



How Thai Banks are Adapting to Climate Change

Comparative Case Study: Financial Disclosures by Thai Banks
under TCFD Recommendations in 2024

Prepared by
Fair Finance Thailand

November 2024

Table of Contents

Executive Summary	6
Governance	7
Strategy	8
Risk Management.....	9
Metrics and Targets	10
Challenges and Opportunities in Complying with TCFD’s Recommendations	12
Getting to Know the Task Force on Climate-related Financial Disclosures (TCFD).....	14
Recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD).....	15
Importance of TCFD to Financial Institutions	18
Overview of Climate-related Disclosures of Financial Institutions Globally	20
Policy Guidelines of the Thai Financial Sector Regulators and the Consolidation of TCFD into IFRS S2	21
Comparison of Information Disclosure based on TCFD’s recommendations by Thai Banks 2024.....	22
Disclosure Evaluation Criteria based on TCFD’s recommendations	23
Outcome of Disclosure Evaluation based on TCFD’s recommendations by 6 Thai Banks	25
Governance	25
Strategy	30
Risk Management.....	38
Metrics and Targets	42
Challenges of Information Disclosure by Thai Banks	55
Appendix A: Summary of Methods and Assessment Outcome of Climate-Related Disclosure Situation of Financial Institutions Worldwide	60
Assessment of the Climate-Related Disclosure Situation of Financial Institutions Worldwide by Ernst & Young	60

Assessment of the Climate-Related Disclosure Situation of Financial Institutions	
Worldwide by TCFD	61
Assessment of the Climate-Related Disclosure Situation of Financial Institutions	
Worldwide by KPMG	61
Assessment of the Climate-Related Disclosure Situation of Financial Institutions	
Worldwide by Accenture	62
Appendix B Disclosure Assessment Criteria Based on TCFD recommendations.....	63
Governance	63
Strategy	64
Risk Management.....	66
Metrics and Targets	67
Bibliography	69

Table of Tables

Table 1 Summary of Scope 1 and 2 GHG emission reduction targets of banks	10
Table 2 Summary of Scope 3 GHG Emission Reduction Targets of Banks	11
Table 3 TCFD-aligned Information Disclosure.....	16
Table 4 TCFD-aligned Disclosure Status by Thai banks.....	22
Table 5 The number of evaluation items under each core element of TCFD's recommendations	24
Table 6 The role of the board of directors of GSB in monitoring climate action	26
Table 7 Governance - a) Board's oversight of climate-related risks and opportunities.....	27
Table 8 Governance - b) Describing management's role in assessing and managing climate-related risks and opportunities	29
Table 9 Justifications for the classification of timeframes by KBank.....	30
Table 10 Strategy - a) Describing identification and assessment processes of climate- related risks.....	32
Table 11 Strategy - b) Describing climate-related risk management process.....	34
Table 12 Strategy - c) Describe how process of identification and assessment of climate-related issues are applied to manage the operational risks of their organizations.....	37
Table 13 Risk Management - a) Describe the organization's processes for identifying and assessing climate-related risks	39
Table 14 Risk Management b) Describe the organization's processes for managing climate-related risks.....	41
Table 15 Risk Management - c) Describe how processes for identifying and assessing climate-related risks are integrated into the organization's overall risk management.....	41
Table 16 Scope 1 and Scope 2 GHG Emission Reduction Targets of the Banks.....	42
Table 17 Scope 3 GHG Emission Reduction Targets of the Banks.....	43
Table 18 Metrics and Targets - a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.....	44

Table 19 Metrics and Targets – b) Disclose Scope 1, Scope 2 and, if appropriate, Scope 3 GHG emissions and the related risks from the organizations’ emission.....	50
Table 20 Bank's 2023 Sustainability Targets Compared against Progress	52
Table 21 Bank's 2023 Sustainability Targets Compared against Progress	54

Table of Figures

Figure 1 Transmission Channels for Environmental and Climate Change Risks	19
Figure 2 Climate change-related organizational structure of Kbank	28
Figure 3 Kbank's Climate-related Risk Considerations Guidelines	38
Figure 4 Guidelines for determining the list of major impacts of TISCO	40
Figure 5 Scope 1 and 2 GHG emissions in Kasikornbank's operations	47
Figure 6 Scope 3 GHG Emissions of Kbank by Industry	48
Figure 7 Scope 3 GHG Emissions of Kbank by Asset Class	48
Figure 8 Scope 3 GHG Emissions of SCB by Industry	48
Figure 9 Scope 3 GHG Emissions of SCB by Asset Class	49
Figure 10 Scope 3 GHG Emissions of ttb	49
Figure 11 Scope 3 GHG emissions of TISCO	49
Figure 12 glide path – Intensity reduction targets for GHG emissions from electricity generation in the port of SCBX	53
Figure 13 glide path – Projection of temperature rise from corporate loan and listed equity and corporate bond portfolios of SCBX	53

Executive Summary

Countries globally must now urgently transition to a low-carbon economy to address climate change, which continues to intensify and becoming a more serious issue. Here, financial institutions—as the main capital allocators for the business sector—play an indispensable role. Their contributions include focusing on financing low-carbon businesses, reducing financing for carbon-intensive businesses, and supporting their corporate clients to transition to low-carbon production. Simultaneously, the financial institutions themselves also face the same risks from environmental and climate change, like other organizations.

The Task Force on Climate-Related Financial Disclosures (TCFD) is the world's most credible body of standards for the preparation and disclosure of financial information on risks and opportunities from climate change. In 2024, the standards and TCFD were consolidated and currently are under the supervision of the International Sustainability Standards Board (ISSB Board) under the International Financial Reporting Standards Foundation (IFRS), as it was recognised that the IFRS S2 Climate-related Disclosures are in line with the four core elements of TCFD's recommendations.

The TCFD believes that climate-related disclosures under its recommendations will enable financial institutions to better utilise risk and opportunity information to forecast the financial impact of climate change, such as cash flow projection, asset and investment evaluations, default rates, asset and investment impairment risks. Moreover, it enables improvement of risk management practices, strategic planning, and financing decision-making by financial institutions that integrate climate considerations, thereby enhancing the institutions' ability to adapt to and mitigate long-term financial risks.

Overall, Thai banks have become increasingly attentive to assessing climate-related financial risks and opportunities arising from climate change, pursuant to the TCFD's recommendations. Particularly after the Bank of Thailand (BOT) encouraged banks to disclose information in alignment with internationally recognised frameworks or standards at least once a year, citing those of the TCFD and the ISSB as examples. Currently, both standards have been integrated into the aforementioned IFRS S2.

For this report, Fair Finance Thailand assessed the TCFD-aligned disclosure practices of six Thai banks at the end of October 2024, encompassing four core elements according to the TCFD's recommendations: Governance, Strategy, Risk Management, and Metrics and Targets. In addition, the research team conducted interviews with the banks to collect their opinions

on the TCFD-aligned disclosure. The interviewed banks can be categorised into: (1) five banks that complied with TCFD's recommendations, consisting of four commercial banks, one Specialized Financial Institution (SFI); and (2) one bank that had not yet conducted TCFD-aligned disclosure. The research team also interviewed two regulatory agencies that played an important role in the process of TCFD-aligned disclosure by Thai banks, namely the Securities and Exchange Commission (SEC) and BOT.

In the overview, the research team found that there are six Thai commercial banks that have prepared and published reports on climate change in alignment with TCFD recommendations. Ranging from the highest to lowest proportion of disclosure, the banks that conducted TCFD-aligned disclosure are:

1. **Siam Commercial Bank (SCB)** and **Kasikornbank (KBank)** disclosed 39 out of the total of 60 items of recommendations (65.0 percent).
2. **Bangkok Bank (BBL)** disclosed 32 items of recommendations (53.3 percent).
3. **TISCO Bank (TISCO)** disclosed 31 items of recommendations (51.7 percent).
4. **TMBThanachart Bank (ttb)** disclosed 20 items of recommendations (33.3 percent).
5. **Government Savings Bank (GSB)** disclosed 14 items of recommendations (23.3 percent).

The standout issues disclosed can be summarised according to the category of the following TCFD recommendations:

Governance

The TCFD recommends that organizations disclose the organization's governance around climate-related risks and opportunities, based on two recommended disclosures: a) to describe the board's oversight of climate-related risks and opportunities; and b) to describe management's role in assessing and managing climate-related risks and opportunities.

Based on the review of TCFD-aligned disclosure by the six Thai banks, it was found that most banks disclosed the processes and frequency by which meetings on climate-related issues were held at the level of the banks' board of directors or sub-committee. A work plan was determined for the sub-committee to regularly meet and monitor the risks related to Environmental, Social, and Governance (ESG), including climate change risks, on a monthly, quarterly, and biannually basis, with some variations among banks.

Additionally, the board of directors or sub-committees of the banks have adopted climate-related issues in reviewing and formulating corporate strategies and risk management policies. **KBank** and **GSB** have noted that they applied climate-related issues in the allocation of their annual budgets and business plan development.

However, **none of the banks** have disclosed that the board of directors or sub-committees of the banks adopted climate-related issues in monitoring their operations and performance.

Strategy

The TCFD expects organizations to divide the actual and potential impacts of climate-related risks and opportunities on their business, strategies, and financial planning (where such information is material) into three recommended disclosures: a) to describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term; b) to describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning; and c) to describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.

Based on the review of the data from the six banks, it was found that most of them reported potential financial impacts over different time horizons. Regarding the reporting of physical and transition risks arising from climate change—in terms of both lending and providing financial intermediary business activities— all six banks have conducted risk analyses. Most banks stated that they are coping with these risks by developing environmentally friendly financial products and services. Alternatively, they also established a policy of prohibited lending and formulated industry-specific strategies to control the amount of greenhouse gases (GHG) in carbon-intensive sectors.

However, the research team found that **none of the banks** disclosed TCFD concentrations of credit-exposure to carbon-related assets. In addition, **none of the banks** disclosed the results of their analysis on the impact of climate change on acquisitions or divestitures, access to capital, financial performance, and the adoption of climate issues to inform their financial planning.

Regarding the disclosure of climate-related scenario analyses results, it was found that most banks did so, in addition to describing their scenario selection and the timeframe for which the scenario will be used to develop their financial strategies. **KBank** is the only bank

that has disclosed more than one scenario analysis, namely the Well-below 2 Degrees Celsius Scenario (WB2C) and the Net Zero Scenario (NZE). KBank explained that it affected three business segments of its clients: natural gas power plants, hydropower plants, and biomass power plants—all of which are affected by changes in energy demand. For the analysis of physical risks, KBank used RCP 2.6 and RCP 8.5 scenarios combined with flood statistics over the past 10 years. The analysis showed that the level of flood did not materially affect the asset value of KBank and its clients.

However, the research team found that **the six banks** disclosed transition plans towards a low-carbon economy, as well as the GHG emission reduction targets and described the main activities to be implemented for the reduction of GHG emissions. However, for the last recommended disclosure concerning the requirement to ‘describe the resilience of the organization’s strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario’, **none of the banks** have yet described the strategic management process if the climate change situation shifts.

Risk Management

TCFD expects organizations to have risk management in place to help them cope more efficiently with potential risks from climate change and to strengthen the confidence of investors and stakeholders. The risk management category under TCFD’s recommendations is divided into the following recommended disclosures: a) to describe the organization’s processes for identifying and assessing climate-related risks; b) to describe the organization’s processes for managing climate-related risks; and c) to describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization’s overall risk management.

