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Introduction:

It has been increasingly recognised that climate change will have a significant impact on business including the finance sector. Climate risks include devaluing of investments and assets due to regulation change in the transition to a decarbonised society, as well as physical loss and damage caused by extreme weather events like natural disasters. This will have significant impact on financial aspects including company balance sheets and profit & loss, as well as on financial institutions and the investors financing them. If this kind of situation occurs on a huge scale and in a short period of time, the entire global financial system will be in danger.

On the other hand, these climate risks will encourage companies to introduce or create new technologies, services or business models aligned with emerging needs of societies making a transition to decarbonised and more resilient ones, in order to avoid or minimise the negative impacts of those risks.

Therefore, making medium and long-term business strategy and plans to shift investment in the direction of decarbonisation and resilience should be a key point for companies to manage climate risks and enhance business opportunities more effectively.

In order to make this happen, policy tools and an enabling environment including financial incentives should also be put in place, in addition to efforts by businesses themselves. For example, at the G20 summit in China last year, focus was put on green finance to scale up environment-friendly projects including climate mitigation and adaptation toward sustainable development, and the Communique adopted recommendations on green finance. This kind of policy recommendation could be a clear signal to the business and finance sectors, encouraging them to act in response to climate risks and opportunities.

This discussion paper aims to identify critical factors to encourage the business and finance sectors to act on transitioning to investments for decarbonised and resilient society by recognising the climate risks and opportunities. Chapter 1 defines climate risks and opportunities for the business and finance

sectors, referring mainly to recommendations from the Task Force on Climate related Financial Disclosure (TCFD) under the Financial Stability Board of G20. Chapter 2 identifies some tangible options that business and finance should take to manage climate risks and opportunities. Chapter 3 discusses how green finance can encourage such actions and what are the challenges and how they should be addressed. Finally, Chapter 4 addresses some of critical policy tools and enabling environment for business and finance sector to implement their climate actions toward a decarbonised and more resilient society.

1. What are climate risks and opportunities?

TCFD (2016b) has recognised climate-related risks and opportunities as useful information for decisions by investors, lenders and insurance underwriters.

First of all, climate risks are divided into two broad categories: **1) transition risks**, and **2) physical risks**. Transition risks are related to transition to a lower-carbon economy toward the 1.5° and 2° Celsius scenarios in the context of climate change mitigation (i.e. a reduction in GHG emissions). There are five main kinds of transition risks:

- **Policy risk:** policy actions for promoting climate change efforts;
- **Litigation or legal risk:** failure of companies to mitigate climate change impacts, failure to adapt to climate change, and insufficiency of the financial disclosure;
- **Technology risk:** technological failure of improvements or innovations to support low-carbon transitions;
- **Market risk:** shifts in supply and demand for certain commodities, products, and services as climate risks; and
- **Reputation risk:** changes in customer perception to favour lower-carbon goods and services.

On the other hand, physical risks are more relevant to the increasing damage caused by climate events due to changes in their frequency, intensity and duration as a consequence of global warming, in the context of climate change adaptation (i.e. the necessity for enhanced resilience to climate events) (Seneviratne et al., 2012). The physical risks are divided into acute risk and chronic risk:

- **Acute risk:** damage caused by extreme weather events, such as cyclones, hurricanes and floods; and
- **Chronic risk:** damage caused by slow onset events, such as sea level rise, increasing temperatures, ocean acidification and salinisation.

Second, climate-related business opportunities can be also seen by addressing climate risks. There are five broad types of climate-related opportunities, depending on business industry, market and region:

- **Resource efficiency:** reduction of operating costs by improving specific energy efficiency across production, distribution, buildings, machinery and transportation;

- **Energy source:** potential savings on annual energy costs using low CO₂ emission energy sources, such as wind, solar, wave, tidal, hydro, geothermal, nuclear, biofuels, and carbon capture and storage;
- **Products and services:** Innovation and development of new low CO₂ emission products and services by shifting consumer and producer preferences that place emphasis on carbon footprint and reduction of CO₂ emissions;
- **Markets:** Emergence of new markets for lower-carbon with multi-stakeholder involvements (e.g., governments, development banks, entrepreneurs, community groups, etc.) and with financial mechanisms such as green bonds and infrastructure; and
- **Resilience:** Capacity building for adaptation and improvement of contingency planning against climate risks, such as cultivar adaptation and efficient water management in the agriculture sector, as well as the development of risk insurance for new risk assets and locations in the insurance sector.

2. How to respond to climate risks and opportunities?

While non-financial companies (such as those in the energy, real-estate and agriculture sectors) can be directly exposed to climate risks and opportunities, financial companies (such as asset owners, asset managers, banks, insurance companies) are more likely to be indirectly exposed to these risks and opportunities through their investment and lending operations (TCFD, 2016a).

