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Key Points

- Following the 2015 Paris Agreement goal of limiting the global average temperature rise to well below 2°C above pre-industrial levels, and to aim for 1.5°C, the majority of countries have committed to achieving net-zero greenhouse gas (GHG) emissions by around 2050.
- Globally, current climate policy commitments and practices have fallen significantly short of the necessary measures to achieve these emissions targets. It is important for Asia to enhance the resilience of financial system against climate risks and ensure the availability of private sector financial flows.
- Promoting companies to disclose climate-related information based on standardized frameworks is crucial.
- Asia should promote corporate disclosure based on the Task Force on Climate-related Financial Disclosure (TCFD) recommendations to correct market failure that hampers efficient financial allocation.
- Asia should also consider preparing a plan to adopt the climate change-related standards published by the International Sustainability Standards Board (ISSB) in June 2023.

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Promoting Sustainable Finance and Financial Stability Through Climate-Related Corporate Disclosure in Asia

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1. Introduction, Facts, and Basic Concepts

Many countries and companies in the world are increasingly concerned that global warming and associated hazards have already begun to cause substantial social and economic damages and losses in many economies and regions and will have even greater adverse impacts in the future. In 2015, therefore, nearly 200 economies reached the Paris Agreement—a legally binding international treaty on climate change of holding the global average temperature increase to well below 2°C or pursuing efforts to limit the temperature rise to 1.5°C above pre-industrial levels (1850–1900) by the end of the century. These committed countries have since submitted Nationally Determined Contributions (NDCs) including the 2030 GHG targets to the United Nations Framework Convention on Climate Change by 2020 and are expected to resubmit more ambitious climate plans every 5 years thereafter to reach the Paris Agreement goals. Most of these economies have also set long-term net-zero GHG emissions targets—roughly equivalent to carbon neutral target—to be achieved by 2050 or a little after some EMDEs by taking necessary climate policies.

Information about business activities concerning climate issues based on an accountable and high-quality disclosure and reporting system is a critical tool for the government and the financial sector in being informed, tracking, and governing climate-associated risks of the economies. This in turn enables businesses and the country to utilize actual and potential opportunities that the decarbonization process will offer in the short, medium, and long term. This is because the disclosure allows each company and sector to understand how climate risks are affecting their activities and strategies and how the prospects of sustainable and climate-friendly business and society will change the viability of their activities. These processes will ultimately help develop sustainable finance, which will accelerate a reallocation of investment capital toward low carbonization and decarbonization projects and reduce serious associated investment gaps. These gaps are substantially large for emerging and developing economies (EMDEs) where access to affordable climate finance is limited and thus it is important to start with promoting their understanding about climate risks and associated financial risks through introducing a disclosure and reporting system in a phased manner.

1.1 Discrepancy in GHG Emissions Targets and Actual Practices

Since the Paris Agreement, the IPCC released the 1.5°C special report and stressed the importance of keeping global warming to 1.5°C by the end of the 21st century (2100) as the severity of climate changes and impact on economies and societies will be much greater under the 2°C scenario relative the 1.5°C scenario (IPCC 2018). GHG emissions from human economic activities and associated burning of fossil fuels over the period of more than a century have already led to global warming of 1.1°C in 2011–2020 above pre-industrial levels (around 1850–1900). Thus, maintaining the global average temperature to 1.5°C by the end of this century requires more comprehensive and active climate policy measures and industrial and corporate actions. Five years later in 2023, in the Synthesis Report of the Sixth Assessment Report (the AR6 Report), the IPCC gave a strong warning that not only the 2030 global GHG emissions targets set by the NDCs are insufficient, but also the pace and scale of climate mitigation policies undertaken so far are inadequate to tackle climate change. This will significantly increase the challenge of limiting global warming to well below 2°C, not to mention the feasibility of approaching the 1.5°C target (IPCC 2023). As the increase in GHG emissions is accelerating global warming and even the prospect of keeping the global temperature below 2°C is becoming distant, the IPCC called for deeper, more rapid, and sustained reductions in GHG emissions in all sectors.

Figure 1a indicates the annual GHG emissions of the world, developed economies, EMDEs, and Southeast Asia from 1990 to 2021, as well as their NDC emissions targets set for around 2030. The data refer to actual total *GHG emissions*, *excluding land use*, *land-use* change, and forestry and the 2030 targets. While developed economies emit a smaller amount of GHG emissions and indicate declining trends, it should be acknowledged that their accumulated GHG emissions using fossil fuels since their industrialization over the period of more than a century have been substantial. Thus, there is a consensus that advanced economies, which have already industrialized and thus achieved higher levels of per capita income, should be more responsible for reducing GHG emissions than EMDEs although EMDEs should also make efforts to cut their current emissions. To meet the NDCs, the world needs to reduce GHG emissions to 80% of todays' emissions level (i.e., latest 2021 level). To fulfil the 2030 targets, developed economies must cut emissions to 64% of today's emissions level by reducing emissions at an average annual rate of 4.5% between 2022 and 2030. Meanwhile, EMDEs' emissions must be reduced to 95% of today's emissions level to meet the 2030 targets by cutting emissions at an average annual rate of 0.6%.

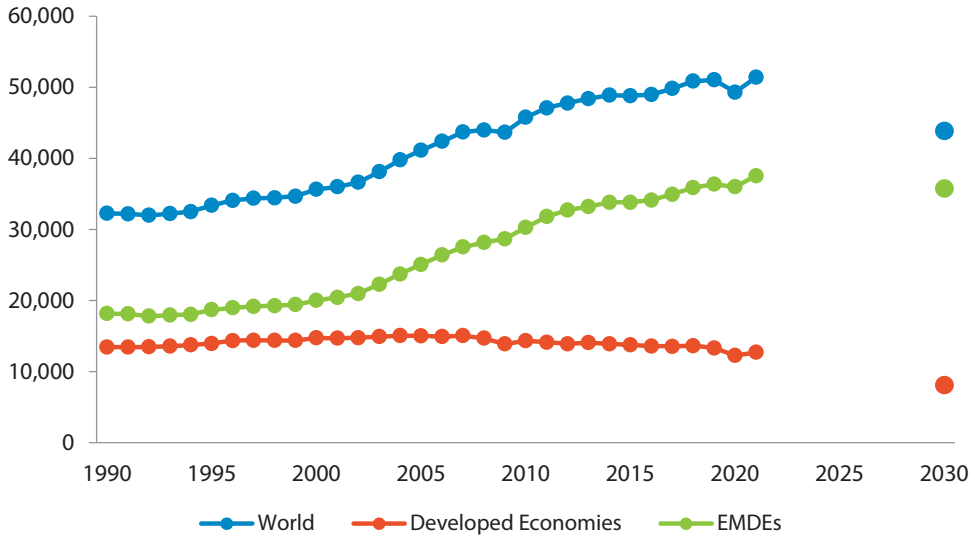
Developed economies have been facing sluggish potential economic growth rates due to aging and/or declining populations and a shift in their industrial structures toward services (such as health and social services, finance, professional services, entertainment, and retail/wholesale trade). Developed economies are equipped with higher levels of knowledge and skills, capital stock, and a well-developed financial sector and systems. The amount of their investment in clean energy has been rising. These favorable factors have been associated with a decline in GHG emissions (Figure 1a). Much more effort has to be made by developed economies to cut emissions rapidly to fulfill the 2030 targets and revise them to more desirable, ambitious targets given that more than a century of GHG emissions have been generated by industrial and economic activities in these countries.

In contrast, EMDEs, in particularly those in Asia, will continue to face higher economic and population growth in the future than developed economies. This will require substantial energy supply in response to anticipated energy demand. Thus, holding GHG emissions to the 2030 emissions level pledged under the NDCs is a challenging task for EMDEs given that many existing energy-related facilities are carbon-intensive and many coal-fired power plants are relatively new (average 14 years) related to around 45 years in the United States and Europe (Figure 1b). Thus, Asia has to adopt measures to reduce emissions from those facilities by replacing existing facilities, while new energy investment should be increasingly concentrated in low-carbon or clean energy industries. While EMDEs also have to take more climate policy actions to meet their 2030 emissions targets, low-income countries with high debt levels need to obtain support from developed economies and the international community to meet the Paris Agreement goals.

1.2 Physical Risks, Transition Risks, and Associated Legal Risks

Given the pace of global warming is accelerating more than expected, it is important to deepen understanding of climate risks. It is now widely understood that there are two types of climate change risks to global economies and societies: physical risks and transition risks.

Figure 1a: GHG Emissions and NDCs (million metric tons of CO_2 equivalent)

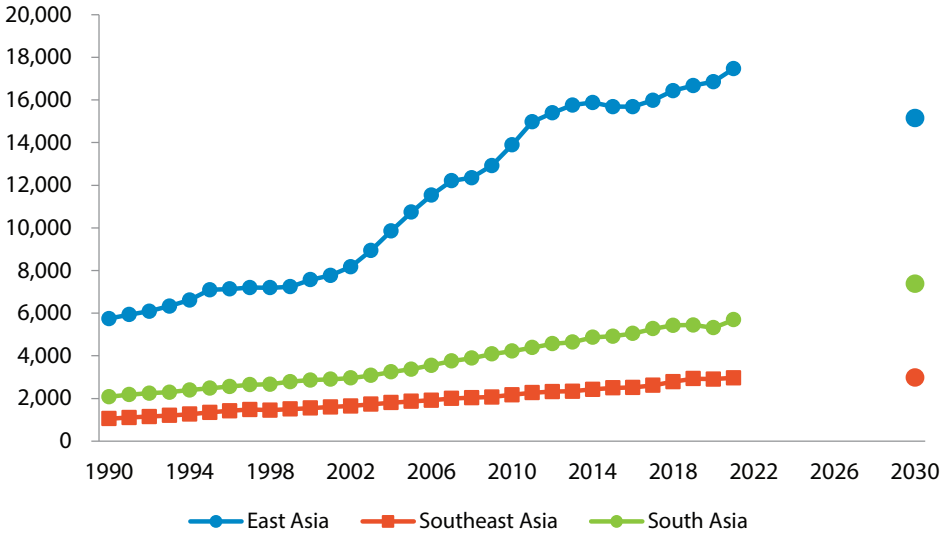


EMDEs = emerging and developing economies, GHG = greenhouse gas, NDCs = Nationally Determined Contributions.

