



Amundi Asia Responsible Investment Views 2024

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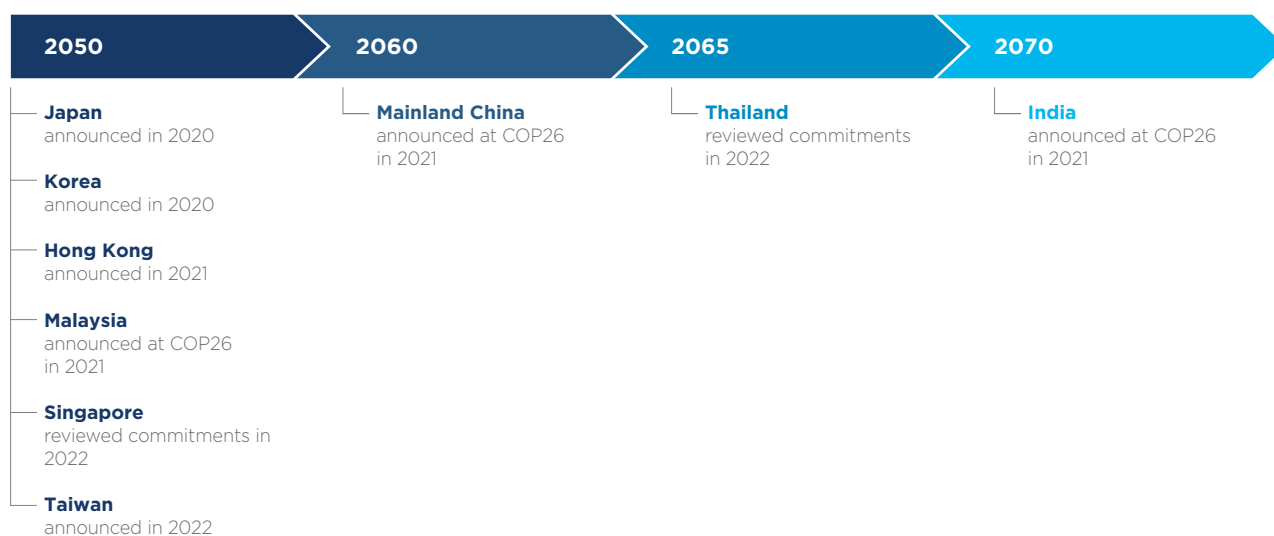
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Introduction

The global push towards a sustainable future is an urgent and complex challenge that requires the collective efforts of nations worldwide. In this endeavor, Asia emerges as a pivotal player, offering a unique combination of technological advancements, industrial prowess, and biodiversity wealth. Yet, the diversity of development maturity levels across Asian countries cannot fit into a one-size-fits-all sustainability framework, and Asia's dense production and supply chains present significant hurdles to climate commitment ambitions, especially when contrasted with Europe and the United States.

Net Zero commitments in Asia¹



Asia has become a global hub for green technological advancements, fostering innovation and driving progress across various sectors. From renewable energy solutions to smart infrastructure and electrification of transportation, the region's technological capabilities are instrumental in shaping a sustainable future. Asia's contributions in those areas are crucial for achieving global sustainability goals: these technological advantages, coupled with Asia's manufacturing prowess, not only fuel the region's progress but also engender a growing dependency from European and American green technology supply chains.

In the same time, the IMF estimates that emerging and developing Asia nationally determined contributions [will require \\$1.1tn annually for climate mitigation and adaptation investments, currently falling short by \\$800bn](#). Initiatives are being built to bridge this gap, incorporating mechanisms such as taxonomy, carbon pricing and increased supply chain due diligence to foster responsible investment and development. Nonetheless, a rapid acceleration is imperative to ensure a trajectory compatible with Net Zero aspirations. Achieving a global balance is essential, not only to bolster Asian nations' development in sustainable practices but also to channel capital towards the energy transition and the proliferation of green technologies.

The region's technological and regulatory strides have laid a robust foundation for effecting positive change. By recognizing and leveraging Asia's strengths, investors can better navigate the complexities of sustainable transition, paving the way for increased sustainable investments in the region.

1. [Energy & Climate Intelligence unit website](#)

Executive summary

1. Sustainability Race:

Asia's GREEN TECH GIANTS6

- Asia, led by China, is at the forefront of the global movement towards sustainable development, heavily investing in green technologies. The region accounts for approximately 70% of the \$470bn global investment in clean energy technologies necessary to meet the 2030 Net Zero Emission Scenario demands
- Governments in Asia have played a key role to promote green technology through policies, subsidies, and tax incentives. China, Japan, and South Korea, in particular, have recognized the potential of solar energy and battery storage early on, directing substantial investment towards these technologies
- China has established a dominant position in the manufacturing of solar PV, wind power, and EV batteries, holding 80%, 60% and 70% of the global manufacturing capacity respectively. The country's aggressive cost reduction strategies in solar panel production with renewable portfolio standards and feed-in tariffs have significantly undercut prices globally, contributing to its dominance and raising concerns among international competitors
- Besides traditional green technologies, Asian nations are focusing on emerging sectors such as green steel, biofuels, and green hydrogen to maintain their global leadership. China's investment in sodium-ion batteries and Japan's green steel & hydrogen strategy highlight the region's commitment to diversifying its green technology portfolio
- The Asia-Pacific region, rich in biodiversity, faces significant environmental threats exacerbated by climate change and unsustainable practices. However, there is a growing recognition of the risks associated with biodiversity loss and climate change effects, prompting increased investment in nature-based solutions and initiatives such as the AIIB Adaptation Bond to enhance climate resilience and adaptation

2. Net Zero Compass:

Aiming for a Just Transition to Net Zero in Asia15

- Asia and especially Southeast Asia face the dual challenge of transitioning to low-carbon economies and fostering inclusive growth, requiring innovative financing to support essential infrastructure and energy projects, and emphasizing the urgency of allocating resources towards sustainable development
- The IEA reported a growing divide in CO₂ emissions evolution between developed and emerging countries. On one side, advanced economies saw a record decline in emissions in 2023, primarily due to clean energy growth, for which China contributed significantly to, through global addition of renewable energy capacities. On the other hand, local emissions of emerging economies like China and India have surged on the back of rapid economic growth and energy demand. Globally, emissions increased by 1.1% (+410 Mt CO₂) in 2023. Compared to 2019, it represents additional 900Mt CO₂, and would have been three times larger without the growing deployment of clean energy technologies emphasizing the global challenge of aligning economic development with environmental sustainability.
- Asian countries are pursuing the development of comprehensive sustainable finance frameworks, including transition finance, sustainability roadmaps, taxonomy approaches, and carbon pricing schemes, providing clear guidelines and roadmaps for facilitating sustainable investments and assessing companies' transition credibility

- Asian companies are facing an increased need to enhance due diligence practices due to development of green taxonomies locally, as well as with the expected implementation of the CSDDD in Europe. Local initiatives are also pushed to provide clarity on sustainable investments and mitigate greenwashing risks
- Just Energy Transition Partnerships (JET-P) serve as a critical mechanism for coal-dependent economies, with financial pledges like South Africa's \$8.5bn and Indonesia's \$20bn indicating the scale of support for transitioning to renewable energy sources

3. ETS and VCM development - *market trading development in China and across Asia*.....22

- Asia is making notable strides in carbon pricing with China's national ETS covering 4 billion tons of CO₂, accounting for over 40% of the country's emissions. Additionally, the region is responding to the EU's Carbon Border Adjustment Mechanism (CBAM) by enhancing their carbon pricing mechanisms, highlighting a unified effort towards mitigating climate change despite varying progress rates among countries
- The region's proactive stance is exemplified by various initiatives, from Hong Kong's Core Climate voluntary market to Singapore's carbon tax covering 80% of its emissions. South Korea's comprehensive ETS and Japan's plans for a full-scale national ETS by 2026 further demonstrate Asia's commitment to robust carbon pricing mechanisms as a critical tool for climate action
- With the world's largest ETS, China is advancing its market-based carbon pricing, covering 2,257 power sector companies and planning to include more sectors. The recent compliance cycle saw carbon prices exceed RMB 80/t, with expectations to rise amidst efforts to align with international carbon pricing

Sustainability Race: Asia's GREEN TECH GIANTS

“We are, on the one hand, extremely vulnerable to the impacts of climate change, and on the other hand, a place that uses technology very intensively in order to overcome all our natural disadvantages.”

Jacqueline Poh,
managing director of the
Economic Development Board,
about Singapore

“The rest of the world was not prepared for that [...] If you work on a free market basis, you can't move so fast”

Lance Guo,
expert on Chinese politics and
economy at National University of
Singapore about China green tech
development in Financial Times

In the era of global climate action, the imperative to shift towards sustainable development has never been more pressing. At the heart of this transformation is the need for significant investment in green technologies, innovations supporting reduction of environmental footprint, enhancing energy efficiency, and fostering a sustainable future. While the quest for green technology development is a global endeavour, Asia, led by China, stands at the vanguard of this movement, pioneering in both the adoption of these technologies and the crucial financing mechanisms that enable their growth.

Asian countries have taken different approaches regarding green technologies with one common denominator: stay ahead of the curve in investment and technological development. Green tech is now a cornerstone of Asia's climate strategy, with committed financing across Asian countries accounting for around [70% of the \\$470bn announced global cumulative investment](#) in mass manufacturing of selected clean energy technologies required to meet demand in the NZE Scenario for 2030.

