

# Transition Finance in China's Guangdong Hong Kong-Macao Greater Bay Area



# Executive Summary

Climate change is one of the most critical global challenges facing the world. The release of the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) has sounded a warning to the world. It is now an imperative for all countries to jointly face the climate crisis, enhance climate resilience, and strengthen mitigation actions. It is not enough to support the development of green and low-carbon industries alone. Ensuring the rapid transition of high-GHG emitting industries and high-emitting sectors is an essential component of facilitating a low carbon economy.

There has been much discussion around the world about the use of a transition finance label to finance the transition journey of high-emitting sectors to a low carbon future. However, the concept of transition finance is still in its infancy and there is no widely accepted definition of what it encompasses. As a result, its use to date has received mixed responses, in particular from investors who are concerned that it does not result in any significant change from business as usual.

This report intends to review the transition finance concepts and practices that are currently being used around the world, to discuss the principles that credible transition finance should adhere to, and to take the Guangdong-Hong Kong-Macao Greater Bay Area (the GBA) as a case for studying the application of transition finance concerning the low-carbon transition.

The GBA is one of the regions with the highest degree of openness and has one of the strongest economies in China. Under the framework of China's '30-60' (have CO<sub>2</sub> emissions peak before 2030 and achieve carbon neutrality before 2060) climate target and the Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area (the GBA Outline Plan), the development positioning of the GBA determines that it must take into account the environmental impact and realise a sustainable form of development, while maintaining high-quality economic growth.

Together with the development of the GBA's green climate-linked investment and relevant supporting policies and practices, it has become an ideal test field for the implementation of transition finance.

In order to further stimulate the development of transition finance in China and the world, we would like to bring forward the following recommendations:

**Policy makers** can set ambitious targets for 2030, and demonstrate sufficiently ambitious, flexible and inclusive transition guidelines in order to ensure a credible transition.

**Policy makers and regulators** can play a leading role in promoting transition finance, specifically in Policy support, government procurement and incentives mechanisms.

**Research institutions** can support industry to formulate and refine a granular and scientific transition pathway, and companies can use this as a basis to understand and make transition plans.

**Build the GBA into a transition finance pilot** - the development of transition finance requires joint efforts by multiple stakeholders to promote cooperation between cities, regions and stakeholders.

**Transition finance can learn from the current green finance mechanisms and tools**, and innovate in the selection of paths and objectives to ensure credible transition.

## Contents

### Executive Summary 2

#### 1. Introduction 3

#### 2. International Transition Finance Practice and Progress 5

#### 3. The prospects for the development of transition finance in the Guangdong-Hong Kong-Macao Greater Bay Area 10

#### 4. Summary and Discussion 16

Appendix I: International Transition Pathways Research Organisations 17

Appendix II: Organisations that provide transition services to investors 18

Appendix III: Overview of transition finance definitions and key areas 19

Appendix IV: Selected green finance policies in the GBA 21

Endnotes 23

# 1. Introduction

## 1.1 The need to finance green transitions

The UN's 17 Sustainable Development Goals (SDGs) frame a global sustainable future of clean air and water and the mitigation of climate change to avoid threats to peace and survival. In order to achieve these goals, we urgently need to reverse rising greenhouse gas (GHG) levels and help communities and economies to adapt.

By mid-2021, countries representing more than 65% of global CO<sub>2</sub> emissions and more than 70% of the world economy, had made ambitious commitments to carbon neutrality.

The implications of this are enormous – investors all around the world shall no longer questioning if a shift will happen, but rather how quickly it will happen and how it will play out. Stranded assets are already seeing declining share and restricted access to financing.

Meanwhile, the implications of transition are much more far-reaching than coal or even the fossil fuel sector – every entity in every sector needs to be aligned with the net zero emissions target by 2050. The IEA's Net Zero report outlines a pathway to net zero which requires no new investment in fossil fuels and that the least efficient coal plants are phased out by 2030, and the remaining coal plants still in use are retrofitted by 2040. By 2050, almost 90% of electricity generation comes from renewable sources.

Green and sustainable bonds have become an increasingly important tool to finance these transitions. As the market has grown, so too has the breadth of assets and activities that is being financed to cover a more diversified cross-section of the global economy. Large GHG emitters, however, are still largely absent from the green finance market. While large GHG emitters have not played a significant role in the green finance market to date, they have a vital role to play in reducing global emissions. They are also often key constituents in mainstream investment portfolios, which make them critical to the transition of those investment portfolios.

There is, however, an absence of a market-adopted standard for transition finance and, specifically, transition-labelled transactions. Some of the transactions to date have raised concerns in the market about inconsistencies across transition-labelled products and the potential for greenwashing. Investors have also expressed concerns that the label does not represent any change from business as usual.

## 1.2 What is meant by transition?

The transition finance space remains at a nascent stage globally and, as a result, there is no single global definition of 'transition' or a transition taxonomy. This section provides some definitional underpinnings of 'transition' for the remainder of the paper.

### Transition to a common goal

Across all definitions of transition, there is little debate that transition should be towards a common goal which, in the case of climate mitigation, is the alignment with the objectives of the Paris Agreement

For the purposes of this paper, our focus is on how economic entities, asset portfolios or specific economic activities can move from today's high greenhouse gas (GHG) emissions to levels commensurate with meeting the goals of the Paris Agreement – i.e. a 'climate mitigation transition'. We start here with climate as this is the focus of most transition-labelled transactions to date, and is integral to achieving many of the SDGs. The transition concept, however, could be applied to other environmental objectives and SDGs.

The need for a common goal is critically important: it means that the 'transition' label cannot include activities that are a 'bit green' but have very limited impact on reducing global emissions. Instead, transition must be in support of a common and ambitious pathway to align with the Paris Agreement.

### Transition means change over time: it is a journey, not a destination

Transition does not mean that the activity is green right now, it is a journey over time, to green. However, given the steep decarbonisation required to meet the goals of the Paris Agreement, this journey cannot last forever. The timescale is critical to whether or not the world can stay within 2 degrees of warming. Any associated sector or entity-level transition pathways must be accompanied by science-based and ambitious time frames to achieve milestones along the way and the ultimate targets.

### Transition covers high GHG-emitting sectors

While the majority of activities and entities will need to initiate some level of transition to meet the goals of the Paris Agreement, the 'transition' concept has been used primarily in reference to high GHG-emitting sectors and activities, and how to aid their sustainable transition. This is in recognition that such sectors have a more difficult pathway to transition as they have significant economic and technological barriers to overcome.

The distinction is important as such sectors have not played a significant role in the green finance market to date, despite them having a vital role to play in reducing global emissions and in greening investment portfolios.

### Transition can encompass interim activities

The Climate Bonds White Paper, Financing Credible Transitions, proposes that a transition label should also be applicable to interim activities: investments that are making a substantial contribution to halving global emissions by 2030 and reaching net zero by 2050, but do not have a long-term role to play.

### Transition is not light green

The transition concept and label is a complete departure from business as usual. To transition in line with the Paris Agreement requires a complete re-orientation of the global economy and, for the activities of some entities, a complete transformation. The transition concept captures this ambitious journey that each activity and entity needs to make effort for the world to avoid catastrophic climate change.

## Five categories of transition finance are:

### NEAR ZERO

Activities already at or near net-zero emissions that may require some further decarbonisation but not a significant transition - e.g. wind power generation.

### PATHWAY TO ZERO

Activities needed beyond 2050 and have a clear 1.5-degree decarbonisation pathway - e.g. shipping

### NO PATHWAY TO ZERO

Activities that are needed beyond 2050 but at present, do not have a clear 1.5 degree decarbonisation pathway to 2050 - e.g. long-haul passenger aviation.

### INTERIM

Activities currently needed but should be phased out by 2050 - e.g. production of energy from municipal waste

### STRANDED

Activities that cannot be brought into line with global warming targets and have an alternative, low-emissions substitute - e.g. electricity generation from coal.

## 1.3 Essential elements of a credible transition framework

The transition bond market is part of a larger climate finance market. If credible, it will assure investors, provide clear guidance for financial institutions, and offer additional financial supports for issuers. A single definition of 'transition' will bring huge opportunities to investors, and at the same time provide the entire market with a principled guide to avoid the risk of 'green washing'.

In the White Paper, Financing Credible Transitions, we identified that a credible transition should be:

- **Ambition** – this means in line with 1.5 degrees and the Paris Agreement.
- **Flexible** – applicable to whole entities, everything they do, and a range of associated financial products.
- **Inclusive** – allow all sectors and activities to participate as long as they demonstrate compliance with the principles and framework outline.

In order to realise this ambitious goal, the White Paper further proposes five principles for an ambitious transition. It then divides economic activities into five different categories depending on how they fit into the transition finance landscape with either green or transition finance label applicable to different categories depending on their pathway to alignment with the Paris Agreement.

## 1.4 Green and transition taxonomies

A green taxonomy is defined as a classification system which establishes a list of environmentally sustainable economic activities. It is a tool for assessing the alignment of economic activities with a goal which, for the purposes of this paper, is climate mitigation. The purpose of a green finance taxonomy is to provide clarity to the market and to reduce the potential for greenwash when defining and labelling green assets.

## 5 principles for an ambitious transition



### 1. In line with 1.5 degree trajectory

All goals and pathways need to align with zero carbon by 2050 and nearly halving emissions by 2030.



### 2. Established by science

All goals and pathways must be led by scientific experts and be harmonised across countries.



### 3. Offsets don't count

Credible transition goals and pathways don't count offsets, but should count upstream scope 3 emissions.



### 4. Technological viability trumps economic competitiveness

Pathways must include an assessment of current and expected technologies. Where a viable technology exists, even if relatively expensive, it should be used to determine the decarbonisation pathway for that economic activity.



### 5. Action not pledges

A credible transition is backed by operating metrics rather than a commitment/pledge to follow a transition pathway at some point in the future. In other words, this is NOT a transition to a transition.

A transition taxonomy is being discussed and proposed as a tool specifically for high-carbon emission entities and sectors to help their transition. In doing so, a transition taxonomy could also outline a clear and time-based pathway to achieve the alignment with the Paris Agreement.

*We propose that a climate transition taxonomy is defined as: a classification system for high-GHG emissions activities and sectors to reach alignment with the Paris Agreement (net-zero) in the time frame required by climate science.*

Given that both green and the proposed transition taxonomies have a common goal - they can be seen as subsets of the broader sustainable finance taxonomy. However, we propose here that there is a useful distinction to be made

between the two frameworks. The value of a separate transition taxonomy is that it can focus on activities of which the starting points are further away and the journeys to reach net zero are either unclear or have significant hurdles to overcome.

The line between activities that belong in a transition taxonomy vs a green one is not definitive. As a result, some jurisdictions may separate transition and green taxonomies while others may not. The EU, for example, puts all transition activities within the broader sustainable taxonomy.

We note that the transition taxonomy is useful in providing an understanding of entity exposure to sustainable activities and is one type of information that companies can use to plan and communicate their transition. However, the taxonomy alone is not sufficient for communicating the details of a company's overall transition.

## 2. International Transition Finance Practice and Progress

### 2.1 Progress of research on transition pathways

On the global scale, a series of studies exploring possible transition pathways for various industries is underway. These studies demonstrate the characteristics of **diversification and multiple perspectives**. Some institutions focus on the technological path of the industry per se (see **Annex I** for details), some focus on providing advice and guidance to enterprises, and some focus on providing corresponding guidelines, tools and disclosure standards as services to investors. (Please see **Annex II** for the list of organisations and institutions providing services to investors.)

Existing research has focused more on the pathway to transition, namely how to transition. The Climate Bonds Initiative is working with multiple parties to take the guidance one step further by providing detailed criteria and standards for evaluating a credible transition and, in doing so, providing the market with a framework of transition standards that is inclusive, trusted and also flexible.