For example, fossil fuel producers can directly suffer climate-related transition risks because their assets of coal, oil or gas may be impaired or converted to liabilities (stranded assets) if regulations on GHG emissions are strengthened. Furthermore, agricultural or food companies could directly suffer climate-related physical risks that may reduce their revenues if increasingly severe cyclones and floods cause reduced output and sales. International companies with global supply chains may suffer direct physical impacts, such as shutdowns, supply chain interruptions, and workforce health and safety issues due to increasing climatic disasters. Concerns about these transition and physical risks can undermine the credibility and stock prices of companies. As a result, financial companies which invest securities of or provide loans to companies with direct exposure to climate risks could be indirectly affected by climate risks via their equity and credit holdings.

Therefore, non-financial companies should enhance climate risk awareness and understanding of the potential climate impacts on their businesses, carry out risk management and disclosure for climate risks, as well as exploring climate-related business opportunities. On the other hand, financial companies should strengthen compliance with fiducial duties to their investors and enhance engagements in management and disclosure of climate risks and opportunities within the companies they invest and lend to. They also should improve the understanding of the potential climate impacts

on their portfolio mix and consider their clients' vulnerabilities, while assessing them, and adequately disclose them.

One of the TCFD's key recommendations stresses the disclosure of potential impacts of climate-related risks and opportunities on an organisation's businesses, strategies, and financial planning under different potential future scenarios, including a 2°Celsius scenario. If this is the case, the forward-looking analysis on the potential financial implications of climate change may be required by both non-financial and financial companies.

3. How could green finance encourage climate actions?

In order for companies to implement a climate strategy and plan, one of the critical factors is finance. Green finance is considered a useful modality to encourage companies to shift from recognition to action responding to climate change risks and opportunities.

(1) Green finance and climate business opportunities

Green finance can be understood as the financing of investments that provide benefits in the broader context of environmentally sustainable development. These benefits include reduction in air, water, and soil pollution, improved natural environment and biodiversity, and mitigation of and adaptation to climate change.

Green finance may provide growth in green industries, technical innovations, and create financial business such as green bonds, green funds, or exchange traded funds. It may also alter the way in which environmental factors impact on financial institutions, because inadequate recognition of financial risks from environmental factors may pose a challenge to the soundness and safety of financial institutions.

Adjustment to climate change creates a demand for new and different products and services. That will require investment in reducing greenhouse gas emissions including renewable energies, energy efficiency, low-carbon cities, and climate-smart agriculture, as well as measures to enhance the resilience of infrastructure, water-intensive industries, improved irrigation systems, more sustainable land management and disaster risk reduction. Green finance could cover these investments by companies.

According to an IFC survey in 2016, over 60% of 135 emerging market financial institutions responding to the survey are already active in financing these climate-related and green projects (IFC, 2016). In addition, another 9% of banks expressed interest in pursuing investment opportunities in this space.

From the viewpoint of a financial tool for green finance, for example, since 2007/08 a market has emerged for bonds specially designated as green bonds. A green bond is differentiated from regular

bonds by its commitment to use the funds raised to finance green projects, assets or business activities. With growing market appetite for such bonds, annual issuance of green bonds rose from USD 3 billion in 2011 to USD 81 billion in 2016, and it will reach USD 150 billion in 2017, according to Climate Bonds Initiative (CBI, 2017). The Climate Bonds Initiative also identifies sectoral distribution of green bonds in 2016 as follows; (1) Energy 38%, (2) Building and Industry 18%, (3) Transport 16%, (4) Water 14%, (5) Adaptation 6%, and others. It implies that the sectors green bond could cover major climate mitigation and adaptation projects. Therefore, information on climate opportunities by companies will be useful information for green bond issuers to bundle various climate related projects.

(2) Challenges and key options to scale up green finance

At G20 last year in China, the Communiqué acknowledged the need to scale up green finance and welcomes a new report from the G20 Green Finance Study Group (GFSG), co-chaired by China and the UK, which set out a series of policy recommendations designated to boost the flow of green finance.

According to the GFSG report, while green finance has made some progress globally, only a small fraction of bank lending is classified as green. Less than 1% of global bonds are labelled green, and less than 1% of the holdings of global institutional investors are green infrastructure assets.

The Communiqué addresses major challenges largely unique to green finance. They include difficulties in internalising environmental externalities, environmental information asymmetry between investors and recipients, inadequate analytical capacity, and a lack of clarity on the definition of green financing.