Government policies across the region have been instrumental in this rise, with nations developing incentives and technology roadmaps earmarking capital for green technology research and development, creating the necessary ecosystem for green innovation to thrive. Countries such as China, Japan and South Korea recognized early the potential of solar energy and battery storage solutions, investing heavily in these technologies in the early 2000s.

China has established itself as a global leader in green technology, being a driver for mainstream technologies in renewables and EV batteries but also investing heavily in emerging ones. The successive Five-Year governmental plans have put green innovation at the center of the country's industrial policy. Beyond subsidies and tax incentives, the government committed resources to develop its strategy by defining renewable portfolio standard (RPS) in 2018, setting [mandatory renewable and non-hydro renewable consumption targets](#) at provincial level, and [implemented feed-in tariffs](#) in 2016, guaranteeing a fixed priced for renewable electricity making for predictable revenues. Feed-in tariffs started phasing out in 2021 and were replaced with several policies and market mechanisms.

China has a supply chain advantages in solar PV, wind power and EV batteries, accounting for [80%, 60% and 70%](#) of the global manufacturing capacity respectively. The export value of solar cells, lithium-ion batteries and EVs has reached [RMB 1,060bn](#) (c. \$150bn) in 2023.

Dominance from China is not about to slow down. In the past year solar panel production costs in [China went down 42% reaching 15 cents \(USD\) per watt](#), China's prices are more than 60% lower than those in the United States and significantly lower than Europe (30 cents per watt) and India (22 cents per watt). These rapid expansion and cost reduction have raised concerns among EU and U.S. producers, who fear that the influx of new Chinese factories could render their own factories uneconomical.

Beijing is now at the juncture of ambitious climate change goals. The EU and the US have been pushing for the greening of their supply chains through initiatives like the Green Deal and the IRA, it is imperative to acknowledge that China cannot be excluded from the equation when it comes to clean tech supply chains and climate strategies.

Asia, and particularly China, has been propelled to the forefront of global green technology leadership through strategic investments, robust industrial policies and green tech roadmaps, and significant financial commitments. Asian nations are now directing their attention towards the future of green technology, including areas such as green steel, biofuels, and green hydrogen. By emulating their historical success, these countries aim to maintain their status as global leaders in the green technology sector, aligning with their ambitious climate objectives.

01 China green tech dominance

Leadership on Electric Vehicles (EVs)

China is the largest market of EVs, accounting for [60%](#) of the [\\$10.5m](#) global EV sales in 2022, and the share of China's EV sales is expected to remain above 50% even with the expected global EV sales surges to [\\$27m](#) in 2026.

Chinese manufacturers are now implementing measures, such as China RoHS² regulation limiting usage of hazardous substances in electronic products or the [standard for pollution control on hazardous waste storage](#), to limit the carbon footprint during the production process and along the supply chain.

Fast-growing Renewable Technologies: Solar PV and Wind Power

In late 2020, China set out a roadmap for total installed capacity of wind and solar to be [1,200 gigawatts \(GW\)](#) by 2030. In 2023, China commissioned as much solar PV as the entire world did in 2022, and the solar PV alone accounted for [three-quarters](#) of renewable capacity additions worldwide, which increased by almost 50% to nearly 510GW in 2023. China also accounts for [95%](#) of announced global N-type solar cell capacity, using phosphorus during manufacturing, making it a more efficient technology compared to P-type solar panels.

The newly installed wind power capacity has reached [75.9GW](#), accounting for over 60% of the [expected global wind capacity additions in 2023](#).

Emerging Green Technologies: Sodium battery

Sodium battery is a type of rechargeable battery used as an alternative to lithium-ion batteries for energy storage. They have the potential to be a more cost-effective and environmentally friendly option. [The global sodium-ion battery market size](#) was exhibited at \$0.86bn in 2022 and is projected to hit around \$4.8bn by 2032 with a registered CAGR of 19%. [Over 100 GWh of manufacturing capacity of sodium-ion batteries either currently operating or announced, is almost all in China.](#) ["White Paper the Development of China's Sodium Ion Battery Industry \(2023\)"](#) forecasts that the industry will have a dedicated mass production line capacity of 13.5GWh for sodium-ion batteries by the end of 2023, and the sodium-ion batteries shipments will reach 347GWh by 2030.

BYD, the Chinese electric-car maker established its sodium-ion batteries production base in Xuzhou. Its sodium battery is installed on the A00-class model Seagull in the fourth quarter of 2023. The sodium battery version is expected to sell for 60,000 yuan and have a cruising range of 300km. The largest application area will be energy storage.

02 Japan developing its green tech industry

Japan's hydrogen strategy

The Japanese government revised its hydrogen strategy in June 2023, recognizing the critical role that hydrogen will play in country's future industrial competitiveness, energy security, and carbon neutrality by 2050. The government has identified five categories as core strategic priorities in the plan: hydrogen supply, decarbonized power generation, fuel cells, direct use of hydrogen and utilization of hydrogen compounds (including fuel ammonia and carbon-recycle products).

The strategy aims to create demand for hydrogen to increase consumption volume from the current 2 million tons to 12 million tons per annum by 2040³. Fuel cells are another technology that Japan is focusing on, and the strategy sets a target of having 1000 refueling stations by 2030, up from the current 180. This expansion in refueling infrastructure will support the growing number of vehicles that rely on hydrogen as a fuel source, further driving the adoption of fuel cell technology.

On the supply side, the government is exploring the development of international partnerships to ensure stable supply. It intends to build supply chains in Asia and the Indo-Pacific region by commercializing hydrogen-related technologies. Japan targets 10% of the global market share of electrolyzers with 15 GW capacities installed by 2030³. Domestically, the strategy lists the support for large-scale industrial clusters in metropolitan areas and the development of infrastructure for hydrogen. With growing demand and reliable supply, the government seeks to reduce the supply cost of hydrogen by 80% to JPY 20/Nm³ by 2050.

In the hydrogen strategy, Japan is following the trend of policy intervention in other major economies, such as the EU's Green Deal and the IRA of the US. The government will extend support to promote investment of JPY 15 trillion (c. \$100bn) in hydrogen supply chains and infrastructure through collaboration between the public and private sectors over the next 15 years.

Case study of Japanese Steel industry

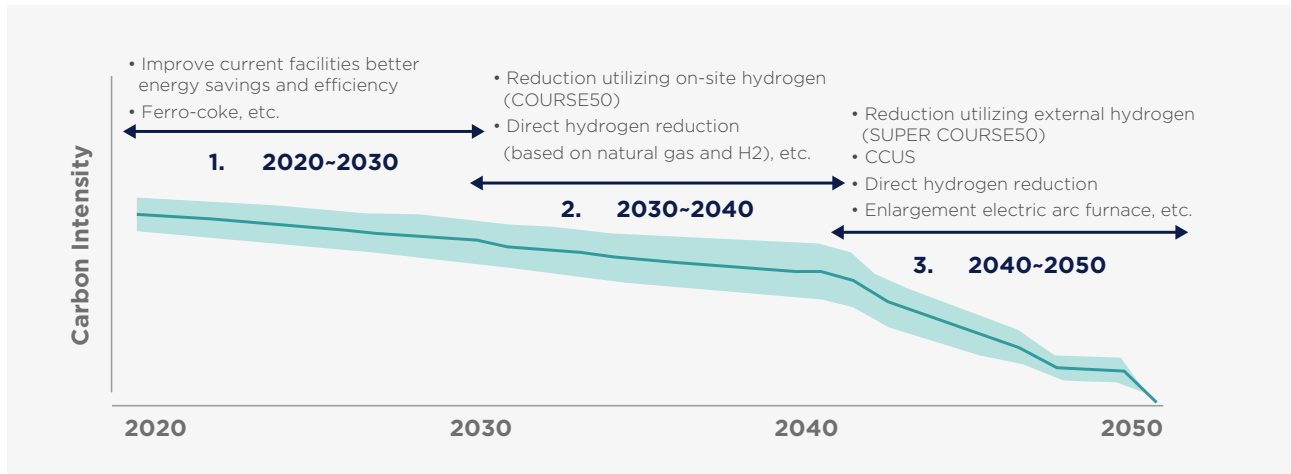
Steel is a major industry in Japan, that employs 220,000 workers and contributes to 8.5% of the GDP, emits about 14% of the country's GHG⁴ as the industry relies on coal-fired blast furnaces (BF). The winds of change towards a low-carbon steel industry are underway with innovations like green steel, that can potentially replace fossil fuels with hydrogen in the steel manufacturing process which would lead to a 54% fall of emissions by 2050⁵.

The roadmaps for the steel industry list the following low-carbon technologies: H2-DRI (hydrogen direct reduction iron) and CCS (carbon capture and storage) for the blast furnace, thermal conductivity improvement and electrified heating in the strand casting and rolling processes, and capacity up-scaling with enhanced impurity removal for the electric arc furnace. It also presents dependencies on renewable energies, green hydrogen, and CCUS to achieve complete decarbonization, as described below.

3. Agency for Natural Resources and Energy, Overview of Basic Hydrogen Strategy, June 2023

4. All numbers are from METI, "Technology Roadmap for 'Transition Finance' in Iron and Steel Sector", October 2021.

5. <https://esgclarity.com/green-steel-the-industrys-path-to-net-zero/>

Graph 1: Assumed CO₂ Reduction Pathway

Japan's steel industry has begun phasing in a series of projects to establish the technologies with the government's support. METI created a JPY 2tn (c. \$125bn) fund for green innovation. Additionally, New Energy and Industrial Technology Development Organization (NEDO), Japan's national research and development agency, launched a green steel project and recently doubled the budget to JPY 450bn (c. \$3bn) to build up the core technologies with the domestic steel producers, aiming to achieve practical application by 2040.

