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# Sino-German Joint Research on Transition Finance Joint Scoping Study

April 2024

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The release of this Sino-German Joint Research on Transition Finance (Joint Scoping Study), conducted by the Institutes of Science and Development, Chinese Academy of Sciences (CASISD) and the Frankfurt School of Finance and Management (FSFM) on behalf of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), is the result of fruitful scientific cooperation between the two author groups. It is a landmark report on the Sino-German understanding of transition finance.

The findings hold multiple critical implications for public and private market actors, as the joint research contributes to the development of a common definition of the nascent field of transition finance. It provides insightful policy recommendations that will pave the way for the development of a stronger transition finance market and accelerate the urgent transition to a low-carbon and sustainable economy in alignment with the goals enshrined in the Paris Agreement.

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## Table of Content

Table of Content.....	1
List of tables .....	2
List of Figures.....	2
List of Abbreviations.....	2
<b>1 Executive Summary .....</b>	<b>4</b>
<b>2 Definitions of Transition Finance .....</b>	<b>4</b>
2.1 Germany.....	5
2.1.1 Key differences between green and transition finance .....	6
2.2 China.....	8
2.2.1 China's objectives for transition finance .....	10
2.3 Transition pathways for key sectors in China and Germany.....	11
2.4 Working towards a harmonized definition of transition finance.....	14
<b>3 Existing Gaps and Key Challenges in Defining and Applying Transition Finance .....</b>	<b>15</b>
3.1 Lack of consensus on the definition of Transition finance.....	15
3.2 Outline investors' concerns centred on "green/transition washing" .....	16
3.3 Data gaps on transition activities.....	16
<b>4 Overview of Global, Regional and National Initiatives and Key Actors on Transition finance; Policy Updates and Research Progress .....</b>	<b>17</b>
4.1 Transition finance policy development and private sector initiatives .....	17
4.2 The G20's Transition Finance Pillars and taxonomy development .....	18
4.3 Additional government policy measures to promote transition finance.....	19
<b>5 Transition finance Market Practices in Germany and China .....</b>	<b>21</b>
5.1 Transition finance market practices in Germany.....	21
5.1.1 Financial market practices and strategies to promote transition finance .....	22
5.1.2 Supporting the green transition through monetary policy .....	24
5.1.3 Case examples from the German real economy and financial industry.....	25
5.2 China.....	26
5.2.1 Transition finance market practices in China .....	26
5.2.2 Market mechanisms for transition finance in China .....	29
<b>6 Conclusion and Outlook.....</b>	<b>31</b>
6.1 Policy recommendations for enhancing transition finance .....	31
6.2 Conclusion .....	32
<b>7 Annexes .....</b>	<b>35</b>
7.1 Annex 1: Scoping Study Outline .....	35

## List of tables

Table 1: Key characteristics of transition and green finance .....	7
Table 2: Definition of transition finance by representative entities in China .....	9
Table 3: Transition pathways for key sectors in China and Germany .....	12
Table 4: Defining transition finance .....	14
Table 5: Barriers, challenges, and government role in transition finance .....	25
Table 6: China's progress in practicing Transition finance .....	26
Table 7: Basic information of sustainability-linked bonds .....	28

## List of Figures

Figure 1: Transition and green finance instruments.....	8
Figure 2: Traded volume of sustainable debt in Germany by deal type as of 2021.....	21

## List of Abbreviations

ABC	Agricultural Bank of China
ASEAN	Association of Southeast Asian Nations
BOC	Bank of China
BP	Basis Points
CBI	Climate Bonds Initiative
CBIRC	China Banking and Insurance Regulatory Commission
CCB	China Construction Bank
CCD	Carbon Contracts for Difference
CCS	Carbon Capture and Storage
CCUS	Carbon Capture and Utilization
CECEP	China Energy Conservation and Environmental Protection Group
CEIBS	China Europe International Business School
CGFA	China Green Finance Association
CHP	Combined Heat and Power
CO <sub>2</sub> e	Carbon Dioxide Equivalent
CRD	Capital Requirements Directive
CSDDD	Corporate Sustainability Due Diligence Directive
CSO	Civil Society Organizations
CSRC	China Securities Regulatory Commission
CSRD	Corporate Sustainability Reporting Directive
DNSH	Do No Significant Harm
EBRD	European Bank for Reconstruction and Development
ECB	European Central Bank
EC	European Commission

EPF	Environmental Protection Fund
ESG	Environmental, Social, and Governance
ESRS	European Sustainability Reporting Standards
EU	European Union
EUR	Euro
FI	Financial Institutions
FMP	Financial Market Participants
GFANZ	Glasgow Financial Alliance for Net Zero
GHG	Greenhouse Gas Emissions
GIP	Green Investment Principles for the Belt and Road
GSFCG	Green and Sustainable Finance Cluster Germany
ICBC	Industrial and Commercial Bank of China
ICMA	International Capital Market Association
IDFC	International Development Finance Club
IPCC	Intergovernmental Panel on Climate Change
IPSF	International Platform for Sustainable Finance
KfW	Kreditanstalt für Wiederaufbau
KPI	Key Performance Indicators
LEILAC	Low Emissions Intensity Lime and Cement
LPR	Loan Prime Rate
MEE	Ministry of Ecology and Environment
NAFMII	National Association of Financial Market Institutional Investors
NDRC	National Development and Reform Commission
NGFS	Network for Greening the Financial System
NZBA	Net-Zero Banking Alliance
OECD	Organization for Economic Co-operation and Development
PBOC	People's Bank of China
RMB	Renminbi
SBTi	Science-Based Target Initiative
SDG	Sustainable Development Goals
SME	Small-Medium Enterprises
SFWG	Sustainable Finance Working Group of G20
SLL	Sustainability-Linked Loans
SLB	Sustainability-Linked Bonds
SSE	Shanghai Stock Exchange
SPT	Sustainability Performance Targets
TCFD	Task Force on Climate-Related Financial Disclosures
TFP	Transition Finance Principles
TPI	Transition Pathway Initiative
TSC	Technical Screening Criteria
UFK	Untied Loan Guarantees
UNPRI	United Nations Principles for Responsible Investment
UoP	Use of Proceeds
USD	United States Dollar

## 1 Executive Summary

Sustainable finance continues to be a prominent topic in international, national markets and political spheres. Considering the increasing importance and continued development of the topic, various elements of it are being mapped out in more detail. One area of focus for the G20's Sustainable Finance Working Group (SFWG) in 2023 is transition finance, with finance ministers pledging to *“take action to enable transition finance to support orderly, just and affordable transitions towards a low greenhouse gas emissions and climate resilient economy”*.

The purpose of this Sino-German joint research collaboration on transition finance is to accelerate a fair and inclusive understanding of how transition finance can enable climate neutrality in both the Chinese and German economies. To this end, this report seeks to develop a common understanding of transition finance in China and Germany, while exploring the prevailing differences in approach, their roots, and potential pitfalls. Among others, this report clarifies how transition finance is to be distinguished from other fields in sustainable finance, such as green finance, and how the topic is being shaped by stakeholders in both countries.

Therefore, this joint study addresses the following main aspects. [Section 2](#) starts with definitions of transition finance, including scope, national transition goals and pathways of key sectors. [Section 3](#) highlights existing gaps and key challenges in defining and applying transition finance. [Section 4](#) provides an extensive overview of global, regional and national initiatives and key actors in transition finance, as well as policy updates and research progress. [Section 5](#) outlines transition finance market practices in Germany and China. Finally, [Section 6](#) concludes with policy recommendations and outlook.

## 2 Definitions of Transition Finance

Despite its emerging importance on the world stage in recent years, there is still no consensus on the definition of transition finance.<sup>1</sup> However, to support any development in the field, it is crucial to demarcate the term and to lay down its scope and limitations.

The purpose of this section is to provide the basis for a common understanding of transition finance and to identify a clear and workable definition of the concept. To this end, the scope of transition finance and how it is to be distinguished from other fields within the broader segment of Environmental, Social, and Governance (ESG) investing is explained, as well as how it may facilitate a low-emission transformation of the economy.

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<sup>1</sup> Caldecott, Ben. (2022). Defining transition finance and embedding it in the post-Covid-19 recovery. *Journal of Sustainable Finance & Investment* 12.3 934-938.

## 2.1 Germany

Within the German context, the definition of transition finance builds on the *German Sustainable Finance Strategy*<sup>2</sup>, as well as the guidelines brought forward by the Organization for Economic Co-operation and Development (OECD) in the *Guidance on Transition finance*.<sup>3,4</sup>

The German Sustainable Finance Strategy sets the political foundation for transition finance activities. Of the twenty-six measures defined to achieve Germany's goal of establishing a leading centre for sustainable finance, measure number five<sup>5</sup> highlights the relevance of transition policies to ensure the goal of a decarbonized economy. Additionally, the OECD *Guidance on Transition Finance* provided a cornerstone in establishing the concept of transition finance, outlining several key characteristics of the discipline, namely, transition finance's roots in the Paris Agreement and the pursuit of the net-zero goal. The *Guidance on Transition Finance* incorporates a time dimension into the definition, since it describes transition finance as a dynamic process of becoming sustainable which focuses on the decarbonization pathway of hard-to-abate<sup>6</sup> and heavily polluting industries, as opposed to other fields that tackle investments in activities that are inherently environmentally friendly or low-GHG. In turn, the International Platform for Sustainable Finance (IPSF) highlights that achieving the required transition to be aligned with a low emission pathway requires private and public firms to decarbonize their activities, or potentially to shift away from practices where no decarbonization is possible.

Therefore, this report follows the operational definition that transition finance is defined as the **financing and funding of all sectors, specifically high-emitting and hard-to-abate industries, to enable them to gradually shift their activities aligned with a net zero pathway by 2045, while incorporating social and environmental safeguards**. More broadly, it reflects the need for a systemic change and incorporates the following elements in varying degrees:

- Alignment with the temperature goal set in the Paris Agreement and with the 2030 Agenda for Sustainable Development;
- Decarbonization of hard-to-abate sectors (e.g., coal, steel, cement, chemicals);
- A 'time' dimension to capture the process of gradually decarbonizing all sectors; and
- Consideration of a wider sustainable development scope, including just transition (see box 1), social inclusion,<sup>7</sup> environmental protection and other sustainability elements, such as adaptation and resilience, water, circular economy, pollution, and biodiversity (incl. the targets of the Kunming-Montreal Global Biodiversity Framework).

### Box 1: Just Transition in Germany

Transition finance, as understood in this report and the German context means that economic activities that enable the transition are *just*. The objective is to move towards an environmentally sustainable economy while considering social implications, such as decent work for all, social inclusion, and the eradication of poverty.<sup>8</sup> This goal builds on international definitions of transition finance, such as that of the IPSF *Transition finance Report* (2022), which introduces the target sub-principle of "alignment with a just transition."<sup>9</sup> More specifically, this sub-principle requires that vulnerable communities are supported and socioeconomic opportunities are safeguarded, so that no one is left behind and the transition is fair and inclusive. In this regard, the participation and understanding of local social contexts provided by Civil Society Organizations (CSOs) is key to establishing a dialogue with vulnerable communities and ensuring that their needs are incorporated into national transition agendas.<sup>10</sup> In the German context, this applies to the phase-out of coal-fired power generation. In the affected coal mining regions, it is important to facilitate new business opportunities and the settlement of new



industries to ensure job security for the affected population and a smooth social transition. This prevents conflict and safeguards societal resilience while fostering sustainability.<sup>11</sup>

**Regarding environmental protection and biodiversity conservation**, these are in the process of being integrated into the transition activities. The environmental objective of ecosystems and biodiversity is enshrined in the EU Taxonomy, under the ‘Do No Significant Harm’ (DNSH) criteria.<sup>12</sup> In practice, the way in which these aspects are incorporated depends on the sector in question. For example, heavy industry sectors, such as cement, steel, coal, or oil that are priority sectors for transition finance tend to have significant biodiversity and ecosystem impacts, due to the inherent invasive nature of operations on the physical environment. Therefore, as these industries follow the transition development and investments shift towards less emission intensive technological solutions and practices, it is crucial that environmental and biodiversity risks and impacts are considered in any investment decisions made. The objective of transition finance to address decarbonization implies that, for instance, existing carbon sinks, such as wetlands or forests are considered for their co-benefits when expanding operations. In this scenario, climate and biodiversity objectives are closely aligned.