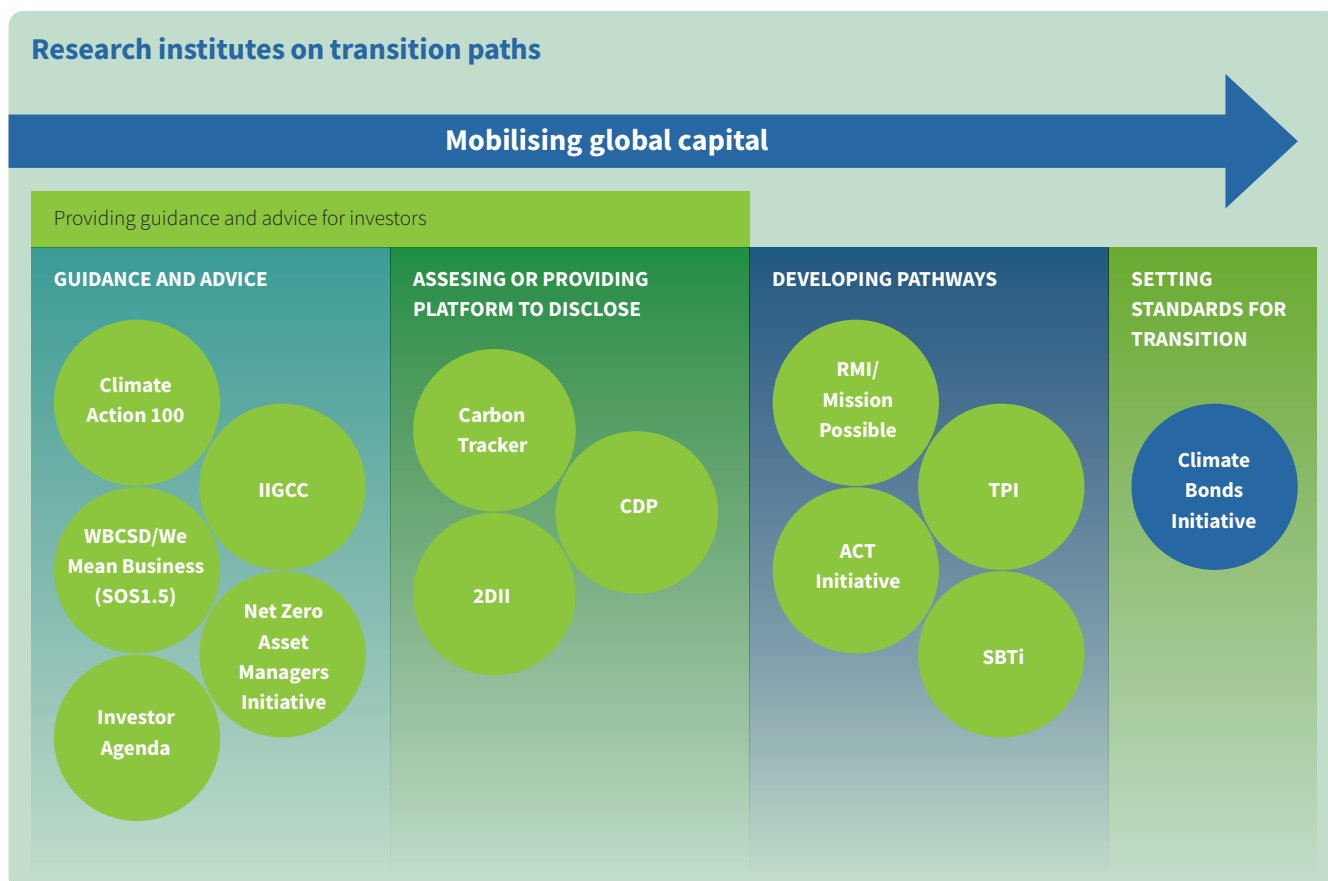
In terms of the research on transition pathways, most of the existing guidelines address a subset of the total range of economic activities, assets and projects that need to be decarbonised rapidly and need further development and refinement.

**Transition targets, pathways and metrics exist for some sectors but not others.** There is already research covering construction (construction and refurbishment) and land transport (manufacture and operation of road vehicles, trains and related infrastructure). However, there is almost no guidance for aviation, shipping, and other heavy industry. Clear criteria relating to heavy industry are only mentioned in four frameworks: the EU Taxonomy, the China Green Bond Support Project Catalogue, the Transition Pathways Initiative (TPI), and the Corporate Knights and Clean Capitalism Commission Classification. Meanwhile, the first two classification schemes only relate to current performance and do not establish a transition pathway to achieve long-term goals.

**There is a lack of guidance on the time required to transition for economic activities that will be phased out by 2050.** Guidance is needed to develop transition targets and pathways that exploit time-limited mitigation potential and avoid locking in or prolonging the life cycle of such economic activities. Similarly, for entities where the transition requires the business to move away from its current activities, little work has been done on specifying any time-based trajectory for the transition.

**For interim activities**, there are also gaps in the guidance about the contribution that an activity needs to make to be defined as 'interim' and the timeframe that 'interim' can be eligible before needing to be replaced by low-carbon alternatives.

Definitions of transition agree that all transition is towards a common goal which, in the case of climate mitigation, is alignment with the Paris Agreement and net zero by 2050. **However, transition-focused pathway studies and industry initiatives are not based on the same objectives, methodologies and principles.** For example, few transition pathways align with 1.5 degree warming targets, some include offsets, some are based on best-in-class benchmarks, and some are driven by a policy agenda as much as a climate science agenda. Therefore, interested parties will need to pay particular attention to the emission reduction targets to be achieved by the different pathways when using the relevant guidelines. The existing guidance is not always consistent with the Transition Principles set out in this report. A full review of all existing guidance and the assumptions underpinning them is needed to fully understand their alignment with these Principles and with each other.



Progress in the development of transition pathways in selected industries<sup>2</sup>

	Climate Bonds Initiative	Science-based Targets initiative (SBTi)	Transition Pathway Initiative (TPI)	Assessing Low-Carbon Transition Initiative (ACT)	Rocky Mountain Institute and the Mission Possible Partnership (RMI/MPP)	Energy Transition Commission (ETC)
Iron & Steel	Yellow	Light Green	Green	Yellow	Red	Green
Cement	Yellow	Light Green	Green	Green	Red	Green
Basic Chemicals	Yellow	Yellow	Light Green	Red	Red	Light Green
O&G E&P	Light Green	Yellow	Green	Yellow	Light Green	Light Green
Integrated oils	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
Agriculture	Yellow	Yellow	Light Green	Light Green	Light Green	Light Green
Hydrogen	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
Chemical intermediates	Red	Light Green	Light Green	Light Green	Light Green	Light Green
Formulated chem products	Red	Light Green	Light Green	Light Green	Light Green	Green
Aluminium	Red	Yellow	Red	Red	Red	Light Green
Paper& Pulp	Red	Light Green	Red	Red	Light Green	Light Green
Glass	Light Green	Light Green	Light Green	Red	Light Green	Light Green
Auto manufacture	Light Green	Green	Green	Green	Light Green	Light Green
Low carbon transport	Green	Light Green	Light Green	Green	Light Green	Light Green
Heavy duty road transport	Light Green	Light Green	Light Green	Light Green	Red	Green
Aviation	Light Green	Light Green	Green	Light Green	Red	Green
Mining	Light Green	Light Green	Green	Light Green	Light Green	Light Green
Apparel	Light Green	Green	Light Green	Light Green	Light Green	Light Green
Food & Beverage	Light Green	Light Green	Light Green	Yellow	Light Green	Light Green
Aerospace & Defense	Light Green	Light Green	Green	Light Green	Light Green	Light Green
Electrical utilities	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
Shipping	Green	Light Green	Green	Light Green	Red	Green
Financial Institutions	Light Green	Green	Light Green	Light Green	Light Green	Light Green
ICT	Light Green	Green	Light Green	Light Green	Light Green	Light Green
Forestry	Green	Green	Light Green	Light Green	Light Green	Light Green
Retail	Light Green	Light Green	Light Green	Green	Light Green	Light Green
Buildings	Green	Light Green	Light Green	Green	Light Green	Light Green

\*Red: planned but not yet started \*Yellow: in progress \*Green: is complete

## 2.2 International Practice and Progress in Transition Finance

Every part of the global economy to transition to net-zero requires strong financial support. According to the forecast by the International Energy Agency (IEA), in order to achieve global net zero emission target by 2050, global annual energy investment must grow from an average of USD2tn per year over the last five years to reach almost USD5tn per annum by 2030, and further reaching USD4.5tn in 2050. This will require total annual capital investment to rise from 2.5% of global GDP in recent years to go to about 4.5% by 2030, and then fall back to 2.5% by 2050<sup>3</sup>. According to the estimates set by Bloomberg's New Energy Finance, by 2050 the world needs USD92tn of investment to achieve the goals of the Paris Agreement<sup>4</sup>. According to the calculations by relevant Chinese institutes, in order to achieve China's carbon neutrality goal, an overall investment of approximately RMB136tn (USD20.86tn) is required.<sup>5</sup>

Since 2020, transition finance has received widespread attention internationally, with different market participants proposing their own solutions from a variety of perspectives, including the definition of: transition finance, transition criteria, frameworks, disclosure requirements, industry standards, and taxonomies.

At the level of policy makers and regulators, including the EU, Japan, Canada, China and the Organisation for Economic Co-operation and Development (OECD), concepts and guidance related to transition finance have been developed:

### Transition finance practices of market institutions

In addition to the exploration of transition finance frameworks by sovereign and supra-sovereign institutions, at the level of market participants, industry associations, standard-setters and financial services institutions have also been active in transition finance practices and have made various advances.

In September 2020, the **Climate Bonds Initiative (CBI)** published the White Paper **Financing Credible Transitions (FCT)**, which provides an initial framework and five principles for identifying credible transition finance activities. According to the framework proposed in the FCT, a credible transition financial standard accepted by the market shall not only be able to meet the ambitious goals of the Paris Agreement, but also flexible enough to be applicable to various types of market tools. In addition, these standards need to be sufficiently inclusive fundamentally, so that all regions, sectors, and different types of stakeholders in the global economy would be able to obtain financial support for low-carbon transition activities through relevant guidelines.

## Progress in transition finance at a national and regional level

### Japan

In April 2021, the Financial Services Agency, the Ministry of Economy, Trade and Industry, and the Ministry of the Environment of Japan, published Basic Guidelines on Transition Finance. The guidelines are aimed at promoting financing for businesses that are either already decarbonised (e.g. renewable energy) or are transitioning towards decarbonisation - in order to realise Japan's goal of a carbon-neutral society by 2050. The guideline has been drafted in accordance with the Climate Transition Finance Handbook published by ICMA. The guidelines incorporate the ICMA Handbook's recommendations on disclosures.<sup>6</sup>

Tokyo plans to set up working groups in the April 2021-March 2022 fiscal year and put together a detailed transition roadmap for each industry that emits heavy greenhouse gases (GHG), including steel, chemical, power, gas and shipping, to decarbonise their operations towards 2050.<sup>7</sup>

### OECD

The OECD Development Co-operation Directorate launched a new line of work called 'transition finance', first presented at its February 2018 formal meeting. It carried out seven pilot studies over the course of 2018--19 on countries facing different transition challenges: Cabo Verde, Chile, Lebanon, Solomon Islands, Uganda, Viet Nam and Zambia. The transition finance work explores the interactions of different sources of financing for sustainable development as countries develop and reach higher levels of income.<sup>8</sup> The OECD's transition framework focuses more on the financing challenges faced by countries in transitioning their economies to meet the Sustainable Development Goals.

### Canada

The Canada Standards Association started a process to work on a Transition Taxonomy in 2019, as part of creating a full National Standard of Canada for Transition Finance. It was to build on existing taxonomies and guidance, in particular the EU Taxonomy. Seven priority sectors were: i) oil and gas (upstream, midstream and downstream utilities), ii) utilities (energy production), iii) agriculture, iv) forestry, v) transportation (focus on heavy duty vehicles - railways, aviation, trucking), vi) materials (cement, steel, glass) and vii) mineral mining. The process is currently on hold as an initial version of the Taxonomy failed to secure a majority vote from the Technical Committee working on it.<sup>9</sup>

In July 2021 the Canadian Government announced the creation of a Sustainable Finance Action Council. The Council has indicated that it now intends to take on the role of developing a transitions taxonomy for Canada

### European Union

In July 2020, the EU's Taxonomy Regulation was published; it will enter into force on 1 January 2022. The first stage of that taxonomy addresses climate change adaptation and mitigation. A second delegated act for objectives around circular economy, biodiversity protection, pollution prevention and marine sectors will be published in 2022.

In January 2021, the European Commission asked the newly established Platform on Sustainable Finance to provide advice on transition finance, looking at how the EU Taxonomy could provide a framework for inclusive transition finance for companies, and other economic actors working to improve their environmental impact. In March 2021, the Sustainable Finance Platform released its Transition Finance Report, which focuses on responding to relevant questions about transition finance.

The EU taxonomy covers transition activities which are described as economic activities that contribute to greenhouse gas emissions at a level that is consistent with current best practice in the sector; that does not prevent the development and deployment of low carbon alternatives; and that does not result in locking up carbon-intensive portfolios, given their economic lifetimes. The transition part will be assessed every three years and will become progressively more stringent.

### China

In China, a Central Climate Leading Group has been established by the Politburo to coordinate efforts across ministries and agencies to achieve its recently announced '30--60' (peak GHG emission by 2030 and carbon neutral by 2060) climate targets. The Leading Group is formulating a timeline and road map for carbon peak and carbon neutralisation, which will cover 10 areas, from green finance, manufacturing, and transport to low-carbon technology.<sup>10</sup>

The People Bank of China (PBoC) have advised media that the Chinese central bank is working on developing the 'definition, standards, classifications, assessment, and management systems of transition finance' that is 'suitable for China's national conditions and development stages'.<sup>11</sup> The National Development and Reform Commission (NDRC) is also currently working on the preparation of a consequential 2030 carbon emission peaking action plan, setting decarbonisation targets and pathways for each sector.