Case study: Japanese steelmakers investments in green steel

An investment worth JPY 100bn (c. \$733m) to a green steel project is envisioned by Nippon Steel, the 4th largest steel producer globally⁶ and Japan's biggest steelmaker. Besides this, Nippon Steel plans to begin testing 100% hydrogen direct reduction to apply the technology with electric arc furnaces and blast furnaces with CCS by 2050⁷. To finance these projects, Nippon Steel issued convertible bonds to raise JPY 300bn (c. \$2bn) in 2021 for the first time in 15 years.

Kobe Steel launched Japan's first low CO₂ blast furnace (BF) steel – the Kobenable Steel, which uses hot briquetted iron (HBI) from the MIDREX[®] Process as a feedstock to BFs which significantly reduce CO₂ emissions during the process. Since its launch, Kobenable Steel has been put to use by a diverse range of manufacturers in the automotive, shipbuilding and construction sectors⁸. In the future, Kobe Steel has the ambition to further reduce their CO₂ footprint by mobilizing green hydrogen, produced from renewable energy, in their MIDREX H₂ products⁹.

While Japan is making huge strides in transforming the manufacturing processes of steel by mobilizing hydrogen to produce environmentally friendly and sustainable green steel, there remain challenges in the commercialization of these technologies at a large scale. Hence, Japanese steelmakers still require continued support in terms of significant investments directed towards R&D of green steel.

6. [World Steel Association](#)

7. Morgan Stanley, Green Steel 2.0, April 17 2023, and [Nippon Steel home page](#)

8. [Transition Asia press article](#), November 2023

9. [Kobe Steel website](#)

03 Korea's Green tech and policy support

Battery

The total annual battery usage in global electric vehicles in 2023 was found to be 705.5GWh, an increase of 38.6% YoY. Among these, the global market share of the three Korean battery companies decreased by 1.6% points YoY to 23.1%, but battery usage increased for all three companies. LG Energy Solution ranked 3rd, growing 33.8% (95.8GWh) YoY, while SK On grew 14.4% (34.4GWh) and Samsung SDI grew 36.1% (32.6GWh), ranking 5th and 7th, respectively. The expansion of new car launches along with strong sales of vehicles equipped with each company's batteries served as major factors for growth.

Table 1: **Global Battery Usage & Market Share for xEV**

(Unit: GWh, %)

| Rank | Battery Supplier | Region | Annual Usage | | | Market Share | |
|--------|--------------------|-------------|--------------|-------|-------------|--------------|--------|
| | | | 2022 | 2023 | Growth Rate | 2022 | 2023 |
| 1 | CATL | China | 184.4 | 259.7 | 40.8% | 36.2% | 36.8% |
| 2 | BYD | China | 70.5 | 111.4 | 57.9% | 13.9% | 15.8% |
| 3 | LG Energy Solution | South Korea | 71.6 | 95.8 | 33.8% | 14.1% | 13.6% |
| 4 | Panasonic | Japan | 35.6 | 44.9 | 26.0% | 7.0% | 6.4% |
| 5 | SK On | South Korea | 30.1 | 34.4 | 14.4% | 5.9% | 4.9% |
| 6 | CALB | China | 18.5 | 33.4 | 80.9% | 3.6% | 4.7% |
| 7 | Samsung SDI | South Korea | 23.9 | 32.6 | 36.1% | 4.7% | 4.6% |
| 8 | Guoxuan | China | 13.9 | 17.1 | 23.1% | 2.7% | 2.4% |
| 9 | EVE | China | 7.0 | 16.2 | 129.8% | 1.4% | 2.3% |
| 10 | Sunwoda | China | 9.1 | 10.5 | 15.4% | 1.8% | 1.5% |
| Others | | | 44.4 | 49.4 | 11.3% | 8.7% | 7.0% |
| Total | | | 509.2 | 705.5 | 38.6% | 100.0% | 100.0% |

Source: Global EV and Battery Monthly Tracker, SNE Research (2024.01)¹⁰

South Korea is a major player in the global market, accounting for more than 50% of the market outside of China. The country has achieved "Technological Competitiveness" by accumulating over 60,000 patents over the past 30 years. Additionally, it has ensured "Supply Stability" by establishing more than 80% of its manufacturing facilities in Europe and North America. These factors have contributed to South Korea's global competitiveness.

10. [SNE research website](#), February 2024

Goldman Sachs recently published a report predicting that South Korea's exports of secondary batteries will increase by an average of 33% per year by 2030. This growth is expected to have a positive impact on the country's real GDP, with an average annual growth rate of 0.3%.¹¹

In December 2023, the Korean government announced a policy to strengthen the competitiveness of the secondary battery industry. This policy aims to secure the battery supply chain in major countries such as Europe and the US. As part of this policy, over 38 trillion won of policy financing will be provided to various areas of the battery supply chain, including minerals, materials, cells, and waste batteries, over a period of five years until 2028. Additionally, a [total of Won 117.2bn \(c. \\$89m\) will be invested in research and development projects](#) for next-generation battery technology and overseas resource development. To incentivize investment, a tax credit of 3% of the investment amount will be implemented.

Furthermore, the Korean government plans to prepare legislation in 2024 to promote a circular economy in the battery industry. This legislation will aim to foster an industrial ecosystem that remanufactures, reuses, and recycles used batteries, contributing to sustainable practices in the industry.¹²

Hydrogen

In January 2019, the Korean government announced the *Hydrogen Economy Activation Roadmap* for the first time, and after the launch of the new government, the roadmap was revised and supplemented by holding the "Hydrogen Economy Committee" in 2022-2023. Through this policy, the goal was to increase hydrogen supply to 5.26 million tons per year by 2040, lower the price to about 2 EUR/kg, and set the clean hydrogen standard at less than 4kg of greenhouse gas emissions per 1kg.

In terms of policy, hydrogen economy infrastructure was established through the enactment of the 'Hydrogen Act' in 2021, the launch of the 'Global Hydrogen Industry Association (GHIAA)' in 2022, and the opening of the world's first 'hydrogen power generation bidding market' in 2023. This year, in 2024, the key tasks are to establish a 'Clean Hydrogen Certification System' that meets international standards and implement the 'Clean Hydrogen Energy Portfolio Standards (CHPS)'.

As of December 2023, it is confirmed that the goal is being achieved step by step, with about 34,000 hydrogen electric vehicles registered, 300 hydrogen charging stations installed, about 1GW of fuel cells for power generation distributed, and the unit price of blue hydrogen production being about \$4.9 /kg.¹³

In terms of hydrogen technology, Korean companies have been focusing on the development of hydrogen vehicles and fuel cell technology from the beginning, and recently, upstream sectors such as production and distribution have become active. Starting in March 2023, the Korean government has raised the importance of hydrogen by designating it as a 'national strategic technology' and plans to strengthen policy support by setting 10 strategic areas and 40 core items, so global investors need to pay attention to this.¹⁴

11. [Korea herald press article](#), May 2023

12. [Republic of Korea website, press article](#), December 2023

13. [H2 news, press release](#), February 2024

14. [Republic of Korea website, press article](#), December 2023

04 Green techs momentum in India

Renewable Energy

India has set ambitious renewable energy targets, aiming for 500 GW of capacity by 2030. It ranks fourth globally in renewable energy capacity, including wind and solar power. Non-fossil fuel capacity now represents 42% of the country's total capacity as of November 2023¹⁵. India has approved 50 solar parks with a combined capacity of 37.49 GW and offshore wind energy targets 30 GW by 2030, with identified potential sites¹⁶. The national programme on high-efficiency solar PV modules, with an outlay of INR 24,000 crore (c. \$2.89bn), aims to build 65 GW of annual manufacturing capacity. India's goal of 50% power generation from non-fossil sources by 2030 is supported by initiatives like the Green Energy Corridor project and production-linked incentives for solar PV module and battery manufacturing¹⁷.

Electrification of Transport

India is the world's third-largest car manufacturer and is actively pursuing road transport electrification through flagship national programs¹⁸. The Faster Adoption and Manufacturing of Electric Vehicles (FAME) scheme provides incentives for EV purchases and charging infrastructure, while the Production-Linked Incentive (PLI) schemes will support manufacturing across sectors. EV sales are projected to reach nearly 35% of total vehicle sales by 2030, aiming for 50% to align with 2070 decarbonization goals. India has also implemented Corporate Average Fuel Consumption (CAFE) standards and fuel economy standards for trucks to penalize high-emitting vehicles.

By 2030, the electric bus market is projected to reach over 70% penetration across various applications due to demand aggregation driving economies of scale. E-bus penetration is expected to increase to 20% by 2026 from the current 3%. The Central Government's allocation of INR 57,613 crore (\$6.94bn) for deploying 10,000 electric buses in 169 cities will expand electric bus mobility nationwide¹⁹. Additionally, the National e-Bus Programme (NEBP) targeting 50,000 electric buses nationwide and the anticipated FAME-III policy in FY24 will further accelerate the adoption of green public transportation²⁰.

Bioethanol in transport

India aims to increase the use of bioethanol in transport as part of its National Policy of Biofuels-2018. The government aims to achieve 20% ethanol-blended petrol by 2024-25 and 30% by 2029-30, advancing the E20 fuel target from 2030 to 2025. Over 9,300 retail outlets now sell E20 fuel, with nationwide coverage expected by 2025²¹. India has demonstrated global leadership in the biofuels supply chain by launching the Global Biofuels Alliance in September 2023.