### 2.1.1 Key differences between green and transition finance

Transition finance can take various forms that support the aforementioned transition activities to different extents, such as use-of-proceeds instruments (e.g., transition and certain green bonds), or general corporate purpose instruments (e.g., sustainability-linked bonds and loans) that are linked to ESG

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<sup>2</sup> German Federal Ministry of Finance (2021, May). German Sustainable Finance Strategy. [German Sustainable Finance Strategy \(bundesfinanzministerium.de\)](https://www.bundesfinanzministerium.de)

<sup>3</sup> Organization for Economic Cooperation and Development (2022, October). OECD Guidance on Transition Finance. [Executive summary | OECD Guidance on Transition Finance : Ensuring Credibility of Corporate Climate Transition Plans | OECD iLibrary \(oecd-ilibrary.org\)](https://www.oecd-ilibrary.org)

<sup>4</sup> International Platform on Sustainable Finance (2022, November). Transition Finance Report. [International Platform on Sustainable Finance transition finance report - November 2022 \(europa.eu\)](https://www.europa.eu)

<sup>5</sup> Measure five refers to “advancing the European Union’s Sustainable Finance Agenda”.

<sup>6</sup> There is no commonly accepted definition of hard-to-abate sectors. Key characteristics are high abatement costs (Haites et al., 2023), a low technology readiness level, and a high economic relevance (IPCC, 2022) connected with the lack of substitute technologies, or economic unviability (Tandon, 2021).

<sup>7</sup> Social inclusion, which involves assessing and incorporating the risks and needs of affected communities within civil society is critical for the success of the transition, since stakeholders with strong vested interests may resist and inhibit the transition process (IPCC, 2022).

<sup>8</sup> International Labour Organization (2016, February). Guidelines for a just transition towards environmentally sustainable economies and societies for all. [Microsoft Word - Guidelines for a just transition - copyrighted.docx \(ilo.org\)](https://www.ilo.org)

<sup>9</sup> International Platform on Sustainable Finance (2022, November). Transition Finance Report. [International Platform on Sustainable Finance transition finance report - November 2022 \(europa.eu\)](https://www.europa.eu), Chpt 3: Target setting Principles – guiding robust transition targets

<sup>10</sup> Just Transition Centre (2017). Just Imperative of a Just Transition. [Just-Transition-Centre-report-just-transition.pdf \(oecd.org\)](https://www.oecd.org)

<sup>11</sup> Deutscher Bundestag (2021, November). Just Transition in der Entwicklungspolitik. [Just Transition in der Entwicklungspolitik.](https://www.bundestag.de)

<sup>12</sup> European Commission (2021, June). COMMISSION DELEGATED REGULATION (EU) .../... of 4.6.2021 supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council. [resource.html \(europa.eu\)](https://eur-lex.europa.eu)

performance indicators. However, it is important to understand that although transition and green finance both aim to support the transition towards a low-emission and environmentally friendly economy, they have some differences in scope and approach, as shown in the table below:

*Table 1: Key characteristics of transition and green finance*

	Transition finance	Green finance
Activities	Transition finance refers to financing activities that enable high-emission and environmentally harmful sectors, industries, and firms to shift to more sustainable business models and practices.	Green finance refers to financing activities that inherently have a positive impact on the environment, such as renewable energy, energy efficiency, green buildings, clean transportation, sustainable agriculture, and forestry.
Dynamic component	Transition finance is based on the principle of continuous improvement and alignment with long-term climate and environmental goals.	Green finance describes an inherent status at one point in time.
Instruments	Transition finance instruments include transition bonds, transition loans, sustainability-linked bonds and loans, and blended finance.	Green finance instruments include green bonds, green loans, green funds, and green indices. Green finance typically follows strict criteria and standards to ensure the environmental integrity and transparency of the financed projects.

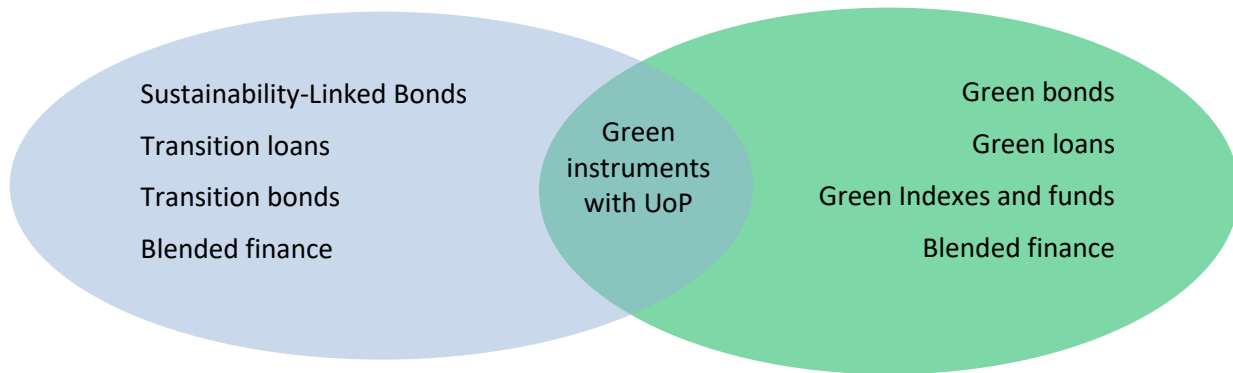
*Note: List is non-exhaustive, based on European Commission (2021)<sup>13</sup>*

As explained in Table 1, the main difference between transition finance and green finance is that transition finance targets sectors and firms that are not yet green but have the potential and willingness to become greener over time, while green finance targets sectors and firms that are already green or have minimal environmental impact. Moreover, transition finance is more inclusive and flexible than green finance,<sup>14</sup> as it recognises the diversity of starting points and pathways for different sectors and regions in the transition to a sustainable economy. However, if Use of Proceeds (UoP) from green bonds support the transition pathway, rather than financing an activity as a one-point-in-time (direct green UoP), they fall under transition finance as well. This potential overlap is illustrated in the figure below.

<sup>13</sup> European Commission (2021, June). [Strategy for financing the transition to a sustainable economy.](#); Asian Development Bank (2022, September). [Transition Finance is Critical to Address Climate Change. Transition Finance is Critical to Address Climate Change | Asian Development Blog \(adb.org\)](#)

<sup>14</sup> This could also make it more difficult to introduce robust frameworks and thereby avoid “transition washing”.

Figure 1: Transition and green finance instruments



Note: Non-exhaustive, only illustrative. Authors' illustration, based on ICMA ECB (2022).<sup>15</sup> Blended instruments, include but not limited to, risk-sharing instruments for transition activities and tools aimed at green project deployment.

## 2.2 China

In China, transition finance is a new concept that emerged with the development of green finance, climate investment and financing. Thus far, unified definitions and standards for transition finance have not been established on the national level. In 2016, seven ministerial departments of the Chinese Government, headed by the People's Bank of China (PBOC), issued the *Guidelines on Constructing a Green Financial System*, a top-level design that set out the definition for green finance. According to the document, "green finance" is about,

*"Providing financial services for investment and financing, operations, and risk management, among other things, with respect to projects in such areas as environmental protection, energy conservation, clean energy, green transportation, and green building for the purposes of supporting economic activities in terms of environmental improvement, climate change, and conservation and efficient use of resources."*<sup>16</sup>

In 2020, after the "Dual Carbon Goals" were put forward, five ministerial departments of the Chinese Government, headed by the Ministry of Ecology and Environment, issued the *Guidelines on Promoting Investment and Financing to Address Climate Change*, specifying for the first time the definition and scope of China's climate investment and financing. That is, climate investment and financing means: "activities designed to guide and promote the flow of more funds into climate change to facilitate the Nationally Determined Contributions and the low-carbon development objectives. It is an important part of green finance and covers both mitigation and adaptation."<sup>17</sup> In 2021, the PBOC kickstarted a study on the definition and policy framework for transition finance. Thus far, it has established the basic principles of transition finance, specifying that the supported economic activities or enterprises should have four characteristics as follows: firstly, they should make significant contribution to climate change mitigation

<sup>15</sup> ICMA / ECB Bond Market Contact Group, (2022, 11). [Latest Developments in the Sustainable Finance Market](#)

<sup>16</sup> People's Bank of China, etc. (2016, August). Guidelines on Building a Green Financial System. [https://www.mee.gov.cn/gkml/hbb/gwy/201611/t20161124\\_368163.htm](https://www.mee.gov.cn/gkml/hbb/gwy/201611/t20161124_368163.htm)

<sup>17</sup> Ministry of Ecology and Environment, etc. (2020, October). Guidelines on Promoting Investment and Financing to Address Climate Change. [https://www.mee.gov.cn/xxgk2018/xxgk/xxgk03/202010/t20201026\\_804792.html](https://www.mee.gov.cn/xxgk2018/xxgk/xxgk03/202010/t20201026_804792.html)

and be free of major damage to environmental objectives such as ecological protection; secondly, they should comply with the “Dual Carbon Goals” of China and the carbon reduction objectives set by the Paris Agreement; thirdly, they should reach the current benchmark or an advanced level of energy efficiency; and lastly, they should make predictions and preplans for the potential impact on social and economic development. The PBOC will, as soon as possible, issue and enforce the criteria for transition finance.<sup>18</sup>

In terms of local and market practices, China has made many explorations into the definition of transition finance. One example at the local level is the city of Huzhou in Zhejiang Province, which has published the *Huzhou City Transition Finance Catalogue (2022)* (hereinafter referred to as “Catalogue”) and established a definition for transition finance.<sup>19</sup> The definition describes transition finance according to the following dimensions: (1) the fundamental goal of transition finance is addressing climate change; (2) the content and path of transition, i.e., transition finance must attach equal importance to industry transition, corporate development, and tech application, while taking carbon emissions and development efficiency into account; and (3) the target groups, including economic entities, activities, and projects. In comparison with international transition finance catalogues formulated by the “principle-based approach,” this Catalogue is similar in terms of format to other existing standards of China, such as the *Catalogue of Green Bond-supported Projects (2021)* and is therefore better suited to China’s conditions. On the market level, in early 2021, Bank of China (BOC) and China Construction Bank (CCB) issued the *Statement on the Management of Transition Bonds*<sup>20</sup> and the *Framework of Transition Bonds*,<sup>21</sup> respectively. Both documents established the definition of transition finance and set forth categories of transition activities or projects, but both definitions mainly served the issuance of transition bonds. In May 2022, the National Association of Financial Market Institutional Investors (NAFMII) issued a *Notice on Piloting Transition Bond Innovation*,<sup>22</sup> identifying a preliminary connotation of “transition bonds” and specifying the requirements for the use and management of funds raised, the disclosure of information on transition, the appraisal and certification by third parties, etc. (Table 2).

Table 2: Definition of transition finance by representative entities in China

Time of issuance	Issued by	Name	Definition of Transition Finance
January 2022	General Office of the People’s Government of Huzhou City	Huzhou City Transition Finance Catalogue (2022)	Transition finance means to use a rich array of financial instruments to fund the low-carbon transition of market players, economic activities, or asset projects to address climate change, focusing on meeting the financial needs of carbon-intensive industries in transitioning to low-carbon development, of high-carbon enterprises in seeking

<sup>18</sup>Guotai Junan Securities, (2023). Xuan Changneng, Deputy Governor of the People's Bank of China: Actively promote the introduction and implementation of transformational financial standards as soon as possible. <https://www.gtja.com/cos/look/detail/729708893908653.html>

<sup>19</sup> Beijing Institute of Green Finance and Sustainable Development, (2022). ESG and Green Finance. [http://www.greenfinance.org.cn/upfile/file/20221207221319\\_945864\\_63378.pdf](http://www.greenfinance.org.cn/upfile/file/20221207221319_945864_63378.pdf)

<sup>20</sup> Bank of China, (2021). Bank of China Co., Ltd. Transformation Bond Management Statement. <https://pic.bankofchina.com/bocappd/report/202101/P020210106328842685396.pdf>

<sup>21</sup> China Construction Bank, (2021). China Construction Bank Transformation Bond Framework. [http://www.ccb.com/cn/investor/upload/bond/20210413\\_1618282946/20210413110254366415.pdf](http://www.ccb.com/cn/investor/upload/bond/20210413_1618282946/20210413110254366415.pdf)

<sup>22</sup> National Association of Financial Market Institutional Investors, (2022, May). Notice on Piloting Transition Bond Innovation. <http://images.policy.mofcom.gov.cn/file/20220621/94241655795681241.pdf>

			efficient growth, and of market participants in applying low-carbon transition technology.
January 2021	Bank of China	Statement on the Management of Transition Bonds	Transition finance is finance complying with international guidelines or standards and supporting traditional industries to cut down on pollution and in turn, achieve low-carbon or zero-carbon transition through tech renovation or upgrading equipment according to country/region-specific paths to carbon neutrality.
April 2021	China Construction Bank	Framework of Transition Bonds	Transition finance is finance complying with international guidelines or standards and supporting traditional industries to cut down on pollution and in turn, achieve low-carbon or zero-carbon transition through tech renovation or upgrading equipment according to country/region-specific paths to carbon neutrality.
June 2022	National Association of Financial Market Institutional Investors (NAFMII)	Notice on Piloting Transition Bond Innovation	Transition bonds refer to debt financing instruments that raise funds to finance low-carbon transition to support and adapt to environmental improvements and address climate change.

Sources: publicly available information.