Based on the review of the information disclosure by the six banks in alignment with the TCFD’s recommendations, it was found that on a) description of the organization’s processes for identifying and assessing climate-related risks, four banks (**BBL, KBank, SCB, and TISCO**) disclosed how their organizations identify and assess climate-related risks. The risks were classified based on the banks’ conventional guidelines, including credit risk, market risk, liquidity risk, and operational risk. Each bank described the impact of the anticipated risks, as well as disclosed the approach to address each type of risk according to the timeframes set by the bank, ranging by the short, medium and long term.

Metrics and Targets

To ensure transparent and accountable disclosure of climate-related risks and opportunities, the TCFD recommends that organizations disclose climate change-related metrics and targets by dividing them into three recommended disclosures: a) to disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process; b) to disclose Scope 1, Scope 2 and, if appropriate, Scope 3 GHG emissions and the emission-related risks; and c) to describe the targets used by the organization to manage climate-related risks, opportunities, and performance against targets.

From the review of the TCFD-aligned disclosure by the six banks, it was found that **all banks** announced their Scope 1 and Scope 2 GHG emissions targets. Only **KBank** and **SCB** have committed to achieving net-zero GHG emissions by 2030, while **TISCO** and **GSB** have set such targets to be achieved by 2050. The net-zero targets have not yet been announced by either **BBL** or **ttb**.

Table 1 Summary of Scope 1 and 2 GHG Emission Reduction Targets of Banks

Banks	Scope 1 and 2 GHG Emission Reduction Targets
Bangkok Bank	Reduce GHG emissions by 25% by 2030 compared to 2020 (base year)
Kasikornbank	Achieve net-zero emissions by 2030
TMBThanachart Bank	Reduce GHG emissions by 15% by 2026 compared to 2019 (base year)
Siam Commercial Bank	Achieve net-zero emissions by 2030
TISCO Bank	Achieve net-zero emissions by 2050
Government Savings Bank	Achieve net-zero emissions by 2050

In addition, almost all banks have set targets to reduce or limit financing to businesses in carbon-intensive industries, such as coal mining and coal-fired power plants, as well as the oil and natural gas industry. However, in relation to Scope 3 GHG reduction targets (which includes GHG emissions by clients in the bank's loan portfolio), only **KBank**, **SCB**, and **TISCO** have stated that they will reduce Scope 3 GHG emissions, with varying details regarding the target years.

Table 2 Summary of Scope 3 GHG Emission Reduction Targets of Banks

Banks	Scope 3 GHG Emission Reduction Targets
Kasikornbank	To achieve net-zero targets in KBank's financial portfolio, in alignment with Thailand's commitment and to accelerate this process when feasible
Siam Commercial Bank	To achieve net-zero targets in lending and investment by 2050
TISCO Bank	To achieve net-zero targets under Scope 3 by 2065 for financed emissions

For the disclosure of climate-related risk metrics (including water resources, energy, and waste management), it was found that only **BBL**, **KBank** and **TISCO** provided water and waste management information.

For the disclosure of internal carbon prices, which is important for decision-making on climate-related issues, the research team found that only SCBX, the parent company of **SCB**, disclosed internal carbon pricing data. Such data was utilised to assess potential GHG emissions arising from electricity consumption, evaluate energy efficiency, and to improve understanding of the benefits of investing in low-carbon activities. This is based on the estimated carbon price assumption of THB 650 per ton (from the approximate cost of USD 20 per ton) and investment opportunities (such as shadow price) of THB 100 per ton.

However, **no bank has yet to disclose** the following essential information:

- Remuneration policies based on performance metrics, where climate-related issues are material;
- Metrics used for impact assessment of physical risks and transition risks on lending and other financial intermediary business activities in the short, medium and long term;
- The volume and proportion of carbon-related assets to total assets

Challenges and Opportunities in Complying with TCFD's Recommendations

From the interviews with five banks that have conducted TCFD-aligned disclosures and with one bank that has not yet made such disclosures, as well as with competent officials in the SEC and BOT, challenges and opportunities in the implementation of TCFD-aligned disclosure perceived by the interviewees can be categorised into four main issues:

1. **Resources, time, and costs:** Conducting a TCFD-aligned disclosure is a time-consuming and resource-intensive process. It is evident that banks that were capable of fully disclosing information tend to be the larger ones, such as KBank, which has recognised the importance of this matter and has been analysing data on the impact of climate change for more than 5 years before producing and publishing its first report. On this issue, BOT, as the central bank of Thailand, noted that it is currently providing capacity-building trainings to banks to enhance their ability to implement TCFD-aligned disclosures. The BOT also requires banks to conduct a climate stress-test analysis, as a basis for developing transition plans and the determination of GHG reduction metrics and targets. The BOT estimates that all banks should be able to conduct TCFD-aligned disclosures by 2025.
2. **Data Accessibility:** More than 99 percent of the banks' GHG emissions come from financed emissions. It is considered as Scope 3 GHG emissions, as the banks are obligated to seek GHG emission data from their clients. This is a challenge for many banks as they still have to use proxies in most calculations. Many banks indicated the difficulties that come with data collection from clients. There are also discrepancies in the utilisation of the data collected, particularly in valuation processes, where different methodologies are adopted by different banks. Also, not every client possesses the preparedness to disclose this information, especially the small- and medium-sized enterprises (SMEs); they do not have sufficient resources to analyse and disclose information such as large or listed companies with greater capacity and commitment to achieving net-zero emissions. Some banks believe that there should be open data or a national-level shared database that is conveniently accessible and usable by all stakeholders. Government agencies should also provide support to SMEs to enhance their ability to address climate change at the national level in solidarity.

3. Collaborative approach between the government and regulators: The BOT and the SEC as financial sector regulators have already organized trainings and developed a collaborative approach with banks and other companies pursuant to the TCFD's recommendations. However, climate-related disclosures still need the cooperation of other regulators, such as the Stock Exchange of Thailand (SET) and the Thailand Greenhouse Gas Management Organization (TGO) to streamline climate-related disclosure approaches and to efficiently enable access to the GHG emission database for Scope 3 emissions calculation. Several banks noted that, in the future, government agencies are likely to strengthen their roles in enforcing climate-related disclosure regulations, including the Climate Change Act, which will lead to further adaptation by banks and companies, both in terms of efficient information disclosure and risk management.
4. Upgrading disclosures under the TCFD's recommendation to IFRS S2 Climate-Related Disclosures: Many banks consider TCFD-aligned disclosures to be a good starting point to prepare banks to upgrade their disclosure to IFRS S2, which focuses on disclosing information on risks and financial impacts from climate change on businesses. IFRS S2 standards are more stringent in terms of financial impact disclosure, particularly for accounting procedures. Hence, the banks expect government agencies and the BOT to provide trainings and work collaboratively with them to build their capacity to comply with IFRS S2, as well as to prepare them for the disclosure of more complex quantitative information and implementation timeline. Also, the support from the regulatory agencies for the development of database systems and the creation of comprehensive disclosure standards will be critical to the long-term success of the implementation of IFRS S2.

Getting to Know the Task Force on Climate-related Financial Disclosures (TCFD)

Climate change is a global challenge that requires the global community to work together for the mitigation and adaptation purposes. At the 21st Conference of Parties (COP21) in 2015, countries signed the Paris Agreement to commit to limiting the global average temperature rise to well below 2°C above pre-industrial levels (around 1850 – 1900), and to pursue efforts to limit the increase to no more than 1.5°C (United Nations, n.d.). However, the challenge of climate change has become even more urgent when the Assessment Report 6 (AR6) was disclosed by the Intergovernmental Panel on Climate Change (IPCC) in 2021, indicating that the global average temperature has already increased by approximately 1.09°C from the pre-industrial levels (IPCC, 2021). If GHG emissions continue to follow the current trajectory, the global temperatures may rise beyond 1.5°C by 2040 and may be higher than 2°C within 2100. Meanwhile, Thailand is among the countries most vulnerable to climate risks. According to the data from the Global Climate Risk Index (CRI) of Germanwatch, the impact statistics suggest that between 2000 – 2019, Thailand faced 146 occurrences of natural disasters with the total value of losses at USD 7.71915 billion (Eckstein, Künzel, & Schäfer, 2021).

If the global community does not collaborate on climate adaptation, the risks of climate change will bring adverse damage to the eco-efficiency and the livelihood of populations. The potential global damage suffered by the climate change-prone assets can be as high as USD 4.2 trillion. If the global temperature reaches 6°C, the value of loss would be USD 43 trillion (The Economist Intelligence Unit Limited, 2015). This emphasises the need for strict and urgent actions to reduce GHG emissions and expedite the transition to a low-carbon economy. It is estimated that not less than USD 1 trillion per year would be required as investment (TCFD, 2017).

Companies, investors, or actors in the economy thus need to take into account the impact of the climate change that may affect the liquidity on their investment portfolios. In other words, the transition to a low-carbon economy is an inevitable financial challenge for companies in fossil fuel-related industries and an investment opportunity for companies with low-carbon adaptation plan (TCFD, 2017). To achieve a smooth transition to a low-carbon

economy, it is necessary to rely on sufficient information on the organization's preparedness for a low-carbon economy.

However, the understanding of investors, companies, or other relevant actors in the economy on making business decisions that integrate climate change risks considerations is still in the initial stages. In addition, the reporting of climate change-related data is still concentrated on reporting GHG emission quantity. Therefore, the Task Force on Climate-Related Financial Disclosure (TCFD) was established to develop financial disclosure guidelines focusing on the opportunities and challenges of climate change of companies or organizations. This is to ensure that the disclosure is useful for the decision-making of actors in the economy, enabling them to allocate investment funds in line with the direction of the economy transitioning to a low-carbon economy (TCFD, 2017).

The TCFD was established by the Financial Stability Board (FSB), an international organization established by G20¹ countries. The TCFD aims for businesses around the world to disclose climate-related financial information based on the same standard—both in terms of the risks and climate, climate management strategies and guidelines, as well as setting targets and metrics for performance evaluation related to climate-related risks and opportunities. This could enhance market transparency and informed capital allocation based on the risk information (TCFD, n.d.).

Recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD)

Recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD's recommendations) focus on disclosures pursuant to the 11 recommendations, under the four core elements (TCFD, 2021), as shown in Table 3.

¹ The G20 consists of representatives of the European Union and 19 other countries, including 8 leading industrialized countries (including the United Kingdom, Canada, France, Italy, Japan, Germany, the United States, and Australia) and 11 large developing countries (Argentina, Brazil, China, India, Indonesia, Mexico, Russia, Saudi Arabia, South Africa, South Korea and Türkiye). The economies of G20 members account for 90 percent of the global economy and account for about two-thirds of the world's population

Table 3 TCFD-aligned Information Disclosure

Core Elements	Details	Disclosure Recommendations
Governance	Disclose the organization's governance around climate-related risks and opportunities	a) Describe the board's oversight of climate-related risks and opportunities
		b) Describe management's role in assessing and managing climate-related risks and opportunities
Strategy	Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term
		b) Describe the impact of climate-related risks and opportunities on the organisation's businesses, strategy, and financial planning
		c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario
Risk Management	Disclose how the organization identifies, assesses, and manages climate-related risks	a) Describe the organization's processes for identifying and assessing climate-related risks
		b) Describe the organization's processes for managing climate-related risks
		c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management
Metrics and targets	Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material	a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process
		b) Disclose Scope 1, Scope 2 and, if appropriate, Scope 3 GHG emissions and the related risks
		c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets

Source: TCFD (2021)

The above guidelines focus on disclosure of "Material risks to climate change", determined from the current business strategy and the projection of climate change impact on future business operations, both in terms of the higher cost of carbon dioxide emissions and the global temperature increase. This allows businesses to improve their current business strategies to take into account climate change and plan to address the impacts of climate change that may occur in the future (TCFD, 2021).