Note: Data refer to total *GHG emissions, excluding land use, land-use* change and forestry. Dot in the figure refers to the Nationally Determined Contributions.

Source: Prepared by the author based on the International Monetary Fund's Climate Change Dashboard.

Figure 1b: GHG Emissions and NDCs (million metric tons of CO_2 equivalent)



GHG = greenhouse gas, NDCs = Nationally Determined Contributions.

Note: Data refer to total *GHG emissions, excluding land use, land-use* change and forestry. Dot in the figure refers to the Nationally Determined Contributions.

Source: Prepared by the author based on the International Monetary Fund's Climate Change Dashboard.

As for physical risks, they are already increasingly exerting adverse impacts and damage on economic and social activities and lives through extreme weather conditions. It is expected that such risks will materialize more frequently and extensively, generating more significant damage and food and water shortages in the near future in many parts of the world. Physical risks are related to higher frequency and severity of acute events (e.g., severe and prolonged draughts, heatwaves, wildfires, precipitation, cyclones, typhoon, hurricanes) and to chronic events (e.g., sustained rising temperature, rising sea level, changing precipitation patterns). While the frequency and the scale of climate change-driven natural hazards will be greater as global warming progresses, the occurrence of such events will likely happen nonlinearly. Governments could cope with physical risks through climate adoption policies to enhance resilience to the current and future impacts of climate change. Such policies include building climate resilient infrastructure, making land use and water management planning more effectively to cope with physical risks, promoting agricultural practices more resilient to climate event, and protecting ecosystems and natural stock that could possibly provide natural protection against physical risks.

Meanwhile, economies and companies will face transition risks as governments adopt more rigorous climate mitigation polices aimed at preventing or reducing GHG emissions into the atmosphere in line with the Paris Agreement goals. Transition risks tend to materialize in the process of adjusting the economy and society toward carbon neutrality. Mitigation measures include carbon pricing (carbon tax and emissions trading system); increase in renewable energy supply (such as solar power, wind power, hydro power, geothermal energy), research and development to promote renewable energy, batteries and storage, and other low-carbon or decarbonization technology through tax incentives and subsidies; phasing out subsidies supporting fossil fuel industries; low-emissions public investment, as well as regulations related to emissions limits and energy efficiency. Private-sector initiatives to develop low-carbon technology and production methods, as well as a shift in consumer preferences and market sentiments toward clean energy sources and products will also accelerate the transition of the economy toward carbon neutrality and thus contribute to transition risks. Thanks to technology development, the prices of renewable energy are dropping and thus help to facilitate transition.

Transition risks are related to those that will drive corporate and sectoral restructuring and an increase in stranded assets. In particular, companies and financial institutions should pay attention to the possibility of incurring stranded assets related to carbon-intensive assets (including production equipment, facilities, and fossil fuel reserves). These assets are likely to generate losses because investment cost cannot be fully recovered as expected future carbon pricing or tighter environmental regulation will turn them obsolete and economically unviable in the transition process. To accelerate climate mitigation policy actions smoothly, governments should ensure the process is inclusive by taking into account the distributional outcomes including adverse impact on some communities and their workers heavily depending on carbon-intensive industries (just transition mechanisms). Although the net impact of reducing GHG emissions and facing transition risks will be substantially positive, just transition mechanisms should minimize disturbances by supporting communities and their workers to shift into new industries. Transition risks could also be related to increased national protectionism in the face of rising demand for precious metals and natural resources used for renewable energy and low carbon transportation. In addition, some regions may opt for divergent climate-related trade policies including the carbon borders adjustment policy. These factors can affect heavily EMDEs, particularly export-oriented countries in Asia.

Governments and companies also need to enhance awareness of climate-related litigation risks (liability risks). With regard to physical risks, lawsuits are more likely to occur in the future if plaintiffs or victims of natural disasters can provide scientific evidence that GHG emissions-intensive companies are directly responsible for extreme natural disaster events and the resultant losses. Governments and companies should also recognize that lawsuits challenging insufficient climate change mitigation policies and measures, as well as the payment of penalties and compensation will increase in the transition process as part of transition risks. For example, governments and emissions-intensive companies that officially set time-bound carbon neutral targets might be sued by civil society, including nongovernment organizations, if their actions are inconsistent with the official GHG emissions targets. When companies advertise and use labels that their products and services are environmentally friendly, caution is needed to ensure that their contents are not viewed as greenwashing practices. Consumers that believe that they were misled by such advertisements and labels may sue the companies. Indeed, there is a growing number of lawsuits or punishments against companies violating environmental regulations. According to Norton Rose Fulbright, a global law firm,

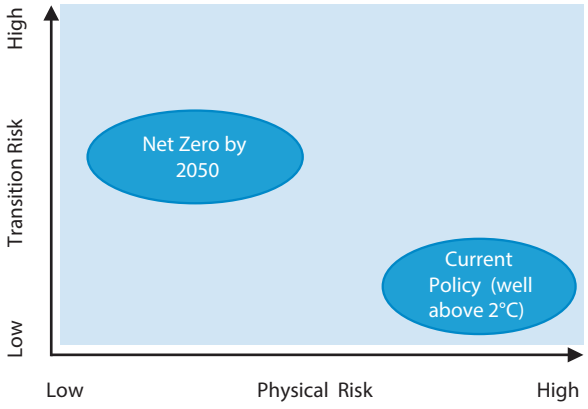
the total number of climate change cases filed globally as of September 2022 reached 2,419, up from about 1,890 in February 2022. Among these cases, there were 858 cases in the United States, 244 cases in Europe, and 126 cases in Australia (de Wit and Stebbing 2022). Governments and companies may lose reputation and companies may also lose customers and investors.

1.3 *Inverse Relationships between Physical Risks and Transition Risks*

Physical risks and transition risks are known to be inversely related (Figure 2). Unless necessary climate policies are adopted in a timely manner by governments across the globe, transition risks remain low, but instead physical risks will increase significantly over time. As a result, the global average temperature could rise to well above 2°C from the pre-industrial levels by the end of this century or even much sooner as pointed out above. To avoid this excessive global warming, collective global efforts must be made to limit the increase in the global average temperature to 1.5°C or at least well below 2°C by the end of this century in concordance with the 2015 Paris Agreement.

The IPCC's AR6 Synthesis Report emphasized that, global GHG emissions must peak before 2025 and be reduced by 43% by 2030 and by 60% 2035 relative to the 2019 level in order to limit global warming to about 1.5°C (IPCC 2023). As some residual GHG emissions remain due to the presence of hard-to-abate manufacturing, aviation, and agricultural sectors, those emissions should be offset by using carbon dioxide removal methods including afforestation and reforestation, direct air capture, and bioenergy with carbon capture and storage. Although many countries are reluctant to implement climate policies in fear of transition risks, it is desirable to start policy actions to reduce GHG emissions as soon as possible. The sooner the necessary climate mitigation policies are adopted, the smoother the transition process will be since governments, companies, and individuals will have more time to adjust. As a result, the transition risks will be lower compared with those in the case of delaying necessary actions now and thus finding it inevitable to adopt the policies later at a greater speed and with more drastic content.

Figure 2: Relationships Between Physical Risks and Transition Risks



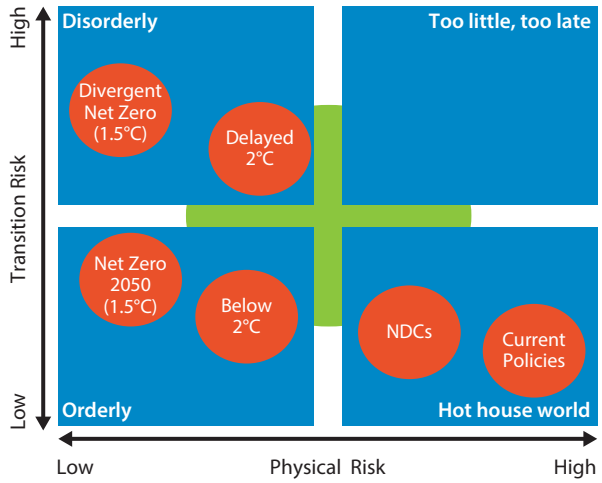
Source: Prepared by the author.

1.4 *Evolution of Physical Risks and Transition Risks Under Climate Scenarios*

One way to understand the relationships between physical risks and transition risks is to examine the possible outcomes envisaged under various long-term climate scenarios (the time span generally extending up to around 2050). The climate scenarios have been developed by several international organizations such as the IPCC and International Energy Agency (IEA) to assess the possible impacts of climate change by generating possible future path of GHG emissions and associated global average temperature. Based on the assumptions related to policy options (such as carbon pricing and other climate policies), energy use and systems, and technology development, for example, the IEA provide three major climate scenarios. These are (i) sustainable development scenarios (SDS) that enable to limit the global average temperature to well below 2°C; (ii) the more ambitious net-zero emissions by 2050 scenario leading to global net-zero GHG emissions by 2050 and limiting global average temperature to 1.5°C by the end of this century; and (iii) the stated policies scenario (STEPS) that consider the current climate policies around the world and thus not consistent with the Paris Agreement goal as a result of leading to a global average temperature rise to well above 2°C. Physical risks under the STEPS will be higher than those under the two other scenarios. Transition risks under the net-zero emissions by 2050 scenario will require more rigorous climate policies.