### 2.2.1 China's objectives for transition finance

Developing transition finance is not only in alignment with China's economic structure but is also an important boost for the country's "Dual Carbon Goals." China's key objectives in developing transition finance include funding the low-carbon transition of carbon-intensive industries to resolve the "carbon lock-in" problem and reducing transition risks.

On the one hand, China is still in the late stage of industrialisation, with steel, cement, energy, transportation, and chemical industries being important sectors making huge contributions to both economic growth and emissions. Transition finance can meet the financial needs of these sectors in their low-carbon development, while reducing capital losses when high-carbon assets are withdrawn and preventing "carbon lock-in" from trapping funds in high-carbon areas – a major hurdle to the "Dual Carbon Goals." On the other hand, transition finance can, through the allocation of resources, enable relevant industries to achieve stable transition, reducing the transition risks involved in the carbon peaking and carbon neutrality of China. To address climate change, China will enact more rigorous emission reduction policies and legal systems. Consequently, high-carbon industries may be subject to resulting policy and legal risks. Thus, by means of resource allocation, transition finance can enable relevant industries to achieve a stable and orderly transition and therefore help to reduce the climate and transition risks faced by high-carbon enterprises.

## 2.3 Transition pathways for key sectors in China and Germany

Carbon-intensive industries, e.g., steel, chemical, and cement, are the key areas of low-carbon transition in China. They are now trying to achieve the transition to low-carbon development by improving production technologies, raising energy efficiency, and advancing electrification process. In the short run, the transition pathway is relatively clear for the industrial sector, which is to improve their energy efficiency and material use efficiency through improving the processes of production. In the long term, however, emission reduction requires the deployment of innovative technologies, e.g., carbon capture and utilisation (CCUS) and electrolytic hydrogen production. Nonetheless, low-carbon transition technologies may usher in breakthroughs in the future, making the pathways to emission reduction in the medium-to-long term quite different from the current design.

In Germany, transition pathways are largely determined at the firm level in alignment with the economy wide GHG emissions reduction target enshrined in the amended federal *Climate Change Act*. Under the new legislation, which came into effect in August 2021, firms across different sectors of the economy are required to achieve the same mid-term goals<sup>23</sup> and reach GHG neutrality by 2045 at the latest, thereby overruling the prior sector-specific climate targets.<sup>24</sup> Nevertheless, it is important to point out that the amended *Climate Change Act* and the elimination of sectoral climate targets is the product of an evolving regulatory landscape, which may adapt and lead to further adjustments in the future as public funding support for the development of new technologies to accelerate the transition of the economy grows in importance. To comply with the amended Act, firms operating in hard-to-abate sectors in Germany, such as the steel, cement, and chemicals manufacturing industries have widely engaged in various public initiatives, adopted science-based transition pathways, and are seeking to reduce GHG emissions by replacing coal with alternative fuels and by implementing net-zero, low-carbon, and Carbon Capture and Storage (CCS) technologies.

Table 3 below provides a detailed insight into the transition pathways of the steel, cement, and chemicals industries in China and Germany, with the aim to highlight existing differences and key cross-country similarities. Key similarities in transition pathways are identified in the German and Chinese steel, cement, chemicals, and aluminium sectors. For example, cement manufacturers in both countries seek to implement CCS technologies and energy substitution methods like biomass conversion to achieve climate neutral operations. Moreover, Chinese and German firms operating in the chemicals and steel industries envision the adoption of energy efficiency technologies in the short term. However, it is important to recognize that because the industries described above vary greatly from one another in terms of their energy demand and manufacturing processes, their transition pathways differ as well. As a result, they have considerably different needs for technologies and funding for decarbonization purposes, which in turn requires transition finance to remain adaptable and flexible.

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<sup>23</sup> Mid-term goals introduced by the amended *Climate Change Act* are the achievement of reductions in GHG emissions of 65% by 2030 and 88% by 2040 compared with 1990 levels (German Federal Government, 2023).

<sup>24</sup> For 2022-30, the previous *Climate Change Act* defined annual greenhouse gas (GHG) emissions reduction targets for six individual sectors: energy, industry, buildings, transport, agriculture, waste, and land use. The pace of emissions reductions varied by sector and targets were set in line with the European GHG reduction plans, following a linear trajectory. For example, the Act established that to meet its 2030 sector targets, Germany's energy sector would require to cut GHG emissions by 37.5%, whereas the agricultural sector needed to cut down GHG emissions by 17% between 2020-30 (Council of Experts on Climate Change, 2022).

Table 3: Transition pathways for key sectors in China and Germany

Sector	Short- and long-term transition measures in China	Transition technologies and initiatives in Germany
Steel	<p><b>Short-term measures:</b> use energy conservation technologies to renovate or upgrade existing facilities, and roll out short flow smelting processes, such as the blast furnace coal injection technology, the negative energy converting process for converters, and the regenerative combustion technology for heating furnaces used in rolling mills.</p> <p><b>Long-term measures:</b> after 2030, coking furnaces, blast furnaces and converters will gradually adopt CCS technologies, with the rate of furnaces installed with CCS exceeding 60% by 2060.</p>	<p>Development of “Green Steel” through the gradual replacement of fossil-fuel powered blast furnaces with hydrogen in the iron ore reduction process, which accounts for the emission of two metric tons of CO<sub>2</sub> per ton of steel.<sup>25</sup></p> <p>Industry-wide adoption of the net-zero target under the Net-Zero Steel Initiative.<sup>26</sup> In the case of Thyssenkrupp Steel AG, verification of decarbonization plans by the Science-Based Target Initiative (SBTi).<sup>27</sup></p>
Cement	<p><b>Short-term measures:</b> use pre-processing, energy substitution, and energy secondary circulation technologies to reduce carbon emissions. Examples include using pre-calcination kilns, generating power with residual heat, increasing the share of natural gas and biofuel to replace coal, etc.</p> <p><b>Long-term measures:</b> raise the share of cement kilns adopting the CCUS technology to 85% by 2060.</p>	<p>Increasing use of biomass (organic energy) as a replacement for coal in the production process,<sup>28</sup> as well as greater implementation of CCS technologies due to the limited applicability of hydrogen.</p> <p>Investment in CCS technologies with the support of the European Commission, for example under the LEILAC<sup>29</sup> (Low Emissions Intensity Lime and Cement) project.</p>

<sup>25</sup> Roland Berger GmbH (2021, October). Green Steel: The race is on. [Green steel: The race is on | Roland Berger](#)

<sup>26</sup> World Economic Forum (2022, November). This is how the steel industry is forging a path to net-zero. [This is how the steel industry is forging a path to net-zero | World Economic Forum \(weforum.org\)](#)

<sup>27</sup> Thyssenkrupp AG (2023, June). Klimastrategie und Klimaziele. [Klimastrategie und Klimaziele \(thyssenkrupp.com\)](#)

<sup>28</sup> European Commission JRC (2021, February). Deep decarbonisation of industry: The cement sector. [jrc120570\\_decarbonisation\\_of\\_cement\\_fact\\_sheet\\_2.pdf \(europa.eu\)](#)

<sup>29</sup> Cement and Lime Decarbonisation Solution (2023, May). [Cement & Lime Decarbonisation Solution | Leilac](#)

Sector	Short- and long-term transition measures in China	Transition technologies and initiatives in Germany
Chemicals	<p><b>Short-term measures:</b> improve the processes of production and the structure of raw materials, make the industry lightweight, and promote high energy efficiency technologies, to cut 80% or so of carbon emissions on a cumulative basis.</p> <p><b>Long-term measures:</b> introduce breakthrough technologies, e.g., biomass conversion, low-carbon hydrogen generation, and CCUS.</p>	<p>Investment in energy efficiency (e.g., Bayer AG will invest EUR 500 Mio. between 2020 and 2030 to increase energy efficiency across its production facilities).<sup>30</sup> Replacement of fossil fuels with electricity from renewable sources and active engagement via the development of dedicated subsidiaries, e.g., BASF Renewable Energy GmbH<sup>31</sup> and the pledge to reach 100% renewable energy production by 2029 in the case of Bayer AG.<sup>32</sup></p>
Aluminium smelting	<p><b>Short-term measures:</b> roll out energy efficiency improvement technologies, increase the share of renewable-aluminium smelting, and make the scaling up of electrolytic cells the focus of technological transformation.</p> <p><b>Long-term measures:</b> introduce emerging technologies, such as the coke particle baking and startup technology, the energy conservation technology for the control system of large, efficient anode baking furnaces, etc.</p>	<p>Replacement of anodes with inert anodes to eliminate CO2 emissions in the Hall-Héroult electrolysis process. At the same time, firms aim at integrating renewable energy sources to reduce GHG emissions from electricity usage in plants and increasing the share of recycled aluminium in total production.</p> <p>The private sector, academia, and public institutions in Germany have joined efforts under the “CO2 free aluminium production” to develop an inert anode technology. The project is partially funded by the Ministry for Economic Affairs, Innovation and Digitization of the State of Nord Rhein-Westphalia.<sup>33</sup></p>

*Note: Data on transition measures in China were compiled according to Energy Sector Roadmap to Carbon Neutrality in China<sup>34</sup> and Roadmap for Achieving China’s Carbon Peak and Carbon Neutrality Pathway,<sup>35</sup> etc.*

<sup>30</sup> Sustainability Report 2022 (2023, February). [Bayer Sustainability Report 2022](#)

<sup>31</sup> BASF (2023, February). Konzernbericht 2022. [entire-basf-gb22.pdf](#)

<sup>32</sup> Bayer AG (2023, February). Nachhaltigkeitsbericht 2022. [Bayer Nachhaltigkeitsbericht 2022](#)

<sup>33</sup> Trimet SE (2023, October). [Production of inert metallic anodes \(trimet.eu\)](#)

<sup>34</sup> IEA. An energy sector roadmap to carbon neutrality in China. Paris, 2021.

<sup>35</sup>Wei Yiming, Yu Bijing, Tang Baojun, etc. Research on the carbon neutrality timetable and roadmap for China's carbon peak [J]. Journal of Beijing Institute of Technology (Social Science Edition),2022,24(04):13-26.DOI:10.15918/j.jbits1009-3370.2022.1165.



## 2.4 Working towards a harmonized definition of transition finance

Based on the research, both China and Germany consider transition finance as an important tool to address the decarbonization of hard-to-abate sectors. Transition finance builds upon the countries' sustainability and growth strategies, policy frameworks, differing priorities, timelines and focus areas. Nonetheless, through the cooperation of both research teams, the following table demonstrates both the similarities and differences:

Table 4: Defining transition finance

Transition finance	China	Germany
<b>Goal(s)</b>	Gradually promote the transformation of high-carbon industries to low-carbon.	Enable all sectors, specifically high-emitting and hard-to-abate industries to gradually shift their activities to alignment with a net zero pathway by 2045.  'time' dimension, which captures the process of sector decarbonization and considers wider sustainable scope, such as social inclusion, and environmental protection.
<b>Sectors</b>	Primarily includes carbon-intensive industries such as steel, cement, chemicals, and aluminum.	All sectors, paying particular attention to high-emitting and hard-to-abate industries, such as steel, cement, chemicals.
<b>Financial Instruments</b>	Carbon emission reduction support tool and special refinancing loan to support the clean use of coal are provided by the PBOC. Transition bonds, sustainability-linked bonds, and sustainability-linked loans are used in carbon-intensive industries.	Sustainability-linked bonds and loans (SLB, SLL) in hard-to-abate sectors, sovereign bonds, un-tied loan guarantees (UFK), Just Transition Fund.  Evolving process with the aim to increase the number of more dedicated transition finance instruments in the future.
<b>Transition Pathways</b>	Based on the "Dual Carbon Goals", in the short term, carbon-intensive industries will accelerate the upgrading and renovation of energy consumption, while in the medium and long term, low-carbon fuels, CCUS, etc. will be used in carbon-intensive industries.	Based on the Federal <i>Climate Change Act</i> goal to reduce emissions of GHG gradually, in comparison with their levels in 1990 by at least 65% (88%) by 2030 (2040). By 2045, greenhouse gas emissions should be reduced to net GHG neutrality.  Currently, the <i>Climate Change Act</i> only considers total (sector-agnostic) emissions in the respective year.

### 3 Existing Gaps and Key Challenges in Defining and Applying Transition Finance

Currently, private and public actors in Germany and China struggle to mobilise sufficient financial resources towards their respective transition goals. In Germany, an average annual investment of roughly EUR 0.24 trillion (RMB 1.87 trillion)<sup>36</sup> is needed through 2045, EUR 40 billion (RMB 0.30 trillion) of which is considered as additional investments.<sup>37</sup> In turn, it is estimated that China requires between RMB 3.18 trillion and RMB 4.35 trillion (EUR 0.41 and EUR 0.56 trillion) annually from 2020 to 2050 to fund the transition in alignment with the country's "Dual Carbon Goals".<sup>38</sup> The massive financing needs reflects the current state of transition finance in both countries and are in turn aggravated by the existence of several urgent challenges, which must be addressed to accelerate high-impact transition efforts.

