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Guangdong Green Finance Committe

CGT RESEARCH SERIES PHASE 3:

# Operationalizing IPSF Common Ground Taxonomy in the Greater Bay Area

HONG KONG GREEN FINANCE ASSOCIATION • GUANGDONG GREEN FINANCE COMMITTEE
GREATER BAY AREA GREEN FINANCE ALLIANCE

# ACKNOWLEDGEMENT


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Part 1

# EXECUTIVE SUMMARY

With USD 1.94 trillion of combined GDP in 2022, the Greater Bay Area (the "GBA") of nine cities and two Special Administrative Regions, has emerged not only as an economic superpower in China, but also a leading sustainable finance hub in recent years. Notably, Guangdong Province has doubled its green bond issuance from 2021 to USD 10.5 billion equivalent in 2022 according to Climate Bonds Initiative. Hong Kong, as the super connector for mainland China and the rest of world, plays a vital role in sustainable capital raising for China's "30.60" dual carbon goals and sustainability journey towards equality and inclusive growth. In 2022, 80% of Hong Kong's sustainable bonds and loans markets were arranged for Chinese issuers[1]. Despite of the current progress made, there is still significant room for the connectivity of the green finance markets in the GBA to grow and interoperable green definitions will be critical in enabling further cross-border capital flow.

As such, to further integrate sustainable finance markets within the GBA, the Cross-Border Green Finance Product Alignment Working Group[2] has been set up as part of the Greater Bay Area Green Finance Alliance's key priorities since 2022 with a prolonged research in three phases over 2022 and 2023. Building on the previously published Phase 1 "Principles for advancing the adoption of the Common Ground Taxonomy (CGT) in Hong Kong SAR and the Greater Bay Area[3]" and Phase 2 "Understanding Use Cases of the Common Ground Taxonomy[4]", Phase 3 goes further to operationalize the Common Ground Taxonomy as the basis to form Greater Bay's green definitions in order to mobilize more international capital to support the entire GBA and China's decarbonization. Reflecting the latest developments by IPSF with the Common Ground Taxonomy and the publication of Prototype of a Green Classification Framework for Hong Kong (the "Prototype") by Hong Kong Monetary Authority (HKMA), the working group has put forward the following suggestions to chart a path forward for policymakers and market participants' consideration in the GBA in the next phase development of Hong Kong's green taxonomy.

**Suggestion to expand the scope of green activities:** With the Prototype in place that has set up a sound structure for classifying green activities in Hong Kong with four pilot sectors that are most material to Hong Kong's greenhouse gases (GHG) footprint, we are putting forth additional 21 green activities spanning from Electricity to Agriculture for policy makers' consideration of the next phase of Hong Kong green taxonomy, due to the sectors' significant environmental benefits and high potential for cross-border green financing and investing. This can further strengthen the unique position that Hong Kong can play or sustain as the leading international sustainable finance hub for Hong Kong and beyond.

**Suggestion to define transition activities:** Despite of exponential growth in sustainable finance worldwide reaching USD 4.2 trillion by the end of the first half of 2023 according to Climate Bonds Initiative, majority of the funding has gone to "dark green" or "pure green" activities, while support to the decarbonization of hard-to-abate sectors is limited due to a lack of consensus on credible transition finance framework. As such, identifying the material hard-to-abate sectors in the Hong Kong and Mainland GBA contexts is an important next step. Leveraging existing credible standards and guidelines such as the National Development and Reform Commission (NDRC) guidelines, Climate Bonds Initiative standards and EU Taxonomy, clear criteria with technical quantitative thresholds along with qualitative considerations are presented to assist hard-to-abate sectors in their decarbonization journey, ultimately leading to a greener output to achieve net zero. Three sectors, namely "Manufacture of Iron and Steel," "Manufacture of Cement," and "Manufacture of Basic Chemicals" are used as examples to illustrate our suggested approach, which could be considered by policymakers in the next phase development of Hong Kong's taxonomy and by market participants industry as a self-driven initiative towards transition finance/investment product development. To emphasize, as low carbon transition is a dynamic process from "brown" to "green", technical quantitative thresholds alone are not sufficient to claim as a credible transition finance/entity. In fact, we encourage market players to align to key considerations outlined in ICMA Transition Finance Handbook, G20 Framework for Transition Finance and OECD Guidance on Transition Finance.

**Suggestion to implement DNSH and MS:** The Do No Significant Harm (DNSH) and Minimum Safeguard (MS) components of a comprehensive taxonomy account for environmental and social impacts beyond climate change mitigation. The implementation of DNSH criterion has encountered challenges due to overly complex prescriptions, and a lack of alignment

with existing disclosure standards and regulations. To reduce complexities, Hong Kong and the broader region could consider adopting a principle-based approach of DNSH by requiring an environmental impact assessment. Hong Kong has an existing Environmental Impact Assessment Ordinance, which provides a framework to assess environmental impact of certain designated projects, and corresponding impact prevention and mitigation measures. This approach is in line with the EU Taxonomy's DNSH requirements. Given the impact of transition sectors on employment and the economy, particularly in Asia, it is crucial to include social safeguards that ensure a fair transition in Hong Kong's taxonomy, with MS components being a minimum requirement. Implementation could begin by considering key just transition aspects in Hong Kong and providing corporate-level guidance to promote them among companies. The Climate Action 100+ platform, which includes the four elements of acknowledgement, commitment, engagement, and action, can serve as a reference for developing MS.

**Suggestion to adopt by phase from voluntary to mandatory:**
To facilitate the initial adoption of Hong Kong's future taxonomy, policymakers could promote pilot issuances by offering supportive policies and initiatives, such as subsidies for taxonomy-aligned issuances. For instance, the Hong Kong government could take the lead by updating its green bond program to align with the taxonomy. Encouraging the voluntary adoption of the taxonomy as a tool for aligning financial instruments can help corporates and financial institutions become familiar with the taxonomy. As the market becomes more mature, mandatory uses for the Hong Kong taxonomy could be considered. One possible approach to gradual implementation could be the phased introduction of mandatory disclosures, such as CAPEX, revenue or investments that align with the taxonomy. The expanded use of Hong Kong's future taxonomy would follow a similar path to the EU and China taxonomies, with voluntary adoption initially. It is important to announce the adoption of the taxonomy in a clear roadmap to give market participants sufficient time to comply with new regulations.

**Suggestion to Connect GreenTech with GreenFi:**
Decarbonization has become a top priority on the national development agenda, leading an increasing focus on green technology development in Hong Kong, the GBA and China as a whole. With Shenzhen known as China's Silicon Valley and Hong Kong as a world-class international finance centre, the GBA has a natural advantage to incubate green tech with green finance. In early 2023, as part of the Policy Address, the Hong Kong SAR government seeks to establish itself as an International GreenTech and GreenFi Centre. Therefore, we believe policymakers could reflect the latest government strategies on green technologies. This will enable market participants such as financiers, investors and third-party reviewers to assess the "greenness" of any green or transition technologies systematically and quickly as we race towards net zero.

1. https://www.climatebonds.net/files/reports/cbi_hk_briefing_2022_final.pdf.
2. "粤港澳大湾区绿色金融联盟跨境绿金产品标准工作组"
3. https://www.hkgreenfinance.org/wp-content/uploads/2022/06/HKGFA-Report-Principles-for-advancing-the-adoption-of-the-CGT-in-HK-and-the-GBA_.pdf
4. https://www.hkgreenfinance.org/research-report/cgt-research-series-phase-2-understanding-use-cases-of-the-common-ground-taxonomy/

Part 2

# NAVIGATING THE TRANSITION: EXPLORING ADDITIONAL ELEMENTS TO THE HONG KONG'S TAXONOMY

## 2.1 Current State of the Hong Kong's Taxonomy

As a first step, HKMA has published a Prototype of a Green Classification Framework for Hong Kong, with the support of Climate Bonds Initiative. The Prototype includes four pilot sectors to identify green activities, with CGT being the key referenced taxonomy along with other creditable definitions:

**4 Pilot Focus Sectors in the Prototype of a Green Classification Framework for Hong Kong**

| Electricity, gas, steam and air conditioning supply | Transportation and storage | Water supply; sewerage, waste management and remediation activities | Construction |
|---|---|---|---|
| **Description & Green Activities** | | | |
| **Electric Power Generation, Transmission and Distribution:**<br>• Electricity generation using concentrated solar power technology<br>• Electricity generation using solar photovoltaic technology<br>• Electricity generation from wind power | **Land Transport Including Railways:**<br>• Construction and operation of public transportation system in urban and rural areas<br>• Construction and operation of personal mobility devices, cycle logistics<br>**Water Transport:**<br>• Transportation of freight by sea<br>• Transportation of passengers by sea | **Sewage Sludge Treatment:**<br>• Sewage sludge treatment – anaerobic digestion<br>**Waste Collection, Treatment and Recycling:**<br>• Collection and transport of non-hazardous waste in source segregated fractions<br>• Utilization/ treatment of domestic waste – anaerobic digestion | **Construction and Renovation of Buildings:**<br>• Construction of new buildings<br>• Renovation of existing buildings |

Reference: Prototype of a Green Classification Framework for Hong Kong published by HKMA and supported by Climate Bonds Initiative

## The Vital Role of the Taxonomy in Supporting the Environmental Initiatives of Hong Kong

In our view, the forthcoming taxonomy, the Hong Kong SAR Government's Green Bond Framework, and its overarching environmental strategies are closely related and mutually supportive. While the taxonomy complements the Green Bond Framework projects' criteria and thresholds, the Green Bond Programme supports the implementation of Hong Kong's environmental strategies.

### A mapping of the 4 Pilot Focus Sectors in the Prototype and Hong Kong's major Environmental Initiatives

| Electricity, gas, steam and air conditioning supply | Transportation and storage | Water supply; sewerage, waste management and remediation activities | Construction |
|---|---|---|---|
| **The Taxonomy** | | | |
| • Production of electricity from Concentrated Solar Power<br>• Production of electricity from Solar Photovoltaic<br>• Production of electricity from wind power | • Construction and operation of public transportation system in urban and rural areas<br>• Construction and operation of personal mobility devices, cycle logistics<br>• Transportation of freight by sea<br>• Transportation of passengers by sea | • Sewage sludge treatment – anaerobic digestion<br>• Collection and transport of non-hazardous waste in source segregated fractions<br>• Utilization/ treatment of domestic waste – anaerobic digestion | • Construction of new buildings<br>• Renovation of existing buildings |
| **Hong Kong's Climate Action Plan 2050 – Decarbonisation Strategies** | | | |
| • Construction of new buildings<br>• Renovation of existing buildings | Green transportation | Waste reduction | Energy saving and green buildings |
| **HKSAR Green Bond Framework Eligible Categories** | | | |
| Renewable energy | Clean transportation | Waste management and resource recovery | Waste management and resource recovery |

Reference: Prototype of a Green Classification Framework for Hong Kong, Hong Kong's Climate Action Plan, HKSAR Green Bond Framework

## 2.2 Strengthening Hong Kong Taxonomy: Enhancing the Foundation with Supplementary Elements

With the Prototype in place that has set up a sound structure for classifying green activities, further supplement elements are proposed in this research paper by the working group as input to support the development of Hong Kong's forthcoming taxonomy by policy makers:

- a methodology to distinguish green and transition activities that is specific to Hong Kong's context as an international finance hub
- expansion of the current Prototype to cover more material green activities
- eligible criteria for transition activities in the selected high impact sectors.
- proposals to operationalize DNSH and MS considerations

### Recommendation for Defining 'Green' and 'Transition' Criteria: Insights for Future Hong Kong Taxonomy Users

Despite of exponential growth in sustainable finance worldwide reaching USD 4.2 trillion by the end of the first half of 2023 according to Climate Bonds Initiative, majority of the funding has gone to "dark green" or "pure green" activities, while support to the decarbonization of hard-to-abate sectors is limited due to a lack of consensus on credible transition finance framework.

According to G20[5], transition finance refers to financial services supporting the whole-of-economy transition, in the context of the Sustainable Development Goals (SDGs), towards lower and net-zero emissions and climate resilience, in a way aligned with the goals of the Paris Agreement. Similarly, OECD advocates that transition finance focuses on the dynamic process of becoming sustainable, rather than providing a point-in-time assessment of what is already sustainable. This approach can provide solutions for a whole-of-economy decarbonization, and decarbonize the most polluting and hard-to-abate industries today.

In Asia, the green and transition taxonomy proposed by the Monetary Authority of Singapore (MAS) utilizes a "measures-based approach", where activities under a particular sector could be identified as Green, Amber, or Red based on the decarbonizing measures they adopted[6]. The pilot transition bonds guideline proposed by the National Association of Financial Market Institution Investors (NAMFII) defines transition activities as those can supplement the scope of the current China Green Bond Catalogue (2021 Edition) and are relevant to entity-level transition[7].

Hong Kong, being a super connector and gateway between East and West places it in a unique position to facilitate the flow of finance, resources, and knowledge between different regions, including connecting high-emitting sectors in Mainland China with global financing opportunities. Defining what constitutes "green" and "transition" activities in Hong Kong's taxonomy would be essential due to Hong Kong's role in the region and the potential impact that its investments and initiatives can have on the environment. Therefore, it is vital to have a clear and consistent framework that guides sustainable connectivity between different regions and ensures that any investments align with international standards and best practices for environmental sustainability and decarbonization potential. The forthcoming taxonomy could serve as a guide to connect high-emitting sectors in Mainland China with global financing opportunities. Therefore, this report suggests the forthcoming taxonomy to define "Green" and "Transition" as below:

- **Green activities:** activities that are already or closely aligned with the Paris Agreement
- **Transition activities:** activities that can aid in the hard-to-abate sectors' decarbonization pathway towards net zero, grounded in credible transition plan in accordance with the overarching principles set out in frameworks such as the G20 Transition Finance Framework or ICMA Climate Transition Finance Handbook

With the definitions above, identifying the material hard-to-abate sectors in the Hong Kong and GBA contexts would be an important future development. The development of eligible technological pathways and corresponding Technical Screening Criteria (TSC) in selected hard-to-abate sectors can act as a useful prototype for the transition taxonomy and steer investments towards sustainable and low-carbon solutions, contributing to the transition towards a more sustainable and low-carbon future in the region. Later parts of this report will illustrate the lists of eligible technological pathways and the corresponding TSCs in a few selected hard-to-abate sectors, which could be a useful reference of the transition taxonomy to be considered by Hong Kong.

A high-level comparison of the existing taxonomies that take transition into consideration is in **Table 1**, which is helpful to understand the common grounds and regional-specific variance in the jurisdictions' perception of transition as a concept.

**Table 1 Major transition finance taxonomies and frameworks**

| EU Taxonomy | G20 Framework | ASEAN Taxonomy | Japan's Basic Guidelines on Climate Transition Finance | Climate Bonds Initiative (CBI) Taxonomy |
|---|---|---|---|---|
| **Objective** | | | | |
| Provide a common classification system for sustainable economic activities, a common language and a clear definition of what is 'sustainable' | Support the whole-of-economy transition, and improve the ability of sectors or firms to gain access to financing to support their transition to net-zero emissions. | Serve as a common language across the different jurisdictions to communicate and coordinate on labelling for economic activities and financial instruments | Strengthen the position of climate transition finance (hereinafter referred to as "transition finance") as a means of financing transitions, especially in hard-to-abate sectors, and introduce more funds in order to contribute to achieving the 2050 carbon-neutral goals and the Paris Agreement, by popularizing transition finance, which is in its startup phase, and ensuring the credibility of financing in labeling as transition finance. | Create the foundation for capital markets to drive the mobilisation of large pools of investments dedicated to accelerating the transition to resilient, sustainable economies and societies. |
| **Scope of environmental objectives** | | | | |
| Six environmental objectives<br>1. Climate change mitigation<br>2. Climate change adaptation<br>3. The sustainable use and protection of water and marine resources<br>4. The transition to a circular economy<br>5. Pollution prevention and control<br>6. The protection and restoration of biodiversity and ecosystems | Climate Mitigation | Include climate change and adaptation, protection of healthy ecosystem and biodiversity, and promotion of resource resilience and transition to circular economy.<br><br>Among the environmental objectives set out, climate change mitigation is the main objective that governs how an activity is classified. | Climate Mitigation | Climate Mitigation |
| **Transition finance perspective** | | | | |
| "Transition" is used on multiple occasions in the Taxonomy Regulation to describe changes in economies needed to meet the EU's environmental goals.<br><br>Consistent with the EU Action Plan on Financing Sustainable Growth, finance is a critical enabler of transformative improvements in existing industries in Europe and globally. | Refers to financial services supporting the whole-of-economy transition, in the context of the Sustainable Development Goals (SDGs), towards lower and net-zero emissions and climate resilience, in a way aligned with the goals of the Paris Agreement. | Not explicitly defined | Refers to a financing means to promote long-term, strategic GHG emissions reduction initiatives that are taken by a company considering to tackle climate change for the achievement of a decarbonized society. | Transition should mean a significant reduction in GHG emissions relative to current practice and alignment with the Paris Agreement. |
| **Level of detail a) High-level principles b) Specific requirements** | | | | |
| Specific requirements | High-level principles | High-level principles | High-level principles | High-level principles |
| **Transitional activities definition** | | | | |
| Refer to a specific sub-set of activities making a substantial contribution to climate change mitigation. | Depends on approaches | Activities contributing to decarbonization where mitigation of other harm to environmental objectives is necessary. (Amber FF category) | N.A. | Activity can be aligned with Paris Agreement global warming target<br><br>5 distinct categories for economic activities are identified:<br>1. Near zero: activities already at or near net-zero emissions that may require some further decarbonization but not a significant transition*** - e.g. wind power generation.<br>2. Pathway to zero: activities needed beyond 2050 and have a clear 1.5-degree decarbonization pathway to 2050 – e.g. shipping.<br>3. No pathway to zero: activities that are needed beyond 2050 but at present, do not have a clear 1.5 degree decarbonization pathway to 2050 – e.g. long-haul passenger aviation.<br>4. Interim: activities currently needed but should be phased out by 2050 – e.g. production of energy from municipal waste.<br>5. 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 or solid fossil fuels.<br><br>Categories 2,3,4,5 can own transition labels |

