



Financing Asia's Transition to a Net-Zero Future

This report is a collaborative research project prepared¹ by the ASEAN+3 Macroeconomic Research Office (AMRO), Boao Forum for Asia Academy (BFAA), and CICC Global Institute (CGI).

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Abbreviations

ADB	Asian Development Bank
AE	Advanced economies
AMRO	ASEAN+3 Macroeconomic Research Office
ASEAN	Association of South-East Asian Nations (Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam)
ASEAN+3	ASEAN plus China (including Hong Kong), Japan, Korea
ATB	ASEAN Taxonomy Board
BFAA	Boao Forum for Asia Academy
BIS	Bank of International Settlement
CGI	CICC Global Institute
CICC	China International Capital Corporation
EC	European Commission
ECCC	Environment and Climate Change Canada
EMDE	Emerging markets and developing economies
ETS	Emissions trading systems
FISMA	Financial Services and Capital Markets Union
ICMA	International Capital Market Association
IEA	International Energy Agency
IFC	International Financial Centre
ILO	International Labor Organization
IMF	International Monetary Fund
IPSF	International Platform on Sustainable Finance
JMOF	Japan Ministry of Finance
MAS	Monetary Authority of Singapore
METI	Ministry of Economy, Trade and Industry of Japan
SBFN	Sustainable Banking and Finance Network
T&E	European Federation for Transport and Environment
WBG	World Bank Group

Executive Summary

The world is at a turning point. As economies strive for a sustainable future, Asia stands out as a region with immense potential and significant progress. More people in the region maintain a strong belief that their governments will take more strict measures to reduce carbon emissions compared to other parts of the world, according to the Ipsos Global Advisor Predictions Survey. This finding comes against the backdrop of global geopolitical fragmentation, notably the US withdrawal from the Paris Agreement, which has created uncertainty for international carbon commitments. Nonetheless, this challenging reality has presented an opportunity for the region to take the lead in driving a collective, coordinated push toward a net-zero future.

Market mechanisms alone lack sufficient incentives to correct the market failure associated with climate change, as a sustainable environment is not only a public good but a global public good. Policy intervention at the national, regional, and international levels is essential for the pathway to net zero, particularly through transition finance, which supports industries and economies on their drive toward carbon neutrality.

Many Asian economies, such as those in the ASEAN+3 region, face structural challenges that further complicate the transition. High fossil inertia, uneven development of financial markets and shortages of skilled labor force make it difficult to accelerate decarbonization. Overcoming these obstacles requires a well-designed policy framework that integrates both real economy policies and transition finance policies to create a more supportive environment. Specifically, real economy policies can make transition assets economically viable by creating market demand, reducing investment costs and risks, and improving market access. Meanwhile, transition finance policies focus on directing financial resources toward high-carbon industries, ensuring they have the necessary capital to transition—the key focus of this report.

An essential component of an effective transition finance framework is a well-structured taxonomy. Compared to principle-based approaches, a taxonomy-based approach offers greater transparency for financial institutions and transitioning corporates. To promote efficiency and clarity, financial regulators must take the lead in designing a purpose-specific taxonomy exclusively for transition finance. This taxonomy should be easy to understand, align with other broader regulatory frameworks, and serve as the primary reference for financial institutions and corporates involved in transition finance.

International cooperation will also be a key enabler in advancing transition finance. Cross-border coordination can improve interoperability between markets, making it easier for capital to flow into transition assets. International organizations should coordinate a standardized framework for ensuring seamless integration across different economies and providing lower-cost funding sources to address financial constraints.

The region is at a pivotal juncture. With growing public support for a net-zero future and a unique opportunity for regional leadership, now is the time to overcome barriers and accelerate the shift toward a low-carbon economy. By addressing structural challenges, enhancing policy transparency, and leveraging international cooperation, the region can build a sustainable future, one that balances financial stability, economic growth, and environmental responsibility.

1. Introduction

Climate change is a global challenge that has gained prominence, particularly since the adoption of the Paris Agreement (COP21) in 2015. While notable progress has been made in advancing environmentally sustainable practices, significant challenges remain. In particular, the transition to a net-zero future is both complex and capital-intensive, requiring substantial financial support to drive meaningful change. As industries and economies adapt to evolving global climate commitments, transition finance emerges as a critical mechanism to bridge funding gaps and facilitate a gradual shift from carbon-intensive operations to low-carbon, sustainable alternatives. Effective mobilization of transition finance requires a well-coordinated policy framework, clear regulatory guidance, and active participation from financial markets.

Economies worldwide have been taking steps to address global environmental externalities by reducing greenhouse gas emissions (GHG) and achieving the goal to limit global warming to 1.5–2°C above pre-industrial levels by 2050. However, the increasing frequency of extreme weather events, rising global temperatures, and biodiversity loss highlights the urgency for economies to move beyond green activities to actively support transitioning to a low-carbon economy. This would require transitioning the entire economy, not just expanding the green economy (Menon 2023).

Nevertheless, market mechanisms alone lack sufficient incentives to correct the market failure associated with climate change, as a sustainable environment is not only a public good but is a global one. Therefore, policy intervention at the national, regional, and international levels is essential for the pathway to Net Zero, particularly through transition finance, which supports industries and economies on their path towards carbon neutrality.

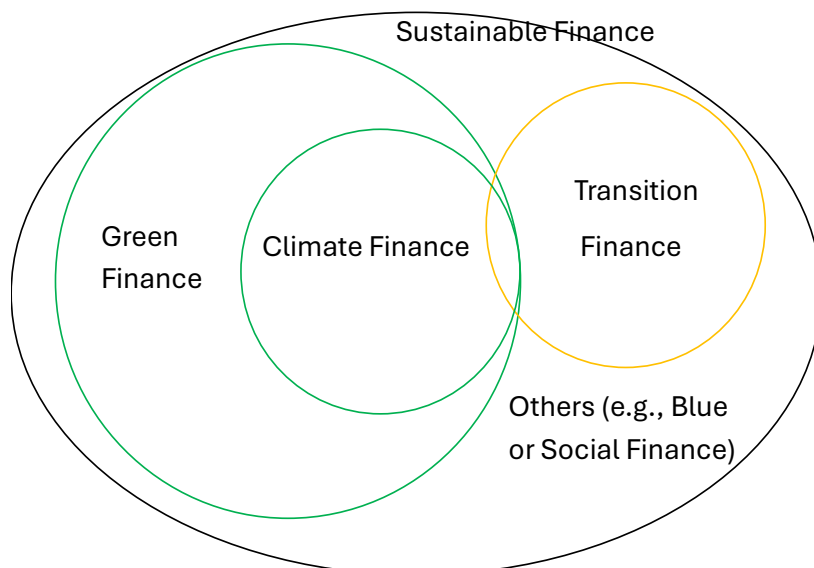
1.1 Differentiating Green Finance and Transition Finance

There is currently no universally accepted definition or systematic categorization of the various types of finance, including sustainable finance (Packer 2022, Goel 2022, NGFS 2021), green finance, climate finance (UNFCCC 2024, IPCC 2022), and transition finance (GFANZ 2024). This lack of clarity has led to ambiguity and overlapping concepts, making it difficult to establish a clear and common understanding. Figure 1 makes a preliminary attempt to clarify the boundaries among these financing categories to facilitate more structured discussions and avoiding confusion brought on by ambiguity in the terminology.

Sustainable finance is the broadest category, integrating environmental, social, and governance (ESG) factors in alignment with the Sustainable Development Goals (SDGs). Under this umbrella, green finance are investment products that primarily supports projects and assets that are already environmentally sustainable, such as renewable energy, energy-efficient infrastructure, and circular economy initiatives. As a subset of green finance, climate finance refers to financing instruments targeted specifically for mitigating climate change and supporting adaptation efforts. Meanwhile, transition finance is designed to facilitate the gradual decarbonization of high-emission sectors, industries, and economies that are not yet fully green but are making efforts toward carbon reduction and sustainability. Specifically, transition finance addresses the current gap in funding the shift to low carbon production and energy alternatives by providing capital for heavy-emission industries such as steel, cement, and energy, which require long-term strategies to phase out their carbon-intensive processes. The concept has gained prominence in recent years, as economies recognize that achieving net-zero emissions requires both the scaling of green investments and the managed phase-out of

high carbon-emitting activities. Recognizing the distinction between green and transition finance is important for ensuring that financial resources are effectively allocated to both immediate and long-term sustainability goals.

Figure 1: Distinction between various types of finance



Note: The overlap between green finance and transition finance exists in practice due to the lack of standardized definitions. To enhance clarity, taxonomies should establish clear criteria and thresholds to differentiate between the two.

1.2 Comprehensive Understanding of Transition Finance

The ultimate goal of transition finance is to serve the global green transition, particularly the transformation of high-carbon industries into low carbon activities. Therefore, to analyse the future direction of global transition finance, it is essential to have a comprehensive understanding of its core objectives.

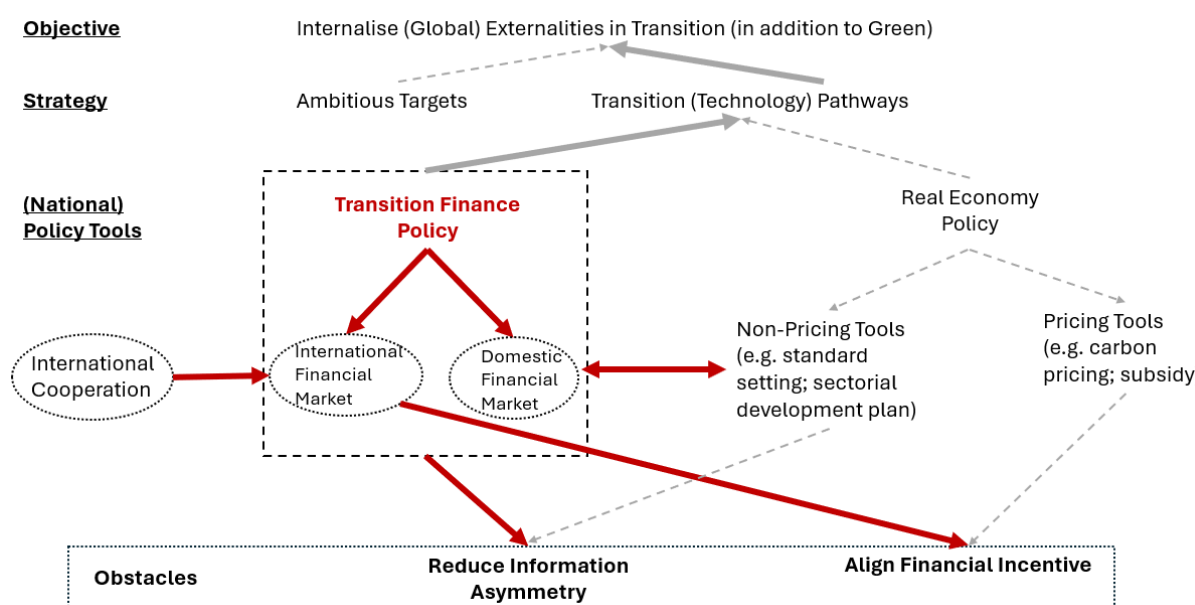
The transformation of high-carbon industries requires policy intervention due to market failure caused by positive externalities associated with green development. The current policy system (Figure 2) consists of both strategic and policy measures. At the strategic level, the government sets national carbon reduction targets. Based on the process and technological characteristics of different high-carbon industries, governments recognize transition technology routes in a certain manner to provide references for relevant industry transition measures.

In terms of specific policy tools, two types of policies work together to minimize transition costs and maximize transition benefits. One policy option is the real economy policy, which directly acts on physical assets and uses administrative and carbon pricing means to make the transition activities of high-carbon emission industries profitable. A second policy alternative is transition finance policy, which is the core focus of this report.

The main purpose of building a transition finance system is to promote the service of financial resources to high-carbon industries in forming transition assets, ensuring that greenwashing does not occur. In the domestic financial market, this is reflected in identifying transition measures, establishing disclosure systems, and managing the socio-economic impacts of

transitions. In the international financial market, it is mainly reflected in improving the interoperability of transition finance systems across countries, while also facilitating access to lower cost funding from global financial resources. Chapter 2 begins with the development trends faced by global transition assets and then looks forwards to the future of transition finance in details based on this foundation.

Figure 2: An Analytical Framework of Transition Finance



Source: AMRO, CGI, BFAA

1.3 Uneven Progress in Transition Efforts

Despite the growing recognition of transition finance, progress in implementation has been highly uneven across economies. Advanced economies (AEs) with well-developed financial markets, have made some progress in adopting transition finance in the capital market and integrating transition finance into their regulatory frameworks. Conversely, many emerging markets and developing economies (EMDEs) face structural challenges that hinder the development of transition finance mechanisms. These challenges include high dependence on fossil fuels, underdeveloped financial markets, lack of a skilled workforce, and limited access to low-cost finance. While economies acknowledge the need for transition, some may struggle with balancing economic growth and energy security. The absence of standardized transition finance frameworks across borders further complicates financial mobilization efforts, creating risks of "greenwashing" or "transition-washing" and inconsistent implementation.

Discussed in greater detail in Chapter 3, economies within the ASEAN+3 region exhibit significant differences in their structural characteristics, therefore providing impetus for the uneven progress in transition finance. This disparity becomes even more pronounced when compared to AEs. The Transition Readiness Index, constructed based on key indicators for the four various challenges mentioned above, illustrates these variations. The Plus-3 economies emerge as the most prepared for transition, followed by the two international financial centres (IFCs) Singapore and Hong Kong, China, primarily due to their well-developed financial markets. Several ASEAN economies are also making considerable

progress. Overall, this uneven progress shows the need for a more inclusive and coordinated approach to facilitate a balanced transition across the region.

1.4 Global Fragmentation and Transition Uncertainties

In addition to domestic challenges, global geopolitical fragmentation has introduced further uncertainties into the global transition process. Rising trade tensions, energy security concerns, and diverging policy approaches among major economies have disrupted financial flows and investment strategies for sustainable projects. War, together with subsequent disruptions in global energy markets, have led to a resurgence of fossil fuel investments, as countries prioritize short-term energy security over long-term decarbonization goals. More recently, the US withdrawal from the Paris Agreement further exacerbates this uncertainty, signalling potential shifts in global sustainable commitment and investment priorities.

Given these challenges, a well-designed and coordinated transition finance framework across economies is essential to ensure that capital is mobilized effectively to support an orderly transition. Discussed more deeply in both Chapters 3 and 4, international cooperation will be key in overcoming obstacles that hinder transition finance progress, particularly addressing information asymmetry and misaligned financial incentives. Beyond transition finance, a wider cross-border collaboration is also necessary to facilitate the region's transition. Achieving meaningful progress will require a proactive cooperation across borders, especially in an increasingly fragmented global landscape. Asia must foster regional unity in these efforts to ensure sustainable long-term growth.

The remainder of this paper will be discussed as follows: Chapter 2 explores the global trends of each element in the framework in forming transition assets. Chapter 3 focuses on transition finance policy developments in ASEAN+3 region and highlights the unique challenges faced by member economies in the transition to net zero. Chapter 4 documents the international cooperation in transition finance and explores ways for enhanced collaboration. Lastly, chapter 5 summarizes the main findings and presents some policy recommendations for further discussion.

2. Global Transition Trends and their impacts on Transition Finance

As introduced in Chapter 1, the current landscape of transition finance has made some encouraging progress. However, it is important to understand that transition finance does not develop in a vacuum. In this chapter, we analyse the ambition of countries in setting climate targets, the recognised transition technology routes, and the future development trends in the areas of transition finance policy and real economy policy, as well as how these trends affect the formation of transition assets and, consequently, the development of global transition finance.

2.1 Ambitious Targets Under Threat: How Geoeconomics Create Uncertainties for Transition Actions

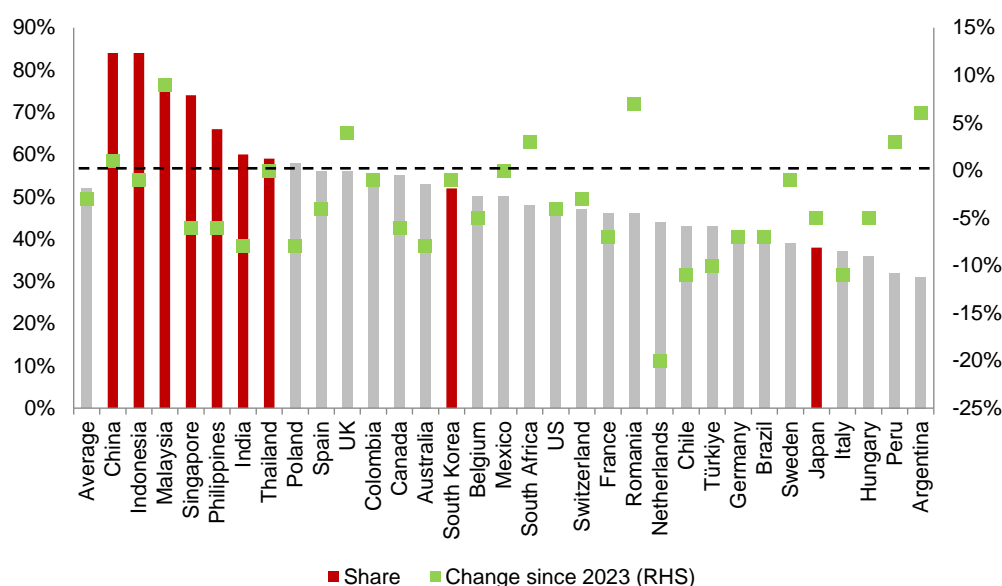
Ambitious climate goals are the foundational determinant that drives an economy's green transition. They determine the speed of an economy's transition process and the intensity of the policies that they entail. The degree of climate policy ambition in national climate goals is intricately shaped by both international and domestic dynamics. At the international level, the United Nations Framework Convention on Climate Change (UNFCCC), established in 1992, has been the cornerstone for delineating the varying responsibilities of countries in global climate mitigation efforts. Over the past three decades, the evolution from the Kyoto Protocol to the Paris Agreement has marked a significant shift in the distribution of these responsibilities. Initially, the Kyoto Protocol placed the primary responsibility of emissions reduction on developed countries. However, the Paris Agreement has transitioned to a more inclusive approach, where all economies, based on their capabilities and historical emissions, contribute to the collective effort. To ensure that this bottom-up approach ultimately helps achieve the goal of limiting global temperature rise to well below 2°C, with a preferable target of 1.5°C, the Paris Agreement also establishes a ratcheting-up mechanism, requiring all countries to increase their ambitions over time. On the domestic front, the integration of green economy with green industry into the economic mainstream has redefined the dynamics of climate policy ambition. Traditionally, the focus was on the costs associated with carbon reduction. However, the discourse has evolved to emphasize the broader socio-economic benefits of transitioning to a green economy, which increase the possibility of incentivizing a higher climate ambition that accelerates the urgency of transition, leading to quicker and larger-scale formation of transition assets. These assets not only mitigate climate risks but also drive innovation and economic diversification.

Despite the progress in international climate frameworks, geopolitical tensions have introduced significant uncertainties. One notable trend is the denial of climate change as exemplified by the Trump administration in the United States. Such views and positions have the potential to derail the global green transition by undermining international cooperation and commitment. Additionally, even among those who acknowledge the need for climate action, there is a growing tendency to link climate policies with trade and industrial strategies. This form of green protectionism, while intended to safeguard national economic interests, can inflate the costs of achieving commitments towards a global green transition. It may also create barriers for countries that are less equipped to comply with stringent environmental regulations, thus weakening the overall ambition of global climate goals. The determination of climate ambition levels is thus a delicate balancing act. On one hand, it requires adherence to

international commitments and the collective goal of limiting global warming. On the other hand, it must navigate domestic economic and political realities, including the need to manage transition costs and protect national interests.

