEMENT

Although China's policies and standards have not established mandatory requirements on carbon emissions for the steel industry, the "Reform Plan for the Legal Disclosure System of Environmental Information" requires companies to disclose carbon emissions information, including emissions and discharge facilities[30]. The China Securities Regulatory Commission (CSRC) and China's stock exchanges also require listed companies to disclose carbon emissions information in the form of ESG reports, social responsibility reports or sustainable development reports[31]. Globally, there are disclosure standards and frameworks developed by the Global Reporting Initiative (GRI), such as the Task Force on Climate-related Financial Disclosures (TCFD) and the Climate Disclosure Standards Board.

As domestic and foreign carbon markets develop, and international trade policies constrain carbon emissions, it is essential for the steel industry to optimise carbon emissions auditing and management. Therefore, steel companies must prepare for these developments by taking action early on.

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29 The Beijing News. The Main Focus of the Green Finance Committee Next Year: Research On Financial Standards For Transition of High-Carbon Industries Like Petrochemicals. 2022. https://www.bjnews.com.cn/detail/166833301314224.html

30 Ministry of Ecology and Environment. Reform Plan for the Legal Disclosure System of Environmental Information. 2021. https://www.mee.gov.cn/xxgk2018/xxgk/xxgk02/202112/t20211221_964837.html

31 Song Ziying. The Environmental Information Disclosure System is Undergoing Major Changes. How Should Companies Respond? 2022. https://chinadialogue.net/zh/1/75002/

APPENDIX 1
MAJOR POLICIES RELATED TO THE TRANSITION OF CHINESE STEEL SECTOR

Time		Government agencies	Policy name	Keyword	Policy overview
13th Five-Year Plan (2016-2020)	February 2016	The State Council	Opinions on Resolving Excess Capacity in Steel Industry	Resolving excess capacity	From 2016, the production capacity of crude steel reduces 100-150 million tonnes within 5 years.
	April 2016	People's Bank of China, CSRC, former CBRC and former CIRC	Opinions on Supporting Steel and Coal Industry to Resolve Production Capacity Issues	Resolving excess capacity	- Strictly control loan input for new production capacity; - Provide medium and long-term loans for companies' intelligent transition and product upgrades; - Support companies in financing at various levels of capital markets, including issuing bonds, using credit enhancement measures, using overseas markets to issue stocks/bonds/asset securitisation products, insurance funds; - Support corporate debt restructuring, and mergers and acquisitions
	April 2016	Seven ministries including the Ministry of Human Resources and NDRC	Opinions on Employee Resettlement in Resolving Excess Capacity of Steel and Coal Industry	Resolving excess capacity	Proactively manage employee resettlement work
	2017	MIIT	Implementation Measures for Capacity Replacement in the Iron and Steel Industry (Revised in 2021)	Resolving excess capacity, capacity replacement	-Specifies the capacity replacement requirements for each region and company; the capacity replacement plan must be announced before the construction project is filed - After the revision in 2021, the requirements for capacity replacement are in more detail; the revision will provide supporting policies for equivalent replacement of green and low-carbon processes such as hydrogen metallurgy
	2017	NDRC	Blueprint for the Adjustment and Upgrades of the Steel Industry (2016-2020)	Resolving excess capacity; adjusting capacity layout; energy conservation and environmental protection; technological innovation	With the targets of comprehensively improving the overall competitiveness, and focusing on resolving excess capacity of the steel industry, ten key tasks have been put forward, including resolving excess capacity and deleveraging, layout adjustment, innovative development, intelligent manufacturing, and green manufacturing.
	2019	Ministry of Ecology and Environment, NDRC, MIIT, Ministry of Finance and Ministry of Transport	Opinions on Promoting Implementation of Ultra-Low Emissions in Steel Industry	Ultra-low emission transition	By the end of 2025, the ultra-low emission transition of steel companies in key regions will basically be completed, and China will strive to complete the transition of more than 80% of its steel production capacity.