TCFD divides the risks of climate change into two categories to guide the financial impact assessment from risks arising from climate change, including: (1) physical risks; and (2) transition risks (TCFD, 2017).

(1) Physical risks

Physical risk is the potential for damage to occur to assets and operations from the impact of natural disasters that may occur acutely and periodically or regularly and chronically. The financial impact on the organization from physical impacts can take various forms. There can be direct impacts on the organization's assets and indirect impacts on the organization's supply chain—such as adequacy of water resources, food security or employee safety—that may be affected by rising global temperatures.

The acute physical risks are the risks caused by extreme weather, such as cyclones, hurricanes or floods. The chronic physical risks are those arising from the increase in global temperature that are likely to be constant and long term, such as sea level rise and heat waves.

(2) Transition risks

Transition risks are the potential for damage to occur to assets and operations as a result of a transition to low-carbon economy, which requires policies, laws, and economic adaptation that addresses the remedy from climate change-related impacts and adaptation to a low-carbon economy. Transition risks can be divided into four categories, as follows:

- *Policy and legal risks*

Climate change leads to the improvement of relevant policies or regulations so that businesses or organizations can transition to the low-carbon economy. Risks arising from the improvement of policy and legal risks are divided into two categories: (1) policies or laws that

attempt to address the impacts of climate change or promote climate change adaptation, such as the establishment of a carbon pricing mechanisms to incentivise businesses or organizations to reduce GHG emissions or measures to promote energy efficiency; and (2) policies or laws that address contributors of climate change. That is, any company or organization that contributes to the negative impact on the environment and climate change will face the risk of legal prosecution.

- *Technology risks*

Climate change has brought about the development of technology and innovation to support the transition to a low-carbon economy, such as renewable energy, battery storage, or the development of carbon capture and storage (CCS). This forces the private sector to adapt and deploy new technologies that do not cause any negative impact on climate change.

- *Market risks*

Climate change has led to a shift in the behaviour of consumers, who have become more environmentally conscious in their selection of goods or services. Therefore, companies or organizations must focus on developing products and services that align with the low-carbon economy.

- *Reputation risks*

Climate change has led to a shift in the perspective of a business or organization's stakeholders. Stakeholder groups focus on determining the extent to which businesses or organizations prioritize the mitigation of climate change impact and their participation in the transition to a low-carbon economy. Therefore, it is important to consider the transition strategy to green operations.

Importance of TCFD to Financial Institutions

Financial institutions allocate funds to businesses to carry out various activities. They are crucial to the allocation of the funds to businesses or projects that are more responsible for climate change. The Paris Agreement stipulates that finance flows should be consistent with a low-emission pathway and be climate resilient. Hence, financial institutions play a vital role in responding to the urgency of the climate change crisis and driving towards a net-zero economy (SBTi, 2023).

Additionally, similar to other organizations, financial institutions are at risk of severe environmental and climate changes. The Basel Committee on Banking Supervision (BCBS) has

conducted a study and disclosed a study report on the impact of climate change on the financial risks of banks (BCBS, 2021) through the transmission channels.² The potential impact on financial risks of banks can be summarized as shown in Figure 1.

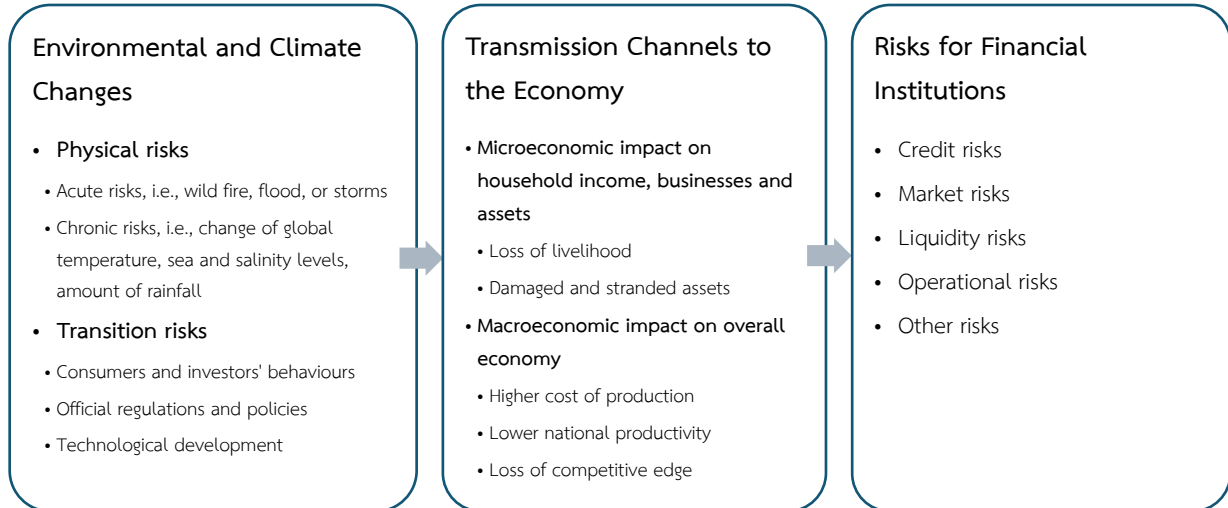


Figure 1 Transmission Channels for Environmental and Climate Change Risks (Bank of Thailand, 2023)

What is the importance of TCFD standards to financial institutions?

TCFD believes that if more climate-related data of the business sector is disclosed, more climate data consistency will be revealed. Thus, cross-business climate data can be more efficiently compared. For financial institutions, the preparation of TCFD-aligned disclosure report allows them to utilise the risk and opportunity data to better project the financial impact of climate change. i.e., cash flow projection, asset and investment valuations, default rates, impairment risks of asset and investment. This projection will lead to improvements in risk management practices, strategic planning, and financing decisions of financial institutions that integrate climate change considerations, in order to adapt and mitigate the financial risks in the long term (SBTi, 2023).

In addition, the preparation of a TCFD-aligned disclosure report by financial institutions also contributes to investors' understanding of the financial impact of climate change, helping them to make informed investment decisions in companies or projects that recognise sustainability issues and possess good climate management.

² Transmission channels refer to "causal chains that link climate risk drivers and financial risks of banks". On the other hand, it can be seen as a mechanism that leads climate change to become a source of financial risk". (สมาคมธนาคารไทย, 2566)

However, to ensure that financial institutions produce TCFD-aligned disclosure reports—which is the pathway towards net-zero targets by 2050, in line with the objectives of the Paris Agreement—the UNEP Finance Initiative has developed the Guidelines for Climate Target Setting for Banks. The Guidelines will guide financial institutions to set targets that are in line with the objectives of the Paris Agreement. It has been adopted as a guideline for banks that are members of the Net-Zero Banking Alliance and banks that are voluntary signatories of the Principles for Responsible Banking (PRB).

Guidelines for Climate Target Setting for Banks expect banks to follow the principles of long-term and medium-term target setting to support the achievement of net-zero by 2050. Banks are expected to determine a base year to annually measure and report the GHG emissions profile of their lending, investment, and capital markets activities, based on the accepted scientific principles. Banks have to regularly review their targets to ensure that their goals are consistent with the updated scientific principles (UNEP Finance Initiative, 2024).

Reporting GHG emissions according to the TCFD’s recommendations is considered a disclosure of the progress of financial institutions’ operations towards net-zero targets by 2050. This reflects that financial institutions can truly contribute to driving the economy to achieve net-zero.

Overview of Climate-related Disclosures of Financial Institutions Globally

Since 2017, when the TCFD developed its recommendations, financial institutions around the world have responded to and supported the TCFD’s recommendations by utilising the data in their preparation of annual reports, sustainability reports and/or reports specifically prepared for TCFD-aligned disclosures (TCFD, 2023). The number of financial institutions disclosing climate-related information has increased accordingly. However, TCFD-aligned disclosures remain a challenge for financial institutions due to the relatively detailed guidelines.

At present, TCFD, Ernst & Young (EY), KPMG, and Accenture conducted an assessment on the status of climate-related information disclosure of financial institutions around the world by analysing the consistency between the documents of the banking institutions and the TCFD’s recommendations (Accenture, 2022; EY, 2023; KPMG, 2023; TCFD, 2023). Based on the assessment reports of the four organizations, there has been a positive improvement to the overall situation of climate-related information disclosures by financial institutions around the world pursuant to TCFD’s recommendations. This is because more financial institutions

continue to respond to and comply with TCFD-aligned disclosures, particularly in respect of Core Element 1 (Governance) and Core Element 3 (Risk Management). However, financial institutions still must improve and develop climate-related disclosures to be more comprehensive and advanced in Core Element 2 (Strategy) and Core Element 4 (Metrics and Targets) (further information can be found in Appendix A: Summary of Methods and Assessment Outcome of Climate-Related Disclosure Situation of Financial Institutions Worldwide).

Policy Guidelines of the Thai Financial Sector Regulators and the Consolidation of TCFD into IFRS S2

The Securities and Exchange Commission (SEC) and the Bank of Thailand (BOT) are important agencies that are making efforts to drive financial institutions and businesses to disclose climate-related financial information. In 2021, the SEC required listed companies to disclose information on their environmental, social, and governance operations, including climate-related risk information according to TCFD's recommendations to investors and stakeholders as an annual filing in the form of the 56-1 One Report. They also developed a manual on good recommendations for managing and disclosing information on climate-related risks for investment management businesses, in line with the TCFD Good Practice Handbook (SEC, 2023).

The BOT has formulated policy guidelines for the operations of financial institutions, which covered the environmental and climate change perspectives. The policy guidelines require Thai financial institutions to disclose their governance structures, strategies, action plans, environmental opportunities and risks management, including environmental metrics and targets. Such requirements are in line with the reporting framework under TCFD Good Practice Handbook. The BOT has also collaborated with the Thai Bankers' Association to produce a handbook for the operations of financial institutions that consider environmental and climate change perspectives. The handbook is intended to be used as a guideline to establish understanding of financial institutions to better manage environmental and climate change risks. (สมาคมธนาคารไทย, 2566).

Moreover, the TCFD in 2017 issued guidelines for climate-related financial disclosure. Later in 2024, the standards and the TCFD were consolidated with the International Sustainability Standards Board (ISSB) under the International Financial Reporting Standards (IFRS)³ Foundation (IFRS, 2024), since both organizations recognise that IFRS S2 standards are consistent with the four core elements of the TCFD's recommendations (IFRS, 2023).

³ The ISSB has issued two sets of sustainability-related disclosure standards: (1) IFRS S1 "General Requirements for Disclosure of Sustainability-related Financial Information" and (2) IFRS S2 "Climate-related Disclosures" (SEC, 2023).

Comparison of Information Disclosure based on TCFD's Recommendations by Thai Banks 2024

Based on the 2024 policy review of 11 Thai financial institutions,⁴ as of 15 September 2024, the research team found that six Thai banks have disclosed climate-related risks information in accordance with the TCFD Good Practice Handbook. The banks are: (1) five banks that have produced reports according to TCFD Good Practice Handbook, being Bangkok Bank (BBL), Kasikornbank (KBank), Siam Commercial Bank (SCB), TMBThanachart Bank (ttb), and Government Savings Bank (GSB); and (2) TISCO Bank (TISCO) was the only bank that disclosed information according to TCFD Good Practice Handbook in the Sustainability Report.

From the investigation by the research team, the Bank of Ayudhya and Kiatnakin Phatra Bank disclosed some information in their sustainability reports that aligned with the TCFD's recommendations. However, such information was not included in this case study since it has not been announced by either of the banks whether such disclosures followed TCFD's recommendations.