Uncertainty surrounding clean energy support policies is also affecting market sentiment. For example, US President Trump has proposed cancelling the tax credits and subsidies for clean energy and electric vehicles under the IRA (Inflation Reduction Act), shifting support towards natural gas instead. According to a survey conducted by Ipsos (Ipsos 2024) between October 25 and November 8, 2024, involving over 23,700 people across 33 countries, more than half (52%) of the respondents believe that their government is likely to introduce stricter carbon reduction targets in 2025 (Figure 3). However, this figure represents a 3% decrease compared to 2023. In the United States, 47% of respondents shared this view, a 4ppt drop from 2023. In Europe, respondents from Italy and the Netherlands experienced the largest declines since 2023, with decreases of 11ppt and 20ppt, respectively.

Figure 3: Share of Respondents Who Think It Is Likely Their Government Will Introduce More Demanding Targets to Reduce Carbon Emissions In 2025



Source: Ipsos Global Advisor Predictions, CGI

2.2 Technological Pathways: How Greater Diversification Unlocks Potential for Transition Actions

In moving towards the goal of transformation—achieving net-zero carbon emissions—there are likely to be many technological pathways from the current state to that endpoint, especially at the corporate level. Ideally, the selection of technological pathways should be autonomously determined by enterprises based on their own circumstances. However, theoretically, enterprises' green and low-carbon transformation actions have positive externalities and cannot be spontaneously completed without government intervention.

However, it is impractical for governments to directly intervene in corporate operations, and even helping enterprises set transformation targets and formulate transformation plans are not feasible. A viable approach is for the government to develop industry-specific emission

reduction pathways based on national goals, which can serve as references for enterprises within the industry. Enterprises can then formulate their own transition plans and targets based on their operational conditions. Financial institutions can subsequently decide whether and how to provide transition finance services to enterprises based on their transition plans and targets. In this process, the transformation technology pathways recognized by the government become extremely important. It should be noted that, based on current practices in various countries, the forms of government recognition can include publishing industry transition technology pathways. For example, Ministry of Economy, Trade and Industry of Japan (METI) released technological transition roadmaps towards 2050 for high-carbon industries in 2021 (METI 2021) and the United States' Department of Energy did the same in 2022 (DOE 2022). Another example is recognizing relevant technologies in the form of transition taxonomy, such as EU's taxonomy regulation, which entered into force in 2020 (EC 2020).

Nonetheless, transformation technology pathways can also differ—they can either be diverse or singular. If they are relatively singular, it is easier to form a global unified standard, with only differences in implementation timelines. However, if there is a high degree of diversity, how should national governments choose when formulating their own technology pathways, and should they ultimately be unified? After more than a decade of explorations, there is a general consensus on the direction of technological pathways for high-carbon industries to achieve net-zero carbon emissions, but there are different technical options at the firm or entity level.

Directionally, high-carbon industries—mainly raw material industries such as steel, chemicals, building materials, and non-ferrous metals—need to focus on two aspects—energy use and raw material use—to transition from low-carbon to zero-carbon:

- For energy use, the first option is to reduce energy consumption in the production process and improve energy efficiency, which is the most cost-effective transformation action. Then, the level of electrification should be continuously advanced, with as many production segments as possible being electrified, while simultaneously increasing the proportion of green electricity used. However, many high-carbon industries require high-temperature and high-pressure environments for production, which cannot currently be supplied by electricity alone. Therefore, non-electric clean energy forms, such as biomass fuels and green hydrogen, are needed.
- For raw material use, on the one hand, coal and natural gas are also major raw materials in the production processes of steel and chemicals, and production processes using these as raw materials generate carbon dioxide. On the other hand, limestone, used as a raw material for cement clinker production, also generates carbon dioxide emissions unrelated to energy consumption during the production process. There are two ways to address these emissions from raw materials: one is raw material substitution, such as using hydrogen as a reducing agent to replace coke in steelmaking or employing carbon capture and storage (CCS). It is worth emphasizing that CCS, as a technology for end-of-pipe carbon emission treatment in the production process, is applicable to all carbon emissions from energy and raw material use.

The above technological directions have basically reached a consensus in the literature. However, in practice and at a more micro level, certain technologies continue to spark discussion, such as clean coal and natural gas.

Clean coal and natural gas have been controversially considered as important interim solutions, and there appears to be a growing consensus around their role. Although clean coal and natural gas can eventually be completely replaced by clean energy sources in the future, the pace of this substitution is unlikely to be rapid. According to data from the International Energy Agency (IEA), coal remains the largest source of electricity globally, accounting for 36% of global electricity generation and 40% of emissions from all energy sectors (IEA 2024). Supporters think high-efficiency, low-emissions (HELE) coal plants or gas plants with carbon capture and storage (CCS) can serve as transitional solutions while renewable energy capacity scales up. In regions heavily reliant on coal or gas, supporting cleaner technologies ensures stable energy supply while reducing emissions compared to traditional technologies. For some economies, an immediate switch to renewables may be economically or technically unfeasible. Supporting cleaner fossil fuel technologies could provide a pragmatic pathway to gradual decarbonization.

Critics argue, however, that investments in cleaner coal or natural gas could lock economies into fossil fuel dependence, delaying the shift to renewables and contradicting long-term net-zero goals. They contend that transition finance should prioritize low- and zero-carbon (LZC) technologies, which provide a more sustainable path to decarbonization (Greg 2021). Additionally, the inclusion of coal- and natural-gas-based technologies in transition finance frameworks may lead to greenwashing concerns and undermine credibility.

Energy security concerns have been significantly amplified by the Russia-Ukraine conflict in 2022 (Sun, et al. 2024), particularly for Europe, and by Trump's second administration's favourable policies for fossil fuel extraction. These factors have led to a step backwards, shifting back to reliance on coal and natural gas, as countries seek to stabilize their energy supply amidst geopolitical tensions and pursue energy independence to address the potential risks of higher inflation.

2.3 Real Economy Policies: A Wider Coverage of Pricing Policies Improves the Transparency in Valuing Transition Assets

The role of real economy policies is to enhance the profitability of physical assets, or in the case of transition assets, to render them economically viable by creating market demand, reducing investment costs and risks, and improving market access, among other strategies. This is something that financial policies may find harder to achieve. It is also why real economy policies are essential for effectively addressing market failures.

Nevertheless, there is a close linkage between real economy policy and transition finance policy. Carbon pricing, for example, plays a crucial role by providing a clear market signal, increasing the cost of carbon emissions and thereby creating stronger incentives for companies to transition to more sustainable practices. Additionally, phasing out fossil fuel subsidies would help make the transition more competitive by reducing the artificial advantage currently held by high-emission industries. To avoid fragmented or conflicting actions, transition finance policies should be aligned with industry-specific transition plans. This integrated approach can help accelerate the pace of decarbonization while fostering a more resilient and sustainable economy.

In the field of carbon reduction, there are two types of real economy policies that affect the profitability of transition assets: pricing policies and non-pricing policies. Both types of policies can increase the cost of fossil fuel use, but they achieve this goal through different means.

Pricing policies primarily introduce a carbon price by establishing carbon trading markets or setting carbon taxes. By sending clear price signals to the market, they make market participants aware of the additional costs associated with the absence of transition actions. Non-pricing policies, on the other hand, mainly increase the cost of fossil fuel use for enterprises through laws and regulations, technical standards, and administrative measures. In fact, many studies (OECD and IMF 2022) also regard these measures as introducing an implicit carbon price, emphasizing that their essence is to raise the cost of fossil fuels as well. However, the difference between the two is that the explicit carbon price introduced by pricing policies can provide more dynamic and comprehensive price information. It should be particularly emphasized that while the explicit carbon price can provide better price information, whether this price accurately reflects the cost of carbon emissions depends on many factors related to the design and implementation of the pricing mechanism.

Hence, compared with the implicit carbon price, the explicit carbon price can make the valuation of transition assets by market participants, including financial institutions, more transparent. Consequently, if pricing policies are more widely applied at the global level, they will be more conducive to enhancing the transparency of transition asset valuation, thereby creating a better environment for the development of transition finance. According to our observations, the application of pricing policies is expanding across three dimensions:

First, an increasing number of countries are considering introducing such mechanisms in the case of countries that have not yet established a carbon pricing mechanism. According to the world bank (WBG 2024), as of April 1, 2024, 75 carbon pricing mechanisms are in operation worldwide, covering approximately 13 billion metric tons of carbon dioxide equivalent. These mechanisms include 39 carbon tax initiatives and 36 Emissions Trading Systems (ETS). The coverage of global emissions by carbon pricing instruments has significantly expanded from 7% of total emissions a decade ago, to approximately 24% today. Historically, carbon pricing mechanisms have primarily been implemented by developed economies. However, a notable recent trend is that an increasing number of developing countries, particularly middle-income countries such as Brazil, India, Chile, Colombia, and Turkey, are making significant strides in implementing emissions trading schemes.

Second, in economies that already have carbon pricing mechanisms in place such as China and the European Union, they are continuously expanding the industry coverage of these mechanisms. China's national carbon trading market is recently set to include the steel, cement, and aluminium sectors (Xue 2024). This expansion is projected to cover approximately 60% of China's carbon emissions. The EU is also undergoing a significant expansion of its carbon market to include shipping and road transport (T&E 2022).

Lastly, the negotiations on Article 6 of the Paris Agreement are gradually promoting the establishment of a global carbon market and creating conditions for the global trading of voluntary carbon credits. Article 6 aims to create a more transparent and efficient framework for CO₂ certificate trading, enabling countries to collaborate on emission reduction targets using market-based approaches. The clarity provided by the recent COP29 decisions is expected to drive increased demand for carbon credits. This increased demand can lead to greater investment in high-integrity Voluntary Carbon Market (VCM) projects, as companies

and countries seek to offset their emissions through verified and additional emission reductions. For nations struggling to meet their emissions targets, the ability to purchase credits through international markets offers a viable pathway to achieving their climate goals. Moreover, the enhanced transparency and integrity of the carbon markets under Article 6 can encourage investment in transition actions, particularly in developing countries.

2.4 Finance Policies: Converging Towards a Taxonomy-Based Approach Enhances the Recognizability of Transition Assets

Issues on Taxonomies

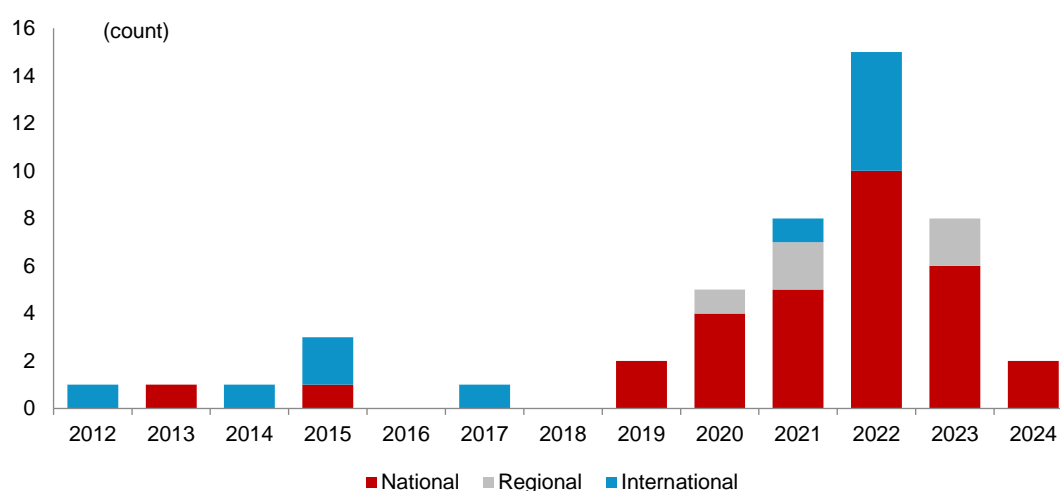
The goal of building a transition finance policy framework is to ensure that as many financial resources as possible flow into the transition activities of high-carbon industries. To achieve this goal, a balance must be struck: on the one hand, funds need to be directed towards high-carbon industries, while on the other hand, greenwashing must be avoided to prevent these funds from continuing to support high-carbon production. Therefore, the key to policy design is to identify which activities qualify as transition activities and to gain recognition from enterprises, financial institutions, and regulatory authorities what these transition activities are. This will inevitably incur transaction costs. An efficient policy framework should aim to minimize these transaction costs. To reduce transaction costs within an economy, the solution is to establish a set of standards that are as clear and easy to operate as possible. These standards should be consolidated within a single official document, ensuring that the taxonomy is simple to understand while maintaining clear and well-defined criteria. Between economies, the goal should be to unify standards as much as possible or enhance the interoperability of different standard systems.

Currently, global standard systems can be broadly divided into two categories: principle-based and taxonomy-based. Within the taxonomy-based category, there are market-based and official-based standards. The former refers to standards that are independently published by third-party institutions and gain market recognition, while the latter refers to standards set by policy or regulatory authorities. From the current trend, an increasing number of economies are publishing official-based taxonomies, and there is a growing movement towards a more unified common taxonomy. The specific analysis on the different perspectives on the development of taxonomies are in the subsequent sections.

Global transition finance activities can be broadly divided into two types of markets: investor-driven and regulation-driven. In regulation-driven markets, such as those in the European Union and China, investment decisions are largely influenced by regulatory mandates. Market regulators compel investors to engage in green investments through the imposition of either restrictive or incentivizing policies. Consequently, in these markets, regulators offer guidance and directives to assist investors in identifying assets that can be classified as 'green' or sustainable. This is evident in the development of official taxonomies by jurisdictions like the EU and China. On the other hand, in investor-driven markets, exemplified by the United States, investors are motivated by self-interest, which may stem from a desire for enhanced reputation, societal impact, or the pursuit of higher-performing assets. As long as investors perceive an investment as 'green,' they are inclined to invest. This is why investor-driven markets tend to adopt principles for sustainable investment, allowing investors to refer to market-based taxonomies, such as the Climate Bonds Initiative (CBI) Climate Bonds Taxonomy, for their investment decisions.

To instil confidence in the sustainable investment market, an increasing number of countries have begun to develop sustainable finance taxonomies. According to the Sustainable Banking and Finance Network (SBFN), as of February 2024, 47 sustainable finance taxonomies or lists of eligible activities have been issued globally since 2012, with 31 being national taxonomies issued by 20 different countries, and most of them are concentrated in Asia (SBFN 2024) (Figure 4). The current landscape of taxonomies varies widely in terms of complexity and coverage. Some countries, although adopting a taxonomy-based approach, focus on defining a set of core principles for the market, outlining the characteristics of activities that can be supported, such as Malaysia. Some countries have provided a whitelist of activities that can be supported, identifying compliant projects or economic activities under each sector or subsector, such as Russia and Mongolia. Some countries have developed more detailed taxonomies that typically define quantitative thresholds and screening criteria for economic activities and how to assess their compliance with specific taxonomy objectives, such as the EU. It is worth noting that countries like China and Sri Lanka consider the nature of the activity and whether there are suitable proxy certifications or labels when they determine the detail required in the technical criteria. As more and more countries issue taxonomies, however, there is a need for ongoing governance and maintenance of these frameworks to ensure their effectiveness and to update and expand them - strengthening the key features and adding more activities. The latest versions of taxonomies in many countries have already included sections on transition finance for high-carbon industries.

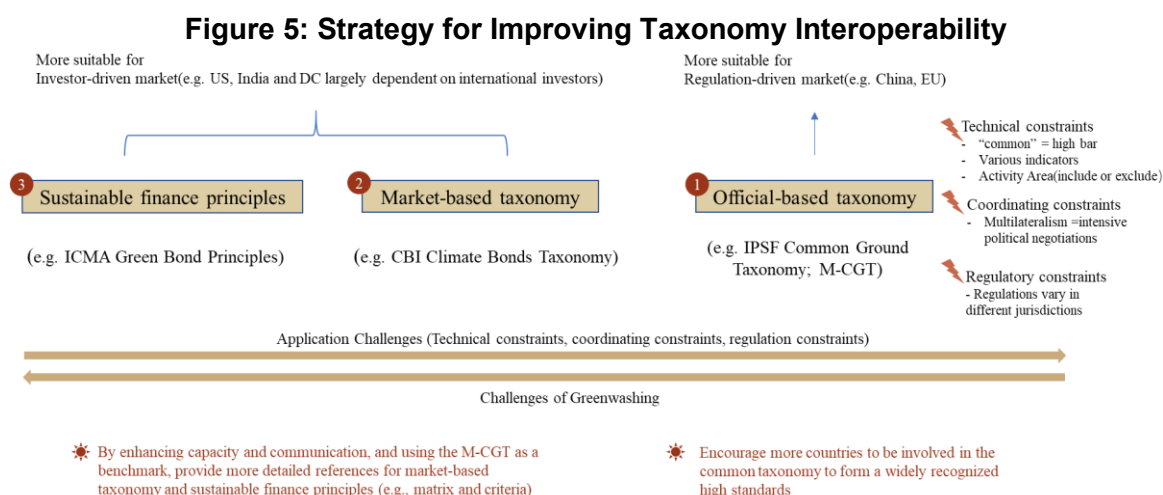
Figure 4: Annual Number of Taxonomies Published Worldwide (2012 - Feb.2024)



Source: Sustainable Banking and Finance Network (SBFN), CGI

As discussed previously, numerous countries have recently introduced a wide array of taxonomies. Concurrently, international organizations like the International Capital Market Association (ICMA) have issued corresponding taxonomies or sustainable investment standards (ICMA 2022). The profusion of taxonomies, compounded by their lack of consistency, is prone to result in market fragmentation, prohibitively high costs for mutual certification, and the risk of greenwashing. Against this backdrop, the China - EU Common Ground Taxonomy and the Multi - jurisdiction Common Ground Taxonomy jointly developed by China, Europe, and Singapore have emerged. These two common taxonomies incorporate relevant high - carbon transition activities supportable by transition finance, aiming to enhance the consistency and comparability of sustainable finance across different regions worldwide.

The integration of taxonomies among countries encounters multiple challenges. The creation of a common taxonomy typically requires two or more countries to adopt high-level standards, which may be complex when additional countries are involved. Divergent indicators used by each country and significant disparities in major production sectors and activity pose substantial technical hurdles in forming a common taxonomy. Moreover, the need to comply with diverse regulatory requirements across countries and engage in political negotiations can impede the development and application of the common taxonomy. With the growing demand for global transition finance investment and higher international capital flows, two key strategies are emerging. Firstly, in countries with comparable macroeconomic structure and financial conditions, establishing a regional common ground taxonomy that encompasses transition finance considerations is a viable approach. This can foster coordinated sustainable development within the region. Secondly, improving interoperability between regulation-driven and investor-driven taxonomies is essential. Market-based taxonomies, which are indirectly utilized in investor-driven markets, will gradually integrate criteria from official taxonomies to pursue enhanced environmental performance. If the Multi-jurisdiction Common Ground Taxonomy (MCGT) continues to gain influence, market-based taxonomies are likely to increasingly adopt the MCGT criteria (Figure 5).