15. [Ministry of New and Renewable Energy](#), December 2023

16. [Invest in India website](#)

17. [Invest in India press article](#), November 2023

18. [Energy Economic Times press article](#), January 2024

19. [Press information Bureau, Government of India](#), August 2023

20. [Business line press article](#), August 2023

21. [India Ministry of Petroleum & Natural Gas](#), December 2023

05 The rising importance of physical risk and biodiversity loss in Asia

Biodiversity-related and climate risks are exacerbated in Asia, with far reaching consequences

The Asia Pacific region can only be qualified as exceptionally rich in biodiversity. While Southeast Asia only occupies 3% of the world's total land, it houses almost one-fifth of the planet's plant and animal species, one-third of coastal and marine habitats, one-third of the world's coral reef species, more than half of tropical peatlands, and almost half of the world's mangrove areas²².

The region constitutes some of our planet's richest biodiversity and is therefore at risk of every possible environmental threat, from climate change and rising sea levels to deforestation and destructive resource extraction, with the risk of species extinction and ecosystem collapse looming in the horizon. The situation is exacerbated by unsustainable industrial and agricultural practices and rapid development and urbanization. More than 660 million people depend on the region's biodiversity for their livelihoods and welfare¹, and overall, the region has a large and dense population living in low-lying, coastal areas.

On top of a humanitarian risk, the increasing intensity and frequency of extreme climate events pose significant economic and financial risks: at present, Asia has a fairly high amount of critical infrastructure, with more than a third of power plants, cable networks, airports and road infrastructures situated in higher risk areas prone to climate hazards²³. Regarding biodiversity loss risks, the estimated economic costs are well documented, with 63% of GDP in Asia Pacific (\$19.5tn) potentially at risk from biodiversity and nature loss, higher share than the global average due to the reliance on sectors highly dependent on nature, including food and agriculture.

A historically difficult issue to address, biodiversity preservation is entering national regulations

Despite the major role biodiversity plays in Asia, public response has not always been up to the challenge. Worth noting, none of the Asian countries were able to meet all of the 20 Aichi Biodiversity Targets, the ancestor of the Kunming-Montreal Global Biodiversity Framework. The region was also the most underperforming against the commitment to protecting at least 17% of terrestrial land by 2020 (Aichi Target 11), with just 13.2% of terrestrial protected area coverage²⁴. A 2020 UN Report stated that failure to meet the targets were often due to poorly aligned national targets, both in terms of scope and ambition²⁵.

Finding opportunities in biodiversity-related investments

The Kunming-Montreal agreement not only covers governments and also includes a commitment to mobilize at least \$200 billion per year by 2030 in financial flows from "all sources", including both public and private sectors, to close the estimated biodiversity finance gap of \$700bn per year²⁶.

This commitment comes consistent with the final recommendations of the Taskforce for Nature-related Financial Disclosures (TNFD) framework for businesses to identify and assess their nature related dependencies and impacts. It is important for businesses to better understand extreme climate hazards, evaluate the potential financial and operational impact on assets, and integrate this into their decision making process to ensure effective adaptation and resilience to climate change.

22. Asia Pacific Foundation of Canada, [The Ambitious New Global Biodiversity Framework: The View from Southeast Asia, 2023](#)

23. World Meteorological Organization: [State of the Climate in Asia 2020](#)

24. [Current trends suggest most Asian countries are unlikely to meet future biodiversity targets on protected areas, 2022](#)

25. Convention on Biological Diversity, [Global Diversity Outlook 5, 2020](#)

26. Paulson Institute, [Financing Nature: Closing the Global Biodiversity Financing Gap](#)

For businesses, nature-based solutions represent an immense opportunity. Temasek, the Singaporean sovereign fund reports²⁷ that the 59 nature-positive business opportunities which have been identified could represent \$430tn and could create 232 million jobs in the Asia Pacific region annually by 2023. In this same report, are also identified the main challenges to the growth of nature-based but also climate resilience solutions is access to capital and the lack of viable projects for investments. Multistakeholder initiatives, combining for instance multilateral development banks, NGOs and governments, therefore play a key role in developing and financing biodiversity-projects.

Case study: the AIIB Climate Adaptation Bond



To support needs climate-resilient and adaptive infrastructure investments, the Asian Infrastructure Investment Bank (AIIB) successfully launched its first Climate Adaptation Bond in 2023. The five-year bond, issued under AIIB's Sustainable Development Bond Framework, successfully raised AUD500 million, directs its proceeds towards investments with a strong focus on building adaptation and long-term resilience. The Climate Adaptation Bond has two main objectives:

1. Mobilize additional private sector financing for climate adaptation
2. Raise awareness of the need to enhance the resilience of our valuable built environment.

The proposed investments in climate adaptation cover projects in water, urban development, transportation and energy, including the sustainable water services improvement project in India and the flood emergency rehabilitation and recovery project in China.

Biodiversity loss is a global-scale issue, but its effects on the Asian continent are exacerbated due to its reliance on unique and fragile environments, and the related ecosystem services. The criticality of the biodiversity issue has now become a priority in international forums, and this momentum is reaching governments, institutions and companies in Asia. Given the increasing needs for investments to slow the catastrophic biodiversity loss and climate change, the success will depend on the collaboration between international organizations, governments and the private sector.

27. Temasek, [New Nature Economy: Asia's next wave](#), 2021

Net Zero Compass: *Aiming for a Just Transition to Net Zero in Asia*

“Southeast Asia can meet the daunting challenges of transitioning to low-carbon economies even as the region continues to build strong, inclusive growth that reduces poverty. However, this complex task requires urgent action on innovative finance to fund crucial infrastructure and energy projects.”

Christine Engstrom,
Senior Director, Asian
Development Bank

While significant strides were made in Europe and the US, China and India face the challenge of balancing rapid economic growth with environmental sustainability. The disparities in emissions trajectories highlight the complex interplay between economic development and climate action. Transition finance and regulatory frameworks need now to come into play to facilitate this economic shift.

Transition finance is driven by a growing recognition of the financial sector’s role to address climate change and support a just transition to a low carbon economy. Sustainable finance is most relevant for Asian countries, as the region is highly exposed to environmental risks, and requires an enabler to address their environmental challenges and ambitious development goals.

Asian countries are increasingly positioning themselves as a hub for sustainable finance by developing comprehensive frameworks, sustainability roadmaps, taxonomy approaches and carbon pricing schemes, which underscore the region’s commitment to integrating ESG principles into financial practices. The Just Energy Transition Partnerships (JETPs) are increasingly being mobilized by emerging economies as a source to support and finance the exiting of coal.

However, in this rapidly evolving landscape of sustainability regulations, emerging economies in Asia also have the hard task to re-define their pathway towards economic growth. An example of this are the regulations from advanced economies around mandatory environmental and human rights disclosures within their global supply chains, such as Corporate Sustainability Due Diligence Directive (CSDDD). These regulations are expected to have a spillover effect on Asian economies, that are a crucial part of the supply chain of most advanced economies.

01 Despite the efforts, a contrasting CO₂ dynamics²⁸

The 2023 analysis on CO₂ emissions by IEA underscores a divergence in emissions trends between developed economies and emerging markets, notably China and India. While advanced economies have seen a significant reduction in CO₂ emissions, falling to the levels observed fifty years ago, China and India have experienced marked increases.

In developed economies, a mix of structural and cyclical changes has contributed to a decline in emissions. The transition to clean energy has been a significant factor, with electricity generation from renewables and nuclear reaching 50% of total in 2023 in advanced economies, with renewables accounting for 34% of total share. It is however important to remind that this development heavily relies on China due to its dominant position in manufacturing critical components for solar panels, wind turbines and batteries, making it a pivotal supplier in the global renewable energy sector.

28. Figures based on IEA report, CO₂ Emissions in 2023, March 2024

Conversely, China and India's CO₂ emissions have surged, driven by energy-intensive economic growth and compounded by unfavorable weather conditions. China's emissions grew by 565Mt in 2023, due to its energy-intensive post-pandemic economic recovery. Despite leading in global clean energy additions, China's overwhelming energy demand outpaced the growth in clean energy, amplified by a historically bad hydro year that increased coal dependency. India's situation was similar, with a strong GDP growth pushing emissions up by 190Mt, where a weak monsoon season also amplified the demand for electricity and reduced hydro production, further increasing reliance on coal.

The increased emissions in China and India not only reflect their current stage of economic development but also highlight the challenges faced in balancing economic growth with environmental sustainability. This divergence in emissions trends between developed and developing economies also underscores the critical importance of cooperation, local and international, to address transition.

02 Does transition finance as a framework fit Asia Net Zero goals

Asian countries are taking different approaches that set the scene to the Net Zero transition. Singapore and The Association of Southeast Asian Nations (ASEAN²⁹) have both developed guidance regarding transition finance, while Japan has published decarbonizing and enabling technology "roadmaps."

Capital Markets forum, ASEAN

ASEAN capital markets forum published in March 2023 a comprehensive framework, outlining principles, criteria and methodologies that financial institutions, companies and investors should adopt to facilitate the transition. It aims to provide a simplified approach to assess company's transition credibility, leveraging on existing guidance worldwide. By providing concrete guidelines, it intends both to facilitate the mobilization of capital towards sustainable investments and leverage finance flows for transitioning companies, and to build trust among stakeholders by incentivizing real economy companies to create more ambitious transition plans.