Climate scenarios have also been developed by the Network of Central Banks and Supervisors on Greening the Financial System, which comprises more than 100 central banks and financial supervisors (NGFS 2022).

Figure 3: NGFS Six Types of Climate Scenarios



NDCs = Nationally Determined Contributions, NGFS = Network of Central Banks and Supervisors on Greening the Financial System.

Source: NGFS (2022).

These scenarios are developed for the purpose of being used by financial authorities in performing bottom-up climate scenario analysis for financial institutions (such as banks and insurance companies) in their jurisdictions. The six types of climate scenarios can be decomposed into (i) orderly scenarios (net-zero [1.5°C] scenario and below 2°C scenario), (ii) disorderly scenarios (delayed 2°C scenario and divergent net-zero scenario), and (iii) hot house world scenarios (NDCs) scenario and current policies scenario). Transition risks are higher but physical risks are lower under the orderly scenarios while transition risks are limited but physical risks are much higher under the hot house world scenario (Figure 3). The main scenarios are the net-zero emissions scenario, the delayed 2°C scenario, and the current policies scenario. More than 30 jurisdictions have been implementing climate scenario analysis. Financial authorities use these scenarios by adding country- or regional-specific factors. Such analysis helps financial authorities to examine the potential impact on financial institutions and financial system under various climate scenarios. Financial authorities could use these exercises to promote financial institutions' awareness about potential deficiencies in their climate risk management framework, leading to improvement of their risk management practices.

1.5 Need to Reduce Investment Gaps

The IEA projects that global investment in clean energy (clean electrification, energy efficiency, low-emission fuels) needs to increase from current around $1.6 trillion in 2022 to about $4.6 trillion in real terms by 2030 under the net-zero GHG emissions by 2050 scenario (IEA 2023). It is clear that developed countries need to take the lead in investment in clean energy and other sectors (including agriculture) and promote further cuts in GHG emissions. Meanwhile, the world should pay more attention to EMDEs to cut GHG emissions in the near future given that about 775 million people lack access to electricity and 2.4 billion people lack access to clean cooking fuels (IEA and IFC 2023).

Under the aforementioned IEA's STEPS leading to a global average temperature rise to well above 2°C, it is estimated that one-third of the rise in energy use in EMDEs over the next 10 years would be met by fossil fuels (IEA and IFC 2023). To prevent this scenario and enable these countries to benefit from clean energy technologies and GHG emissions cuts, the issue of how to mobilize more finance and investment must be examined urgently. At present, around $770 billion is invested annually in clean energy in EMDEs in 2022, but most of this investment is concentrated in a few large emerging economies such as the People's Republic of China (PRC), India, and Brazil. In particular, the PRC accounts for two-thirds of this total investment (about $511 billion). To meet the Paris Agreement goals, EMDEs need to make annual (public and private) investment in clean energy more than triple from the current $770 billion to $2.2 trillion under the SDS and $2.8 trillion under the net-zero emissions by 2050 scenario by 2031–2035 and maintaining similar amounts up to 2050 (Table 1). Excluding the PRC, the amount of investment needs to rise more sharpy, about sevenfold from the current $260 billion to around $1.4 trillion under the SDS and $1.9 trillion under the net-zero emissions by 2050 scenario. To mobilize these levels of investment, expanding private funds through blended finance schemes is necessary (Shirai 2023).

2. Promoting Firm-Level Climate-Related Disclosure

To achieve the Paris Agreement goals, economic and business activities need to be reconsidered in terms of their contribution to GHG emissions. According to the World Resource Institute, energy accounts for about 75% of total GHG emissions. Among energy driven GHG emissions, electricity and heat account for about 40%, followed by transportation (19%), and manufacturing and construction (8%). This suggests that emissions from electricity and heat must be cut substantially by

Table 1: Actual and Estimated Annual Clean Energy Investment ($ billion)

			Sustainable Development Scenario			Net-Zero Emissions by 2050 Scenario		
	2015	2022	(1) 2026–2030	(2) 2031–2035	(2)/2020 level	(1) 2026–2030	(2) 2031–2035	(2)/2020 level
EMDEs	538	773	1,784	2,219	3	2,222	2,805	4
People's Republic of China (PRC)	287	511	730	850	2	853	947	2
EMDEs excluding PRC	251	262	1,054	1,369	5	1,369	1,858	7
Southeast Asia	28	30	171	208	7	185	244	8
India and Other Asia	76	82	321	418	5	348	467	6
Africa	26	32	160	207	6	203	265	8
Latin America	63	66	150	209	3	243	332	5
Middle East and Eurasia	57	52	223	303	6	390	550	11

EMDEs = emerging and developing economies.

Note: The sum of regional data does not add up to total amount due to rounding.

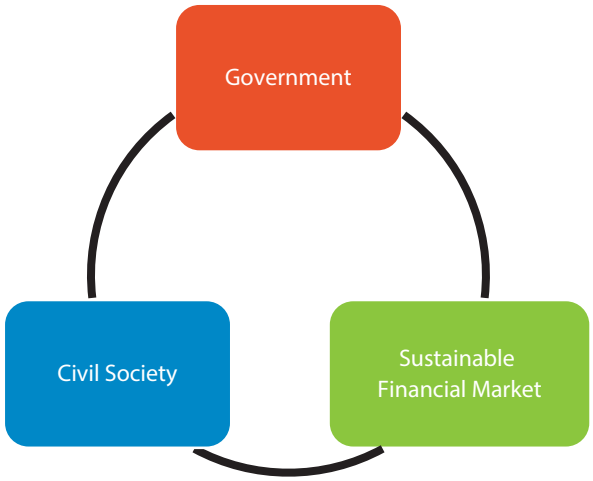
Source: Prepared by the author based on IEA and IFC (2023).

shifting from fossil fuel energy to renewable energy and other low-emission fuels and utilizing heat pumps. The transport sector can reduce emissions by increasing the number of electric vehicles. The manufacturing sector can do so by promoting energy efficacy, developing new low-carbon technology, using renewable energy and low carbon fuels, and investing in carbon, capture, utilization, storage technology. These changes require substantial transformation in the industrial structures and corporate business models. To accelerate the transition process, corporate disclosure is essential for governments to provide necessary support and for investors to prove more funds to essential projects.

2.1 Coordination Among the Three Entities

To achieve the 2030 GHG emissions targets and net-zero GHG emissions by around 2050, each country needs to transform industries and companies toward more environmentally sustainable and low carbon-intensive activities. To materialize this smoothly, the following three entities—the public sector, sustainable finance, and civil society—need to function smoothly. The public sector includes central and local governments, financial regulators, and central banks. Sustainable finance comprises banks, investors, banks, and other financial institutions, as well as the financial sector and systems as a whole. Civil society includes nongovernment organizations, think tanks, universities, and individuals. Each entity should act more proactively to help transform corporate activities and make their businesses more environmentally sustainable (Figure 4).

Figure 4: Three Entities in Achieving Net-Zero Emissions



Source: Prepared by the author.

Among the three entities, governments play the most important role in implementing climate policies. They include fiscal policy and regulatory tools—such as carbon pricing, public investment, research and development subsidies and tax incentives, and environmental regulations—to encourage innovation and investment

by the private sector. The pace of adopting specific climate policy measures will greatly affect the speed of transitioning the economy toward carbon neutrality and resultant future global warming. Within their existing mandates, central banks could assess the effects of climate risks on financial systems and central bank operations. Together with financial supervisors, central banks could help remediate financial market mispricing and promote sustainable finance.

As the second essential entity, sustainable finance is essential to support environmentally sustainable activities of governments, companies, individuals, and other stakeholders. Financial institutions should pay attention to financed emissions and associated climate-related financial risks. By understanding such risks, they are encouraged to allocate more funds to companies engaging in decarbonization and low carbon projects and new technology. By transforming their business models to become more sustainable, financial institutions play an important role in fostering sustainable finance and accelerating the pace of transition of the economy toward carbon neutrality. As the third, equally important entity, civil society plays an essential role in encouraging more environmentally sustainable actions among governments, financial institutions, businesses, and individuals by monitoring their activities and calling for more actions. Education and dissemination of information to promote understanding of climate risks and policies among the general public is also necessary to generate support for climate policies and cope with transition risks. To promote effective actions among the three entities, government efforts to improve corporate disclosure in collaboration with stock exchanges setting listing requirements are crucial, as mentioned below.

2.2 *Promoting Climate-Related Disclosure Based on TCFD Recommendations*

The world needs to increase investment in clean energy and low-carbon technology in order to meet their 2030 GHG emissions targets, as shown in Figure 1a, and accelerate the path toward carbon neutrality by 2050. Also, Table 1 indicates estimates on the annual amount of clean investment necessary to achieve the Paris Agreement goals. Many of these investment activities are expected to be undertaken by companies in the form of projects. Given that the scale of these investment is substantial, the mobilization of private-sector finance is crucial. For this to take place at scale, it is necessary for investors and financial institutions to allocate more funds to these activities.