Firstly, the lack of standards, both in regulations and instruments due to missing definitions and limited data availability, divert resources from potentially meaningful projects and increase the risk of transition washing. Secondly, insufficient cooperation between private and public stakeholders at the national and international levels, along with the shallow incorporation of social and environmental safeguards into existing frameworks, undermines the potential of transition finance.

The following paragraphs provide a more detailed insight into the urgent challenges facing transition efforts in both China and Germany, including some country-specific references and examples.

#### 3.1 Lack of consensus on the definition of Transition finance

In Germany, there is a converging understanding of transition finance and how it relates to other concepts like green and sustainable finance. As previously mentioned, ongoing efforts by researchers, policy makers, and practitioners to further solidify the definition of transition finance are tackling the incorporation of environmental and social safeguards to ensure a just and socially inclusive transition process.

In China, there is no official and unified definition of transition finance yet. In fact, public endeavours to elaborate one are scattered at the national and regional levels. At the national level, the PBOC is still formulating a definition for transition finance. At the local level, the city of Huzhou in Zhejiang Province established its own definition for transition finance in 2022. However, the most used operational definition is that of the International Capital Markets Association (ICMA) *Climate Transition Finance Handbook*,<sup>39</sup> but it remains to be applied consistently across China. Despite the lack of an official and unified definition, China expects to finalize one in the near future and advance the development of transition finance based on the experiences of green finance.

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<sup>36</sup> Based on exchange rate as of September 14<sup>th</sup> 2023 (OANDA, 1 EUR=7.78 RMB) <https://www.oanda.com/currency-converter/en/?from=EUR&to=CNY&amount=1>

<sup>37</sup> McKinsey, 2021, Net-zero Germany: Chances and challenges on the path to climate neutrality by 2045 Investment needs for Germany.

<sup>38</sup> Tsinghua University (2021, July). China Long-term Low-carbon Development Strategies and Pathways. [efchina.org/Attachments/Report/report-iceg-20210711/China-s-Long-Term-Low-Carbon-Development-Strategies-and-Pathways.pdf](http://efchina.org/Attachments/Report/report-iceg-20210711/China-s-Long-Term-Low-Carbon-Development-Strategies-and-Pathways.pdf)

<sup>39</sup> International Capital Markets Association (2023, June). Climate Transition finance Handbook. Guidance for Issuers. [Climate-Transition-Finance-Handbook-CTFH-June-2023-220623v2.pdf \(icmagroup.org\)](https://www.icmagroup.org/Climate-Transition-Finance-Handbook-CTFH-June-2023-220623v2.pdf)

### 3.2 Outline investors' concerns centred on "green/transition washing"

Transition washing refers to the practice of overstating or misrepresenting the environmental benefits and impact of specific projects, which ultimately diverts financial resources towards activities that do not contribute to meaningful and credible decarbonization efforts.<sup>40</sup> It is generally attributable to the lack of clear standards and definitions, as well as insufficient disclosure and reporting practices that make it more difficult to track and measure the impact of transition activities. As a result, it can erode trust in crucial transition related efforts or mislead creditors about the environmental performance and impact of their investments, which would expose them to reputational and regulatory risks and ultimately block the path to a climate-neutral transformation of the economy.

From the German and Chinese perspective, there are two crucial reasons why transition finance is particularly vulnerable to transition washing:

1. Transition finance instruments are more flexible than those of green finance, since they need to consider the evolution of transition activities over time. This means that investors focusing on improving GHG performance (absolute or relative) are likely to continue in favour of green finance over transition finance instruments as transition finance are only excluding brown sectors gradually.<sup>41</sup>
2. The lack of an information disclosure system and standards for transition activities hinders the supervision of funded projects throughout their lifespan, which in turn increases the probability of transition washing.<sup>42</sup>

In the Chinese context, financial institutions face two critical problems that aggravate the risk of transition washing. On the one hand, there is a lack of credible transition plans in key Chinese industries, and financial institutions do not have unified standards and criteria to accurately identify transition activities. On the other hand, there are no auditing and reporting mechanisms in place to verify that transition funds are used for their intended purpose. To be more precise, China has not established standards on how transition projects should be verified by third-party institutions, nor has it regulated how financial institutions should supervise and participate in transition projects along their life cycle. This may lead to asymmetric information between creditors and fund recipients and block necessary financial flows for the transition.

Thus, to prevent transition washing practices, financial institutions ought to apply robust frameworks and guidelines for transition finance that are science-based, transparent, consistent, and aligned with long-term climate and environmental goals. It is crucial to enhance data infrastructure and disclosure requirements on climate-related risks, as well as to explore the development of new indicators beyond GHG levels to make it easier for investors to track progress and sort out activities that do not make any significant impact on reducing greenhouse gas emissions.

### 3.3 Data gaps on transition activities

Disclosing information about the outcomes of transition activities is key to firms and investors. More specifically, firms need reliable data on the progress of transition projects to ensure that they are achieving

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<sup>40</sup> Organization for Economic Cooperation and Development (2022, September). Transition finance: What is it and why is it needed? [Transition finance: What is it and why is it needed? | OECD Podcasts | OECD iLibrary \(oecd-ilibrary.org\)](#)

<sup>41</sup> Oxford Analytica (2021). Transition bonds market will grow from slow start. Expert Briefings. <https://doi.org/10.1108/OXAN-DB265010>

<sup>42</sup> Bertelsmann Stiftung (2023, January). Sustainability Transformation Monitor 2023. [Sustainability Transformation Monitor 2023 \(bertelsmann-stiftung.de\)](#)

a substantial impact and are aligned with pre-established decarbonization targets. In turn, investors require quantitative metrics with a greater level of granularity than green finance to support a data-driven investment approach. However, reliable and comprehensive carbon-related data and information about the environmental performance of firms is not widely available yet. In China, the corporate information disclosure system is not sufficient to sustain a large-scale deployment of transition finance resources. More precisely, China had imposed climate-related information disclosure requirements on listed, key enterprises and financial institutions, but the requirements were incentivised rather than mandatory, making the level of disclosure by market players uneven. In addition, the lack of a unified accounting method made it difficult to effectively carry out accounting and disclosure of climate information such as carbon emissions.<sup>43</sup> A major step to increase the availability of climate-related data and introduce unified accounting methods at the corporate level was conducted by the Shanghai Stock Exchange (SSE), the Shenzhen Stock Exchange (SZSE) and the Beijing Stock Exchange (BSE) with the release of the sustainable development information disclosure guidelines on April 12th 2024. These guidelines define mandatory disclosure requirements for selected index sectors, including Shanghai 180, Shanghai Sci-Tech 50 SZSE100, SZGEM, as well domestic and international dual listing companies, but they will first become effective as of May 1st 2024. Consequently, environmental and emission-related information provided by enterprises is still very limited, which makes it difficult to monitor progress towards transition goals.

In Germany, approximately 85.4% out of a comprehensive sample of 735 executive managers from the country's private sector outlined in January 2023 that they were not required to disclose sustainability-related data under the disclosure requirements laid down in the *CSR Guideline Implementation Law*.<sup>44</sup> Despite this, roughly 47.7% of the interviewees stressed that their organization was providing data on sustainability, either as part of annual reports or in a separate publication.<sup>45</sup>

## 4 Overview of Global, Regional and National Initiatives and Key Actors on Transition finance; Policy Updates and Research Progress

On the international stage, different actors in the public and private sectors have started to support the development of transition finance via the establishment of robust principles, as well as the improvement of regulatory and methodological frameworks to reach the temperature objectives laid down in the Paris Agreement. This section provides a comprehensive up-to-date review of the current state of knowledge in transition finance, including key policy developments and private sector initiatives, along with national and regional taxonomies linked to transition finance.

### 4.1 Transition finance policy development and private sector initiatives

In recent years, there has been an increasing number of public and private sector initiatives focused on transition finance in the EU and China. While multilateral banks and regional initiatives have focused on

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<sup>43</sup>After China had put forward its carbon peaking and carbon neutrality target, the Securities and Exchange Commission, the People's Bank of China, the Ministry of Ecology and the Environment, respectively, in accordance with their respective functions, set requirements for environmental and climate information disclosure for listed firms, financial institutions and key emitting enterprises.

<sup>44</sup> The requirements of the *CSR-Guideline Implementation Law* were replaced in January 2023 with the introduction of the *Corporate and Sustainability Disclosure Requirements (CSRD)*.

<sup>45</sup> Bertelsmann Stiftung (2023, January). Sustainability Transformation Monitor 2023. [Sustainability Transformation Monitor 2023 \(bertelsmann-stiftung.de\)](https://www.bertelsmann-stiftung.de/en/sustainability-transformation-monitor-2023)

developing guidelines and methodological frameworks, including regional and national level taxonomies, private sector initiatives have elaborated principles targeted at specific asset classes. In terms of content, the international sectors have gradually built a policy framework for transition finance from the perspectives of definition standards, key industries, information disclosure, and incentives mechanisms.

Some key examples in the public sector that complement the frameworks elaborated by Multilateral Development Banks include the creation of the *EU Taxonomy for Sustainable Activities*,<sup>46</sup> which provides a classification system for “green” activities and that also allows investors to identify transition projects. Similarly, Huzhou City has implemented its own *Transition Finance Catalogue* to support the identification of transition activities within its jurisdiction. Moreover, private initiatives such as the ICMA<sup>47</sup> and the Climate Bonds Initiative (CBI)<sup>48</sup> have introduced principles that govern the use of proceeds of different transition finance instruments and are currently being widely applied in the German and Chinese financial markets. In addition, banking institutions and asset managers from all over the world have gathered under a wide array of initiatives, such as the Net-Zero Banking Alliance (NZBA),<sup>49</sup> with the objective to align their operations with climate targets and drive investments in the transition of hard-to-abate industries.

## 4.2 The G20’s Transition Finance Pillars and taxonomy development

The five pillars of transition finance defined by the G20, and transition-oriented taxonomies<sup>50</sup> are key policy developments related to transition finance. Both initiatives have the objective to provide reliable frameworks for the identification of transition finance activities. In turn, such a basis for decision making allows investors to avoid resource diversion and support the mobilization of financial flows towards meaningful projects that are aligned with ambitious and systemically relevant climate targets.

The *G20 Sustainable Finance Report*<sup>51</sup> aims at providing a sound framework for assessing the social impact of transition activities, as well as enhancing their identification and related reporting practices. To this end, it builds on the Transition Finance Principles (TFP) drafted by the IPSF and contains 22 principles that are connected to five G20 transition finance pillars.<sup>52</sup> Overall, the G20 advocates for dynamic and internationally compatible standards, including evidence-based transition strategies (e.g., ICMA) or the development of innovative products, such as tailor-made debt and equity instruments. Risk mitigation tools like insurance and guarantees aim to enable effective cooperation between public and private actors. The provision of technical assistance and international support to developing countries, including

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<sup>46</sup> European Commission (2023, May). EU taxonomy for sustainable activities - Regulation (EU) 2020/852. [EU taxonomy for sustainable activities - Regulation \(EU\) 2020/852](https://european-council.europa.eu/media/e300042/1/1920200852_en.pdf) | [Circular Cities and Regions Initiative](https://ec.europa.eu/eip/circular-cities-and-regions-initiative/) (europa.eu)

<sup>47</sup> International Capital Markets Association (2023, September). [The International Capital Market Association » ICMA](https://www.icmagroup.org/) (icmagroup.org)

<sup>48</sup> Climate Bonds Initiative (2023, September). [Climate Bonds Initiative | Mobilizing debt capital markets for climate change solutions](https://www.climatebondsinitiative.com/)

<sup>49</sup> Net-Zero Banking Alliance (2023, September). [Net-Zero Banking Alliance – United Nations Environment – Finance Initiative](https://www.netzeroalliance.org/) (unepfi.org)

<sup>50</sup> G20 Sustainable Finance Working Group (2023, September). [G20 Sustainable Finance Working Group - G20SFWG](https://www.g20sfwg.org/)

<sup>51</sup> G20 Sustainable Finance Working Group (2022, May). 2022 G20 Sustainable Finance Report. [2022-G20-Sustainable-Finance-Report-2.pdf](https://www.g20sfwg.org/2022-g20-sustainable-finance-report-2.pdf) (g20sfwg.org)

<sup>52</sup> First, identification of transition activities and investments; Second, reporting of Information on transition activities and investments; Third, transition-related finance instruments; Forth, design of policy measures; Fifth, Assessment and mitigation of negative social and economic impact of transition activities and investments.

consideration of socioeconomic implications of transition pathways are promoted by a socially inclusive approach including the incorporation of just transition elements.