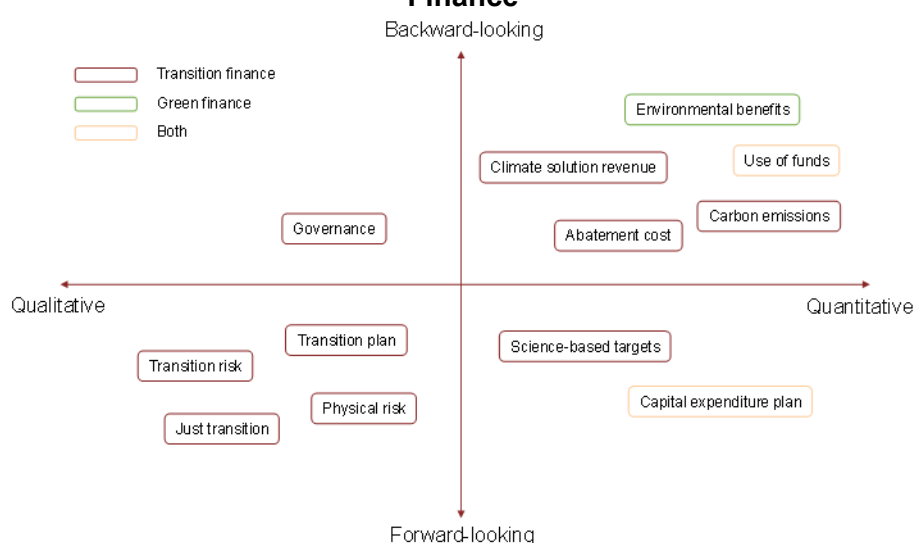
Note: DC – developing countries; M-CGT: Multi-jurisdiction Common Ground Taxonomy

Source: CGI

In Asia, countries share similar industrial structures, with heavy industries accounting for a significant proportion of the economic aggregate in most of them. Nations like China, Japan, South Korea, and India are among the world's top eight heavy - industrial countries. Their climate goals are clearly defined, and the timelines for achieving net - zero are relatively similar. Additionally, countries such as India and Indonesia are progressively introducing their own sustainable taxonomies, laying a solid foundation for the design of a common Asian taxonomy. There exists the potential to develop comparable indicators and criteria. Based on the Multi - jurisdiction Common Ground Taxonomy, formulating a taxonomy applicable to more Asian countries that cover high-carbon industry transition activities, can effectively promote cross-border flows of green capital and prevent greenwashing. This initiative is instrumental in facilitating Asian countries' efforts to meet climate goals and contribute to global sustainable development.

Due to the externalities of achieving climate goals over time and across a wider set of countries, transition finance should play a role in "guiding more resources towards sustainable areas". The taxonomy approach, with its unparalleled clarity, can effectively prevent greenwashing and stabilize investor confidence, thereby guiding financial resources. This is why we are seeing a growing number of economies around the world developing taxonomies. Since transition finance requires not only the identification of industries but also specific transition activities and technical standards, we expect that as economies and governments place more emphasis on transition finance, a bigger percentage of countries will be inclined to adopt a taxonomy-based approach to facilitate transition finance. At the same time, in the process of upgrading and iterating existing taxonomies, more and more countries will adopt more granular taxonomies largely based on scientific criteria and thresholds.

Figure 6: Information Disclosure Requirements for Green Finance and Transition Finance



Source: CICC Research, CGI

Issues On Transition Finance Disclosures

The characteristics of transition finance disclosure lie in its stronger forward-looking nature and greater difficulty in quantification (CICC 2024) (Figure 6). Firstly, before making an investment, investors can utilize a company's transition plan to assess the authenticity and scientific validity of its transformation. The transition plan outlines how the company will transform its assets, operations, and business model to align with the decarbonization pathway, and it has become a core element of the transition disclosure system. In reality, however, only a small proportion of companies disclose their transition plans. According to the Carbon Disclosure Project (CDP), only a quarter of the companies reported to the CDP that they had developed a climate transition plan in 2023. Among them, less than 1% of the companies reported all 21 indicators required to determine the credibility of the transition plan (CDP 2025). At the same time, challenges such as the lack of a comparable basis for quantification models and the high flexibility in disclosure, to a certain extent, restrict investors' willingness to invest in transition finance. In view of this, some international institutions have already issued relevant guidelines for transition plans, aiming to enhance the enthusiasm and uniformity of global companies in disclosing transition plans. In addition to the transition plan, companies should also disclose the annual data on the effectiveness of carbon emission reduction in a

timely manner to help financial institutions calculate the emission reduction performance of their investment portfolios. This usually includes the company's carbon emission data, energy intensity data, and the achievements of corporate climate governance. Although carbon emission data is quantifiable and backward-looking, due to the low disclosure rate of corporate carbon emission data, a large amount of data is missing. With the uneven quality of historical carbon emission data, financial institutions also face challenges in calculating the effectiveness of emission reduction, which limits the reference value of information disclosure for investors.

Just Transition

Additionally, another important dimension to consider is the role of a just transition, which is integral to the overall transition process. Neglecting just transition considerations could impact the effectiveness of transition finance policies. By addressing socio-economic impacts, regulators and the private sector are more likely to adopt and support transition initiatives. However, implementing a just transition requires significant financial resources, making it a key topic of discussion. Box 1 provides further details on just transition at the global level.

Box 1: Global Trends in Just Transition

The rising importance of a just transition is mainly due to the increasing focus on the impact of climate change on labour and employment. The painful lessons from the experience of developed countries are still vivid: In the late 1940s, the British government's coal mine closure plan caused large-scale unemployment. To this day, Durham, once a major coal industry town in the UK, still has a relatively high unemployment rate and its GDP ranks low in the country. In the post-pandemic recovery period, to restore economic resilience as soon as possible, many nations are prioritizing job creation and stability as core elements of economic policies such as the U.S. and Germany. Moreover, Asia is the “world's factory” (BFA 2024), and industries like coal mining, oil, and manufacturing are major employers, such that abrupt changes could have widespread social and economic repercussions.

In the transition of high carbon industries, just transition stands as a cornerstone of far-reaching significance. As transition involves multiple stakeholders like enterprises, workers, and local communities, just transition ensures the fair distribution of transition costs and benefits, upholding social fairness and enabling all to enjoy the fruits of a low - carbon future. Moreover, it links climate transition with social transition. High carbon industries are economic pillars in many regions. Just transition allows for the concurrent pursuit of climate change mitigation and social developments, promoting social equity and inclusive growth during the climate transition. Lastly, just transition is vital in reducing the risk and impact of stranded assets.

Governments are increasingly incorporating just transition measures—such as retraining programs, social safety nets, and investments in green jobs—into their climate strategies to balance economic growth with equity. As counted in a 2021 study by (Krawchenko and Gordon 2021) (Figure B1 in the appendix), many countries around the world have already introduced policies and tools related to a just transition. In the context of sustainable development, just transition policies and tools can be classified into several distinct categories. First, Policy Framework and Legislation form the bedrock upon which the just transition is built. The European Climate Law - Just Transition Mechanism serves as a regulatory edifice, providing a structured and coherent framework for European Union member states to implement a strategic transition towards a low - carbon economic paradigm. International Finance Support is an indispensable component. The World Bank's "Just Transition for ALL" initiative has been a cornerstone of financial assistance in this regard. Since 1995, it has channelled over \$3 billion in financial resources (W. WBG 2023). Economic Diversification and Job Creation are equally critical aspects. For example, in Canada, the establishment of a Just Transition Task Force dedicated to coal - power workers and their communities represents a proactive approach to re-engineering the economic landscape (ECCC 2019). Education and Training are essential for equipping the workforce with the requisite skills for the emerging clean - energy and sustainable development sectors. The Just Transition Platform (ECCC 2019), for example, serves as a comprehensive resource, offering a suite of training programs and educational curricula. Finally, Community Engagement and Participation are integral to the success of the just transition.

3. Advancement of Transition Finance in the ASEAN+3

As discussed in Chapter 2, recognizing the vast diversity in economic development across the ASEAN+3 region is important for ensuring a just transition. While Japan, Korea, and the two international financial centres are classified as advanced economies by the IMF, many ASEAN countries are still in the process of economic advancement. These disparities highlight the need for tailored transition policies to prevent disruptions to economic growth.

As a benchmark, this chapter first compares economies within the region to advanced economies outside the region whenever possible, illustrating that ASEAN+3 economies are preparing to catch up with some of the world's advanced economies who are leading the pathway to net zero. The chapter then delves into a discussion of the challenges being faced in transitioning, followed by a measure of transition readiness. Subsequently, an account of the progress of transition finance in ASEAN+3 is presented, along with a stocktaking of transition finance policies already implemented by individual member economies. Lastly, the chapter ends with a discussion of the various policy options to address the information asymmetry issue in transition finance.

3.1 Distinct Challenges in the Transition: A Comparison of ASEAN+3 with Other Advanced Economies Outside the Region

The ASEAN+3 region will play an important role in global efforts to transition towards sustainable and low-carbon economies as it accounts for 42% of global emissions as of 2023. This region is uniquely characterized by its diverse economic structures, rapid development, and significant contributions to global supply chains. However, its transition journey is shaped by multiple dimensions that influence its pathways and priorities, namely energy mix, sectoral composition, financial market development, and workforce skills.

Firstly, the energy mix reveals the region's continued dependence on fossil fuels, particularly coal and natural gas, which power a significant portion of its economic activity. Meanwhile, sectoral composition highlights the region's reliance on export-oriented industries such as manufacturing, mining and utility, and agriculture, many of which are carbon-intensive and deeply integrated into global supply chains. In addition, financial market development is another crucial factor, as the maturity of financial systems varies across the region, influencing the ability to mobilize and deploy transition finance effectively. Lastly, workforce skills are essential to the transition, as sectors undergoing decarbonisation will require reskilling and upskilling to support new technologies, green jobs, and sustainable practices. Depending on where each economy lies in each of these dimensions, it seems that at the regional level, each economy could have a comparative advantage in taking off at different stages in the transition. Together, these dimensions provide a comprehensive framework to understand the opportunities and challenges ASEAN+3 faces in achieving its sustainability goals.

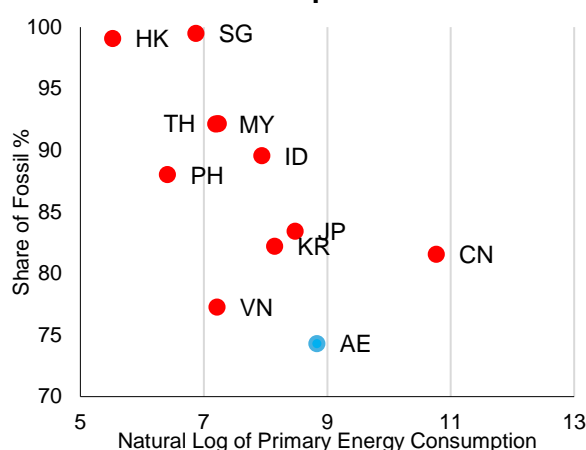
Energy mix

The current energy mix in primary energy consumption and electricity generation across ASEAN+3 economies provides valuable insights into energy utilization patterns. Primary

energy consumption² offers a comprehensive overview of the energy sources used within an economy, encompassing all sectors. In contrast, the energy mix in electricity generation focuses more narrowly on how energy is applied in economic activities. This distinction is critical for understanding the transition to low-carbon economies, as electricity generation plays a key role in driving decarbonization efforts.

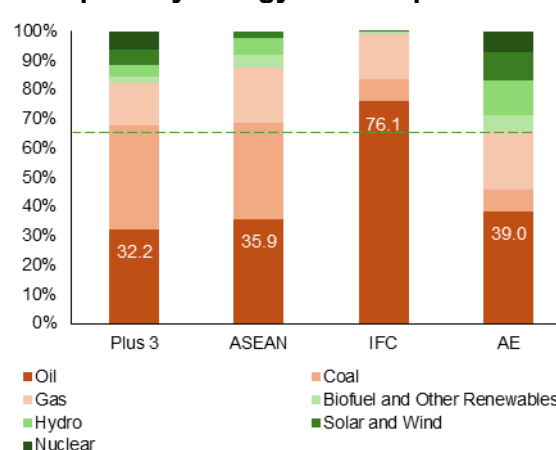
As shown in Figure 12, ASEAN+3 economies rely more heavily on fossil fuels compared to the average of AEs. The key driver of this difference is the high dependence on coal in both ASEAN and Plus-3 economies, as illustrated in Figure 13. In contrast, IFCs, such as Singapore, rely predominantly on oil and natural gas; however, their energy consumption is relatively smaller in scale. This reliance on fossil fuels reflects both the inertia in transitioning to cleaner energy sources and the significant need for such a transition.

Figure 12. Fossil dependence in energy consumption



Source: OWID and AMRO staff calculations.
Note: Data is for 2023. AE represents the weighted average of 31 advanced economies, with weights based on each economy's total primary energy consumption.

Figure 13. Composition of energy mix for primary energy consumption



Source: OWID and AMRO staff calculations.
Note: Data is for 2023. AE represents 31 advanced economies, while Plus-3 includes China, Japan, and Korea. ASEAN refers to Indonesia, Malaysia, the Philippines, Thailand, and Vietnam, and IFC includes Hong Kong, China and Singapore. Weighted averages are calculated using the natural logarithm of primary energy consumption.

While primary energy consumption provides an overarching view of energy utilization, the energy mix in electricity generation is particularly relevant for near-term transition strategies. Electricity generation accounts for one of the largest shares of emissions and plays an important role in decarbonizing other sectors as they electrify, such as transport and industrial sectors. Furthermore, renewable energy technologies for electricity generation are more advanced, cost-effective, and scalable compared to technologies for decarbonizing other forms of primary energy consumption, making electricity a high-impact area for investment and policy action.

² Primary energy consumption refers to the total energy extracted or captured from natural sources before undergoing any transformation or conversion process. It includes energy from fossil fuels (coal, oil, and natural gas), nuclear power, and renewable sources (hydropower, wind, solar, geothermal, and bioenergy). Data is obtained from Our World in Data (Ritchie, Rosado and Roser 2023).

Table 3 presents a detailed breakdown of the energy mix in ASEAN+3 economies. On average, Plus-3 economies exhibit around 6% reliance on fossil fuels³ in electricity generation. This figure is notably higher for most ASEAN economies, except for Cambodia, Laos, Myanmar, and Vietnam, where hydropower constitutes a significant share of electricity generation due to their abundant natural resources. In contrast, IFCs like Singapore rely almost entirely on natural gas, with a smaller contribution from coal. Comparatively, the reliance on fossil fuels in AEs is only around 30%, highlighting the significant fossil inertia in the ASEAN+3 region.

**Table 3. Energy mix of electricity generation in ASEAN+3
(as a share of total electricity generation in %)**

	Biofuel & Other RE	Hydro	Solar and Wind	Nuclear	Oil	Coal	Gas
Plus-3							
CN	2.0	13.2	15.5	4.6	0.8	60.7	3.3
JP	4.9	7.3	11.7	7.6	3.4	32.3	32.8
KR	3.0	0.6	5.3	29.4	1.1	33.0	27.6
ASEAN							
BN	0.0	0.0	0.0	0.0	0.7	21.2	78.1
ID	0.0	7.9	0.4	0.0	2.1	69.9	19.7
KH	0.9	45.4	4.4	0.0	5.7	43.6	0.0
LA	0.2	72.7	0.1	0.0	0.0	27.0	0.0
MM	1.5	55.4	1.7	0.0	0.7	11.6	29.3
MY	0.0	16.9	1.7	0.0	0.6	43.6	37.1
PH	10.8	7.7	3.2	0.0	1.4	61.9	15.0
TH	7.3	3.5	4.8	0.0	0.5	16.0	67.9
VN	0.1	28.9	13.3	0.0	0.9	46.8	10.0
IFCs							
HK	0.4	0.0	0.3	0.0	0.6	39.0	59.8
SG	2.9	0.0	1.6	0.0	1.9	1.0	92.6

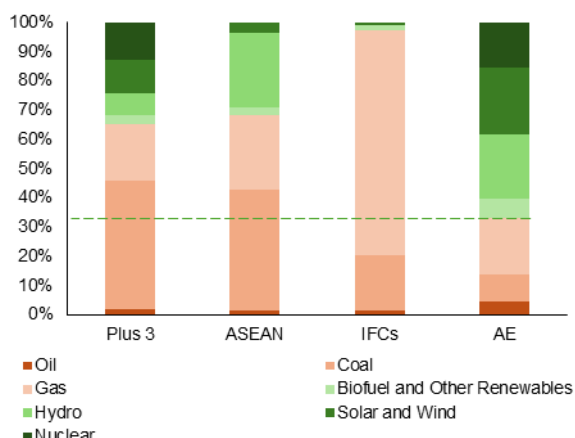
Source: OWID and AMRO staff calculations.

Note: Data refers to 2023, except HK, BN, KH and LA in 2022 due to data availability.

In terms of clean energy sources (Figure 14), Plus-3 economies show a more balanced distribution, resembling the pattern observed in AEs but at a smaller scale. ASEAN economies, however, rely predominantly on hydropower in clean sources, suggesting untapped potential for diversifying into other renewable sources such as solar and wind. These technologies, already widely adopted in AEs, could dramatically reduce the carbon intensity of electricity generation in the region. Figure 15 demonstrates how increasing the share of renewable energy in electricity generation relates to much lower carbon intensity, thereby helping meet the GHG targets outlined in each economy's NDCs.

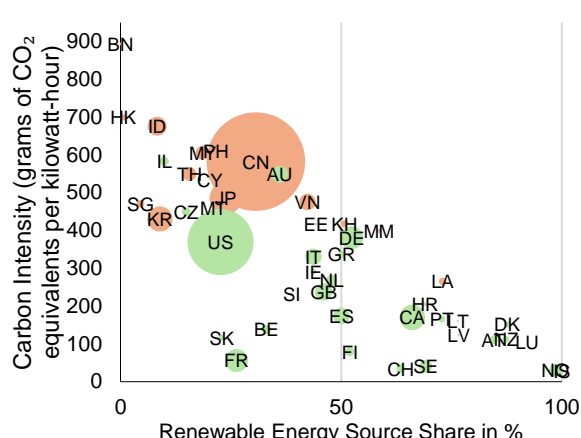
³ Fossil fuels include oil, coal and gas.

Figure 14. Composition of energy mix for electricity generation



Source: OWID and AMRO staff calculations.
 Note: Data is for 2023. Weighted averages are calculated using the natural logarithm of total electricity generation. AE refers to 32 advanced economies outside the ASEAN+3 region, as classified in the latest IMF WEO. IFCs include Singapore and Hong Kong, China.

Figure 15. Carbon intensity vs Renewable share



Source: OWID and AMRO staff calculations.
 Note: Data is for 2023. Bubble size represents the total electricity generated by each economy.

Sectoral composition

The sectoral composition of ASEAN+3 economies provides valuable insight into their economic structures and stages of development. Advanced economies within the region—namely Japan, Korea, Singapore, and Hong Kong, China—derive much of their Gross Value Added (GVA) from relatively greener industries, particularly in the services sector, which accounts for over half of their economic output. In contrast, emerging markets such as China and most ASEAN economies are still heavily reliant on manufacturing, as shown in Figure 16. Additionally, the most pollutive sectors, such as mining and utilities, play a significant role in the economic output of countries like Brunei and Laos.

When compared to advanced economies (Figure 17), the IFCs exhibit a sectoral composition that aligns closely with their developed counterparts. However, most other ASEAN and Plus-3 economies continue to rely on emission-intensive sectors, such as mining, utilities, and manufacturing, which together account for approximately 30% of their GVA. A sharp and sudden transition away from these sectors could lead to significant short-term economic disruption, dampening incentives for public and private investment in cleaner alternatives. This adds to the region's fossil inertia, making the transition to a low-carbon economy more challenging.