Thus, promoting climate-related corporate disclosure is essential for investors and financial institutions to assess companies and their activities and make proper financing decision. As companies increasingly face physical risks, transition risks, and associated litigation risks (liability risks), financial institutions including banks and investors financing those companies will face potential losses. They have to understand that their loans and investments provided to emissions-intensive companies may become nonperforming in the future if those companies find it difficult to recover the costs of fixed asset investment—thus, making those assets stranded and lowering companies' repayment capacity and returns. If there are many financial institutions that finance such industries and companies, there is a risk that the stability of the financial system will be threatened.

Given this background, the Task Force on Climate-related Financial Disclosure (TCFD) was created by the Financial Stability Board (FSB) in 2015 in response to the Group of Twenty (G20) decision that recommended organizations and companies disclose climate-related financial information. This initiative was formed to help correct market failure that hampers appropriate pricing of climate risks and thus result in inefficient financial allocation. To correct market failure, financial institutions and investors need more accurate, timely, standardized information. The TCFD recommendations were released in 2017. They are a set of recommendations for the voluntary disclosure of climate change-related financial risks and opportunities. Those were developed in response to a growing demand by investors, lenders, insurance companies, and other stakeholders by providing information useful for their financing decisions. The TCFD recommendations have since been widely accepted by many countries as a basis for climate-related reporting by companies and financial institutions. More than 100 countries and jurisdictions officially support the recommendations. Updated recommendations were released in 2021 (TCFD 2017, 2021).

Climate-related Risks and Opportunities: The disclosure framework is based on promoting companies to identify and assess climate-related risks and opportunities that are material to their business operations, as well as disclose them as part of their annual financial reporting process (such as sustainability reports, TCFD reports, integration reports, etc.). Climate change could bring a number of opportunities to corporate businesses. For example, companies could improve efficiency in energy, water, materials, and waste management and reduce operation costs; develop new low-emissions products and services and thus attract new customers and seek

new markets and enhance corporate ability to cope with climate change. On the other hand, climate-related risks comprise physical risks and transition risks. Physical risks are decomposed into acute and chronic risks as described above. Transition risks include (i) policy and regal risks, (ii) technology risk, (iii) market risk, and (iv) reputation risk.

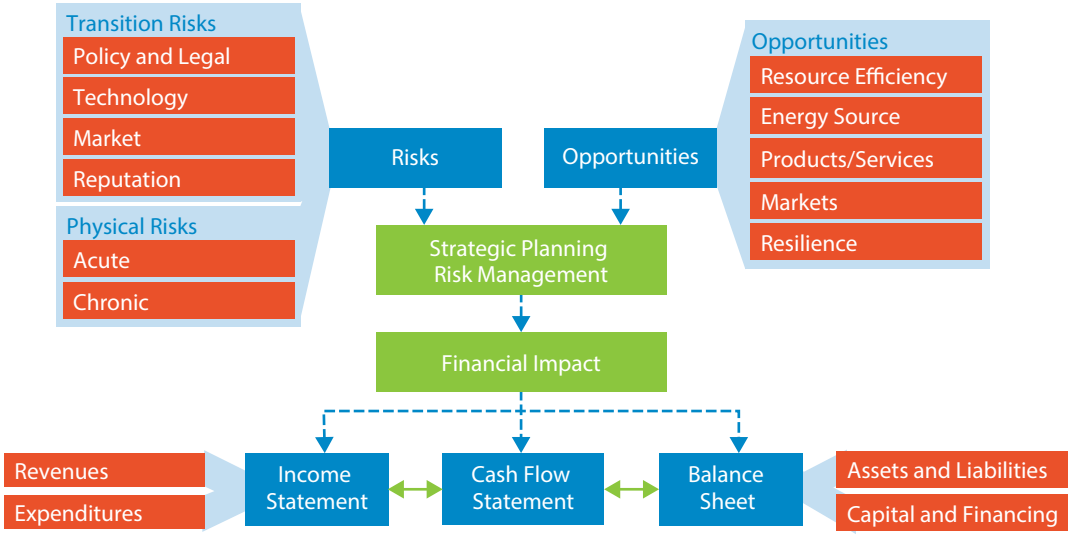
- **Policy and regal risks** are related to climate policy actions (such as carbon pricing, energy, or water efficiency-enhancing measures, more sustainable land-use) and litigation claims that can be brought before the courts by governments, companies, investors. insurers, nongovernment organizations, and individuals, for example, due to the inaction to mitigate impacts of climate change and insufficient disclosure of climate risks.
- As for **technology risk**, low carbon technology might result in stranded assets and existing production system no longer viable.
- **Market risk** might occur when shifts in supply and demand for commodities, products, and services take place.
- **Reputation risk** is related to a loss of reputation as a result of customers' changes in preference toward low-carbon products and services.

Financial Impacts of Climate-related Risks and Opportunities: Once companies identify climate-related risks and opportunities, possible impacts on corporate income statements (revenue, expenditure), and balance sheets (assets, liabilities) could be examined. Corporate revenue can be affected as climate change influences demand for products and services and carbon pricing raise cost of using fossil fuel energy. Expenditure can be influenced by various physical and transition risks. Companies should look at how those risks and opportunities are likely to impact their revenue and expenditure materially. Various risks and opportunities could affect the valuation of companies' long-lived assets and liabilities. Companies should focus not only on existing assets and committed activities including possible restructuring or impairment of assets, but also on new capital expenditures and research and development leading to new capital stock formation. Internal carbon pricing practice is recommended to see the impact of possible carbon pricing promoted by governments on their future cost of operations. The equity and debt structure can be affected as well if financing conditions change in response to climate risks.

2.3 *Four Pillars of the TCFD Reporting Framework*

The TCFD recommendations consist of four pillars: governance, strategy, risk management, and metrics and targets. These four pillars are now becoming global common foundations to disclose corporate

Figure 5: Climate-Related Risks, Opportunities, and Financial Impact



Source: TCFD (2017).

sustainability or environment, social, and governance (ESG) information.

- The governance pillar focuses on disclosing the corporate governance structure to cope with climate risks and opportunities including the board supervision and role of the management.
- The strategy pillar describes the "material" climate risks and opportunities identified over the short, medium, and long term and their implications on the business models, strategies, and financial planning. Companies are expected to explicitly disclose actual and potential financial impacts of climate change and transition plans (measures to transform current business operations toward low carbon operations). It also includes the climate scenario analysis including a 2°C or lower scenario in line with the Paris Agreement although a 1.5°C scenario is increasingly expected by ESG investors.
- The risk management pillar describes the process of identifying, assessing, managing, and integrating climate risks into overall risk management.
- The metrics and targets pillar is the most important pillar since indicators and targets can be used by ESG investors and financial institutions to deepen their understanding of the climate-related risks and opportunities of their invested or financed companies. The information is useful for financial institutions and other stakeholders to engage with companies to promote their actions and at the same time to shift funds to more sustainable assets in the investment and loan portfolios by making efforts to align with the Paris Agreement goals.

Regarding GHG remissions, companies are expected to disclose Scope 1 (direct emissions from the company's operations) and Scope 2 (indirect emissions generated from purchased energy) GHG emissions regardless of materiality. While Scope 3 GHG emissions (such as those emitted by suppliers and users) is subject to materiality, companies are encouraged to disclose them. Scope 3 emissions can be decomposed into 15 categories from upstream stages to downstream stages according to the GHG protocol. GHG emissions can be disclosed using both absolute emissions and emissions intensity according to the GHG Protocol (WBCSD and WRI 2004 2011). The world is now increasingly focusing on Scope 3 GHG emissions because they account for about 75% of total GHG emissions (CDP 2022). Without making efforts to disclose Scope 3 emissions data and then cut those emissions, achieving net-zero GHG emissions is not feasible. Also, it is essential to disclose progress against the targets—especially, in relation to GHG emissions targets in the medium and long term. Such companies are also expected to explain how those targets are used to manage their regular climate-related risks and opportunities with regard to allocating funds to investment and research and development activities.

As cross-industry climate-related metric categories, furthermore, companies are encouraged to estimate the amount and extent of assets or business activities vulnerable to transition risks and physical risks, respectively, and disclose each in terms of amount or percentage (related information will be provided below in the context of the ISSB Standards). Climate-related opportunities can also be estimated with regards to associated revenue, assets, or other business activities and disclose then in terms of amount or percentage. Disclosure on capital investment related to climate-related risks and opportunities is also recommended since this information could influence long-term corporate value and thus is important for investors, creditors, and other stakeholders. Information about the use of internal carbon prices (carbon prices on each ton of GHG emissions) used for capital investment plans is also recommended. Some investors and stakeholders find such information essential to find out companies' risk and opportunity assessment and risk management, as well as to assess their vulnerability to future policy responses and resilience to transition risks. Finally, the proportion of executive management remuneration linked to climate factors (such as progress related to corporate GHG emissions target) is also recommended. Such renumeration could provide incentives for management to make greater efforts to achieve their targets and improve the governance, oversight, and accountability.