Time		Government agencies	Policy name	Keyword	Policy overview
14th Five-Year Plan (2021-2025)	October 2021	The State Concil	Action Plan for Carbon Dioxide Peaking Before 2030	Carbon peaking; energy saving and carbon reduction; advanced technology	Determined to promote carbon peaking in the steel industry. Key actions include strictly controlling new production capacity, optimising the structure of existing production capacity, using clean energy, energy-saving and carbon-reducing transition, advanced technology demonstrations which include all-scrap electric furnace technology, hydrogen metallurgy, CO_2 capture and utilisation, heating with low-grade waste heat and linking steel and chemical production
	November 2021	MIIT, People's Bank of China, CBIRC, CSRC	Guiding Opinions on Strengthening Industry-Finance Cooperation to Promote Industrial Green Development	Green transition	Encourages financial institutions to innovate financial products to support the green transition of key industries such as steel industry; accelerates the development of green funds and increases investment in key areas of industrial green development
	November 2021	MIIT, People's Bank of China, CBIRC, CSRC	Benchmark and Standard Energy Efficiency Levels In Key High Energy-Consuming Industries	Energy efficiency upgrade; technical transition	- Specifies the standard and benchmark level of energy consumption per unit of product in the converter process and EAF smelting. For example, for the EAF smelting process with a nominal capacity equal to or greater than 50 tonnes, the benchmark energy consumption level is 72 kg standard coal/tonne, and the standard is 61 kg standard coal/tonne; - Projects to be constructed and under construction will be implemented according to energy efficiency benchmark; renovation, upgrading and elimination will be carried out in batches within a time frame; high-quality financial services will be provided to key projects with significant energy-saving and emission-reduction effects
	January 2022	MIIT, NDRC and Ministry of Ecology and Environment	Guiding Opinions on Promoting High-quality Development of Steel Industry	Capacity regulation; advanced technology; Low-carbon emission	By 2025, breakthroughs will be made in advanced technologies such as hydrogen metallurgy, low-carbon metallurgy, clean steel smelting, thin strip casting and rolling, and endless rolling; the comprehensive energy consumption per tonne of steel will be reduced by more than 2%, and water resource consumption will be reduced by 10% or more to ensure that CO_2 peaks before 2030
	March 2022	Ministry of Ecology and Environment	Notice on Key Work Related to the Reporting and Management of Companies' Greenhouse Gas Emissions in 2022	Carbon auditing	Requires steel companies with greenhouse gas emissions of more than 26,000 tonnes of CO_2 equivalent (comprehensive energy consumption of about 10,000 tonnes of standard coal) to audit, report and submit data of their greenhouse gas emissions in 2021 using any one year of 2020 and 2021's emission data.

APPENDIX 2
SPECIFIC BOND PRODUCTS SUPPORTING THE STEEL INDUSTRY'S LOW-CARBON TRANSITION

Product	Location of listing	Capital use and management	Format and content of information disclosure		Independent certification	
			Before issue	Bond duration	Before issue	Bond duration
Transition bonds	China Interbank Bond Market	Specially used for companies' low-carbon transition projects and economic activities: • The eight pilot industries include electricity, building materials, steel, non-ferrous metals, petrochemicals, chemicals, papermaking, and civil aviation; • Projects included in the green bond catalogue but technical indicators do not meet the standards and five types of economic activities related to dual-carbon targets: clean production and efficient utilisation of coal, use of cleaner energy like natural gas, equivalent replacement of production capacity in eight industries, green equipment/technology application, other projects with low-carbon transition benefits; Separately managed accounts for such capitals. If the capitals are used in non-transition areas, companies will be subject to self-disciplinary punishment and public notification.	Format: prospectus; Contents: investment direction of funds, transition effects, transition plan, and the alignment of national carbon neutrality policies (including but not limited to carbon neutrality targets, Action Plan for Carbon Dioxide Peaking Before 2030, 14th Five-Year Plan Outline)	Format: annual and semi-annual reports; Contents: use of capitals, progress of transition projects, environmental benefits	Suggested	No requirement
Sustainability-linked bonds	China Interbank Bond Market	No restrictions on the use of funds (if combined with special-purpose products such as green debt financing tools, the use of funds raised should be used in corresponding areas), but the bond terms are specific and linked to the performance of sustainability targets. If the target is not met, the trigger mechanism will take effect, and the bond interest rate, term, and size will be adjusted according to the actual situation.	Format: prospectus; Contents: core indicators of sustainability performance, as well as indicator definitions, targets, time frame for achieving the targets, selection basis, measurement methods, trigger mechanisms, historical data, etc.	Format: annual special reports; Contents: performance results linked to objectives, sustainability benefits, etc.	Suggested	Annual verification
Low carbon transition bonds	Stock exchanges	70% or more of the total funds raised are used for low-carbon transition economic activities, including but not limited to: • Energy-saving and consumption reduction in infrastructure • Plant energy system optimisation	Format: prospectus; Contents: investment direction of funds, including the specific content of the project (if any) or economic activities, transition effects, environmental and social benefits, etc	Format: regular reports; Contents: use of funds, progress of transition projects (if any), transition effects, etc.	No requirements	No requirements
Low carbon transition linked corporate bonds	Stock exchanges	No specific restrictions, but the terms of the bonds are specific and linked to the goal of low-carbon transition	Format: prospectus; Contents: low-carbon transition indicators, targets, time frame for achieving the targets, selection basis, measurement method, basal figures, etc.	Format: regular report; Contents: goal-linked performance results, low-carbon transition benefits, etc.	Suggested	Annual verification