In order to overcome these challenges, seven voluntary options are suggested by the Communiqué. They are: (1) to provide clear strategic policy signals and frameworks; (2) to promote voluntary principles for green finance; (3) to expand learning networks for capacity building; (4) to support the development of local green bond markets; (5) to facilitate cross-border investment in green bonds; (6) to encourage knowledge-sharing on environmental and financial risks; and (7) to improve the measurement of green finance activities and their impacts.

(3) Required policy and investment environment enhancing green finance

Although there is no shortage of capital available for green finance, investment barriers, market failure and policy misalignments prevent many investments from being undertaken. The following points are considered required for a policy and investment environment that enhances green finance, taking the example of the energy sector.

- 1) Setting stronger and coherent domestic policies including renewable energy and energy efficiency targets, investment incentives such as feed-in tariffs or tax incentives, and phasing-down of support measures for the consumption and production of fossil fuels.

- 2) Strengthening the broader investment environment including investment policies, competitive policies, financial markets, trade and public governance. In the power sector for instance, it is important to consider the direct influence of the ownership of power generation and utilities, regulation of the power grid and influence on incumbent competitions.
- 3) Deploying de-risking and transaction-enabling interventions that catalyse project-level investment including credit guaranteed, warehousing function to pool small transactions, capacity building, project preparation and matchmaking with investors.

In China, for example, the state council approved the “Guideline for Establishing the Green Financial System” in September 2016. This guideline includes a series of policy incentives to support green investment, such as a green guarantee programme, interest subsidies, and the launch of a national green development fund.

4. What policy tools and enabling environment should be in place?

In addition to finance, other policy tools and enabling environment to encourage business and finance sector to implement climate actions are considered necessary. These include not only policies and a regulatory framework but also proactive communication and collaboration among various stakeholders inside and outside business.

(1) Carbon pricing

Carbon pricing is a cost applied to carbon pollution to encourage polluters to reduce the amount of greenhouse gas emissions and is the single most effective way to reduce emissions. The costs and risks on future generations who will suffer the consequences of climate change should be internalised in the market price.

To serve this purpose, the carbon price set by a tax or a cap-and-trade scheme must be sufficiently high to encourage polluters to change behaviour and reduce pollution including greenhouse gas emissions in accordance with national targets. At the same time, it is necessary to minimize the negative impacts on vulnerable social groups due to introduction of carbon price through proper measures including reallocation of carbon tax or carbon credit.

Leading businesses already recognise this, and have disclosed that they support carbon pricing policies and are building a carbon price into their business operations and investment decisions as a way to prepare for a low-carbon economy. They are, for example, agreeing to align with the UN Global Compact Business Leadership Criteria on Carbon Pricing, in which they are 1) setting an internal carbon price, 2) publicly advocating the importance of carbon pricing through policy mechanisms, and 3)

communicating on progress over time in public corporate reports (United Nations Global Compact, 2014).

For example, according to CDP (former Carbon Disclosure Project), 1,249 companies disclosed their practice of pricing carbon emissions, or their plans to soon do so (CDP, 2016). This represents a 23% increase from 2015. Out of these, 147 companies are taking this approach further, by embedding a carbon price deeper within business strategies and operations. They have identified it as a mechanism that can help systematically achieve emissions reductions and related targets.

(2) Climate related information disclosure

The Task Force on Climate related Financial Disclosure (TCFD) is transforming the landscape for corporate non-financial reporting. The TCFD recommendation lays out a number of climate risks and opportunities that can affect an organisation's revenues and expenditures, and possibly estimates of future cash flows, as well as its assets and liabilities through scenario analysis.

More disclosure will allow investors to make better informed decisions on where and how they will allocate their capital. Stakeholders across the financial value chain will be in a better position to evaluate climate-related risks and exposures. This would also enhance the ability of companies in assessing and managing those risks and opportunities so they can control them more effectively.

Therefore, adoption of the TCFD recommendation will help ensure that climate-related financial issues are routinely considered in business and investment decisions, and this will encourage an effective dialogue between companies and banks, insurers and investors. It is expected that disclosure will help investors understand if they need to engage with companies to assist them on the pathway to the well-below 2 degree C goal, as well as shift investment away from risky stocks, or increase investment in companies developing decarbonising business models.

One of the challenges is how this voluntary recommendation could be implemented effectively without a regulatory framework or legal enforceability. Additionally, the needs of multinationals for consistent adoption of the recommendation across jurisdictions should be met. At the same time, if companies can see the benefits of disclosing, disclosure rates would rise, and opposition to mandatory disclosure requirements could be reduced.

Encouraging news is that France has introduced mandatory climate-related reporting by investors under Article 173 of France's law on energy transition for green growth effectuated since January 2017. Investors are required to report not only on how investors integrate environmental, social and governance (ESG) factors into their investment policies, but also specifically on how climate change considerations are incorporated.