2.4 ISSB Standards on Climate-Related Disclosures

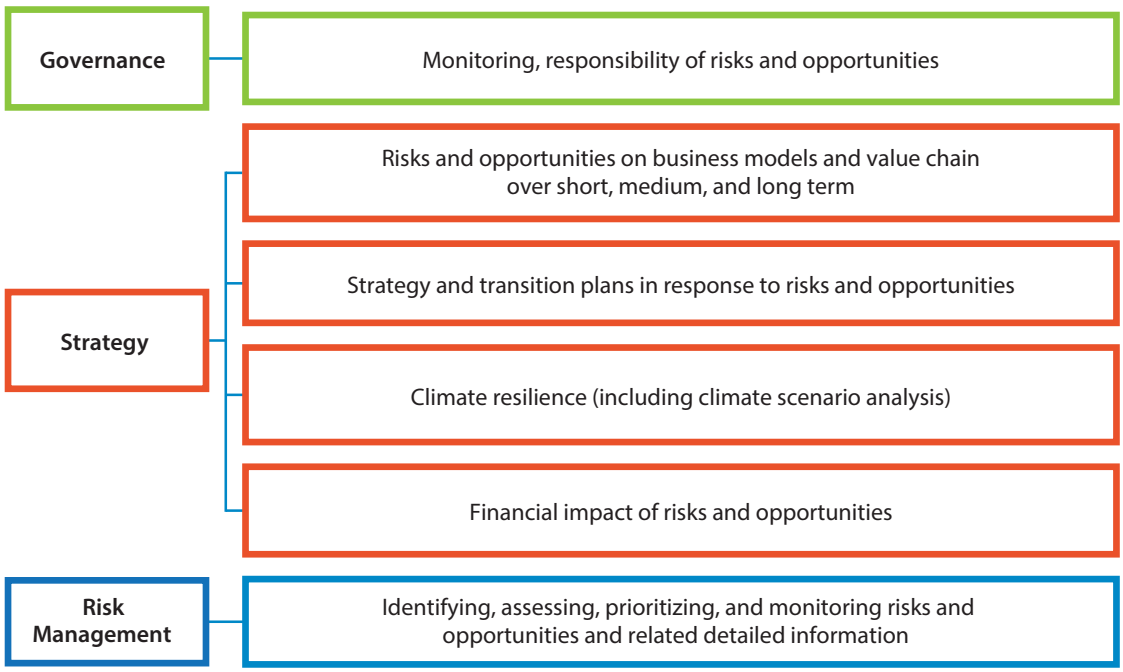
While TCFD recommendations are increasingly accepted by countries and companies, corporate-level disclosure remains inadequate and tends to be cherry-picking. In particular, disclosure of GHG emissions data and their reduction targets remain highly inadequate. Moreover, there are numerous sustainability reporting standards developed by nongovernment organizations, think tanks, and others. As companies freely pick some of those standards and often follow just part of the selected

standards, investors and financial institutions continue to find it difficult to compare the disclosed information across companies, industries, and countries. This has led to a growing call for developing a global standardized corporate disclosure requirement.

Given this background, the ISSB was established by the International Financial Reporting Standards (IFRS) Foundation in November 2021 with strong worldwide support to provide timely, reliable, and comprehensive information on ESG issues. There is a consensus that IFRS Foundation, whose Accounting Standards are already required by more than 140 jurisdictions, is the suitable organization to develop and promote disclosure standards related to climate change and other ESG issues. The ISSB published Sustainability Disclosure Standards, which were decomposed into the General Requirements for Disclosure of Sustainability-related Financial Information (IFRS S1) and Climate-related Disclosure (IFRS S2) in June 2023 after releasing the draft standards 1 year ago and revising them based on feedback derived from public consultation (ISSB 2023a, 2023b). IFRS S1 focuses on the sustainability-related risks and opportunities companies face over the short, medium, and long term, while IFRS S2 focuses on specific climate-related disclosures. Both standards were developed by integrating the TCFD recommendations, the Standards of the Sustainability Accounting Standards Board (SASB), Climate Disclosure Standards Board Framework, Integrated Reporting Framework, and World Economic Forum metrics.

Companies using IFRS disclosure standards will be required to disclose climate-related information from January 2024 (i.e., reporting in 2025) with regard to climate matters of IFRS S1 as well as IFRS S2 for the first year. From the second year, the ISSB requires disclosure of IFRS S1 including sustainability-related risks and opportunities beyond climate-related information. Earlier application is permitted. The adoption of the ISSB Standards by companies is on a voluntary basis, but regulators in each country are expected to make the disclosure mandatory to companies in their jurisdictions possibly with some transition phases. As the objective of developing ISSB Standards is to ensure comparable, reliable, consistent disclosure for investors and stakeholders, disseminating the ISSB Standards to large companies is essential. This would promote confidence of investors and other stakeholders in terms of assessing and monitoring sustainability risks and opportunities of diverse companies with different businesses. Some countries may switch disclosure of climate-related

Figure 6a: ISSB Climate-Related Disclosure: Governance, Strategy, and Risk Management Pillars



Source: Prepared by the author based on ISSB (2023b).

information based on the IFRS 2 rather than that based on the TCFD recommendations.

The ISSB's IFRS S1 and S2 are mainly built on the TCFD recommendations' four pillars (governance, strategy, risk management, and metrics and targets). The overall content of the ISSB Climate Related Disclosure (IFRS S2) is fully compliant with the TCFD recommendations by requiring companies to provide information of climate-related physical and transitional risks and opportunities. Industry-specific disclosures are built on the SASB standards that were revised for international applicability.

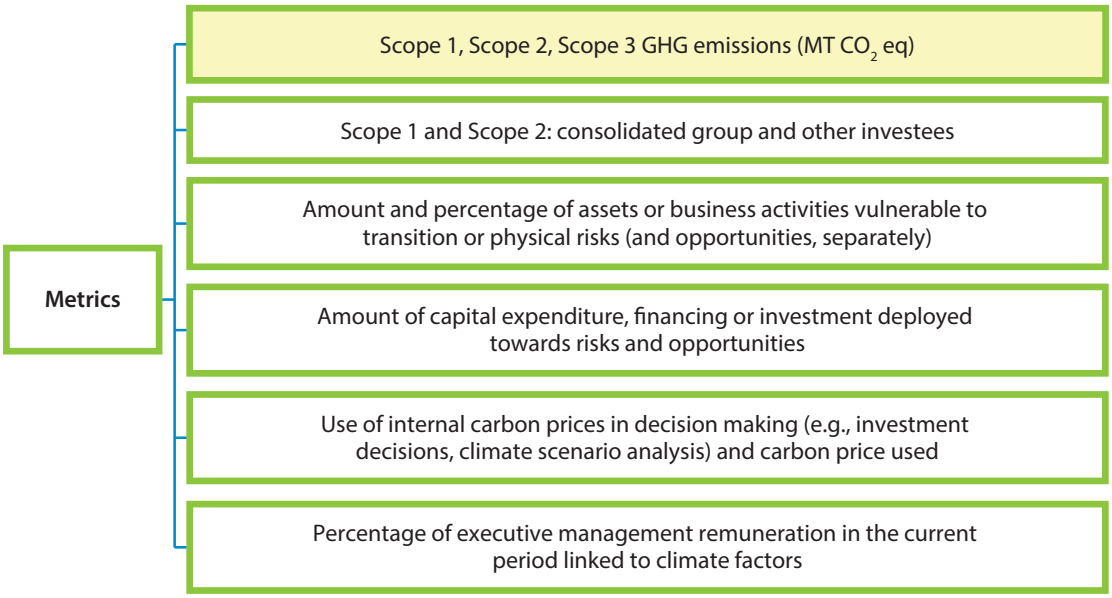
Figure 6a highlights the main elements of the governance, strategy, and risk management pillars. Nonetheless, the ISSB requires disclosure of more detailed and comprehensive information as for the four pillars. On the strategy pillar, the ISSB requires a climate scenario analysis—a long-term analysis to examine the impact of climate changes on corporate financial positions (such as sales, cash flows, and profits) under various climate scenarios as visualized in Figure 2 and Figure 3. But the climate analysis can be conducted in a flexible manner depending on the company's circumstance. Companies with a high degree of exposure to climate risks are able to use a simpler "qualitative" scenario analysis if they are not equipped with skills, capabilities, or resources needed to perform quantitative analysis. Over time, however, such companies are expected to accumulate capabilities and thus are expected to apply a more advanced "quantitative" climate scenario analysis.

One of the features on the IFRS S2 is the scope of detailed information disclosure particularly with regard to the metrics and targets pillar. As for the metrics, the ISSB Standards encourages companies to disclose not only Scope 1 and 2, but also the entire value chain (upstream and downstream, Scope 3) GHG emissions for all companies regardless of whether Scope 3 emissions are material. The disclosure of Scope 3 emissions data can be delayed for 1 year due to the complexity of measuring emissions. Compared to Scope 1 and Scope 2 GHG emissions, companies may more often use estimation based on various inputs in addition to direct measurement of GHG emissions. Companies are required to disclose the measurement approaches, inputs, and assumptions used and prioritize on using verified data.

Moreover, the ISSB placed emphasis on encouraging companies to disclose GHG emissions data using an absolute amount (metric tons of CO_2 equivalent) rather than the intensity indicator (such as GHG emissions divided by output or sales). Thus, companies have to make greater efforts to reduce their emissions across business units within their groups and through more actively engaging with suppliers. This means investors and other stakeholders could get more clear, reliable, consistent information about companies' actual climate change mitigation efforts and progress relative to their emissions targets. Companies are given 1-year relief from disclosing Scope 3 GHG emissions data. The ISSB places GHG emissions data as most important basic information and requires a number of detailed requirements compared to the TCFD recommendations. Companies are required to disclose seven cross-industry metric categories including GHG emissions data. Major points or data requirement with regards to climate-related metrics are highlighted below (Figure 6b):

- Disclosure of Scope 1, Scope 2, and Scope 3 GHG emissions data should be expressed as metric tons of CO_2 equivalent. Information about the measurement approach, inputs, and assumptions used to measure GHG emissions, as well as the reasons for doing so shall be disclosed.
- Disclosure of Scope 1 and Scope 2 GHG emissions data is required by dividing into two groups: the first group is the consolidated accounting group (parent and its consolidated subsidiaries), and the other group covers other investees such as associates, joint ventures, and unconsolidated subsidiaries.
- The amount and percentage of assets or business activities vulnerable to climate-related ***transition risks*** (e.g., volume of real estate collaterals highly exposed to transition risk) shall be disclosed.
- The amount and percentage of assets or business activities vulnerable to climate-related ***physical risks*** (e.g., proportion of property and infrastructure in areas subject to flooding, heat stress or water stress) shall be disclosed.
- The amount and percentage of assets or business activities aligned with climate-related ***opportunities*** (e.g., revenues from products or services supporting the transition to a lower-carbon economy) shall be disclosed.
- The amount of capital expenditure, financing or investment deployed towards climate-related risks and opportunities shall be disclosed.
- Information about internal carbon prices—explaining whether and how applying a carbon price in decision making (such as investment decisions, transfer pricing, and climate scenario analysis) shall be disclosed. The price for each

Figure 6b: ISSB Climate-Related Disclosure with Regards to Metrics



GHG = greenhouse gas, ISSB= International Sustainability Standards Board, MT = million tons.