Figure 16. Sectoral composition

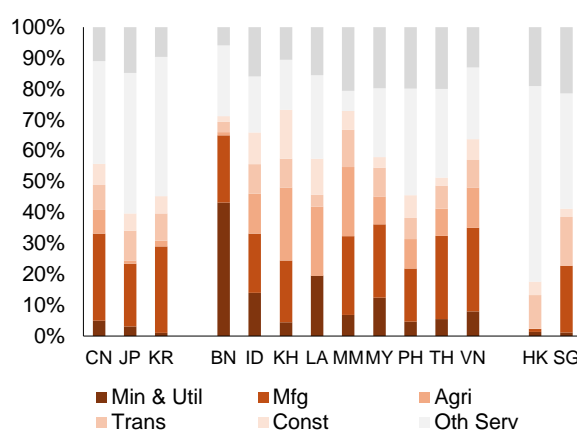
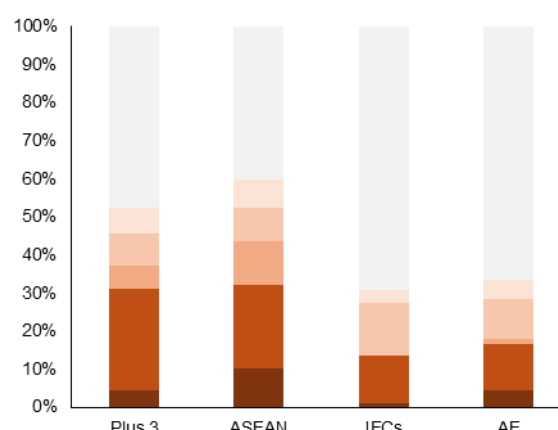


Figure 17. Comparison among groups

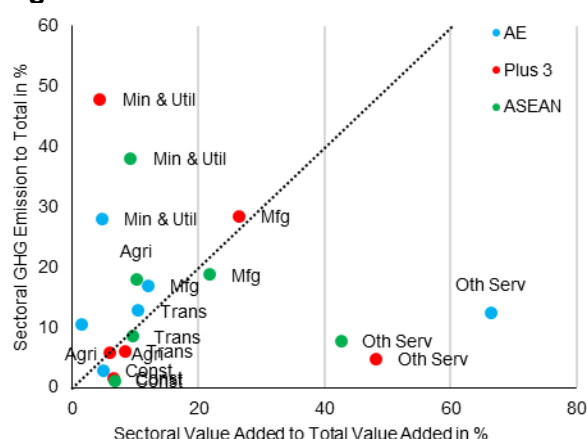


Source: UNSD and AMRO staff calculations.

Note: Data is from 2022. AE refers to 32 advanced economies outside the ASEAN+3 region. Weighted averages are based on total value added. Industry classification follows ISIC Rev. 3.1: "Min & Util" corresponds to sections C and E, "Mfg" to section D, "Agri" to sections A and B, "Trans" to section I, "Const" to section F, and "Oth Serv" to all remaining sections.

Figure 18 further illustrates the contrast between advanced economies and the ASEAN+3 region at the region-industry level. While the share of mining and utilities in GVA is comparable across advanced economies, Plus-3 economies, and ASEAN countries, these sectors contribute disproportionately to GHG emissions. In Plus-3 economies, mining and utilities account for nearly half of total GHG emissions, while in ASEAN, they contribute around 40%—significantly higher than the below-30% share observed in advanced economies. This highlights the substantial potential for GHG reduction through targeted transitions to cleaner energy sources and industrial practices.

Figure 18. Sector value added vs emission⁴



Source: United Nations Statistics Division, IMF Climate Data Dashboard, and AMRO staff calculations.

Note: Sectoral value-added data is from 2022 and follows ISIC Rev. 3.1, while sectoral GHG emission data is from 2023 and based on ISIC Rev. 4. Conversion between classifications of economic activity has been performed using best estimates. AE includes all advanced economies. Plus-3 comprises China (including Hong Kong, China), Japan, and Korea, while ASEAN encompasses all ASEAN member economies.

⁴ Sectoral value-added data is obtained from the UNSD, and emission data is obtained from (IMF, Climate Change Indicators Dashboard. 2022)

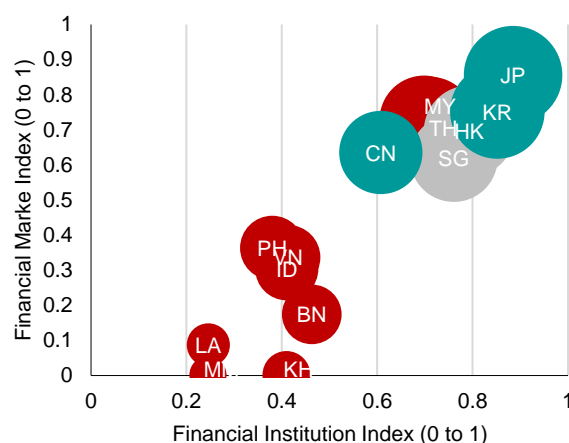
Despite these challenges, differences in economic structures across the region offer opportunities for collaboration. Economies with comparative advantages in greener industries can support those transitioning from high-emission sectors. This dimension of economic diversity shows the potential for mutual benefits through coordinated efforts to achieve sustainable development and decarbonization.

Financial development⁵

In addition to fossil inertia, measured by energy mix and sectoral composition, the pace of transition adoption is significantly influenced by the development of financial markets, as transition investments require substantial capital. Well-functioning financial markets are essential to mobilize and direct funds both domestically and across borders, particularly for developing economies with limited internal funding sources.

Figure 19 highlights the state of financial market and financial institution development across ASEAN+3 economies. Plus-3 economies, IFCs, as well as Malaysia and Thailand, appear to have relatively advanced financial market systems, indicating their potential roles as sources of funding or intermediaries to facilitate fund flows for transition finance. In contrast, other ASEAN economies, particularly lower-income countries, lag in financial market development. However, with abundant natural resources for clean energy, these countries stand to benefit from receiving external funds and serving as clean energy producers for the region.

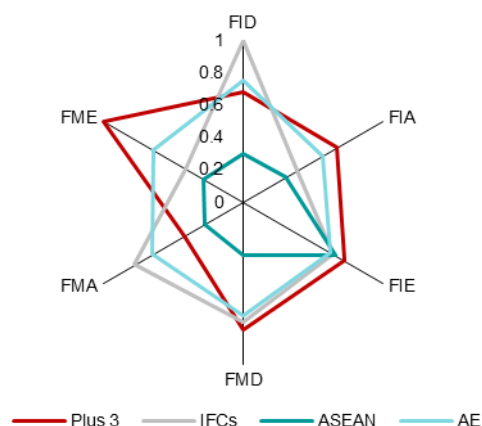
Figure 19. Financial market and institution indices



Source: IMF Financial Development Index and AMRO staff calculations.

Note: Data is for 2021. Bubble size represents the Financial Development Index, with larger bubbles indicating higher levels of financial development.

Figure 20. Comparison of sub-indices between groups



Source: IMF Financial Development Index and AMRO staff calculations.

Note: Data is for 2021. AE includes 21 advanced economies, with values calculated as the simple average across economies within each group.

When examining the components of financial development, three key dimensions emerge: depth (D), access (A), and efficiency (E), evaluated for both financial markets (FM) and financial institutions (FI). Combined, these six areas provide a composite picture of financial

⁵ Data is obtained from the IMF Financial Development Index (Svirydzenka 2016)

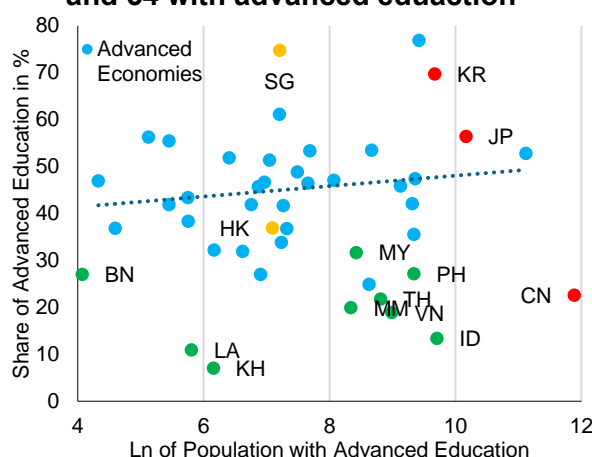
development. Figure 20 reveals that advanced economies generally perform well across all six dimensions, with high scores reflecting advanced development. Plus-3 economies excel in financial market efficiency, reflected in their high stock market turnover ratios that indicate strong liquidity, and in financial institution access, demonstrated by the widespread availability of bank branches and ATMs, which could signal robust funding resources. Meanwhile, IFCs outperform in terms of financial institution depth as well as in financial market access, highlighted by a more diversified financial market with many issuers, providing significant advantages for regional issuers seeking funding for transition initiatives. By combining the strengths of Plus-3 economies and IFCs, the financial development scores across all six dimensions—depth, access, and efficiency for both financial markets and institutions—could collectively surpass those of advanced economies, offering a uniquely comparative advantage for supporting transition finance in the ASEAN+3 region.

This analysis highlights the complementary roles of Plus-3 economies and IFCs in supporting transition finance in the region. The well-developed financial markets of Plus-3 economies provide substantial liquidity and long-term capital through institutional investors, while the diversified and innovative markets of Hong Kong, China and Singapore act as intermediaries, leveraging global networks, market expertise, and financial instruments such as green and transition bonds and carbon trading platforms. Together, these economies facilitate cross-border investments, support risk-sharing mechanisms, and channel funds into high-priority transition projects across ASEAN. By integrating the funding capacity of Plus-3 economies with the financial sophistication of IFCs, the ASEAN+3 region can accelerate its transition to a low-carbon, sustainable future.

Skilled labour force necessary for the transition

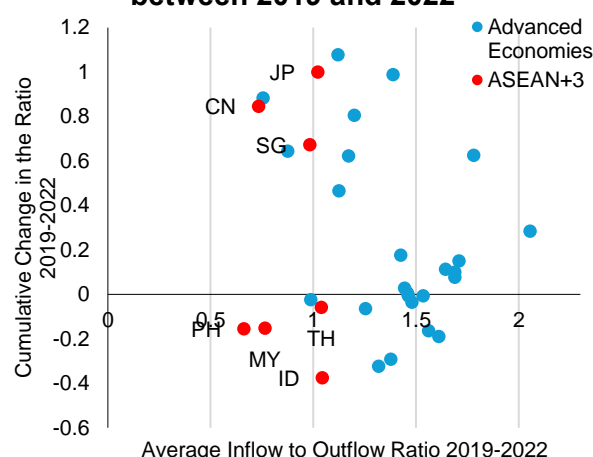
High-skilled labour is critical for enabling the ASEAN+3 region to transition to a low-carbon economy because they drive technological innovation, support sectoral decarbonization, and facilitate the adoption of advanced green technologies. They play a key role in designing and managing financial instruments, such as green/transition bonds and carbon trading, which are essential for building investor confidence and ensuring efficient capital allocation. A well-trained workforce also enhances regional competitiveness in green industries, informs effective policymaking, and promotes collaboration and knowledge transfer across borders. Moreover, high-skilled labor ensures workforce adaptability by enabling reskilling for emerging roles in low-carbon sectors, mitigating economic disruptions, and supporting inclusive growth.

Figure 21. Population aged between 25 and 54 with advanced education



Source: ILO and AMRO staff calculations.
Note: Data covers the period from 2020 to 2023, with most data points from 2023. For economies without 2023 data, the latest available data has been used.

Figure 22 High skill labour outflow between 2019 and 2022



Source: LinkedIn, World Bank, and AMRO staff calculations.
Note: AE includes 25 advanced economies outside the ASEAN+3 region, based on data availability. An inflow-to-outflow ratio of less than 1 indicates a net outflow of high-skilled labour.

To gauge the availability of skilled labor for the transition, the share of people aged 25 to 54 with advanced degrees serves as a useful proxy. Figure 21 highlights that most Plus-3 economies and IFCs exhibit higher shares of skilled labour, although IFCs each have a much smaller workforce compared to Plus-3 and ASEAN-5 economies. Specifically, Japan, Korea, and Singapore lead the region with the highest share of their advanced-education workforce, while China has the largest absolute number of individuals with advanced education. Given that this skilled labor force is a key indicator of readiness for transitioning to a cleaner economy, these economies are well-positioned to lead the region's transition and transition finance efforts. For example, Japan, Korea, and Singapore could potentially drive innovation in clean energy technologies, sustainable finance, and policy development, while China's vast skilled labour pool supports the scaling of production and funding for regional infrastructure. Meanwhile, Malaysia, Indonesia, and the Philippines, with growing skilled labor, can serve as key clean energy producers, green manufacturing hubs, and regional nodes for transition finance through instruments like green and transition bonds. By adapting advanced technologies, upskilling their workforce, and promoting regional collaboration, these countries can bridge the gap between developed and less developed ASEAN economies, ensuring an inclusive and balanced transition.

However, high-skilled migrant labour also plays a part in the transition. Figure 22 reveals a concerning trend: some economies have experienced significant net outflows of high-skilled workers compared to advanced economies. Between 2019 and 2022, countries like China, the Philippines, and Malaysia saw annual net outflows of skilled labor, with a substantial portion migrating to countries outside the region. For the Philippines and Malaysia, the inflow-outflow ratio decreased by approximately 20%, signaling an accelerated net outflow. While this trend has limited short-term impacts due to the relatively large skilled labour pools in these economies, continued outflows could weaken their long-term readiness for transitioning to a low-carbon economy, particularly in terms of workforce capacity.

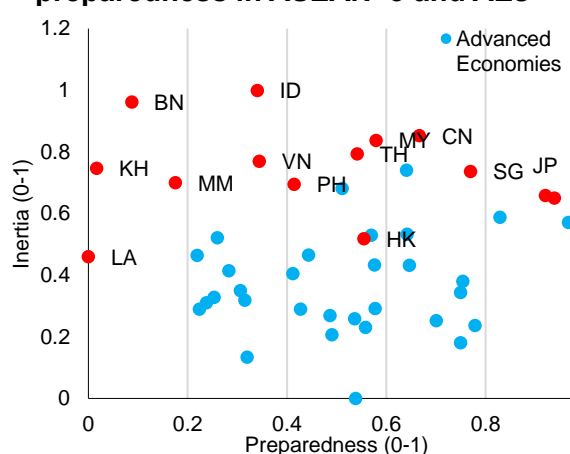
3.2 Transition Readiness in ASEAN+3: A Composite Index Approach

To provide a holistic assessment of transition potential across ASEAN+3 economies, a composite measure was developed to rank economies in the region and explore opportunities for collaboration. This integrates key dimensions of transition: fossil inertia and transition readiness. Fossil inertia, measured by the share of fossil fuels in electricity generation and high-emission sectors, highlights the challenges of achieving a sharp transition compared to AEs. Transition readiness, on the other hand, is signaled by financial development and the availability of a skilled labour workforce, which together indicate the capacity to implement and sustain the transition.

To construct the composite index, measures were normalized across ASEAN+3 and AEs using a min-max transformation. Fossil inertia was aggregated from the share of fossil fuels in electricity generation (to reflect dependence), total electricity generation (to account for scale), the share of high-emission sectors (to represent economic impact), and total value added (to account for economic size). Transition readiness was derived from normalized aggregates of financial development, the share of skilled labor, and its absolute size. Both indices were normalized again to ensure comparability on a 0–1 scale.

Figure 23 reveals that ASEAN+3 economies exhibit significantly higher fossil inertia compared to AEs. However, Plus-3 economies, IFCs, Malaysia, and Thailand score high in readiness, showing their relatively developed financial systems or skilled labour pools. To create a comprehensive ranking, an overall transition index was calculated as readiness minus fossil inertia, normalized to a 0–1 scale. Figure 24 shows that the Plus-3 economies lead the region, with final score approaching the simple average of AEs. Hong Kong, China and Singapore follow closely, driven by their roles as international financial centers.

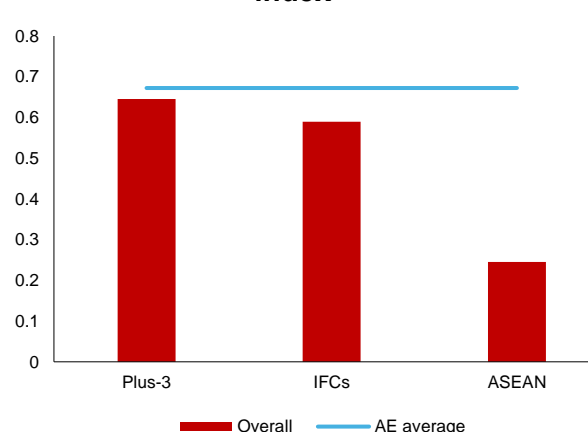
Figure 23. Fossil inertia and transition preparedness in ASEAN+3 and AEs



Source: OWID, UNSD, ILO, IMF and AMRO staff calculations.

Note: A higher score indicates either greater fossil inertia—characterized by a higher dependence on fossil fuels in the energy mix and a significant presence of high-emission sectors—or a higher level of preparedness for transition, reflected in a more developed financial market and a highly skilled workforce.

Figure 24. Overall transition readiness index



Source: OWID, UNSD, ILO, IMF and AMRO staff calculations.

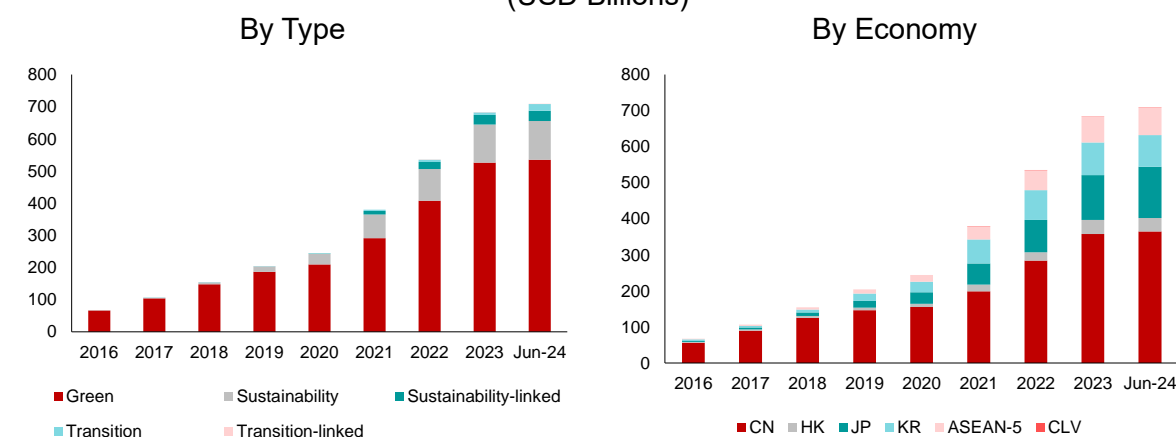
Note: Plus-3 includes China, Japan and Korea; IFCs includes Hong Kong, China and Singapore; ASEAN includes Brunei, Indonesia, Cambodia, Laos, Myanmar, Malaysia, the Philippines, Thailand, and Vietnam.