(3) Proactive dialogue or engagement

For investors, it is critical to deliver better and long-term investment performance to clients. At the same time, they have been recognising that they have a duty to act as responsible owners of the companies in which they have invested and the assets that they manage should be to the advantage of the society as a whole.

Many investors start to believe that companies with strong governance and astute management of their environmental and social risks and opportunities not only make a more positive contribution than those that do not, but also provide greater long-term value and reduced risk for shareholders.

Therefore, effective and constructive dialogue or engagement with boards and management by investors should contribute to better management of companies and their long-term success. This in turn should lead to wider benefits to society and for investors' clients. In this context, climate risks and opportunities should be addressed as one of the critical topics in ESG dialogue or engagement between investors and companies in which they have invested.

Some investors recognise the benefits of working with like-minded peers to advocate for change at particular companies as well as broader market value. Where there are shared objectives in the promotion of long-term sustainable value including response to climate change, investors work collectively with other like-minded investors.

However, we should keep in mind that engagement activities between investors and companies on ESG in Japan, for example, are not so common and are limited among leading investors and companies. Some of the reasons may be due to issues such as lack of knowledge and capacities on quantitative analysis on ESG, miscommunication between the ESG department and Investors relations department in one company, and so forth.

(4) Learning network on climate-related financial risk analysis

As described in chapter 3, the Communiqué of last year's G20 recommends key options for scaling up green finance, and one of them is to encourage knowledge-sharing on environmental and financial risks. GFSG report describes "... key challenges include the lack of capacity, complexity and the absence of adequate data... Collaboration among financial, environmental and policy specialists as well as international knowledge sharing may be required for developing and improving environmental risk methodologies."

Regarding climate-related financial risks, the TCFD recommendation identifies the most difficulties in data quality and financial impact. Those include: (1) gaps in emissions measurement methodologies and product lifecycle emissions methodologies; (2) lack of robust and cost effective tools to quantify the potential impact of climate related risks and opportunities; (3) variability of climate-related impacts

across and within different sectors and markets; and (4) the high degree of uncertainty around the timing and magnitude of climate-related risks.

Some good news is that the Investor Group on Climate Change (IGCC- Australia/New Zealand) and Asia Investor Group on Climate Change (AIGCC-Asia) developed a tool called “Transparency in Transition: A Guide to Investor Disclosure on Climate Change” in April 2017, which is aligned with the draft recommendation by TCFD. The guide sets out a practical framework for implementing and improving investor disclosure, organised around core principles, an effective narrative and the selection of appropriate metrics.

In the process of developing, improving and learning these methodologies and tools on climate-related financial risk analysis, it is expected that a network will be established through mutual learning among not only companies and financial institutions but also researchers, financial service providers, auditors and financial regulators.

(5) Customer choice for low-carbon products and services

Consumer demand for lower carbon products and services is gradually growing, and customers are also aware that products they buy come at a high price in terms of carbon emissions across the supply chain. The Carbon Trust (2016) reveals that in France where three-quarters of shoppers say they would feel more positive about a company that has reduced the carbon footprint of their products, of which 30% would feel much more positive. The majority of consumers in the UK and Germany felt the same, with 56% and 50% respectively saying they would also feel more positive. In return, more leading businesses are responding to these changes by measuring and reducing their impact and engaging their customers in the debate.

This customer demand is creating a new market for carbon labeled goods. For example, in the UK, the Carbon Trust Carbon Reduction Label is used on hundreds of products, including those of familiar brands such as Dyson and Tesco, with an estimated combined sales value of over GBP 2 billion, according to the Carbon Trust.

In this way, choice for climate-smart products and services is a strong drive for companies to change their business models. In other words, educating and raising awareness among consumers or clients on climate change should be an effective approach to ensure that climate actions are taken by companies, financial institutions and investors alike.

Conclusion:

Climate risks and opportunities have been increasingly recognised by the business and finance sectors. However, it is not enough to achieve a decarbonised and resilient society. This recognition should convert to behaviour change and concrete actions on the ground.

This discussion paper aims to identify specific policy tools and an enabling environment to encourage the business and finance sectors to make the change from recognition to action themselves.

Of course, clear policy signals such as carbon pricing and scaling up green finance are critical. In addition to this, proactive dialogue between companies and investors, and coalition among like-minded groups should be strengthened and deepened through information disclosure on climate change. In this process, mutual learning on climate risk analysis and its management should be enhanced among stakeholders. Furthermore, education and awareness-raising for customers or clients on climate change would be a strong drive for business to change their mindset and behaviour.

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