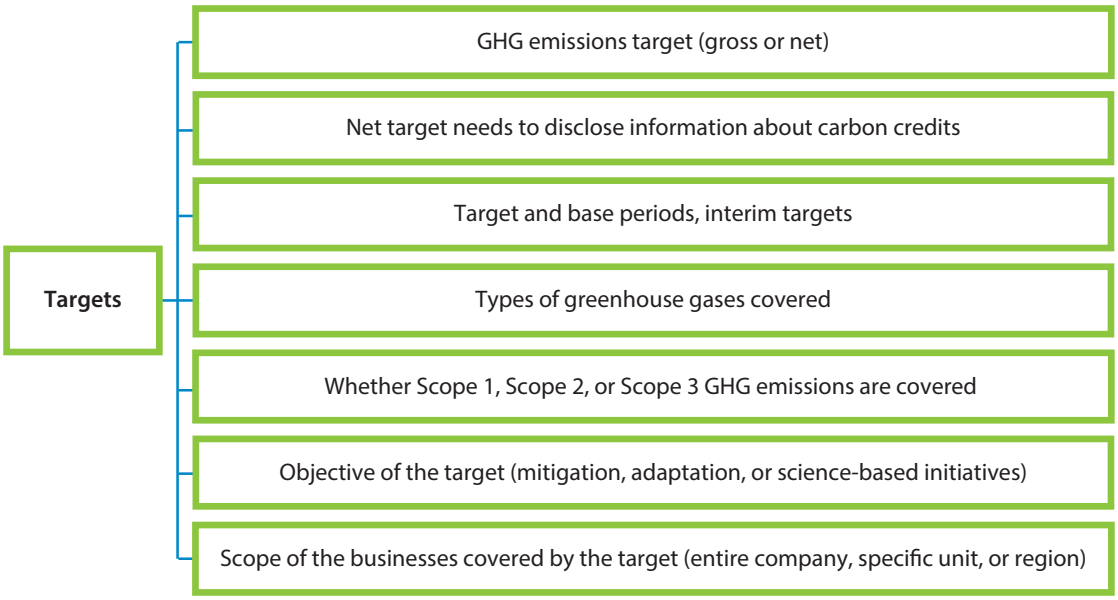
Source: Prepared by the author based on ISSB (2023b).

metric ton of GHG emissions used to assess the costs of its GHG emissions should be specified.

The IFRS 2 concerning climate-related targets involves both the quantitative and qualitative targets used to monitor progress toward achieving goals including GHG emissions targets. Companies using net GHG emissions targets are required to disclose offsetting measures—such as carbon credits, which are transferable or tradeable instruments. This is to clarify a company's own emissions reduction efforts without depending excessively on meeting its GHG emissions targets by purchasing carbon credits from third parties. Companies shall provide information about approaches to setting and reviewing each target and monitoring progress against each target. For example, information on whether the target and the methodology for setting the target has been validated by a third party, how the process of reviewing the target is made, what metrics are used to monitor progress toward reaching the target, and whether revisions to the target was made. Major points related to climate-related targets are summarized below (Figure 6c):

- Need to specify whether GHG emissions targets is gross or net. Gross GHG targets reflect the total changes in GHG emissions planned within the value chain, while net GHG emissions targets are the targeted gross GHG emissions minus any planned offsetting efforts (such as carbon credits).
- In case of using a net GHG emissions target, it is required to disclose a gross GHG emissions target, planned use of carbon credit to achieve a net target, as well as the extent to which carbon credits to achieve net GHG emissions targets. Companies should disclose information such as which third-party schemes will verify the planned use of carbon credits, whether the underlying carbon offset will be nature-based (such as reforestation, afforestation, soil carbon sequestration) or based on technological carbon removals (such as direct air capture; carbon, capture, utilization, storage; bioenergy with carbon capture and storage).
- Need to specify whether the GHG emissions target cover Scope 1, Scope 2, or Scope 3 GHG emissions.
- Need to clarify the types of greenhouse gases covered by the GHG emissions target.
- The objective of the target (for example, mitigation-related target such as GHG emissions, adaptation target, or conformance with science-based initiatives) shall be disclosed.

Figure 6c: ISSB Climate-Related Disclosures with Regards to Targets



GHG = greenhouse gas, ISSB= International Sustainability Standards Board.

Source: Prepared by the author based on ISSB (2023b).

- The scope of the businesses to which the target applies (for example, applicable to the company as a whole or a specific business unit or specific geographical region) shall be disclosed.
- The period over which the target is applied (such as 2030, 2050) and the base period from which progress is measured, as well as interim targets shall be disclosed.
- Description on whether it is an absolute target or an intensity target If the target is quantitative shall be disclosed.
- Reference to how the latest international agreement on climate change (such as the Paris Agreement goals), including how jurisdictional commitments that arise from that agreement (such as NDCs and net-zero targets), have informed the GHG emissions targets shall be disclosed.

The ISSB also developed Industry Based Guidance for IFRS S2 with respect to the consumer goods sector (six subsectors), the extractives and minerals processing sector (eight subsectors), the financial sector (five subsectors), the food and beverage sector (seven subsectors), the health sector (five subsectors), the infrastructure sector (eight subsectors), the renewable resources and alternative resources sector (six subsectors), the resource transformation sector (five subsectors), the services sector (three subsectors), the technology and communications sector (six subsectors), and the transport sector (nine sectors). The guidance is based on the SASB Standards that identify particular environmental, social, and governance issues for companies, but revised by taking into account rules and indicators adopted by international organizations.

GHG emissions for the finance sector including asset management companies, banks, and insurance companies, mainly arise from financed emissions (Scope 3 GHG emissions). They are required to describe how ESG factors are integrated into their financing and asset management decisions. In addition, commercial banks need to describe how ESG factors are reflected in estimating possible financial losses and report significant concentrations of credit exposure to ESG factors including carbon-intensive assets and water-stressed regions. Insurance companies need to provide a wide range of information, for example, including disclosing their approaches to incorporate environmental risks into the underwriting process and physical risk exposure by providing quantitative data (such as the probable maximum loss and total losses attributable to insurance pay-outs). This reflects that the viability of nonlife insurance businesses, which provide insurance

for property, casualty, and liability risks, is increasingly threatened by climate change due to a rising number of insurance claims for property damage and liability issues and resultant insurance payouts. As a result, they find it inevitable to allocate more resources to risk assessment and adjust insurance premiums and coverage.

3. Expected Government Actions to Promote Sustainable Finance and Financial Stability in Asia

Financial supervisors are increasingly aware of physical risks and transition risks as well as financial risks resulting from them. As for physical risks, the increasing frequency and severity of climate change-driven natural hazards and extreme weather are already causing substantial economic and social losses and associated financial losses to communities, companies, and individuals and thus financial institutions in the world. These losses are expected to increase further in the future. Meanwhile, transition risks will take place gradually and they could be amplified if the transition to a low carbon economy occurs in a disorderly manner—such as the case of disorderly scenarios (delayed 2°C scenario and divergent net-zero scenario) highlighted in Figure 6c. Physical and transition risks could destabilize the financial sector and financial systems through a sudden rise in risk premia and an abrupt decline in assets prices, thus generating significant downward pressures on corporate activities and economic growth. Climate-related financial risks might become systemic across sectors and borders. Thus, coping with these risks could enhance financial stability. Increasing awareness of climate-related financial risks also helps foster sustainable finance and thus improve financial allocation to low carbon or decarbonization projects and activities. So far, low carbonization and decarbonization efforts concentrate in high-income countries and high emissions in large emerging economies such as the People's Republic of China. The focus should also be paid to other EMDEs that also require a shift to low-carbon alternatives while sustaining economic growth. Especially, Asia needs greater attention due to rising physical and transition risks and their heavy dependence on fossil fuels.

3.1 Understanding Climate-Related Financial Risks

There is an increasingly shared understanding that climate risks should be treated as financial risks that have the potential to undermine the soundness of financial institutions and pose risks to overall financial stability. However, there are differences between traditional financial risk and climate-related financial risk. The impacts of climate risks on financial stability can be intricate, extensive, and profound with a higher level of uncertainty, including tail risk. The duration of the risks may span long-term horizons. Climate change has the capacity to generate substantial risks affecting specific activities and the financial performance of countries, regions, companies, and individuals. Moreover, there is the possibility that such risks may manifest intensely and simultaneously across multiple countries and regions, posing challenges in providing timely and necessary relief measures and support.