Green Finance Industry Taskforce (GFIT), MAS, Singapore

The GFIT published a document outlining Singapore's role in catalyzing Asia's transition to Net Zero. GFIT is composed of dedicated experts and practitioners aiming to mainstream sustainable finance, by developing practical solutions and actions for enhancing Singapore's financial sector's capacity to support the transition, and to foster public-private collaboration. The publication highlights key areas for development across four focused workstreams, addressing taxonomy, disclosures, green finance solutions and environmental risk management.

Japan's sector-specific climate Roadmaps

The Ministry of Economy, Trade and Industry (METI), has released the Japanese roadmaps in the manufacturing and utilities sectors: iron & steel, chemicals, electric power, gas, oil, pulp & paper, cement, and autos. The roadmaps cover concrete action points for those eight industries as part of the government's Net Zero by 2050 commitment. They are references for financial market participants when assessing whether and how the issuer's business or projects will contribute to the transition to carbon neutrality.

Japan has also demonstrated political leadership on the Net Zero transition, through the publication of the Climate Transition Finance Guidelines, accompanying industry technology roadmaps, and a pioneering Green Transformation (GX) Plan to reach carbon neutrality.

29. ASEAN countries include – Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam.

Case study: Japan Climate Transition Bond



To support its transition finance landscape, Japan launched the 1st ever sovereign Climate Transition Bond, certified by the Climate Bond Standard, in February 2024, whose proceeds will be mobilized to fund the GX programme.

The \$11bn Climate Transition Bond³⁰ has a diverse range of Use of Proceeds (UoPs) categories that catalyze public-private investments to bolster subsidies for established green initiatives and vital research and development (R&D) of green technologies that will steer Japan's government and industry on the right track to achieving its Net Zero by 2050 commitment.

The Climate Transition Bond has earmarked 55.5% of its UoP to R&D projects, including 18% for the utilization of hydrogen in the steel making process and the decarbonization of the thermal process. While the remaining 44.5% of the bond's UoP is earmarked to support subsidy programmes which are aligned with decarbonization objectives. The largest allocation of subsidies (81.6%)³¹ are directed to semiconductors, electricity storage batteries, and energy-efficiency measures in buildings.

03 Approach towards taxonomy and development in Asia

The EU Taxonomy is a critical milestone of the EU's Sustainable Finance Framework and an important tool for the European Green Deal. With EU's Taxonomy Regulation entering into force in 2020 and introducing the concept of Technical Screening Criteria, Do No Significant Harm (DNSH) and Minimum Social Safeguards, many jurisdictions around the world have also embarked on developing their versions to address this topic.

Taxonomy and guidelines emerged to provide greater transparency around definition and approach in classifying relevant economic activities that are aligned with sustainable objectives, mitigate greenwashing concerns, and support investment and capital flows into sustainable activities. Taxonomy alignment in projects and activities is frequently used in labelled instruments and financing tools, and company disclosure on taxonomy alignment for turnover, capital expenditure, or operating expenses are required for companies in scope of the EU Non-Financial Reporting Directive.

In Asia, a number of jurisdictions have released or are currently working on taxonomy development. China first published its Green Bond Endorsed Projects Catalogue in 2015, with the last update in 2021 to harmonize its green definitions. Considered as China's green taxonomy, The Green Bond Endorsed Projects Catalogue, together with The Green Industry Catalogue, aim to define eligible green projects and activities across six environmental sectors from i) energy conservation and environmental protection, ii) clean production, iii) clean energy, iv) ecological environment, v) green innovation of infrastructure, and vi) green services. With the surge of global sustainable taxonomies and frameworks, demand for interoperability is ever-increasing; therefore, the EU and China initiated a working group in 2020 to develop a common ground taxonomy that maps activity-by-activity to identify commonalities and differences between the two taxonomies. Updated in June 2022, the current Common Ground Taxonomy (CGT) covers 72 climate mitigation activities that are recognized under both jurisdictions.

30. [Climate Bonds Initiative, Press Release](#). February 2024.

31. [Climate Bonds Initiative, Briefing Note](#). February 2024.

Singapore launched the final version of the Singapore-Asia Taxonomy in December 2023, the world's first multi-sector transition taxonomy. The Singapore-Asia Taxonomy sets out detailed thresholds and criteria for green and transition activities that contribute to climate change mitigation across eight focus sectors. Considering the important role that transition plays in decarbonization efforts in the region, it adopts a traffic light system to embrace transition category, besides green and ineligible. It further helps to provide clarity for transition activities and measures that do not yet meet the green thresholds but are on the pathway to net zero or desired outcome; for example, The Singapore-Asia Taxonomy recognizes abated natural gas as a transition activity if such activity aligns with the Transition Pathway Initiative's 2°C-aligned scenario.

On the comparability with other taxonomies, Singapore has begun working on interoperability between the Singapore and other taxonomies and subsequently enhancing the CGT.

In Southeast Asia, Malaysia developed its Climate Change and Principle-based Taxonomy in 2021, Indonesia and Sri Lanka both launched its green taxonomy in 2022, and Thailand published its Sustainable Finance Taxonomy Phase I June in 2023. On top of that, ASEAN Taxonomy for Sustainable Finance has been in development – it aims to be an overarching guide for the region while catering for the different developing stages of the member states. One example of alignment can also be seen from Indonesia As an example, Indonesia is revising its taxonomy to better align with ASEAN and include early coal phase-out.

In 2023, the Hong Kong Monetary Authority released a prototype proposal to develop a Green Taxonomy for Hong Kong to cover energy, transport, water and buildings. Instead of a taxonomy, Japan has a unique approach to focus on transition finance and develop technology-specific roadmaps for hard-to-abate sectors. For India, the lack of a detailed green taxonomy was flagged as a gap in its policy report in 2023, but no concrete plan yet announced on the taxonomy development.

What's different for ASEAN Taxonomy and Singapore-Asia Taxonomy versus the rest is that they include coal phase-out criteria to be considered as transition finance. The inclusion of specific criteria to accelerate and manage the phase-out of unabated coal power plants helps to provide more clarity and credibility in these projects. The world is fighting against time in that according to it needs the unabated phase-out deadline by 2030 for developed markets, and by 2040 for emerging markets to be on the net zero pathway set, according to the International Energy Agency.

Taxonomies have evolved to provide granularity about transition finance. While green definitions are somewhat aligned, the approach and details on transition vary as the starting point and the pathway trajectory to reach net zero are vastly different. Taxonomies are crafted by each jurisdiction to align with their national agenda and sustainable objectives. This has resulted in the growing concern of market fragmentation and inconsistency, and the call for harmonization. For international investors or cross-border financing, extension of CGT and comprehensive mapping of commonalities across key markets and regions will play a crucial role in facilitating investment and capital flows.

04 How improved due diligence in Europe's supply chain will impact Asian companies

As sustainable regulation landscape is rapidly evolving within global supply chains, the world is increasingly moving away from a purely voluntary approach in meeting social and environmental standards to a mandatory system with binding human rights and environmental obligations for companies. The rapidly evolving landscape of regulations and framework development around environmental and human rights disclosures are also expected to impact emerging economies, which are a crucial part of the supply chain of most advanced economies.

In December 2023, the European Commission announced a provisional deal on the Corporate Sustainability Due Diligence Directive (CSDDD). The directive introduced a set of rules to create a framework on corporate due diligence standards regarding environmental and human rights impacts across the supply chains.

In March 2024, the European Council voted in favor of a stripped down version of the CSDDD: the directive could now be applicable to EU companies with a worldwide turnover of more than €450m (c. \$490m) and more than 1000 employees and non-EU companies with a net turnover of over €450m (c. \$490m) in the EU. The implementation date of the requirements is yet to be defined, as the European Parliament still has to vote in favor of the revised directive before end of April 2024.

If in the scope, companies will be required to carry out due diligence so as to identify, prevent, or mitigate the actual and potential adverse impacts of their activities on the environment and human rights abuses such as child labor, slavery, labor exploitation, pollution, deforestation, excessive water consumption or damage to ecosystems.

For companies directly within the directive's scope: companies are expected to put more resources to upskill existing operations, therefore significant resource investment will be required leading to cost implications. Besides, companies need to establish climate change mitigation transition plans so their business plans include carbon reduction objectives. Non-compliance may result in trade restrictions or limitations on market access, affecting export opportunities and revenue streams. Supply chain companies, especially Medium, Small and Micros Enterprises may lose business opportunities to bigger competitors who may have access to technological and financial resources for such reporting.

It also has far-reaching short-term implications for businesses in Asia, particularly in Southeast Asia where Indonesia, Malaysia, Thailand, and Vietnam are the world's major commodity exporters for palm oil, rubber and coffee. Businesses would need to enhance their capacity and resource to conduct environmental and human rights due diligence, and often time it would require additional process and procedures in place to alleviate and manage adverse impacts and potential risks.

05 Are Jet-Ps delivering up to world expectations

A nascent cooperation mechanism

Despite deep knowledge about its contribution to climate change, coal combustion still accounts for 40% of global CO₂ emissions from energy use today³², making it one of the largest contributors to climate change. For the world to reach net zero by 2050, considerable amounts of capital need to be mobilized to accelerate decarbonization efforts. The weight of the coal phase out efforts lie disproportionality on the shoulders of the developing countries, which are facing ever growing demands for energy. Coal remains a widely available resource and is still a privileged energy source, as roughly 60 percent of the electricity generated in China, India and Indonesia is from coal³³. As such, phasing out of coal is not only an environmental challenge, but also a social one as this industry still provides a large number of employment opportunities and financial income for society.