Transition-oriented taxonomies are systems that enable the identification of activities that have either a positive or negative contribution to climate and environmental targets. While so called “traffic light” systems as the one introduced by the Association of Southeast Asian Nations (*ASEAN Taxonomy for Sustainable Finance*)<sup>53</sup> incorporate graded designs<sup>54</sup> that provide more flexibility and allow for a more gradual improvement in economic activities to be classified as taxonomy-aligned, the *EU Taxonomy for Sustainable Activities* establishes a classification system for environmentally sustainable economic activities based on Technical Screening Criteria (TSC).<sup>55</sup>

In Germany, the EU Taxonomy allows stakeholders to identify transition activities (e.g., manufacturing of equipment for the production and use of hydrogen, or the production of energy efficiency equipment for buildings) that are not yet low emission but have a clear pathway to decarbonization. On the other hand, although the Chinese government has not developed a nation-wide applicable Taxonomy, the Huzhou City and two state-owned commercial banks respectively provide an initial framework that lays out the transition paths, criteria, and goals for several key industries.

### 4.3 Additional government policy measures to promote transition finance

Germany adopted new climate legislation in June 2021 that sets more ambitious national emissions reduction targets for 2030 and 2040,<sup>56</sup> with the goal of achieving net greenhouse gas neutrality by 2045.

Even though the German Federal Government has committed to expanding the pilot scheme for Carbon Contracts for Difference (CCDs), which will help reduce the higher operating costs of low- and zero-emission technologies,<sup>57</sup> it is yet unclear which technological advances will and can be adopted by industries in their path towards decarbonization. In fact, various measures including energy efficiency, biomass, electrification, green hydrogen, and circularity are being considered, but their individual contributions are still being discussed.<sup>58</sup> Hence, from the German perspective, there is a need to create a supportive environment for the transition to a low-emission and sustainable economy.

To achieve this, existing public initiatives must be strengthened and complemented with additional government policy measures, including the gradual extension of carbon pricing<sup>59</sup> and the removal of fossil

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<sup>53</sup> ASEAN Taxonomy Board (2021, November). ASEAN Taxonomy for Sustainable Finance. [Microsoft Word - ASEAN Sustainable Finance Taxonomy - Nov 2021](#)

<sup>54</sup> Green (meets one or more environmental objectives and does no significant harm), amber (meets one or more environmental objectives, but causes harm and is in process of remediating this negative impact), red (causes significant harm and is not undertaking efforts to remediate it).

<sup>55</sup> Economic activities are divided into three sub-categories, namely near-zero carbon activities (i.e., green activities), transition, and enabling activities.

<sup>56</sup> Germany is set to reduce national GHG emissions by at least 65% and 88% until 2030 and 2040 compared with 1990 levels, respectively (BMF, 2021).

<sup>57</sup> German Ministry of Finance. (2021, June). Immediate climate action programme for 2022. [Federal Ministry of Finance - Immediate climate action programme for 2022 \(bundesfinanzministerium.de\)](#)

<sup>58</sup> Fleiter, T., Rehfeldt, M., Neuwirth, M., Herbst, A. (2020, June). Deep decarbonisation of the German industry via electricity or gas? A scenario-based comparison of pathways. Fraunhofer Institute for Systems and Innovation Research. [Deep decarbonisation of the German industry via electricity or gas? A scenariobased comparison of pathways \(fraunhofer.de\)](#)

<sup>59</sup> Carbon pricing is considered as the guiding policy instrument of the national sustainable finance strategy.

fuel subsidies to create a level playing field and incentivise all sectors to shift towards more sustainable practices. In addition, enhancing data (e.g., by introducing new firm-level metrics for transition finance that look beyond GHG emission levels) and harmonizing disclosure requirements on climate-related risks and opportunities is key to improving the transparency and comparability of transition finance indicators. Furthermore, leveraging more public funds to catalyse private investment through blended finance mechanisms, such as first-loss guarantees, risk-sharing instruments, public-private partnerships, demand-side incentives, concessional loans for small and medium-sized enterprises, and subventions for critical sectors<sup>60</sup> to reduce the upfront costs of high-impact projects, eliminate feasibility constraints in early transition phases,<sup>61</sup> and mitigate market failures that obstruct transition finance is necessary. Additionally, coordination across behavioural, socio-cultural, institutional, business, and technological dimensions and the alignment of policies and regulations at the national and international levels (see *EU Green New Deal*) are essential for scaling up resources towards transition projects, as well as to prevent leakage effects across jurisdictions. Moreover, public policy credibility is considered as a key driver to address climate change as it influences perception, trust, and confidence regarding a decent transformation. Credible signals, including the introduction of instruments to catalyse private investment as described above and policy roadmaps for the transition reduces uncertainty, transaction costs, and increases long-term commitment among financial market actors and CSOs. In turn, this supports a decent economic transformation. For instance, the existence of national sector emission targets can guide financial actors, such as financial regulators in developing policy frameworks or private sector actors in developing clear transition roadmaps to redirect financial resources.

China envisions the implementation of a wide set of short and long-term measures to reach its “Dual Carbon Goals”. More precisely, short-term measures target reductions in carbon intensity<sup>62</sup> through a better use of circular economy strategies, the replacement and overhaul of outdated energy infrastructure, as well as energy conservation and efficiency improvements. These initial measures must be complemented in the long run with the substitution of fossil fuels by alternative low-carbon technologies, such as industrial hydrogen and biomass. In turn, CCUS technologies will be implemented where decarbonization is not possible, which concerns certain production processes in the petrochemicals, power generation, steel, and cement industries.

It is important to recognize that both in China and Germany, industries have different manufacturing processes and thus varying technological needs for decarbonization. Consequently, funding schemes may differ in structure, which requires transition finance to adapt to different industrial environments and incorporate future technological breakthroughs when providing support for the emission reduction strategies of enterprises.

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<sup>60</sup> An example is the *German Building Efficiency Law* that is yet to be passed by Parliament, which grants subsidies for the replacement of heating systems powered by fossil fuels. The law requires that the new heating systems must be powered with at least 65% of renewable energy and the German Federal State assumes a maximum of 70% of total replacement costs (a 30% subsidy is granted as basic funding, which can be complemented with an additional 40% in the case of low-income households and a 20% “speed bonus” if the replacement is done until 2028).

<sup>61</sup> Difficulties in early transition stages comprise carbon lock-in mechanisms that prevent firms from scaling up transition efforts due to the loss of high-polluting physical assets.

<sup>62</sup> In China, carbon-intensive industries such as the cement, steel, and power generation sectors accounted for 10%, 15%, and 35% of the country’s total CO<sub>2</sub> emissions in 2020, respectively. Consequently, decarbonizing these industries will be a vital step towards the achievement of China’s dual carbon goals.

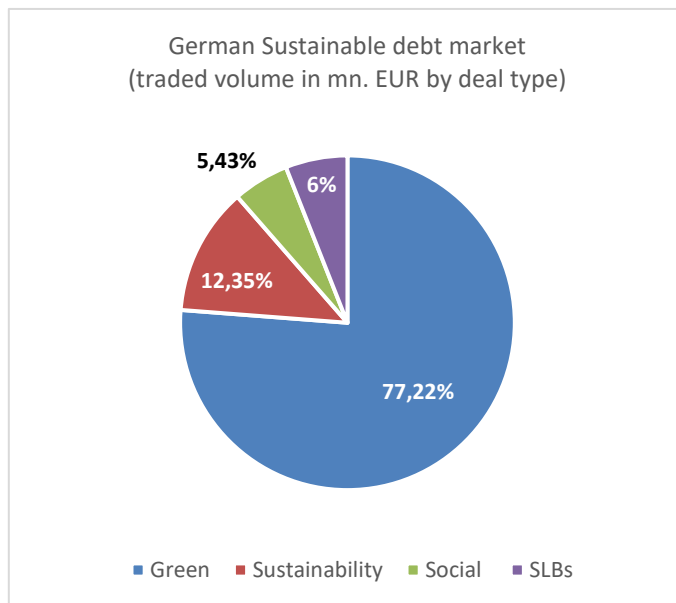
## 5 Transition finance Market Practices in Germany and China

### 5.1 Transition finance market practices in Germany

The *German Sustainable Finance Strategy*<sup>63</sup> provides the framework for any sustainable, green and transition finance activity in the German market. In June 2021, the German Government began the implementation of the Sustainable Finance Strategy with the aim to align the financial sector with the climate and sustainability goals initially set at the public level, as well as to turn Germany into a leading centre for sustainable finance. Among the 26 measures contained in the action plan, which range from strengthening disclosure and reporting requirements to supporting green innovation and digitalization, the government also stated the need to finance the energy transition.

Germany's path to climate neutrality is being shaped by both public and private actors. Public funding instruments include untied UFK loan guarantees, sovereign bonds, and the Just Transition fund.<sup>64</sup> In the private sector, even though Sustainability-Linked Bonds (SLBs) have increasingly been traded by organizations in hard-to-abate sectors, green bonds still dominate the country's sustainable debt market. In fact, as illustrated in figure below, SLBs only accounted for 7.9% of Germany's traded sustainable debt assets in 2021.

Figure 2: Traded volume of sustainable debt in Germany by deal type as of 2021<sup>65</sup>



An overview of the most commonly traded transition finance instruments in Germany is provided below, including their characteristics and key issues:

**Sustainability-Linked Bonds (SLBs):** Unlike traditional fixed income instruments, the issuer of an SLB commits itself to increasing the coupon rate of the product if it fails to reach predefined sustainability objectives. These are measured by Key Performance Indicators (KPIs), which in turn build on clear Sustainability Performance Targets (SPTs).

The Central Bank of Germany (Bundesbank) accepts SLBs as collateral for credit on behalf of the Euro System since June 2021<sup>66</sup> and

several German firms have started issuing them. For instance, the cement producer Heidelberg Material AG issued its first SLB in December 2022, with a face value of EUR 750 million and a fixed annual coupon

<sup>63</sup> Federal Ministry of Finance (2021, May). German Sustainable Finance Strategy. [Deutsche Sustainable Finance-Strategie \(bundesfinanzministerium.de\)](https://www.bundesfinanzministerium.de)

<sup>64</sup> European Commission (2022, October). EU Cohesion Policy: €2.5 billion for a just climate transition in Germany. [Inforegio - EU Cohesion Policy: €2.5 billion for a just climate transition in Germany \(europa.eu\)](https://ec.europa.eu/eu-cohesion-policy/en/eu-cohesion-policy-2.5-billion-for-a-just-climate-transition-in-germany)

<sup>65</sup> Natwest (2021, October). Transitioning to net-zero carbon, Germany's Green Market. [Germanys Green Finance market | NatWest Corporates and Institutions](https://www.natwest.com/insights/transitioning-to-net-zero-carbon-germanys-green-market); Author's illustration

<sup>66</sup> Deutsche Bundesbank (2021, May). Sustainability-Linked Bonds. [Sustainability-Linked Bonds | Deutsche Bundesbank](https://www.bundesbank.de/press-releases/sustainability-linked-bonds)



rate of 3.75%.<sup>67</sup> Regarding the instrument's proceeds, the firm committed itself to achieving a 30% reduction in generated CO2 emissions per ton of cementitious material by 2030 compared with average 2021 levels.

**Sustainability-Linked Loans (SLLs):** The term Sustainability-Linked Loan is used to describe a corporate credit whose interest rate is tied by the borrower or the lender to the achievement of specific ESG objectives. Similar to SLBs, the sustainability goals incorporated into the lending terms are based on predetermined KPIs and overarching SPTs. According to the commercial bank Unicredit AG, the total market volume for SLLs in Germany amounted to EUR 45.723 billion as of December 2021. With a total of EUR 5.1 billion of credit in the form of SLLs and a corresponding market share of 11.9% at the end of 2021. Unicredit AG was also the largest provider of this specific product in the country.<sup>68</sup>

**Transition bonds and loans:** According to the Climate Bonds Initiative, transition products differ from other sustainable debt instruments in the sense that they are only issued by firms in hard-to-abate sectors, which require funding to undertake deep structural transformations in the way they operate and thereby avoid potential regulatory risks. Furthermore, as outlined in Section 1, transition bonds are targeted at financing low or net-zero activities rather than projects that are inherently "green".<sup>69</sup>

In terms of market availability, as described by the Climate Bonds Initiative in its report Sustainable Debt Global State of the Market (2021), 70 transition bonds only accounted for a rather small portion of traded sustainable instruments worldwide and in Europe. In fact, the volume of transition bonds traded globally amounted to EUR 4.15 billion<sup>71</sup> as of December 2021, compared with the larger sum of EUR 112.08 billion<sup>72</sup> in SLBs. Moreover, no German firm or asset manager was present in the list containing the origin of the tracked issuers.

Building on this overview, the following paragraphs give a detailed description of the most traded transition finance instruments in Germany among investors and real sector entities, the strategies and market practices adopted by key players in the economy and the role played by the German banks and the European Central Bank (ECB) in Europe's sustainable transformation.