1. EU Taxonomy https://finance.ec.europa.eu/system/files/2020-03/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf
2. G20 Sustainable Finance Report https://g20sfwg.org/wp-content/uploads/2022/10/2022-G20-Sustainable-Finance-Report-2.pdf
3. ASEAN Taxonomy https://asean.org/wp-content/uploads/2021/11/ASEAN-Taxonomy.pdf
4. Japan's Basic Guidelines on Climate Transition Finance https://www.meti.go.jp/press/2021/05/20210507001/20210507001-3.pdf
5. Climate Bonds Initiative Taxonomy https://www.climatebonds.net/files/reports/cbi_fincredtransitions_final.pdf

| EU Taxonomy | G20 Framework | ASEAN Taxonomy | Japan's Basic Guidelines on Climate Transition Finance | Climate Bonds Initiative (CBI) Taxonomy |
|---|---|---|---|---|
| **Approach** | | | | |
| Taxonomy-based approaches | Principle-based approaches, Taxonomy-based approaches, Combination of approaches | Taxonomy-based approaches<br>• Foundation Framework<br>qualitative assessment of activities<br>• Plus Standard<br>uses metrics and thresholds to further qualify and benchmark eligible green activities and investments. | Principle-based approaches | Principle-based approaches |
| **Criteria** | | | | |
| A "transitional activity" is an economic activity for which there is no technologically and economically feasible low-carbon alternative but supports the transition to a climate-neutral economy consistent with a pathway to limit the temperature increase to 1.5 °C above pre-industrial levels, including by phasing out GHG emissions, in particular emissions from solid fossil fuels, and where that activity:<br><br>a) has emission levels that correspond to the best performance in the sector or industry;<br>b) does not hamper the development and deployment of low-carbon alternatives; and<br>c) does not lead to a lock-in of carbon-intensive assets, considering the economic lifetime of those assets. | Principle-based approaches provide high-level guidance for identification of tools that can help support climate transitional activities and relevant investments and can be applied at the activity level, company level, financial instrument level, portfolio level as well as industry level. Principle-based approaches can provide guidance on transition plans, strategies, emission reduction targets, pathways, timeframes, transparency and verifiability.<br><br>Taxonomy-based approaches takes the form of a list of specific activities that support the climate transition, typically classified by sector. Taxonomies have varying levels of specificity in terms of technical pathways and emission reduction targets, sometime reflecting local or national circumstances and availability of resources. In general, taxonomies can be used by investors and companies to identify, label, and report on transition activities as well as enable the measurement/monitoring of transition performance.<br><br>Combination of approaches, where some sectors/ activities areas are defined using a taxonomy-based approach, and other sectors/activities are identified by a principles-based approach. | Multi-tier Taxonomy Design<br><br>Tier1: the 'Foundation Framework' uses a single sector agnostic decision tree to classify activities into 'green FF', 'amber FF', or 'red FF'. The decision tree is designed for applicability to all economic activities.<br><br>Tier2: The 'Plus Standard' The 'Plus Standard' can be used to further assess economic activities using activity-level threshold criteria to determine if they are 'green PS', 'amber PS' or 'red PS'. This approach acknowledges the complexities of defining transition activities. | (1) Use of Proceeds instrument (bond or loan) that meets the four elements of transition (when the Use of Proceeds does not fall under Green Projects (*) but the process follows the existing principles and guidelines)<br>(2) General Corporate Purpose instrument (bond or loan) that meets the four elements of transition, sets targets in line with the transition strategy, and changes its financial and/or structural characteristics depending on the achievement of predefined targets<br>(3) Instrument that meets the four elements of transition and follows the existing Green Bond Principles and the Green Bond Guidelines (when the Use of Proceeds falls under Green Projects*)<br><br>Financial instruments that fulfil the four elements of disclosure for transition finance may be recognized as transition finance:<br><br>Element 1: Issuer's climate transition strategy and governance<br>Element 2: Business model environmental materiality<br>Element 3: Climate transition strategy to be science-based including targets and pathways Element 4: Implementation Transparency | Transition label can be used for eligible investments that:<br><br>- are making a substantial contribution to halving global emissions levels by 2030 and reaching net zero by 2050 but will not have a long term role to play; OR<br>- will have a long term role to play, but at present the long term pathway to net zero goals is not certain. |
| **Sectors or industries covered** | | | | |
| Agriculture, manufacture, renewable energy, transportation, building, data processing | High-emitting and/or hard-to-abate sectors | Ranking of priority sectors<br>1. Agriculture, forestry, and fishing<br>2. Manufacturing<br>3. Electricity, gas, steam, and air conditioning supply<br>4. Transportation and storage<br>5. Construction & Real estate activities<br>Water supply; sewerage, waste management, and remediation activities | 9 hard-to-abate sectors: iron & steel, chemicals, electricity, gas, oil, cement, paper & pulp, shipping and aviation | Applicable to high emissions sectors |

1. EU Taxonomy https://finance.ec.europa.eu/system/files/2020-03/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf
2. G20 Sustainable Finance Report https://g20sfwg.org/wp-content/uploads/2022/10/2022-G20-Sustainable-Finance-Report-2.pdf
3. ASEAN Taxonomy https://asean.org/wp-content/uploads/2021/11/ASEAN-Taxonomy.pdf
4. Japan's Basic Guidelines on Climate Transition Finance https://www.meti.go.jp/press/2021/05/20210507001/20210507001-3.pdf
5. Climate Bonds Initiative Taxonomy https://www.climatebonds.net/files/reports/cbi_fincredtransitions_final.pdf

## Incorporate Additional Green Activities

The Hong Kong taxonomy prototype currently covers four pilot sectors: "Electricity, gas, steam and air conditioning supply", "Water supply; sewerage, waste management and remediation activities", "Construction", and "Transportation and storage". In the context of international capital markets, we believe that it could consider the inclusion of more green activities to capture a wider range of environmentally sustainable economic activities in Hong Kong, the GBA, and China, as well as other geographies. As a natural extension, we are proposing to prioritize relevant activities in GBA and Greater China context with high interoperability and with reference to CGT to provide comparable eligibility criteria. Among the current four pilot focus sectors with 12 green activities, an additional 21 green activities are proposed to incorporate into the next phase of Hong Kong's taxonomy development.

After conducting a comprehensive review of the criteria specified in the CGT, EU Taxonomy, China Green Bond Catalogue, and Hong Kong local practices, it was determined that the categories outlined by the CGT would be the most appropriate primary reference for the criteria and thresholds for Hong Kong local and offshore green activities. It is important to note that when conducting projects outside of Hong Kong, taxonomy users must also refer to the relevant local regulatory requirements and standards. To enhance usability, we recommend that the specific green criteria applicable to projects in Mainland China and the EU could be summarized under "Additional Requirements". As a result, taxonomy users could easily refer to the suggested requirements for these new green activities as illustrated in **Appendix 1** of this paper, making the decision-making process more streamlined and efficient.

### Electricity, gas, steam and air conditioning supply

| Current Activities covered by the 4 Pilot Focus Sectors of the Prototype[8] | New Green Activities to be considered under CGT Context | CGT Activity Number |
|---|---|---|
| • Production of electricity from Concentrated Solar Power<br>• Production of electricity from Solar Photovoltaic<br>• Production of electricity from wind power | Electricity generation from hydropower | D1.5 |
| | Electricity generation from bio-energy | D1.6 |
| | Storage of electricity | D1.8 |
| | District heating and cooling | D2.1 |
| | Construction, installation and operation of heat pump facilities | D2.2 |
| | Production of heat/cool from solar thermal heating | D2.3 |
| | Cogeneration of heat/cool and power from solar energy | D2.4 |
| | Cogeneration of heat/cool and power from renewable non-fossil gaseous and liquid fuels (Production of heat/cool from renewable non-fossil gaseous and liquid fuels) | D2.5 |
| | Cogeneration of heat/cool and power from bioenergy (Production of heat/cool from bioenergy) | D2.6 |
| | Production of heat/cool using waste heat | D2.7 |

According to the International Energy Agency (IEA), as of 2020, Hydropower and bio-energy accounted for approximately 25% and 30% respectively within the renewable energy mix[9]. In the context of the GBA, a CBI paper[10] indicates that while solar and wind energy receive the highest attention among renewables, some cities in GBA still have installed power generation capacity for hydropower and biofuels. Additionally, energy storage is identified as a key area for development. Bioenergy and energy storage are also specifically mentioned in the "Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area" as the main focus to develop green and low-carbon energy supply. Therefore, hydropower, bio-energy and storage of electricity could be prioritized in the next phase.

The current taxonomy prototype covers solar and wind energy within the aspect of "electric power generation, transmission and distribution". However, the CGT includes the aspect of "steam and air conditioning supply". Therefore, in the next phase, relevant activities within this area could also be considered. According to the IEA[11], China's district heating network is the largest in the world, and the impact of district heating and cooling energy use and emissions on the Chinese economy, local air quality and public well-being is substantial. China has a significant opportunity to reduce the environmental footprint of its district energy system

### Transportation and storage

| Current Activities covered by the 4 Pilot Focus Sectors of the Prototype[12] | New Green Activities to be considered under CGT Context | CGT Activity Number |
|---|---|---|
| • Construction and operation of public transportation system in urban and rural areas<br>• Construction and operation of personal mobility devices, cycle logistics<br>• Transportation of freight by sea<br>• Transportation of passengers by sea | Construction and operation of rail freight transport and upgrade of existing railways | H1.2 |
| | Construction and operation of facilities for shared transport, including motorbikes, passenger cars and light commercial vehicles | H1.3 |
| | Passenger interurban rail transport | H1.4 |

In addition to the CGT activities, the forthcoming taxonomy could also add "transport by motorbikes, passenger cars and light commercial vehicles, including electric vehicles.

The Guangdong-Hong Kong-Macao Greater Bay Area Intercity Railway Construction Plan[13] aims to establish a "Greater Bay Area on the Track/Rails" by integrating and connecting high-speed rail, regular-speed railway, urban (suburban) rail and other rail networks. This integration would enable major cities in GBA to be reached within one hour, inland cities in Guangdong Province within two hours, and surrounding provincial capitals within three hours. The plan also set development goals of achieving a 4,700 kilometers of railway network by 2025, and a 5,700 kilometers of railway network by 2035. Therefore, the forthcoming taxonomy could include both rail for freight and passenger transport to support the low-carbon development.

In addition to rail and public transportation system, the Taxonomy could incorporate shared transport and transportation by motorbikes, passenger cars and light commercial vehicles to encompass a broader range of low-carbon transportation solutions.

### Water supply; sewerage, waste management and remediation activities

| Current Activities covered by the 4 Pilot Focus Sectors of the Prototype[14] | New Green Activities to be considered under CGT Context | CGT Activity Number |
|---|---|---|
| • Sewage sludge treatment – anaerobic digestion<br>• Collection and transport of non-hazardous waste in source segregated fractions<br>• Utilization/ treatment of domestic waste – anaerobic digestion | Recycling non-hazardous waste | E2.2 |

According to the CBI paper[2], the permanent population of the GBA was approximately 72.7 million in 2019. The two major cities, Guangzhou and Shenzhen, have experienced an average growth of over 3% in their permanent populations over the past decade. With the ongoing improvement of infrastructure and the fast-growing population, the volume of waste in GBA will continue to rise.

To minimize the amount of residual and non-hazardous waste being sent to waste-to-energy facilities and landfill, recycling and the circular economy will play a crucial role. Initiatives such as the Hong Kong Blueprint for Sustainable Use of Resources 2013–2022 and the Macao Construction Waste Management System promote recycling and the circular economy as means to achieve waste reduction targets.

### Construction

| Current Activities covered by the 4 Pilot Focus Sectors of the Prototype[15] | New Green Activities to be considered under CGT Context | CGT Activity Number |
|---|---|---|
| • Renovation of existing buildings | Green lighting upgrades | F3.1 |
| • Construction of new buildings | Installation, maintenance and repair of renewable energy technologies in buildings | F3.2 |

According to the IEA, the buildings and construction sector accounted for 36% of final energy use and 39% of energy and process-related carbon dioxide emissions in 2018[16]. As the GBAis a highly populated and fast-growing region, construction and building activities within the area contribute significantly to $CO_2$ emissions. For instance, buildings in Hong Kong consume 90% of the electricity and generate over 60% of the city's carbon emissions[17].

While the current taxonomy prototype already covers construction of new buildings and renovation of existing buildings, the addition of guidelines and criteria for green lighting updates and the adoption of renewable energy technologies in buildings would provide more detailed guidance to the markets, thereby further promoting decarbonization within the sector.

### Agriculture, forestry and fishing

| Sectors suggested to be prioritized | New Green Activities to be considered under CGT Context | |
|---|---|---|
| ISIC/HSIC classification | Under CGT Context | CGT Activity Number |
| A. Agriculture, forestry and fishing | Afforestation | A1.1 |
| | Rehabilitation and restoration of forests, including reforestation and natural forest regeneration after an extreme event | A1.2 |
| | Forest management | A1.3 |
| | Conservation forestry | A1.4 |
| | **Additional Activities Suggested to Be Prioritized:** | |
| | Comprehensive management of key ecological areas, including mangrove/wetland/seagrass bed restoration and river basin biodiversity protection | N/A |

While fossil fuel and power have been the largest emitting sectors, agriculture is next in line, accounting for approximately 17% global emissions by sector[18]. Notably, China is the largest contributor within the Agriculture sector, accounting for approximately 13% of global emissions in this sector6. Hong Kong's future taxonomy would provide stakeholders such as investors, bankers, borrowers understand the environmental impact of economic activities, including those related to agriculture. This would enable them to make informed decisions regarding sustainable finance, thereby facilitating the transition to a more sustainable economy.

The Hong Kong government's formulation of the Biodiversity Strategy and Action Plan (BSAP)[19] signifies their commitment to biodiversity conservation and sustainable development. Therefore, the forthcoming taxonomy may incorporate potential investment activities that focus on biodiversity and ecosystem services. One priority could be the comprehensive management of key ecological areas, specifically the restoration of mangroves, wetlands, seagrass beds, and river basin biodiversity protection. These activities provide not only biodiversity but also aid in carbon capture, erosion protection, and serve as a natural buffer against extreme weathers. Incorporating such activities into the taxonomy can facilitate stakeholders to make informed decisions regarding sustainable finance and drive the transition towards a greener economy in Hong Kong.

When selecting activities within the agriculture, the forthcoming taxonomy could prioritize the activities that are more relevant under GBA and China, while also considering their interoperability. The CGT can serve as a valuable reference to identifying activities within these sectors.

## Integrate Credible Transition Activities for Hong Kong's Low-Carbon Transformation

Transition finance plays a crucial role in supporting the decarbonization efforts of hard-to-abate sectors. In recent years, there has been a renewed focus on transition financing, particularly following the publication of the ICMA Transition Finance Handbook[20], OECD Guidance on Transition Finance[21] and the G20 Framework for Transition Finance[22], which complement existing guidance on transition finance. Countries like Japan are also considering the issuance of transition bonds[23] to drive their decarbonization targets.

We recognize the significance of companies in hard-to-abate sectors to reduce their carbon footprint. As part of the evolving development of Hong Kong's taxonomy, the proposed transition activities by the working group aim to establish clear criteria that define which transition activities can be deemed credible by meeting specific thresholds. These thresholds are designed to assist hard-to-abate sectors in their decarbonization journey, ultimately leading to a greener output to achieve net zero.

We have summarized major principles from the G20, the OECD Guidance, and ICMA Climate Transition Finance Handbook that could be considered when developing criteria for transition activities. These principles are as follows:

1. For best practice, should align with net zero carbon by 2050 and nearly halving emissions by 2030;
2. Be science-led;
3. Be sure that credible transition goals and pathways don't count offsets;
4. Include an assessment of current and expected technologies which can be used to determine a decarbonization pathway;
5. Be backed by operating metrics rather than a commitment or pledge;
6. Avoid carbon lock-in.

The followings are some suggested transition activities that could be included in the next phase of the taxonomy. Please refer to **Appendix 2** of this paper for the details of the suggested requirements for these transition activities.

| Sectors suggested to be prioritized | Transition Activities to be considered under CGT Context | |
|---|---|---|
| ISIC/HSIC classification | Under CGT Context | CGT Activity Number |
| C. Manufacturing | Manufacture of Iron and Steel | C1.2 |
| | **Additional Activities Suggested to Be Prioritized:** | |
| | • Manufacture of Cement<br>• Manufacture of Basic Chemicals | |

Within the GBA, a research paper from the World Resource Institute[24] states that three sectors, namely manufacturing, transportation and construction, are responsible for 83% of carbon emissions in the region. While transportation and construction are already included in the current Prototype, manufacturing, which is a crucial sector, has yet to be included. The same research paper indicates that an estimated USD 830 billion would be required to support manufacturing and other energy-intensive industries to achieve zero-emission scenario.

Transition activities within the manufacturing sector are gaining more attention in the market. Among these activities, steel, cement and chemicals are three relatively high emitters, accounting for approximately 33%, 28% and 7% of emissions within the manufacturing sector[6]. Specifically, the production of iron and steel, cement, and basic chemicals plays a critical role in infrastructure and industrial development within the GBA. Therefore, addressing the climate mitigation aspect of these three activities could be given a high priority in order to drive a low-carbon economic development in the rapidly growing GBA, which has strong demand for iron and steel, cement and basic chemicals. Including these activities in Hong Kong's future taxonomy would help establish clear criteria and thresholds for associated activities, thereby promoting sustainable financing opportunities in this sector and meeting the decarbonization financing needs of these industries.

### Principles and Methodologies for Transition Activities

Activities such as the "Manufacture of Iron and Steel," "Manufacture of Cement," and "Manufacture of Basic Chemicals" are widely recognized for their significant environmental impacts. As a result, various international and regional standards have developed guidance to support decarbonization efforts in these sectors. The Common Ground Taxonomy, EU Taxonomy, and the Climate Bonds Initiative are valuable references that have been widely adopted by international markets and investors.

Within GBA, the Guangdong Provincial Government announced the Carbon Neutrality Action Plan ("the Action Plan") in June 2022, which outlines emission reduction targets and suggests technological pathways for key carbon-emitting sectors in Guangdong, such as metal, petrochemical, and cement. The recommendations from the Guangdong Green Finance Committee provide useful guidelines and thresholds in Hong Kong's future taxonomy. Additionally, the Climate Bonds Initiative's studies on the corresponding sector's transition pathway are included in the framework as a reference for offshore transition activities.

This paper proposes two types of eligibility criteria for the forthcoming taxonomy, namely the "energy consumption-based" framework and the "carbon market-based" framework. Please refer to **Appendix 2** of this paper for detailed information regarding the two types of eligibility criteria.

**The "energy consumption-based" framework** aligns with the approach of the Guangdong Green Finance Committee, which has widely adopted the "energy consumption-based" framework in Mainland China. For example, the Huzhou's Transition Finance Framework also employs this approach. This framework specifies a range of thresholds that suit the technological capacity of the region, as stated in the National Development and Reform Commission's Notice on renewable electricity consumption quota and related matters[25]. Companies must meet the Minimum criteria level while working towards achieving Best Practice standards, promoting energy optimization, carbon emissions reduction, and environmental performance improvement.

**The "carbon market-based" framework** is particularly relevant given China's progress towards implementing a national carbon cap-and-trade system. For instance, the Guangzhou Emissions Exchange, one of China's first carbon markets, has already seen a significant volume of carbon credit transactions. This framework may become increasingly important as the use of carbon credits becomes more prevalent in China and internationally.

Nevertheless, energy consumption data is believed to have very different implications on the regional decarbonization pathway, adding to the uncertainty of actual adoption[26]. Regulators in Mainland China has been calling action to shifting the focus on energy consumption performance to carbon emission performance for transition related developments[27]. Incorporating the "carbon market-based" framework into Hong Kong's future taxonomy allows its adoption once the Chinese government provides more detailed methodologies. By including both frameworks, Hong Kong's future taxonomy can accommodate different approaches support future sustainable finance practices.

We understand that different regions may have different thresholds in place to align with technology capacity and decarbonization goals. In order to accommodate both Mainland China and offshore projects, the proposed criteria and thresholds include "Best Practice criteria" and "Minimum criteria," which draw upon the strictest guidelines in the EU and China technical guidelines, as well as the minimum criteria. For projects conducted in Mainland China, companies are required to meet the Minimum criteria level as a minimum requirement, while striving to achieve the Best Practice criteria level.

The Guangdong Transition Finance Catalogue[28] suggests aligning the threshold with Guangdong Province's transition objective of reducing carbon emissions from the key focus sectors, and ultimately in line with international standards such as those outlined by the CGT, the EU Taxonomy and the Climate Bonds Initiative Reference[29]. It is worth noting that these references have established different thresholds for different types of process and activities, as such, users of Hong Kong's taxonomy may take into account the context and location of the manufacturing process when referring to the different references provided to determine compliance.

Despite of the complexity in data usage, the design of criteria and performance threshold must be clear (i.e., easy to understand), science-based (i.e., evidence-based), and easily measurable. The forthcoming taxonomy could also be a dynamic instrument — the criteria could be periodically reviewed and updated regularly based on new information and technology. Please see **Appendix 2** of this paper for the details of the proposed criteria and thresholds.