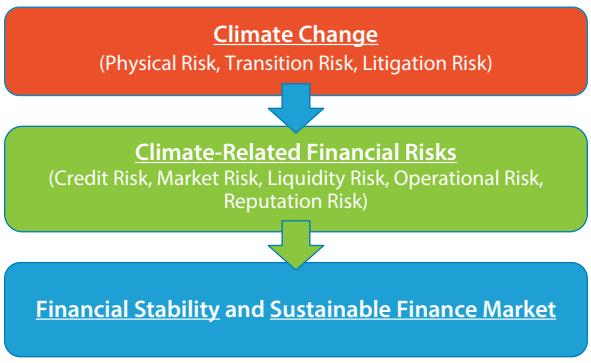
Climate-related financial risks are generally decomposed into five types of risks—credit risk, market risk, liquidity risk, operational risk, and reputation risk (BCBS 2022). These financial risks could lead to losses of financial institutions, undermining financial stability (Figure 7).

- **Credit risk** refers to the potential financial losses arising from bank loans and bond finance when a counterparty borrower fails to repay their debt in a timely manner due to the adverse impacts of climate change. Climate-induced defaults resulting from severe floods and rising sea levels are already happening worldwide. Some low-income developing countries are grappling with debt crisis triggered by climate change (so-called "climate debt trap"). When a bank experiences significant loan losses, it not only encounters challenges in extending new credit to other companies and individuals but also faces bank runs. Similarly, an insurance company confronted with large financial losses from its financing activities may struggle to meet increasing insurance claims and face insolvency problems.
- **Market risk** is related to the risk of facing a decline in the market value of financial assets including bonds, stocks, derivatives, and real estate, due to the adverse impacts of climate change. Assets associated with carbon-intensive companies and projects are more susceptible to decline compared to those related to low-carbon companies and projects. Currently, many of these financial assets do not adequately account for climate factors in their market prices. This is partly due to insufficient climate actions taken by governments, such as inadequate carbon pricing mechanisms aimed

at altering the relative costs between carbon-intensive and low-carbon energy sources. If climate policy actions are implemented in a disorderly manner, it could lead to sudden shifts in market prices and significant financial losses for investors and financial institutions.

- **Liquidity risk** refers to the potential inability of a financial institution to swiftly acquire the necessary cash to meet its immediate payment obligations such as rapid withdrawals of deposits by selling assets. The presence of liquid markets facilitates smooth cash generation through market transactions, with numerous buyers and sellers readily available. For instance, the period between March and May 2023 witnessed the failure of Silicon Valley Bank, Signature Bank, and First Republic Bank in the United States due to liquidity risk. These banks encountered challenges in obtaining cash due to capital losses resulting from the sale of treasury securities and other bonds—whose values were rapidly dropping as the United States Federal Reserve increased the federal funds rate drastically in a short period—in the face of rapid withdrawals of bank deposits. Financial institutions may face similar liquidity risks associated with climate risks, leading to bank runs, when assets such as bank loans extend to carbon-intensive companies This kind of liquidity risk could happen to financial institutions when their assets such as bank loans or bond finance toward emissions-intensive companies, which are currently liquid, suddenly turn into illiquid assets as market sentiments change. Such banks may face bank runs.
- **Operational risk** is associated with climate-related legal and regulatory compliance risks. This type of risk arises from the potential losses incurred by failing to meet climate-related regulatory and legal obligations. Examples of such obligations include automotive emissions controls, energy efficiency regulations, nature preservation requirements, and data disclosure mandates. Additionally, operational risk can also happen as extreme weather events cause damage to factory and office operations, further exacerbating potential losses.
- **Reputational risk** is important for financial institutions since their business is based on trust from clients. Their reputation can deteriorate if financial institutions face many litigation cases and penalty payments, and negative media coverage increases. Under such conditions, a change in market, client, or consumer sentiment may lead to a loss of clients and businesses. Civil society is increasingly monitoring financial institutions' activities with regards to financing fossil fuel related sectors and disclose their analysis. Legal actions can arise when engagement with such companies do not know marked improvement.

Figure 7: Climate-Related Financial Risks, Sustainable Finance, and Financial Stability



Source: Prepared by the author.

The World Business Council for Sustainable Development, a global organization comprising global chief executive officers of more than 200 leading companies, pointed out that the number of lawsuits has been rising sharply against companies on ESG issues over the past decade (WBSCD 2023). Litigation is increasing against companies as a result of activities of their subsidiaries or suppliers. More importantly, litigation takes place with reference to regulations such as the French Duty of Vigilance Law (Due Diligence Law) adopted in 2017, but also with regards to soft laws or principles including biodiversity conventions, the Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises, etc.

3.2 *FSB's Roadmap for Addressing Climate-Related Financial Risks*

The Financial Stability Board (FSB) recognizes the need to prioritize climate-related financial risks to safeguard the stability of financial institutions and the overall financial system. In response to the request from the G20 Financial Ministers and Central Bank Governors, the FSB published a comprehensive roadmap in July 2021. This roadmap focuses on coordinating international supervisory and

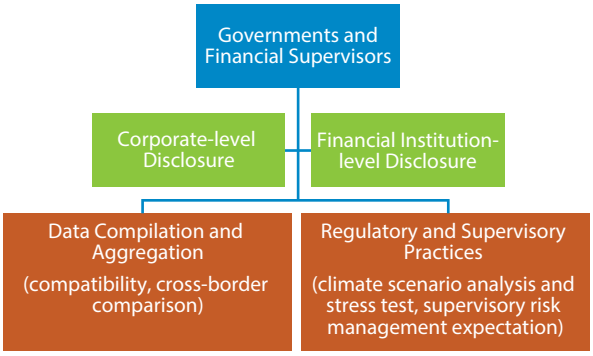
regulatory efforts pertaining to climate-related financial risks, which have a global impact (FSB 2021b). The roadmap consists of four priority areas: (i) firm-level disclosure, (ii) data compilation and aggregation, (iii) financial vulnerability analysis, and (iv) regulatory and supervisory practices and tools. Each priority area outlines detailed steps that will be implemented by global initiatives and financial supervisors in each jurisdiction, in consultation with organizations such as the Basel Committee on Banking Supervision, the Network of Central Banks and Supervisors for Greening the Financial System (NGFS), the International Organization of Securities Commissions, and other international standard setters (FSB 2021b, 2022a).

- **Firm-level disclosure**, which has already been discussed in detail in the previous section, will also be further elaborated on below. Financial institutions can enhance the reliability of their emissions data from financing activities once they have access to GHG emissions data from their corporate counterparties. This availability will be facilitated by international disclosure standards led by the ISSB based on the TCFD recommendations, the revised SASB Standards, and other relevant disclosure frameworks. Firm-level disclosure serves as the foundation for the other three priority areas, including data compilation and aggregation.
- **Data compilation and aggregation** involve the development of comprehensive, consistent, and comparable data to assess and monitor climate-related financial risks faced by companies, financial institutions, and the overall financial system, with the ultimate goal of ensuring financial stability. International coordination is crucial to enhance data availability for cross-border comparability. In particular, it is important to collect and compile data that reflect the degree, scale, and concentration of a financial institution's exposure to climate risks, as these factors can have implications for financial stability. Such data should encompass both physical risks and transition risks, enable the aggregation of a financial institution's climate risk exposure, allow for cross-country comparisons, and facilitate forward-looking assessments of climate risks to financial stability. The FSB has identified significant data gaps concerning the availability and consistency of data on the underlying drivers of climate-related risks. Additionally, there is a need to improve the quality and consistency of data on financial institutions' exposure to climate-related risks arising from their relationships with corporate counterparties. Furthermore, it is essential to develop forward-looking metrics on climate risks at the individual firm level and for the financial system as a whole (FSB 2021a).
- **Financial vulnerability analysis** involves the development and refinement of analytical tools used to assess and monitor climate-related vulnerabilities. This includes utilizing available monitoring tools, establishing conceptual frameworks, and conducting climate scenario analysis.
- **Regulatory and supervisory practices and tools**, closely linked to vulnerability analysis, have been formulated by international bodies, encompassing supervisory risk management expectations and guidance for the banking, insurance, and asset management sectors (FSB 2022b). As a result of these advancements, several financial supervisors have already begun incorporating climate-related financial risks into their overall supervisory frameworks. This entails further enhancing and applying climate scenario analysis within stress testing exercises, which have implications for capital adequacy. Given the shared focus on developing and utilizing climate scenario analysis, this article views that financial vulnerability analysis and regulatory and supervisory practices and tools can be integrated into a cohesive framework. While the consideration of microprudential and macroprudential approaches is beyond the scope of this article, it is worth exploring their potential integration as well (Shirai 2023a).

3.3 Processes Leading to Risk Management to Ensure Financial Stability

This policy brief presents a perspective that the FSB roadmap can be reorganized in terms of highlighting the step-by-step processes that would contribute to monitoring and assessing climate-related financial risks, thereby ensuring financial stability through supervisory and regulatory frameworks (Figure 8). The initial crucial step involves promoting corporate-level disclosure aligned with the TCFD recommendations and the IFRS Sustainability Standards on Climate-Related Disclosures (ISSB S2). This enables financial institutions to access more reliable data on financed emissions and enhance their internal risk management practices. As a next step, the availability of comparable and consistent data facilitates

Figure 8: Process Leading to Climate-Related Financial Risk Management



Source: Prepared by the author based on FSB (2021a, 2022a).

the compilation of aggregate information across sectors, countries, and regions. The deeper understanding of the vulnerability of the financial system to climate risks can be further enhanced through the implementation of climate scenario analysis.