**The Hong Kong Green Finance Association (HKGFA)** released the Navigating Climate Transition Finance in November 2020, which proposes important principles that market authorities and market participants should consider when defining the operational framework for climate transition financing. The principles adopt the format and transparency requirements of existing regulatory standards or market-accepted frameworks. They also propose that issuers and borrowers disclose: med- and long-term plans aligned with the Paris Agreement; constraint(s) on engaging in low-carbon activities with evidence; technologies and activities for climate transition financing; measures in place to ‘do no significant harm’ and propose a ‘do least harm’ strategy; a deliberate phase-out plan for transition technologies and activities in order to make way for net-zero compatible technologies and activities.<sup>12</sup>

**ICMA** released the Climate Transition Financing Handbook in December 2020.<sup>13</sup> Unlike the CBI, which aims to harmonise definitions of transition and provide clear criteria, the Handbook does not set out definitions or classification schemes for climate transition projects. Instead, it specifies the forms of financing and disclosure requirements for climate transition bonds to demonstrate the credibility of the transition. ICMA clarifies that the forms of funds raised for transition finance include: (1) debt financing instruments with a specific use of funds raised, i.e. bonds that comply with the Green Bond Principles, the Socially Responsible Bond Principles and the Sustainability Bond Guidelines; or (2) debt financing instruments with funds raised for general corporate purposes that comply with the Sustainability Linked Bond Principles. Meanwhile, the four key elements recommended for disclosure in the Handbook are:

1. Issuers’ climate transition strategy and corporate governance.
2. The importance of considering environmental elements in the business model.
3. The climate transition strategy should be informed by scientifically based goals and pathways.
4. Transparency of information relating to implementation.

**Financial Services Institutions** are also conducting business in the transition finance. **Sustainalytics** launched its second-party advice service for transition bonds in June 2020 which assesses a transition framework in two ways.<sup>14</sup> Firstly, it assesses the bond issue itself, focusing on: use of proceeds, fund management, project selection and fund allocation reporting. Secondly, it assesses the issuer itself, whether it has established a strategy to address climate change and whether the strategy clearly states how it plans to adapt its business model to

contribute positively to the transition to a low-carbon economy.<sup>15</sup>

A number of **banks**, including BNP Paribas, DBS Bank, HSBC and Crédit Agricole CIB, have issued their own definitions of transition bonds. Bank of China and China Construction Bank have also issued a Transition Bond Management Statement and a Transition Bond Framework respectively. Among the pioneering banks, DBS Bank published its Sustainable and Transition Finance Framework and Taxonomy in June 2020, which is the world’s first taxonomy covering transition finance.<sup>16</sup> The People’s Bank of China is also currently conducting research on transition finance with a view to working with the industry to develop a broadly adaptable, targeted and actionable transition finance programme for China.

Please see **Annex III** for an overview of transition finance definitions and key areas.

### **Summary of current transition finance practice**

**To date, there is no internationally agreed conceptual definition of what constitutes credible transition finance and the criteria for classifying its operations.** Guidance on transition finance has been or is being developed by several market participants, including research institutions, investor organisation, national and regional bodies, and financial institutions. In terms of the technical specifications and binding frameworks for transition finance, progress varies from institution to institution. Further, the ambition of government departments and institutions in relation to the climate transition goals associated with transition finance varies considerably from country to country.

Nonetheless, a general consensus can be seen as follows:

- Transition finance **supports high GHG-emitting** or high environmental impact sectors;
- Transition finance to date has been focused on the **climate mitigation transition**; and
- Transition finance aims to achieve an appropriately **ambitious transition to zero carbon**.

### **The term ‘transition’ can be applied to whole entities or their individual activities.**

The European Union, Bank of China and China Construction Bank focus on activity-level transition. That is, the transition applicable to a specific activity (or sub-sector) for it to be green. Both Development Bank of Singapore (DBS) and CBI have consider the transition at activity and entity level.

DBS Bank has proposed two verification methods in order to label the activities: One is to judge whether economic activities meet the conditions based on the purpose of their application; the other is to identify company

financing with unspecified Use of Proceeds, and mark them as ‘Corporate in Transition’, as long as this transaction meets the three criteria: Divested, Diversified and Decarbonised within the past 12 months. When the applied financing subject meets one of the criteria, it then can be labelled as corporate in transition.<sup>17</sup>

Climate Bonds includes both economic entities and activities in its White Paper, and provides decision-making processes for the transition of entities and economic activities respectively. It plans to release evaluation standards for the transition of economic entities in 2021, so as to enhance the credibility and operability of entities under transition.

### **The fields which financial service institutions focus on demonstrate a high level of consistency.**

The difference lies in the order and progress of the relevant standards and research in the key fields, as well as the differences in the specific technology choices among them.

The research progress varies concerning this issue in different industries and by various institutes. Cement, steel, and energy industries are generally selected as the priority industries for development. Among them, DBS Bank launched the ‘Sustainable and Transition Finance Framework and Taxonomy in June 2020,<sup>18</sup> and at the same time introduced the economic activity classification of 16 industries that conform with the labels set by DBS Bank as sustainable and transition financial industries. Sustainalytics set the priority on publishing research on transition paths for the gas and steel industries. HSBC took the UK as an example to discuss the key areas of transition finance, then focused on the sustainable transition of the chemicals industries in Oman, Saudi Arabia and the United Arab Emirates. Acting as the standard-setter, CBI scheduled to publish standards on cement and basic chemicals by the end of 2021, and standards on steel, oil and gas by 2022.



## 2.3 Practices of transition finance

The primary financial instruments used for transition are mainly transition bonds and sustainability-linked bonds /loans:

**Transition bonds** refer to bonds that raise funds to support projects related to the transition of traditional industries and energy structures into low carbon or zero carbon. Within the traditional industries such as utilities, cement, aluminium, and steel, projects with transition benefits are listed under the category of transition bonds sector. Transition bonds are different from green bonds which are designed only for green industries such as renewable energy and clean transportation. They can provide financing for low-carbon transition projects with significant environmental benefits in traditional industries, thereby reducing greenhouse gas emissions in carbon-intensive industries, which in turn promote the low-carbon transition of the national energy structure.<sup>19</sup>



### Sustainability-linked bonds (SLB) and loans (SLL) are

general purpose bonds, where the cost of finance moves up or down depending on the achievement of key performance indicators of the issuing entity. Compared with green bonds, sustainability-linked bonds do not have specific requirements for the usage of raised funds. Instead, they aim to incentivise the issuer to meet its sustainability performance targets with penalties or rewards on the cost of finance. While these are not specifically labelled as 'transition', they are seen by the market as a transition instrument as they support an entity's overall goals/strategy rather than financing specific assets.



SLB and SLL transactions have proliferated since 2018 with over USD120bn in loan volumes and USD11bn in bond volumes in 2020 alone. There have been some concerns around the credibility and impact of SLLs and SLBs. In particular, for SLLs, there is very limited transparency leading to some doubts around the impacts of these deals. For both types of transactions, there are concerns

that as the KPIs are set by the issuing entity, they are not material or sufficiently ambitious to be easily assessed against broader goals such as the Paris Agreement. Nevertheless, if structured well, they can be a valuable addition to the green and transition finance landscape.

The International Capital Market Association launched guidance in the form of the Sustainability-Linked Bond Principles in June 2020.

### Transition Finance Case Study

Issuer: **Etihad Airways**

Debt financing instrument: **sustainability-linked bond**

CBI's classification of this economic activity: **No pathway to zero**

Etihad Airways issued a five-year sustainability-linked bond for USD600m in October last year. This was a first in the aviation industry and the world's first Islamic bonds (Sukuk) with the concept of 'transition finance'. It promotes the development of sustainable aviation by linking Islamic bonds with Etihad' short- and medium-term emission reduction goals, including reducing the emission intensity of airline's passenger aircraft by 20% by 2025, with a net 50% reduction by 2035, and achieving net-zero carbon emissions by 2050.<sup>20</sup>

The aviation industry accounts for 2% of global carbon emissions and yet, at this moment, it is unclear how long-haul aviation can reduce

emissions in line with a net zero emission target. The practice implied by the aviation industry is inconsistent with the goals set by the Paris Agreement. Technological options include the development of new models of aircraft and engines with higher energy-efficiency, and the use of sustainable aviation fuels (such as biofuel or composite fuel), as well as optimizing operational management (such as air traffic control procedures) and infrastructure (such as improving airspace utilization and airport layout to increase throughput).<sup>21,22,23</sup>

Etihad released its Transition Finance Framework last year, which elaborated on the definition and practices of Use of Proceeds Financing and Sustainability-Linked Financing. KPIs include a 17.8% reduction in emissions intensity in the issuer's passenger fleet (gCO<sub>2</sub>/RTK PAX only) between 2017 and 2024. The Sustainability Performance Targets (SPT) for 2024 exceeds the level set by the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), which means

that it will apply the level in 2010 as baseline and continuously reduce carbon intensity by 2% per year until 2050. Its carbon emission level will also be lower than that set in the International Pledges Scenario by the Transition Pathway Initiative although this scenario only reflects the world's current emission reduction commitments, which are insufficient to limit global warming to 2°C or below.<sup>24</sup>

Etihad also put forward proposals of eligible low-carbon transition projects for **Limited Loan-usage Financing** (ie transition debt/financing), ranging from investment in new aircraft to replace its old aircraft (such as Boeing 787-9 and Boeing 787-10), to inputting into research and development of sustainable aviation fuel.

Etihad's carbon reduction initiatives include the use of higher energy-efficient aircraft, the use of optimized flight routes, the use of sustainable fuels and the reduction of single-use plastics.

# 3. The prospects for the development of transition finance in the Guangdong-Hong Kong-Macao Greater Bay Area

## 3.1 Guangdong-Hong Kong-Macao Greater Bay Area has the needs and potential for low-carbon transition

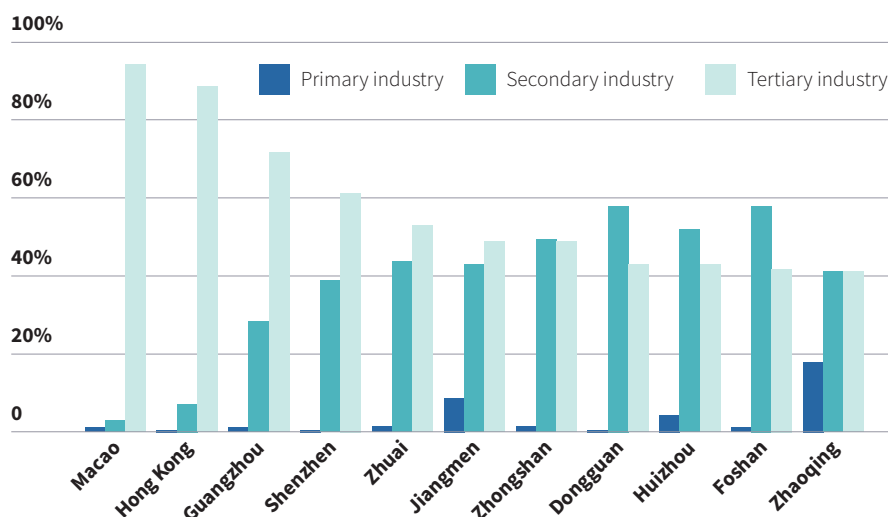
The Guangdong-Hong Kong-Macao Greater Bay Area (the GBA) is comprised of Hong Kong Special Administrative Region, Macau Special Administrative Region and Guangzhou, Shenzhen, Zhuhai, Foshan, Huizhou, Dongguan, Zhongshan, Jiangmen, and Zhaoqing. With a total area of 56,000 square kilometres and a total population of about 86.17 million at the end of 2020<sup>25</sup>, it is one of the regions with the highest level of openness and the strongest economic vitality in the country. On 18 February, 2019, the Central Committee of the Communist Party of China and the State Council issued the GBA Outline Plan, marking the official implementation of the national strategy for the GBA. The GBA Outline Plan proposes to build the GBA into a vibrant, world-class metropolitan cluster, supported by an international, technological, innovation centre with global influence. This will be an important support for the implementation of the 'Belt and Road' initiative, a demonstration zone for in-depth cooperation between the Mainland, Hong Kong and Macao, and an area with a high-quality lifestyle suitable for living, working and travelling.