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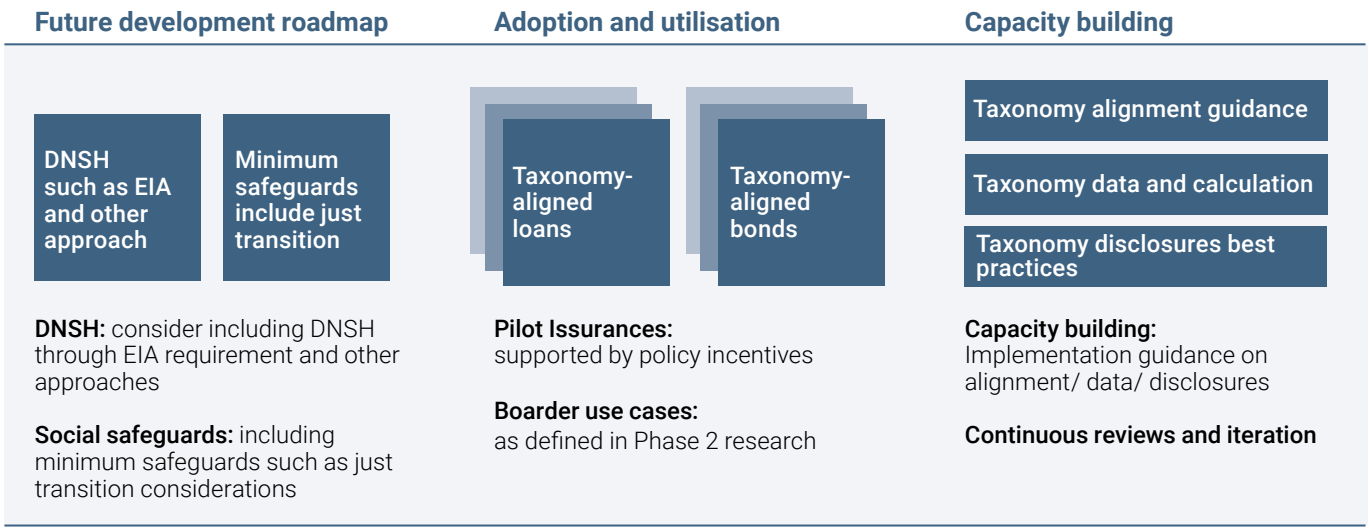
Part 3

# OTHER CONSIDERATIONS AND KEY RECOMMENDATIONS




## 3.1 Additional taxonomy considerations for future

### EIA as principles-based implementation of DNSH

Global developments following COP27 and launch of TNFD's framework has also placed increasing global emphasis on broader sustainability objectives beyond climate mitigation such as on adaptation and biodiversity. The importance of these additional objectives signifies the need to assess related risks and impact on these dimensions. It is against this backdrop that DNSH criteria become increasingly important as a way to consider these broader sustainability impact.

This principle has been named the Do No Significant Harm "DNSH" element in the EU Taxonomy, which focus on a number of environmental areas, such as climate change adaptation, circular economy, pollution, biodiversity and ecosystems and water resources. Singapore's proposed taxonomy also has a similar structure of DNSH criteria, on those objectives, except not on water resources. As other taxonomies, such as the EU or the proposed Singapore versions, take into account DNSH considerations, it is crucial for Hong Kong's future Taxonomy to maintain credibility and gain recognition from other regions by incorporating DNSH criteria as well. This is necessary to ensure best market practices and promote convergence with other taxonomies. As the forthcoming taxonomy will likely be applicable across different jurisdictions, there may be challenges in implementing the same requirements across multiple regulatory regimes. In this context, we would recommend that Hong Kong's future taxonomy to consider taking a principles-based approach to implementing DNSH, leveraging existing regulatory requirements as much as possible and using international standards such as the IFC Performance Standards, which are widely used and understood across many regions. For example, whilst they are structurally different, there is much overlap between the details assessed in the DNSH requirements and the IFC Performance Standards.

Using the Environmental Impact Assessment ("EIA") requirements across multiple taxonomies as an example, the EU Taxonomy's DNSH criteria for Protection and Restoration of Biodiversity and Ecosystems leverage EU environmental regulations for projects located in the EU and the use of International Finance Corporation Performance Standard 1 ("IFC PS1") to assess activities located outside of the EU. Singapore's DNSH criteria refer to local as well as international standards and processes, including IFC PS1, ISO standards, World Bank or UNEP guidelines, or generic qualitative requirements not linked to any national regulations. Whilst the China Green Bond Endorsed Catalogue does not explicitly have DNSH criteria formulated as such, they do refer to national environmental regulations which are similar in intent. Projects in China would inherently comply with appropriate Chinese EIA regulatory requirements already, even though these requirements are not mentioned explicitly in the China Taxonomy.

In the context of Hong Kong, the Environmental Impact Assessment Ordinance provides a statutory framework for the assessment of environmental impacts of designated projects, and the implementation of prevention and mitigation measures

to protect the environment, as defined in Schedule 2 & 3 of the Ordinance, and the implementation of prevention and mitigation measures to protect the environment. Under this Ordinance, Schedule 2 designated projects require Environmental Permits to construct and operate. The statutory EIA process is transparent with public consultations and the related EIA and environmental monitoring reports published online. Detailed requirements for conducting Ecological Impact Assessments and necessary mitigation and/or compensation measures as part of the statutory EIA for designated projects located in or near biodiversity-sensitive areas, including Site of Special Scientific Interest, Marine Park, Marine Reserve, Wild Animal Protection Area, Coastal Protection Area and Conservation Area in Hong Kong are also in place. This approach is in line with the DNSH requirement for Biodiversity and elements of the Pollution or Water objectives. For the DNSH requirements for the other objectives, we would recommend that the forthcoming taxonomy can use the IFC Performance Standards beyond the EIA requirement.

Overall, incorporating the requirement of an EIA can serve as a first step for this region's taxonomy to include DNSH criteria and progressively evolving in the future, in line with the EU Taxonomy's DNSH requirements. This approach can facilitate progress towards broader sustainability objectives beyond climate mitigation.

## Prioritizing Just Transition in social safeguard considerations

To accelerate a socially just, low-carbon transition, the activities highlighted in the forthcoming taxonomy could incorporate elements to safeguard social standards as much as possible. Amongst the HKGFA membership, there are different views as to which areas of social standards to focus on, in general there is agreement that at the minimum, Hong Kong's future taxonomy could include high standards on issues including labour protection, local community consent, and just transition. Such considerations are particularly relevant in Asia given the pace of urbanisation and development and the prevalence of high emitting activities in the region. For example, regarding just transition elements, the Climate Action 100+ platform has good guidance on just transition considerations for companies. This guidance includes looking at:

- **Acknowledgement:** formal recognition on social impacts of climate / transition strategy
- **Commitment:** commitments to decarbonize in line with Just Transition principles
- **Engagement:** engaging with stakeholders on Just Transition
- **Action:** decarbonization strategy in line with Just Transition principles such as supporting vulnerable stakeholders affected by decarbonization or supporting initiatives benefitting affected communities

The Hong Kong Government can consider what elements of a just transition that the forthcoming taxonomy could promote, such as equitable distribution of green economic opportunities and achieving consent from local communities on the rollouts of green infrastructure.

## Further developments

Users of Hong Kong's future taxonomy are encouraged to refer to the key considerations outlined in other principles such as those outlined in the G20's Transition Finance Framework and the ICMA Climate Transition Finance Handbook, for example:

**Science-based**

By establishing science-based scenarios and projections of future technology availabilities, the financial industry can be provided with practical guidance to bridge the gap between climate science and investment decision-making. These scenarios provide practical guidance for companies to develop strategic transition plans towards sustainable practices and associated disclosures, contributing to local and global decarbonization targets, in particular the Hong Kong Government's decarbonization targets. A recent example for a local sector specific pathway is the Hong Kong Green Building Council's "Climate Change Framework for Built Environment" that sets out decarbonization targets for the Hong Kong building sector's embodied and operational emissions. Activities shall also contribute to common climate mitigation targets, such as 2 degrees Celsius control by 2100, especially for investments outside Hong Kong.

**Avoid carbon lock-in**

Avoiding carbon lock-in while conducting all activities, including transition activities, under the Hong Kong Taxonomy is crucial in ensuring that systems heavily reliant on fossil fuels do not hamper the shift towards low-carbon alternatives. Thus, all activities carried out under the Hong Kong Taxonomy shall refrain from creating carbon lock-in and focus on promoting sustainable options as part of the transition process.

**Interim Timeframe**

Transition activities are typically carried out for a limited period, while alternative low-carbon technologies continue to develop and become viable solutions. Any interim activities should eventually phase out, giving way to more sustainable options as they mature. It is crucial to keep in mind that any interim activities shall eventually phase out, giving way to more sustainable options as they mature and become economically feasible. The forthcoming taxonomy could therefore carefully consider how to balance short-term needs with long-term goals, and prioritize technologies that can be integrated quickly without having a negative impact on the environment or economy.

**Supply Chain considerations**

As a major global trading hub, Hong Kong should address supply- and value-chain aspects in its taxonomy by including supply and value-chain impacts explicitly in its environmental performance criteria, based on international voluntary sustainability standards[30]. Especially around Scope 3 GHG emissions, companies are increasingly being held accountable for the entire lifecycle impact of their products and services. While Scope 3 emissions reductions can be challenging to implement, collaboration with suppliers to improve energy efficiency, reduce waste, and adopt sustainable practices can lead to cost savings, operational efficiencies and more resilient supply chains over the long term.

## 3.2 Examining Green Technology Integration in Hong Kong's future taxonomy

With decarbonization as a priority for Hong Kong's development, green technology is gaining attention in the area. Hong Kong aims to become an International GreenTech and GreenFi Centre, and the government is promoting the development of a green technology ecosystem through strategies such as attracting top enterprises and start-ups and encouraging interaction between industry, academia, and research sectors. The government is also focusing on developing a digital economy through the 2023-24 HKSAR Budget[31] and establishing an Artificial Intelligence Supercomputing Centre, which aims to support decarbonization efforts by promoting the growth of digital infrastructure and services. The forthcoming taxonomy may consider these strategies and establish a set of criteria and guidelines to accurately capture the environmental impact of green technologies.

To evaluate the ecological impact of each technology, Hong Kong's taxonomy could convene a panel of green technology experts to consider factors such as energy efficiency, renewable energy integration, carbon footprint mitigation, and other environmental considerations. This evaluation approach will allow investors to obtain a comprehensive understanding of the environmental benefits of their investments in the technology sector.

In order to promote green technology development, Hong Kong's future taxonomy could focus on integrating green data centre standards and best practices and the development of IoT, 5G, and AI technologies. The forthcoming taxonomy may reference standards such as the "Green Data Centres Practice Guide"[32] published by the BEAM Society and the EU Taxonomy criteria for "data processing, hosting and related activities"[33] to formulate criteria for data centres' energy efficiency and potential global warming. Cross-referencing with the EU Taxonomy's criteria such as "data-driven solutions for GHG emissions reductions"[34] criteria can be one way to drive green information technology solutions. These efforts are not only crucial in achieving a sustainable future but are also vital in promoting a green and digital economy in Hong Kong and the GBA.

Overall, integrating green technologies in the taxonomy's strategies will help Hong Kong achieve its goal of becoming an International GreenTech and GreenFi Centre while contributing to the area's decarbonization efforts.

## 3.3 Adoption & Utilization of taxonomy

### Pilot issuances utilizing taxonomy

HKMA's release of the taxonomy prototype in June has not yet been accompanied with clarification on possible use cases. Therefore, there is still room for the market and stakeholders to suggest how it can be best used, whilst also taking into consideration developments from other jurisdictions. Based on market observations, a recommended first step is to encourage voluntary adoption of the taxonomy in pilot issuances of financing instruments. Pilot issuances are a good way to demonstrate the taxonomy in practice and successful capital raises can also encourage further adoption.

For example, looking at the EU's various disclosures and labelling policies based on the EU Taxonomy, reference can be taken. The policy intent behind the EU Taxonomy is that a well-designed taxonomy embedded in a carefully considered ecosystem of policies can enable rapid acceleration of finance flows towards climate friendly and sustainable investments and away from polluting and other harmful activities. The combination of EU Taxonomy related regulations require that various types of market participants need to disclose their proportion of investments, lending, or instruments that are aligned with the EU Taxonomy, without any requirements on the actual proportions disclosed. In the EU, the disclosure requirements have been gradually phased in over time from voluntary to mandatory. In contrast, in China, there are no such disclosure requirements, and the use of green labels for financial instruments is voluntary, with the only mandatory requirement being that labelled instruments should align with the China Green Bond Endorsed Projects Catalogue. Overall, the use of the taxonomy is more voluntary than in the EU. In most other jurisdictions, there are no taxonomy-based disclosure requirements either.

Policy incentives would be useful to incentivise pilot issuances with taxonomy alignment once rolled out. Examples could include subsidies on issuance costs with alignment to the taxonomy, or government releasing bonds utilizing the taxonomy. The Hong Kong SAR Government can update its Green Bond Program to be aligned with Hong Kong's future

taxonomy to set a benchmark and lead by example to trial how it works and identify any areas for improvement. For example, there have been multiple European sovereign green bond programs linked to the EU Taxonomy, which adds additional policy support for its adoption. Besides, as the governments of Hainan province and the Shenzhen municipality have utilized Hong Kong for their offshore Renminbi (RMB) green bond issuances, we believe that Hong Kong policy makers could also encourage such public sector issuers to align to Hong Kong's future taxonomy.

Therefore, it would be recommended that the forthcoming taxonomy could start off with a similar beginning as in the EU and China, by being used first as a voluntary alignment tool for financial instruments. This would be a light touch way for corporates and financial institutions to become familiar with the structure and details of Hong Kong's taxonomy before any mandatory adoption.

### Broader use cases

Thereafter, as market understanding of Hong Kong's taxonomy matures, additional requirements and mandatory uses can be added. In "CGT Research Series Phase 2: Understanding use cases of the Common Ground Taxonomy"[35], the research details 6 primary use cases for taxonomies that can be considered.

### Key CGT Use Cases

| Category | Use Case | Detailing of Use Case | Users | | | Existing Examples |
|---|---|---|---|---|---|---|
| | | | Financial Management Professionals | Corporate | Government | |
| **Financing and Investments** | Debt financing | Increase comparability of sustainable finance<br>1. Labelling with reference to CGT<br>2. Capacity building tool | Y | Y | | Green debt issuances referring to CGT |
| | Investment Strategies | Widen investor base and products<br>1. Harmonize investment process<br>2. Equity selection tool<br>3. Climate solutions in real assets<br>4. Engagement Framework | Y | | | Various funds/ strategies referencing taxonomies |
| | Benchmark & Index | CGT aligned tracking of securities<br>1. CGT-aligned green bond index | Y | | | Various index and benchmarks |
| **Regulation and Disclosures** | Corporate Disclosures | Standardized disclosures<br>1. CGT aligned Disclosure | | Y | Y | EU: Taxonomy Regulation (TR), Corporate Sustainability Reporting Directive (CSRD) |
| | Investor Disclosures | Standardized label/ disclosures<br>1. General disclosures (all funds)<br>2. ESG Fund Labelling and Disclosure<br>3. Sustainability Preferences | Y | | Y | EU: TR, Sustainable Finance Disclosure Regulation (SFDR), Markets in Financial Instruments Directive (MiFID) |
| **National Policy** | Policy Setting | Regulation framework and policy tool<br>1. CGT-based regional taxonomy<br>2. CGT-referencing policy making | Y | Y | Y | EU: do-no-significant-harm (DNSH), EU Ecolabel, Climate Benchmark |

This includes the role of taxonomies in sustainability disclosures such as requiring Hong Kong listed corporates to disclose their CAPEX and revenues against HK Taxonomy alignment, similar to the CSRD requirements in the EU, or for investors to disclose the proportion of their Hong Kong Taxonomy aligned holdings in certain funds, as with Sustainable Finance Disclosure Regulation ("SFDR") in the EU. Such disclosures can be included in the HKEx disclosure requirements for example. They would allow EU investors to see better how Hong Kong listed corporates compare with European companies that disclose under the Corporate Sustainability Reporting Directive ("CSRD"), as well as giving more transparency to other investors.

This future development of additional requirements should be announced in a clear and consistent roadmap, which also lays out clear responsibilities for different market participants to allow for ample preparation time by the market.

## 3.4 Other Implementation Considerations

### Capacity building

Hong Kong's taxonomy development should also be accompanied by active efforts to raise awareness of the tool and also to disseminate technical and practical guidance.

For example, as a complement to the EU Taxonomy, the European Commission launched the EU Taxonomy Navigator, an online tool to support companies in understanding the implementing the taxonomy[36]. The navigator consists of 4 key tools:

1. **Taxonomy Compass:** visual representation of sectors, activities and criteria
2. **Taxonomy Calculator:** step-by-step guide on reporting obligations
3. **FAQs repository:** overview on common questions and answers relating to taxonomy
4. **Taxonomy User Guide:** guidance on how taxonomy fits within EU's wider sustainable finance regulatory framework

The industry has also helped to support the rollout of the EU Taxonomy through guidance published by the industry including UN PRI's "Implementing the EU Taxonomy" guidance[37] that covers an overview on taxonomy along with implementation best practices and examples.

Similar guidance can thus be developed for the taxonomy, in particular helpful areas would include:

- **Alignment:** Assessing if activities are aligned to taxonomy requirements
- **Data:** methods of data gathering and analysis
- **Implementation & Disclosures:** best practices relating to disclosures and broader use cases

Promotion of pilot issuances would also generate more awareness and understanding of its use.

Capacity building efforts should be mindful that the forthcoming taxonomy may be used by a range of participants in addition to corporate issuers, including advisory (e.g., underwriters), law firms, engineering firms, consultants, data providers and service providers. Efforts to build capacity amongst each of these sectors will help the development of the overall market, rather than focusing on small part.

### Review and Iteration

The forthcoming taxonomy will need to stay up to date with evolving scientific understanding of the environment, technological developments and developments in the market. To ensure that the taxonomy remains a relevant instrument on an ongoing basis, it would be worthwhile to regularly review such developments and consider necessary updates.

After the taxonomy instrument has been first finalized, it is recommended that a pilot use phase for several months or up to half a year be implemented, where selected issuers, verifiers, investors and other stakeholders are invited to trial the instrument and report back on their experience, before rolling out a version with any necessary adjustments more widely across the market on a voluntary use basis. This voluntary basis can be maintained for a period before those requirements are made mandatory for relevant users.

It would be expected that as the taxonomy is rolled out, the experiences of the market participants and users can inform further development and evolution of the taxonomy. It would be helpful to consider feedback and evolve the document, especially in the first couple of years after its first launch.