This overall transition readiness provides valuable insights for both transition investors and policymakers. For investors, the index highlights which economies have a more favorable environment for transition-related investments, including regulatory stability, financial depth, and labor market readiness. For policymakers, it serves as a benchmark to assess national progress in decarbonization efforts and identify areas where policy interventions can improve transition finance accessibility. Discussed in greater detail in Chapter 4, economies with lower transition readiness should adopt a more proactive approach to international cooperation, as doing so would help them access lower-cost financing, build its domestic capacity, and establish a clear pathway toward a sustainable future.

3.3 Current Progress of Transition Finance in the Region

Financial markets across the ASEAN+3 region are increasingly embracing transition finance tools and frameworks to support the shift towards a low-carbon economy. While green bonds remain the dominant instrument within sustainable finance, there has been notable growth in transition and sustainability-linked bonds. The Plus-3 economies, particularly China, have driven the regional market, accounting for the majority of outstanding climate-related bonds (Figure 7 RHS). Other ASEAN economies have also made significant progress in expanding their green, transition, and sustainability-linked bond markets since 2018, with the ASEAN+3 region collectively comprising nearly 20 percent of the global sustainability labelled bond market. However, transition bonds still represent a smaller fraction of the total market compared to green bonds (Figure 7 LHS).

Figure 7. Selected ASEAN+3: Climate-Related Bonds Outstanding
(USD Billions)



Source: AsianBondsOnline.

Source: AsianBondsOnline.

Note: CN = China; HK = Hong Kong, China; JP = Japan; KR = Korea; ASEAN-5 refers to Indonesia, Malaysia, the Philippines, Singapore and Thailand; CLV refers to Cambodia, Lao PDR and Vietnam.

Not only regionally, but the global issuance of transition bonds remains relatively modest. The total issuances were recorded to be only USD 3 billion in 2023, compared to USD 1 trillion for green, social, sustainable, and sustainability-linked (GSSSL) bonds combined, highlighting the challenges in their adoption (Wong 2024). Transition bonds play a vital role in filling the financing gaps that traditional green bonds leave within sustainable finance. Transition bonds are specifically designed to facilitate the decarbonization of high-emission industries such as steel, cement, and petrochemicals. By offering access to capital markets, they support companies with substantial greenhouse gas emissions—provided they demonstrate a well-defined and credible transition plan.

Within the ASEAN+3 region, countries like Japan (JMOF 2024) and China (CBI 2024) have taken the lead in developing transition finance, driven by sector-specific roadmaps and policy frameworks. Japan's issuance of JPY 800 billion (USD 5.3 billion) in sovereign climate transition bonds in 2024 and China's transition finance initiatives in the steel industry exemplify how these tools can align with broader national decarbonization goals. As the demand for fossil fuels persists in developing economies, transition bonds are poised to play a crucial role in bridging the financing gap for sectors that cannot immediately qualify for green bonds, ensuring that no sector/firm is left behind in the low-carbon transition.

However, the effectiveness of transition bonds is closely tied to the robustness of sustainable finance taxonomies, which provide clear definitions and criteria for eligible green and transition activities.⁶ Regional economies have also been actively developing guidelines and regulations to bolster transition finance (Figure 8). These efforts encompass the creation of their own taxonomies, the implementation of carbon taxes, the issuance of transition bonds, and the establishment of climate-related financial disclosure standards. Authorities aim to clarify the definitions of green and transition activities through credible and interoperable taxonomies, thereby ensuring that ESG labels and ratings based on these frameworks are reliable. This clarity is crucial for channelling financing flows toward activities that deliver sustainable outcomes while mitigating the risk of green- or transition-washing⁷. Concurrently, aligning climate-related financial disclosure standards with international best practices—and making them mandatory—will enable market participants to better evaluate their exposure to climate risks and opportunities. The following are some of the progresses made as of the writing of this paper in the ASEAN+3, either in establishing transition finance taxonomies or guidelines, or in making the market environment more conducive to its development:

- China's Green Bond Endorsed Project Catalogue (2021) advances national decarbonization goals by directing capital toward sustainable projects and ensuring compliance with predefined green criteria. Complementing this, the Green Low-Carbon Transition Industry Guidance Catalogue (2024) supports the transformation of key industrial sectors like steel, non-ferrous metals, petrochemicals, and building materials. While a national-level taxonomy is still in development, regional taxonomies in green finance pilot zones are laying the groundwork for a unified framework. The central bank's ongoing efforts, including expert consultations, may lead to transitional financial policies built on these initiatives. Strengthening transition finance with clear KPIs, structured categories, and entity-level disclosures will further support high-emission industries on a credible path to sustainability.
- Japan's Basic Guidelines on Climate Transition Finance (2021) align strongly with the country's 2050 carbon neutrality goal, providing a structured framework to support industries that require a gradual transition. The guidelines emphasize science-based targets, corporate-level climate strategies, and transparent disclosures, ensuring accountability in transition financing. While they offer a clear approach to transition finance, incorporating more detailed sector-specific classifications could further enhance their effectiveness. Overall, Japan's

⁶ See (ICMA, Climate Transition Finance Handbook: Guidance for Issuers 2020) for guidance on best practices, disclosure expectations, and criteria for capital markets participants raising funds in debt markets for climate transition-related purposes. The handbook complements sustainable finance taxonomies by establishing clear expectations for issuers of transition bonds, ensuring alignment with science-based transition criteria and reducing greenwashing risks.

⁷ Greenwashing is a marketing tactic that misleads consumers about a company's environmental impact, while transition washing misaligns finance with a company's sustainability goals. Meanwhile, transition-washing is the potential for companies to deflect attention from their true environmental impact while claiming to be on a path to sustainability.

framework provides a strong foundation for supporting decarbonization efforts while ensuring credible and measurable emissions reductions.

- The Philippine Sustainable Finance Taxonomy Guidelines (2024) provides a strong foundation for sustainable finance in the Philippines, aligning with global climate goals and ensuring transparent investment standards. However, to effectively support transition finance, it should introduce clear sector-specific KPIs, entity-wide disclosures, and a more granular classification system to encourage industries on a structured decarbonization pathway.
- Hong Kong's Securities and Futures Commission (SFC) and the Hong Kong Monetary Authority (HKMA) have expanded their taxonomy to explicitly include transition activities. The government is taking active steps to ensure that Hong Kong's taxonomy aligns with global standards, thereby facilitating cross-border investment and ensuring the credibility of financial products. The HK government is taking active steps to ensure that Hong Kong's taxonomy aligns with global standards, thereby facilitating cross-border investment and ensuring the credibility of financial products.
- Cambodia's capital market has undergone several reforms aimed at embedding sustainability into its financial practices. The most notable of these is the publication of the Corporate Bond Regulations Guidelines in 2022, which provided detailed guidance on Green Bond issuance in the country. The guidelines were further expanded to include social and sustainability bond issuance, reflecting a comprehensive approach to addressing environmental and social concerns through financial instruments.
- Indonesia is preparing for the next steps in its sustainable finance journey, including finalizing the taxonomy for sustainability finance and aligning national policies with international standards such as the ASEAN taxonomy and International Sustainability Standards Board (ISSB)'s International Financial Reporting Standards (IFRS). These initiatives aim to standardize reporting and disclosure systems, improve risk management, and foster the development of innovative financial products that cater to sustainability needs. This includes the establishment of the Indonesian Carbon Exchange and frameworks like the Climate Risk Management and Scenario Analysis (CRMS), which provides comprehensive guidance for banks and financial institutions on managing climate-related risks.
- In Laos, the development of sustainable finance was initiated by the establishment of a Green, Social, and Sustainability Bond Development Committee. Lao PDR's NDC was submitted in 2015, and the government has taken steps to integrate climate change into national policies. The Ministry of Finance and the Security Commission Office are working on setting policy directions and creating an enabling environment for green business and projects. Challenges include developing competency frameworks, enabling business environments, and monitoring and reporting environmental performance. Lao PDR is now studying ASEAN and international standards to develop its own sustainable finance framework.
- The first phase of the Thailand Taxonomy focuses on two high-impact sectors: energy and transport, which together accounted for 68% of Thailand's greenhouse gas (GHG) emissions in 2018. This phase employs a traffic light system for categorizing economic activities based on their contribution to climate objectives. The second phase of the taxonomy development, set to be published in 2025, will broaden its scope to cover additional sectors, such as manufacturing, agriculture, waste management, and real estate. Public consultations and stakeholder engagement will be critical in this phase, with the aim of incorporating diverse perspectives and addressing potential language barriers. Local experts will be brought in to ensure that the taxonomy remains relevant to Thailand's unique economic and environmental context.

- Korea's sustainability disclosure policy is evolving to meet international standards while accommodating the unique characteristics of its industries. The disclosure of climate-related risks and opportunities is essential for ensuring transparency and guiding investments in sustainable practices. In line with global best practices, Korea is reviewing the open draft of its climate disclosure standards. The draft, under public consultation from May to August 2024, emphasizes global consistency, interoperability with other standards, and the practicality of the guidelines for domestic industries. Full implementation is expected by 2026, setting the stage for more structured and reliable sustainability disclosures across Korean businesses.

Figure 8. Selected Transition Finance Guidelines and Initiatives by ASEAN+3



Source: AMRO staff visualization.

Note: The policies stated are non-exhaustive. Some of the policies stated are only for green finance but may be later incorporated into transition finance guidelines. CN = China; HK = Hong Kong, China; ID = Indonesia; JP = Japan; KR = Korea; LA = Lao PDR; MY = Malaysia; PH = the Philippines; and TH = Thailand.

As shown in Figure 8, taxonomies vary significantly in scope, stringency, and treatment of high-emission sectors across the ASEAN+3 region, creating challenges for market confidence and investor alignment (SFIA 2024). While Singapore and the ASEAN taxonomies employ structured classification systems to guide transition finance, Indonesia's more lenient criteria, particularly its conditional classification of new coal plants as green, raise concerns about green- or transition-washing risks. It has been noted by (Schmittmann and Gao 2022) that weak taxonomies or lenient classification criteria can inadvertently facilitate these risks, where firms exploit transition finance labels without genuine commitments to decarbonization. Additionally, they noted that such risks arise due to asymmetric information between bond issuers and investors, and the absence of stringent reporting requirements can allow brown firms to falsely signal compliance with green objectives, undermining market integrity. Indeed, concerns have been raised about the absence of clear, quantitative emissions reduction targets in these frameworks (Zero Carbon Analytics 2024).

Hence it is imperative that greater harmonization of taxonomies, with clear science-based standards and stringent reporting requirements is developed and mainstreamed, to scale transition finance and ensure its credibility in the region's path to decarbonization. The ASEAN Taxonomy (ATB 2024), launched to provide a regional framework, includes a distinct category for transition finance, recognizing that economies are at different stages of development and require flexible pathways to decarbonization (Iyer 2024). By adopting a multi-tiered approach, the ASEAN Taxonomy allows economies at different stages of development to integrate transition finance into their policy frameworks. This structure includes both a principles-based

Foundation Framework and a Technical Screening Criteria (TSC)-based Plus Standard, ensuring flexibility for countries with varying readiness levels to implement transition finance measures. The taxonomy specifically classifies activities into green and amber tiers, with amber serving as an essential bridge for high-emission sectors that require time and investment to transition to greener alternatives.

Nevertheless, the differences in definitions, classification methodologies, and alignment with international frameworks pose challenges for cross-border investments and regional coherence in transition finance. A comparative analysis of these taxonomies would highlight areas of convergence and divergence, offering insights into potential pathways for greater harmonization. As such, to assess the effectiveness of transition finance taxonomies in the region across the different economies, the framework proposed by (Ehlers, Gao and Packer 2021) serves as a useful benchmark. According to a survey on ASEAN+3 transition finance initiatives by PBoC (PBOC 2023) and more recently in (Shirai and Dang 2024), majority of the members are using/considering taxonomy-based approach in the development of transition finance framework. To facilitate meaningful comparisons between both principle-based and taxonomy-based approaches, our analysis does not compare them horizontally (e.g., sector coverage or environmental objectives) but instead evaluates their effectiveness in fulfilling their intended purpose. The five evaluation criteria⁸ focus on the ability of taxonomies to provide clear guidance, incentivize meaningful transitions, and mitigate risks of transition-washing. Applying this framework to some of the member economies reveals varying levels of effectiveness across their taxonomies.

While most countries initially focused on green taxonomies, recent trends indicate that transition finance is becoming a critical component of carbon neutrality strategies. However, some taxonomies lack clear criteria for classifying transition finance, despite containing elements relevant to it. A clear distinction between green and transition taxonomies is also necessary, whether in an integrated framework (as in many ASEAN economies' traffic light approach) or as separate taxonomies (as in Japan's guidelines). Ultimately, the goal is to provide clarity to firms seeking financing for their projects and to financial institutions and investors assessing whether a project qualifies for its stated purpose.

⁸ (1) An effective taxonomy should aid investors in channelling capital into long-term national sustainable development plans. For example, the taxonomy objectives should be aligned with high-level policy objectives of the Paris Agreement and/or existing national standards and regulations. In addition, the objectives should be translated into measurable outcomes—for example, a reduction of GHG emissions by a set benchmark.

(2) Taxonomies usually encompass multiple objectives that may be interlinked, and this could lead to information loss. For example, a project may be positively contributing to one environmental objective, while harming another at the same time. Without a clear label, investors would face considerable uncertainty over the environmental benefits of the certified assets.

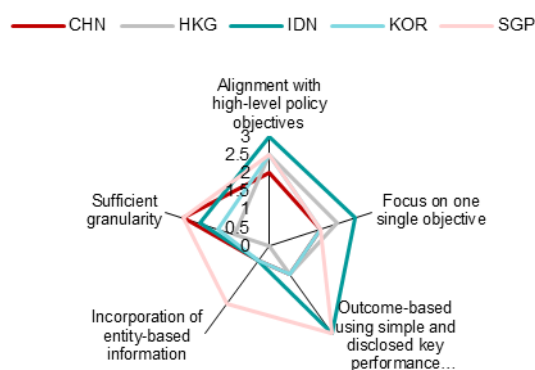
(3) The choice of KPIs should be directly linked with the high-level policy objective. For example, GHG emissions, whereby both direct and indirect emissions are taken into consideration.

(4) Entities may label some activities as green/transition, despite their overall carbon footprint being substantial. It is important for taxonomies to be able to affect incentives on an entity level.

(5) Taxonomy that only labels an activity as “green/transition” vs “not green/transition” greatly limits the range of investment strategies. By targeting only firms with strong environmental performance, this fails to capture firms that are currently transitioning towards greener practices or MSMEs that cannot fulfil the stringent criteria. Therefore, taxonomies should have different categories with thresholds that can be adjusted to circumstances, to determine if an asset or project is on a pathway to be aligned with high-level objectives.

As shown in Figure 9 and 10⁹, national taxonomies¹⁰ developed by selected ASEAN+3 economies generally perform well in aligning with high-level policy objectives. However, they could be further improved by explicitly incorporating measurable and forward-looking targets, ensuring that each taxonomy is self-contained.

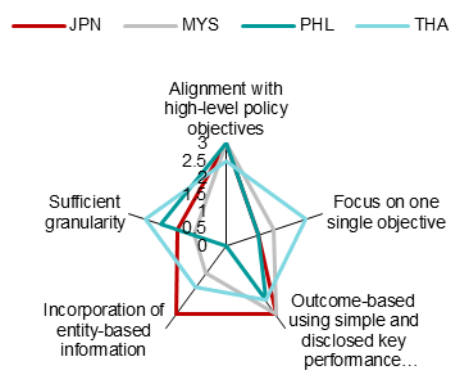
Figure 9. Mainly Taxonomy-based Economies (Index)



Source: AMRO staff calculations

Notes: For each principle (represented by a vertex on the pentagon), a score between 0, 0.5, 1.0, 1.5, 2.0, 2.5 and 3 is assigned. A higher score denotes greater effectiveness in the respective principles. More detailed explanations of how the scores are assigned can be found in Table 1A-E.

Figure 10. Mainly Principle-based Economies (Index)



Source: AMRO staff calculations

Notes: For each principle (represented by a vertex on the pentagon), a score between 0, 0.5, 1.0, 1.5, 2.0, 2.5 and 3 is assigned. A higher score denotes greater effectiveness in the respective principles. More detailed explanations of how the scores are assigned can be found in Table 1A-E.

For transition purposes, taxonomies should integrate more entity-based information, either in defining transition activities or in monitoring their impact. This is particularly relevant for economies that adopt a taxonomy-based approach. In contrast, economies that follow a principle-based taxonomy generally emphasize science-based targets, corporate-level climate strategies, and transparent disclosures, ensuring accountability in transition financing, as shown in the case of Japan. Nonetheless, making the official taxonomy document self-contained would provide greater clarity for users.

Another factor limiting the effectiveness of these taxonomies is the lack of sufficient granularity in thresholds defining transition activities. Firms, industries, and countries have different starting points in sustainability performance, and a one-size-fits-all approach may not be effective. To support an inclusive transition, clearer criteria or differentiated thresholds for firms with varying characteristics would be more useful. For instance, Indonesia and the Philippines have implemented tailored criteria for large firms and MSMEs, which account for a significant share of emissions and require access to transition finance. While implementing quantitative

⁹ Based on the five principles, a detailed evaluation of the taxonomies is set out in Table 1A-E in the Appendix.

¹⁰ Economies are still in the process of developing their taxonomies, with some expanding their frameworks to include transitional taxonomies in stages. For the purposes of this report, the taxonomies evaluated refer to taxonomies as of January 2025 in Table 2 in the Appendix.

thresholds may be challenging in practice, a more tailored and transparent process would significantly enhance the effectiveness of transition taxonomies.

Finally, as transition finance remains in its early stages across most ASEAN+3 economies, transition taxonomies are largely embedded within national taxonomies originally designed for green activities. To minimize confusion for users, a separate transition taxonomy—clearly specifying qualitative criteria or quantitative thresholds by industry—could be a more effective way to promote transition finance. This echoes the lower scores observed in the principle of “Focus on a Single Objective” in Figure 9 and 10 as most national taxonomies currently follow a one-size-fits-all approach which could lead to information loss.

As described earlier, there is a wide disparity in terms of the level of development in the taxonomies and regulations related to transition finance in the ASEAN+3 region. While some economies have established their taxonomies, others, such as Brunei, Cambodia, Laos, and Myanmar, are still in the early stages of implementation, monitoring, and enforcement of all sustainability related policies (see Figure 11). Overall, an effective taxonomy must clearly define either green or transition eligibility to provide transparent guidance for users. It should also establish well-defined thresholds, particularly for transition and enabling activities, ensuring clarity and consistency. To maintain relevance amid technological advancements, regular updates are essential. Additionally, a phased implementation—beginning with the most polluting sectors and tailored to each country’s specific context—can enhance effectiveness and facilitate a smoother transition.

3.4 Policy Alternatives to Address Information Asymmetry

The region’s progress in transition finance is at risk due to the challenges of information asymmetry, which undermines effective capital allocation by obscuring the true sustainability and risk profiles of investments. This asymmetry arises from inconsistent definitions and taxonomies, divergence in the quality of environmental disclosures, and evolving reporting standards that can quickly become outdated (Wong 2024). Additionally, the risks of greenwashing and the lack of interoperability between national and international standards further obscure the true climate impact of investments, making it challenging for market participants to accurately assess and compare the sustainability and risk profiles of transition finance instruments (ACMF 2024). Effectively addressing information asymmetry in transition finance is critical to achieving desired climate objectives. Regional authorities must carefully evaluate and implement tailored approaches—balancing market-driven innovation with robust regulatory frameworks—to bridge data gaps and ensure that financial flows support a genuine transition to a low-carbon economy.