In the context of a global response to climate change and China's goal to peak emissions in 2030 and to reach carbon neutrality in 2060, the development positioning of the GBA determines that it is expected to boost high-quality economic growth, while taking into account the environment and sustainable development. A whole range of actions on carbon transition will be rolled out to create an advanced energy, transportation and industrial system that is compatible with its future development goals.

Climate change has already caused serious loss in the GBA, including warming, rising sea levels, increased rainfall and flooding, and other extreme weather events. In 2019 alone, climate-related disasters caused a total direct economic loss of about RMB430m (USD65.95m),<sup>26</sup> and the death of 16 people. For the GBA, aviation, domestic transportation, real estate, agriculture and finance sectors are particularly vulnerable to climate and environmental-related risks.

The industrial structure of the GBA presents the characteristics of decentralisation and diversification. The tertiary industry in Hong Kong, Guangzhou, Macau and Shenzhen is the main driving force to promote their economic development. By contrast, the development of the secondary industry in other parts of the GBA makes a greater contribution to the GDP.<sup>27</sup>

Composition of GDP by industry by city in 2019



Source: Wind database, Guangdong Statistical Yearbook 2020

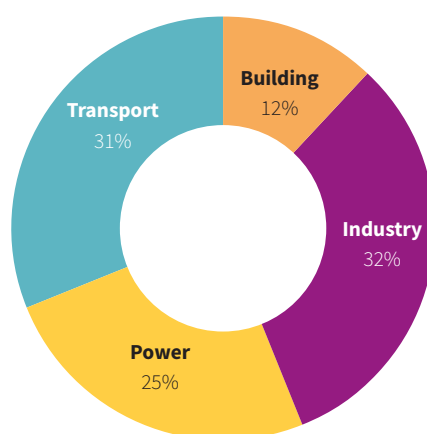
The proportion of primary, secondary and tertiary industries in Guangdong Province stood at 4.3%, 39.2% and 56.5%, respectively, in 2020. The added value of advanced manufacturing and high-tech manufacturing accounted for 56.1% and 31.1% of the above-scale industries, respectively, and the added value of modern service industry accounted for 64.7% of the service industry. The pace of industrial transition and upgrading has accelerated. At present, Guangdong Province has formed seven trillion-level industrial clusters, including electronic information, petrochemicals, smart home appliances, and advanced materials.<sup>28</sup>

As one of the most economically developed regions in China, the huge production and residential demands have resulted in an

extremely high demand on energy in the GBA. In 2017, the comprehensive energy consumption was about 239 million tons of standard coal. Demand for energy was made up of 32% for industrial use and accounted for 31% in transportation energy. Geographically, Guangzhou, Dongguan, and Hong Kong were the major energy consuming cities.<sup>29</sup>

Carbon emissions from energy production and heavy industries accounted for 39% and 20% of the total emissions in the GBA, while energy production and heavy industry emissions from other cities in Guangdong Province accounted for 50% and 31%. The service industry is the third largest source of carbon emissions in the GBA, accounting for 25%, of which transportation dominates.<sup>30</sup>

GBA energy consumption by sector in 2017



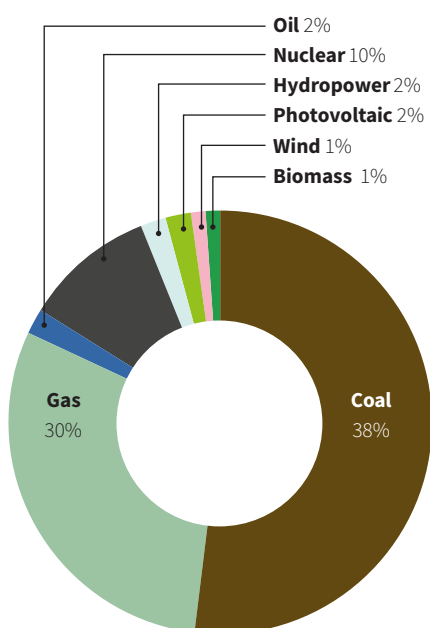
## 3.2 The GBA has a solid foundation for the development of transition finance

According to a range of studies and estimations, the scale of investment required for China to achieve the carbon emission neutrality '30-60' target is in the hundreds of billions of yuan. According to the estimation of the Environmental Planning Institute of the Ministry of Ecology and Environment, in order to achieve emission peak in 2030, China will need RMB9.3tn (USD1.4tn) during the 14th Five-Year Plan period, and RMB11.5tn (USD1.76tn) during the 15th Five-Year Plan period.<sup>31</sup> CICC estimates that China's total demand on green investment is approximately RMB139tn (equivalent to USD21.32tn), of which the demand from 2021--2030 is approximately RMB22tn (USD3.37tn). The average rate of China's annual green investment demand is about 2% of GDP.<sup>32</sup>

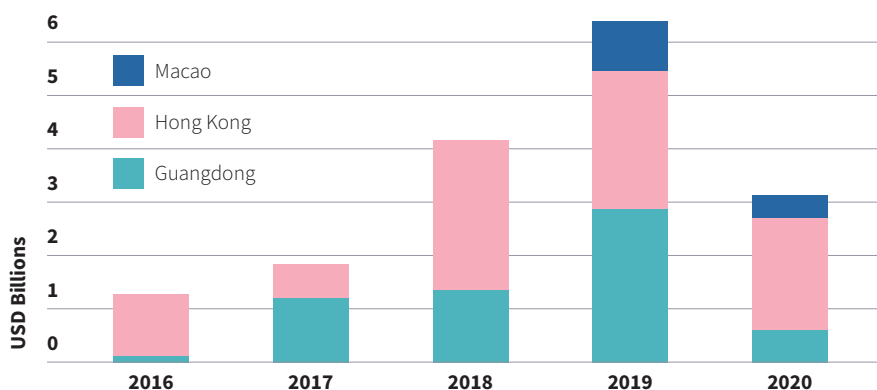
Meanwhile, China has been vigorously developing green finance. At the end of 2020, China's domestic and foreign currency green loan balance was about RMB12tn (USD1.8tn), with stock size ranking first in the world and green bond stock of about RMB800bn (USD120bn), ranking second in the world. Since the Huadu District of Guangzhou City took the lead in launching the pilot zone for green finance reform and innovation in 2017, the GBA has gained considerable experience and achievements in promoting green finance. The GBA Outline Plan emphasised the target of constituting a green financial centre in the bay area, as well as varied development plans for Hong Kong, Guangzhou, Macau and Shenzhen. From 2016--2020, the total amount of green bonds, in line with international standards, that was issued in the GBA reached USD16.9bn. Prior to the outbreak of the epidemic, the green bond market in the GBA grew at a compound annual growth rate of 69%, which was mainly driven by registered issuers in Hong Kong and Guangdong. In 2019, the Bank of China's Macau Branch issued green bonds with a total value of USD963m, marking the first issuance of green bonds in Macau.

To support the development of green finance applied at various stages, levels and cities, the GBA has published a whole range of green finance policies, including a designed policy framework, regulatory policies, incentive mechanisms, and restraint mechanisms. For the list of policies, please see **Annex IX**. Local governments, including Hong Kong, Shenzhen, Guangzhou, Guangzhou development zone and Huadu district of Guangzhou city, have also issued specific regulations and incentive measures for green finance development covering green credit, green loans, green bonds and green insurance.

### GBA installed power generation capacity in 2017



### Internationally-aligned green bonds were on the rise before Covid-19



Source: Climate Bonds Initiative

At the same time, Guangdong is one of the earliest pilot zones for testing the carbon market at provinces and cities in China. In December 2013, Guangdong officially launched carbon emission rights trading, bringing about 250 emission control companies, in six major industries, including steel, petrochemical, electric power, cement, aviation, and paper into the carbon market, covering about 70% of the province's energy carbon emissions. Since the operation of the carbon market, more than 80% of emission control companies have implemented energy-saving and carbon-reduction technological transitions, and the amount of carbon emissions per production unit in power, cement, steel, paper, and civil aviation, have decreased respectively by 11.8%, 7.1%, 12.7%, 15.9% and 5.4%.<sup>33</sup>

The province of Guangdong continues to promote innovative products of carbon finance. As of 12 September, 2021, 136 trading transactions of carbon emission rights have been conducted, with a total of 10.6650 million tons of carbon

emission rights that have been traded; 53 carbon emission allowance custody operations have been conducted, and a cumulative custody allowance of 18.71 million tons has been launched. Moreover, there has been 43 carbon emission rights repurchase business, with a total of 16.83 million tons of transactions; a total of 16 carbon emission rights mortgage financing business, with a mortgage of 7.46 million tons of carbon emission rights; a total of 3 China Certified Emission Reduction (CCER) mortgage financing, and a mortgage of 2.8 million tons of CCER, resulted in the amount of financing adding up to RMB20m.

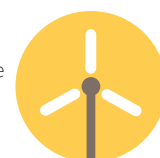
The unique advantages due to the perfect location of the bay area, as well as years of green finance development experience, the GBA has turned into an ideal place to develop transition finance and explore relevant policies, standards and tools.

### 3.3 Prospects for the low-carbon transition path of the GBA

This section discusses the sectors and activities critical to the low-carbon transition in the GBA, aiming to achieving goals set by "30-60" and Paris Agreement. These high-carbon emission activities are still largely absent from the green finance market despite their importance within the transition.

#### 1. Electricity

Electricity is both indispensable for production and living in modern society and fundamental to the decarbonisation of other sectors (e.g. electrification of transport). The decarbonisation of electricity in the GBA is at the core of the entire low-carbon transition. Coal power currently accounts for more than 50% of electricity installed capacity in the bay area. Nearly half of the power supply needs to be supplied from outside of the GBA while Macau's power is supplied almost entirely by the Mainland. Of the coal power units in service in 2017, half of them have been in service for more than 20 years, and the average standard coal consumption for power generation of thermal power units in the area is still below national average.<sup>34</sup>



## Energy transition in the power sector

### Gradually phase out coal power

Coal power is the main source of sulphide and fine particulate matter. It also accounts for half of the CO<sub>2</sub> emissions in China.<sup>35</sup> At the same time, the overall power generation efficiency of coal-fired power plants in the Greater Bay Area is low. Local governments have issued relevant policies to discontinue building new coal-fired power plants and to speed up the elimination of coal-fired power plants in service. The Guangdong Province's Implementation Plan for Winning the Blue Sky Defence War (2018--2020) clearly requires that the Pearl River Delta region to prohibit the establishment or expansion of coal-fired and oil-fired thermal power units or the self-supplied coal-fired and oil-fired power stations of enterprises. The Hong Kong Climate Action Blueprint 2030+ issued by the Hong Kong Special Administrative Regional Government also committed Hong Kong to gradually reducing coal-fired power generation and increasing non-fossil fuel sources. The IEA Net Zero report puts forward a pathway to net zero globally which requires no new unabated coal plants, that the least efficient coal plants are phased out by 2030, and the remaining coal plants still in use are retrofitted by 2040.<sup>36</sup>

### Develop renewable energy according to local conditions

In the GBA, the land resources are precious and the development density is high, making it unsuitable for developing large-scale ground solar photo-voltaic (PV) power plants; however, promoting rooftop distributed PV has great potential. According to the prediction made by the Guangdong-Hong Kong-Macao Greater Bay Area Energy Transition Mid- and Long-Term Scenario Study, the annual roof area of new buildings in the Pearl River Delta region exceeds 21 million square metres. If PV power generation systems are installed on 10% of the roofs, the installed capacity of PV power generation will exceed 200,000 kilowatts. The municipal governments of Guangzhou Huangpu district (development zone) and Guangzhou high-tech zone will begin subsidising distributed photo-voltaic power generation projects in 2021, with the aim of promoting the development of distributed PV power.<sup>37</sup>

In terms of biomass power generation, the GBA has a high urbanisation rate, with less agricultural and forestry waste and limited land use. Therefore, it is not suitable for the development of biomass power plants based on agricultural and forestry waste. However, due to its large population, the amount of domestic waste generated is relatively high. Therefore, energy from waste is one potential solution.

Guangdong province is rich in wind power resources, while the offshore wind power in the Pearl River Delta region is mainly located in Zhuhai, Jiangmen and Zhaoqing. Onshore wind

power enters the wind farm planning mainly via Huizhou and Zhaoqing. Although offshore wind power in the GBA is limited, it remains under active development. After 2025, the total installed capacity of offshore wind power in the GBA is anticipated to reach 1.62 million kilowatts.<sup>38</sup>

### Increase purchasing of green power from outside the GBA

The power supply in the GBA needs to come from the 'West-to-East Power Transmission' from outside the province<sup>39</sup>, as well as from the eastern and western region within Guangdong province. While purchasing green electricity from the outside the GBA can reduce local carbon emissions, it can also push for energy transition of power suppliers. China Southern Power Grid Corporation has committed that the proportion of installed clean energy for the GBA will reach 80% by 2035<sup>40</sup>. The outcome of this transition will provide strong support for the development and utilisation of clean energy, and increase the supply of clean and low-carbon electricity outside the GBA. The offshore wind power deployed in eastern and western Guangdong will reach a total installed capacity of 65 million kilowatts in 2035. It is estimated that 200 billion kilowatt-hours of electricity is expected to be generated per month, which can become an important base for green power supply in the GBA<sup>41</sup>.