### 5.1.1 Financial market practices and strategies to promote transition finance

On the one hand, when trying to understand financial institutions and their mandates in the German context, the market framework defined by the ECB needs to be acknowledged. Addressing climate change has been a key element of the ECB's strategy since its *Climate Action Plan* was set in motion in 2021 to foster the Bank's contribution to the objectives of the Paris Agreement. More precisely, the ECB has stepped up efforts to counter climate risks by incorporating them into its monetary and non-monetary

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<sup>67</sup> Heidelberg Materials AG (2023, January). Heidelberg Materials places first sustainability-linked bond – Interest rate linked to industry's most ambitious climate targets. [Heidelberg Materials places first sustainability-linked bond – Interest rate linked to industry's most ambitious climate targets | Heidelberg Materials](#)

<sup>68</sup> Unicredit Bank AG (2023, May). [ESG Linked Loans | HypoVereinsbank \(HVB\)](#)

<sup>69</sup> CBI (2023, April). Sustainable Debt, Global State of the Market 2022. [cbi\\_sotm\\_2022\\_03e.pdf \(climatebonds.net\)](#)

<sup>70</sup> CBI (2022, April). Sustainable Debt, Global State of the Market 2021. [cbi\\_global\\_sotm\\_2021\\_02h\\_0.pdf \(climatebonds.net\)](#)

<sup>71</sup> Based on exchange rate as of September 14th 2023 (OANDA, 1 EUR= 1.06 USD) <https://www.oanda.com/currency-converter/en/?from=EUR&to=USD&amount=1>.

<sup>72</sup> Based on exchange rate as of September 14th 2023 (OANDA, 1 EUR= 1.06 USD))

policy operations, macroeconomic models, stress tests, and disclosure requirements. Most importantly, it has shifted away from the market neutrality principle, which stipulates that asset purchases should be distributed equally across the economy to avoid distortions in relative prices of corporate assets and now aims at reducing dependency on high-emitting industries.

On the other hand, due to its position as a key liquidity provider to real sector entities, the banking system plays a crucial role in the green transformation of the economy. In Germany, the credit market is characterized by its three-pillar structure, where commercial, cooperative, and institutional banks coexist. Despite having key differences in terms of ownership structure and voting rights, most German banks are members of the NZBA and have therefore committed to achieving a 100% reduction in the carbon intensity of their loan portfolios by 2050 at the latest.

Lastly, firms operating in hard-to-abate industries within Germany, such as cement, steel, and shipping firms, have increasingly incorporated climate risks and opportunities into their core business strategies. However, even though there is a clear tendency towards the issuance of green bonds, SLBs and other transition finance instruments still play a minor role in their financing structure.

**Cooperative banks.** Cooperative banks in Germany are characterized by their strong regional presence and unique membership structure, which grants clients the right to vote in institutional meetings and thereby help shape the path taken by the organization. These banks are in turn part of a central institution called DZ Bank AG, which makes up the second-largest creditor in the German market by consolidated total assets<sup>73</sup>.

In terms of the sustainability efforts undertaken by the DZ Bank AG, the group has not only embedded the achievement of 0% carbon intensity by 2050 into its core business strategy but has also put in practice concrete measures to support the decarbonization plans of companies in hard-to-abate sectors, which accounted for 13% of its total lending volume as of December 2022<sup>74</sup>. Particularly, transition efforts are centered on the establishment of climate targets and decarbonization pathways for five hard-to-abate industries (energy, automotive, steel, cement, and aviation sectors), in accordance with the PACTA (Paris Agreement Capital Transition Assessment) guidelines. This methodology incorporates sector-specific current emissions, market developments, and potential risk factors to develop transformation pathways. For example, as a result of the PACTA framework, the group aims at reducing its portfolio's CO2 intensity stemming from the steel industry by five percent by 2025 and by 18 percent by 2030.

**Public banking institutions.** The second pillar of the German banking system is made up of public credit institutions, such as the savings (“Sparkassen”) and federal state (“Landesbanken”) banks. In contrast with commercial and cooperative lenders, Sparkassen and Landesbanken are non-profit organizations owned by local municipalities and federal states, respectively.

Similarly to cooperative creditors, German savings and federal state banks have explicitly refused to cut lending to companies with high carbon emission levels and have instead pledged to support them in their decarbonization plans.<sup>75</sup> More precisely, the asset management branch of the savings banks group, called Deka Bank AG, which is also part of the GFANZ Alliance, will intensify dialogue with high emitters and develop new products to align its portfolio with the temperature goal of the Paris Agreement.<sup>76</sup> Nevertheless, it has not set specific interim goals for each hard-to-abate sector yet.

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<sup>73</sup> DZ Bank Group (2023, April). Annual Business Report 2022. [Group management report | DZ BANK Group](#)

<sup>74</sup> DZ Bank AG (2023, March). DZ Bank expands ESG targets. [DZ BANK expands ESG targets](#)

<sup>75</sup> S-Communication Services GmbH (2023, May). [Förderung von Nachhaltigkeit | Sparkasse.de](#)

<sup>76</sup> DekaBank (2023, February). Deka Group Sustainability Report 2022. [Deka Sustainability report 2022](#)

**Commercial banks.** Unlike cooperative lenders, commercial banks in Germany do not grant institutional voting rights to account holders. Furthermore, they are privately owned and universal in the sense that they operate their corporate, asset management, and retail banking branches under the same legal entity.

According to Statista, two German institutions held the largest market share by consolidated total assets in this pillar: Deutsche Bank AG and Commerzbank AG. Even though the Commerzbank has stated that it will provide 300 million Euros in funding to support the decarbonization plans of clients operating in hard-to-abate industries by 2025<sup>77</sup>, its competitor Deutsche Bank has not yet specified how it will deal with high-polluting companies other than those related to the coal industry, from which it will withdraw entirely by 2025<sup>78</sup>.

### 5.1.2 Supporting the green transition through monetary policy

To accelerate the green transformation of the economy, the ECB devised the Climate Action Plan in accordance with the European Union's Paris-aligned targets. Although climate risks directly affect businesses and households, they also threaten the EU's banking system. In fact, according to a press release from the Governing Council of the ECB, mitigating transition risks is vital to the preservation of financial stability in the Euro System. To tackle this pressing issue, the Climate Action Plan incorporates climate risks into the Central Bank's core activities and asset classes.

**Corporate bond holdings.** New asset purchases will be redirected towards companies that can demonstrate a higher commitment to decarbonization, either through a consistent reduction in greenhouse gas emissions, more transparent disclosure of climate risks, or by setting more ambitious targets. Consequently, hard-to-abate sectors may also profit from the ECB's purchase programs if they step foot on a greener path. Nevertheless, this measure, called "flow-based tilting", will only affect the ratio of green bonds among newly bought assets and will, therefore, have no impact on the total volume of corporate debt holdings. This is because the monetary offer will still rely entirely on the ECB's first mandate, which is to maintain price stability.

**Collateral framework.** As part of the Climate Action Plan, the ECB will limit the share of bonds issued by high polluting firms that can be used as collateral for credit. Although this measure could incentivize companies to engage in decarbonization, it is imperative to ensure that hard-to-abate industries have sufficient liquidity to finance the transition. Furthermore, the Bank will include climate risks in the assessment of the face value of collateral debt. In other words, firms with high greenhouse gas emissions will have less relative liquidity to finance their operations as companies that are in line with the EU's climate targets.

Because of their larger upfront costs, renewable energy projects are particularly vulnerable to interest rate increases. Nevertheless, Isabel Schnabel, a member of the ECB's executive board, argues that there is no trade-off between the current contractionary monetary policy, necessary to meet the price stability mandate of the ECB and the success of the green transformation<sup>79</sup>.

This can be explained by the source of inflation in the EU. In other words, given that the current increase in the aggregate price level is caused primarily by a supply shock (a sharp increase in production costs due to higher gas prices), the EU is suffering from stagflation. This type of inflation is particularly harmful since

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<sup>77</sup> Ernst and Young GmbH (2022, March). Zusammengefasster gesonderter nichtfinanzieller Bericht. [Microsoft Word - 11\\_GB 2021\\_Nichtfinanzielle Erklärung\\_DE\\_Final.docx \(commerzbank.de\)](#)

<sup>78</sup> Deutsche Bank AG (2022). Corporate loan portfolio financed emissions and net zero aligned pathways for focus sectors: Towards net zero emissions. [Towards net zero emissions \(db.com\)](#)

<sup>79</sup> ECB (2023, January). Monetary policy tightening and the green transition. [Monetary policy tightening and the green transition \(europa.eu\)](#)

it is accompanied by large decreases in productivity and recessionary processes. In fact, Mrs. Schnabel indicates that avoiding monetary contractions today could potentially lead to more severe restrictive policies in the future, as was the case in the US after the oil crisis of the 1970s. Put differently, holding back asset purchases and increasing interest rates today might be necessary to secure a scenario where the green transformation can flourish.

### 5.1.3 Case examples from the German real economy and financial industry

As part of the first scoping study on transition finance in Germany, Frankfurt School conducted a round of interviews with a leading European financial institution and one industry expert with experience in the cement and plastics manufacturing sectors to gather first-hand insights into the adoption of transition finance in the German private sector and to understand how it is being shaped in terms of approach by different stakeholders. In addition, the interviews provided crucial information about the current challenges facing real sector entities and financial institutions, as well as the role of the German government in the transition to climate neutrality. The table 5 shown below summarizes these findings and highlights key policy considerations brought forward by the industry experts:

*Table 5: Barriers, challenges, and government role in transition finance*

Interviews	Leading financial institution in EU	Manufacturer with experience in cement and plastics
<b>Barriers and challenges</b>	<ul style="list-style-type: none"> <li>Low predictability of businesses' adaptive capabilities and resiliency.</li> <li>Lack of reliable quantitative tools to measure biodiversity impact of transition projects.</li> </ul>	<ul style="list-style-type: none"> <li>In contrast with listed firms, small-medium Enterprises (SMEs) face considerably higher financing gaps and are therefore less able to adopt transition technologies and overcome the business risks involved in the process.</li> <li>On the use of hydrogen as an input energy source, there are still technical limitations that need to be further addressed.</li> </ul>
<b>Role of the government</b>	<ul style="list-style-type: none"> <li>Complement private initiatives such as H2 Global and the CCD mechanism with public investments in hydrogen infrastructure, for instance via the KfW H2 platform.</li> <li>Provide UFK guarantees to mitigate the risks involved in the development of transition technologies and clean energy sources, such as technological, default and insolvency risks.</li> </ul>	<ul style="list-style-type: none"> <li>CCDs alone will not accelerate decarbonization and must be accompanied by investments in infrastructure to make transition technologies scalable.</li> <li>Provide first-loss guarantees, which would be highly welcome in the plastics manufacturing sector. Particularly, such policy measure would benefit SMEs, who struggle the most to receive funding for their decarbonization plans.</li> </ul>

In light of these interviews, the shallow integration of environmental safeguards into the definition of transition finance can be attributed to the lack of quantitative tools to quantify the impact of financial portfolios on biodiversity. While current frameworks assess nature dependencies, financial institutions highlight the need to develop accurate impact assessment tools for investors. Moreover, unlike listed firms, SMEs face considerably higher financing gaps and are therefore less able to adopt transition technologies and overcome the business risks involved in the process. To solve this problem, the interviewees highlighted the need to create tailor-made funding options for SMEs and to extend the guarantees provided by the German Federal Government under the UFK mechanism to cover investments in transition technologies.

## 5.2 China

China has, thus far, made some progress in transition finance (Table 6). Currently, the participants of transition finance in China include the PBOC, development banks, and commercial banks. Existing transition finance instruments mainly include carbon emission reduction support tool, transition bonds, sustainability-linked bonds, sustainability-linked loans, etc. Particularly, the PBOC uses a preferential interest rate and green relending tools, such as carbon emission reduction support tool, and special refinancing loan to support the clean and efficient use of coal, to support financial institutions to provide preferential financing for key projects with significant carbon reduction effects. At the same time, market-oriented instruments, such as transition bonds, sustainability-linked bonds, and sustainability-linked loans offer enterprises more flexible avenues to raise funds for their transition process.

*Table 6: China's progress in practicing Transition finance*

Institution	Instruments
People's Bank of China	<ul style="list-style-type: none"> <li>Carbon emission reduction support tool.</li> <li>The special refinancing loan of RMB 300 billion for supporting the clean and efficient use of coal.</li> </ul>
Commercial banks and other FIs	<ul style="list-style-type: none"> <li>Bank of China and China Construction Bank release transformation bond standards.</li> <li>The National Association of Financial Market Institutional Investors (NAFMII) launches the first domestic SLB.</li> <li>Sustainable development-linked loans, carbon quota pledge loans, carbon emission reduction preferential loans, etc.</li> </ul>
Development bank	<ul style="list-style-type: none"> <li>Support energy conservation and efficiency improvement in key industries and the clean, low-carbon, safe and efficient transformation of the energy system.</li> </ul>
Supporting measures: reducing the project capital ratio, tax incentives, strengthening government special bond funding support, accelerating depreciation, and supporting clean and efficient coal utilization projects, etc.	