Just Energy Transition Partnerships (JETPs) are a financing mechanism between private capital sources, from developed and developing nations, aiming to address this specific challenge, by supporting a selection of heavily coal-dependent emerging economies, to define pathways as they move away from coal production and consumption in a way that addresses the social consequences involved. For instance, by ensuring training and alternative job creation for affected workers and new economic opportunities for affected communities³⁴.

32. Nature Climate Change Volume 10, [The future of coal in a carbon-constrained climate](#), 2020

33. International Energy Agency, [It's critical to tackle coal emissions](#), 2021

34. International Institute for Sustainable Development, <https://www.iisd.org/articles/insight/just-energy-transition-partnerships>, 2022

Case study: **Jet-Ps implementation in South Asia, Indonesia and Vietnam**



Announced at COP26 in November 2021, South Africa was the first country to launch a JETP and secure a \$8.5bn financing pledge. In the following year, South Africa published its JETP Implementation Plan and set out a roadmap on investments required for a five-year period (2023-2027). This plan has included areas in large-scale and distributed renewable energy generation, battery storage, transmission grid expansion, distribution system upgrade and retirement of coal power plants with the support of alternative livelihoods for workers, communities and local enterprises. A pipeline of 24 projects have been identified and under development in the near and medium term, together with regulatory reforms in the energy sector, The Energy Action Plan, Climate Change Bill, and the launch of the South African Green Finance Taxonomy. There is a notable rapid scale-up of renewable investments, but the energy crisis could lead to prioritize energy security and reassessment on the schedule of decommissioning of coal power plants. Despite this, JETP work will focus on repurposing, repowering and community development for these projects.

Indonesia was the second country, followed by Vietnam, to launch JETP toward the end of 2022. With a funding commitment of \$20bn, the biggest energy transition financing package globally to date, Indonesia's JETP launched its Comprehensive Investment and Policy Plan in 2023. Several priorities are detailed: accelerated retirement of coal-fired power plants, widespread deployment of energy efficiency and electrification tools, technologies and reforms, and identified portfolio of programmes and investments including renewable energy potential. Timeline for short (< 2 years) and long term (>5 years) with reform areas and implementation guidelines are provided, in addition to a Just Transition Framework that is specific to Indonesia, building on the foundation of human rights, gender equality and empowerment, and accountability.

On the other side, Vietnam agreed to a \$15.5bn package, and released an investment framework called The Resource Mobilization Plan (RMP) in 2023. The RMP lays out its targets for national emissions reductions, including reduction of its total GHG emissions by 43.5% by 2030, and six priority areas of investment: power transmission grid projects, battery storage and pumped storage hydropower plants, offshore wind power development, energy efficiency, solar power, and coal power plant transition.

Challenges ahead

Many of these participants in JETPs are no exceptions when it comes with energy trilemma: energy equity, energy security, and environmental sustainability. The balance of these aspects is key to ensure the success and inclusiveness of energy transition. This could cause reconsideration in coal phase-out timeline.

Some other hurdles being mentioned include credibility and transparency concerns, unfeasibility of these projects as they often require concessional financing and grants to be economical, and financial institutions have existing coal policies to limit or exclude such investments. To counter these challenges, Indonesia and the Asian Development Bank (ADB), under the ADB's Energy Transition Mechanism (ETM) program, agreed the first pilot project to shut down Cirebon-1 coal-fired power plant seven years earlier than originally planned. MAS³⁵, together with McKinsey & Company, published a working paper on the utilization of "transition credits" in early coal phase-out projects to account for the benefits of emissions avoided and incentivize the acceleration of these projects. Other countries are in discussion to join JETPs, and more projects should be expected to be included.

35. Monetary Authority of Singapore

The next steps

JETPs help bridge expertise, technology, financing and support gaps that are keeping emerging economies from making significant strides in their energy transitions. While new announcements show real progress towards real-world decarbonization and a just transition, the implementation of the JETPs will be the true test of their contribution.

The barriers to scaling up JETPs are well identified, and actors in financial markets and philanthropy, such as the Environmental Defense Fund and the Rockefeller Foundation, are already discussing the next steps to scale up and improve the functioning of JETPs. Recommendations include the implementation, at national level in beneficiary countries, of platforms to map financially promising projects and coordinate directly with international financial banker and better processes for new candidate countries for their JETP applications³⁶.

36. Environmental Defense Fund and Rockefeller Foundation, [Scaling the JETP model](#), 2024

ETS and VCM development - *market trading development in China and across Asia*

“Diverting the trillions of dollars by which the world subsidizes fossil fuel production each year, and putting an implicit price on carbon emissions, would generate the vast amounts of cash needed to tackle the climate crisis”

Kristalina Georgieva,
Head, International Monetary Fund

Market mechanisms and carbon pricing are essential in allocating resources and guiding activities on a path to addressing climate change and reducing greenhouse gas emissions. The development of Emissions Trading Schemes (ETS) and Voluntary Carbon Market (VCM) in Asia has been a significant step in this direction.

On the ETS side, China's national ETS is the largest in the world in terms of covered emissions with [4 billion ton CO₂ and accounting for over 40% of country's carbon emissions](#). Beyond China, Asia-Pacific countries are actively responding to the European CBAM³⁷ by accelerating the implementation or enhancement of their own carbon pricing mechanisms. Asian nations are all making significant strides in their carbon pricing efforts, reflecting a collective movement towards enhanced carbon pricing and regional environmental policy. However, the absence of a common structure has resulted in a disparity of progress, with countries moving at varying paces.

On the VCM side, while more than 40% of carbon credits were issued from projects in Asia³⁸, since the tracking of voluntary carbon credits project, the [trading has mostly taken place in Europe and the US](#). Asian nations are setting up several trading platforms to facilitate the trading of carbon credits notably in Singapore, Thailand, Hong Kong and Malaysia.

01 Carbon Pricing Schemes in China

The launch of China National Emissions Trading Scheme (China ETS) in [July 2021](#) represents a significant step in establishing a market-based mechanism for carbon pricing. In addition to the covering [2,257 companies](#) in the power sector that emit 5 billion tons of CO₂e emissions, China ETS is expected to expand its scope and cover other emission-intensive sectors, such as cement, steel and petrochemical.

In 2023, China ETS finished its second compliance cycle with the highest transaction price exceeding [RMB 80/t \(c. \\$11/t\)](#), and this carbon price is expected to exceed [RMB 105/t \(c. \\$14.5/t\)](#) by 2025, which is much lower than the 2023 average carbon price of €80/t (c. \$87.5/t) in EU ETS. The implementation of Carbon Border Adjustment Mechanism (CBAM) by the European Union, is expected to push China towards a stronger carbon pricing, which could lead to the convergence of carbon prices between China and EU.

37. Carbon Border Adjustment Mechanism

38. [Voluntary Registry Offsets](#) from Berkeley as of database v9

Since January 2024, the China Certified Emission Reduction (**CCER**) has been re-launched to allow companies to offset up to 5% of their emissions by purchasing credits from certain emission reduction projects in areas like forestation and wind power.

It will be interesting for investors to keep an eye on the China ETS and whether it will follow other major markets by incorporating financial attributes and opening its doors to financial institutions. This incorporation could be essential in creating new investment opportunities in carbon assets, which are not limited to the emission reduction projects like those under the CCER.

China is constantly exploring the alternative carbon pricing approach – the carbon tax. Currently, the carbon tax in China has taken the form of resource taxes on fossil fuels, consumption taxes on refined oil products or environmental protection taxes. In 2022, the resource taxes amounted to [RMB 338.9bn \(c. \\$47bn\)](#), which served as an important source of funding for new energy development projects in China. Given that the CBAM will effect approximately \$74.8bn of China's exports to the EU, that account for 11% of China's total exports to the EU³⁹, an integrated carbon tax scheme becomes an even more urgent task for China.

02 Asia Ramp Up Carbon Pricing Efforts in Response to European CBAM

In response to the impending Carbon Border Adjustment Mechanism (CBAM) by the European Union, which is set to introduce a carbon cost on high-carbon imports by 2026, Asia-Pacific countries are accelerating the implementation or enhancing their carbon pricing mechanisms. This proactive approach is helping to mitigate potential costs associated with exporting goods to Europe.

03 Regional Overview of Carbon Markets in Asia

- **Hong Kong's Voluntary Carbon Market:** In 2022, the Hong Kong Exchanges and Clearing Limited (HKEx) launched the Core Climate, which is an international carbon marketplace designed to support the trading of high-quality voluntary carbon credits and is currently the only carbon marketplace that offers Hong Kong Dollar and Renminbi settlement for the trading of international voluntary carbon credits⁴⁰.
- **Taiwan Explores a Carbon Fee Systems:** Taiwan's Ministry of Environment announced that 512 companies that emit more than 25,000 metric tons of CO₂ per year will be charged a carbon fees in 2025, based on verification of their total emissions in 2024⁴¹.
- **Singapore's Tax-Based Approach:** Singapore developed a carbon tax that covers 80% of its greenhouse gas emissions from about 50 facilities. Voluntary markets are also emerging, with increasing number of businesses purchasing carbon offsets with the intention to achieve their net-zero goals.

39. JP Morgan report: The Impacts of CBAM on Supply Chain

40. [HKEX press article](#), September 2023

41. [Focus Taiwan press article](#), October 2023

Case study: **Climate impact X**



The Climate Impact X (CIX), a joint venture between DBS Bank, SGX, Standard Chartered and Temasek, was launched in 2021 and has since played a significant role in positioning Singapore as a global carbon trading and financing hub. The CIX is a pioneering global marketplace and exchange for high-quality carbon credits, that aims to scale the voluntary carbon market and help bridge the emission gap.