30. Voluntary Sustainability Standards (VSS) are private standards that require products to meet specific economic, social, and environmental sustainability metrics. The requirements can refer to product quality or attributes, but also to production and processing methods, as well as transportation (UNCTAD, 2022).
31. https://www.budget.gov.hk/2023/eng/pdf/e_budget_speech_2023-24.pdf
32. https://www.ogcio.gov.hk/en/our_work/business/tech_promotion/green_computing/green_data_centre.html
33. https://ec.europa.eu/sustainable-finance-taxonomy/activities/activity/230/view
34. https://ec.europa.eu/sustainable-finance-taxonomy/activities/activity/231/view
35. CGT Research Series Phase 2: Understanding use cases of Common Ground Taxonomy https://www.hkgreenfinance.org/wp-content/uploads/2022/09/CGT_Phase2reportENG_final.pdf
36. European Commission https://ec.europa.eu/sustainable-finance-taxonomy/
37. PRI's "Implementing the EU Taxonomy" https://www.unpri.org/download?ac=1614

# APPENDICES

## Appendix 1:
## Suggested requirements for Additional Green Activities

### Sector: Electricity, gas, steam and air conditioning supply

The respective category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds, with respective additional requirements to be comply for projects conduct in the China or the EU.

| Additional Green Activities to be considered under CGT Context | CGT Activity Number | Suggested Criteria and Threshold |
|---|---|---|
| **Production of electricity from hydropower** | D1.5 | **Main Criteria**<br>The "D1.5 Electricity generation from hydropower" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>**For projects in the Mainland China[1]:**<br>Including only the major large-scale hydropower projects listed in the National Renewable Energy Program and other related programs |
| **Electricity generation from bio-energy** | D1.6 | **Main Criteria and Threshold**<br>The "D1.6 Electricity generation from bio-energy" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>None |
| **Storage of electricity** | D1.8 | **Main Criteria and Threshold**<br>The "D1.8 Storage of electricity" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>For projects in the EU:<br>• Chemical energy storage: medium of storage (such as ammonia) complies with the criteria for Manufacture of the corresponding product specified in Section C or, if unspecified, in the technical annex X. (EU, 4.10)<br>• Hydrogen electricity storage: hydrogen meets the screening criteria specified in C2.10 Annex, re-electrification of hydrogen is also considered part of the activity. (EU, 4.10) |

| Additional Green Activities to be considered under CGT Context | CGT Activity Number | Suggested Criteria and Threshold |
|---|---|---|
| District heating and cooling | D2.1 | **Main Criteria and Threshold**<br>The "D2.1 District heating and cooling" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>**For projects in the EU:**<br>The activity meets either of the following criteria:<br>a) Life-cycle GHG emissions from the generation of heat/cool from gaseous fuels are lower than 100 g $CO_2$e/kWh.<br>b) Facilities for which the construction permit is granted by 31 December 2030 comply with all of the following:<br>i. the thermal energy generated by the activity is used in an efficient district heating and cooling system as defined in Directive 2012/27/EU;<br>ii. the direct GHG emissions of the activity are lower than 270 g $CO_2$e/kWh of the output energy;<br>iii. the heat/cool to be replaced cannot be generated from renewable energy sources;<br>iv. the activity replaces an existing high emitting heating/cooling activity using solid or liquid fossil fuel;<br>v. the newly installed production capacity does not exceed the capacity of the replaced facility;<br>vi. the facility is designed and constructed to use renewable and/or low-carbon gaseous fuels and the switch to full use of renewable and/or low-carbon gaseous fuels takes place by 31 December 2035, with a commitment and verifiable plan approved by the management body of the undertaking;<br>vii. the replacement leads to a reduction in emissions of at least 55% GHG per kWh of output energy;<br>viii. the refurbishment of the facility does not increase production capacity of the facility;<br>where the activity takes place on the territory of a Member State in which coal is used for energy generation, that Member State has committed to phase-out the use of energy generation from coal and has reported this in its integrated national energy and climate plan |
| Construction, installation and operation of heat pump facilities | D2.2 | **Main Criteria and Threshold**<br>The "D2.2 Construction, installation and operation of heat pump facilities" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>None |
| Production of heat/cool from solar thermal heating | D2.3 | **Main Criteria and Threshold**<br>The "D2.3 Production of heat/cool from solar thermal heating" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>**For projects in the EU:**<br>Where an economic activity is an integral element of the 'Installation, maintenance and repair of renewable energy technologies' as referred to in Section 7.6 of the EU Taxonomy, the technical screening criteria specified in Section 7.6 apply. |

| Additional Green Activities to be considered under CGT Context | CGT Activity Number | Suggested Criteria and Threshold |
|---|---|---|
| Cogeneration of heat/cool and power from solar energy | D2.4 | **Main Criteria and Threshold**<br>The "D2.4 Cogeneration of heat/cool and power from solar energy" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>None |
| Cogeneration of heat/cool and power from renewable non-fossil gaseous and liquid fuels (Production of heat/cool from renewable non-fossil gaseous and liquid fuels) | D2.6 | **Main Criteria and Threshold**<br>The "D2.6 Cogeneration of heat/cool and power from renewable non-fossil gaseous and liquid fuels (Production of heat/cool from renewable non-fossil gaseous and liquid fuels)" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>None |
| Cogeneration of heat/cool and power from bioenergy (Production of heat/cool from bioenergy) | D2.7 | **Main Criteria and Threshold**<br>The "D2.7 Cogeneration of heat/cool and power from bioenergy (Production of heat/cool from bioenergy)" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>None |
| Production of heat/cool using waste heat | D2.8 | **Main Criteria and Threshold**<br>The "D2.8 Production of heat/cool using waste heat" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>None |

## Sector: Transportation and storage

| Additional Green Activities to be considered under CGT Context | CGT Activity Number | Suggested Criteria and Threshold |
|---|---|---|
| Construction and operation of rail freight transport and upgrade of existing railways | H1.2 | **Main Criteria and Threshold**<br>The "H1.2 Construction and operation of rail freight transport and upgrade of existing railways" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>None |

| Additional Green Activities to be considered under CGT Context | CGT Activity Number | Suggested Criteria and Threshold |
|---|---|---|
| Construction and operation of facilities for shared transport, including motorbikes, passenger cars and light commercial vehicles | H1.3 | **Main Criteria and Threshold**<br>The "H1.3 Construction and operation of facilities for shared transport, including motorbikes, passenger cars and light commercial vehicles" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>**For projects in the EU:**<br>The activity complies with the following criteria: (EU 6.5)<br>a) for vehicles of category M1 and N1, both falling under the scope of Regulation (EC) No 715/2007:<br>i. until 31 December 2025, specific emissions of $CO_2$, as defined in Article 3(1), point (h), of Regulation (EU) 2019/631, are lower than 50g$CO_2$/km (low- and zero-emission light-duty vehicles);<br>ii. from 1 January 2026, specific emissions of $CO_2$, as defined in Article 3(1), point (h), of Regulation (EU) 2019/631, are zero.<br>for vehicles of category L, the tailpipe $CO_2$ emissions equal to 0g $CO_2$e/km calculated in accordance with the emission test laid down in Regulation (EU) 168/2013 |
| Passenger interurban rail transport | H1.4 | **Main Criteria and Threshold**<br>The "H1.4 Passenger interurban rail transport" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>None |

## Sector: Water supply; sewerage, waste management and remediation activities

| Additional Green Activities to be considered under CGT Context | CGT Activity Number | Suggested Criteria and Threshold |
|---|---|---|
| Recycling non-hazardous waste | E2.2 | **Main Criteria and Threshold**<br>The "E2.2 Recycling non-hazardous waste" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>None |

## Sector: Construction

| Additional Green Activities to be considered under CGT Context | CGT Activity Number | Suggested Criteria and Threshold |
|---|---|---|
| Green lighting upgrades | F3.1 | **Main Criteria and Threshold**<br>The "F3.1 Green lighting upgrades" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>**For projects in the Mainland China:**<br>The energy efficiency of the lighting products should meet Level One of the national standards, including: *the Energy Efficiency Limits and Energy Efficiency Grades of LED Products for Indoor Lighting (GB 30255), the Energy Efficiency Limits and Energy Efficiency Grades of LED Luminaires for Road and Tunnel Lighting (GB 37478), the Energy Efficiency Limits and Energy Efficiency Grades of LED Flat Lamp for General Lighting (GB 38450), the Energy Efficiency Limits and Energy Efficiency Grades of LED Flat Lamp for Double-ended Fluorescent Lamps for General Lighting (GB 19043), the Energy Efficiency Limits and Energy Efficiency Evaluation Value for Single-ended Fluorescent Lamp (GB 19415), the Energy Efficiency Limits and Energy Efficiency Grades for Self-ballasted Fluorescent Lamps for General Lighting (GB 19044), the Energy Efficiency Limits and Energy Efficiency Grades of AC Electronic Ballasts for Single-ended Non-polar Fluorescent Lamps (GB 29142), the Energy Efficiency Limits and Energy Efficiency Grades for Self-ballasted Non-polar Fluorescent Lamps for General Lighting (GB 29144) the Energy Efficiency Limits and Energy Efficiency Grades for High-pressure Sodium Lamps (GB 19573), the Energy Efficiency Limits and Energy Efficiency Grades for Metal Halide lamps (GB 20054), and the Energy Efficiency Limits and Energy Efficiency Evaluation Value for Halide Tungsten Lamps (GB 31276).* |
| Installation, maintenance and repair of renewable energy technologies in buildings | F3.2 | **Main Criteria and Threshold**<br>The "F3.2 Installation, maintenance and repair of renewable energy technologies in buildings" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>None |

## Sector: Agriculture, forestry and fishing[2]

| Additional Green Activities to be considered under CGT Context | CGT Activity Number | Suggested Criteria and Threshold |
|---|---|---|
| Afforestation | A1.1 | **Main Criteria and Threshold**<br>The "A1.1 Afforestation" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>**For projects in the Mainland China:**<br>To follow the criteria detailed in the Green Bond Endorsed Projects Catalogue, including:<br>• 4.2.1.5 Projects of turning farmlands back to forests or grasslands and restoring grazing lands to grasslands<br>• 4.2.1.8 Comprehensive treatment of key ecological areas<br>• 4.2.1.10 Comprehensive treatment of desertification, rocky desertification and soil erosion<br>• 4.2.2.1 Forest resources cultivation industry<br>• 4.2.2.3 Carbon sequestration forest, tree and grass planting, seedlings, and ornamental flowers<br><br>Criteria for projects in the EU:<br>To follow the criteria detailed in the "E1.1 Afforestation" activity category of the EU Taxonomy, including:<br>1. Afforestation plan and subsequent forest management plan or equivalent instrument<br>2. Climate benefit analysis<br>3. Guarantee of permanence<br>4. Audit<br>5. Group assessment |
| Rehabilitation and restoration of forests, including reforestation and natural forest regeneration after an extreme event | A1.2 | **Main Criteria and Threshold**<br>The "A1.2 Rehabilitation and restoration of forests, including reforestation and natural forest regeneration after an extreme event" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>**For projects in the Mainland China:**<br>To follow the criteria detailed in the Green Bond Endorsed Projects Catalogue, including:<br>• 4.2.1.1 Protection of natural forest resources<br>• 4.2.1.5 Projects of turning farmlands back to forests or grasslands and restoring grazing lands to grasslands<br>• 4.2.1.7 Protection and restoration of national ecological security barriers<br><br>**Criteria for projects in the EU:**<br>To follow the criteria detailed in the "1.2 Rehabilitation and restoration of forests, including reforestation and natural forest regeneration after an extreme event" activity category of the EU Taxonomy, including:<br>1. Afforestation plan and subsequent forest management plan or equivalent instrument<br>2. Climate benefit analysis<br>3. Guarantee of permanence<br>4. Audit<br>5. Group assessment |

| Additional Green Activities to be considered under CGT Context | CGT Activity Number | Suggested Criteria and Threshold |
|---|---|---|
| Forest management | A1.3 | **Main Criteria and Threshold**<br>The "A1.3 Forest management" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>**For projects in the Mainland China:**<br>To follow the criteria detailed in the Green Bond Endorsed Projects Catalogue, including:<br>• 4.2.1.1 Protection of natural forest resources<br>• 4.2.1.5 Projects of turning farmlands back to forests or grasslands and restoring grazing lands to grasslands<br>• 4.2.1.7 Protection and restoration of national ecological security<br><br>**For projects in the EU:**<br>To follow the criteria detailed in the "1.3 Forest management" activity category of the EU Taxonomy, including:<br>1. Afforestation plan and subsequent forest management plan or equivalent instrument<br>2. Climate benefit analysis<br>3. Guarantee of permanence<br>4. Audit<br>5. Group assessment |
| Conservation forestry | A1.4 | **Main Criteria and Threshold**<br>The "A1.4 Conservation forestry" category of Common Ground Taxonomy will serve as the primary reference for the criteria and thresholds.<br><br>**Additional Requirements**<br>**For projects in the Mainland China:**<br>To follow the criteria detailed in the Green Bond Endorsed Projects Catalogue, including:<br>• 4.2.1.2 Protection of animal and plant resources<br>• 4.2.1.3 Construction and operation of nature reserves<br>• 4.2.2.5 Protection and operation of national parks, world's heritages, national-level scenic and historic interest areas, national forest parks, national geo-parks, and national wetland parks<br><br>**For projects in the EU:**<br>To follow the criteria detailed in the "1.4 Conservation forestry" activity category of the EU Taxonomy, including:<br>1. Afforestation plan and subsequent forest management plan or equivalent instrument<br>2. Climate benefit analysis<br>3. Guarantee of permanence<br>4. Audit<br>5. Group assessment |

1. Green Bond Endorsed Projects Catalogue (2021 Edition) 3.2.2.4 Construction and Operation of Large-Scale Hydropower Facilities.
2. http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/4342400/2021091617180089879.pdf

# Appendix 2:
# Suggested requirements for the proposed Transition Activities

## Sector: Manufacturing

| Transition Activities to be considered under CGT Context | CGT Activity Number | Suggested Criteria and Threshold |
|---|---|---|
| Manufacture of Iron and Steel | C1.2 | **Main Criteria and Threshold**<br>**A1. "Energy consumption-based" Framework**<br>**For projects in the Mainland China:**<br>In terms of "Energy consumption-based" framework, the following threshold have been established in a range to cater the technology capacity in the Mainland China, namely the "NDRC Advanced and Benchmark Levels of Energy Efficiency in Key Industrial Areas (2023 Version)"[3] published by the National Development and Reform Commission (NDRC). Companies are required to meet the minimum criteria level as a minimum requirement, while striving to achieve the best practice level.<br><br>i. Iron and steel where energy consumption intensity do not exceed the following values applied to the respective nominal capacity (Appendix 3 Guangdong Transition Finance Catalogue Energy Consumption version): |

Energy consumption per tons of standard coal

| Nominal capacity | Best Practice Criteria | Minimum Criteria |
|---|---|---|
| | unit: energy consumption per tons of standard coal | |
| Greater than or equal to 50 tons | 61 | 72 |
| Lower than 50 tons but greater than 30 tons | 67 | 86 |

**A2. Carbon market-based" framework**

In terms of "Carbon market-based" framework, the following threshold has taken into account of the suggested criteria in the Common Ground Taxonomy, EU Taxonomy and Guangdong Transition Finance Catalogue . Thresholds for asset such as sintered ore, coke, EAF have been established in a range to cater the technology capacity in the Mainland China and the requirement for projects in the EU and mainland China (Appendix 3 Guangdong Transition Finance Catalogue Carbon market version).

i. Iron and steel where GHG emissions (reduced by the amount of emissions assigned to the production of waste gases*) do not exceed the following values** applied to the respective manufacturing process steps:

| Eligible asset | Best Practice Criteria[5] | Minimum Criteria[6] |
|---|---|---|
| | unit: $tCO_2e/t$ product | |
| i. Hot metal | 1.331 | |
| ii. Sintered ore | 0.163 | 0.1757 |
| iii. Coke | 0.144 | 0.7261 |
| iv. Iron casting | 0.299 | |
| v. Electric Arc Furnace (EAF) high alloy steel | 0.266 | 0.3417 |
| vi. Electric Arc Furnace (EAF) carbon steel | 0.209 | |

* EU applies the Regulation (EU) 2019/331 Annex VII point 10.1.5(a) to calculate the relevant amount of emissions

** For projects conducted in Mainland China, companies are required to meet the Minimum Criteria level as a minimum requirement, while striving to achieve the Best Practice Criteria level. For offshore projects, companies should meet the benchmark level and, if applicable, consider local requirements.

**B. Electric arc furnaces (EAFs) technology requirement**

Steel in electric arc furnaces (EAFs) producing EAF carbon steel or EAF high alloy steel*, and where the steel scrap input relative to product output is not lower than:

| Eligible asset | Scrap input |
|---|---|
| i. High alloy steel | 70% of the production |
| ii. Carbon steel | 90% of the production |

* EU defines EAF carbon steel and EAF high alloy steel in Commission Delegated Regulation (EU)

<table>
<tr><th>Transition Activities to be considered under CGT Context</th><th>CGT Activity Number</th><th>Suggested Criteria and Threshold</th></tr>
<tr><td>Manufacture of Iron and Steel</td><td>C1.2</td><td>
Additional Requirements<br>
Climate Bonds Initiative Reference<br>
Meanwhile, Climate Bonds Initiative has developed its sector criteria for steel sector with the goal of keeping global temperature rises to no more than 1.5oC above pre-industrial levels. It is also a good reference for the future development of the Hong Kong Taxonomy.<br><br>
For new iron and steel production facilities becoming operational in 2022 or thereafter:
<table>
<tr><th>Eligible Asset</th><th>Facility specific mitigation criteria</th></tr>
<tr><td>Blast Furnace-Basic Oxygen Furnace (BF-BOF)</td><td rowspan="4">Have Carbon Capture Utilisation and Storage (CCUS) that should capture at least 70% of all emissions (additional requirements on Transport and Storage of $CO_2$</td></tr>
<tr><td>Smelting reduction</td></tr>
<tr><td>Fossil gas-based Direct Reduction Iron Electric Arc Furnace (DRI-EAF)</td></tr>
<tr><td>Fossil gas-based DRI</td></tr>
<tr><td>Scrap based Electric Arc Furnace (EAF)</td><td>• The facility needs to use 70% of scrap as total annual inputs; OR<br>• The combined scrap and (100%) Hydrogen based DRI should add to at least 70% of the EAF total annual inputs</td></tr>
<tr><td>(100%) Hydrogen-based DRI</td><td rowspan="2">The Hydrogen used should meet the criteria in Climate Bonds Initiative Hydrogen production criteria, such as Hydrogen carbon intensity thresholds:
<table>
<tr><th rowspan="2">Asset Type</th><th colspan="4">Criteria</th></tr>
<tr><th>2022</th><th>2030</th><th>2040</th><th>2050</th></tr>
<tr><td>Hydrogen carbon intensity ($kgCO_2e/kgH_2$)</td><td>3</td><td>1.5</td><td>0.6</td><td>0</td></tr>
</table>
</td></tr>
<tr><td>(100%) Hydrogen-based DRI-EAF production line</td></tr>
<tr><td>Electrolysis of iron ore steelmaking production line</td><td>A plan that describes how the use of renewable energy will be increased/introduced in the facility within the term of the bond through different strategies such as:<br>a) Increasing renewable-based captive power generation<br>b) Increasing renewable-based power purchase agreement<br>The plan shall be provided with evidence of the strategies that will be implemented. Progress of the implementation plan to be assessed every 36 months.</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Transition Activities to be considered under CGT Context</th><th>CGT Activity Number</th><th>Suggested Criteria and Threshold</th></tr>
<tr><td>Manufacture of Cement</td><td>Not available</td><td>

**Main Criteria and Threshold**

**A1. "Energy consumption-based" Framework**

**For projects in the Mainland China:**

While striving to achieve the best practice level, companies are required to meet this minimum criteria level as a basic requirement. Manufacturing activities in relation to cement clinker, conducted in China, may refer to the following energy consumption-based criteria. Companies are required to meet the minimum criteria level as a minimum requirement, while striving to achieve the best practice level.

ii. Manufacture of cement where energy consumption intensity do not exceed the following values applied to the respective nominal capacity:

| Nominal capacity | Best Practice Criteria | Minimum Criteria |
|---|---|---|
| | unit: energy consumption per tons of standard coal | |
| Cement clinker | 100 | 117 |

**A2. "Carbon market-based" framework**

**For projects in the Mainland China:**

In terms of "Carbon market-based" framework, the interim threshold could be established with reference to the criteria in the Guangdong Transition Finance Catalogue[7] (Appendix 3). This threshold, which to be valid until 2030 and applicable to projects in China, is aligned with Guangdong Province's transition objective of reducing carbon emissions from cement clinker production by over 8% compared to 2020 levels[8].

iii. **Cement clinke**r where carbon emission intensity does not exceed the following values applied to the respective nominal capacity:

| Nominal capacity (unit: $tCO_2/t$) | Threshold Target |
|---|---|
| 4000t/d (inclusive) or above ordinary clinker production line | < 0.813 |
| 2000-4000t/d (inclusive) or above ordinary clinker production line | < 0.836 |
| 2000t/d or below ordinary clinker production line | < 0.874 |
| White cement clinker production line | < 1.019 |

**For projects in the EU:**

The EU Taxonomy has set up criteria and thresholds for "Manufacture of cement". When developing cement-related activities, particularly for projects in the EU, the Hong Kong Taxonomy could use these relevant criteria and thresholds as an important point of reference.

| Eligible asset | Specific mitigation criteria |
|---|---|
| i. Grey cement clinker | 0.722 $tCO_2e/t$ product |
| ii. Cement from grey clinker or alternative hydraulic binder | 0.469 $tCO_2e/t$ product |

**Additional Requirements**

**Climate Bonds Initiative Reference**

Meanwhile, Climate Bonds Initiative has developed its sector criteria for cement sector with the goal of keeping global temperature rises to no more than 1.5oC above pre-industrial levels. These criteria can serve as a valuable source of guidance for the future development of the Hong Kong Taxonomy.