Table 4 TCFD-aligned Disclosure Status by Thai banks

No.	Banks	Disclosure complies with TCFD's recommendations?	Included in this case study?
1	Bangkok Bank	Disclosed	Included
2	Kasikornbank	Disclosed	Included
3	Krungthai Bank	Not Disclosed	Not included
4	Siam Commercial Bank	Disclosed	Included
5	Bank of Ayudhya	Partially disclosed	Not included
6	TMBThanachart Bank	Disclosed	Included
7	Kiatnakin Phatra Bank	Partially disclosed	Not Included
8	TISCO Bank	Disclosed in the sustainability report	Included

⁴ Consisting of eight Thai commercial banks, namely Bangkok Bank, Kasikornbank, Krung Thai Bank, Siam Commercial Bank, Bank of Ayudhya, TMBThaiThanachart Bank, Kiatnakin Phatra Bank and TISCO Bank, and three state-owned Specialized Financial Institutions, namely the Government Savings Bank, Bank for Agriculture and Agricultural Cooperatives, and the Small and Medium Enterprise Development Bank of Thailand.

No.	Banks	Disclosure complies with TCFD's recommendations?	Included in this case study?
9	Government Savings bank	Disclosed in brief	Included
10	Bank for Agriculture and Agricultural Cooperatives	Not disclosed	Not Included
11	Small and Medium Enterprise Development Bank of Thailand	Not disclosed	Not Included

The research team interviewed banks to gather their opinions on TCFD-aligned disclosures. The banks were categorised into: (1) five banks that conducted TCFD-aligned disclosures, consisting of four commercial banks and one Specialized Financial Institution (SFI); and (2) one bank that has not conducted TCFD-aligned disclosure. The team also interviewed two regulatory agencies, the SEC and BOT, which play a crucial role regarding TCFD-aligned disclosure by Thai banks.

The research team found that in general, the banks that followed TCFD-aligned disclosures, ranked from highest to lowest proportion of disclosures, were:

1. **Siam Commercial Bank (SCB)** and **Kasikornbank (KBank)** disclosed 39 out of the total of 60 items of recommendations (65.0 percent).
2. **Bangkok Bank (BBL)** disclosed 32 items of recommendations (53.3 percent).
3. **TISCO Bank (TISCO)** disclosed 31 items of recommendations (51.7 percent).
4. **TMBThanachart Bank (ttb)** disclosed 20 items of recommendations (33.3 percent).
5. **Government Savings Bank (GSB)** disclosed 14 items of recommendations (23.3 percent).

Disclosure Evaluation Criteria based on TCFD's recommendations

The evaluation criteria are based on the TCFD's recommendations which include additional suggestions for the financial sector. The banking industry is divided into four core elements, each of which contains a number of sub-clauses on good disclosure practices: nine items on Governance; 21 items on Strategy; ten items on Risk Management; and 20 items on Metrics and Targets. The details of the evaluation criteria are in Appendix B: Disclosure Assessment Criteria Based on TCFD's recommendations.

Table 5 The number of evaluation items under each core element of TCFD's recommendations

Core Elements	Disclosure Recommendations	Number of items
Governance	a) Describe the board's oversight of climate-related risks and opportunities	4
	b) Describe management's role in assessing and managing climate-related risks and opportunities	5
Strategy	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term	6
	b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning	11
	c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario	4
Risk Management	a) Describe the organization's processes for identifying and assessing climate-related risks	6
	b) Describe the organization's processes for managing climate-related risks	3
	c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management	1
Metrics and Targets	a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process	10
	b) Disclose Scope 1, Scope 2 and, if appropriate, Scope 3 GHG emissions and the related risks	6
	c) Describe the targets used by the organization to manage climate-related risks, opportunities, and performance against targets	4

This case study evaluated six banks that have conducted TCFD-aligned disclosures, relying on the data from the TCFD Report, or the respective banks' Climate Change Report, as well as the Sustainability Report on chapter of Disclosure following the TCFD's recommendations that were published as of the 30 September 2024.

Outcome of Disclosure Evaluation based on TCFD's recommendations by 6 Thai Banks

The research team evaluated the information disclosure of the six Thai banks based on the four core elements of the TCFD's recommendations: Governance, Strategy, Risk Management, and Metrics and Targets.

Governance

Climate change causes social, economic, and operational risks and opportunities for organizations. It is considered one of the risks that each organization should prioritize. The TCFD's recommendations advise organizations to disclose corporate governance mechanisms pertaining to climate-related risks and opportunities, based on two recommended disclosures: a) board's oversight of climate-related risks and opportunities; and b) management's role in assessing and managing climate-related risks and opportunities.

Based on the review of TCFD-aligned disclosures by the six banks, it was found that: a) on the oversight of the board and sub-committees of the banks on climate-related risks and opportunities, most banks disclosed the processes and frequency by which meetings on climate-related issues were held at the level of the banks' board of directors or sub-committee. Work plans were specified and sub-committees have been tasked to monitor the risks of Environmental, Social, Governance (ESG) aspects, including climate change risks on monthly, quarterly, and bi-annual bases.

Also, the board or sub-committees of the banks also considered climate-related issues in reviewing and guiding corporate strategies and risk management policies. KBank and GSB indicated that they applied climate-related issues in the allocation of annual budget and production of business plans, which reflects that the banks view climate change as a major risk in the future.

However, none of the banks has disclosed that their board or sub-committees have adopted climate-related issues in monitoring their operations and performance, as well as overseeing capital expenditures, acquisition, and divestiture of major businesses.

Table 6 The role of the board of directors of GSB in monitoring climate action

GSB disclosed information pertaining to the board of directors' monitoring of climate-related actions pursuant to TCFD's recommendations:

- *The board of directors of GSB has the highest responsibility for integrating climate change strategy into its corporate governance.*
- *The Corporate Governance and Sustainability Committee is responsible for determining the target strategy, practices, and master plan on good governance and sustainability. The responsibilities include the oversight of strategy, policies, targets, projects, and monitoring of climate change progress of the Bank.*
- *The Risk Oversight Committee established a risk management policy that covers the risk identification, assessment, monitoring, control, and continuous reporting to maintain an appropriate level of risk, in addition to reviewing policies and strategies to ensure that GSB operates on an acceptable risk level.*

Table 7 Governance - a) Board's oversight of climate-related risks and opportunities

Good Disclosure Practices	BBL	KBANK	TTB	SCB	TISCO	GSB
(1) Disclose processes and frequency by which the board and/or board committees (e.g., audit, risk, or other committees) are informed about the climate-related issues	✓	✓	✓	✓	X	✓
(2) Disclose whether the board and/or board committees consider climate-related issues when reviewing and guiding strategy, major plans of action, risk management policies, annual budgets, and business plans	<ul style="list-style-type: none"> • Organizational strategy • Risk management policies 	<ul style="list-style-type: none"> • Organizational strategy • Risk management policies • Allocation of annual budget • Business plan 	<ul style="list-style-type: none"> • Organizational strategy • Risk management policies 	<ul style="list-style-type: none"> • Organizational strategy • Risk management policies 	X	<ul style="list-style-type: none"> • Organizational strategy • Risk management policies • Allocation of annual budget • Business plan
(3) Disclose whether the board and/or board committees consider climate-related issues when setting the organization's performance objectives, monitoring implementation and performance, and overseeing capital expenditures, acquisition and divestitures.	X	X	X	X	X	X
(4) Disclose how the board monitors and oversees progress against goals and targets for addressing climate-related issues	✓	✓	✓	✓	X	✓

In respect of the disclosure of b) management's role in assessing and managing climate-related risks and opportunities, it was found that the six banks have assigned responsibility for climate-related issues to management positions or executive committees. However, there are only three banks, being KBank, SCB (on behalf of SCBX Group) and GSB, that require, in writing, the management or executive committees with the responsibility of climate-related issues to report to the bank's board of directors or sub-committees.

In addition, most banks have revealed their climate-related organizational structure, in order to clearly divide the roles and responsibilities of climate risk management, ensuring efficient operations consistent with sustainability goals.

Figure 2 shows an example of climate-related organizational structure of KBank. The main agencies involved include the Board of Directors, responsible for overseeing the Kbank's operations, approve the risk management plan, framework, risk ceiling and determination of acceptable risk levels, as well as the following two committees:

(1) Risk Oversight Committee. Responsible for reviewing and ensuring compliance with centralised risk management policies and strategies and willingness to take acceptable risks, as well as evaluating risk management policies and strategies to cover all risks, including emerging risks.

(2) Corporate Governance Committee. Responsible for monitoring and implementing sustainable development.

Under the Risk Oversight Committee and the Corporate Governance Committee, there are two sub-committees:

(1) Credit Risk Sub-Committee. Responsible for formulating and updating ESG-related credit policies and processes.

(2) Sustainable Development Sub-Committee. Responsible for developing guidelines and policies that are consistent with KBank's sustainability principles.

Both the business division and monitoring and controlling function are at the operational level. They are responsible for reviewing the environmental and social risks of the facilitated projects, certifying and monitoring compliance with environmental and social laws/agreements pertaining to the project, and determining environmental and social management as agreed upon and reporting to the Corporate Governance Committee.

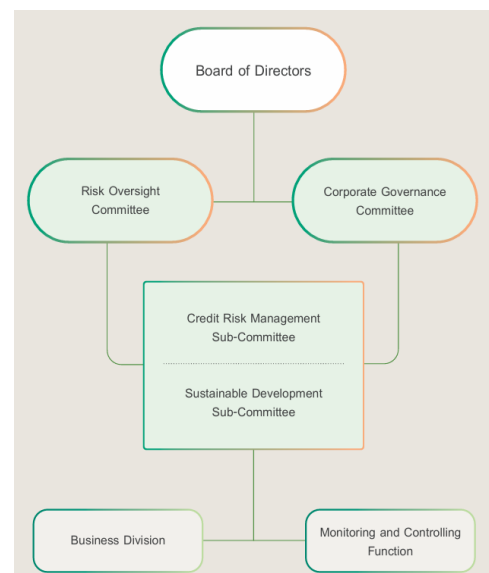


Figure 2 Climate change-related organizational structure of Kbank

Table 8 Governance - b) Describing management's role in assessing and managing climate-related risks and opportunities

Good Disclosure Practices	BBL	KBANK	TTB	SCB	TISCO	GSB
(1) Disclose whether the organization has assigned climate-related responsibilities to management-level positions or committees	✓	✓	✓	✓	✓	✓
(2) Disclose whether such management positions or committees report to the board or a committee of the board and whether those responsibilities include assessing and/or managing climate-related issues	X	✓	X	✓	X	✓
(3) Describe the associated organizational structure	✓	✓	X	✓	✓	✓
(4) Describe the processes by which management is informed about climate-related issues	X	X	X	X	X	X
(5) Describe how management (through specific positions and/or management committees) monitors climate-related issues	X	X	X	X	X	X

Strategy

The TCFD's recommendations expect organizations to disclose the actual and potential impact of climate change on their business operations, strategies, and financial plans based on three issues: a) to describe climate-related risks and opportunities the organization has identified over the short, medium, and long term; b) to describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning; and c) to describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.

Based on the review of the data from the six banks, it was found that: a) in respect of describing climate-related risks and opportunities identified over the short, medium, and long term, all banks have provided definitions according to the said timeframes. However, KBank is the only bank that has specified the justifications for the timeframe classification as stated in Table 9. On the description of impact of climate-related risks and opportunities, it was found that the majority of the banks reported potential financial impacts on banks based on multiple different timeframes. However, each bank may have a different process for identifying the risks and opportunities that may have significant financial impact. For their financial impact analysis, one of the identification methods used by Thai banks is qualitative analysis, namely through discussions with the bank's relevant internal departments on possible scenarios, driving factors, relevant assumptions, possibilities, as well as the potential impacts on the bank's businesses.