## 2. Industry

Guangdong Province is an important manufacturing hub in China. In 2019, industry production accounted for 57% of Guangdong's total energy consumption, of which manufacturing accounted for 48%. In 2019, the energy consumption of

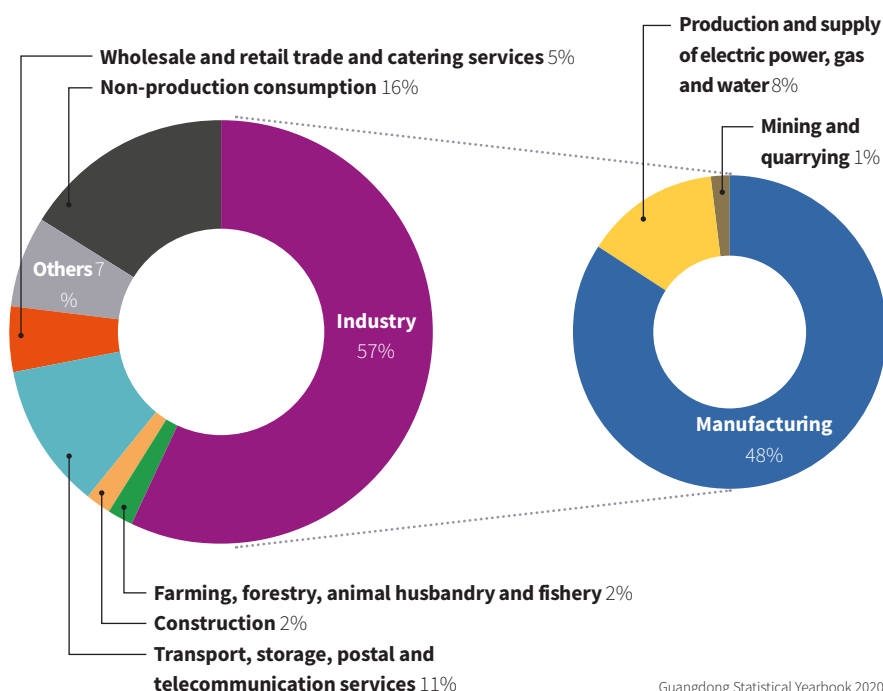


the petrochemical, building materials, steel, information technology, paper production and printing industries in the GBA added up to 77% of the total industrial energy consumption.<sup>42</sup>

According to the analysis of the Guangdong-Hong Kong-Macao Greater Bay Area Energy Transition Mid- and Long-Term Scenario Study, the GBA will transit from the petrochemical, paper and printing, and building materials industries, to petrochemical, information technology, general equipment manufacturing and specialized equipment manufacturing industry by 2035. As Huizhou in the GBA will be built into the top petrochemical zone in China, the energy consumption of the petrochemical industry will continue to rise in the foreseeable future. Meanwhile, other high-energy-consuming traditional industries such as paper, steel, and building materials will gradually move away from the Pearl River Delta by 2035, resulting in cutting energy consumption to 50%-60% by 2017. In the future, emerging industries with high-added value and low-energy consumption, such as new generation information technology, biotechnology, and high-end equipment manufacturing, will become the focus of industrial structure optimisation.

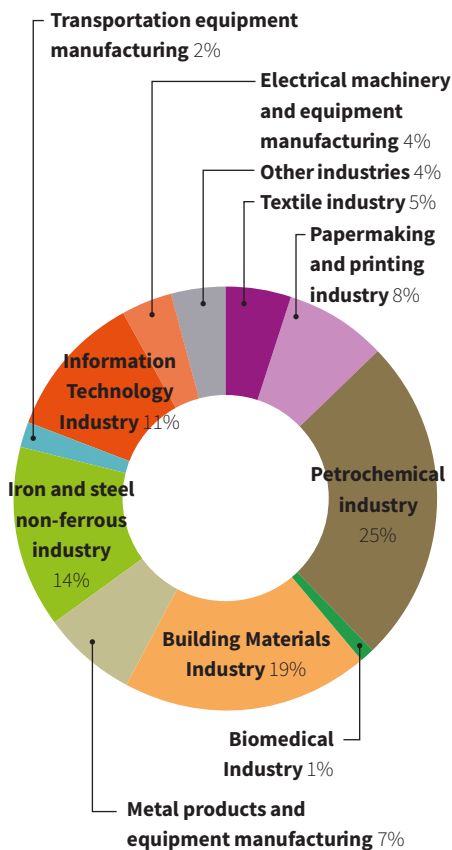
Furthermore, the low carbon transition of the manufacturing industry in the GBA would radiate to the entire supply chain. Take the automobile manufacturing industry as an example, in 2020, the Green Finance Professional Committee of the Guangdong Association of Finance Studies issued the Guidelines for Green Supply Chain Financial Services in the Greater Bay Area (Automotive Manufacturing). By establishing the core enterprise white list management system,

## Guangdong Province total energy consumption by sector in 2019



Guangdong Statistical Yearbook 2020

## Guangdong Province manufacturing total energy consumption in 2019



Guangdong Statistical Yearbook 2020

it will be able to achieve green management of the entire industry and stimulate the green development of core enterprises, promote the green transition of major enterprises, and unify green supply chain financial standards within the GBA. Through the above measures, it aims, eventually, to promote the coordinated development of financial institutions and industrial green transition in the GBA.

In the GBA, the city of Huizhou will develop into a petrochemical energy industry base.<sup>43</sup> Dongguan's paper industry, Foshan's textile industry and ceramics industry, and Zhaoqing's cement industry are all industries with advantages locally. In the future, they will optimise and upgrade their industries and continue their development.

### Steel

Currently almost two billion tons of steel is produced annually. Steel is manufactured and used all over the world, in everything from infrastructure to vehicles, wind farms and packaging. It is a low-margin, highly-traded commodity in a fragmented and highly competitive global industry. The sector is the largest global consumer of coal, which provides almost 75% of its energy demand and is used to make coke, which is instrumental in the chemical reactions necessary to produce steel from iron ore. The manufacture of steel (and its primary ingredient, iron) accounts for 8% of global CO<sub>2</sub> emissions.



The transition path of the steel industry includes:

- Energy efficiency improvements in blast furnaces (heat recovery systems, waste gas reuse and injection of natural gas).
- Increased recycling of materials and innovative product design.
- Low-carbon solutions for blast furnaces such as top gas recycling or carbon capture and storage (CCS).
- Low-carbon alternatives such as powering electric arc furnaces with low-carbon electricity, or green hydrogen or novel technologies such as direct electrolysis.

The energy consumption of the steel industry in the GBA is mainly concentrated in the long process, but the capacity is relatively small. There is only one long process enterprise in Zhuhai, which may withdraw from the GBA industry cluster in the future. The energy consumption level of the short process unit production is still lagging behind the advanced level, with a potential to drop 15%-20%.<sup>44</sup>

### Cement

The global cement market reached a volume of 4.9 billion tons in 2020. Demand is driven by population expansion and a need for residential space as well as infrastructure projects, especially in emerging economies. The manufacture of cement accounts for 7% of global CO<sub>2</sub> emissions and 26% of industry CO<sub>2</sub> emissions. Roughly 50% of CO<sub>2</sub> emissions are process-related with another 34% related to the thermal energy required to produce clinker.

The transition paths of the cement industry include:

- Energy efficiency improvements.
- Alternative fuels for delivering the heat requirements needed to run the kilns for drying limestone (making the clinker).
- Alternatives to clinker to reduce the proportional content in cement. This reduces emissions, but availability of substitutes is limited.
- Setting of pathways – likely to be by size of installation as emissions differ significantly by geography.
- Carbon management technologies – much hope in CCS, but is in early development stages.

In the GBA, the industries of building materials such as cement, ceramics, and glass are mainly located in cities such as Foshan and Zhaoqing. The current average level of energy consumption per production unit is 10%-15% higher than the advanced ones, and still has room for improvement.<sup>45</sup>



### Basic chemicals

Basic chemicals are a small number of chemicals used as the feedstock of thousands of chemical products and materials. They include olefins that make polymers (for plastics and synthetic fibres) and aromatics that make solvents, as well as methanol (an industrial alcohol), and ammonia (used for fertilisers). This category has the most significant volume and energy consumption, representing around 60% of total direct CO<sub>2</sub> emissions from the chemical industry. The chemical industry is highly energy intensive. Most of its processes heavily rely on fossil fuels. Its global direct GHG emissions are about 5% of total global emissions. This sector is among the largest energy consumers, accounting for 30% of industrial energy consumption.

The transition path of the basic chemical industry includes:

- Effective management on the demand side, such as using alternatives to urea-based fertiliser.<sup>46</sup>
- Use sustainable raw materials, such as green hydrogen, biomass fuel.
- Improve energy efficiency.
- Develop technical routes for the production of chemical products with carbon dioxide as raw materials, or adopt CCS.

The petrochemical industry in the Greater Bay Area is concentrated in Huizhou and Guangzhou. The energy consumption per production unit of crude oil processing and ethylene production still has room for energy saving.<sup>47</sup>

### 3. Transportation

The energy consumption and carbon emissions of the transportation sector in the GBA in 2017 accounted for approximately 28% and 34% of the total energy consumption and carbon emissions of the bay area. The anticipated rapid development of the GBA in the coming future will further increase the transportation demand related to production and living. It will also bring about transportation-related energy consumption demand as well as greenhouse gas and air pollutant emissions. Therefore, the low-carbon transition of the transportation sector is another focus for GBA.

#### Energy transition in the transportation sector

##### Electrification of road traffic- electric vehicles or fuel cell electric vehicles.

Compared with diesel locomotives, electric vehicles have higher efficiency. The electrification of road (and rail) transportation is the main tool to reduce direct emissions from the transportation sector. In the short term, emission savings will, of course, be reduced by the emissions from the high-carbon electricity grid. However, a rapid shift towards electric vehicles will



still result in significant emissions savings in both the short term and long term. In the short term, as EVs have much higher efficiency than internal combustion engines, they will reduce emissions by 20-33% even with a high carbon grid.<sup>48</sup> In the long-term, as the grid becomes decarbonised, this saving will become even more pronounced. According to the analysis of the Global Report of the Energy Transition Commission, the full life cycle cost of electric vehicles is expected to be lower than that of internal combustion engine vehicles by 2020.

The GBA has adopted strong policy support to actively promote the development of electric vehicles. Shenzhen achieved full transition to electric buses in 2017, Guangzhou and Zhuhai realised transition to electric buses at the end of 2018, and other cities in the Pearl River Delta planned to realise this transition by 2020, within which electric buses account for over 85%.<sup>49</sup> In addition, starting from 2018, all new or renewal cruise taxis and online car-hailing platforms in the Pearl River Delta region are called upon to use new energy vehicles.<sup>50</sup> Moreover, the GBA is also a core industrial cluster for China's new energy vehicle manufacturing, providing a solid foundation for the promotion of electric vehicles.

The National Development and Reform Commission approved the Guangdong-Hong Kong-Macao Greater Bay Area Intercity Railway Construction Plan in July 2020.<sup>51</sup> The plan aims to create a 'Greater Bay Area on Track' and set the following development goals: in the near future to 2025, the mileage of the GBA's railway network in operation and under construction will reach 4,700 kilometres, covering the central cities, connecting cities in the bay area, as well as key metropolitan areas such as Guangzhou and Shenzhen. In the long term, by 2035, the mileage of the Greater Bay Area's railway network in operation and under construction will reach 5,700 kilometres, covering 100% of cities at county level and above. At present, China's high-speed rail has already realised its electrification target. With the expansion of the high-speed rail network, the electrification of high-speed railway will also form an important part of the electrification process of road transportation.

The potential of green hydrogen energy in the field of long-distance cargo transportation and intercity public transportation is huge. In the future, sharp decline in the cost of electrolysis and fuel-cell equipment will also bring cost advantages to the green hydrogen energy industry. Guangdong Province has adopted a set of policies to promote the development of fuel-cell vehicles and hydrogen refuelling infrastructure. It is expected that by 2022, the province will build 200 new hydrogen refuelling stations<sup>52,53</sup> and purchase new energy vehicles (including electric vehicles and hydrogen fuel-cell vehicles) during 2017-2020, and provide subsidies to entities and individuals who build infrastructure for charging and replacing electricity and hydrogen.<sup>54,55</sup>

#### Fuel substitution for shipping and aviation

For long-distance transportation, the application of new fuels will be an important way to reach

decarbonisation. According to the research conducted by the Energy Transition Commission and the Rocky Mountain Institute, the decarbonisation of air transportation does not focus on technical feasibility, but on the cost-effectiveness of bio-jet fuel and synthetic jet fuel, as well as the supply capacity of sustainable biomass resources. The comprehensive use of electricity, hydrogen energy, bio-fuels and ammonia will help China's shipping industry achieve the goal of decarbonisation. Specific fuel selection and development methods also need to be adapted to local conditions, and determined according to available regional resource endowments.