</td></tr>
</table>

<table>
<tr><th>Transition Activities to be considered under CGT Context</th><th>CGT Activity Number</th><th>Suggested Criteria and Threshold</th></tr>
<tr><td>Manufacture of Cement</td><td>Not available</td><td>

<table>
<tr><th>Year</th><th>Carbon intensity ($tCO_2$/t cementitious product)</th><th>Year</th><th>Carbon intensity ($tCO_2$/t cementitious product)</th><th>Year</th><th>Carbon intensity ($tCO_2$/t cementitious product)</th><th>Year</th><th>Carbon intensity ($tCO_2$/t cementitious product)</th></tr>
<tr><td>2020</td><td>0.469</td><td>2028</td><td>0.384</td><td>2036</td><td>0.253</td><td>2044</td><td>0.107</td></tr>
<tr><td>2021</td><td>0.458</td><td>2029</td><td>0.374</td><td>2037</td><td>0.234</td><td>2045</td><td>0.089</td></tr>
<tr><td>2022</td><td>0.448</td><td>2030</td><td>0.363</td><td>2038</td><td>0.216</td><td>2046</td><td>0.071</td></tr>
<tr><td>2023</td><td>0.437</td><td>2031</td><td>0.345</td><td>2039</td><td>0.197</td><td>2047</td><td>0.054</td></tr>
<tr><td>2024</td><td>0.427</td><td>2032</td><td>0.326</td><td>2040</td><td>0.179</td><td>2048</td><td>0.036</td></tr>
<tr><td>2025</td><td>0.416</td><td>2033</td><td>0.308</td><td>2041</td><td>0.161</td><td>2049</td><td>0.018</td></tr>
<tr><td>2026</td><td>0.406</td><td>2034</td><td>0.289</td><td>2042</td><td>0.143</td><td>2050</td><td>0.000</td></tr>
<tr><td>2027</td><td>0.395</td><td>2035</td><td>0.271</td><td>2043</td><td>0.125</td><td></td><td></td></tr>
</table>

The cement facility is eligible if its emissions intensity, adjusted using the relevant correction factor (by multiplying the facilities emissions intensity with the correction factor according to the cement class), is lower than the relevant facility-level emissions intensity threshold:

*Threshold values forming the emissions pathway for all cement production facilities*
*Correction factors to determine the carbon intensity of the production*

| Cement class | Correction factor |
|---|---|
| 32.5 | 1.18 |
| 42.5 | 1.00 |
| 52.5 | 0.87 |

If the cement facilities use virgin biomass, hydrogen, or waste-derived fuels as a fuel source, additional criteria would be required:

- Biomass, including residues, energy crops and lignocellulosic biomass: The biomass used complies with the Climate Bonds Initiative Bioenergy criteria , such as:
  - Meet the established GHG emissions threshold; and
  - Reduce the risk of indirect land use impact (iLUC)

**Summary of the GHG emissions thresholds for different asset types**

| Asset type | Thresholds for biofuel/ biomass produced/used (primary energy) | Energy efficiency thresholds |
|---|---|---|
| Facilities producing liquid biofuel, solid and gaseous biomass for heating and co-generation | 16.0 $gCO_2e/MJ$ | N/A |
| Facilities producing biofuel for transport | 18.8 $gCO_2e/MJ$ | N/A |
| Heating/cooling, and co-generation facilities using biofuel/biomass | 16.0 $gCO_2e/MJ$ | 80% |

- Hydrogen: The Hydrogen used should meet the criteria in Climate Bonds Initiative Hydrogen production criteria, such as Hydrogen carbon intensity thresholds:

| Asset Type | Criteria | | | |
|---|---|---|---|---|
| | 2022 | 2030 | 2040 | 2050 |
| Hydrogen carbon intensity ($kgCO_2e/kgH_2$) | 3 | 1.5 | 0.6 | 0 |

- Waste-Derived Fuels, including Municipal Solid Waste:
  - All waste of recycling potential must be removed prior to burning in line with the waste hierarchy; and
  - Municipal solid waste will not be eligible as a fuel type after 2035

If the cement facilities adopt Carbon Capture Utilisation and Storage (CCUS), additional criteria on $CO_2$ transportation and storage is required.

</td></tr>
</table>

<table>
<tr><th>Transition Activities to be considered under CGT Context</th><th>CGT Activity Number</th><th>Suggested Criteria and Threshold</th></tr>
<tr><td>Manufacture of Basic Chemicals</td><td>C1.1</td><td>
Main Criteria and Threshold<br>
A1. “Energy consumption-based” Framework<br>
For projects in the Mainland China:<br>
In terms of “Energy consumption-based” framework, the following threshold has taken into account of the criteria in the “NDRC Advanced and Benchmark Levels of Energy Efficiency in Key Industrial Areas (2023 Version)”[10] published by the National Development and Reform Commission (NDRC). Thresholds have been established in a range to cater the technology capacity in the Mainland China, companies are required to meet the minimum criteria level as a minimum requirement, while striving to achieve the best practice level. Manufacturing activities in relation to Ethylene Oxide/ Ethylene Glycols, conducted in China, may refer to the following energy consumption-based criteria:<br><br>
iv. Manufacture of Ethylene Oxide/ Ethylene Glycols where energy consumption intensity do not exceed the following values applied to the respective nominal capacity:
<table>
<tr><th rowspan="2">Nominal capacity</th><th>Best Practice Criteria</th><th>Minimum Criteria</th></tr>
<tr><th colspan="2">unit: energy consumption per tons of standard coal</th></tr>
<tr><td>Ethylene Oxide/ Ethylene Glycols</td><td>375</td><td>470</td></tr>
</table>
A2. “Carbon market-based” framework<br>
Eligibility for this activity category may be based on the following criteria:<br><br>
For projects in the Mainland China:<br>
In terms of “Carbon market-based” framework, the interim threshold could be established with reference to the criteria in the Guangdong Transition Finance Catalogue[11]. This threshold, which to be valid until 2030 and applicable to projects in China, is aligned with Guangdong Province’s transition objective of reducing carbon emissions from Crude oil processing and ethylene unit products by over 4% and 5% respectively compared to 2020 levels[12] (Appendix 3 Guangdong Transition Finance Catalogue Carbon market version).<br><br>
Common Ground Taxonomy Reference<br>
The Common Ground Taxonomy “C1.1 Manufacture of organic basic chemicals” states that EU criteria are more stringent for the activity. The relevant criteria and thresholds could be a good reference for the Hong Kong Taxonomy when developing the chemicals activity. The criteria requires GHG emissions from the organic basic chemicals production processes are lower than:
<table>
<tr><th>Eligible asset (unit: $tCO_2e/t$)</th><th>Specific mitigation criteria</th></tr>
<tr><td>High Value Chemicals (HVC)</td><td>0.693</td></tr>
<tr><td>Aromatics</td><td>0.0072</td></tr>
<tr><td>Vinyl Chloride</td><td>0.171</td></tr>
<tr><td>Styrene</td><td>0.419</td></tr>
<tr><td>Ethylene Oxide/ Ethylene Glycols</td><td>0.314</td></tr>
<tr><td>Adipic Acid</td><td>0.32</td></tr>
</table>
Where the organic chemicals in scope are produced wholly or partially from renewable feedstock, the life-cycle GHG emissions of the manufactured chemical, manufactured wholly or partially from renewable feedstock, are lower than the life-cycle GHG emissions of the equivalent chemical manufactured from fossil fuel feedstock.
</td></tr>
</table>

<table>
<tr><th>Transition Activities to be considered under CGT Context</th><th>CGT Activity Number</th><th>Suggested Criteria and Threshold</th></tr>
<tr><td>Manufacture of Basic Chemicals</td><td>C1.1</td><td>Meanwhile, EU Taxonomy also covers inorganic basic chemicals:
<table>
<tr><th>Eligible asset</th><th>Specific mitigation criteria</th></tr>
<tr><td>Anhydrous Ammonia</td><td>• Ammonia is produced from hydrogen that complies with the technical screening criteria set out under “Manufacturing of hydrogen” (i.e. Hydrogen of life-cycle GHG emissions lower than 3t$CO_2$e/tH2); or<br>• Ammonia is recovered from waste water.</td></tr>
<tr><td>Nitric Acid</td><td>• GHG emissions from the manufacture of nitric acid are lower than 0.038 t$CO_2$e per tonne of nitric acid.</td></tr>
<tr><td>Chlorine</td><td>• Electricity consumption for electrolysis and chlorine treatment is equal or lower than 2.45 MWh per tonne of chlorine; and<br>• Average life-cycle GHG emissions of the electricity used for chlorine production is at or lower than 100 g $CO_2$e/kWh.</td></tr>
<tr><td>Carbon Black</td><td>• GHG emissions from the carbon black production processes are lower than 1.141 t$CO_2$e per tonne of product.</td></tr>
<tr><td>Soda Ash</td><td>• GHG emissions from the soda ash production processes are lower than 0,789 t$CO_2$e per tonne of product.</td></tr>
</table>
<br>Climate Bonds Initiative Reference<br>Meanwhile, Climate Bonds Initiative has developed its sector criteria for Basic Chemicals sector with the goal of keeping global temperature rises to no more than 1.5oC above pre-industrial levels. It is also a good reference for the future development of the Hong Kong Taxonomy.<br><br>The production facility should meet the basic chemical-specific carbon and energy intensity thresholds. In addition, the energy source should not be coal or coal derivatives or biomass and the feedstock is not coal or coal derivatives.</td></tr>
</table>

**Basic chemical-specific carbon and energy intensity thresholds**

| Asset Type | Criteria | | | | Criteria applicable in all years |
|---|---|---|---|---|---|
| | 2022 | 2030 | 2040 | 2050 | |
| Ammonia | <3 t $CO_2$e/t $H_2$, for the life cycle emissions of hydrogen used as feedstock; or ammonia is recovered from wastewater | <1.67 t $CO_2$e/t $H_2$, for the life cycle emissions of hydrogen used as feedstock; or ammonia is recovered from wastewater | <1.0 t $CO_2$e/t $H_2$, for the life cycle emissions of hydrogen used as feedstock; or ammonia is recovered from wastewater | <0.6 t $CO_2$e/t $H_2$, for the life cycle emissions of hydrogen used as feedstock; or ammonia is recovered from wastewater | $CO_2$ from ammonia production should not be used for urea production. |
| Nitric Acid | 0.038 t $CO_2$e/t nitric acid | 0.021 t $CO_2$e/t nitric acid | 0.011 t $CO_2$e/t nitric acid | 0.007 t $CO_2$e/t nitric acid | Use electricity that meets the most up to date Climate Bonds criteria for electricity grids. |
| Chlorine | 2.45 MWh electricity/t chlorine | 1.85 MWh electricity/t chlorine | Uses only electricity produced from renewable sources | Uses only electricity produced from renewable sources | Implement one of the following alternatives:<br>a. Renewable-based captive power generation<br>b. Renewable-based power purchase agreement |
| Carbon Black | 1.141 t $CO_2$e/t carbon black | 0.63 t $CO_2$e/t carbon black | 0.34 t $CO_2$e/t carbon black | 0.20 t $CO_2$e/t carbon black | NA |
| Disodium Carbonate/ Soda Ash | 0.789 t $CO_2$e/t disodium carbonate/ soda ash | 0.44 t $CO_2$e/t disodium carbonate/ soda ash | 0.23 t $CO_2$e/t disodium carbonate/ soda ash | 0.14 t $CO_2$e/t disodium carbonate/ soda ash | Implement one of the following alternatives:<br>a. Renewable-based captive power generation<br>b. Renewable-based power purchase agreement |
| High Value Chemicals (ethylene, propylene, butadiene) | 0.51 t $CO_2$e/t high value chemical | 0.28 t $CO_2$e/t high value chemical | 0.15 t $CO_2$e/t high value chemical | 0.09 t $CO_2$e/t high value chemical | NA |
| Aromatics BTX (benzene, xylene and toluene) | 0.0072 t $CO_2$e/t aromatics BTX | 0.0040 t $CO_2$e/t aromatics BTX | 0.0021 t $CO_2$e/t aromatics BTX | 0.0012 t $CO_2$e/t aromatics BTX | NA |
| Methanol | <3 t $CO_2$e/t $H_2$, for the life cycle emissions of hydrogen used as feedstock | 1.67 t $CO_2$e/t H2 for the life cycle emissions of hydrogen used as feedstock | 1.0 t $CO_2$e/t $H_2$ for the life cycle emissions of hydrogen used as feedstock | 0.6 t $CO_2$e/t $H_2$ for the life cycle emissions of hydrogen used as feedstock | NA |

3. NDRC 工业重点领域能效标杆水平和基准水平（2023 年版). https://www.ndrc.gov.cn/xxgk/zcfb/tz/202307/P020230704381062435004.pdf
4. 广东转型金融支持目录 (Appendix 3)
5. References: IPSF CGT and CBI Steel Criteria. https://www.climatebonds.net/files/files/Climate Bonds Steel Criteria.pdf
6. NDRC 工业重点领域能效标杆水平和基准水平（2023 年版）.
7. 广东转型金融支持目录 (Appendix 3)
8. 广东省人民政府关于印发广东省碳达峰实施方案的通知 - 粤府〔2022〕56号 http://www.gd.gov.cn/zwgk/wjk/qbwj/yf/content/post_4091117.html
9. Bioenergy Criteria under the Climate Bonds Standard (Aug 2022) https://www.climatebonds.net/files/files/Bioenergy%20Criteria%20Document%20Aug%202022.pdf
10. NDRC 工业重点领域能效标杆水平和基准水平（2023 年版）.
11. 广东转型金融支持目录 (Appendix 3)
12. 广东省人民政府关于印发广东省碳达峰实施方案的通知 - 粤府〔2022〕56号 http://www.gd.gov.cn/zwgk/wjk/qbwj/yf/content/post_4091117.html

# Appendix 3:
# Guangdong Transition Finance Catalogue (广东转型金融目录)

## 3.1 Energy Consumption-Based Framework

**(1) General Requirements for Transition Target Setting**

1. The entity or project should indicate medium- to long-term benchmarks for improving energy consumption-related performance of the productive facilities.

2. The entity or project should indicate final targets for its energy consumption-related performance that are at least aligned with the "Benchmarking Levels for Energy Efficiency in Industry Key Areas (2023 Edition) (https://www.gov.cn/zhengce/zhengceku/202307/content_6890009.htm)" published by the China National Development and Reform Commission (NDRC), or more ambitious targets that are aligned with the Paris Agreement.

3. If the industry baseline of energy consumption level is available, targets of energy consumption performance in the eligible entity or project's transition plan must be more ambitious than the baseline requirements.

**(2) General Entry Barriers for Entities and Projects**

The Entity or project's activities should fall under the scope of the "Industrial Structure Adjustment Guidance Catalogue (https://www.gov.cn/zhengce/2021-11/30/content_5713262.htm)" published by the NDRC.

**(1) 转型目标设定的要求**

1 列出中长期生产设施低碳转型的能耗路径阈值;

2. 设定最终目标阈值（至少为与《工业重点领域能效标杆水平和基准水平（2023 年版）》 (https://www.gov.cn/zhengce/zhengceku/202307/content_6890009.htm) 匹配的标杆值，或与巴黎协定匹配或更具雄心的目标）;

3. 有行业能耗基准线的，所受支持项目必须在行业基准线以上。

**(2) 企业（项目）准入门槛**

参考国家发展改革委现行《产业结构调整指导目录》(https://www.gov.cn/zhengce/2021-11/30/content_5713262.htm) 开展相关活动。