APPENDIX 3
SUPPORT AND GUIDANCE OF FOREIGN TRANSITION FINANCIAL STANDARDS

Name of guidance	Key content
The CBI Steel Eligibility Criteria of the Climate Bonds Standard & Certification	The CBI Steel Eligibility Criteria of the Climate Bonds Standard & Certification is guided by the key measures for the steel industry to achieve net zero emissions in 2050 proposed by the Institutional Investors Group on Climate Change (IIGCC)'s report Global Sector Strategies: Investor Interventions To Accelerate Net Zero Steel (2021). It certifies the assets and activities in steel production, including integrated steel manufacturing plants, scrap EAF facility, direct reduced iron (DRI) - EAF Line, and DRI Facilities. To meet the certification standards, steel producers must demonstrate that: the assets have already met the certification standards; that the capital investment will bring steel production into compliance with the certification standards; that the company has reliable plans to follow the decarbonisation pathway, and that it does so without impeding the achievement of long-term targets using existing facilities to adopt emission reduction measures. CBI determines whether a company is eligible for the International Energy Agency's (IEA) Near Zero Emissions (NZE) pathway based on its emissions and usage of external scrap steel.
The Sustainable Steel Principles	The Sustainable Steel Principles are the world's first climate-adjusted finance agreement for steel industry lenders. The Principles were signed by six top lenders - Citibank, Credit Agricole, ING, Société Générale, Standard Chartered and UniCredit Bank, and the signatories commit to abide by the following five principles (STEEL principles): Standardised assessment of climate alignment - a method for measuring emissions of an investment portfolio; Transparent reporting - a framework for annual disclosure of progress; Enactment - instructions for obtaining reliable and high-quality data; Engagement - encouraging signatories to engage customers in net-zero transition plans and available financial products; Leadership - signatories are encouraged to use the framework to advocate for the decarbonisation of the steel industry. In terms of measuring portfolio emissions, the STEEL principles have designed a clear carbon emission accounting boundary (Fixed System Boundary). Through specific steps and algorithms, it calculates the consistency score between the borrower, the investment portfolio and the principles, and provides a basis for banks to evaluate the lending activities of steel companies.
DBS Bank Sustainable & Transition Finance Framework & Taxonomy	Released in 2020, DBS Sustainable & Transition Finance Framework & Taxonomy guides the classification, monitoring and reporting of its corporate financial services such as lending, bond underwriting, M&A advisory, trade finance and deposits. DBS Bank believes that the criteria to be met for "transition activities" are to replace high-carbon technologies, or to assist the application and integration of low-carbon technologies, and should be consistent with the transition path of the Paris Agreement. The industries currently involved in the "Taxonomy of transition financial projects" by the bank include automotive, metals and mining, food and agric-business, oil and gas, chemicals, power, transportation, telecommunications, and logistics. Under the metals and mining sector, two types of activities by steel producers can be viewed as transitional: using decarbonisation technologies (e.g. scrap steel recycling, carbon capture and storage for steel production, electrolysis), and improving the energy efficiency of blast furnaces (e.g. waste gas power generation); at the same time, steelmaking and ironmaking activities that use coal are explicitly excluded. Considering the complexity of transition activities, on the basis of the taxonomy of transition activities, DBS Bank also combines the characteristics of each transaction or financial service (including the location of the project, the best available technology in the industry, time and transition intensity), to determine whether it can be categorised as a "transition activity".
Japan Technology Roadmap for Transition Finance in the Steel Sector	In 2021, based on ICMA's Climate Transition Finance Handbook, Japan's Ministry of Economy, Trade and Industry, and the Ministry of the Environment jointly released the Basic Guidelines on Climate Transition Finance. Under this framework, a roadmap for transition finance in seven sectors including steel was released. In the same year, the Bank of Japan launched a green financing plan to address climate change. It plans to provide zero-interest loans to financial institutions to support them in issuing green loans to companies or investing in green bonds. The transition technology path of Japan's steel industry has established specific emission reduction technology measures for BF, EAF, DR and so forth, such measures include improving energy efficiency, employing hydrogen smelting technology and carbon capture and storage. The transition activities within this framework are eligible for financial support.
EU Climate Delegated Act	In April 2021, the EU released its first technology screening standard, the Climate Delegated Act. The Act specifies the technology screening standards that contribute to climate mitigation and adaptation targets. The enabling act covers nine broad sectors that account for around 80% of total EU greenhouse gas emissions; transition activities come from five of the said sectors - manufacturing, energy, transport, buildings, and information. For the steel industry, the Act listed the advanced and flexible transition requirements: Using Electric Arc Furnace (EAF) is the main transition path; Make a clear limit on the carbon emission intensity of EAF steelmaking and resource utilisation rate: the carbon emission per unit product of high alloy steel, and carbon steel produced by EAF are required to be no higher than 266 and 209 tonnes of CO_2 emission equivalent per a tonne of product respectively; use of scrap steel accounts for no less than 70% and 90% of the total output respectively; Benchmarking the industry's best standards: the above carbon emission intensity indicators reflect the average level of the top 10% of the EU's emission performance ranking; Regular reviews: assess the technical screening criteria for manufacturing transition activities at least every three years. For steel manufacturing, the technology screening criteria assessment will further consider hydrogen energy steelmaking pilots, as well as new situations and new data in the carbon trading market.

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ABOUT TRANSITION ASIA

Founded in 2021, Transition Asia is a Hong Kong-based non-profit think tank that focuses on driving 1.5°C-aligned corporate climate action in East Asia through in-depth sectoral and policy analysis, investor insights, and strategic engagement. Transition Asia works with corporate, finance, and policy stakeholders across the globe to achieve transformative change for a net-zero, resilient future. Visit transitionasia.org or follow us @transitionasia to learn more.