Table 9 Justifications for the classification of timeframes by KBank

Short-term risks	The bank may be affected by the legal and policy risks due to the increasing implementation of climate-related regulations and policies in several countries. For example, the European Union's Carbon Border Adjustment Mechanism (CBAM), which came into effect in 2023, as well as other measures in the pipeline of other countries.
Long-term risks	KBank may be affected by sea level rises which will take more than 10 years for their effect to become more evident. Therefore, the bank specified the timeframe, based on which they analysed the impact of relevant risks, so that they can contemplate the impacts, as well as the timeframe-specific risk control practices.

For the reporting of physical and transition risks—both in terms of lending and financial intermediary business activities—all banks have analysed their physical risks based on natural disasters, floods, droughts, or other disasters, which can consequently damage the assets of the banks and their clients, ultimately decreasing client’s ability to repay.

In terms of transition risks, there is a tendency for environmental laws and regulations to become stricter, such as: carbon taxation, Emissions Trading System (ETS), environmental measures that induce trade barriers. If the banks’ clients are unable to adapt to the changing laws and environmental requirements, their ability to repay will definitely be affected. There are also technology risks, as the market demands for technology that reduces GHG. Hence, obsolete or GHG-intensive assets may be written off and impaired. Additionally, the perspective of the banks’ stakeholders has changed, with their focus shifted to the environment, products, or organizations that do not cause further negative environmental impact (that can consequently cause market and image risks for the banks). If the banks continue to finance carbon-intensive businesses or projects or those that can adversely impact the environment and society, the banks are more likely to face this risk. Therefore, banks address this issue by developing environmentally friendly financial products and services. Moreover, banks have formulated policies on prohibited lending and industry-specific strategies to control the amount of GHG in carbon-intensive industries.

However, none of the banks disclosed data regarding the significant concentration of credit exposure to carbon-intensive clients.

Table 10 Strategy - a) Describing identification and assessment processes of climate-related risks

Recommended Disclosures	Good Disclosure Practices	BBL	KBANK	TTB	SCB	TISCO	GSB
a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term	(1) Describe what the organization considers to be the relevant “short term”, “medium term” and “long term” time horizons	✓	✓	✓	✓	✓	✓
	(2) Describe the justifications of “short term”, “medium term” and “long term” classifications of the time horizons	X	✓	X	X	X	X
	(3) Describe specific climate-related issues potentially arising in each time horizon (short, medium and long term) that could have a material financial impact on the organization	✓	✓	✓	✓	✓	X
	(4) Describe the process(es) used to determine which risks and opportunities could have a material financial impact on the organization	X	✓	X	✓	✓	✓
	(5) Describe significant concentrations of credit exposure to carbon-related assets	X	X	X	X	X	X
	(6) Disclose climate-related risks (transition and physical) in the lending and financial intermediary business activities	✓	✓	✓	✓	✓	X

Note: The green boxes are the criteria from Supplemental Guidance for Banks.

For item b) to describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning, it was found that most banks recognise the impact of climate change on their products. Consequently, banks have adjusted various strategies to focus on environmentally friendly financial products and promote the transition to a low-carbon economy. Additionally, the banks have identified the impact of climate change on their mitigation and adaptation activities, as well as the impact of climate change on investment in research and development of new knowledge and technologies to address the transition to a low-carbon economy and the impacts of potential natural disasters. Most banks have analysed the impact of climate change on their operations, focusing on the impact and damage the floods may cause to some of their branches.

KBank, SCB and TISCO clearly provided that climate change impacted their supply and value chains. The banks disclosed the impact of physical risks, such as flood, that may affect the lives and assets of clients, employees and all stakeholders. However, the research team has not found any banks that have disclosed the results of their analysis on the impact of climate change on acquisitions or divestitures, access to capital, financial performance, and the application of climate-related issues as input in their financial planning.

For the climate-related scenario analysis, it was found that most banks have analysed and disclosed the results of their climate-related scenario analysis, as well as describing the specification of climate-related scenarios and the timeframe for such scenarios for the planning of their financial strategies. This includes the disclosure of KBank's transition risk analysis based on two scenarios. It is the only bank that disclosed more than one climate-related scenario analysis, namely the Well-below 2 Degrees Celsius Scenario (WB2C) and the Net Zero Scenario (NZE). The analysis revealed the effect on 3 business segments of the bank's clients, which are natural gas power plants, hydropower plants, and biomass power plants due to the changes in energy demand. For the impact analysis of physical risks, the bank applied RCP 2.6 and RCP 8.5 scenarios combined with flood statistics for the past ten years. The analysis showed that the flood level does not materially affect the value of the assets of the bank or its clients.

However, the research team found that all banks disclosed their plans for the transition to a low-carbon economy, as well as disclosure of GHG emission reduction targets and description of the main activities to be implemented for such reduction purposes.

The last point is c) describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C scenario. The research team found neither the description of the banks' resilience nor the specified strategic management process in light of the change of climate situation. The organizations did not provide any comments on the potential impact on their organizational strategies from climate-related risks and opportunities.

Table 11 Strategy - b) Describing climate-related risk management process

Good Disclosure Practices	BBL	KBANK	TTB	SCB	TISCO	GSB
(1) Describe the impact on the organization's businesses, strategy, and financial planning in the area of products and services	✓	✓	✓	✓	✓	X
(2) Describe the impact on the organization's businesses, strategy, and financial planning in the area of supply and/or value chains	X	✓	X	✓	✓	X
(3) Describe the impact on the organization's businesses, strategy, and financial planning in the area of adaptation and mitigation activities	✓	✓	✓	✓	✓	X
(4) Describe the impact on the organization's businesses, strategy, and financial planning in the area of investment in research and development	✓	✓	✓	✓	✓	X
(5) Describe the impact on the organization's businesses, strategy, and financial planning in the area of operations (including types of operations and location of facilities)	✓	✓	X	✓	✓	X

Good Disclosure Practices	BBL	KBANK	TTB	SCB	TISCO	GSB
(6) Describe the impact on the organization's businesses, strategy, and financial planning in the area of acquisitions and divestments	X	X	X	X	X	X
(7) Describe the impact on the organization's businesses, strategy, and financial planning in the area of access to capital	X	X	X	X	X	X
(8) Describe how climate-related issues serve as an input to their financial planning process, the time period(s) used, and how these risks and opportunities are prioritised. Organizations' disclosures should reflect a holistic picture of the interdependencies among the factors that affect their ability to create value over time.	X	X	X	X	X	X
(9) Describe the impact of climate-related issues on their financial performance	X	X	X	X	X	X

Good Disclosure Practices	BBL	KBANK	TTB	SCB	TISCO	GSB
(10) Disclose climate-related scenarios analysis, if they were used to inform the organization's strategy and financial planning	✓	✓	X	✓	✓	✓
(11) Describe their plans for transitioning to a low-carbon economy, GHG emission targets and specific activities intended to reduce GHG emissions	✓	✓	✓	✓	✓	✓

Table 12 Strategy - c) Describe how process of identification and assessment of climate-related issues are applied to manage the operational risks of their organizations

Recommended Disclosures	Good Disclosure Practices	BBL	KBANK	TTB	SCB	TISCO	GSB
c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario	(1) Describe how resilient their strategies are to climate-related risks and opportunities, taking into consideration a transition to a low-carbon economy consistent with a 2°C or lower scenario and, where relevant to the organization, scenarios consistent with increased physical climate-related risks	X	X	X	X	X	X
	(2) Discuss where they believe their strategies may be affected by climate-related risks and opportunities	X	X	X	X	X	X
	(3) Discuss how their strategies might change to address such potential risks and opportunities	X	X	X	X	X	X
	(4) Discuss the specification of climate-related scenarios and associated time horizon(s) considered	✓	✓	X	✓	✓	X

Risk Management

The TCFD's recommendations expect organizations to have risk management in place, ranging from risk identification and risk assessment to risk management. This will help organizations deal more efficiently with potential risks from climate change and to build the confidence of investors and stakeholders. The risk management category under the TCFD's recommendations is divided into three areas: a) describe the organization's processes for identifying and assessing climate-related risks; b) describe the organization's processes for managing climate-related risks; and c) describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.

According to the review of the TCFD-aligned disclosure by the six banks, it was found that in respect of: a) to describe the organization's processes for identifying and assessing climate-related risks, only 4 banks, being BBL, KBank, SCB and TISCO have disclosed guidelines for identifying and assessing climate-related risks. The banks classified climate-related risks using their conventional approach, including credit risk, market risk, liquidity risk and operational risk. Each bank has explained the impact of the potential risks they anticipated, as well as disclosed the guidelines for addressing each type of risk according to the timeframe set by respective banks, from the short, medium and long term.

For example, KBank disclosed its climate-related risk consideration guidelines which cover risk identification to reflect the situation or threat that climate-related risks can impose on the bank. The guidelines also cover risk assessment and mitigation to show risk priority and preventive approach for the potential impact on the bank's operations, as shown in Figure 3. KBank classified and analysed each type of climate-related risks, both transition risks which include legal risks, technology risks, market risks, reputational risks, and physical risks which include acute physical risks and chronic physical risks. KBank has set a specific timeframe in its guideline to control each potential risk.



Figure 3 Kbank's Climate-related Risk Considerations Guidelines

Table 13 Risk Management - a) Describe the organization's processes for identifying and assessing climate-related risks

Good Disclosure Practices	BBL	KBANK	TTB	SCB	TISCO	GSB
(1) Describe the risk management processes for identifying and assessing climate-related risks; determine the relative significance of climate-related risks in relation to other risks	✓	✓	X	✓	✓	X
(2) Describe whether the organization considers existing and emerging regulatory requirements related to climate change and other relevant factors	✓	✓	X	✓	✓	X
(3) Disclose processes for assessing the potential size and scope of identified climate-related risks and opportunities	✓	✓	X	✓	✓	X
(4) Describe definitions of risk terminology used or references to existing risk classification frameworks used	✓	✓	X	✓	✓	X
(5) Characterise their climate-related risks in the context of traditional banking industry risk categories such as credit risk, market risk, liquidity risk, and operational risk	✓	✓	X	✓	✓	X
(6) Classify their risks based on the framework of Enhanced Disclosure Task Force	X	X	X	X	X	X

Note: The green boxes are the criteria from Supplemental Guidance for Banks.

On the TCFD-aligned disclosure on b) describing the organization's processes for managing climate-related risks, it was found that most banks described the process of climate-related risk management, starting from the decision-making process to mitigate, transfer, accept, or control each type of risks. However, KBank and TISCO are the only two banks that described the climate-related risks prioritisation process, whereby they mentioned the process of making materiality determination. For example, TISCO set guidelines for identifying, assessing, and prioritising the impacts that occurred, as shown in Figure 4, to classify impact consideration based on the level of severity and probability of the impact.