### 5.2.1 Transition finance market practices in China

#### 5.2.1.1 Carbon Emission Support Tool and Special Refinancing Loan to Support the Clean and Efficient Use of Coal

Based on the carbon dioxide peaking and carbon neutrality strategy, in 2021, the PBOC launched carbon emission reduction support tool and special refinancing loan to support the clean, efficient use of coal. Notably, the carbon emission reduction support tool offers financial institutions funds through a direct mechanism that allows financial institutions to extend loans first and then obtain financing from the central bank. To ensure that carbon emission reduction support tool accurately support areas with significant carbon reduction potentials, the PBOC, in collaboration with other authorities concerned and following the principle of taking the intersection of China's existing standards and getting aligned with the international standards, oriented towards reducing carbon emissions, identified three priority areas, namely, clean energy, energy conservation and environmental protection, and carbon reduction technology. On condition of making decisions and bearing risks on their own, financial institutions provide various types of enterprises in the key carbon reduction areas with loans on an equal footing and at a lending rate largely the same as the Loan Prime Rate (LPR) for market-oriented loans made on the same

level and during the same period. After financial institutions release carbon reduction loans to key areas, they can then apply to the PBOC for funding support. Accordingly, the PBOC will offer financial institutions support funds at a lending rate of 1.75% in an amount of 60% of the principal of the loans extended by the financial institution and for a term of 1 year, with twice extensions available. With respect to the 1-year special re-loans given by the PBOC to guide carbon reduction, the fiscal authorities will give them a 25BP interest discount, and the same treatment will continue to be given during grace periods, with the subsidy period spanning a period of up to 3 years. When applying to the PBOC for carbon emission reduction support tool, financial institutions must provide carbon reduction data of the loans granted to carbon reduction projects and disclose relevant information to the public. Regarding feasibility study reports, environmental impact assessment reports, or evaluation reports issued by market-recognized professional organizations for emission reduction projects, as well as the share of the amount of the loans obtained by such projects in their total investment, financial institutions will calculate the annual reduction of carbon emissions made possible by the loans. After obtaining the financial support, financial institutions must disclose some information on a quarterly basis such as the areas of carbon reduction supported, the number of projects financed, the principal and weighted average lending rate of loans released, the carbon reduction data, etc., to facilitate public supervision. In collaboration with other competent authorities, the PBOC will verify the truthfulness of the information disclosed by financial institutions by a variety of means, including by commissioning third-party organizations to conduct verifications. The carbon emission reduction support tool will be extended through the end of 2024 to support national financial institutions (development banks, state-owned banks, and joint stock banks), some local corporate financial institutions and foreign financial institutions (e.g., Deutsche Bank (China), Societe Generale (China), HSBC (China)). By the end of March 2023, the carbon emission reduction support tool has released more than RMB 300 billion relending and supported commercial banks in extending RMB 500 billion of loans. In 2022, the carbon emissions reduction attributable to this financial support tool reached 100 Mt Carbon Dioxide equivalent (CO<sub>2</sub>e)<sup>80</sup>.

In addition to the carbon emission reduction support tool, the PBOC introduced a special refinancing loan to support the clean and efficient use of coal worth RMB 200 billion in 2021. The supporting area includes safe, efficient, green, and intelligent mining of coal, clean and efficient processing of coal, clean and efficient utilization of coal power, cleaner combustion and cleaner heat supply for industry, cleaner heating for civilian use, comprehensive utilization of coal resources and vigorously promoting the development and utilization of coalbed methane. With the special refinancing loans, banks voluntarily extend preferential loans to eligible projects within the coverage of the facility at a rate largely the same as the market-oriented lending rate for loans made on the same level and in the same period, and afterwards, the PBOC releases relending funds to the banks in an amount equal to the principal of the loans extended by them. In May 2022, the PBOC added RMB 100 billion to the special refinancing loan.

#### 5.2.1.2 Transition Bonds

According to the *Notice on Piloting Transition Bond Innovation* issued by the NAFMII, transition bonds are debt financing instruments that raise low-carbon transition funds to support environment improvement and addressing climate change. They are a beneficial supplement to green finance and a sub-category of sustainable finance. Shanghai Stock Exchange (SSE) further stipulates that the corporate bonds raised for low-carbon transition purposes must use at least 70% of their funds for the intended purposes.<sup>81</sup>

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<sup>80</sup> Xinhua News,(2023). People's Bank of China: So far, carbon emission reduction support tool have issued more than 300 billion in re-loans. [http://www.news.cn/2023-03/03/c\\_1129410946.htm](http://www.news.cn/2023-03/03/c_1129410946.htm)

<sup>81</sup> International Institute of Green Finance (IIGF) Central University of Finance and Economics (2022). Development analysis and policy recommendations of my country's transformation bonds. <https://iigf.cufe.edu.cn/info/1012/5699.htm>

In early 2021, Bank of China and China Construction Bank issued the *Statement on the Management of Transition Bonds* and the *Framework of Transition Bonds*, respectively. Both documents gave a clear definition for transition finance and defined categories of transitional projects eligible for transition finance. On January 7, 2021, in accordance with the *Climate Transition Finance Handbook 2020* released by the ICMA and with reference to the EU Taxonomy, Bank of China successfully issued a transition bond publicly offered by financial institutions. The issuance transaction included a 3-year bond worth USD 500 million (EUR 471.70 million<sup>82</sup>) and a 2-year bond worth RMB 1.8 billion. The funds raised would be used for natural gas combined heat and power (CHP) plants, natural gas power generation, and residual heat recovery at cement factory. On April 23, 2021, China Construction Bank issued in Singapore a 2-year transition-themed bond worth RMB 2 billion at a coupon rate of 2.85%. The bond was intended to bring a stable source of funding for projects with significant environmental benefits in the carbon-intensive industries, to deepen the economic and industrial restructuring in China. The funds raised by the thematic bond would be invested in selected areas, which featured the electric power, fuel gas, steam, manufacturing industry, iron and steel, etc.

### 5.2.1.3 Sustainability-Linked Bonds

Sustainability-linked bonds (SLB) are debt financing instruments that link the terms of bonds to the sustainable development goals of the issuers and, through the structural design of bonds, incentivise the issuers to formulate and realize sustainability goals and meet the financing needs of enterprises. The key characteristics of SLBs are as follows. Firstly, borrowers pursue achieving sustainability goals, with the cost of their financing linked to their performance. Secondly, the funds raised are not earmarked for particular purposes. Finally, the KPIs are subject to third-party verification on a yearly basis. Entities participating in such bonds include non-financial enterprises, financial institutions, etc.

On April 28, 2021, the NAFMII, as an important market regulator for labeled bonds, organized market members to issue SLBs. Meanwhile, based on the *Sustainability-Linked Bond Principles* issued by the ICMA, the NAFMII prepared the document titled *10 Q&As on Sustainability-linked Bonds*, giving detailed explanations on the basic concept, structural design, information disclosure, and third-party assessment and verification of SLBs. SLBs issuers are mainly high carbon-emitting industries, such as electric power, steel, coal, transportation, construction, etc. According to statistical data, by the end of 2022, China has cumulatively issued 58 SLBs, with the size of issuance totaling RMB 74.2 billion.<sup>83</sup> Table 7 presents the basic information of several Sustainability-linked Bonds.

Table 7: Basic information of sustainability-linked bonds

Issued by	Sector	KPIs	Reward and penalty terms for bonds
China Yangtze Power Co., Ltd.	Electric power	Managed installed capacity of power generation from renewable energy.	Failure to meet the KPI will cause the lending rate to increase by 25BP from the third year on.
GD Power Development Co., Ltd.	Electric power	Incremental installed capacity of power generation from wind energy.	Failure to meet the KPI will cause the coupon rate to

<sup>82</sup> Based on exchange rate as of September 14th 2023 (OANDA, 1 EUR= 1.06 USD)

<sup>83</sup> China Chengxin Green Finance Technology (2023). 2022 Domestic Sustainable Development Linked Bond Market Operation Annual Report. [http://news.sohu.com/a/636919268\\_121123915](http://news.sohu.com/a/636919268_121123915)

			increase by 20BP from the third year on.
<b>Shaanxi Coal and Chemical Industry Group Co., Ltd.</b>	Coal	Comprehensive energy consumption per ton of steel, standard power supply coal consumption of thermal power plants, installed capacity of power generation from new energy sources.	Failure to meet the KPI will cause the coupon rate to increase by 20BP from the fifth year on.
<b>Huzhou Economic and Technological Development Zone Investment and Development Corporation</b>	Construction	Floor space completed of green buildings.	Failure to meet the KPI will cause the lending rate to increase by 25BP.
<b>Ping An Leasing</b>	Leasing	Amount of leasing in micro and inclusive business.	Failure to meet the KPI will cause the bonds redemption.

#### 5.2.1.4 Sustainability-Linked Loans

Sustainability-linked Loans (SLL) are loans that link prices to sustainability performance indicators, which include GHG reduction, energy efficiency or ESG performance. SLLs primarily have the following characteristics: Firstly, borrowers promise to achieve sustainability (carbon reduction) goals, which are linked to the cost of financing. Secondly, the funds raised are not earmarked for particular purposes. Finally, borrowers are subject to rigorous disclosure requirements.

In China, SLLs are currently in their startup stage and are issued relatively more in Hong Kong. Mainland China has a relatively small issuance volume, but some progress has been made. Firstly, active policy support. The Chinese Government has always stressed the importance of sustainable development, encouraging financial institutions to extend SLLs to eligible borrowers at preferential rates, among other supports. Secondly, gradual participation of financial institutions. A growing number of Chinese financial institutions start to offer SLLs, including large commercial banks and development bank. They cooperate with borrowers to ensure compliance of the projects financed with sustainability requirements and to track their progress. Finally, expansion of the coverage of SLLs. China's SLLs are not limited to particular industries but are gradually expanding to many more areas. For example, sustainable energy, energy conservation and emission reduction, clean production, and environmental protection projects are all eligible for SLLs. In 2022, the PBOC Wuhan Branch instructed Industrial Bank Xiangyang Branch to successfully issue the first sustainable development-linked loan in Hubei Province to a chemical group in Xiangyang City, China. The SLL was linked to performance goals set for that chemical group, namely, the comprehensive utilization of phosphogypsum, and the reduction of carbon emissions. If the enterprise fulfilled either of the two goals, the lending rate for its SLL would be reduced by 10BP.

#### 5.2.2 Market mechanisms for transition finance in China

In China, the main participants in transition finance activities are financial institutions and large enterprises. Among them, financial institutions mainly include the PBOC, large commercial banks and policy banks. Relevant entities have been actively participating in transition finance market practices to promote the development of transition finance in China.



**Central banks.** At the macro-prudential level, the PBOC has taken measures such as assessing financial institutions' green finance performance, conducting climate stress testing, and strengthening climate risk disclosure to promote the development of transition finance. Regarding the assessment of financial institutions' green finance performance, in the third quarter of 2017, the PBOC started to include green loans and green bonds in the Macro Prudential Assessment (MPA) for deposit-taking banking institutions to measure and evaluate their green finance services through a system of green finance standards. Subsequently, it issued the *Green Finance Evaluation Plan for Banking Institutions*, and continued to expand the scope of assessment of green finance services. In terms of climate stress testing, the PBOC developed a basic framework for climate stress testing in 2021 and organized 23 major banks in China to conduct climate risk sensitivity stress testing on loans for three carbon-intensive industries, namely thermal power, steel and cement. With regard to climate risk disclosure, the PBOC enacted the *Guidelines for Environmental Information Disclosure of Financial Institutions* in 2021, which lays down the requirements for environmental information disclosure by financial institutions, including the principles, forms, frequency and content of such disclosure.

On the monetary policy side, the PBOC included some of the high-quality green bonds and green loans in the scope of collateral for its medium-term lending facility (MLF) in 2018, in an effort to guide financial institutions to increase their support for the green economy. In 2021, the PBOC further set up a carbon-reduction support tool and targeted re-lending to support the clean and efficient use of coal, in a bid to channel more funds to low-carbon transition sectors.

**Commercial banks.** Commercial banks have been advancing the development of transition finance through fundamental work, including by conducting carbon footprint accounting, disclosing environmental and climate information, and promoting climate stress testing. In terms of carbon footprint accounting, commercial banks, including ICBC and ABC, have all calculated the carbon emissions of their operations, and some are trying to calculate the carbon emissions from projects backed by their loans. In terms of environmental and climate information disclosure, commercial banks, such as ICBC and BOC, have successively announced their support for the framework recommended by the Task Force on Climate-related Financial Disclosures (TCFD), and those such as Industrial Bank Co., Ltd. (CIB), the Bank of Jiangsu and the Bank of Huzhou have joined the UK-China Climate and Environmental Information Disclosure Pilot. In terms of climate stress testing, ICBC has conducted research on carbon trading-related stress testing, analyzing the impact of four factors, namely carbon price, industry baseline, proportion of paid carbon allowances, and application of emission reduction technologies, on corporate finance and bank credit risk.