Systematic vs. independent approach to achieve climate goals

One key strategy involves choosing between systematic and independent approaches to achieve climate goals. An example of a systematic approach is the (Singapore Green Plan 2024), which integrates climate objectives across ministries under a national economic framework. This approach helps to reduce information gaps and ensure that sustainability goals are aligned across various sectors of government. In contrast, other economies are establishing independent bodies dedicated solely to climate policy oversight. For instance, Japan has also adopted more specialized measures by empowering dedicated bodies like the (Japan Climate Initiative 2024), consisting of a group of Japanese companies, local governments and research institutions to participate in the discussion of climate strategies and

solutions. These specialized agencies are allowed to prioritize climate action by providing targeted analysis and policy measures without the constraints of broader bureaucratic coordination. That said, such an approach may require additional measures to ensure that their outputs align with broader governmental strategies.

Market driven vs. regulation driven to develop transition finance

Another important dimension is balancing market-driven and regulation-driven mechanisms to develop transition finance. While market-driven initiatives—such as voluntary sustainability disclosures and the promotion of innovative green bonds—encourage private-sector participation and financial innovation, regulation-driven approaches, which mandate standardized reporting and disclosure frameworks, are crucial to ensuring transparency and mitigating risks like greenwashing and transition-washing. For instance, certain ASEAN+3 markets such as Singapore which fostered a vibrant market for green bonds and sustainability-linked loans through incentives, voluntary disclosure frameworks, and robust financial market infrastructure, benefitted from the robust growth in climate-related bonds supported by investor demand for sustainable financial products (MAS, Banking and Capital Markets 2024). In contrast, South Korea is in the process of establishing clear guidelines and mandatory reporting standards for climate-related disclosures, is designed to reduce greenwashing by ensuring that financial products meet stringent sustainability criteria (FSC 2024). By setting these standards, South Korea not only builds investor confidence but also directs capital toward projects that are aligned with its national decarbonization goals.

Static vs. dynamic threshold in the forward-looking transition plan

When developing transition plans, regional economies face the challenge of choosing between static thresholds—fixed, unchanging criteria—and dynamic thresholds that evolve to incorporate technological advancements over time. Fixed benchmarks offer transparency and certainty for investors, while reducing the risk of greenwashing. In contrast, dynamic thresholds, which are periodically reviewed and updated based on the latest scientific data and technological innovations, emphasize feasibility and long-term sustainability in determining eligibility. For example, the Singapore-Asia taxonomy launched by (MAS, Singapore - Asia Taxonomy for Taxonomy for Sustainable Sustainable Finance 2023 Edition 2023) utilizes science-based criteria to clearly differentiate between green and transitional activities. By complementing static benchmarks with dynamic thresholds, this approach enhances the overall sustainability and adaptability of transitional activity assessments over time.

National taxonomies vs. internationally interoperable taxonomies

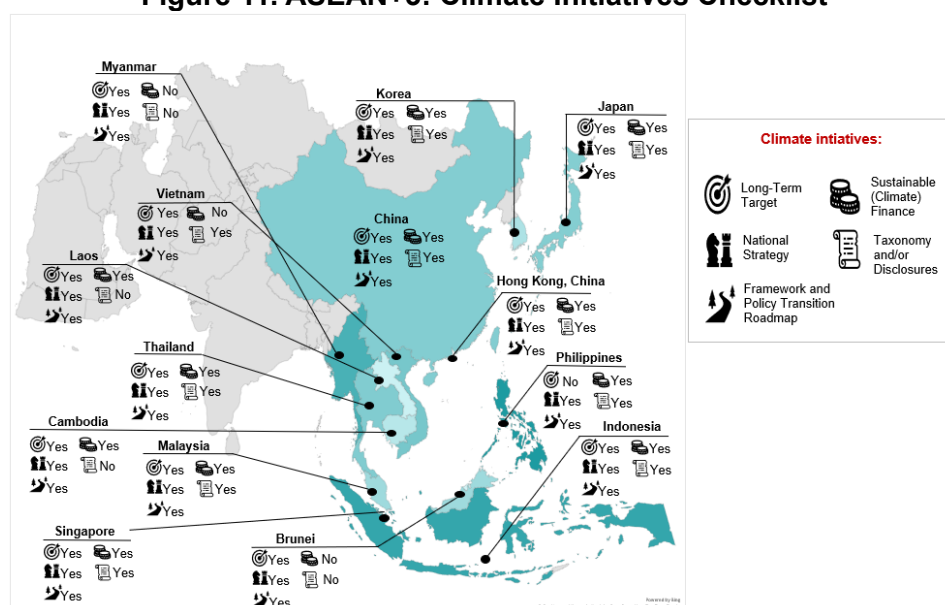
Finally, the balance between national and international interoperability is crucial in reducing information asymmetry and enhancing the credibility of transition finance frameworks in the region. Divergence in transition finance taxonomies across the region can create inefficiencies, limiting cross-border investment flows and reducing market confidence in sustainability-labelled financial instruments. It is therefore essential to expand the scope of interoperability beyond national boundaries to ensure a seamless and effective transition finance landscape in the region. Pertinent examples of such efforts include China, where steps were taken to align the Green Bond Endorsed Project Catalogue with international standards such as those established by the ICMA and the European Union taxonomy (IPSF 2021). These alignments help bridge the gap between the criteria for green activities across jurisdictions, facilitating cross-border investment in sustainable projects. Similarly, Thailand has taken steps to

harmonize its climate-related financial disclosure practices with international frameworks like the Task Force on Climate-related Financial Disclosures (TCFD), thereby ensuring that both local and foreign investors have access to consistent and comparable information (SEC 2023).

While the efforts of China, Thailand, and Singapore to align with international frameworks represent significant strides, broader regional coordination remains necessary to bridge existing regulatory and definitional gaps. The disparities in climate policy adoption across ASEAN+3, as evident in Figure 11, underscore the need for greater harmonization in regulatory approaches. More recently, the People's Bank of China (PBOC), the European Union Directorate-General for Financial Stability, Financial Services and Capital Markets Union (FISMA), and the Monetary Authority of Singapore (MAS) have collaborated to develop the Multi-Jurisdiction Common Ground Taxonomy (M-CGT) to enhance the interoperability of taxonomies across China, the EU and Singapore (IPSF, Common Ground Taxonomy Multi-Jurisdiction Activity Tables 2024). Such initiatives lead to greater harmonization of definitions by establishing a unified classification framework that enhances comparability and reduces the risk of greenwashing.

Beyond taxonomy alignment, standardizing climate-related financial disclosures is another critical pillar in mitigating information asymmetry. Investors and financial institutions require access to reliable and comparable data to assess transition risks and opportunities effectively. While countries like Japan and Korea have introduced mandatory sustainability reporting requirements, other regional economies continue to rely on voluntary disclosure frameworks. The gradual adoption of global standards, such as the International Sustainability Standards Board (ISSB) framework and the Task Force on Climate-related Financial Disclosures (TCFD), can facilitate greater transparency, enabling investors to make well-informed decisions. Moreover, the integration of digital solutions, such as centralized sustainability data repositories and blockchain-based reporting mechanisms, could enhance the accessibility and reliability of climate-related financial data across jurisdictions.

Figure 11. ASEAN+3: Climate Initiatives Checklist



Sources: AMRO's visualization

4. International Cooperation in Transition Finance in Asia

This chapter examines the role of international cooperation in mobilizing multilateral financing resources, establishing regional transition finance platforms, and aligning taxonomies and standards in Asia's transition finance. Then, drawing on practices in ASEAN+3, it explores ways to advance collaboration for a balanced and inclusive transition.

4.1 Mobilizing Multilateral Financing Resources

The development of transition finance in Asia faces significant challenges, particularly due to the varying maturity levels of financial markets across the region. As highlighted in Chapter 3.3, some countries possess underdeveloped financial systems, limiting their capacity to adequately support transition projects. This disparity underscores the critical role of multilateral funds and MDBs in mobilizing diverse financing sources and mitigating investment risks associated with transition initiatives.

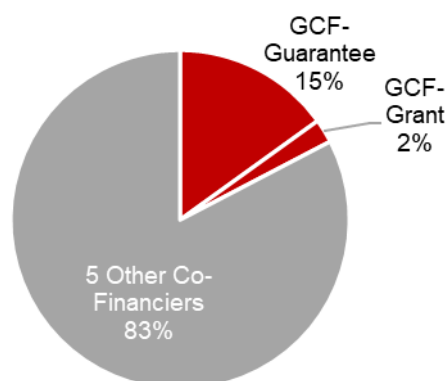
Multilateral Funds

Multilateral green, climate and transition funds are channeling external finance and disseminating best practices to developing countries for their green development and climate resilience. As stated in the G20 Independent High-Level Expert Group Report (G20 2024), the major global green and climate Funds, Vertical Climate and Environment Funds (VCEFs), have a collective annual commitment capacity of around USD 4 billion to USD 5 billion. Though limited in scale, these funds help streamline project selection processes and catalyze market capital for climate financing, including transition financing.

The Green Climate Fund (GCF) is the world's largest dedicated climate fund set up by the United Nations Framework Convention on Climate Change (UNFCCC) in 2010, which accounts for half of the annual commitment capacity of the VCEFs. By the end of 2023, its second replenishment has reached a record level of \$12.8 billion for the 2024-2027 operation period. The GCF plans to support up to 25 countries in shifting towards clean and efficient energy for transport, building, and industry.

The "Scaling up energy efficiency for industrial enterprises in Vietnam" Project (GCF 2024) demonstrates how the GCF helps developing countries adopt a holistic approach to decarbonize high-energy intensive industrial sector, based on pillars of credit risk mitigation, technical assistance and capacity building. As shown in Figure 25, out of the total \$497.2 million financing to the project, the GCF provided \$86.3 million, amounting to 17.4%, with \$75 million as guarantee and \$11.3 million as grant for technical assistance, while the World Bank complemented these with an Energy Efficiency credit line.

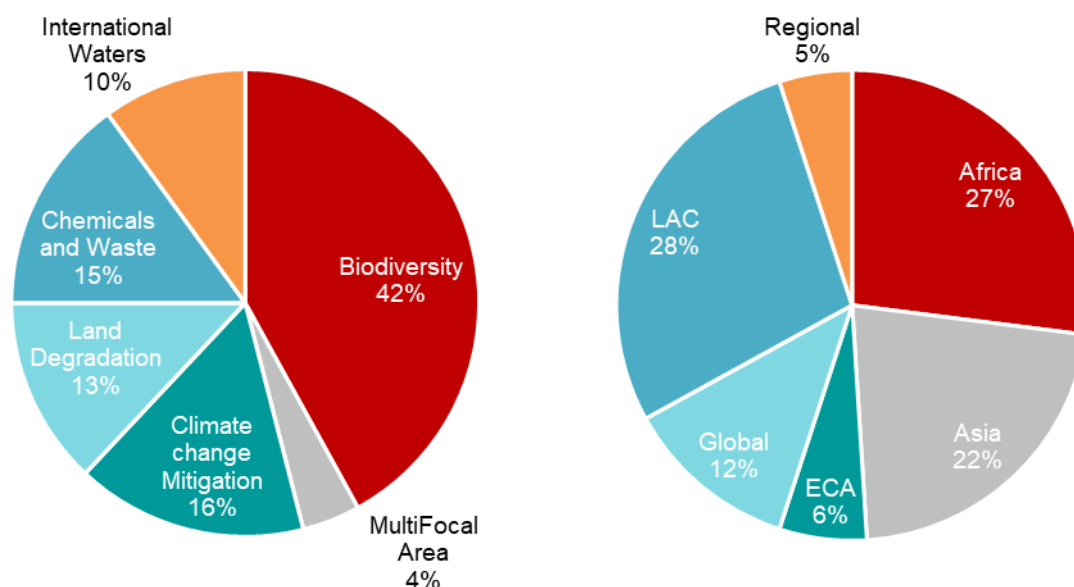
Figure 25. Total Financing to the “Scaling up energy efficiency for industrial enterprises in Vietnam” Project



Source: Green Climate Fund

Industrial decarbonization has also been a strategic focus of the Global Environment Facility (GEF), launched in 1991 by the World Bank partnered with the UNDP and UNEP. Notably in the past two years (2022-2024) during its 8th replenishment for the 2022-2026 cycle, 16% of its \$3.6 billion distributed funding specifically targets climate change mitigation including industrial transitions, mitigating more than 840 million tons of greenhouse gas emissions; 22% of the funding goes to Asia. The GEF-supported project in China “Facilitating Cleaner and Energy Efficient Phosphate Chemicals Industry in China (PhosChemEE) Project” is another example. It aims to enable the extensive application of low carbon and energy efficient technologies in the phosphate chemicals industry in China. This project combined about \$9.34 million in GEF grants with \$97.76 million in co-financing from UNDP, the Chinese government and private sector, which includes grant and in-kind.

Figure 26. The destination of GEF-8 by focal area and by region



Source: Global Environment Facility

Note: LAC = Latin America and the Caribbean; ECA = Europe and Central Asia

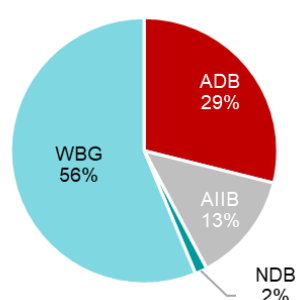
Multilateral Development Banks (MDBs)

The MDBs, including the World Bank Group, ADB, AIIB, and NDB have significantly enhanced their contributions to climate finance. As shown in Table 4, in 2023, these four MDBs have altogether committed over US\$ 21 billion in financial resources for Asia's climate mitigation, in the form of sovereign-backed or non-sovereign-backed financing, equity investments, and guarantees. A preliminary estimate by the BFAA shows that, out of the commitment aggregate of the four banks, those from the World Bank Group, ADB, AIIB and NDB accounted for 56%, 29%, 13%, and 2% respectively.

Table 4: MDB 2023 mitigation finance in million US Dollars

MDB	Mitigation Finance	Mitigation investment in Asia
ADB	6,168	6,168
AIIB	3,093	2,850
NDB	614	313
WBG	26,970	10,788

Figure 27: Mitigation finance in Asia by MDBs



Source: European Investment Bank and estimation by Boao Forum for Asia Academy

Each MDB, through its distinct focus areas, can effectively service the transition finance needs of developing economies by promoting infrastructure development, financial support, and resilience-building in sectors essential for a low-carbon transition (MDBs 2023). For instance, the World Bank's focus on sectors like agriculture, energy, and social protection are particularly relevant for supporting the transition of industries that are pivotal to both economic development and carbon emissions reduction. AIIB focuses on sustainable infrastructure, particularly those beneficial for funding the development of clean energy, electric vehicle supply chains, and hydrogen infrastructure.

Additionally, MDBs facilitate regional projects by mobilizing partnerships, harmonizing policies, and financing cross-border infrastructure, creating synergies that enhance energy connectivity, reduce costs, and accelerate climate action. To accelerate energy transition, ADB set up an ad hoc transition fund in June 2022 termed as the Energy Transition Mechanism Partnership Trust Fund. Supported by contributions from the governments of Japan, Germany, and New Zealand, the fund plans to support Indonesia, the Philippines and Vietnam to hasten the retirement of coal-fired power plants (ADB 2024). AIIB, partnered with other six development financing institutions and select private investors took part in the SUSI Asia Energy Transition Fund (SAETF) to advance energy transition in Asia, launched by the Switzerland-based SUSI Partners and designed to invest in renewable energy, energy efficiency, energy storage, and microgrid projects in Asian markets. With a target fund size of \$250 million, SAETF reached a total commitment of \$120 million as of June 2023. Its investments include utility-scale renewable energy generation, energy efficiency initiatives, and distributed solar photovoltaic (PV) solutions for commercial and industrial clients across Southeast Asia.

As highlighted in Chapter 3.3, the lack of a skilled labor force necessary for transition is a significant challenge faced by some countries during their transformation processes. Technical assistance plays a crucial role in addressing this issue. It involves the transfer of knowledge, skills, and resources from experts to individuals or organizations requiring support, aiming to enhance their capacities and enable them to achieve their development objectives. MDBs are instrumental in providing such technical assistance. For instance, ADB offers technical assistance to its developing member countries to facilitate the preparation, financing, and execution of development projects and programs. This support helps improve their capacities and enables better utilization of development resources.

International Monetary Fund (IMF)

The IMF can also assist member countries' green transition through longer-term balance of payments finance, though not project-based finance. The IMF's newly established Resilience and Sustainability Trust (RST) and the related Resilience and Sustainability Facility (RSF) are examples of innovative mechanisms designed by international financial institutions (IFIs) to support member economies in addressing climate-related vulnerabilities.

A clear example of how these mechanisms support Asia's transition financing can be seen in the case of Bangladesh. In 2023, the IMF Executive Board approved SDR 1 billion (about \$1.4 billion) under the newly created RSF for Bangladesh which is the first Asian economy getting access to the credit line with a 20-year maturity and a 10-year grace period (IMF 2023), in order to support the country's climate change adaptation and mitigation efforts. This program specifically targeted climate-related investments and supported Bangladesh's ambitious transition goals, including its National Adaptation Plan and policies to scale up renewable energy capacity. This financing helped Bangladesh implement the IMF-based program, and in addition, encouraged funding from the World Bank which refers more to western standards when providing transition funds.

The significance of SDRs in transition financing is further underscored in the G20 Leaders' Declaration. The declaration highlights the global ambition of achieving \$100 billion in voluntary contributions through SDRs or equivalent pledges for economies most in need. It emphasizes the importance of swift delivery of pending pledges and encourages economies to explore channeling SDRs to MDBs. Such efforts aim to enhance the financial capacity of MDBs to address global challenges, including sustainable development goals and climate-related vulnerabilities, while maintaining the liquidity of SDR-denominated claims and respecting their reserve asset status. This collaborative approach between IFIs, recipient economies, and private stakeholders is essential for scaling up transition finance, addressing liquidity constraints, and ensuring a sustainable and inclusive energy transition across developing economies.

4.2 Establishing Regional Green Finance Platforms

Beyond mobilizing diverse funding sources for developing countries, another critical aspect of international cooperation is the establishment of regional platforms. Regional Green Finance Platforms can consolidate leading practices and collectively advance transition finance in Asia, thereby fostering the expansion of market-based transition finance through regional collaboration. Regional finance platforms initiated by Asian economies play a significant role in facilitating the region's low-carbon transition, various financing platforms are actively

engaged in transition finance in Asia, through offering affordable loans, technical assistance, and opportunities for cross-border collaboration.

China's Belt and Road Initiative (BRI), Japan's Asia Zero Emission Community (AZEC), Singapore's Finance for a Sustainable Transition (FAST-P) initiative, Hong Kong's transition alliances, as well as the UAE's Alterra platform all exert substantial influence in the region by pivoting financial resources and driving sustainable development across Asia. These platforms are crucial in facilitating blended finance, a mechanism that combines public, private, and philanthropic funding to de-risk investments and mobilize capital for sustainable development.

As an important player in building a green BRI, the China's Silk Road Fund (SRF) launched the \$1 billion BNR HK Flagship Impact Fund jointly with the Hong Kong Monetary Authority (HKMA) on May 2024, aiming at investing in projects in fields such as energy transition and infrastructure. This fund was established under the Cooperation Framework Agreement signed by SRF and HKMA on October 19, 2023. It is part of the Belt and Road Joint Investment Platform, which is expected to reach a total scale of 15 billion RMB (or equivalent in other currencies). Silk Road Fund also signed a MOU with Masdar, the Abu Dhabi Future Energy Company in November 2024, to jointly explore investment opportunities and invest up to 20 billion yuan in renewable energy projects in countries along the "Belt and Road".