## 3.1 Energy Consumption-Based Framework

| Petroleum 石化 | | |
|---|---|---|
| (GB/T 4754-2017)<br>Industrial classification for national economic activities<br>国民经济行业分类 | Petroleum, coal and other fuel processing industries | 石油、煤炭及其他燃料加工业 |
| ISIC Rev.4 | Manufacture of coke and refined petroleum products | 焦炭和精炼石油产品的制造 |
| HSIC V2.0 | • Manufacture of coke and refined petroleum products 190900<br>• Manufacture of coke and refined petroleum products n.e.c. | • 焦炭和精炼石油产品的制造<br>• 焦炭和精炼石油产品制造 |
| Key field 重点领域 | Oil refinery | 炼油 |
| Threshold baseline for products transition (National)<br>产品转型阈值基准水平（国家） | • Comprehensive energy consumption of refinery per unit crude and purchased materials based on energy factor for refinery<br>• 8.5kgOE/t·energy factor for refinery | • 单位能量因数综合能耗<br>• 8.5千克标准油/吨·能量因数 |
| Transition threshold targets (National)<br>转型阈值标杆值目标（国家） | • Comprehensive energy consumption of refinery per unit crude and purchased materials based on energy factor for refinery<br>• 7.5kgOE/t·energy factor for refiner | • 单位能量因数综合能耗<br>• 7.5千克标准油/吨·能量因数 |
| Transition threshold target basis<br>转型阈值目标依据 | *Advanced and Benchmark Levels of Energy Efficiency in Key Industrial Areas (2023 Version)* | 《工业重点领域能效标杆水平和基准水平（2023 年版）》 |
| Low-carbon transformation tech.& path (National)<br>低碳转型技术或路径（国内） | Reference:<br>(Annex 1,2,3: https://www.ndrc.gov.cn/xwdt/tzgg/202202/P020220211591047750972.pdf)<br>Annex 1: The Implementation Guidelines of Retrofits and Upgrades for Energy Conservation and Carbon Reduction in the Oil Refinery Industry<br>Annex 2: The Implementation Guidelines of Retrofits and Upgrades for Energy Conservation and Carbon Reduction in the Ethylene Industry;<br>Annex 3: The Implementation Guidelines of Retrofits and Upgrades for Energy Conservation and Carbon Reduction in the Paraxylene Industry, etc.<br><br>Such as:<br>1. Reduce direct emissions through process improvements and the use of alternative raw materials.<br>2. Reduce carbon emissions through energy efficiency improvements, such as adopting the technology of heat exchanger network (HEN) integration and optimization, the technology of steam power system optimization, the technology of efficient utilization of low-temperature waste heat, the technology of efficient utilization of hydrogen resources, and the technology of component oil refining.<br>3. Enhance the proportion of green eletricity usage.<br>4. Reduce emissions in the product value chain by building a circular economy, developing and producing green and low-carbon products, and optimizing transportation and storage.<br>5. Utilize CCUS and carbon offset mechanism to help the petrochemical industry reduce carbon emissions within its whole life cycle. | 参考:<br>附件1,2,3: https://www.ndrc.gov.cn/xwdt/tzgg/202202/P020220211591047750972.pdf<br>附件1《炼油行业节能降碳改造升级实施指南》、<br>附件2《乙烯行业节能降碳改造升级实施指南》、<br>附件3《对二甲苯行业节能降碳改造升级实施指南》等<br><br>如:<br>1. 通过工艺改进、使用替代原材料等方式减少直接排放。<br>2. 通过能效提升降碳，如采用换热网络集成优化技术、蒸汽动力系统优化技术、低温余热高效利用技术、氢气资源高效利用技术和组分炼油技术等。<br>3. 提升绿色电力使用比例。<br>4. 通过构建循环经济、开发生产绿色低碳产品、优化运输和储存等方式减少产品价值链排放。<br>5. 利用CCUS使用碳抵消机制等助力石化行业减少全生命周期碳排放。 |
| Low-carbon transformation tech.& path<br>低碳转型技术或路径（CBI） | Referring to The Basic Chemicals Eligibility Criteria of the Climate Bonds Standard & Certification Scheme<br>https://www.climatebonds.net/standard/basic-chemicals<br>• Decarbonization measures are as follows (for example, quoted from 3 Criteria for Decarbonisation Measures within Facilities Producing Basic Chemicals (see 3.1 Mitigation Criteria)<br><br>1. Revamps, modifications or acquisition of equipment (boilers, furnaces, reactors, heat exchanger, distillation columns and other separation units, etc.<br>2. Revamps, modification and acquisition of equipment and other infrastructure needed for the implementation and operation of low carbon process technologies.<br>3. Infrastructure related to $CO_2$ capture of emissions from the basic chemicals production, transportation and storage<br>4. Infrastructure for production using green hydrogen Refurbishment and retrofitting of facilities to use green hydrogen<br>5. Acquisition of equipment to produce basic chemicals using green hydrogen; Infrastructure for production using $CO_2$ as a feedstock<br>Refurbishment and retrofitting of facilities to use $CO_2$ as a feedstock<br>Acquisition of equipment to produce basic chemicals using $CO_2$ as a feedstock<br>6. Infrastructure for production using biomass Refurbishment and retrofitting of facilities to use biomass<br>Acquisition of equipment to produce basic chemicals using biomass).<br>7. Infrastructure for the production using recycled feedstock<br>Refurbishment and retrofitting of facilities using recycled feedstock<br>Acquisition of equipment to produce basic chemicals using recycled feedstock<br>8. Revamps, modifications and acquisition of equipment(furnaces, reactors, separators, etc.) and other infrastructure necessary for electrification of the processes<br>9. New heat exchange equipment, such as evaporators,furnaces, boilers, etc.,<br>Revamps or modifications to heating related equipment in existing process<br>10. Revamps or modifications to equipment (boilers,furnaces, burners, etc.) in existing utilities system required for the use of hydrogen as fuel<br>Infrastructure for the production of a basic chemical in scope using hydrogen as an energy source<br>11. Revamps or modifications to equipment (boilers,furnaces, burners, etc.) in existing utilities system required for the use of biomass as fuel<br>Infrastructure for the production of a basic chemical in scope using biomass as an energy source)<br>In addition to these specific criteria, decarbonization measures must be associated with production facilities that meet the following conditions:<br>1. At least 50% of annual production is on the list of basic chemicals in scope (see 3.2 Adaptation & Resilience)<br>2. The energy source is not coal or coal derivatives or biomass.<br>3. The feedstock is not coal or coal derivatives.<br><br>• To demonstrate compliance, all measures must meet the checklist requirements detailed in the "Adaptation & Resilience Performance Checklist for Basic Chemicals Decarbonisation Measures "(see 3.2 Adaptation & Resilience) | 参照《基础化学品行业认证标准气候债券标准和认证计划》<br>· 脱碳措施如下（示例，引用自3基础化学品生产设施内脱碳措施的认证标准，具体减排标准见3.1减排标准要求）<br><br>1. 改造、改进或购置设备（锅炉、熔炉、反应器、热交换器、蒸馏塔及其他分离装置等）；<br>2. 改造、改进或购置实施和运营低碳工艺技术所需的设备及其他基础设施;<br>3. 与捕获在基础化学品生产、运输和储存过程中排放的$CO_2$相关的基础设施;<br>4. 使用绿色氢气进行生产的基础设施、翻新和改造设施、以使用绿色氢气、购置使用绿色氢气生产基础化学品的设备;<br>5. 以$CO_2$为原料进行生产的基础设施翻修和改造、以$CO_2$为原料的设施购置、以 $CO_2$为原料生产基础化学品的设备;<br>6. 使用生物质进行生产的基础设施、翻新和改造设施，以使用生物质、购置使用生物质生产基础化学品的设备;<br>7. 使用回收原料进行生产的基础设施<br>翻修和改造使用回收原料的设施<br>购置使用回收原料生产基础化学品的设备<br>8. 改造、改进和购置工艺流程电气化所需的设备（熔炉、反应器、分离器等）及其他基础设施;<br>9. 新热交换设备，如蒸发器、熔炉、锅炉等，对现有工艺中的加热相关设备进行改造或改进;<br>10. 对现有公用事业系统中使用氢气作为燃料所需的设备（锅炉、熔炉、燃烧 器等）进行改造或改进，使用氢气作为能源生产本标准所涵盖的某种基础化学品的基础设施;<br>11. 对现有公用事业系统中使用生物质作为燃料所需的设备（锅炉、熔炉、燃烧器等）进行改造或改进、使用生物质作为能源生产本标准涵盖的某种基础化学品的基础设施。<br>除这些特定标准外，脱碳措施必须与符合以下条件的生产设施相关:<br>1. 年产量中至少有50%属于本标准所涵盖的基础化学品（见3.2 气候适应和韧性）。<br>2. 生产所消耗的能源不是煤炭或煤炭衍生物或生物质。<br>3. 原料不是煤炭或煤炭衍生物。<br><br>· 为证明符合标准，所有措施都必须满足《基础化学品行业脱碳措施的气候适应和韧性表现清单》中详列的清单要求（具体见3.2气候适应和韧性）。 |

## 3.1 Energy Consumption-Based Framework

| Cement 水泥 | | |
|---|---|---|
| (GB/T 4754-2017)<br>Industrial classification for national economic activities<br>国民经济行业分类 | Non-metallic mineral products industry | 非金属矿物制品业 |
| ISIC Rev.4 | Manufacture of other non-metallic mineral product | 其他非金属矿物制品的制造 |
| HSIC V2.0 | • Manufacture of other non-metallic mineral products 239300<br>• Manufacture of cement, lime and plaster | • 其他非金属矿产品制造<br>• 水泥、石灰和石膏的制造 |
| Key field 重点领域 | Cement clinker | 水泥熟料 |
| Threshold baseline for products transition (National)<br>产品转型阈值基准水平（国家） | • Comprehensive energy consumption per unit output of product<br>• 117 kgce/t | • 单位产品综合能耗<br>• 117 千克标准煤/吨 |
| Transition threshold targets (National)<br>转型阈值标杆值目标（国家） | • Comprehensive energy consumption per unit output of product<br>• 110 kgce/t | • 单位产品综合能耗<br>• 115千克标准煤/吨 |
| Transition threshold target basis<br>转型阈值目标依据 | *Advanced and Benchmark Levels of Energy Efficiency in Key Industrial Areas (2023 Version)* | 《工业重点领域能效标杆水平和基准水平（2023 年版）》 |
| Low-carbon transformation tech.& path (National)<br>低碳转型技术或路径（国内） | Referring to *The Implementation Guidelines of Retrofits and Upgrades for Energy Conservation and Carbon Reduction in the Cement Industry* (Annex 11: https://www.ndrc.gov.cn/xwdt/tzgg/202202/P020220211591047750972.pdf),<br><br>Such as:<br>1. Technologies for the preparation of concrete from recycled construction waste products, reduce carbon emissions by reducing the use of cement and sandstone.<br>2. To improve energy efficiency, adopt dry process kilns with pre-firing, multi-stage cyclone preheater, and multi-pass coal combustion technology.<br>3. Technologies for waste heat recovery and power generation, resulting in electricity savings per unit of clinker produced.<br>4. Technologies for post-combustion remediation (chemisorption, membrane separation with calcium cycling) to improve carbon capture efficiency.<br>5. Technologies for energy-efficient glass furnaces to increase the melting rate of the furnace cycle and improve energy efficiency.<br>6. Building smart factories and improving resource efficiency through digitization. | 参照《水泥行业节能降碳改造升级实施制指南》(附件11: https://www.ndrc.gov.cn/xwdt/tzgg/202202/P020220211591047750972.pdf) 等<br><br>如:<br>1. 建筑垃圾再生产品制备混凝土技术，减少水泥和砂石的使用量减少碳排放量。<br>2. 采用预烧成、多级旋风预热器和多通道燃煤技术的干法窑，提高能源效率。<br>3. 余热回收发电技术，生产单位熟料可节约电能。<br>4. 燃烧后补集技术（化学吸附法、膜分离法与钙循环法），提高碳捕获效率。<br>5. 高效节能玻璃窑炉技术，提高窑炉周期熔化率，提高能源效率。<br>6. 通过数字化，建设智能工厂，提高资源使用效率。 |
| Low-carbon transformation tech.& path<br>低碳转型技术或路径（CBI） | Referring to The Cement Eligibility Criteria of the Climate Bonds Standard & Certification Scheme<br>https://www.climatebonds.net/standard/cement<br><br>Criteria for decarbonization measures are as follows: (example: see 3. Criteria for decarbonization measures within cement production facilities)<br><br>All measures must meet the following requirements:<br>• Mitigation Criteria(see 3.1 Mitigation Criteria), including measures that are automatically eligible for emission reductions from the point of view of emission reductions as well as measures that are eligible for emission reductions when specific eligibility criteria are met.<br><br>Measures that automatically qualify as emission reductions from an emission reduction perspective include:<br>1. Installation, upgrade and operation of precalciners<br>2. Installation, upgrade, and operation of heat recovery systems<br>3. Installation, upgrade and operation of digital control equipment or infrastructure. This may include:<br>• Sensors and measurement tools (including software that allows real-time and close control of the process to improve efficiency)<br>• Communications and control (including advanced software and control rooms, and automation of plant processes)<br>4. Installation, upgrade and operation of testing equipment. Examples: Automated XRD systems<br>5. Electrification of heat (e.g. electrical kiln processes)<br>6. Installation, upgrade and operation of equipment dedicated to calcined clay use in cement production as distinct from clinker<br><br>Note: These assets and activities must still meet the requirements for Adaptation & Resilience set out in Section 3.2<br><br>Measures to meet the emission reduction requirements after meeting specific eligibility criteria include:<br>1. Installation, upgrade, retrofit and operation of measures which achieve emissions savings equivalent to the emissions decrease for facilities between the start year of the bond and the end year(see example in the text).<br>2. Installation, upgrade, and operation of carbon capture and storage equipment where the average capture rate across all point sources is greater than 70% of total emissions, and where the criteria for transport and storage components are met by the applicant (see Section 6.4 for details).<br>3. Infrastructure, revamps or modifications of equipment needed for the production of cement using hydrogen as a fuel where the criteria for hydrogen are met by the applicant (see Section 6.2 for details).<br><br>Note: These assets and activities must still meet the requirements for Adaptation & Resilience set out in Section 3.2<br>• Adaptation & Resilience Criteria(see 3.2 Adaptation & Resilience Criteria"Adaptation and Resilience Checklist for cement production mitigation measures "for details) | 参照《水泥标准气候债券标准和认证计划》<br><br>脱碳措施标准如下:（示例: 具体见 3.水泥生产设施内的脱碳措施标准）<br><br>所有措施必须满足以下要求:<br>· 减排标准（具体见 3.1减排标准），包括从减排角度来看自动符合减排要求的措施以及满足特定资格标准后符合减排要求的措施。<br><br>从减排角度来看自动符合减排要求的措施包括:<br>1. 分解炉的安装、升级和运行<br>2. 热回收系统的安装、升级和运行<br>3. 数字化控制设备或基础设施的安装、升级和运行。这可能包括:<br>· 传感器和测量工具（包括允许实时和密切控制过程以提高效率的软件）<br>· 通信和控制（包括先进的软件和控制室，以及工厂流程的自动化）<br>4. 测试设备的安装、升级和操作。 例如: 自动化XRD系统:<br>5. 热的电气化（例如电气窑工艺流程）<br>6. 水泥生产（与熟料不同）中煅烧粘土专用设备的安装、升级和运行<br><br>注意: 这些资产和活动仍必须满足第3.2节中规定的适应性和韧性要求<br><br>满足特定资格标准后符合减排要求的措施包括:<br>1. 安装、升级、改造和运行措施，该措施实现的减排量相当于债券开始年份至结束年份期间设施的减排量(见文中的示例）。<br>2. 申请人在满足运输和储存部分标准的情况下，安装、升级和运行碳捕获和封存设备（详见第6.4节）。<br>3. 申请人在满足氢气行业认证标准的情况下，对以氢气为燃料生产水泥所需的设备进行基础设施建设、改造或改进（详见第6.2节)。<br><br>注意: 这些资产和活动仍必须满足第3.2节中规定的适应性和韧性要求<br>· 适应性和韧性标准（具体见 3.2 适应性和韧性标准 《水泥生产减排措施的适应性和韧性清单》） |

## 3.1 Energy Consumption-Based Framework

| Steel 钢铁 | | | | |
|---|---|---|---|---|
| (GB/T 4754-2017)<br>Industrial classification for national economic activities<br>国民经济行业分类 | Ferrous metal smelting and rolling processing industry | | 黑色金属冶炼和压延加工业 | |
| ISIC Rev.4 | Manufacture of basic metals | | 基本金属的制造 | |
| HSIC V2.0 | • Manufacture of basic metals 241000<br>• Manufacture of basic iron and steel (excl. casting) | | • 基本金属的制造<br>• 基本铁和钢的制造（不包括铸造） | |
| Key field 重点领域 | • Blast furnace process<br>• Converter process<br>• Electric Arc Furnace (EAF) smelting 30t<Nominal capacity<50t<br>• Electric Arc Furnace (EAF) smelting Nominal capacity≥50t<br>• Ferrosilicon<br>• Manganese-silicon alloy<br>• High carbon ferrochrome | | • 高炉工序<br>• 转炉工序<br>• 电弧炉冶炼 30吨＜公称容量＜50吨<br>• 电弧炉冶炼 公称容量≥50 吨<br>• 硅铁<br>• 锰硅合金<br>• 高碳铬铁 | |
| Threshold baseline for products transition (National)<br>产品转型阈值基准水平（国家） | • Blast furnace process<br>• Converter process<br>• Electric Arc Furnace (EAF) smelting 30t<Nominal capacity<50t<br>• Electric Arc Furnace (EAF) smelting Nominal capacity≥50t<br>• Ferrosilicon<br>• Manganese-silicon alloy<br>• High carbon ferrochrome | Energy consumption per unit output of product: 435 kgce/t<br>Energy consumption per unit output of product: 10 kgce/t<br>Energy consumption per unit output of product: 86 kgce/t<br>Energy consumption per unit output of product: 72 kgce/t<br>Energy consumption per unit output of product: 1850 kgce/t<br>Energy consumption per unit output of product: 950 kgce/t<br>Energy consumption per unit output of product: 800 kgce/t | • 高炉工序<br>• 转炉工序<br>• 电弧炉冶炼 30吨＜公称容量＜50吨<br>• 电弧炉冶炼 公称容量≥50 吨<br>• 硅铁<br>• 锰硅合金<br>• 高碳铬铁 | 单位产品能耗: 435千克标准煤/吨<br>单位产品能耗: 10千克标准煤/吨<br>单位产品能耗: 86千克标准煤/吨<br>单位产品能耗: 72千克标准煤/吨<br>单位产品能耗: 1850千克标准煤/吨<br>单位产品能耗: 950千克标准煤/吨<br>单位产品能耗: 800千克标准煤/吨 |
| Transition threshold targets (National)<br>转型阈值标杆值目标（国家） | • Blast furnace process<br>• Converter process<br>• Electric Arc Furnace (EAF) smelting 30t<Nominal capacity<50t<br>• Electric Arc Furnace (EAF) smelting Nominal capacity≥50t<br>• Ferrosilicon<br>• Manganese-silicon alloy<br>• High carbon ferrochrome | Energy consumption per unit output of product: 361 kgce/t<br>Energy consumption per unit output of product: -30 kgce/t<br>Energy consumption per unit output of product: 67 kgce/t<br>Energy consumption per unit output of product: 61 kgce/t<br>Energy consumption per unit output of product: 1770 kgce/t<br>Energy consumption per unit output of product: 860 kgce/t<br>Energy consumption per unit output of product: 710 kgce/t | • 高炉工序<br>• 转炉工序<br>• 电弧炉冶炼 30吨＜公称容量＜50吨<br>• 电弧炉冶炼 公称容量≥50 吨<br>• 硅铁<br>• 锰硅合金<br>• 高碳铬铁 | 单位产品能耗: 361千克标准煤/吨<br>单位产品能耗: -30千克标准煤/吨<br>单位产品能耗: 67千克标准煤/吨<br>单位产品能耗: 61千克标准煤/吨<br>单位产品能耗: 1770千克标准煤/吨<br>单位产品能耗: 860千克标准煤/吨<br>单位产品能耗: 710千克标准煤/吨 |
| Transition threshold target basis<br>转型阈值目标依据 | *Advanced and Benchmark Levels of Energy Efficiency in Key Industrial Areas (2023 Version)* | | 《工业重点领域能效标杆水平和基准水平（2023 年版）》 | |
| Low-carbon transformation tech.& path (National)<br>低碳转型技术或路径（国内） | Referring to *The Implementation Guidelines of Retrofits and Upgrades for Energy Conservation and Carbon Reduction in the Iron and Steel Industry* (Annex 14: https://www.ndrc.gov.cn/xwdt/tzgg/202202/P020220211591047750972.pdf).<br><br>Such as:<br>1. Promote practical technologies with high technological maturity, such as electric furnace steelmaking, increasing pellet ratio, direct reduction of iron (DRI), and hydrogen enrichment in blast furnaces, to drive the optimization of steel manufacturing process technology.<br>2. Enhance energy efficiency in all procedures and reduce fossil fuel consumption.<br>3 Develop advanced and innovative technologies such as hydrogen smelting for deep decarbonized metals, carbon capture utilization and sequestration (CCUS/CCS).<br>4. Improve the upstream electricity structure. | | 参照《钢铁行业节能降碳改造升级实施指南》<br>(附件14: https://www.ndrc.gov.cn/xwdt/tzgg/202202/P020220211591047750972.pdf) 等<br><br>如:<br>1. 推广电炉炼钢、增加球团比、直接还原铁（DRI）、高炉富氢等技术成熟度高的实用性技术，带动钢铁制造流程工艺的优化 。<br>2. 提升各工序能效，减少化石燃料消耗。<br>3. 发展氢冶深度脱碳金、碳捕集利用与封存（CCUS/CCS）等先进创新技术。<br>4. 改善上游电力结构。 | |
| Low-carbon transformation tech.& path<br>低碳转型技术或路径（CBI） | Referring to The Steel Eligibility Criteria of the Climate Bonds Standard & Certification Scheme<br>https://www.climatebonds.net/standard/Steel<br><br>The decarbonisation measures are as follows (example, quoted from 3. Criteria for decarbonisation measures within steel production facilities are specified in 3.2 Mitigation Criteria ):<br>1. Carbon Capture and Storage or Carbon Capture Utilization and Storage (CCS or CCUS)<br>2. Measures involving the use of hydrogen<br>3. Measures involving the use of biomass<br>4. Optimization of Electric Arc Furnace (EAF), installation and operation of other mitigation measures associated with EAF facilities<br>5. Production line with a blast furnace (BF) that became operational in 2007 or later<br>6. Production line with a blast furnace (BF) that became operational prior to 2007<br>7. Production line with a DRI<br><br>• All measures must meet the checklist requirements detailed in the Adaptation and Resilience Checklist for steel production mitigation measures (see 3.3 Adaptation and Resilience Criteria) | | 参照《钢铁行业认证标准气候债券标准和认证计划》<br>https://www.climatebonds.net/standard/Steel<br><br>脱碳措施如下（示例，引用自 3 钢铁生产设施内的脱碳措施认证标准 具体见3.2 减排标准 ）:<br>1. 碳捕获和封存（CCS）或碳捕获、利用与封存（CCUS）<br>2. 涉及使用氢气的措施<br>3. 涉及使用生物质的措施）<br>4. 优化电弧炉（EAF）、安装和运行与EAF设施相关的其他减排措施<br>5 与2007年或之后投产的高炉（BF）生产线相关的措施<br>6. 与2007年之前投产的高炉（BF）生产线相关的措施<br>7. 与直接还原铁生产线相关的措施(DRI)<br><br>· 所有措施都必须满足《钢铁生产减排措施的气候适应和韧性清单》中详列的清单要求（具体见 3.3 气候适应和韧性标准）。 | |

## 3.2 Carbon Market-Based Framework

**General Requirements for Transition Target-Setting**

1. To indicate medium- to long-term emission reduction pathway with corresponding quantitative benchmarks for the productive facilities.