Meanwhile, as companies and financial institutions improve their disclosure practices, a subsequent stage can be initiated where major financial institutions under the initiatives of central banks and financial supervisors, conduct climate scenario analysis using corporate-level data and estimations. Notably, the NGFS has developed several long-term climate scenarios, which can be applied to financial institutions from a supervisory standpoint (Figure 3). These scenarios are increasingly utilized by financial supervisors and central banks in the world to conduct climate scenario analysis for major banks and insurance companies within their jurisdictions. Furthermore, companies can also employ these scenarios in their scenario analysis, aligning with the strategy pillar of the TCFD recommendations and the ISSB Standards. Over time, these scenarios have been refined and updated with the availability of additional data and the development of advanced modeling and analytical methodologies.

Despite the inherent uncertainty surrounding the realization of physical and transition risks, it remains worthwhile for governments and financial supervisors to encourage companies and financial institutions to conduct climate analysis. This fosters a better understanding of climate-related risks and opportunities and facilitates the formulation of more effective transition strategies toward achieving net-zero emissions by around 2050. Moreover, such analysis provides valuable insights into the resilience of the macro-level or financial system-wide framework against climate risks. Climate scenario analysis enhances the awareness of climate-related financial risks among financial institutions and supports their risk management practices, while also facilitating the adoption of climate-related financial supervisory approaches. The accumulation of experiences, coupled with data compilation and aggregation efforts, can stimulate discussions on the implications of climate change for capital adequacy requirements and other measures within the Basel framework—a set of global standards for the prudential regulation of banks set under the Basel Committee on Banking Supervision (BCBS).

3.4 Corporate Disclosure as a Basis for Addressing Climate-Related Financial Risks

Based on the aforementioned arguments, countries and their regulators should establish firm-level disclosure as the foundation for advancing data compilation and aggregation, as well as regulatory and supervisory practices and tools. Regulators need to expedite the dissemination of disclosure requirements to companies and financial institutions, implementing transition periods in a phased approach. Figure 9 provides a visual representation of the process for promoting firm-level climate-related disclosure. These steps will be crucial for facilitating data compilation and aggregation, as well as regulatory and supervisory approaches.

Aa a first step, countries that have not yet initiated climate-related disclosure for companies and financial institutions within their jurisdiction should publicly endorse the TCFD recommendations and the IFRS Sustainability Disclosure Standards (IFRS S2). They can first encourage companies and financial institutions to voluntarily disclose information in line with the TCFD recommendations first, following a principle-based approach and reporting on a "comply or explain" basis. As companies become more familiar with disclosure and reporting practices, the possibility of making TCFD-based disclosure and reporting mandatory can be explored. Since IFRS S2 requires more comprehensive and detailed disclosure, initial efforts of promoting corporate disclosure can be targeted toward larger listed companies that are already familiar with the TCFD recommendations. Once the familiarity with the recommendations is enhanced, countries can consider aligning climate disclosure with IFRS S2, gradually transitioning from the TCFD recommendations. For

countries that have already been encouraging larger listed companies and financial institutions to disclose based on the TCFD recommendations, expediting the process of aligning climate disclosure with the IFRS standards can be prioritized.

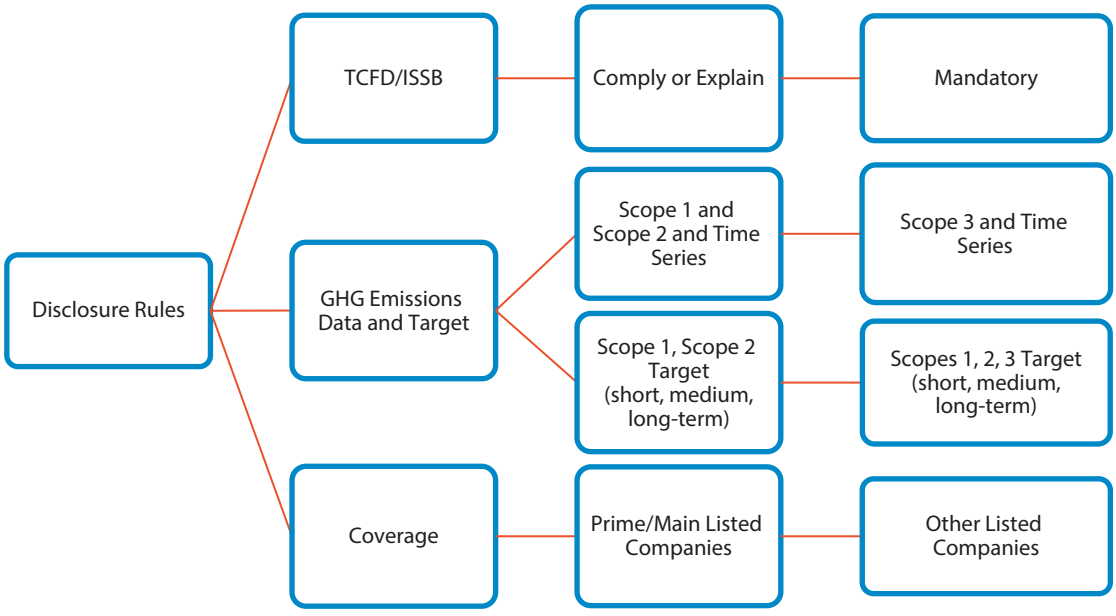
As a next or second step, the disclosure of climate-related data and targets could be implemented in a phased approach. If most of the companies in their jurisdictions are unfamiliar with TCFD-based disclosure practices, regulators should encourage companies to disclose GHG emissions data for Scope 1 and Scope 2 categories first. Subsequently, regulators can progress to disclose Scope 3 GHG emissions data with clear timelines. For companies, learning about calculating and estimating Scope 3 GHG emissions data using internal and external sources may require some time. The quality of such data is also likely to improve over time as collective efforts across sectors and companies globally accelerate. Thus, Scope 3 emissions data are likely to be revised compared with Scope 1 and Scope 2 categories. These data should be mandatory with some relief periods for Scope 3 GHG emissions data.

Moreover, companies should be encouraged to set GHG emissions targets for medium-term (e.g., 2030) and long-term (e.g., achieving net-zero emissions by 2050) time spans using Scope 1 and Scope 2 categories. Companies should also be encouraged to establish short-term GHG emissions targets (e.g., for the next 1–5 years) that align with their medium- and long-term targets and should be integrated into the existing corporate medium-term managerial planning. Setting targets for emissions should be mandatory. While setting Scope 3 emissions target is desirable, the coverage and methodologies could be revised overtime given the challenged related to Scope 3 emissions data. Making Scope 3 emissions target could be discussed by each regulator considering industry- and country-specific conditions.

Currently, many countries official endorse TCFD-based guidelines without requiring the disclosure of GHG emissions data and targets. Countries should mandate all four pillars of the disclosure framework with clear disclosure requirements on transition plans and climate scenario analysis (both in the strategy pillar) and metrics and targets pillar with some timelines. Detailed issues related to the strategic pillar with emphasis on climate transition plans and climate scenario analysis is discussed in Shirai (2023b).

As for a phased-in approach, regulators may apply the TCFD recommendations and ISSB climate-related standards (IFRS S2) in an initial stage mainly to large

Figure 9: Corporate Climate-Related Disclosure Rules



GHG = greenhouse gas, ISSB = International Sustainability Standards Board, TCFD = Task Force on Climate-related Financial Disclosure.

Source: Prepared by the author.

companies listed in the prime or main segment of the stock exchange in their jurisdictions (ISSB 2023d). Subsequently, these requirements can be extended to companies listed in other segments of the stock exchange (such as standard or growth segments) and some larger unlisted companies, allowing for longer adjustment periods and setting specific timelines. The coverage of disclosure requirements could be more flexibly treated for other segments of the stock exchange. In later stages, consideration can be given to applying these disclosure standards to unlisted companies, with potential adjustments in the disclosure requirements to strike a balance between the benefits and burdens associated with disclosure for these entities. Some companies regardless of their size or listing may voluntarily disclose information in line with ISSB standards in the face of growing demand from global clients and stakeholders.

4. Conclusions

There is no question that governments should bear the primary responsibility for implementing more ambitious climate policies to drive the transformation of industries and businesses toward greater environmental sustainability and achieving a low-carbon economy. At the same time, countries should ensure the availability of financial resources from both domestic and foreign public and private sources to support investments in clean energy, low-carbon technologies, and decarbonization efforts. This policy brief emphasizes the significance of reliable, comparable, and consistent corporate climate-related data disclosure and reporting as a foundation for evaluating and monitoring climate-related financial risks. This, in turn, can contribute to safeguarding long-term financial stability by raising awareness of climate-related financial risks among financial institutions and fostering the growth of sustainable finance resulting from increased trust from investors and financial institutions. To expedite this process, it is crucial for Asian governments to encourage companies to disclose accurate GHG emissions data, targets, and other climate-related information in alignment with the TCFD recommendations and the ISSB Standards.

Asian governments need to take these actions urgently. Meanwhile, they need to be aware that broader regulatory and supervisory measures should be considered as a next step in view to promoting sustainable finance and financial stability. These include promoting the integration of climate factors into portfolio asset management by institutional investors, implementing interoperable taxonomies or classifications, addressing greenwashing practices, and regulating ESG assessment companies and auditors. This policy brief primarily focuses on corporate climate-related disclosure starting with GHG emissions as the initial step to enable investors and financial institutions to assess investment risks and returns and enhance climate-related supervisory and regulatory frameworks more accurately. In particular, the Asian region critically needs to share a sense of urgency in promoting standardized corporate climate-related disclosure due to the high degree of vulnerability to climate risks, large infrastructure and clean energy investment needs, and inadequate green finance to support ambitious low-carbon growth goals.

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