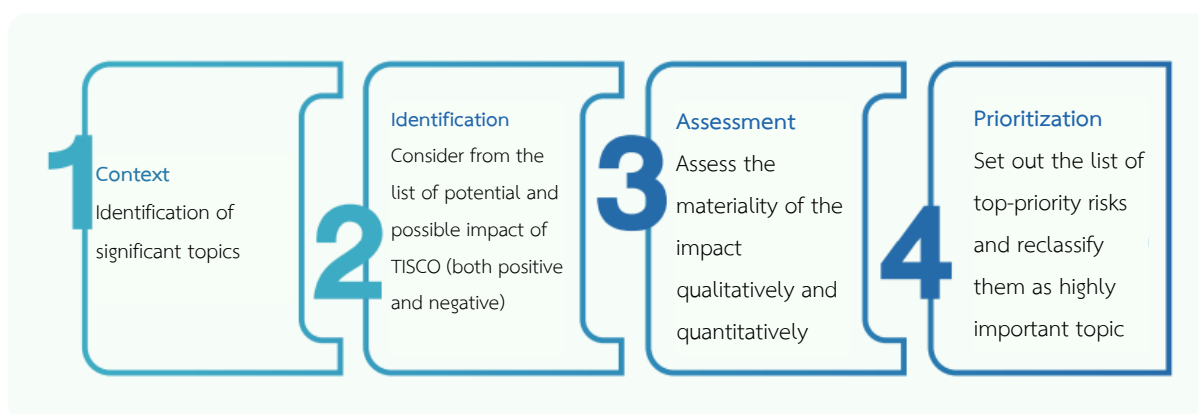


Figure 4 Guidelines for determining the list of major impacts of TISCO

The research team found that none of the banks has made any TCFD-aligned disclosure on c) describing processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.

Table 14 Risk Management b) Describe the organization's processes for managing climate-related risks

Recommended Disclosures	Good Disclosure Practices	BBL	KBANK	TTB	SCB	TISCO	GSB
b) Describe the organization's processes for managing climate-related risks	(1) Describe the processes for managing climate-related risks, including how they make decisions to mitigate, transfer, accept, or control those risks	✓	✓	X	X	✓	X
	(2) Describe its processes for prioritizing climate-related risks, including how materiality determinations are made within the organizations	X	✓	X	X	✓	X
	(3) Classify the risks into 1) transition risks; and 2) physical risks in the description of climate-related risk management	✓	✓	X	✓	✓	X

Table 15 Risk Management - c) Describe how processes for identifying and assessing climate-related risks are integrated into the organization's overall risk management

Good Disclosure Practices	BBL	KBANK	TTB	SCB	TISCO	GSB
(1) Describe how their processes for identifying, assessing, and managing climate-related risks are integrated into their overall risk management	X	X	X	X	X	X

Metrics and Targets

To ensure that the disclosure of information on climate-related risks and opportunities is transparent and accountable, the TCFD's recommendations advise organizations to disclose their metrics and targets pertaining to climate change, which can be divided into three areas: a) disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process; b) disclose Scope 1, Scope 2 and, if appropriate, Scope 3 GHG emissions and the related risks; and C) describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.

Based on the review of the TCFD-aligned disclosure from the six banks, it was found that on a) disclosing the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process, the six banks had set Scope 1 and Scope 2 GHG emission reduction targets. Only KBank and SCB have set their net-zero targets by 2030, while TISCO and GSB have set their net-zero targets by 2050, 20 years apart from the targets of the two former banks. BBL and ttb have not yet disclosed their net-zero targets.

Table 16 Scope 1 and Scope 2 GHG Emission Reduction Targets of the Banks

Banks	Scope 1 and Scope 2 GHG Emission Reduction Targets
Bangkok Bank	Reduce GHG emissions by 25% by 2030 compared to 2020 base year
Kasikornbank	Achieve net-zero by 2030
TMBThanachart Bank	Reduce GHG emissions by 15% by 2026 compared to 2019 base year
Siam Commercial Bank	Achieve net-zero by 2030
TISCO Bank	Achieve net-zero by 2050
Government Savings Bank	Achieve net-zero by 2050

In addition, almost all banks have set targets to reduce or limit lending to businesses in carbon-intensive industries, such as the coal mining industry and coal-fired power plants, as well as the oil and natural gas industry, to support the transition to a low-carbon economy. Each bank has set specific lending conditions for renewable energy projects and sustainable businesses. However, Scope 3 GHG emission reduction target has been set only by KBank, SCB, and TISCO which have stated that they will reduce Scope 3 GHG emissions as detailed in Table 17.

Table 17 Scope 3 GHG Emission Reduction Targets of the Banks

Banks	Scope 3 GHG Emission Reduction Targets
Kasikornbank	To achieve net-zero target in the bank's financial portfolio, in line with Thailand's commitment and will expedite this process when feasible
Siam Commercial Bank	To achieve net-zero target in lending and investment by 2050
TISCO Bank	To achieve Scope 3 net-zero target by 2065 for financed emissions

All banks disclosed their annual GHG emissions in tonnes of carbon dioxide equivalent (tCO₂e) and calculated as a percentage compared against the base year set by each bank. This allows the monitoring and comparison of the amount of GHG emissions against the set targets. It is also an international unit that can be used for cross-industry comparisons.

In terms of the disclosure of climate-related metrics, including water, energy resources, and waste management, it was found that only BBL, KBank, and TISCO disclosed information on the banks' water and waste management.

The research team found that only SCBX, the parent company of SCB, disclosed internal carbon pricing data to assess potential GHG emissions from electricity consumption, assess energy efficiency, and to better understand the benefits of investing in low-carbon activities. The analysis used the assumption of an estimated carbon price of THB 650 per ton (from a cost of USD 20 per ton) and investment opportunities (such as shadow prices) of THB 100 per ton. In addition, SCBX planned to pilot the monitoring of the impact of carbon fee collection in certain departments. The collected money will be invested in future green initiatives.

However, no bank disclosed the information on (4) approach of incorporating performance metrics into remuneration policies, where climate-related issues are material; (7) metrics used to assess impact arising from physical risks and transition risks on lending and financial intermediary business activities in the short, medium and long term'. Metrics provided may relate to credit exposure, equity and debt holdings, or trading positions, broken down by industry, geography, credit quality, and average tenor; and (8) the amount and percentage of carbon-related assets relative to total assets.

Table 18 Metrics and Targets - a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process

Good Disclosure Practices	BBL	KBANK	TTB	SCB	TISCO	GSB
(1) Disclose key metrics used to measure and manage each climate-related risks and opportunities	✓	✓	✓	✓	✓	✓
(2) Disclose metrics consistent with the cross-industry, climate-related metric categories	✓	✓	✓	✓	✓	✓
(3) Disclose metrics on climate-related risks associated with water, energy, land use, and waste management where relevant and applicable	✓	✓	X	X	✓	X
(4) Describe whether and how related performance metrics are incorporated into remuneration policies, where climate-related issues are material	X	X	X	X	X	X
(5) Disclose internal carbon prices	X	X	X	✓	X	X
(6) Provide forward-looking metrics for the cross-industry, climate-related metric categories—consistent with their business or strategic planning time horizons	✓	✓	X	✓	X	✓

Good Disclosure Practices	BBL	KBANK	TTB	SCB	TISCO	GSB
(7) Provide metrics used to assess impact of (transition and physical) climate-related risks on lending and other financial intermediary business activities in the short, medium, and long term. Metrics provided may relate to credit exposure, equity and debt holdings, or trading positions, broken down by industry, geography, credit quality, and average tenor	X	X	X	X	X	X
(8) Provide the amount and percentage of carbon-related assets relative to total assets	X	X	X	X	X	X
(9) Provide the amount of lending and other financing connected with climate-related opportunities	✓	✓	✓	✓	✓	X
(10) Describe the extent to which their (lending and other financial intermediary business) activities, where relevant, are aligned with a well below 2°C scenario, using whichever approach or metrics best suit their organizational context or capabilities	X	X	X	✓	X	X

Note: The green boxes are the criteria from Supplemental Guidance for Banks.

Issue b) focuses on the disclosure of Scope 1, Scope 2, and Scope 3 GHG emissions that follows international standard methodologies to enable comparisons between organizations and paint an overview of the industry. It is expected that all Scopes of GHG emissions shall be disclosed in accordance with Global GHG Accounting and Reporting Standard for the Financial Industry of the Partnership for Carbon Accounting Financials (PCAF Standard). Moreover, a calculation method consistent with the methodology of the Greenhouse Gas Protocol (GHG Protocol) shall be applied as an internationally accepted model for calculating and disclosing GHG emissions. The definitions of each scope of GHG emissions under PCAF Standard are as follows⁵:

1. Scope 1 GHG emissions: Direct GHG emissions that occur from sources owned or controlled by the reporting company—i.e., emissions from combustion in owned or controlled boilers, furnaces, vehicles.
2. Scope 2 GHG emissions: Indirect GHG emissions from the generation of purchased or acquired electricity, steam, heating, or cooling consumed by the reporting company. The emissions physically occur at the facility where the electricity, steam, heating, or cooling is generated.
3. Scope 3 GHG emissions: All other indirect GHG emissions (not included in Scope 2) that occur in the value chain of the reporting company. Scope 3 can be broken down into upstream emissions that occur in the supply chain (e.g., from production or extraction of purchased materials) and downstream emissions that occur as a consequence of using the organization's products or services. Upstream emissions include all emissions that occur in the life cycle of a material/product/service up to the point of sale by the producer, such as from the production equipment used in a company's operation. Downstream emissions include all emissions that occur as a consequence of the distribution, storage, use, and end-of-life treatment of the organization's products or services, including emissions occurring from lending or investment of a company.

In addition, the TCFD's recommendations expect organizations to release data on the GHG emissions and associated metrics for historical periods to allow for trend analysis.

⁵ <https://carbonaccountingfinancials.com/files/downloads/PCAF-Global-GHG-Standard.pdf>

According to the assessment, there are five banks that disclosed climate change data according to the TCFD's guidelines. They disclosed the quantity of Scope 1 and 2 GHG emissions in the bank's operations over a 4-5-year period from the past to the present (unit: tonnes of CO₂e). Each bank adopted different approaches in determining the scope of data to be used for calculation. Most banks only disclosed Scope 1 GHG emissions from operations within their headquarter buildings. Meanwhile, some banks have provided additional details; for example, KBank provided that it collects GHG emission data from refrigeration equipment used in office buildings. Also, SCB detailed that it collects data from automatic teller machines (ATMs), currency exchange service counters, and available bank branches, and etc.

Parameter	Unit	Performance				Target 2023	Performance 2023 vs Base year 2020
		2020 (Base year)	2021	2022	2023		
Greenhouse Gas Emission (GHG Emission)							
Total Scope 1 emission	Tonnes CO ₂ e	18,727.05	15,833.59	11,232.01	15,467.65		
Total Scope 2 emission (Location based)	Tonnes CO ₂ e	69,105.49	64,980.29	61,336.01	64,034.31		
Total Scope 2 emission (Market based)	Tonnes CO ₂ e	69,105.49	64,980.29	61,141.55	61,174.88		
Total Scopes 1 & 2 emission**	Tonnes CO ₂ e	87,832.54	80,813.88	72,373.56	76,642.53	76,765.64 (12.6% reduction from base year 2020)	-12.74%
Total Scopes 1 & 2 emission intensity**	Tonnes CO ₂ e per FTE	2.66	2.55	2.30	2.40		
Full Time Employee	FTE	33,034	31,706	31,469	31,868		

Figure 5 Scope 1 and 2 GHG emissions in Kasikornbank's operations

There is a total of four banks—including KBank, SCB, ttb, and TISCO—that disclosed Scope 3 GHG emissions or emissions that are linked to the bank's credit or investment portfolio (financed emission). KBank and SCB disclosed their past to present annual data on the quantity of GHG emissions by industry and asset class. ttb disclosed its by-industry data and TISCO disclosed by asset class. However, the research team found that the average quality score of the Scope 3 GHG emission data for all disclosing banks is 3.9 (Maximum Quality = 1 and Minimum Quality = 5), based on the calculation methodology of PCAF. This is due to the fact that the disclosed GHG emission data relies on estimates as most of the bank's credit customers have not yet been able to provide complete data on the quantity of GHG emissions.