Singapore's FAST-P initiative, launched at COP 28, is a notable example of how blended finance can address the financing gaps in Asia's energy transition. The Singapore government is set to contribute concessional capital. Initial investments will be supplemented by funds from multilateral development banks, development finance institutions, and philanthropies. The Monetary Authority of Singapore (MAS) is engaging with various investors to attract commercial capital, aiming to reach the \$5 billion target. Its partners are expanding from the Asian Development Bank, Global Energy Alliance for People and Planet, and Temasek to IFC, Blackrock. Fast-P has already established three funding pillars – accelerating energy transition, green investments, and debt financing for industrial transformation. The first Energy Transition Acceleration Finance partnership focuses on the early phase-out of coal plants, grid infrastructure, and battery storage. The second Green Investments partnership focuses on renewable energy plants and storage, electric vehicles, transport, and water and waste management projects. And the third pillar, the Industrial Transformation program, will focus on hard-to-abate sectors like cement and steel, and decarbonisation technology like carbon removal.

The Altéra platform was launched by the UAE at COP28 in December 2023 with a \$30 billion commitment from the country and teamed up with Blackrock, TPG and Brookfield. Under this platform, a \$25 billion Acceleration Fund and a \$5 billion Transformation Fund have been set up. The former strives for large-scale investment in energy transition, industrial decarbonization, sustainable living and climate technologies, while the latter focuses on reducing barriers to investment in developing and emerging markets. Under the Transformation Fund, ALTÉRRRA and TPG launched Global South Initiative at COP28, targeting \$2.5 billion in total capital commitments and designed to accelerate and attract institutional capital at scale by offering return enhancement to encourage private equity investments in high growth climate opportunities across the Global South. Altéra is now the world's largest climate investment fund, aiming at stimulating \$250 billion for climate action by 2030.

Additionally, Indonesia and Vietnam have been receiving \$20 billion and \$15.8 billion transition finance commitments from Just Energy Transition Partnerships (JETPs), a financing vehicle convened by G7 countries and private partners to help economies transition away from high-carbon energy sources while addressing social and economic challenges to ensure an equitable and sustainable transformation. For Indonesia's JETPs, \$10 billion in funding has been pledged by the International Partners Group to leverage an additional \$10 billion private financing from the Glasgow Financial Alliance for Net Zero (GFANZ). For Vietnam, \$8.08 billion has been pledged from the IPG and \$7.75 billion from the Glasgow Financial Alliance for Net Zero (GFANZ). Nevertheless, with the United States' withdrawal from the Paris Agreement and most recently from JETPs, substantial efforts are imperative to translate the JETPs projects from plans into realities.

Regional platforms also serve as a vital mechanism to mitigate investment risks, particularly in addressing climate-vulnerable economies' transition financing challenges. A case in point is ASEAN+3 economies where investors rationally perceive the renewable projects as high-risk due to potential revenue disruptions from extreme weather events, creating a financing gap for decarbonization efforts. The ASEAN+3 Disaster Risk Financing Initiatives strategically counteract this by establishing a regional risk-sharing architecture. By pooling catastrophe risks across member states and deploying financial instruments like climate insurance or contingency funds, the platform essentially "mutualizes" exposure to localized disasters. This transforms previously fragmented, project-specific risks into diversified, system-level risks that are actuarially manageable. Consequently, transition projects become more bankable through enhanced cash flow predictability and reduced default probabilities, while secondary market liquidity improves as standardized risk metrics emerge.

4.3 Alignment of Asian Transition Finance Standards

As pointed out in Chapter 2.4 and Chapter 3.2, the lack of harmonization in transition finance taxonomies across the region has led to market fragmentation, creating barriers to cross-border capital flows and undermining investor confidence in sustainability-labeled financial products. This regulatory divergence underscores the urgent need to establish cross-border interoperability mechanisms to facilitate a coherent and efficient transition finance ecosystem. The current landscape is characterized by fragmented regulatory frameworks and inconsistent definitions of green and transition activities, which have significantly impeded cross-border investment in transition projects. This fragmentation necessitates enhanced international cooperation to align and integrate transition finance standards.

A critical component of this integration process involves developing and unifying the definitions of transition activities across jurisdictions, ensuring clarity and consistency in what constitutes eligible transition investments. The importance of unifying taxonomies has been discussed and highlighted in Chapters 2 and 3 earlier. Many regions in Asia have established taxonomies for sustainable finance, but discussions on transition finance within these frameworks remain limited. The ICMA published the "Climate Transition Finance Handbook" in December 2020, outlining four elements--transition strategy and governance, business model environmental materiality, "science-based" strategy, and implementation transparency.

As highlighted in Chapter 2, the integration of taxonomies among countries faces several challenges, including the need for high-level standardization, technical hurdles due to divergent indicators, and compliance with diverse regulatory requirements. Despite these

obstacles, significant progress has been made through international partnerships. A notable example is the Multi-Jurisdiction Common Ground Taxonomy (MCGT), jointly developed by China, the European Union, and Singapore, and released on November 14, 2024. This follows the 2021 release of the *Common Ground Taxonomy* between China and the EU, which was built upon China's and the EU's green taxonomies. In the Asia-Pacific region, ASEAN introduced the Transition Finance Guidance in October 2024. This guidance supports industries critical for regional decarbonization, particularly high-emission sectors transitioning towards sustainability. By providing a structured pathway for financial entities to support transitional finance initiatives, ASEAN facilitates regional cooperation in achieving net-zero emissions. These efforts are vital for facilitating global sustainable finance and promoting cross-border climate finance flows.

Chapter 2.3 mentions that the harmonization of standards across nations faces significant challenges due to inherent differences between countries. Drawing on the analysis in Chapter 3.3, the ASEAN+3 economies exemplify this issue, as their diverse economic structures and varying stages of development result in distinct transition pathways, unique challenges, and differing transition needs. For instance, some economies may prioritize decarbonizing heavy industries, while others focus on expanding renewable energy capacity or building climate-resilient infrastructure. These disparities complicate the creation of a unified taxonomy that adequately addresses the specific requirements of each economy. A critical challenge for future international cooperation lies in designing a taxonomy framework that is both flexible and inclusive, capable of accommodating the diverse needs of economies at different stages of transition.

The private-led Asia Transition Finance (ATF) Study Group composing of banks that operate in Asia, development banks, export credit agencies, and finance associations (as shown in Table 5), formulated a voluntary Asia Transition Finance Guidelines in September 2022, which provides practical guidance to financial institutions, including how to use an interim approach when country level or sector-level pathways and technology roadmaps for Asia are insufficient (ERIA 2023).

Table 5: The Members and Partners of the Asia Transition Finance Study Group

Category	Participants	
Members	Asia FIs	Bank Danamon, Power Finance Corporation, Security Bank, Bank Mandiri, Bank of Ayudhya, BDO Unibank, Kasikornbank, VietinBank, Maybank, E.SUN Bank, Sumitomo Mitsui Banking Corporation, Sumitomo Mitsui Trust Bank, First Abu Dhabi Bank, Mizuho Financial Group, MUFG Bank
	Global FIs	Brookfield, Barclays Bank, Citi, HSBC, Standard Chartered Bank
Partners / Guests	Development Banks	International Finance Corporation, Export-Import Bank of Thailand, Development Bank of Japan, Japan Bank for International Cooperation, DBS Bank, Nippon Export and Investment Insurance, United Overseas Bank
	Public Agencies and Finance Associations	ASEAN Taxonomy Board; Japanese Bankers Association; Ministry of Energy, Thailand; Australian Government; Japan International Cooperation Agency; Ministry of Finance, Indonesia; Department of Energy, Republic of the Philippines; Ministry of Economy, Malaysia; Ministry of the Environment, Japan; Ministry of Economy, Trade and Industry, Japan; Ministry of Finance, Japan; Financial Services Agency, Japan; Ministry of Energy and Mineral Resources, Indonesia; Sustainable Finance Institute Asia; International Capital Market Association
	Knowledge Contributors	DNV, Economic Research Institute for ASEAN and East Asia (ERIA), Japan Credit Rating Agency Ltd. (JCR), Moody's

Source: BFAA

Carbon credit trading can also contribute to transition finance. At COP29 in Baku, the Malaysia Carbon Market Association (MCMA), Indonesia Carbon Trade Association (IDCTA), Thailand Carbon Market Club, and the Singapore Sustainable Finance Association signed a Memorandum of Cooperation (MoC) to advance regional collaboration within ASEAN through the ASEAN Alliance on Carbon Markets (ACM). The alliance aims to facilitate international trading of carbon credits under this unified framework. By promoting standardization and regional cooperation, ACM enhances transparency and scalability of carbon markets, facilitating greater participation from international investors.

4.4 How to Enhance Regional Cooperation

It is urgent for Asian economies to strengthen collaboration for transition for green growth paradigm in the context of the renewed US withdrawal on the Paris Agreement. Future international cooperation in transition finance can be enhanced in the following four fronts:

Firstly, enhancing collaboration among regional platforms, to effectively pool capital and form synergies of action plans. Sovereign wealth funds in major Asian economies can bring profound impact during this process. Co-investment in cross-border projects can strongly boost regional cooperation (see a case study of cross-border energy trade and regional power grid development in Box 2).

Secondly, working closely with partners in Europe and other regions to attract more transition financing fund providers. To increase more European long-term investors' asset allocation in Asia's green investments, dialogues between financial supervisors are needed to include these investments into key performance indicators like the Green Asset Ratio (GAR), which measures the proportion of EU green taxonomy aligned assets compared to total assets.¹¹

Thirdly, expanding the number of high-impact, model projects backed by blended finance. These projects can manifest how to design the mechanisms to make the public, private, and philanthropic capital providers to work together to scale up transition finance. Multilateral green funds and MDBs can play a central role in providing bankable pipeline projects.

Last but not least, developing adaptive transition finance frameworks aligned with Asia's development stages and sectoral decarbonization pathways. Developing Asian economies face unique challenges in their transition processes, such as limited infrastructure, financial constraints, and the need to balance social and economic development with sustainability goals. Asian financial institutions can consider a higher acceptance of controversial transition technology routes such as clean coal and natural gas projects that focus on clean energy infrastructure, energy efficiency improvements, and policy frameworks to phase out high-carbon activities. This approach can foster more robust and inclusive participation from developing economies in the global green transition.

¹¹ <https://odi.org/en/insights/mobilising-european-institutional-investors-into-emerging-markets-and-developing-economies-three-critical-areas-to-address/>

Box 2: Regional cooperation beyond transition finance: examples of cross-border energy trade and regional power grid development

When an economy has a comparative advantage in generating clean electricity, such as hydro, wind or solar, it can trade surplus power with its neighbours, generating additional revenue while also contributing to regional decarbonization. Beyond economic benefits, a well-integrated power grid enhances energy security by reducing exposure to fossil fuel price fluctuations, a particularly relevant concern for many Asian economies that rely heavily on imported fossil fuels.

Historically, the Nordic synchronous area has been one of the most well-integrated regional electricity systems, serving Norway, Sweden, Finland, and eastern Denmark. As part of the broader Nordic power market, it is one of the most advanced models of regional energy cooperation, characterised by high renewable energy penetration, strong market integration, and effective grid stability. This system serves as a benchmark for how cross-border electricity trade can enhance energy security, market efficiency, and sustainability.

The Laos-Thailand-Malaysia-Singapore Power Integration Project (LTMS-PIP), first proposed in 2014 and launched in 2022, marks a significant milestone in the ASEAN Power Grid (APG) that aims at a fully integrated ASEAN-wide electricity market. It demonstrates both the technical feasibility, and the institutional capacity required for long-distance cross-border power transmission (Arora, 2024). The success of this initiative suggests that deeper forms of integration, either through expanded bilateral ties or more structured multilateral frameworks, could be viable in the longer term.

Despite the significant opportunities presented by regional grid interconnection, several ecological and political challenges persist. While China has been a major investor in infrastructure projects and technology transfer in Laos and Cambodia, thereby indirectly supporting the ASEAN Power Grid, it is not formally involved in its negotiations. Moving forward, ASEAN+3 could serve as a platform to coordinate grid development efforts, with the possibility of expanding cooperation to South Asian countries to enhance regional sustainability and market integration.

Moreover, while hydropower has been the primary focus of cross-border electricity trade, other renewable resources, such as solar and wind, are widely available across several ASEAN economies. To enhance energy security and sustainability, future regional power trade agreements should prioritize a more diversified clean energy mix, reducing overreliance on hydropower, particularly given its environmental impacts and seasonal variability. For regional integration to be truly effective, international cooperation must take a more proactive approach in expanding interconnections beyond hydropower, and engaging with a wider range of stakeholders, such as those within ASEAN+3, as the complementary benefits of such collaboration are discussed in Chapter 5.

5. Conclusion and Policy Discussions

Complementary Roles in ASEAN+3

The ASEAN+3 region's significant fossil inertia highlights the need for substantial time and investment to achieve a cleaner energy mix. Prioritizing electricity generation in transition finance and policy is critical, given its central role in driving decarbonization across sectors. Additionally, the high reliance on emission-intensive industries in many economies necessitates gradual, carefully planned transitions to minimize economic disruption. However, the diverse economic structures and complementary strengths within the region present a unique opportunity to develop tailored transition pathways while fostering regional collaboration and shared progress toward sustainability.

The region's diversity implies that transition finance policies should address the specific characteristics of each member economy while maintaining cross-border applicability. Broadly speaking, each group of economies—Plus-3, ASEAN, and IFCs—can contribute uniquely to the region's decarbonization and sustainable development goals, while also addressing their specific challenges. First, Plus-3 economies hold a key role in driving the region's transition finance efforts. With abundant liquidity, advanced financial systems, and strong R&D capabilities, they are well-positioned to innovate and invest in clean technologies. By developing regional finance mechanisms, such as blended finance models, Plus-3 economies can also help de-risk investments in emerging ASEAN markets while providing technical assistance and facilitating technology transfer to accelerate decarbonization efforts.

Secondly, ASEAN economies are uniquely positioned to leverage their abundant natural resources for clean energy production, such as solar, wind, geothermal, and bioenergy. However, their heavy reliance on emission-intensive industries presents a challenge that requires gradual and well-financed transitions to avoid economic disruption. These economies should focus on leveraging transition finance instruments, such as green/transition bonds and sustainability-linked loans, to fund renewable energy and industrial decarbonization projects. Strengthening institutional capacity to implement and monitor sustainable finance initiatives and fostering regional collaboration to share best practices will enhance their ability to scale up clean energy solutions effectively.

Finally, IFCs play an important role as global financial hubs, driving the development and deployment of innovative financial instruments for transition finance, such as green securitizations, and sustainability-linked derivatives. Their advanced financial ecosystems provide access to global capital markets, which is critical for funding large-scale decarbonization projects across the region. IFCs should focus on harmonizing sustainable finance regulations to attract international investors and enhance market interoperability. By building partnerships with multilateral institutions and global investors, IFCs can channel significant funds into high-impact projects in ASEAN+3 economies while investing in capacity building for sustainable finance professionals.

Collaboration among ASEAN+3 economies is essential to address the disparities in transition readiness and fossil inertia across the region and to ensure a balanced and inclusive transition. Establishing a regional transition finance framework that integrates contributions from all groups can align financial flows with national and regional decarbonization targets. Promoting

regional investment platforms to pool resources and de-risk investments in less-developed ASEAN economies will help ensure equitable access to transition finance. Additionally, strengthening data-sharing and reporting mechanisms across the region will enhance transparency and attract more private-sector participation in transition projects. By aligning efforts and leveraging their unique strengths, ASEAN+3 economies can create a robust and effective transition finance ecosystem. This collaborative approach will accelerate decarbonization, foster regional integration, and support sustainable development, paving the way for a balanced, low-carbon future.

Policy Discussions

Transition finance still faces several challenges and structural barriers in many economies. These continue to pose significant impediments to the advancement of transition in the region. To address these challenges, economies could consider the following strategies (Table 6 provides a summary of policies in a structured format):

1. Develop and Harmonize Transition-Specific Taxonomies

- **National Transition Taxonomies:** Financial regulators should lead the development of a clear and self-contained transition-specific taxonomy to bridge the information gap between financial institutions and corporates. This taxonomy should not only align with national commitments and industry-specific needs, more importantly, it should adhere to a common regional framework. This is to ensure consistency for cross-border investment (e.g., if a Malaysian firm wants to borrow a transition loan from a Japanese bank based in Singapore, national taxonomies should share similar features to be interoperable between these jurisdictions).
- The common framework should be developed by a regional international organisation or think tank, ensuring consistency, credibility, and broad acceptance across regions. A dedicated task force, consisting of representatives from the international organisation and participating economies, should develop and refine the framework. The ASEAN Taxonomy serves as a good example, offering a common framework that national authorities can adapt to their own circumstances. A similar initiative should also include potential capital and technology providers such as the Plus-3 economies.
- **The Regional Transition Taxonomy:** Building on the initial common framework and national taxonomies, member economies could converge towards a regional transition taxonomy to further reduce confusion across borders. The regional taxonomy should accommodate both more advanced transition economies and those in earlier stages. Its goal is to enhance transparency and comparability, attracting international capital to support an inclusive regional transition.

2. Financial Incentives for Transition Assets

- **Introduce clear costs of inaction:** Carbon pricing mechanisms should be established or improved according to each economy's unique conditions to enhance the profitability of transition assets. Additionally, a national transition plan should be established with industry-specific thresholds and phased-out periods. This approach signals to

investors the potential for low returns or even losses from non-transition assets in the future.

- **Financial incentives for transition:** Financial regulators should integrate transition risks into prudential regulatory frameworks for financial institutions, ensuring that financial stability assessments consider risks linked to delayed or insufficient transition efforts. Furthermore, central banks can offer concessional credits through financial institutions to reduce the cost of transition-related borrowing. Fiscal authorities could also provide tax benefits for transition entities. These incentives can motivate investors to invest in transition assets.

3. Enhance Disclosure and Transparency

- **Mandatory disclosure of transition-related information:** Financial regulators should enforce mandatory disclosure of transition-related information for financial institutions and corporations, adhering to international standards such as IFRS S1 and S2. This will improve market transparency and better inform stakeholders about climate-related financial risks. The Hong Kong Securities and Futures Commission plays a critical role in ensuring that listed firms disclose timely and accurate information about their transition-related activities.
- Implementing the aforementioned disclosure policies across ASEAN+3 will further enhance transparency, supporting the region's transition by providing high-quality data that informs all market participants on the actual progress towards carbon neutrality.

4. Provide Capacity Building and Knowledge Sharing

- Comprehensive training and resources should be provided for regulators and market participants to build understanding and engagement in transition finance. Training should focus on taxonomy frameworks, science-based transition thresholds, disclosure requirements, and access to regional funding opportunities.

5. Foster Further Regional Cooperation

- Regional cooperation should be reinforced to address challenges and mobilise financial resources more effectively. Multilateral funds and regional green financing platforms should be used to provide lower-cost financing for transition projects that align with established taxonomies, fostering collaboration among countries to accelerate the transition process.