**Policy banks.** China has three policy banks, all of whom participate in transition finance mainly by supporting sustainable projects. The China Development Bank, as the fastest growing and largest bank by assets of the three, is dedicated to supporting the development of industries and infrastructure, with a focus on energy conservation and efficiency improvement in key industries, and clean, low-carbon, safe and efficient energy systems. The Agricultural Development Bank of China is committed to supporting China's efforts in agriculture, rural areas and farmers, and promoting green development, with a focus on improving the rural ecological environment and forestry carbon sequestration. The Export-Import Bank of China has supported the development of a number of green agriculture and cleaner production projects, combining efforts to help competitive green enterprises go global and to bring in international advanced green technologies and ideas, in the process of promoting major national strategies such as the Belt and Road Initiative (BRI) and international cooperation in production capacity and equipment manufacturing.

**Enterprises.** Enterprises participate in transition finance activities mainly by issuing sustainability-linked bonds (SLBs), transition bonds, etc. Statistics show that as of June 2022, seven carbon-intensive industries, including electricity and heat production and supply, manufacturing and mining, had issued SLBs, of which

14 were issued by the electricity and heat production and supply industry, with a total value of 22.9 billion yuan, the largest in both number and scale<sup>84</sup>

## 6 Conclusion and Outlook

### 6.1 Policy recommendations for enhancing transition finance

The recommendations build on the findings of this report and aim to foster a collaboration between Germany and China.

- (1) Creating a Sound Framework of Official Standards for Transition finance.** Building on existing frameworks, such as the G20’s Transition Finance Framework, regulatory authorities may issue standards systems for transition finance. In this respect, both governments should accelerate the research on transition finance standards to promote the integration between transition finance and the established fields of green and sustainable finance. In doing so, they should specify the market activities and governance structures supporting transition finance, and reasonably delineate the roles, responsibilities and benefits of both governments and financial market participants. Besides the focus on frameworks for net zero economies, appropriate reflections of environmental and social safeguards ensure a resilient economic development leaving no one behind. Finally, aligned third-party performance mechanisms may be developed and established for transition finance in both countries. Transition activities should be scientifically and consistently evaluated in terms of their environmental, social, governance as well as economic impacts. On this basis, supervision mechanisms can improve incentive and restraint measures to ensure the investment direction and efficiency of transition finance. Thus, a sound and robust transition framework ensures policy credibility for all economic actors enable long-termism which is a key driver for transition finance.
- (2) Clarifying the Official Definition of Transition finance.** According to the findings of this study, transition finance is expected to offer financial services for – but not limited to – emission intensive industries with high impact on environment and society. Thus, it should consider emission trajectories and safeguards as described in (1) over time, and it may cover “brown sectors” to some extent, which is not covered by green finance definitions. Transition finance may cover not only asset projects and economic activities featuring a net-zero transformation, including social safeguards, but also market entities with clearly defined emission reduction goals and pathways. Similarities and differences as outlined in Section 2.3, Table 3, may serve as entry point for further dialogues and policy development by recognizing various stages of economic development. To support transition finance, the issuance of a nationally unified finance taxonomy or locally led transition finance taxonomy in China may provide the basis on which to implement transition projects and programs. Germany could also strengthen its efforts to bring forward transition finance as a topic for the EU finance taxonomy regulation, considering economic activities which have not yet been assessed that could make a substantial contribution. This limits participation by some sectors and entities with valid transition strategies which may be relevant for the net zero target. Transition finance may emphasize the necessity of raising funds, the need for transitional entities to define their transition goals and

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<sup>84</sup> Wind. Sustainable-linked Bonds: An Innovation in Bond Market [EB/OL]. 2022.  
<https://baijiahao.baidu.com/s?id=1739644273115510905&wfr=spider&for=pc>

pathways, and the reality that supported entities can achieve their objectives in line with international agreements.

- (3) Increase Innovation in Transition finance Products and Instruments.** There is a need to scale up transition finance instruments in Germany and China at a lower cost. In Germany, the financial sector may enable a decent and rapid transition by developing new forms of risk-sharing financing instruments, such as untied loan guarantees, interest rate subsidies, ring-fenced concessional credit lines (use of proceed) for SMEs and firms operating in hard-to-abate sectors. China may actively develop transition finance products with low-GHG benefits and commercial feasibility, including transition loans and bonds, transition insurance, and transition funds to provide transitional entities with financial support on a larger scale. In addition, China may set up reasonable incentive mechanisms to support the development of transition finance products. For example, it may actively use policy measures, such as the central bank's carbon emission reduction support tool and interest subsidies or create new instruments to provide low-cost funds that help financial institutions raise funds for transition and enterprises transition to low-carbon models.
- (4) Promoting China-Germany Cooperation in Transition finance.** China and Germany can set up new and intensify existing bilateral dialogue mechanisms, including the G20's Transition Finance Framework, to facilitate in-depth and multilateral discussions on definitions, objectives, and goals. Building consensus on core principles and common visions and formulating guiding principles or joint statements regarding transition finance to finally achieve mutual recognition of transition finance standards and products as outlined in the previous recommendations are of central interest. In this regard, dialogues may prioritize coordination across behavioural, socio-cultural, institutional, business, and technological dimensions, as well as participation with various stakeholders to ensure a socially inclusive, just, and systemic transition process. Implementing early and extensive public and stakeholder participation in the dialogues, as well as mobilizing human and financial resources towards affected regions and industries increases trust, social acceptance, resilience, and funding for new technologies via greater private sector involvement. Integration of market practices and intensifying existing and creating new coalitions and partners with strong technical skills, financial resources and political capital may be an important driver for an accelerated transition. At the same time, both countries can conduct cooperation in transition finance market practices, by e.g., encouraging Chinese transition entities to "go global" and raise funds on the international market.

## 6.2 Conclusion

This report contributes to the emerging field of transition finance by providing a detailed assessment of its evolution in the German and Chinese economies. Particularly, the report examines the scope and definition of transition finance in both countries, the pressing challenges facing its development and implementation, existing public and regional initiatives, as well as current market practices aiming at accelerating the transition to a net-zero economy.

Regarding the definition of transition finance, this report provides two crucial findings. Firstly, transition finance in the German and Chinese contexts is to be distinguished from other sub-fields within ESG investing, such as green finance. More specifically, while green finance targets activities or entities that already have a positive impact on climate and the environment, transition finance seeks to support the decarbonization pathway of high-emitting and hard-to-abate sectors and incorporates a dynamic time component (e.g., it recognizes that decarbonization is a gradual rather than stationary process). Secondly,

despite the lack of an official definition in Germany and China, there is an increasingly clearer understanding of transition finance in each country.

In the German context, the term builds on the working definitions of international organizations (OECD and IPSF) and the *German Sustainable Finance Strategy*. More precisely, it is defined as financing and funding provided to all sectors, specifically high-emitting and hard-to-abate industries to enable them to gradually shift their activities towards a net-zero pathway by 2045. In addition, the definition incorporates a time dimension, the need to adapt to domestic jurisdictional contexts, and a wider sustainable development scope (including the consideration of social inclusion and a just transition, biodiversity and environmental protection, and further sustainability elements). In the Chinese context, efforts to elaborate a definition for transition finance are being undertaken by national authorities, regional authorities as well as market participants. At the national level, the PBOC has spearheaded since 2021 the elaboration of a definition and policy framework for transition finance and it has already specified that economic activities and entities should be aligned with the country's "Dual Carbon Goals" and the Paris Agreement, make a significant contribution to climate change, be free of environmental harm, reach the benchmark or an advanced level of energy performance, and plan for the potential impact on social and economic development. At the regional level, the *Huzhou City Transition Finance Catalogue (2022)* provides a definition that is valid within the city's jurisdiction. At the market level, the Bank of China and the China Construction Bank also provided definition for transition finance.

Germany and China have discussed transition finance in the context of both countries, which is an important first step to developing financial means around the topic. At different stages of development, it is possible for economies to consider applying the double-materiality perspective, which considers the associated risks from solving sustainability issues while recognizing the impact on people and the environment. Regardless of the level of economic development, economies would have to take transition risks into account while developing and implementing ambitious transition strategies.

Despite the increasing clarity of transition finance in Germany and China, this report also identifies key challenges in its implementation that prevent both countries from closing the financing gaps required for the transition. Firstly, the lack of an official definition for transition finance, as well as limited data availability on emission-related metrics make it difficult to develop appropriate standards, regulations, and market instruments. This in turn increases the risk of transition washing, which describes the malpractice of diverting financial resources from meaningful activities towards projects that mislead about their true climate and environmental benefits. Secondly, insufficient cooperation between private and public stakeholders at the national and international levels obstructs the swift of large-scale deployment of transition finance resources.

However, to better understand how transition finance is being implemented in the German and Chinese economies despite the pressing challenges, this report also provides a detailed insight into the role of financial market participants and their practices, which are a key element in the transition to a climate-neutral economy. In Germany, the release of *the Sustainable Finance Strategy* by the Government in May 2021 laid the foundations required for the alignment of the financial market with the national climate goals and therefore with the temperature objectives of the Paris Agreement. Despite this effort and the rapid surge in the issued volume of SLLs and SLBs in recent years, transition finance products in Germany are still scarce in comparison with green finance instruments, such as green bonds and loans. For instance, according to Dealogic, these products covered nearly 78% of the country's sustainable debt market by the end of 2021, while transition bonds and loans were not yet traded. Such difficulty to attract funds for the transition in Germany is verified by the interview findings presented in this report, which highlight the low access to funding for SMEs in high-emitting sectors, the absence of appropriate transport infrastructure, and the lack of reliable quantitative assessment tools as key obstacles to accelerating the transition. In

China, some progress has been made, including the issuance of transition finance products, particularly SLBs, carbon emission reduction support tool of the PBOC, etc. For example, as stated in this report, funding obtained via SLBs amounted to RMB 74.2 billion by the end of 2022 and is primarily concentrated in the electric power, steel, coal, transportation, and construction sectors. Moreover, the carbon emission reduction support tool has released more than RMB 300 billion relending by the end of March 2023.

These findings have multiple implications for different actors. On the one hand, this report highlights the need for governments to support financial markets and crack down on malpractices, such as transition washing, by developing an official definition and standards for transition finance, as well as by providing sound disclosure frameworks for carbon and GHG-related data. On the other hand, the report explores additional policy measures to create an enabling environment for transition finance, including the introduction of national sector targets, the removal of fossil fuel subsidies, the gradual extension of carbon pricing, and the implementation of several blended finance instruments. These measures reinforce credibility and long-term commitment among financial market participants and other market actors, which in turn paves the way for a just and socially inclusive economic transformation. However, although the findings described in this report serve as a basis for reaching a common understanding of the nascent field of transition finance in China and Germany, it is essential to recognize that the topic is still in an early development stage and that further contributions, both at the academic and public policy levels are key to continue improving our understanding of the field of transition finance, to the benefit of society as a whole.

## 7 Annexes

### 7.1 Annex 1: Scoping Study Outline

**Scope and Objective:** Sustainable finance is set to be prominent again in 2022, not least to accelerate action on climate change and clean energy. One area of focus for the SFWG this year is transition finance, with finance ministers pledging to *“take actions to enable transition finance to support orderly, just and affordable transitions towards a low-greenhouse gas emissions and climate-resilient economy”*. A relatively new tool, transition finance is focused on supporting decarbonizing emissions-intensive and hard-to-abate sectors (e.g., emissions from agriculture, aviation, shipping, industrial processes), rather than on allocating capital to activities that already meet green standards (e.g., renewable energy). Evidence clearly shows that continued unconditioned investments in unabated high emitting infrastructure prior to 2030 act as a barrier and increase feasibility risks for a low carbon economy. The EU/EC and Germany are currently working on defining activities that are significantly contributing to the environment, along with those that have no significant impact to support the transitions of firms that currently have a negative effect on the planet.

China also sees transition finance as an important component of the 2030/2060 national emission targets and wants to use its pioneering work in green finance as a basis for building up transition finance expertise. China’s ambition is to inaugurate the highest international standards for investments and to have these assessed using established procedures. The objective of this joint study is to develop a common understanding of transition finance in China and Germany, while showing the differences, their roots and potential pitfalls. The research will clarify how transition finance works in both countries, how it differs from other financing concepts and which synergies exist with existing measures. The study will examine the link between transition finance and Just Transition efforts. All of this will be done with the intention to help advance and accelerate the Chinese and German transition to climate neutrality, focusing on transition finance, while ensuring a fair and inclusive transition. This includes stocktaking, identification of gaps and opportunities, establishing definitions and proposing solutions to shared difficulties, such as avoiding “transition-washing”.

Two scoping studies on transition finance were carried out, one regarding the situation in Germany and one regarding the situation in China. The studies followed the same outline and after completion, the two study outcomes were compared and analysed in this joint Sino-German research paper.