Types of assets/sectors	2022 ⁽¹⁾						2023					
	Portfolio allocation	Absolute GHG emissions (Tonnes of CO ₂ equivalent)		Weighted score of data quality ⁽²⁾ (Highest quality = 1 Lowest quality = 5)		Emissions Intensity ⁽³⁾ (Scope 1+2) (Tonnes of CO ₂ equivalent to USD 1 million of investment or loan)	Portfolio allocation	Absolute GHG emissions (Tonnes of CO ₂ equivalent)		Weighted score of data quality ⁽²⁾ (Highest quality = 1 Lowest quality = 5)		Emissions Intensity ⁽³⁾ (Scope 1+2) (Tonnes of CO ₂ equivalent to USD 1 million of investment or loan)
		Scope 1+2	Scope 3 ⁽⁴⁾	Scope 1+2	Scope 3			Scope 1+2	Scope 3 ⁽⁴⁾	Scope 1+2	Scope 3	
By sectors (business loans and project finance loans)												
Municipal power generation and municipal water	100% of business loans and project finance ⁽⁵⁾	4,676,798	-	2.9	-	-	100% of business loans and project finance ⁽⁵⁾	3,620,908	-	3.1	-	-
Oil and gas		2,768,426	3,045,964	3.9	3.9	-		2,615,769	3,244,476	3.8	3.9	-
Cement		850,088	220,158	4.4	4.4	-		740,709	200,208	4.1	4.2	-
Agriculture		720,436	-	4.5	-	-		783,184	-	4.5	-	-
Transportation		654,163	742,653	4.3	4.3	-		746,301	863,015	4.1	4.2	-
Iron and steel		492,727	378,188	4.1	4.1	-		489,972	374,997	4.1	4.1	-
Coal		362,448	336,116	2.2	2.2	-		131,948	322,596	2.2	2.2	-
Aluminium		64,973	97,724	3.2	3.2	-		56,370	92,096	2.9	2.9	-
Real estate		18,005	-	4.1	-	-		39,212	-	4.0	-	-
Other sectors ⁽⁶⁾		7,102,302	13,612,599	4.3	4.3	-		7,222,004	13,856,436	4.3	4.3	-
Total		17,710,366	18,433,402	4.2	4.2	382.3		16,446,376	18,953,824	4.2	4.2	354.3

Figure 6 Scope 3 GHG Emissions of Kbank by Industry

Types of assets/sectors	2022 ⁽¹⁾						2023					
	Portfolio allocation	Absolute GHG emissions (Tonnes of CO ₂ equivalent)		Weighted score of data quality ⁽²⁾ (Highest quality = 1 Lowest quality = 5)		Emissions Intensity ⁽³⁾ (Scope 1+2) (Tonnes of CO ₂ equivalent to USD 1 million of investment or loan)	Portfolio allocation	Absolute GHG emissions (Tonnes of CO ₂ equivalent)		Weighted score of data quality ⁽²⁾ (Highest quality = 1 Lowest quality = 5)		Emissions Intensity ⁽³⁾ (Scope 1+2) (Tonnes of CO ₂ equivalent to USD 1 million of investment or loan)
		Scope 1+2	Scope 3 ⁽⁴⁾	Scope 1+2	Scope 3			Scope 1+2	Scope 3 ⁽⁴⁾	Scope 1+2	Scope 3	
By asset classes according to PCAF standard												
Business Loans and Unlisted Equity	100% of corporate bonds, listed and unlisted equity, and business loan	13,486,639	18,471,275	4.2	4.2	300.0	100% of corporate bond, listed and unlisted equity, and business loans	12,977,636	18,964,195	4.2	4.2	287.3
Listed Equity and Corporate Bonds		79,731	209,534	4.2	4.3	40.4		58,685	163,165	4.4	4.5	45.2
Project Finance Loans	100% ⁽⁵⁾	4,227,346	-	3.0	-	2,709.0	100% ⁽⁵⁾	3,469,414	-	3.0	-	2,654.1
Motor Vehicle Loans	-	-	-	-	-	-	99.7%	673,324	-	3.8	-	165.0
Mortgages Loans	-	-	-	-	-	-	84.9%	367,800	-	4.0	-	39.3
Total		17,793,716	18,680,809	4.2	4.3	366.9		17,546,659	19,127,360	4.1	4.2	286.6

Figure 7 Scope 3 GHG Emissions of Kbank by Asset Class

Detailed Breakdown of Emissions Associated with Our Wholesale Banking Book							
ISIC Sector	S1-S2 Financed Emissions (Mt CO ₂ e)	S1-S2-S3 Financed Emissions (tCO ₂ e per Million USD Financing and/ or investment)	S1-S2 PCAF Data Quality Score	S1-S2-S3 Financed Emissions (Mt CO ₂ e)	S1-S2-S3 Financed Emissions (tCO ₂ e per Million USD Financing and/ or investment)	S1-S2-S3 PCAF Data Quality Score	Relative Contribution
Power generation	3.38	864	2.9	4.12	1055	2.9	17%
CRE	0.18	36	3.5	0.54	108	3.8	22%
Fossil fuel	0.11	401	4.1	1.34	5032	4.1	1%
Industrial Chemicals & Raw Materials	0.33	136	3.7	1.73	722	3.7	10%
Wholesale & Retail	0.24	120	3.5	4.65	2350	4.1	9%
Real Estate	0.00	3	3.6	0.08	49	4.0	7%
Agricultural Products & Commodities	0.09	86	4.0	1.12	1034	4.0	5%
Transportation & Logistics	0.15	152	3.5	0.23	235	3.5	4%
Others	0.05	54	4.0	0.44	455	4.0	4%
Foods and Beverages	0.08	110	4.0	1.00	1452	4.0	3%
Telecommunications & Media	0.01	20	4.3	0.04	68	4.3	3%
Construction	0.02	35	4.1	0.29	451	4.1	3%
Metal	0.68	1096	4.1	2.91	4695	4.1	3%
Electronics & Electrical Appliances	0.03	60	4.1	0.84	1665	4.1	2%
Financial Institutions	0.00	4	4.2	0.03	68	4.3	2%
Auto & Parts	0.02	46	4.1	0.58	1456	4.1	2%
Building Materials	0.05	130	4.0	0.43	1206	4.0	2%
Hospitality	0.01	23	4.0	0.02	80	4.0	1%
Rice & Grain Milling	0.02	129	3.9	0.21	1260	4.0	1%
Power and Utilities	0.05	461	4.0	0.55	4875	4.0	0.5%
Energy	0.02	422	4.2	0.32	7108	4.2	0.2%

Figure 8 Scope 3 GHG Emissions of SCB by Industry

SCBX's Financed Emissions Intensity per Asset Class and Business Segment

Asset Class	2021		2022		2023	
	Financed Emissions (tCO ₂ e per million USD financing and/or investment)	PCAF Data Quality Score	Financed Emissions (tCO ₂ e per million USD financing and/or investment)	PCAF Data Quality Score	Financed Emissions (tCO ₂ e per million USD financing and/or investment)	PCAF Data Quality Score
Business Loan - Corporate	112	4.00	114	3.80	126	3.78
Project Finance	966	3.16	965	3.07	961	3.12
Business Loan - SME	98	4.11	97	4.16	94	4.13
Mortgage Loan	39	4.02	41	4.02	38	4.01
Investment in Listed Equity and Corporate Bond	657	4.76	512	4.26	393	3.89
TOTAL	152	3.95	149	3.87	149	3.86

Figure 9 Scope 3 GHG Emissions of SCB by Asset Class

Scope 3 GHG Emissions Category 15

Sectors (Asset class: Business loans)	Financed absolute emission	Financed emission intensity	Weighted data of quality score ³
Coal	60,636.0	-	4.00
Power generation	1,404,262.9	-	3.04
Oil and gas	1,350.9	-	1.03
Total	1,466,250	0.08	-

Figure 10 Scope 3 GHG Emissions of ttb

Asset Class	Proportion of Data Disclosure in the Portfolio	Absolute Greenhouse Gas Emissions (tonnes of CO ₂ equivalent)	Data Quality Score**
Equity	100% of ordinary shares	403	4.8
Corporate Bonds	100% of corporate bonds	79	5.0
Car and Motorcycle Hire Purchase	44% of total loans*	383,155	5.0
	Total	383,637	5.0

Notes: *Business loans and others are still in the process of data collection for disclosure.

** Data quality score is calculated according to the financed emissions calculation and reporting standards of PCAF (maximum quality = 1 and minimum quality = 5)

Figure 11 Scope 3 GHG emissions of TISCO

KBank, SCB, TISCO, and ttb stated that the disclosure of GHG emissions from the bank's operations is in accordance with the PCAF Standard for Global GHG Accounting and Reporting Standard for the Financial Industry.

Table 19 Metrics and Targets – b) Disclose Scope 1, Scope 2 and, if appropriate, Scope 3 GHG emissions and the related risks from the organizations' emission

Good Disclosure Practices	BBL	KBANK	TTB	SCB	TISCO	GSB
(1) Disclose Scope 1 GHG emission	✓	✓	✓	✓	✓	X
(2) Disclose Scope 2 GHG emission	✓	✓	✓	✓	✓	X
(3) Disclose Scope 3 GHG emission	X	✓	✓	✓	✓	X
(4) Disclose that GHG emissions was calculated in line with the GHG Protocol methodology and provide industry-specific GHG efficiency ratios, as appropriate	X	X	X	X	X	X
(5) Provide GHG emissions and associated metrics for historical periods to allow for trend analysis	✓	✓	X	✓	X	X
(6) Disclose GHG emissions from its operation calculated in line with PCAF Standard for Global GHG Accounting and Reporting Standard for the Financial Industry.	X	✓	✓	✓	✓	X

Note: The green boxes are the criteria from supplementary guidance for the banking sector.

Under the item c) on ‘the recommended disclosure of metrics and targets’, banks are expected to disclose measurable targets in managing climate-related risks and opportunities, as well as to specify clear timeframes, base years, and indicators to measure the progress of the banks’ operations on climate change.

All banks have disclosed Scope 1 and 2 GHG emission reduction targets, but only four banks, namely KBank, SCB, TISCO, and ttb have disclosed their Scope 3 GHG emission reduction targets. The research team did not find a bank that clearly state that the target disclosed by it was absolute-based or intensity-based disclosure.

All banks disclosed the timeframes of the GHG emission reduction targets and the base years for calculation. For instance, SCB disclosed its net-zero targets concerning its operations (Scope 1 and 2) to be achieved by 2030 and net-zero targets for its lending and investments (Scope 3) to be achieved by 2050. SCB has set its short-term targets and identified base years to measure progress, such as reducing Scope 1 and 2 GHG emissions by 5 percent from 2022 onwards.

In addition, it was found that four banks, namely BBL, KBank, SCB, and ttb, have disclosed index or annual performance indicators used to assess progress against climate targets. For instance, SCB aims to reduce GHG emissions in its power generation portfolio from 0.39 tonnes of CO₂e per megawatt hour (MWh) in 2021 to 0.19 tonnes of CO₂e per megawatt hour (MWh) by 2030, as shown in Figure 12. It also applied "Implied Temperature Rise (ITR)" methodology to help financial institutions track whether their investment approach is in line with the target of limiting global temperature rise to 1.5°C, according to the Paris Agreement, as shown in Figure 13.