Table 6: Summary of Policy Discussions

	Information Gap	Financial Incentives
Domestic (Phase 1)	Financial Regulators lead in developing the national transition-only taxonomy for financial institutions and corporates, aligning with national commitments and industry-specific requirements from real economy policymakers.	Real Economy Policy introduces cost of inaction and clear national transition plan with phased-out steps according to dynamic industry-specific thresholds and the transition taxonomy. Financial Regulators encourage concessional credit to transition entities (possibly via financial institutions).
	(Phase 2) Financial Regulators enforce mandatory disclosure of transition-related information for both financial institutions and corporates according to IFSR S1 and S2 requirements.	Fiscal sector provides tax benefits to transition entities (both financial institutions and corporates). Real Economy Policy enhances carbon pricing mechanisms as an additional cost of inaction.
Regional	Regional International Organisations provide harmonised ASEAN+3 transition taxonomies based on existing official and market-driven progress, serving as a mapping between different national versions.	Multilateral Funds provide lower cost financing for transition projects that align with taxonomies. Regional Green Finance Platforms consolidate leading practices and collectively advance transition finance in Asia, fostering the expansion of market-based transition finance and mitigating investment risks.
Capacity Building	Training and resources for both regulators and market participants can enhance understanding and engagement with transition finance. Key areas include the taxonomy framework, science-based transition thresholds, disclosure requirements, tailored treatments for large corporates and MSMEs, and regional funding availability and conditions.	
Further Cooperation	Regional cooperation is a key enabler for the policies mentioned above, helping to address underlying obstacles and effectively mobilize financial resources into the transition.	

Source: AMRO, BFAA and CGI.

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Appendix

Figure B1: National Just Transition Initiatives and Related Policies by Instrument Type and Countries

Type of initiative	AUS	BEL	BUL	CAN	HRV	DNK	EST	EU	FIN	FRA	DEU	GRC	HUG	ITA	KOR	LVA	LTU	MLT	NZL	PRT	ROU	SVK	ESP	SWE	TUR	USA	
GOVERNANCE																											
Consultations & engagements			X	X				X															X			X	
Multi - stakeholder platforms				X															X								
Coordination offices				X															X				X				
SOCIAL SUPPORTS																											
Temporary support for displaced workers	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Employment services	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Social insurance / unemployment support	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Pension support	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WORKFORCE DEVELOPMENT																											
Employment and skills strategies	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Skills training programs	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Job databases / labor market info.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
ECONOMIC DEVELOPMENT																											
Industrial transition	X	X		X					X	X	X	X				X	X		X	X		X	X	X	X		
Business and tax incentives	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Sector - specific investment	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
small and medium-sized enterprises and entrepreneurship support	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
REGIONAL DEVELOPMENT																											
Strategies & plans	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Regional development program	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	
Rural development program	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Local economic development	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Spatial planning	X					X	X		X		X	X		X						X	X	X	X	X	X		
KNOWLEDGE ECONOMY DIGITALIZATION INDUSTRY 4.0																											
Innovation investments / initiatives	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Industry 4.0 Strategy	X								X	X		X		X	X								X	X		X	
Funding for Research and Development	X	X	X			X	X	X	X	X	X			X	X		X				X				X	X	

Source: Krawchenko (2021), CGI

Table 1A. Detailed evaluation of taxonomy effectiveness and rationales

Principle 1: aligns with high-level objectives and measurable interim targets

Components	Scores	ASEAN	CHN	EU	HKG	IDN	JPN	KOR	MYS	PHL	SGP	THA
Aligned with high-level policy goals during development	1 if clearly aligned with high-level environmental goals; 0.5 if mentioned but unclear; 0 otherwise.	Aligns with the EU Taxonomy and other national taxonomies in the ASEAN region (0.5)	In line with China's 2030 sustainable development goals (1)	Aligns with the European Green Deal and Paris Agreement (1)	Aligns with the Paris Agreement and Hong Kong's Climate Action Plan 2050 (1)	Aligns with Indonesia's Sustainable Finance Roadmap Phase I and II (1)	Aligns with the Paris Agreement (1)	Aligns with the Paris Agreement (1)	Alignment with the Paris Agreement and relevant national policies and plans (1)	Alignment with the Paris Agreement and Philippines National Development Plans (1)	Alignment with the Paris Agreement and Singapore Green Plan 2030 (1)	Alignment with the Paris Agreement and Thailand's National Strategy (1)
Clarity on what the target is	1 if targets are clearly defined; 0.5 if referenced in other official documents; 0 otherwise.	GHG emissions reduction (1)	Targets are implicit rather than explicitly stated in the taxonomy (0.5)	GHG emissions reduction (1)	GHG emissions reduction (1)	GHG emissions reduction (1)	GHG emissions reduction (1)	GHG emissions reduction (1)	GHG emissions intensity reduction (1)	GHG emissions reduction (1)	GHG emissions reduction (1)	GHG emissions reduction (1)
Forward looking targets that are realistic and measurable	1 if objectives include both reduction targets and long-term goals; 0.5 if only long-term goals; 0 otherwise.	As early as in the latter half of the 21st century (0.5)	Carbon peak by 2030 and carbon neutrality by 2060 (0.5)	Carbon neutrality by 2050 (0.5)	Carbon neutrality by 2050 (0.5)	32% GHG emissions unconditional reduction by 2030 and carbon neutrality by 2060 (1)	Carbon reduction by 46% by 2030 compared to 2013 and carbon neutrality by 2050 (1)	Carbon neutrality by 2050 (0.5)	45% GHG emissions intensity reduction by 2030 and carbon neutrality by 2050 (1)	75% GHG emissions reduction from a business-as-usual scenario by 2030 (1)	Carbon neutrality by 2050 (0.5)	Carbon neutrality by 2065 (0.5)

Source: ASEAN+3 Climate Initiatives (Del Rosario, Wynn and Ho 2024) at <https://amro-asia.org/asean3-climate-initiatives/>

Note: The principles and criteria are set based on the paper "A taxonomy of sustainable finance taxonomies" by the Ehlers et al. (2021).

Table 1B. Detailed evaluation of taxonomy effectiveness and rationales

Principle 2: Focus on one single objective ("One taxonomy, one objective")

Components	Scores	ASEAN	CHN	EU	HKG	IDN	JPN	KOR	MYS	PHL	SGP	THA
There is a label for each environmental objectives so that they can be focused on one at a time	1 if only one objective per taxonomy; 0.5 if between two and four objectives; 0 otherwise.	4 environmental objectives (0.5)	3 environmental objectives (0.5)	6 environmental objectives (0)	1 environmental objective (1)	4 environmental objectives (0.5)	5 environmental objectives (0)	6 environmental objectives (0)	4 environmental objectives (0.5)	2 environmental objectives (0.5)	5 environmental objectives (0)	1 environmental objective for Phase 1 (1)
Criteria or thresholds to define substantial contribution to an environmental objective	1 if criteria and thresholds exist to determine substantial contribution; 0.5 if mentioned but unclear; 0 otherwise.	Detailed explanation of environmental objectives and criteria to fulfil them but no clear reference thresholds are provided (0.5)	Criteria are used to whitelist eligible activities, but no clear reference thresholds are provided (0.5)	Clear criteria are set at activity level for some environmental objectives (1)	Clear criteria are set to define substantial contribution of each activity to the climate change mitigation objective (1)	Clear criteria are set to define substantial contribution based on the nature of activity, quantitative or qualitative TSC (1)	Criteria are set for determining the eligibility of the activities but no clear thresholds for reference (0.5)	Criteria are set in which the target project will be assessed against but no clear thresholds for reference (0.5)	Criteria are set in which the target project will be assessed against but no clear thresholds for reference (0.5)	No specific criteria set to determine if an activity meets a "substantial" threshold (0)	Criteria are set in which the target project will be assessed against but no clear thresholds for reference (0.5)	Clear set of criteria and thresholds for the climate change mitigation objective (1)
Clear criteria or threshold to apply the negative impacts (e.g., threshold of applying DNSH)	1 if clear criteria exist for applying negative impact management; 0.5 if mentioned but unclear; 0 otherwise.	DNSH is applied, but with no clear criteria or thresholds for each environmental objective (0.5)	DNSH is acknowledged in specific instances, but no comprehensive framework for DNSH criteria (0.5)	DNSH applies with specified criteria or thresholds for each environmental objective (1)	DNSH to other environmental objectives and Minimum Social Safeguards (MSS) will be explored in future development (0)	DNSH applies with specified criteria or thresholds for each environmental objective (1)	Disclosure of the negative impacts are required but unclear how the information will affect the evaluation (0.5)	Exclusion criteria are applied by sector (1)	DNSH is applied, but with no clear criteria or thresholds for each environmental objective (0.5)	DNSH is applied, but with no clear criteria or thresholds for each environmental objective (0.5)	DNSH applies with specified criteria or thresholds for each environmental objective (1)	Generic DNSH is applied to environmental objectives other than climate change mitigation (0.5)

Source: ASEAN+3 Climate Initiatives (Del Rosario, Wynn and Ho 2024) at <https://amro-asia.org/asean3-climate-initiatives/>

Note: The principles and criteria are set based on the paper "A taxonomy of sustainable finance taxonomies" by the Ehlers et al. (2021).

Table 1C. Detailed evaluation of taxonomy effectiveness and rationales

Principle 3: Uses simple and disclosed KPIs in assessment

Components	Scores	ASEAN	CHN	EU	HKG	IDN	JPN	KOR	MYS	PHL	SGP	THA
KPIs used can be linked directly to the sustainability objective (such as carbon emission)	1 if KPIs are directly linked to the environmental objective; 0.5 if mentioned but unclear or referenced in other official documents; 0 otherwise.	GHG emissions where applicable, other measurements in place where necessary (1)	CBRC issued guidelines and KPIs for implementing green credit, which includes carbon emissions, but not in the taxonomy (0.5)	Carbon emissions where applicable, other measurements in place where necessary (1)	GHG emissions where applicable, other measurements in place where necessary (1)	GHG emissions are measured especially for Amber category (1)	GHG emissions and other pre-established KPIs (1)	K-ESG guidelines includes GHG emissions, but not in the taxonomy (0.5)	GHG emissions and other KPIs (1)	GHG emissions and other KPIs (1)	GHG emissions and other KPIs (1)	GHG emissions and other KPIs (1)
Coverage of greenhouse gasses other than carbon dioxide emitted and measure of carbon intensity	1 if all relevant greenhouse gases are covered; 0.5 if mentioned in other official documents; 0 otherwise.	Covers GHGs other than carbon dioxide like methane, nitrous oxide, hydrofluorocarbons etc (1)	Information disclosure required for other GHG by other official documents, but not explicitly stated in the taxonomy (0.5)	Mainly covers carbon dioxide emissions but also has requirements for the other GHGs (1)	Unclear: no explicit mention of gases other than CO ₂ (0)	Covers GHGs other than carbon dioxide (1)	Reduction of air pollutants including sulphur oxides, nitrogen oxides must also be reported, but not a requirement for all projects (0.5)	Unclear (0)	Covers GHGs other than carbon dioxide (1)	Covers GHGs other than carbon dioxide (1)	Covers GHGs other than carbon dioxide (1)	Unclear (0)
Coverage of indirect emissions from production inputs, production distribution, and usage	1 if indirect emissions from production inputs, distribution, and usage are covered; 0.5 if mentioned but unclear; 0 otherwise.	Unclear (0)	Unclear (0)	Indirect GHG emissions are covered (1)	Metrics include only direct emissions (0)	Indirect GHG emissions are covered (1)	Indirect GHG emissions are covered (1)	Indirect GHG emissions are monitored by K-ESG guidelines, but not in the taxonomy (0.5)	One of the assessment requirements is that there shall not be indirect contribution to negative effects to the environment, but more elaborate criteria need to be set (0.5)	Unclear (0)	Indirect GHG emissions are covered (1)	Indirect emissions covered (1)

Source: ASEAN+3 Climate Initiatives (Del Rosario, Wynn and Ho 2024) at <https://amro-asia.org/asean3-climate-initiatives/>

Note: The principles and criteria are set based on the paper “A taxonomy of sustainable finance taxonomies” by the Ehlers et al. (2021).

Table 1D. Detailed evaluation of taxonomy effectiveness and rationales

Principle 4: Incorporates entity-based information whenever possible

Components	Scores	ASEAN	CHN	EU	HKG	IDN	JPN	KOR	MYS	PHL	SGP	THA
Entity level assessment/measurement of emissions	1 if KPI assessment is conducted at the entity level; 0.5 if mentioned but unclear; 0 otherwise.	The entity's plan is used to determine which environmental objective is most relevant to the activity but not clear how it is assessed (0.5)	Entity-level information is mentioned in other official documents, but not explicitly stated in the taxonomy (0.5)	Entity is assessed for taxonomy alignment based on disclosed KPIs (1)	N/A: No transition activity (to be included in next phase) (0)	Entity-level information is mentioned in other official documents, but not explicitly stated in the taxonomy (0.5)	Entity-level GHG emission must be reported (1)	Entity-level information is mentioned, but not explicitly stated in the taxonomy (0.5)	Company information might be assessed by financial institutions, but not explicitly stated in the taxonomy (0.5)	Unclear (0)	Entity is assessed for taxonomy alignment based on disclosed KPIs (1)	Company compliance with the criteria is taken into consideration while assessing for eligibility (1)
Past performance of an entity is measured	1 if an entity's past performance is measured; 0.5 if mentioned but unclear; 0 otherwise.	Unclear (0)	Unclear (0)	Unclear (0)	Unclear (0)	Unclear (0)	Entity needs to disclose at least 3 years of externally verified data for the KPIs if haven't previously done so (1)	Unclear (0)	Unclear (0)	Unclear (0)	Unclear (0)	Not mentioned (0)
Considers if an entity is on a transition pathway to become "green"	1 if the taxonomy recognizes an entity's transition pathway to becoming 'green'; 0.5 if mentioned but unclear or at an activity level; 0 otherwise.	Transition pathway at entity level is explicitly considered in the taxonomy (1)	No transition pathway at entity level is explicitly considered in the taxonomy (0)	No transition pathway at entity level is explicitly considered in the taxonomy (0)	No transition pathway at entity level is explicitly considered in the taxonomy (0)	No transition pathway at entity level is explicitly considered in the taxonomy (0)	Sector transition roadmaps serve as a reference for firms to develop their own transition plans (0.5)	No transition pathway at entity level is explicitly considered in the taxonomy (0)	Encourages financial institutions to assist customers' transition towards sustainable practices in business operations (0.5)	No transition pathway at entity level is explicitly considered in the taxonomy (0)	Transition pathway at entity level is explicitly considered in the taxonomy (1)	Transition pathway is considered with clear thresholds, but only at activity level (0.5)

Source: ASEAN+3 Climate Initiatives (Del Rosario, Wynn and Ho 2024) at <https://amro-asia.org/asean3-climate-initiatives/>

Note: The principles and criteria are set based on the paper "A taxonomy of sustainable finance taxonomies" by the Ehlers et al. (2021).

Table 1E. Detailed evaluation of taxonomy effectiveness and rationales

Principle 5: Ensures sufficient granularity, covering both high and low sustainability performance

Components	Scores	ASEAN	CHN	EU	HKG	IDN	JPN	KOR	MYS	PHL	SGP	THA
Clear criteria or thresholds for Green or Transition labelling	1 if clear criteria or thresholds for labelling exist; 0.5 if mentioned but unclear; 0 otherwise.	There are thresholds where the activity must not exceed to be classified (1)	Clear criteria or thresholds for binary classification (1)	Clear criteria or thresholds for binary classification (1)	Clear criteria or thresholds for binary classification (1)	Clear criteria or thresholds for binary classification (1)	Set of criteria but no clear thresholds (0.5)	Clear criteria or thresholds for binary classification (1)	Clear criteria or thresholds for binary classification (1)	Set of criteria but no clear thresholds (0.5)	Clear criteria or thresholds for binary classification (1)	Set of criteria and thresholds for traffic light system classification (1)
Multiple thresholds for issuers at different sustainability stages (e.g., hard-to-abate sector vs. renewable energy or large firms vs. SMEs) to be qualified for green or transition labelling	1 if different thresholds are defined for various sustainability stages (at either industry or firm level); 0.5 if mentioned but unclear; 0 otherwise.	There are different thresholds where the activity in different industries can be categorised according to a traffic light system (1)	Activities linked to industry-specific green standards and criteria set by competent regulatory authorities (1)	Unclear (0)	Different sustainability stages not considered at this stage (0)	In addition to the traffic light system, TSC is used for large corporates and SDT is used for MSME as criteria (1)	Unclear (0)	Unclear (0)	Unclear (0)	In addition to the traffic light system, a simplified approach is used for MSMEs (1)	There are different thresholds where the activity in different industries can be categorised according to a traffic light system (1)	There are different thresholds where the activity in different industries can be categorised according to a traffic light system (1)
Information disclosure for green or transition labelling	1 if information disclosure requirements are specified; 0.5 if mentioned but unclear or referenced in other official documents; 0 otherwise.	Sustainability reporting disclosures at a portfolio and product level are encouraged (0.5)	Non-standardized disclosure required by other regulations (0.5)	Standardized disclosure required for both financial institutions and non-financial corporates (1)	No explicit mention of disclosure (0)	Does not impose mandatory disclosure in the taxonomy, but other regulations are implemented (0.5)	Entities are required to disclose the allocation of use of proceeds (1)	Does not impose mandatory disclosure in the taxonomy, but other regulations are implemented (0.5)	No explicit mention of disclosure (0)	Does not impose mandatory disclosure in the taxonomy, but other regulations are implemented (0.5)	Does not impose mandatory disclosure, but it will be used in TSC and DNSH assessment (0.5)	When not in compliance, companies are encouraged, but not required, to publicly publish their plan to correct their deficiencies (0.5)

Source: ASEAN+3 Climate Initiatives (Del Rosario, Wynn and Ho 2024) at <https://amro-asia.org/asean3-climate-initiatives/>

Note: The principles and criteria are set based on the paper “A taxonomy of sustainable finance taxonomies” by the Ehlers et al. (2021)

Table 2. List of official taxonomies (in alphabetical order)

	Issuer	Taxonomy	Coverage
ASEAN	ASEAN Taxonomy Board	ASEAN Taxonomy for Sustainable Finance Version 3 (Apr 2024)	Green/Transition
CHN	People's Bank of China; National Development and Reform Council; China Securities Regulatory Commission	The Green Bond Endorsed Project Catalogue (2021)	Green
EU	European Commission	Taxonomy: Final Report of the Technical Expert Group on Sustainable Finance (Mar 2020)	Green/Transition
HKG	Hong Kong Monetary Authority	Hong Kong Taxonomy for Sustainable Finance (May 2024)	Green
IDN	Otoritas Jasa Keuangan	Indonesia Taxonomy for Sustainable Finance (Feb 2024)	Green/Transition
JPN	Ministry of the Environment	Green Bond/Loan and Sustainability Linked Bond/Loan Guidelines (2022)	Green
	Cabinet Secretariat; Financial Services Agency; Ministry of Finance; Ministry of Economy, Trade and Industry; Ministry of the Environment	Japan Climate Transition Bond Framework (Nov 2023)	Transition
KOR	Ministry of Environment	K-Taxonomy Guidelines (Dec 2022)	Green/Transition
MYS	Bank Negara Malaysia	Climate Change and Principle-based Taxonomy (Apr 2021)	Green/Transition
	Securities Commission Malaysia	Principle-based Sustainable and Responsible Investment Taxonomy (Dec 2022)	Green/Transition
PHL	Financial Sector Forum	Philippine Sustainable Finance Taxonomy Guidelines	Green/Transition
SGP	Monetary Authority of Singapore	Singapore-Asia Taxonomy for Sustainable Finance (Dec 2023)	Green/Transition
THA	Thailand Taxonomy Board	Thailand Taxonomy Phase 1 (Jul 2023)	Green/Transition

Source: ASEAN+3 Climate Initiatives (Del Rosario, Wynn and Ho 2024) at <https://amro-asia.org/asean3-climate-initiatives/>