#### 4. Buildings

Globally, the construction industry has been the main source of carbon dioxide emissions, accounting for about 39% of total carbon emissions.<sup>56</sup>



In Hong Kong, buildings accounts for 90% of the electricity consumption and 60% of greenhouse gas emissions.<sup>57</sup> According to the Guangdong-Hong Kong-Macao Greater Bay Area Energy Transition Mid- and Long-Term Scenario Study, the total area of the GBA under construction by 2035 is estimated to be about 1.5 times that of 2017, and the per capita residential construction area will reach 37 square metres. The growth rate for urban residential area in cities and towns is about 3.5%, while the average annual growth rate of public building area is about 2.5%.

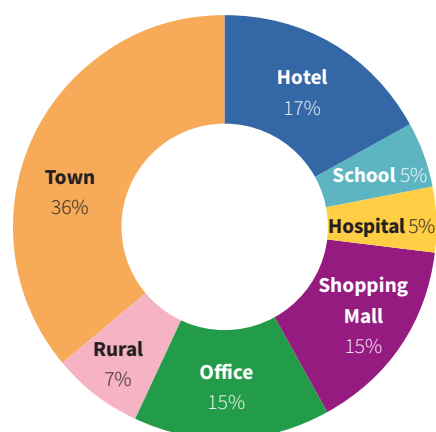
The energy consumption per unit area of public buildings<sup>58</sup> in the GBA is about 137 kWh/(m<sup>2</sup>-year), which is much higher than that of residential buildings.<sup>59</sup> Among them, the overall energy consumption level of shopping malls, hospitals and hotels is much higher than other types. With the continuing development of the tertiary industry in the GBA, the energy consumption of public buildings will increase further in the coming future.<sup>60</sup> On the other hand, with the continual influx of migrants, the demand for urban residential housing keeps rising, which has led to an increase in energy consumption of urban buildings.

#### Energy transition in the building sector

##### Energy efficiency improvement of buildings

The improvement of energy efficiency in buildings includes the research and application of building energy-saving technologies, the development and adoption of energy efficiency standards, and the application of supporting policies and incentive mechanisms. Energy-saving technology can improve the energy efficiency of energy-consuming products in buildings such as air conditioners, water heaters, refrigerators, stoves, etc. It also strengthens the research and development of high-performance green building materials as well as the promotion of technical products related to ultra-low energy buildings. In terms of energy efficiency standards, home appliances can be gradually improved. Other energy efficiency standards for building energy equipment clarify the energy consumption quota standards of various buildings, and aims to achieve

#### GBA energy consumption of different building types in 2017



Source: Study on Mid- and Long-Term Scenarios of Energy Transition in the Guangdong-Hong Kong-Macao Greater Bay Area, September 2020, Science Press

the best international energy efficiency level. In terms of supporting policies, incentives can be established, the building energy efficiency reward system can be implemented, and the energy efficiency labelling certification of buildings can be promoted.

#### Electrification of buildings

While refrigeration, lighting and household appliances are completely electric, in the future, heating could also be electrified using heat pump technology and other technologies using electricity rather than gas. Meanwhile, the application of renewable energy in buildings, the improvement of intelligent building management, and the rapid promotion of smart homes can greatly improve the energy efficiency of buildings.

At the same time, the GBA actively promotes the development of green buildings through policies. Guangdong Province issued the Guangdong Province Green Building Regulations in 2020, which is the country's first local regulation on green buildings. The regulations require new civil buildings to be constructed in accordance with the green building standards. After the implementation of the regulations, all new civil buildings within the scope of Guangdong Province (except for farmers' self-built houses) should meet the requirements of at least the basic level of green buildings and, ultimately, achieve the goal of being 'all green'. The regulations also require the nine cities within the GBA to accelerate the development of green buildings, and build in a certain area in accordance with two or more levels higher than the lowest-level green building standards. The Hong Kong Urban Energy Saving Blueprint 2015-2025+ released by Hong Kong clarifies its goal: new government buildings with a floor area of 5,000 square metres or more, equipped with central cooling systems and with surface area of 10,000 square metres or more, must at least meet the requirements set by Green Building Environmental Assessment (BEAM Plus) Gold award rating; and new public housing must at least meet those set by BEAM Plus gold rating.<sup>61</sup>

At present, Shenzhen has already incorporated public buildings into the carbon trading system. The system stipulates that owners of large public buildings, and office buildings of state agencies with a construction area of more than 10,000 square metres, shall be included in carbon emission control system, and implement carbon emission rights quota management. In the future, the GBA can further extend the types of buildings included in the carbon trading market, and apply market-based means to manage building energy and carbon emissions.

According to data from the Climate Bonds Initiative, in 2019, about 30% of the funds raised from global green bonds went to the green building sector, while only 6% of the funds raised in China's domestic RMB green bonds went to the green building sector. This indicates that green bonds and transition bonds that support the financing of green buildings (especially low-carbon public buildings) have very broad room for growth. But it also puts forward higher requirements for the harmonisation of standards, the granular of the macro-control, and ensure the green performance of design, operation and maintenance stages.

## 5. Information, Communication and Technology

Information, communication and technology has been the top priority of economic development of GBA in recent decades, and it is also one of the most concerned industries under the global low-carbon transition challenge. In the Three-year Implementation Plan for Promoting New-type Infrastructure Construction in Guangdong Province (2020–2022), there are 89 5G projects invested with an investment of approximately RMB97bn (USD14.88bn). At the same time, Guangdong Province plans to complete the project by 2025 with full coverage of 5G networks in urban and rural areas, with a total of 250,000 5G base stations, more than 100 million 5G network users with usage coverage rate of over 80%.<sup>62</sup>

Unlike the transition of traditional industries, the ICT industry is not the main source of emissions at this stage, nevertheless, its impact will continue to expand along with the rapid development of digital infrastructure. In 2020, the emissions of 5G base stations in Guangdong Province ranked first in the country, reaching 3.22 million tons. The carbon emissions of data centres in Guangdong province reached 6.66 million tons.<sup>63</sup> It is estimated that by 2035, the total electricity consumption of China's data centres and 5G will be about 2.5 to 3 times that of 2020, accounting for 5-7% of the entire electricity consumption, and adding up to 2-4% of China's carbon emissions. With the further development of data centres and base stations in the upcoming future, the low-carbon transition of ICT sector will become yet another focusing point.

### Energy transition in the ICT sector

#### Improve data centre efficiency and reduce PUE

Power Usage Effectiveness (PUE) is an index to measure the operating efficiency of a data centre.

## Building sector transition finance case study

Issuer: **New World Development**

Debt financing instruments: **sustainability-linked bonds**

CBI's classification of this economic activity: **Pathway to zero**

Within the past two years, sustainability-linked financing has gradually become an emerging trend in Asia. Many real estate developers and investment trusts in Hong Kong have successively raised funds through related means. In early 2021, New World Development issued a USD200m ten-year sustainability-linked bond, aiming to support rental property projects in the GBA on adapting to 100% renewable energy by 2026.<sup>67</sup>

The Sustainability Performance Targets (SPT) commonly used by real estate developers include energy saving, consumption reduction, accrediting green building certification, and inclusion in the sustainable enterprise index. However, to achieve a low-carbon transition towards net-zero emissions, the impact and relevance of some sustainability performance targets is debatable.

According to the Renewable Energy Blueprint by the New World Development, the company aims to comply with the 1.5°C scenario of the Paris Agreement, and formulates a decarbonisation strategy in accordance with science-based target level. Its ambition is to transition the rental properties in GBA by using 100% renewable energy by 2026, and transition core real estate business in the Greater China region into 100% renewable energy usage by 2031, and eventually aiming to realise the 2030 commitment to reduce carbon emission intensity by 50%.<sup>68</sup>

The closer it is to one, the more efficient the data centre's utilisation of electrical energy is. First of all, construction of data centres can be prioritised in areas with concentrated energy supplies and suitable climatic conditions. Especially considering that wind and solar power will be the main sectors of power supply in the upcoming future, construction of infrastructure for digital industry should be given priority when it comes to the consumption of renewable energy in nearby areas. Secondly, the efficiency of the data centres can be improved by means of power supply and distribution, and cooling and energy conservation of IT equipment.

#### Utilisation of renewable energy

Renewable energy can be obtained through self-construction and procurement. Enterprises can invest in the construction of distributed renewable energy power generation projects, or large-scale centralised renewable energy projects for the purpose of providing power to infrastructures for digital industries. At the same time, they can also

New World Development links the SPT with its own decarbonisation target, and sets the percentage of renewable energy of rental properties in the GBA with a key performance indicator (KPI). In the fiscal year of 2019/2020, this ratio was less than 1% and the goal is to increase this ratio to 100% by 2026, the issuer needs to be highly ambitious and implement strong measures in order to achieve this goal. New World Development plans to implement its strategies to grow renewable energy, through the following three steps: 1) Seeking on-site renewable energy installations (such as solar PV, solar thermal, wind, etc.) to maximise all its new renewable energy power generation capabilities in commercial and retail properties, and retrofitting existing buildings where possible 2) Reach long-term Power Purchase Agreements (PPA) with third-party energy suppliers and partners in Hong Kong and China; 3) Cooperate with third-party energy suppliers and partners in Hong Kong and China, on purchasing Renewable Energy Certificates (REC) to support the development of renewable energy.

New World Development also mentioned that in view of the limited capacity of on-site renewable energy installations in Hong Kong and the GBA as a whole, most of the renewable energy will come from PPA and REC, with the focus on ensuring long-term PPA. At the same time, the issuer will also require third-party energy suppliers to track and disclose data to them, based on their respective renewable energy regions so as to avoid double counting.

purchase renewable energy available on the market with green power certificates. On 7 September 2021, China's green power trading was launched simultaneously on the platforms of two major power trading centres in Beijing and Guangzhou, involving more than 20 provinces<sup>64</sup>, autonomous regions and cities such as Beijing, Guangdong, Jiangsu, Zhejiang and Liaoning, with 1.037 billion kWh of electricity traded on the same day in the Southern Power Grid operating region.

At present, many countries have issued sets of relevant policies for green data centres. For example, the European Union proposes to achieve climate neutrality in data centres, as well as in information and communication industries by 2030,<sup>65</sup> and Singapore published its Green Data Centre Technology Roadmap.<sup>66</sup> In order to achieve carbon peak and carbon neutrality in the IT industry, a whole set of policy guidelines and roadmaps will be developed to promote the low-carbon development of digital infrastructure.

## 4. Summary and discussion

Addressing climate change is one of the most pressing global issues of our time. While vigorously developing green industries, it is now of crucial urgency to facilitate the transition of high-carbon industries to low-carbon business models. Transition finance has emerged to fill this gap. As an important national strategy, the GBA has a solid foundation and practical experience in economic development, industrial upgrading, and green finance. This provides strong foundation for the formation of a world-class green bay area metropolitan cluster.

In order to expedite the implementation of transition finance in the GBA, we propose the implementation of the following key measures:

### Policy and standard makers:

**Demonstrate sufficiently ambitious, flexible and inclusive transition guidelines in order to ensure a credible transition.**



Investors have expressed clearly their requirements on transition finance, that is, transition activities must demonstrate sufficient 'ambition' to avoid greenwashing. To be credible, transition frameworks and standards should be science-based and supported by specific performance indicators and tools to track the progress of transition activities.

In addition, comparing with green finance, they should also be applicable for a range of users including business entities to formulate their transition pathways and strategies.

**Set ambitious targets for 2030.** The window of opportunity for green transition is narrow, the next decade will be crucial. Although China has put forward the goal of carbon neutrality by 2060, and the Paris Agreement has set the global goal of achieving net-zero emissions by 2050, the changes made in the next decade will determine whether or not the world can remain within 1.5degrees. It will not be possible to meet global climate goals if significant emission reductions are left to after 2035.

**Policy support, procurement and incentives - Regulators and policy makers can play a leading role in promoting transition finance.**

Through policy guidance, regulation, constraints and incentives, industries can help to reduce barriers for some activities to transition. In areas where economic viability is a barrier, large scale government procurement or incentives for green technologies (e.g. green cement, low carbon steel etc.) can help to create economies of scale, bring certainty for forward investment and bring down the cost of green technologies. This was the experience in the solar industry where

government incentives in Germany and China helped to create scale in the industry which then drove down costs.