2. To set a final emission reduction target that is aligned with or more ambitious than the Paris Agreement.

3. If the industry baseline of carbon intensity level is available, targets of carbon intensity-related performance in the eligible entity or project's transition plan must be more ambitious than the baseline requirements.

4. If industry baseline is not available, the eligible project must provide sufficient information to prove that its transition plan in terms of emission reduction target and pathway are aligned with the relevant standards in the domestic or global markets.

**转型目标设定的要求**

1. 列出中长期生产设施低碳转型的排放路径阈值（碳强度）；

2. 设定最终碳强度目标阈值（与巴黎协定匹配或更具雄心的目标）；

3. 有行业碳排放基准线的，所受支持项目必须在行业基准线以上；

4. 没有行业碳排放基准线的，所受支持项目的减排目标和速度必须符合国内或国际要求，并提出充分证明。

## 3.2 Carbon Market-Based Framework

| Petroleum 石化 | | |
|---|---|---|
| (GB/T 4754-2017)<br>Industrial classification for national economic activities<br>国民经济行业分类 | Petroleum, coal and other fuel processing industries | 石油、煤炭及其他燃料加工业 |
| ISIC Rev.4 | Manufacture of coke and refined petroleum products | 焦炭和精炼石油产品的制造 |
| HSIC V2.0 | • Manufacture of coke and refined petroleum products 190900<br>• Manufacture of coke and refined petroleum products n.e.c. | • 焦炭和精炼石油产品的制造<br>• 焦炭和精炼石油产品制造 |
| Entry barriers for Enterprises (projects)<br>企业（项目）准入门槛 | Newly built or existing entity or project whose annual amount of $CO_2$ emissions exceed 10000 tons of $CO_2$, or total energy consumption exceed 5000 tons of standard coal. | 年排放1 万吨二氧化碳（或年综合能源消费量 5000 吨标准煤）及以上的新建或运营中的企业（项目） |
| Major carbon emission activities<br>主要碳排放活动分类 | 1. Captive power plant<br>2. Coal liquefaction plant<br>3. Other production process and supporting facilities (apart from the coal liquefaction plant(s)) | 1. 自备电厂<br>2. 煤制氢装置<br>3. 其他装置工序及配套工程（煤制氢装置除外） |
| Product-level baseline for transition<br>产品转型阈值基准线 | As the Guangdong Carbon Market is still using historical-average carbon emissions intensity data for benchmarking the petroleum industry, the threshold for product-level transition is not yet available. Entities are suggested to measure the per unit carbon emissions intensity of its crude oil and ethylene products. | 由于目前广东碳市场石化行业仍采用历史平均碳排放强度，因此无法确定产品转型阈值基准线，企业可根据自身情况测算自身实际原油加工和乙烯单位产品碳排放强度。 |
| Transition target in 2030 (Guangdong)<br>2030 转型阈值目标（广东） | Carbon emission intensity of crude oil refined and ethylene products to be reduced by at least 4% and 5% respectively by 2030. At the same time, the industry-wide performance related to energy consumption level and carbon emission intensity should reach the international advanced level.<br><br>Reference:<br>In the "Announcement of Guangdong Province's Carbon-peaking Plan" by the People's Government of Guangdong Province"(https://www.gd.gov.cn/zwgk/wjk/qbwj/yf/content/post_4091117.html), section "Actions for carbon peaking of the key industrial sectors (transition targets)": Carbon emission intensity of crude oil refined and ethylene products to be reduced by at least 4% and 5% respectively by 2030. At the same time, performances related to energy consumption level and carbon emission intensity should reach the international advanced level in steel, cement, petroleum, and ethylene manufacturing sectors. | 到2030年，原油加工和乙烯单位产品碳排放比2020年分别下降4%和5%以上，整体能效水平和碳排放强度达到国际先进水平。<br><br>目标依据:<br>根据《广东省人民政府关于印发广东省碳达峰实施方案的通知》（粤府〔2022〕56号）（https://www.gd.gov.cn/zwgk/wjk/qbwj/yf/content/post_4091117.html）工业重点行业碳达峰行动（转型目标）：到2030年，原油加工和乙烯单位产品碳排放比2020年分别下降4%和5%以上。到2030年，钢铁、水泥、炼油、乙烯等重点行业整体能效水平和碳排放强度达到国际先进水平。 |
| Transition threshold targets in 2030 (International)<br>2030 转型阈值目标（国际） | Reference: "Common Ground Taxonomy – Climate Change Mitigation" (2022.6 version) (https://finance.ec.europa.eu/system/files/2022-06/220603-international-platform-sustainable-finance-common-ground-taxonomy-table-activities_en.pdf)<br>GHG emissions from the organic basic chemicals production processes are lower than:<br>(a) for HVC: 0,693 $tCO_2e$/t of HVC;<br>(b) for aromatics: 0,0072 $tCO_2e$/t of complex weighted throughput;<br>(c) for vinyl chloride: 0,171 $tCO_2e$/t of vinyl chloride;<br>(d) for styrene: 0,419 $tCO_2e$/t of styrene;<br>(e) for ethylene oxide/ethylene glycols: 0,314 $tCO_2e$/t of ethylene oxide/glycol;<br>(f) for adipic acid: 0,32 $tCO_2e$ /t of adipic acid<br><br>Where the organic chemicals in scope are produced wholly or partially from renewable feedstock, the life-cycle GHG emissions of the manufactured chemical, manufactured wholly or partially from renewable feedstock, are lower than the life-cycle GHG emissions of the equivalent chemical manufactured from fossil fuel feedstock. | 根据《共同分类目录》(2022年6月发布版本) (https://finance.ec.europa.eu/system/files/2022-06/220603-international-platform-sustainable-finance-common-ground-taxonomy-table-activities_en.pdf)<br>基本有机化学品（单位产品）生产过程的温室气体排放量应低于:<br>(a) HVC: 0.693 $tCO_2e$/t;<br>(b) 芳烃: 0.0072 $tCO_2e$/t;（注: 复合加权吞吐量）;<br>(c) 氯乙烯: 0.171 $tCO_2e$/t;<br>(d) 苯乙烯: 0.419 $tCO_2e$/t;<br>(e) 环氧乙烷/乙二醇: 0.314 $tCO_2e$/t;<br>(g) 己二酸: 0.32 $tCO_2e$/t。<br><br>如果上述范围内的有机化学品全部或部分由可再生原料生产，则全部或部分由可再生原料生产的化学品的生命周期温室气体排放<br>低于由化石燃料原料生产的同等化学品的生命周期温室气体排放 |
| Transition technologies & pathways (Mainland China Context)<br>低碳转型技术或路径（国内） | Reference:<br>(Annex 1,2,3: https://www.ndrc.gov.cn/xwdt/tzgg/202202/P020220211591047750972.pdf)<br>Annex 1: The Implementation Guidelines of Retrofits and Upgrades for Energy Conservation and Carbon Reduction in the Oil Refinery Industry<br>Annex 2: The Implementation Guidelines of Retrofits and Upgrades for Energy Conservation and Carbon Reduction in the Ethylene Industry;<br>Annex 3: The Implementation Guidelines of Retrofits and Upgrades for Energy Conservation and Carbon Reduction in the Paraxylene Industry, etc.<br><br>Such as:<br>1. Reduce direct emissions through process improvements and the use of alternative raw<br>2. Reduce carbon emissions through energy efficiency improvements, such as adopting the technology of heat exchanger network (HEN) integration and optimization, the technology of steam power system optimization, the technology of efficient utilization of low-temperature waste heat, the technology of efficient utilization of hydrogen resources, and the technology of component oil refining.<br>3. Enhance the proportion of green eletricity usage.<br>4. Reduce emissions in the product value chain by building a circular economy, developing and producing green and low-carbon products, and optimizing transportation and storage.<br>5. Utilize CCUS and carbon offset mechanism to help the petrochemical industry reduce carbon emissions within its whole life cycle. | 参考:<br>附件1,2,3: https://www.ndrc.gov.cn/xwdt/tzgg/202202/P020220211591047750972.pdf<br>附件1《炼油行业节能降碳改造升级实施指南、<br>附件2《乙烯行业节能降碳改造升级实施指南、<br>附件3《对二甲苯行业节能降碳改造升级实施指南》等<br><br>如:<br>1. 通过工艺改进、使用替代原材料等方式减少直接排放。<br>2. 通过能效提升降碳，如采用换热网络集成优化技术、蒸汽动力系统优化技术、低温余热高效利用技术、氢气资源高效利用技术和组分炼油技术等。<br>3. 提升绿色电力使用比例。<br>4. 通过构建循环经济、开发生产绿色低碳产品、优化运输和储存等方式减少产品价值链排放。<br>5. 利用CCUS使用碳抵消机制等助力石化行业减少全生命周期碳排放。 |

## 3.2 Carbon Market-Based Framework

### Petroleum 石化

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| Low-carbon transformation tech.& path<br>低碳转型技术或路径（CBI） | Referring to The Basic Chemicals Eligibility Criteria of the Climate Bonds Standard & Certification Scheme<br>https://www.climatebonds.net/standard/basic-chemicals<br>• Decarbonization measures are as follows (for example, quoted from 3 Criteria for Decarbonisation Measures within Facilities Producing Basic Chemicals (see 3.1 Mitigation Criteria)<br><br>1. Revamps, modifications or acquisition of equipment(boilers, furnaces, reactors, heat exchanger, distillation columns and other separation units, etc.<br>2. Revamps, modification and acquisition of equipment and other infrastructure needed for the implementation and operation of low carbon process technologies.<br>3. Infrastructure related to $CO_2$ capture of emissions from the basic chemicals production, transportation and storage<br>4. Infrastructure for production using green hydrogen Refurbishment and retrofitting of facilities to use green hydrogen<br>Acquisition of equipment to produce basic chemicals using green hydrogen<br>5. Infrastructure for production using $CO_2$ as a feedstock Refurbishment and retrofitting of facilities to use $CO_2$ as a feedstock<br>Acquisition of equipment to produce basic chemicals using $CO_2$ as a feedstock<br>6. Infrastructure for production using biomass Refurbishment and retrofitting of facilities to use biomass<br>Acquisition of equipment to produce basic chemicals using biomass).<br>7. Infrastructure for the production using recycled feedstock<br>Refurbishment and retrofitting of facilities using recycled feedstock<br>Acquisition of equipment to produce basic chemicals using recycled feedstock<br>8. Revamps, modifications and acquisition of equipment(furnaces, reactors, separators, etc.) and other infrastructure necessary for electrification of the processes<br>9. New heat exchange equipment, such as evaporators,furnaces, boilers, etc.,<br>Revamps or modifications to heating related equipment in existing process<br>10. Revamps or modifications to equipment (boilers,furnaces, burners, etc.) in existing utilities system required for the use of hydrogen as fuel<br>Infrastructure for the production of a basic chemical in scope using hydrogen as an energy source<br>11. Revamps or modifications to equipment (boilers,furnaces, burners, etc.) in existing utilities system required for the use of biomass as fuel<br>Infrastructure for the production of a basic chemical in scope using biomass as an energy source<br><br>In addition to these specific criteria, decarbonization measures must be associated with production facilities that meet the following conditions:<br>1. At least 50% of annual production is on the list of basic chemicals in scope (see 3.2 Adaptation & Resilience)<br>2. The energy source is not coal or coal derivatives or biomass.<br>3. The feedstock is not coal or coal derivatives.<br><br>• To demonstrate compliance, all measures must meet the checklist requirements detailed in the “Adaptation & Resilience Performance Checklist for Basic Chemicals Decarbonisation Measures ”(see 3.2 Adaptation & Resilience) | 参照《基础化学品行业认证标准气候债券标准和认证计划》<br>https://www.climatebonds.net/standard/basic-chemicals<br>· 脱碳措施如下 （示例，引用自 3基础化学品生产设施内脱碳措施的认证标准，具体减排标准见3.1 减排标准要求）<br><br>1. 改造、改进或购置设备（锅炉、熔炉、反应器、热交换器、蒸馏塔及其他分离装置等）；<br>2. 改造、改进或购置实施和运营低碳工艺技术所需的设备及其他基础设施；<br>3. 与捕获在基础化学品生产、运输和储存过程中排放的$CO_2$相关的基础设施；<br>4. 使用绿色氢气进行生产的基础设施、翻新和改造设施、以使用绿色氢气、购置使用绿色氢气生产基础化学品的设备；<br>5. 以$CO_2$为原料进行生产的基础设施翻修和改造、以$CO_2$为原料的设施购置、以 $CO_2$为原料生产基础化学品的设备；<br>6. 使用生物质进行生产的基础设施、翻新和改造设施，以使用生物质、购置使用生物质生产基础化学品的设备；<br>7. 使用回收原料进行生产的基础设施<br>翻修和改造使用回收原料的设施<br>购置使用回收原料生产基础化学品的设备<br>8. 改造、改进和购置工艺流程电气化所需的设备（熔炉、反应器、分离器等）及其他基础设施；<br>9. 新热交换设备，如蒸发器、熔炉、锅炉等，对现有工艺中的加热相关设备进行改造或改进；<br>10. 对现有公用事业系统中使用氢气作为燃料所需的设备（锅炉、熔炉、燃烧器等）进行改造或改进，使用氢气作为能源生产本标准所涵盖的某种基础化学品的基础设施；<br>11. 对现有公用事业系统中使用生物质作为燃料所需的设备（锅炉、熔炉、燃烧器等）进行改造或改进、使用生物质作为能源生产本标准涵盖的某种基础化学品的基础设施。<br><br>除这些特定标准外，脱碳措施必须与符合以下条件的生产设施相关：<br>1. 年产量中至少有 50%属于本标准所涵盖的基础化学品（见3.2 气候适应和韧性）。<br>2. 生产所消耗的能源不是煤炭或煤炭衍生物或生物质。<br>3. 原料不是煤炭或煤炭衍生物。<br><br>· 为证明符合标准，所有措施都必须满足《基础化学品行业脱碳措施的气候适应和韧性表现清单》中详列的清单要求（具体见3.2 气候适应和韧性）。 |

## 3.2 Carbon Market-Based Framework

| Cement 水泥 | | |
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| (GB/T 4754-2017)<br>Industrial classification for national economic activities<br>国民经济行业分类 | Non-metallic mineral products industry | 非金属矿物制品业 |
| ISIC Rev.4 | Manufacture of other non-metallic mineral products | 其他非金属矿物制品的制造 |
| HSIC V2.0 | • Manufacture of other non-metallic mineral products 239300<br>• Manufacture of cement, lime and plaster. | • 其他非金属矿产品制造<br>• 水泥、石灰和石膏的制造 |
| Entry barriers for Enterprises (projects)<br>企业（项目）准入门槛 | Newly built or existing entity or project whose annual amount of $CO_2$ emissions exceed 10000 tons of $CO_2$, or total energy consumption exceed 5000 tons of standard coal. | 年排放1 万吨二氧化碳（或年综合能源消费量5000 吨标准煤）及以上的新建或运营中的企业（项目） |
| Major carbon emission activities<br>主要碳排放活动分类 | 1. Clinker production<br>2. Cement griding<br>3. Mining<br>4. Other grinding (apart from cement griding) | 1. 熟料生产<br>2. 水泥粉磨<br>3. 矿山开采<br>4. 其他粉磨（除水泥外的其他粉磨产品） |
| Product-level baseline for transition<br>产品转型阈值基准线 | Reference: Guangdong Carbon Market Allowance Allocation Proposal(Vintage 2020)<br>(http://gdee.gd.gov.cn/gkmlpt/content/3/3143/post_3143292.html#3217)<br>Type of clinker production line/baseline value ($tCO_2$/t):<br>Normal clinker production line (capacity equal or larger than 4000t/d) 0.884;<br>Normal clinker production line (capacity within 2000t/d (inclusive) – 4000t/d) < 0.909;<br>Normal clinker production line (capacity smaller than 2000t/d) < 0.95;<br>Portland cement clinker production line < 1.108. | 《广东碳市场2020配额分配方案》<br>(http://gdee.gd.gov.cn/gkmlpt/content/3/3143/post_3143292.html#3217)<br>熟料生产线类别/基准值（$tCO_2$/t）<br>4000t/d（含）以上普通熟料生产线 0.884 ；<br>2000（含）-4000t/d 普通熟料生产线 0.909 ；<br>2000t/d以下普通水泥生产线 0.95 ；<br>白水泥熟料生产线 1.108。 |
| Transition target in 2030 (Guangdong)<br>2030 转型阈值目标（广东） | Type of clinker production line/target value ($tCO_2$/t):<br>Normal clinker production line (capacity equal or larger than 4000t/d) < 0.813;<br>Normal clinker production line (capacity within 2000t/d (inclusive) – 4000t/d) < 0.836;<br>Normal clinker production line (capacity smaller than 2000t/d) < 0.874;<br>Portland cement clinker production line < 1.019.<br><br>Reference:<br>In the "Announcement of Guangdong Province's Carbon-peaking Plan" by the People's Government of Guangdong Province"(https://www.gd.gov.cn/zwgk/wjk/qbwj/yf/content/post_4091117.html), section "Actions for carbon peaking of the key industrial sectors (transition targets)": Carbon emission intensity of province-wide cement clinker products to be reduced by at least 8% by 2030. At the same time, performances related to energy consumption level and carbon emission intensity should reach the international advanced level in steel, cement, petroleum, and ethylene manufacturing sectors. | 熟料生产线类别/目标值（$tCO_2$/t）<br>4000t/d（含）以上普通熟料生产线 ＜0.813 ；<br>2000（含）-4000t/d 普通熟料生产线 ＜0.836 ；<br>2000t/d以下普通水泥生产线 ＜0.874 ；<br>白水泥熟料生产线 ＜1.019 。<br><br>目标依据:<br>根据《广东省人民政府关于印发广东省碳达峰实施方案的通知》（粤府〔2022〕56号）(https://www.gd.gov.cn/zwgk/wjk/qbwj/yf/content/post_4091117.html) 工业重点行业碳达峰行动（转型目标）：到2030年，全省单位水泥熟料碳排放比2020年降低8%以上。<br>到2030年，钢铁、水泥、炼油、乙烯等重点行业整体能效水平和碳排放强度达到国际先进水平。 |
| Transition threshold targets in 2030 (International)<br>2030 转型阈值目标（国际） | Reference: Update of benchmark values for the years 2021 – 2025 of phase 4 of the EU ETS (https://climate.ec.europa.eu/system/files/2021-10/policy_ets_allowances_bm_curve_factsheets_en.pdf)<br>Benchmark value for 2021-2025 for BM10 Grey cement clinker: 0.693t $CO_2$e/t<br>Benchmark value for 2021-2025 for BM11 White cement clinker: 0.957t $CO_2$e/t | 根据《欧盟碳排放交易体系第四阶段（2021 - 2025）基准值更新》(https://climate.ec.europa.eu/system/files/2021-10/policy_ets_allowances_bm_curve_factsheets_en.pdf)<br>灰水泥熟料基准值（2021-2025）为0.693t $CO_2$e/t,<br>白水泥熟料基准值（2021-2025）为0.957t $CO_2$e/t。 |
| Transition technologies & pathways (Mainland China Context)<br>低碳转型技术或路径（国内） | Referring to The Implementation Guidelines of Retrofits and Upgrades for Energy Conservation and Carbon Reduction in the Cement Industry (Annex 11: https://www.ndrc.gov.cn/xwdt/tzgg/202202/P020220211591047750972.pdf),<br><br>Such as:<br>1. Technologies for the preparation of concrete from recycled construction waste products, reduce carbon emissions by reducing the use of cement and sandstone.<br>2. To improve energy efficiency, adopt dry process kilns with pre-firing, multi-stage cyclone preheater, and multi-pass coal combustion technology.<br>3. Technologies for waste heat recovery and power generation, resulting in electricity savings per unit of clinker produced.<br>4. Technologies for post-combustion remediation (chemisorption, membrane separation with calcium cycling) to improve carbon capture efficiency.<br>5. Technologies for energy-efficient glass furnaces to increase the melting rate of the furnace cycle and improve energy efficiency.<br>6. Building smart factories and improving resource efficiency through digitization. | 参照《水泥行业节能降碳改造升级实施制指南》<br>(附件11: https://www.ndrc.gov.cn/xwdt/tzgg/202202/P020220211591047750972.pdf) 等<br><br>如:<br>1. 建筑垃圾再生产品制备混凝土技术，减少水泥和砂石的使用量减少碳排放量。<br>2. 采用预烧成、多级旋风预热器和多通道燃煤技术的干法窑，提高能源效率。<br>3. 余热回收发电技术，生产单位熟料可节约电能。<br>4. 燃烧后补集技术（化学吸附法、膜分离法与钙循环法），提高碳捕获效率。<br>5. 高效节能玻璃窑炉技术，提高窑炉周期熔化率，提高能源效率。<br>6. 通过数字化，建设智能工厂，提高资源使用效 |