Through its comprehensive portfolio of services such as the CIX Marketplace, CIX Auctions, CIX Exchange, CIX Intelligence, and CIX Clear, CIX is dedicated to stimulating transactions, price discovery, and liquidity for carbon credits.

CIX has made significant strides since its inception, notably surpassing the trading and clearance of over 1 million tonnes of carbon credits through its exchange, which specialises in standardised spot contracts and specific carbon projects. As of February 2024, CIX facilitated transactions exceeding 2 million tonnes of carbon credits across all its platforms⁴².

- **South Korea's Comprehensive ETS:** Active since 2015, Korea's national ETS includes 684 of the country's largest emitters across various sectors, representing 70% of its GHG emissions. The country also supports a domestic offsetting program linked to its ETS.
- **Japan's Voluntary ETS Set for Full Operation:** The GX league, Japan's national ETS, is currently voluntary with full-scale operations scheduled for FY 2026/27⁴³. Additionally, a carbon levy on fossil fuel importers is expected in FY2028, complemented by the J-credit offset scheme launched by the Tokyo Stock Exchange in Oct 2023⁴⁴.
- **India Preparing for ETS Launch:** India is not in active compliance with carbon markets currently, but within the next two years, the country has plans to introduce an ETS targeted to sectors like steel, aluminium, and cement, aiming to cover 15% of its emissions by 2030. However since 2024, India introduced a Carbon Credit Trading Scheme which allows non-obligated entities to voluntarily participate in the tradable carbon credits market⁴⁵.
- **ASEAN Countries at Different Stages:** Indonesia is introducing a three-phased "cap-and-trade-and-tax" carbon pricing system, initially targeting the coal-fire powered plant in the first phase⁴⁶. Thailand's ETS is in its voluntary phase, aiming to reduce emissions in the energy sector. Meanwhile, Malaysia and the Philippines are reportedly collaborating with the World Bank to develop compliance carbon pricing schemes.

The proactive shift across the Asian region reflects a growing awareness of the need for robust carbon pricing mechanisms, driven by global market pressures and the impending European CBAM. While strategies vary across countries, the collective movement towards enhanced carbon pricing indicates a significant step in regional environmental policy and global climate change mitigation efforts.

42. [Fintech Global press article](#), February 2024

43. [Reuters press article](#), March 2023

44. [Reuters press article](#), October 2023

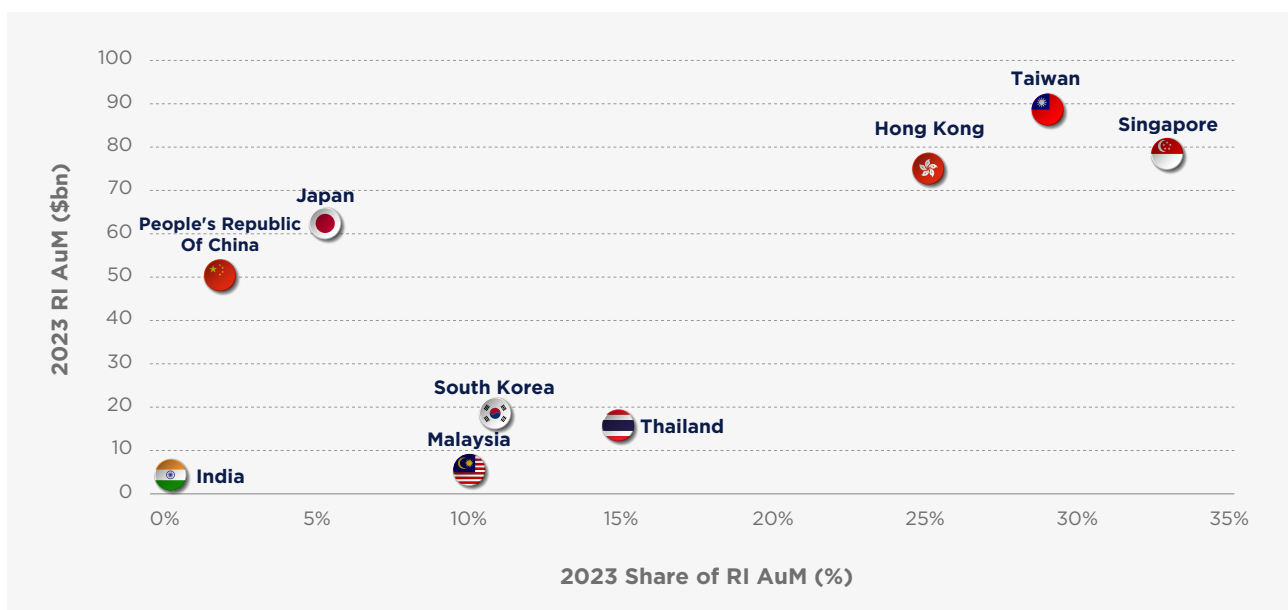
45. [Carboncredits.com website](#), February 2024

46. [S&P global blog](#), October 2023

Appendix: Overview of responsible investment trends by market

Table 2: Total RI Fund Assets AUM by Market - Local Cross Border funds

| | 2020 | | 2021 | | 2022 | | 2023 | |
|----------------------------|-------------------------------|--------------------|-------------------------------|--------------------|-------------------------------|--------------------|-------------------------------|--------------------|
| | Responsible Investment (\$bn) | % age of total AuM | Responsible Investment (\$bn) | % age of total AuM | Responsible Investment (\$bn) | % age of total AuM | Responsible Investment (\$bn) | % age of total AuM |
| People's Republic Of China | 26.4 | 1.5% | 73.9 | 3.1% | 61.8 | 3.0% | 50.3 | 2.3% |
| Hong Kong | 4.2 | 1.3% | 59.0 | 16.6% | 64.6 | 22.7% | 74.6 | 25.1% |
| India | 1.4 | 0.5% | 4.8 | 1.0% | 3.8 | 0.8% | 3.3 | 0.6% |
| Japan | 23.4 | 2.3% | 68.2 | 6.2% | 58.3 | 6.3% | 62.3 | 5.6% |
| Malaysia | 0.3 | 0.6% | 3.8 | 5.8% | 4.8 | 9.2% | 5.5 | 10.4% |
| Singapore | 2.7 | 1.3% | 42.9 | 17.0% | 64.0 | 28.8% | 78.1 | 32.8% |
| South Korea | 2.4 | 1.8% | 18.4 | 12.3% | 15.8 | 12.7% | 17.8 | 11.1% |
| Taiwan | 5.9 | 2.4% | 68.2 | 24.3% | 72.9 | 30.9% | 88.4 | 28.9% |
| Thailand | 2.0 | 1.9% | 11.7 | 10.7% | 12.0 | 13.5% | 15.6 | 15.2% |



Source: Broadridge data as of December 2023, Responsible investment include assets raised from local and cross-border funds

Table 3: **People's Republic of China**⁴⁷

| People's Republic of China | | | | |
|----------------------------|----------|----------|----------|----------|
| Year | 2020 | 2021 | 2022 | 2023 |
| RI AuM (\$bn) | 26,427.8 | 73,869.7 | 61,835.5 | 50,345.8 |
| Share of RI AuM (%) | 1.5% | 3.1% | 3.0% | 2.3% |

Net Zero Target: 2060**ESG policy developments**

- Green Credit Guidelines (2012)
- Guidelines for Establishing the Green Financing System (2016)
- “30·60” carbon targets (2021)
- EU-China Common Ground Taxonomy (2021)
- Plan for the Green Finance Evaluation of Banking Financial Institutions (2021)
- Guideline on Environmental Information Disclosure for Financial Institutions (2021)

Since 2023...

In 2023, the People's Bank of China issued the “Research on Development of Transition Finance in China”, providing analysis and policy suggestions from aspects of transition finance standards, information disclosure, policy incentives, product development, and just transition. The first draft of the transition standards are completed for four sectors: coal-fire power, steel, building & construction material, and agriculture.

At the end of the year, the *2024 Catalogue for Guiding Industry Restructuring* was published. It is a governmental document that provides guidance and direction for the restructuring of industries. It serves as an important reference for directing social investments, managing government investment projects, and formulating policies related to finance, taxation, credit, land, imports, and exports. Since its inception in 2005, the Catalogue for Guiding Industry Restructuring has been a pivotal instrument in shaping investments and directing government projects in China.

In January 2024, the China Certified Emission Reduction (CCER) was restarted, under which companies are allowed to offset up to 5% of their emissions by purchasing credits from certain emission reduction projects in areas like forestation and wind power.

In February 2024, the People's Republic of China's stock exchange released the first *Sustainability Reporting Guidelines* for consultation, which includes a sustainability reporting framework and clear disclosing topics under the Environmental, Social, and Governance pillars. This would make sustainability reporting mandatory for the fiscal year of 2025 for constituent companies of main indices (SSE 180, STAR 50, SZSE 100, GEI) and companies listed simultaneously in domestic and overseas capital markets. More than 400 companies, including those in key stock indexes, will need to publish sustainability reports by 2026, according to draft guidelines released this month by China's three main exchanges. At the same time, the State-owned Assets Supervision and Administration Commission (SASAC) already requires all the listed companies controlled by central enterprises to publish ESG reports.