At the same time, the government can establish national industry databases, project pipelines and other tools, so as to enhance the level of data disclosure and increase the visibility of transition projects, and thus attract further capital investment.

**Facilitate collaboration across cities, regions and stakeholders - the development of transition finance requires joint efforts by multiple stakeholders.** The unique location of GBA is an ideal place to implement and roll out transition guidelines. The bay area hosts nine cities in Guangdong province and two special administrative regions (Hong Kong and Macau). Connecting these onshore and offshore capital markets requires coordination between the three legal entities. This metropolitan area is faced with significant challenges, but also has great opportunities to establish consistent definitions and standards, thus it has the potential to become a pioneer in the study of the definition and standardisation of international transition finance. As China's green finance and carbon market pilot zone, the GBA has accumulated rich experience in implementing green finance, which will provide a strong foundation and support for the development of transition finance.

**Build the GBA as a transition finance pilot.**

As an economically developed region in the country, the GBA has a relatively mature and advanced manufacturing industrial cluster, making it an ideal place to carry out technical feasibility studies on the implementation of low-carbon transition pathways. The GBA would be able to promote a consensus on the pathways and concepts for transition, identify high-carbon emission sectors that should be prioritised for transition, encourage sector experts to formulate relevant timelines and pathways, and propel the involvement of key stakeholders. The area could also demonstrate examples for China's localisation methods and case studies, and provide a reference for the exploration of the difference and balance between international and domestic low-carbon development paths.

### Research institutions:

**Granular and scientific transition pathways** are needed by industries to plan and understand how transition applies to their industry/entity.



The guidance to date is not clear for many high GHG emitting sectors and does not always have sufficient granularity for it to be used to put forward strategies and capex plans that are in line with the Paris Agreement.

### Enterprises and financial institutions:

**Enterprises can formulate transition plans according to the scientific paths**, and finance through transition finance products. Companies can use transition standards to formulate and disclose their low-carbon transition paths. In addition, they can also jointly promote the green supply chain.

**Transition finance can learn from the current green finance mechanisms and tools**, and innovate in the selection of paths and objectives to ensure credible transition, such as changing focus from the green benefits of specific projects to the path of economic entities' transition. In recent years, China's green finance has developed rapidly, with many financing tools such as green credit, green bonds, green funds, green insurance, green trusts, and green PPPs. The development of transition finance can learn from these experiences, explore mechanisms to support transition financing in terms of identification standards, disclosure requirements, and incentive mechanisms, and support financial institutions in launching transition bonds, transition funds, transition insurance and other financial instrument.<sup>69</sup>



# Annex I. International transition pathways research organisations

Name of Institution	Main job content	Industries involved
<b>Assessing Low-Carbon Transition Initiative</b>	Using a future-proof sector-specific approach, assess the readiness of companies for transition and provide them with trend indicators on their transition plans. <sup>70</sup>	Transition pathways have been developed for the retail, automotive, construction and real estate sectors; pathways are being studied and refined for the agri-food, steel, oil and gas, transport and cement sectors; and ACT plans to develop transition pathways for the aluminium, chemicals, pulp and paper, and glass sectors.
<b>Rocky Mountain Institute and the Mission Possible Partnership</b>	The plan is to unite seven industry leaders to agree on industry decarbonisation targets and develop decarbonisation roadmaps for these seven industries. <sup>71</sup>	Seven sectors: aluminium, aviation, cement, chemicals, shipping, steel and trucking
<b>Transition Pathway Initiative</b>	Designed to assess the readiness of transition to a low carbon economy by businesses that have a significant impact on climate change. TPI provides carbon performance benchmarks that include emission performance pathways aligned to three emission reduction scenarios: 1) the Nationally Determined Contributions (NDCs) scenario under the Paris Agreement commitments; 2) the 2 degree temperature rise scenario; and 3) the below 2 degree temperature rise scenario. <sup>72</sup>	The assessment framework applies to industries such as electric utilities, oil and gas, aluminium, cement, mining, paper, steel, airlines, automotive and shipping.
<b>Science Based Targets Initiative</b>	A science-based framework was designed to develop and assess net-zero targets for the corporate sector.  SBTi verifies companies' carbon reduction strategies to ensure they are in line with the latest climate science in order to meet the Paris Agreement targets. <sup>73</sup>	Transition pathways exist for power, financial institutions, apparel and footwear, OEMs (car manufacturers) and ICT. Industry approaches for oil and gas, aluminium, forestry, land and agriculture and chemicals are currently under development.
<b>Energy Transition Commission</b>	Brings together a diverse group of leaders and experts from the energy sector, including energy producers, energy users, equipment suppliers, investors, non-profit organisations and academics from both developed and developing countries. The Commission released its flagship report, Mission Possible: Reaching Net-zero Carbon Emissions from Harder-to-abate Sectors by Mid-century in November 2018. The Commission's work provides the source material for others to develop industry decarbonisation trajectories.	Independent reports cover the cement, steel, plastics, shipping, heavy road and aviation sectors.

## Annex II: Organisations that provide transition services to investors

Name of Organisations	Key tasks related to transition
<b>Global Investor Coalition on Climate Change</b>	GICC has worked with its regional counterparts (Ceres, IGCC, AIGCC) to develop guidance for brownfield sectors such as real estate, construction materials, steel, oil & gas, automotive, power companies, mining and others. <sup>74</sup> With a focus on governance and disclosure, the guidelines clarify the level and pace of transition that investors want to understand and showcase current best practices and alternative technologies/approaches as a way to provide insight into future potential and the pace of change.
<b>Climate Action 100+</b>	The Net-Zero Company Benchmark, launched by Climate Action 100+, using publicly disclosed data, to assess the speed at which high-emitting companies are transitioning to low-carbon business models and the governance processes they are adopting to achieve this goal, using 10 key indicators.
<b>World Business Council for Sustainable Development</b>	WBCSD worked with 30 companies to develop the Circular Transition Indicators (CTI) 2.0 to support companies in using a universal, consistent tool to measure their circularity.
<b>Investor Agenda</b>	The Investor Climate Action Plans (ICAPs) Anticipation Ladder and Guidance, published by Investor Agenda, provides clear guidance for investors on the publication and implementation of comprehensive climate action plans, including steps investors can take to enable institutional investors to accelerate action to address the climate crisis and accelerate the transition to a net-zero economy.
<b>Institutional Investors Group on Climate Change</b>	The Net Zero Investment Framework is a blueprint for investors and provides common set of recommended actions, metrics, methodologies (inc. investment trajectories) which investors can use to maximise their contribution to net zero by 2050.
<b>Net Zero Momentum Tracker initiative</b>	Co-sponsored by Climate Works Australia and the Monash Institute for Sustainable Development, the report brings together and assesses climate action commitments made by Australian business, government and other key sectors. In particular, the report on the resources sector analyses the 22 highest emitting companies in Australia's resources sector, assessing whether each company's climate action commitments are consistent with the global goal of achieving net-zero emissions by 2050. <sup>75</sup> Sector reports released to date cover the real estate, banking, superannuation, local government, retail, transport and resources sectors.
<b>Paris Agreement Capital transition Assessment</b>	A free online tool based on the analysis of the 2°C initiative. The tool covers both equity and bond issuers and is based on an analysis of companies' investment and production plans in the area of high-emission activities and low-carbon solutions, both currently and over the next five years. The tool is used to analyse the 'technology exposure gap' to show the extent to which a given portfolio's investment/production plans are consistent with a given climate scenario. This consistent analysis in itself meets the investor's climate change target analysis requirements; it can also be used as a tool for deeper analysis of inconsistent areas/sectors, or for product design.
<b>Sustainability Accounting Standards Board</b>	The standard's range of topics covers environment, social capital, human capital, business models and innovation, leadership and governance, in addition, standards for 77 industries in 11 sectors, including: mining and mineral processing, multiple other manufacturing industries, finance, transport, infrastructure and services. <sup>76</sup> It has also published a materiality map to identify the dimensions of sustainability that may affect each of the 11 key sectors. The mapping lists for each industry issues that may be less important, issues that are critical to 50% of businesses, and issues that are critical to more than 50% of businesses.
<b>The Corporate Knights and the Council for Clean Capitalism</b>	<p>The Clean transition Bond Guide (CTBG), a taxonomy for clean financing in heavy industry, was published in 2018 covering oil and gas, energy utilities, mining, metals and other non-fossil fuel commodities (e.g. cement, chemicals, steel and metallurgy).<sup>77</sup> Carbon-intensive industries are identified as eligible transition categories, and the guidance distinguishes between eligible transition project categories and eligible clean project categories.</p> <p>The Clean Transition Bond Guidelines provide specific qualification criteria based on a minimum level of GHG emission reductions, but it is unclear whether the proposed reductions are consistent with the requirements of the Paris Agreement targets. In addition, the GHG emissions being accounted for do not include Scope 3 emissions (i.e. emissions from the use of products), thus omitting the most important component of emissions from this sector.</p>
<b>Organisations assessing or providing information disclosure platforms</b>	
Name of Institution	Key tasks related to transition
<b>CDP</b>	They use the material that is disclosed to them to run a well-established rating mechanism (based on TCFD) for companies and cities. It assesses whether plans are ambitious enough.
<b>2 Degrees Investing Initiative</b>	Measure the alignment of climate portfolios with climate scenarios. Run PACTA tool that measures alignment of financial portfolios with climate scenarios.
<b>Carbon Tracker</b>	Focus on ensuring companies are using robust and realistic Paris-aligned scenario modelling approaches, demonstrating to investors what companies need to do to align with well below 2°C and what they are currently doing.

# Annex III: Overview of transition finance definitions and key areas

	Definition	Key areas
<b>Climate Bonds Initiative</b>	The transition label is used for investments that: are making a substantial contribution to halving global emissions by 2030 and reaching net zero by 2050, but do not have a long-term role to play; or will have a long-term role to play, but at present, the pathway to net zero is not certain.	The initial industries to focus on are cement and basic chemicals. And steel, aluminium, oil and gas, and aviation are also considered.
<b>Sustainalytics</b>	The decarbonisation of economic activities along with emissions-reduction pathways that are consistent with the economy-level goal of net-zero carbon by 2050.	Researches on the transition path and potential investment needs of the natural gas and steel industries have been released, other industry reports such as shipping, aviation, cement and aluminium will be launched soon.
<b>BNP Paribas</b>	<p>Transition finance applies to: 1) a sector that is not currently green; 2) it does not turn green immediately; and 3) Industries that can and need to become greener (or 'less brown') faster, at a pace consistent with recognised sustainability programmes, or at least have a publicly available roadmap of transition strategies to bring them within an acceptable timeframe.<sup>78</sup></p> <p>BNP cites the following two factors to demonstrate the impact of the Transition Bond.<sup>79</sup></p> <ol style="list-style-type: none"> <li>1. Policy objectives. A demonstrable carbon reduction target will be a key way for companies to demonstrate the attributes of a transition bond issue to investors during roadshows.</li> <li>2. Science-based targets (SBTs) and key performance indicators (KPIs). Through SBTs and KPIs, issuers can demonstrate the achievement of precise milestones and targets, thus giving investors a clear picture of how the company's ambitions match its ambitions as an investor.</li> </ol>	<p>Sectors of interest are:<sup>80</sup></p> <ol style="list-style-type: none"> <li>1. Mining - especially minerals critical to a low- carbon economy, such as lithium and cobalt</li> <li>2. Heavy industry (e.g. cement, aluminium, iron, steel, chemicals)</li> <li>3. Utilities (e.g. electricity, gas, water, cable, telecommunications)</li> <li>4. Transportation</li> </ol>
<b>DBS</b>	<p>Companies in polluting sectors (to) adopt incremental solutions to become greener.<sup>81</sup></p> <p>DBS considers an activity 'transition', if it can meet the following conditions: 1) displace more carbon-intensive options, document and independently verify the extent of greenhouse gas (GHG) emissions reduction (forecast or realised) compared to industry norms. or 2) enables the wider application or integration of less carbon-intensive options.</p>	The Sustainable and transition Finance Framework and Taxonomy presents economic activities from 16 industries that are in line with DBS's sustainable and transition label.
<b>HSBC</b>	Any form of financial support that helps high-carbon companies start to implement long-term changes to become greener. <sup>82</sup>	The focused industries are chemicals, energy systems, transportation (shipping and aviation), steel, cement, and construction.
<b>Hong Kong Green Finance Association</b>	<p>Climate transition finance is about financing technologies and activities that produce lower carbon outcomes than business-as-usual and support transition to a climate resilient economy, but do not represent the best alternatives in that sector and remain inadequate in meeting decarbonisation targets.<sup>83</sup></p> <p>Three safeguard measures to ensure effective and eventual contribution to emissions reductions:</p> <ol style="list-style-type: none"> <li>1. Outlining a credible plan (by the issuer or borrower) to align with Paris Agreement goals within a precise timeline</li> <li>2. Minimising carbon emissions and other negative externalities during operation of partially satisfactory technologies and activities</li> <li>3. Setting a deliberate plan to phase out partially satisfactory technologies and activities to make way for net-zero compatible technology and activity.</li> </ol>	The report discussed the transition technology and related policies of the steel, cement, and energy industries in detail.