## 3.2 Carbon Market-Based Framework

| Cement 水泥 | | |
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| Low-carbon transformation tech.& path<br>低碳转型技术或路径（CBI） | Referring to The Cement Eligibility Criteria of the Climate Bonds Standard & Certification Scheme<br>https://www.climatebonds.net/standard/cement<br><br>Criteria for decarbonization measures are as follows: (example: see 3. Criteria for decarbonization measures within cement production facilities)<br><br>All measures must meet the following requirements:<br>• Mitigation Criteria(see 3.1 Mitigation Criteria), including measures that are automatically eligible for emission reductions from the point of view of emission reductions as well as measures that are eligible for emission reductions when specific eligibility criteria are met.<br><br>Measures that automatically qualify as emission reductions from an emission reduction perspective include:<br>1. Installation, upgrade and operation of precalciners<br>2. Installation, upgrade, and operation of heat recovery systems<br>3. Installation, upgrade and operation of digital control equipment or infrastructure. This may include:<br>(1) Sensors and measurement tools (including software that allows real-time and close control of the process to improve efficiency)<br>(2) Communications and control (including advanced software and control rooms, and automation of plant processes)<br>4. Installation, upgrade and operation of testing equipment. Examples: Automated XRD systems<br>5. Electrification of heat (e.g. electrical kiln processes)<br>6. Installation, upgrade and operation of equipment dedicated to calcined clay use in cement production as distinct from clinker<br><br>Note: These assets and activities must still meet the requirements for Adaptation & Resilience set out in Section 3.2<br><br>Measures to meet the emission reduction requirements after meeting specific eligibility criteria include:<br>1. Installation, upgrade, retrofit and operation of measures which achieve emissions savings equivalent to the emissions decrease for facilities between the start year of the bond and the end year(see example in the text).<br>2. Installation, upgrade, and operation of carbon capture and storage equipment where the average capture rate across all point sources is greater than 70% of total emissions, and where the criteria for transport and storage components are met by the applicant (see Section 6.4 for details).<br>3. Infrastructure, revamps or modifications of equipment needed for the production of cement using hydrogen as a fuel where the criteria for hydrogen are met by the applicant (see Section 6.2 for details).<br><br>Note: These assets and activities must still meet the requirements for Adaptation & Resilience set out in Section 3.2<br>• Adaptation & Resilience Criteria(see 3.2 Adaptation & Resilience Criteria"Adaptation and Resilience Checklist for cement production mitigation measures "for details) | 参照《水泥标准气候债券标准和认证计划》<br>https://www.climatebonds.net/standard/cement<br><br>脱碳措施标准如下:（示例: 具体见 3.水泥生产设施内的脱碳措施标准）<br><br>所有措施必须满足以下要求:<br>· 减排标准（具体见 3.1减排标准），包括从减排角度来看自动符合减排要求的措施以及满足特定资格标准后符合减排要求的措施。<br><br>从减排角度来看自动符合减排要求的措施包括:<br>1. 分解炉的安装、升级和运行<br>2. 热回收系统的安装、升级和运行<br>3. 数字化控制设备或基础设施的安装、升级和运行。这可能包括:<br>（1）传感器和测量工具（包括允许实时和密切控制过程以提高效率的软件）<br>（2）通信和控制（包括先进的软件和控制室，以及工厂流程的自动化）<br>4. 测试设备的安装、升级和操作。例如: 自动化XRD系统<br>5. 热的电气化（例如电气窑工艺流程）<br>6. 水泥生产（与熟料不同）中煅烧粘土专用设备的安装、升级和运行<br><br>注意: 这些资产和活动仍必须满足第3.2节中规定的适应性和韧性要求<br><br>满足特定资格标准后符合减排要求的措施包括:<br>1. 安装、升级、改造和运行措施，该措施实现的减排量相当于债券开始年份至结束年份期间设施的减排量（见文中的示例）。<br>2. 申请人在满足运输和储存部分标准的情况下，安装、升级和运行碳捕获和封存设备（详见第6.4节）。<br>3. 申请人在满足氢气行业认证标准的情况下，对以氢气为燃料生产水泥所需的设备进行基础设施建设、改造或改进（详见第6.2节）。<br><br>注意: 这些资产和活动仍必须满足第3.2节中规定的适应性和韧性要求<br>· 适应性和韧性标准（具体见 3.2 适应性和韧性标准 《水泥生产减排措施的适应性和韧性清单》） |

## 3.2 Carbon Market-Based Framework

| Steel 钢铁 | | | |
|---|---|---|---|
| (GB/T 4754-2017)<br>Industrial classification for national economic activities<br>国民经济行业分类 | | Ferrous metal smelting and rolling processing industry | 黑色金属冶炼和压延加工业 |
| SIC Rev.4 | | Manufacture of basic metals | 基本金属的制造 |
| HSIC V2.0 | | • Manufacture of basic metals 241000<br>• Manufacture of basic iron and steel (excl. casting) | • 基本金属的制造<br>• 基本铁和钢的制造（不包括铸造） |
| Entry barriers for Enterprises (projects)<br>企业（项目）准入门槛 | | Newly built or existing entity or project whose annual amount of $CO_2$ emissions exceed 10000 tons of $CO_2$, or total energy consumption exceed 5000 tons of standard coal. | 年排放1万吨二氧化碳（或年综合能源消费量 5000 吨标准煤）及以上的新建或运营中的企业（项目） |
| Major carbon emission activities<br>主要碳排放活动分类 | | 1. Coking<br>2. Lime firing<br>3. Pellets production<br>4. Sintering<br>5. Iron casting<br>6. Steel casting (Blast Furnace-Basic Oxygen Converter (BOF))<br>7. Steel casting (Electrical Arc Furnace (EAF))<br>8. Steel calendaring and processing<br>9. Electricity generation using purchased fossil fuel | 1. 炼焦<br>2. 石灰烧制<br>3. 球团<br>4. 烧结<br>5. 炼铁<br>6. 炼钢（转炉）<br>7. 炼钢（电炉）<br>8. 钢压延与加工<br>9. 外购化石燃料掺烧发电 |
| Product-level baseline for transition<br>产品转型阈值基准线 | SIC Rev.4 | Reference: Guangdong Carbon Market Allowance Allocation Proposal(Vintage 2020)<br>(http://gdee.gd.gov.cn/gkmlpt/content/3/3143/post_3143292.html#3217)<br>Processing products/baseline value ($tCO_2$/t product)<br>Coke: 0.7892;<br>Quicklime (including lime-fired products made from limestone and dolomite): 0.8709;<br>Pellets: 0.0746;<br>Sintered ore: 0.1910;<br>Pig-iron: 1.3686. | 《广东碳市场2020配额分配方案》<br>(http://gdee.gd.gov.cn/gkmlpt/content/3/3143/post_3143292.html#3217)<br>工序产品/ 基准值（$tCO_2$/t 产品）<br>焦炭 0.7892 ；<br>生石灰（包括以石灰石和白云石为原料的石灰烧制产品）0.8709;<br>球团矿 0.0746 ;<br>烧结矿 0.1910 ；<br>生铁 1.3686 。 |
| | HSIC V2.0 | Reference: Guangdong Carbon Market Allowance Allocation Proposal(Vintage 2020)<br>(http://gdee.gd.gov.cn/gkmlpt/content/3/3143/post_3143292.html#3217)<br>Processing products/baseline value ($tCO_2$/t product)<br>Converter Furnace high alloy steel: 0.1393;<br>Electric Arc Furnace (EAF) high alloy steel: 0.3714. | 《广东碳市场2020配额分配方案》<br>(http://gdee.gd.gov.cn/gkmlpt/content/3/3143/post_3143292.html#3217)<br>工序产品/ 基准值（$tCO_2$/t 产品）<br>粗钢（转炉） 0.1393 ；<br>粗钢（电炉） 0.3714 。 |
| Transition target in 2030 (Guangdong)<br>2030 转型阈值目标（广东） | SIC Rev.4 | Processing products/target value ($tCO_2$/t product)<br>Coke < 0.7261;<br>Quicklime (including lime-fired products made from limestone and dolomite): 0.8012;<br>Pellets: 0.06863;<br>Sintered ore: 0.1757;<br>Pig-iron: 1.2591.<br>Reference:<br>In the “Announcement of Guangdong Province’s Carbon-peaking Plan” by the People’s Government of Guangdong Province”(https://www.gd.gov.cn/zwgk/wjk/qbwj/yf/content/post_4091117.html), section “Actions for carbon peaking of the key industrial sectors (transition targets)”: Carbon emission intensity of province-wide long-process crude steel unit products to be reduced by at least 8% by 2030 compared with the 2020 baseline. At the same time, performances related to energy consumption level and carbon emission intensity should reach the international advanced level in steel, cement, petroleum, and ethylene manufacturing sectors. | 工序产品/ 目标值（$tCO_2$/t 产品）<br>焦炭<0.7261 ；<br>生石灰（包括以石灰石和白云石为原料的石灰烧制产品）<0.8012 ；<br>球团矿 <0.06863 ;<br>烧结矿 <0.1757 ；<br>生铁 <1.2591。<br>目标依据:<br>根据《广东省人民政府关于印发广东省碳达峰实施方案的通知》（粤府〔2022〕56号）(https://www.gd.gov.cn/zwgk/wjk/qbwj/yf/content/post_4091117.html) 工业重点行业碳达峰行动（转型目标）：到2030年，长流程粗钢单位产品碳排放比2020年降低8%以上。<br>到2030年，钢铁、水泥、炼油、乙烯等重点行业整体能效水平和碳排放强度达到国际先进水平。 |
| | HSIC V2.0 | Processing products/target value ($tCO_2$/t product)<br>Converter Furnace high alloy steel < 0.1282;<br>Electric Arc Furnace (EAF) high alloy steel: < 0.3417.<br>Reference:<br>In the “Announcement of Guangdong Province’s Carbon-peaking Plan” by the People’s Government of Guangdong Province”(https://www.gd.gov.cn/zwgk/wjk/qbwj/yf/content/post_4091117.html), section “Actions for carbon peaking of the key industrial sectors (transition targets)”: Carbon emission intensity of province-wide long-process crude steel unit products to be reduced by at least 8% by 2030 compared with the 2020 baseline. At the same time, performances related to energy consumption level and carbon emission intensity should reach the international advanced level in steel, cement, petroleum, and ethylene manufacturing sectors. | 工序产品/ 目标值（$tCO_2$/t 产品）<br>粗钢（转炉） <0.1282 ;<br>粗钢（电炉） <0.3417 。<br>根据《广东省人民政府关于印发广东省碳达峰实施方案的通知》（粤府〔2022〕56号）(https://www.gd.gov.cn/zwgk/wjk/qbwj/yf/content/post_4091117.html) 工业重点行业碳达峰行动（转型目标）：到2030年，长流程粗钢单位产品碳排放比2020年降低8%以上。<br>到2030年，钢铁、水泥、炼油、乙烯等重点行业整体能效水平和碳排放强度达到国际先进水平。 |

## 3.2 Carbon Market-Based Framework

| Steel 钢铁 | | | |
|---|---|---|---|
| Transition threshold targets in 2030 (International)<br>2030 转型阈值目标（国际） | SIC Rev.4 | a) Base on the Regulation (EU) 2019/331 (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0331&qid=1695195619768) Annex VII point 10.1.5(a) , for manufacturing of Iron and steel GHG emissions (reduced by the amount of emissions assigned to the production of waste gases) do not exceed the following values applied to the respective manufacturing process steps:<br>i. Hot metal < 1.331<br>ii. Sintered ore < 0.163<br>iii. Coke < 0.144<br>iv. Iron casting < 0.299<br>v. Electric Arc Furnace (EAF) high alloy steel < 0.266<br>vi. Electric Arc Furnace (EAF) carbon steel < 0.209 | a）根据《2019/331 欧盟（EU）条例》(https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0331&qid=1695195619768) 8附件 VII 的第 10.1.5（a）条在采取措施实现流程过程废气排放减少后，对于不同工艺流程环节的钢铁（单位产品）温室气体排放量不应超过以下值:<br>i. 铁水= 1.331 $tCO_2e/t$;<br>ii. 烧结矿= 0.163 $tCO_2e/t$;<br>iii. 焦炭（不包括褐煤焦）= 0.144 $tCO_2e/t$;<br>iv. 铸铁= 0.299 $tCO_2e/t$;<br>v. 电弧炉（EAF）高合金钢= 0.266 $tCO_2e/t$;<br>vi. 电弧炉（EAF）碳素钢= 0.209 $tCO_2e/t$。 |
| | HSIC V2.0 | b) Based on the Commission Delegated Regulation (EU) 2019/331 (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0331&qid=1695195619768), steel in electric arc furnaces (EAFs) producing EAF carbon steel or EAF high alloy steel*, and where the steel scrap input relative to product output is not lower than:<br>Eligible asset/Scrap input<br>i. High alloy steel: 70% of the production<br>ii. Carbon steel: 90% of the production<br><br>Where the $CO_2$ that would otherwise be emitted from the Manufacture process is captured for the purpose of underground storage,the $CO_2$ is transported and stored underground, in accordance with the technical screening criteria set out in Sections X of "Common Ground Taxonomy – Climate Change Mitigation" ( 2022.6 version). | b）生产电炉碳素钢或电炉高合金钢的电弧炉用废钢原料投入，根据《2019/331 欧盟（EU）条例》(https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019R0331&qid=1695195619768) 所定义，以产出产品为计算基准，单位产量的废钢投入不低于:<br>i. 生产高合金钢的废钢投入不低于 70%;<br>ii. 生产碳素钢的废钢投入不低于 90%<br><br>如果制造过程中排放的二氧化碳被捕获并被地下封存，则二氧化碳运输及地下封存活动应按照《共同分类目录》第 X 门类中规定的技术筛选标准。 |
| Transition technologies & pathways<br>(Mainland China Context)<br>低碳转型技术或路径（国内） | | Referring to The Implementation Guidelines of Retrofits and Upgrades for Energy Conservation and Carbon Reduction in the Iron and Steel Industry (Annex 14: https://www.ndrc.gov.cn/xwdt/tzgg/202202/P020220211591047750972.pdf).<br><br>Such as:<br>1. Promote practical technologies with high technological maturity, such as electric furnace steelmaking, increasing pellet ratio, direct reduction of iron (DRI), and hydrogen enrichment in blast furnaces, to drive the optimization of steel manufacturing process technology.<br>2. Enhance energy efficiency in all procedures and reduce fossil fuel consumption.<br>3. Develop advanced and innovative technologies such as hydrogen smelting for deep decarbonized metals, carbon capture utilization and sequestration (CCUS/CCS)<br>4. Improve the upstream electricity structure. | 参照《钢铁行业节能降碳改造升级实施指南》<br>(附件14: https://www.ndrc.gov.cn/xwdt/tzgg/202202/P020220211591047750972.pdf）等<br><br>如:<br>1. 推广电炉炼钢、增加球团比、直接还原铁（DRI）、高炉富氢等技术成熟度高的实用性技术，带动钢铁制造流程工艺的优化。<br>2. 提升各工序能效，减少化石燃料消耗。<br>3. 发展氢冶深度脱碳金、碳捕集利用与封存（CCUS/CCS）等先进创新技术。<br>4. 改善上游电力结构。<br>5. 高效节能玻璃窑炉技术，提高窑炉周期熔化率，提高能源效率。<br>6. 通过数字化，建设智能工厂，提高资源使用效。 |
| Low-carbon transformation tech.& path<br>低碳转型技术或路径（CBI） | | Referring to The Steel Eligibility Criteria of the Climate Bonds Standard & Certification Scheme<br>https://www.climatebonds.net/standard/Steel<br><br>• The decarbonisation measures are as follows (example, quoted from 3. Criteria for decarbonisation measures within steel production facilities. see 3.2 Mitigation Criteria ):<br><br>1. Carbon Capture and Storage or Carbon Capture Utilization and Storage (CCS or CCUS)<br>2. Measures involving the use of hydrogen<br>3. Measures involving the use of biomass<br>4. Optimization of Electric Arc Furnace (EAF), installation and operation of other mitigation measures associated with EAF facilities<br>5. Production line with a blast furnace (BF) that became operational in 2007 or later<br>6. Production line with a blast furnace (BF) that became operational prior to 2007<br>7. Production line with a DRI<br><br>• All measures must meet the checklist requirements detailed in the Adaptation and Resilience Checklist for steel production mitigation measures (see 3.3 Adaptation and Resilience Criteria). | 参照《钢铁行业认证标准气候债券标准和认证计划》<br>https://www.climatebonds.net/standard/Steel<br><br>· 脱碳措施如下（示例，引用自 3 钢铁生产设施内的脱碳措施认证标准 具体见3.2 减排标准 ）:<br><br>从减排角度来看自动符合减排要求的措施包括:<br>1. 碳捕获和封存（CCS）或碳捕获、利用与封存（CCUS）<br>2. 涉及使用氢气的措施<br>3. 涉及使用生物质的措施<br>4. 优化电弧炉（EAF）、安装和运行与EAF设施相关的其他减排措施<br>5. 与2007年或之后投产的高炉（BF）生产线相关的措施<br>6. 与2007年之前投产的高炉（BF）生产线相关的措施<br>7. 与直接还原铁生产线相关的措施(DRI)<br><br>· 所有措施都必须满足《钢铁生产减排措施的气候适应和韧性清单》中详列的清单要求（具体见 3.3 气候适应和韧性标准） |