47. Source: Broadridge data as of December 2023, Responsible investment include assets raised from local and cross-border funds

Table 4: **Hong Kong**⁴⁸

| Hong Kong | | | | |
|---------------------|---------|----------|----------|----------|
| Year | 2020 | 2021 | 2022 | 2023 |
| RI AuM (\$bn) | 4,221.0 | 59,013.2 | 64,613.5 | 74,572.7 |
| Share of RI AuM (%) | 1.3% | 16.6% | 22.7% | 25.1% |

Net Zero Target: 2050**ESG policy developments**

- Hang Seng Corporate Sustainability Index Series (2010)
- Launch of the climate-related risks requirements by the SFC (2021)
- The Green and Sustainable Finance Cross-Agency Steering Group (2021)
- “Core Climate” by The Stock Exchange of Hong Kong (HKEx) (2022)

Since 2023...

In 2023, the Hong Kong Monetary Authority released a proposal to develop a *Green Taxonomy for Hong Kong*, including four priority sectors: energy, transport, buildings, waste and water sectors. Moreover, all listed companies will be required to provide climate-related disclosure in their ESG reports from 1 January 2025.

In February 2023, Hong Kong also announced the successful offering of HK\$ 800m (c. \$102m) of tokenised green bond under the Government Green Bond Programme (GGBP). This is the first tokenised green bond issued by a government globally⁴⁹.

48. Source: Broadridge data as of December 2023, Responsible investment include assets raised from local and cross-border funds

49. [Hong Kong government press release](#), February 2023

Table 5: **Taiwan**⁵⁰

| Taiwan | | | | |
|---------------------|---------|----------|----------|----------|
| Year | 2020 | 2021 | 2022 | 2023 |
| RI AuM (\$bn) | 5,926.6 | 68,200.3 | 72,878.7 | 88,419.9 |
| Share of RI AuM (%) | 2.4% | 24.3% | 30.9% | 28.9% |

Net Zero Target: 2050**ESG policy developments**

- Corporate Social Responsibility indices (2010)
- Greenhouse Gas Reduction and Management Act (2015)
- Sustainable Bond Market (2020)
- Social Bond Market (2021)
- Sustainability-linked Bond Market (2022)

Since 2023...

In 2023, the Greenhouse Gas Management Act underwent a transformation, emerging as the *Climate Change Response Act*. This revised legislation aims to develop strategies for curbing greenhouse gas emissions, prioritizing intergenerational and environmental justice, and ensuring a fair transition towards sustainable development, thereby fostering global environmental responsibility.

Moreover, the *Taiwan Sustainable Taxonomy* was released to encourage financial institutions to back enterprises in their shift towards a sustainable, low-carbon economy.

Starting from 2023, domestic banks are required to adhere to the '*comply or explain*' rule, necessitating the disclosure of climate risks in accordance with the Task Force on Climate-related Financial Disclosures recommendations.

50. Source: Broadridge data as of December 2023, Responsible investment include assets raised from local and cross-border funds

Table 6: Singapore⁵¹

| Singapore | | | | |
|---------------------|---------|----------|----------|----------|
| Year | 2020 | 2021 | 2022 | 2023 |
| RI AuM (\$bn) | 2,732.6 | 42,873.4 | 63,998.1 | 78,064.4 |
| Share of RI AuM (%) | 1.3% | 17.0% | 28.8% | 32.8% |

Net Zero Target: 2050**ESG policy developments**

- Green Finance Industry Taskforce (2017)
- Green Finance Action Plan (2019)
- Singapore Green Plan 2030 (2021)
- MAS disclosure and reporting guideline for retail responsible investment funds (2022)

Since 2023...

In 2023, the Monetary Authority of Singapore (MAS) launched the *Singapore-Asia Taxonomy for Sustainable Finance*, which sets out detailed thresholds and criteria for defining green and transition activities that contribute to climate change mitigation across eight focus sectors.

51. Source: Broadridge data as of December 2023, Responsible investment include assets raised from local and cross-border funds

Table 7: **Thailand**⁵²

| Thailand | | | | |
|---------------------|---------|----------|----------|----------|
| Year | 2020 | 2021 | 2022 | 2023 |
| RI AuM (\$bn) | 2,022.3 | 11,705.0 | 12,047.1 | 15,584.1 |
| Share of RI AuM (%) | 1.9% | 10.7% | 13.5% | 15.2% |

Net Zero Target: 2065**ESG policy developments**

- Thailand Sustainable Development Goals (SDG) Investor Map (2022)
- ESG disclosure requirements for responsible investment funds (2022)

Since 2023...

In 2023, Thailand issued a *green taxonomy* in partnership with the Climate Bonds Initiative, and launched an ESG fund scheme that offers tax breaks to help promote the country's sustainable goals.

52. Source: Broadridge data as of December 2023, Responsible investment include assets raised from local and cross-border funds

Table 8: **Malaysia**⁵³

| Malaysia | | | | |
|---------------------|-------|---------|---------|---------|
| Year | 2020 | 2021 | 2022 | 2023 |
| RI AuM (\$bn) | 330.1 | 3,781.1 | 4,830.0 | 5,489.9 |
| Share of RI AuM (%) | 0.6% | 5.8% | 9.2% | 10.4% |

Net Zero Target: 2050**ESG policy developments**

- Sustainable Responsible Investment Roadmap (2019)
- Capital Market Masterplan 3 (2021)
- Sustainable Responsible Investment Taxonomy (2021)

Since 2023...

In 2023, Malaysia introduced its *National Energy Transition Roadmap*, and released the *National Industry Environmental, Social, and Governance (i-ESG) framework*, promoting sustainable development among manufacturing companies (2023).

53. Source: Broadridge data as of December 2023, Responsible investment include assets raised from local and cross-border funds

Table 9: **Japan**⁵⁴

| Japan | | | | |
|---------------------|----------|----------|----------|----------|
| Year | 2020 | 2021 | 2022 | 2023 |
| RI AuM (\$bn) | 23,381.5 | 68,184.1 | 58,276.2 | 62,335.5 |
| Share of RI AuM (%) | 2.3% | 6.2% | 6.3% | 5.6% |

Net Zero Target: 2050**ESG policy developments**

- Climate disclosure requirement for the Prime-market listed companies (2021)
- JFSA Supervisory Guideline proposal (2022)

Since 2023...

In February 2024, to support the transition finance landscape, Japan issued the first ever sovereign Climate Transition Bond (\$11 billion), certified by the Climate Bonds Standard, and whose proceeds will be mobilized to fund the GX programme.

54. Source: Broadridge data as of December 2023, Responsible investment include assets raised from local and cross-border funds

Table 10: **India**⁵⁵

| Year | India | | | |
|---------------------|---------|---------|---------|---------|
| | 2020 | 2021 | 2022 | 2023 |
| RI AuM (\$bn) | 1,419.3 | 4,808.0 | 3,782.3 | 3,348.1 |
| Share of RI AuM (%) | 0.5% | 1.0% | 0.8% | 0.6% |

Net Zero Target: 2070**ESG policy developments**

- National Voluntary Guidelines on Social, Environmental, and Economic Responsibilities of Business (2011)
- Business Responsibility Reports (2012, extended in 2015)
- Companies Act (2014)
- Stewardship Code (2018 to 2020)
- SEBI Disclosure norms for ESG Funds (2022)

Since 2023...

In 2023, SEBI amended the Listing Obligations and Disclosure Requirements (LODR) of the *Business Responsibility and Sustainability Report (BRSR)*, a framework already in place since 2021. While top 1000 listed companies are required to disclose through BRSR overall, only top 150 listed companies are required to publish an amended version from the financial year of 2024.

Moreover, SEBI became the first regulator in the world to regulate ESG Rating Providers, by amending the *Credit Rating Agencies Act*.

Also in 2023, the Reserve Bank of India introduced guidelines for banks and non-bank financial companies (NBFCs) to accept “green deposits”. The purpose is to ensure funds are utilized for energy efficiency, clean transportation, climate change adaptation, sustainable water and waste management, green buildings, and terrestrial and aquatic biodiversity conservation.

In 2024, India introduced a *Carbon Credit Trading Scheme* which allows non-obligated entities to voluntarily participate in the tradable carbon credits market.

55. Source: Broadridge data as of December 2023, Responsible investment include assets raised from local and cross-border funds

Table 11: **South Korea**⁵⁶

| South Korea | | | | |
|---------------------|---------|----------|----------|----------|
| Year | 2020 | 2021 | 2022 | 2023 |
| RI AuM (\$bn) | 2,433.9 | 18,414.8 | 15,846.4 | 17,812.5 |
| Share of RI AuM (%) | 1.8% | 12.3% | 12.7% | 11.1% |

Net Zero Target: 2050**ESG policy developments**

- Mandatory disclosure regulation (2019)
- “New Green Deal” (2020)
- Korea Accounting Standards Board (KSSB) (2022)
- Capital Markets Act (2022)

Since 2023...

At the end of 2022, Ministry of Environment revised the *Korean Green Taxonomy* (K-Taxonomy) guidelines, which are voluntary and that establish a “transition sector”. In 2023, the Korean government began research on Social Taxonomy and is discussing the preparation of Social Bond and Sustainability Bond Guidelines linked to it.

In 2023, the Republic of Korea’s Financial Supervisory Service issued the *ESG Fund Disclosure Standards*, which have been officially implemented since February 2024, and revised the *Proxy Voting Guidelines*, including judgment criteria for ESG cases, reflecting the guidelines of domestic and foreign voting rights advisors.

At the same time, Korea’s comprehensive ESG disclosure regulation has been postponed to implementation after 2026, but a mandatory disclosure system is being implemented in terms of Governance and Environment requirements.

⁵⁶. Source: Broadridge data as of December 2023, Responsible investment include assets raised from local and cross-border funds

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LEGALS

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