(Continued)

	Definition	Key areas
<b>Bank of China</b>	Transition finance which aligns with international guidelines or standards, namely, in accordance with the respective national and regional pathways of achieving carbon neutrality, ultimately, and transition finance which covers projects for the reduction of pollution and emissions from traditional industries through technical retrofits and equipment upgrades towards low carbon or zero carbon. <sup>84</sup>	Eligible projects include:  Production of Electricity from Gas, Cogeneration of Heat/Cool and Power from Gas, Production of Heat/Cool from Gas, Manufacture of Cement, Manufacture of Aluminium, Manufacture of Iron and Steel, Manufacture of Fertilizers and Nitrogen Compounds
<b>China Construction Bank</b>	See Bank of China <sup>85</sup>	Eligible project category:  Gas power generation, gas cogeneration, gas heating or cooling, cement production, aluminum production, steel production, petrochemical production, fertilizer and nitrogen compound production, paper production, air transportation

# Annex IV: Selected green finance policies in the GBA

Policy target region	Regulator	Policy name	Date issued	Description
<b>Guangzhou</b>	PBoC, NDRC, Ministry of Finance, Ministry of Environmental Protection, the former China Banking Regulatory Commission, CSRC, the former China Insurance Regulatory Commission	Overall Plan for Building a Green Finance Reform and Innovation Pilot Zone in Guangzhou City, Guangdong Province <sup>86</sup>	23 June 2017	Clarified the main objectives of the pilot zone, key reform and innovation tasks, national policy support, and local government support matters, and clarified that the pilot zone will be the first to carry out green finance reform and innovation pilot projects in Huadu District, Guangzhou
<b>Huadu District</b>	The former Local Taxation Bureau and National Taxation Bureau of Huadu District, Guangzhou City (State Administration of Taxation, Guangzhou Huadu District Taxation Bureau)	Compilation of Tax Preferential Policies for the Development of Green Finance Industry in Huadu District, Guangzhou City	28 Nov 2017	A total of 106 local tax preferential policies are included to help the construction of green financial reform and innovation pilot zones.
<b>Hong Kong</b>	The Government of the Hong Kong Special Administrative Region of the People's Republic of China (the HKSAR Government)	Green Bond Grant Scheme (GBGS <sup>87</sup> )	15 June 2018	Subsidise eligible green bond issuers in obtaining certification under the Green Finance Certification Scheme (GFCS) established by the Hong Kong Quality Assurance Agency.
<b>Hong Kong</b>	Hong Kong Securities and Futures Commission	Strategic Framework for Green Finance <sup>88</sup>	21 Sept 2018	It covers three major areas: enhancing listed companies, asset manager and investment product disclosures and their consideration of ESG factors, especially environmental and climate risks; facilitating the development of green or ESG-related investment products, and supporting investor awareness and capacity building; and promoting Hong Kong as an international green finance centre.
<b>Guangdong Province</b>	The former Guangdong Banking Regulatory Bureau	Implementation Opinions on Accelerating the Development of Green Finance in Guangdong Banking Industry <sup>89</sup>	12 Oct 2018	Continue to increase financial support in key areas such as green manufacturing, energy conservation and environmental protection, pollution prevention, clean energy, green buildings, green transportation, green agriculture, resource recycling, new energy, new materials, innovate exclusive products for green enterprises and encourage green consumption finance.
<b>Hong Kong</b>	The Government of the Hong Kong Special Administrative Region of the People's Republic of China (the HKSAR Government)	Government Green Bond Programme <sup>90</sup>	15 Nov 2018	Borrow up to a maximum principal amount outstanding at any time of HKD100bn (USD12.9bn) or equivalent under the GGB Programme.
<b>Shenzhen</b>	Shenzhen Municipal People's Government	Guiding Opinions on Building a Green Financial System <sup>91</sup>	8 Jan 2019	Support the development of green credit, listing and refinancing of green enterprises, carry out pilot projects of green bond business, develop green asset securitisation, encourage small and medium-sized enterprises to issue green collective bonds, explore the establishment of green industry investment funds, and promote green insurance market development and equity market development
<b>GBA</b>	Central Committee of the Communist Party of China, State Council	Outline Development Plan for the Guangdong- Hong Kong- Macao Greater Bay Area	18 Feb 2019	Put forward the basic principles, strategic positioning, development goals and spatial layout of the GBA.

(Continued)

Policy target region	Regulator	Policy name	Date issued	Description
<b>Hong Kong</b>	Hong Kong Monetary Authority	Strategic framework to promote the development of green finance <sup>92</sup>	7 May 2019	Phase I – developing a common framework to assess the ‘Greenness Baseline’ of individual banks and providing technical support to banks. Phase II – engaging the industry and other relevant stakeholders in a consultation on the supervisory expectations or requirements.  Phase III – implement, monitor and evaluate banks’ progress in this regard.
<b>Guangzhou</b>	General Office of Guangzhou Municipal People’s Government	Implementation Opinions on Promoting the Reform, Innovation and Development of Green Finance in Guangzhou <sup>93</sup>	16 July 2019	Specific plans and measures to promote the reform, innovation and development of green finance in Guangzhou.
<b>GBA</b>	PBoC, China Banking and Insurance Regulatory Commission (CBIRC), CSRC, and State Administration of Foreign Exchange (SAFE)	Opinions on Financial Support for the Guangdong-Hong Kong-Macao Greater Bay Area <sup>94</sup>	14 May 2020	Supplement and expand upon the policies governing financial services under the GBA Outline Plan. 26 measures were introduced to further promote financial opening up and innovation, and deepen financial cooperation between the Mainland, Hong Kong and Macao.
<b>GBA</b>	Guangdong Financial Supervisory Authority—in association with PBoC Guangzhou Branch, CBIRC Guangdong Office, CSRC Guangdong Office, PBoC Shenzhen Central Sub-branch, CBIRC Shenzhen Office, and CSRC Shenzhen Branch	Implementation Plan for Providing Effective Financial Support for the Guangdong-Hong Kong- Macao Greater Bay Area	31 July 2020	Contains 80 detailed supplementary measures that implement the financial support to the GBA, and is, therefore, of strategic importance to promoting financial cooperation between the three regions and the coordinated economic and social development of the GBA.
<b>Macao</b>	Macao Monetary Authority, Environmental Protection Agency and Macao Association of Banks	Proposal for ‘Jointly Promoting the Development of Green Finance in Macao’ <sup>95</sup>	20 Aug 2020	Advocating the integration of green concepts into the long-term development of society, and enhancing the awareness and participation of all sectors of green businesses and green finance; encouraging Macao financial institutions to develop diversified green financial products, standardising the use by countries in related businesses, and encouraging independent and impartial third-party certification to enhance product credibility and competitiveness in the international market.
<b>Shenzhen</b>	Standing Committee of Shenzhen Municipal People’s Congress	Shenzhen Special Economic Zone Green Finance Regulations <sup>96</sup>	5 Nov 2020	China’s first law and regulation in the field of green finance. The regulations will come into effect on 1 March 2021 and will require some financial institutions to make environmental information disclosure mandatory from 1 January 2022. The Regulations provide a guarantee for Shenzhen to establish a financial ecological environment and a business environment under the rule of law more conducive to the development of emerging green industries and the greening of traditional industries. They also provide an early demonstration for the development of green finance under the rule of law nationwide.
<b>Hong Kong</b>	The HKSAR Government	Government’s Green Bonds Programme <sup>97</sup>	24 Feb 2021	To issue about USD23bn (HKD175.5bn) green bonds in next five years, gauging the market situation, aiming to cover a larger variety of project types and bond features. Working towards achieving a carbon neutrality target.



84. Bank of China Co., Ltd., Bank of China Co., Ltd. Transition Bond Management Statement, March 2021. <https://pic.bankofchina.com/bocappd/report/202101/P020210106328842685396.pdf>.
85. China Construction Bank, China Construction Bank Transition Finance Framework, April 2021, [http://www.ccb.com.cn/investor/upload/bond/20210413\\_1618282946/20210413110254366415.pdf](http://www.ccb.com.cn/investor/upload/bond/20210413_1618282946/20210413110254366415.pdf).
86. The People's Bank of China, Overall Plan for Building a Green Finance Reform and Innovation Pilot Zone in Guangzhou City, Guangdong Province, <http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/3332928/index.html>.
87. The Government of the Hong Kong Special Administrative Region of the People's Republic of China, Green Bond Grant Scheme, [http://www.hkqaa.org/en\\_certservice.php?catid=26&id=50](http://www.hkqaa.org/en_certservice.php?catid=26&id=50).
88. The Government of the Hong Kong Special Administrative Region of the People's Republic of China, Green Bond Grant Scheme, [http://www.hkqaa.org/en\\_certservice.php?catid=26&id=50](http://www.hkqaa.org/en_certservice.php?catid=26&id=50).
89. The former Guangdong Banking Regulatory Bureau, Implementation Opinions on Accelerating the Development of Green Finance in Guangdong Banking Industry, <http://wap.foshankj.com/41072082.html>.
90. The Government of the Hong Kong Special Administrative Region of the People's Republic of China, Government Green Bond Programme, <https://www.hkqb.gov.hk/en/greenbond/greenbondintroduction.html>.
91. Shenzhen Municipal People's Government, Guiding Opinions on Building a Green Financial System, [http://www.sz.gov.cn/zfgb/2019/gb1084/content/post\\_5000165.html](http://www.sz.gov.cn/zfgb/2019/gb1084/content/post_5000165.html).
92. Hong Kong Monetary Authority, Strategic framework to promote the development of green finance, <https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-andcircular/2020/20200630e1a1.pdf>.
93. General Office of Guangzhou Municipal People's Government, Implementation Opinions on Promoting the Reform, Innovation and Development of Green Finance in Guangzhou, [http://www.gz.gov.cn/zwgk/fggw/sfbgtwj/content/post\\_4435518.html](http://www.gz.gov.cn/zwgk/fggw/sfbgtwj/content/post_4435518.html).
94. Opinions on Financial Support for the Guangdong-Hong Kong-Macao Greater Bay Area, [http://www.cnbayarea.org.cn/policy/policy%20release/policies/content/post\\_258474.html](http://www.cnbayarea.org.cn/policy/policy%20release/policies/content/post_258474.html).
95. Proposal for 'Jointly Promoting the Development of Green Finance in Macao', [http://www.ccpit.org/Contents/Channel\\_4269/2020/0824/1285814/content\\_1285814.htm](http://www.ccpit.org/Contents/Channel_4269/2020/0824/1285814/content_1285814.htm).
96. Standing Committee of Shenzhen Municipal People's Congress, Shenzhen Special Economic Zone Green Finance Regulations, [http://jr.sz.gov.cn/sjrb/xxgk/zcfg/djzrc/jfzrc/content/post\\_8279891.html](http://jr.sz.gov.cn/sjrb/xxgk/zcfg/djzrc/jfzrc/content/post_8279891.html).
97. Budget of the Hong Kong Special Administrative Region Government, Budget Speech: Green and Sustainable Finance, 24 February 2021, <https://www.budget.gov.hk/2021/eng/budget21.html>.

## Climate Bonds INITIATIVE

Prepared by Climate Bonds Initiative.

**Authors:** Laqiqige Zhu, Wenhong Xie, Bridget Boule

**Design:** Godfrey Design

The authors thank the generous contribution from Aliya Saiyerjiang and Wenling Li for the research of this report.

© Published by Climate Bonds Initiative, October 2021  
www.climatebonds.net

Disclaimer: The information contained in this communication does not constitute investment advice in any form and the Climate Bonds Initiative is not an investment adviser. Any reference to a financial organisation or debt instrument or investment product is for information purposes only. Links to external websites are for information purposes only. The Climate Bonds Initiative accepts no responsibility for content on external websites. The Climate Bonds Initiative is not endorsing, recommending or advising on the financial merits or otherwise of any debt instrument or investment product and no information within this communication should be taken as such, nor should any information in this communication be relied upon in making any investment decision. Certification under the Climate Bond Standard only reflects the climate attributes of the use of proceeds of a designated debt instrument. It does not reflect the credit worthiness of the designated debt instrument, nor its compliance with national or international laws. A decision to invest in anything is solely yours. The Climate Bonds Initiative accepts no liability of any kind, for any investment an individual or organisation makes, nor for any investment made by third parties on behalf of an individual or organisation, based in whole or in part on any information contained within this, or any other Climate Bonds Initiative public communication.