Table 20 Bank's 2023 Sustainability Targets Compared against Progress

2023		Bangkok Bank	Kasikornbank	TMBThanachart Bank	Siam Commercial Bank
Scope 1 and 2	Targets	7.5% Reduction (2020 Base year)	12.6% Reduction (2020 Base year)	12% Reduction (2019 Base year)	5% Reduction (2022 Base year)
	Progress	<u>Scope 1:</u> 48.48% Increase <u>Scope 2:</u> 3.13% Decrease	12.74%	21%	10%
Green Loans	Targets (Million Baht)	-	25,168	9,000	-
	Progress (Million Baht)	-	46,986	17,829	-
glide path	Targets	-	2 (Total 7)	-	Produced initial database and Scope 3 GHG emissions reduction strategies
	Progress	-	2 (Total 7)	-	Produced initial database and Scope 3 GHG emissions reduction strategies

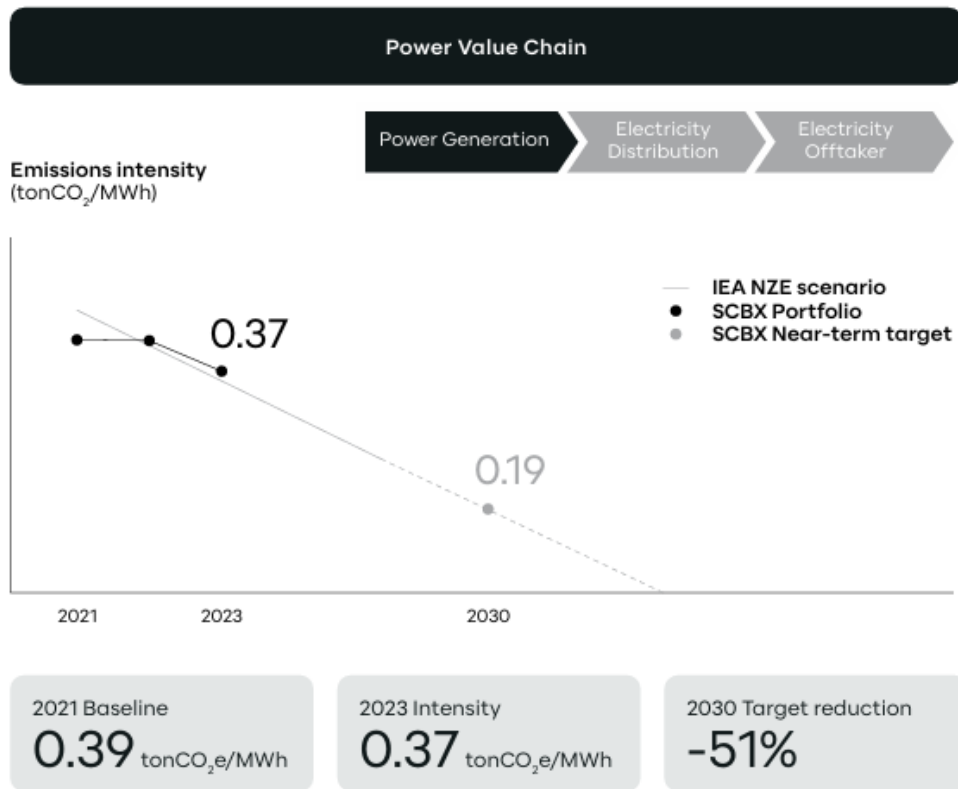


Figure 12 glide path – Intensity reduction targets for GHG emissions from electricity generation in the port of SCBX

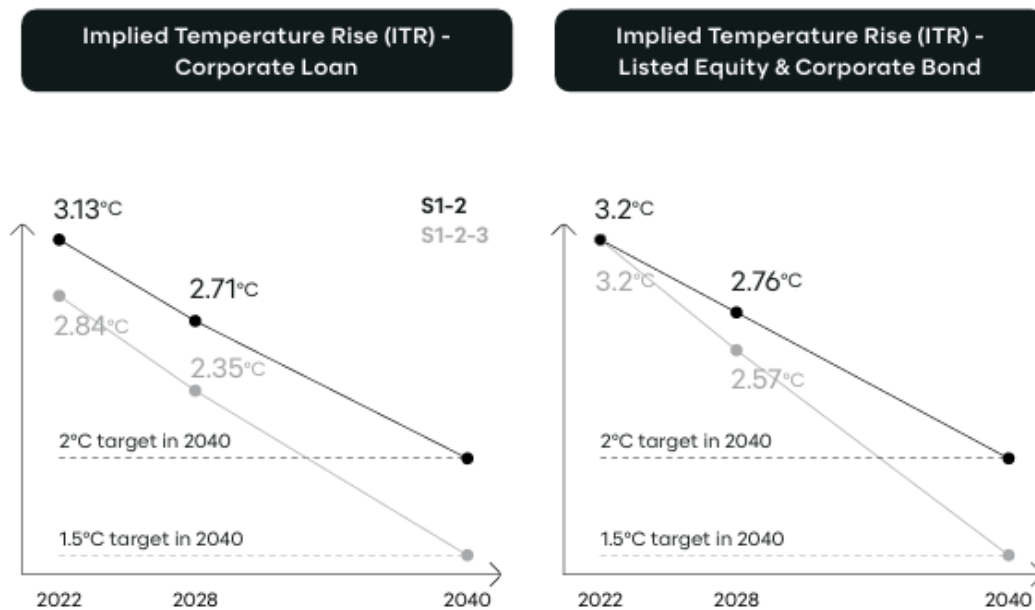


Figure 13 glide path – Projection of temperature rise from corporate loan and listed equity and corporate bond portfolios of SCBX

Table 21 Bank's 2023 Sustainability Targets Compared against Progress

Good Disclosure Practices	BBL	KBANK	TTB	SCB	TISCO	GSB
(1) Describe the consistency between key climate-related targets (GHG emissions, water usage, energy usage, etc.) and cross-industry, climate-related metric categories. If feasible, associate with anticipated regulatory requirements, market constraints, or other targets.	X	X	X	√	X	X
(2) Disclose GHG emission targets, whether the target is absolute or intensity-based	X	X	X	X	X	X
(3) Disclose timeframes of GHG reduction targets and a base year used to calculate progress towards the targets	√	√	√	√	√	√
(4) Disclose key performance indicators used to assess progress against targets	√	√	√	√	X	X

Challenges of Information Disclosure by Thai Banks

TCFD-aligned disclosures keep the banks' stakeholders and investors informed of the progress of addressing climate change and prepares the banks for the climate change situation that will only increase in severity and frequency. The disclosure on Governance enables the banks to adopt an organizational structure and oversight that are climate change-ready; strategy disclosure prepares the banks through the analysis of climate-related risks and opportunities; and risk Management and determination of Metrics and Targets enable the banks' operations to be more in line with climate change.

However, as the banks in Thailand are now facing certain limitations, there are improvable gaps in complying with TCFD-aligned disclosures by banks in Thailand. The challenges and opportunities can be categorised into four main issues:

1. Resources, time, and costs

A TCFD-aligned disclosure is costly, time-consuming, and resource-intensive. Banks with the capability to completely disclose their information are larger banks, such as KBank, which has been focusing on conducting climate change impact analysis for more than five years.

The BOT is currently providing capacity building trainings to banks on TCFD-aligned disclosures and requiring banks to conduct climate stress-test analysis to continue with the development of transition plan and determination of GHG emission reduction indicators and targets. The BOT expects Thai commercial banks to conduct TCFD-aligned disclosures by 2025.

"Currently, the BOT encourages D-SIBs (Domestic Systematically Important Banks) to start conducting pilot stress testing, in order for them to learn the methodologies. In the future, the quality of this exercise will be better and reflect the true risks. Then, the banks will have the potential to measure their physical and transition risks."

Representative of the Bank of Thailand

In addition, the BOT has continuously organized training on climate change issues. However, most of the training still focuses on establishing the overall understanding. Regarding the implementation stage, it is still necessary to improve additional practical skills. This includes spending time to establish the mutual understanding among departments of sustainability, risk, and management. Additionally, it is necessary to persuade the management to recognize and to obtain their buy-in on the climate change management approach. It is also crucial for each department to work together to ensure that their climate change preparedness efficiently aligns with the TCFD's recommendations.

2. Access to information

Over 99 percent of GHG emissions attributable to banks arise from financed emissions. These emissions are part of Scope 3 GHG emissions disclosures, which pose considerable challenges for many financial institutions. From the quality score of the banks' disclosure of Scope 3 GHG emission according to the PCAF Standard, the quality scored is relatively low as proxies have been applied for most of the calculations.

Many banks reflect that it is not easy to collect data from their clients and there are still uncertainties about how the collected data is utilised, such as the different valuation methods used by the banks. Moreover, the calculation of GHG emissions relies on data from clients, which is not always readily available to be disclosed, particularly for small and medium enterprises (SMEs). They do not have sufficient cost to analyse and disclose data like larger companies or listed companies which have the knowledge and commitment to their net-zero targets.

"From a national perspective, everyone should use the same standardized database. The situation now requires that if any entity wants to do something, they may need to hire a consultant or buy data from other sources. If this is the approach that everyone needs to follow, there should be an open data database or centralised national database that everyone can conveniently access and use. Having a database like this will enhance the efficiency of the process and reduce the cost burden for all parties."

A bank representative

However, many banks have shown their readiness to support SMEs to increase their capacity in this area, but costs required for this purpose may need to be subsidised by some government agencies to enhance the ability to cope with climate change at the national level in solidarity.

"Incentives are an important factor in supporting banks in this process, as banks can help customers to some extent, but taking on the entire operational burden without adequate support can be too much of a burden for banks."

A bank representative

3. Collaborative approach between the public sector and regulators

As regulating agencies, the BOT and the SEC play an important role in promoting and supporting TCFD-aligned disclosures. They have been providing training and developing a collaborative approach with banks and companies to ensure that disclosure follows international standards. However, climate-related disclosures still require the cooperation of other regulators, such as the Stock Exchange of Thailand (SET) and Thailand Greenhouse Gas Management Organization (TGO), to streamline the climate-related disclosure guidelines and to efficiently gain access to the GHG emission database for Scope 3 GHG emissions calculation. Government agencies have made efforts to streamline their operations through collaboration, communication, and exchange of work plans among regulating agencies, fostering consistency and driving the progress in the same direction.

"Therefore, the proposed approach may be general, which is not wrong in any way, but the role of the Bank of Thailand, or even the Thai Bankers' Association, is to ensure that the platform adopted or the given approach can clearly benefit the banks. The process under the banks' framework must have clear standards. Additionally, communication must be provided to banks to establish mutual understanding and consistent overall picture."

A bank representative

In the future, government agencies will likely increase their role in enforcing regulations on climate change information disclosure, such as the Climate Change Act, especially in comprehensive data collection and risk assessment. Banks and companies will need to further adapt in terms of efficient data disclosure and risk management.

4. Upgrading the information disclosure following the TCFD's recommendations to IFRS S2

The TCFD-aligned disclosure is a good starting point to prepare banks to upgrade their disclosure up to IFRS S2 Climate-Related Disclosure which focuses on disclosing information on the risks and financial impacts of climate change on businesses, while the TCFD focuses on strategic disclosure and environmental risks. Therefore, IFRS S2 enforces more stringent requirements for the disclosure of financial impact, especially in relation to accounting operations.

Many banks in Thailand have begun to prepare data disclosures under IFRS S2, by improving their climate-related data collection and evaluation capacity. Regulatory agencies, such as the BOT and SEC play an important role in supporting banks in complying with this standard.

Therefore, banks expect that government agencies and the BOT will organize trainings and collaborate with the banks to enhance the capacity required to comply with international standards, particularly for information disclosures under IFRS S2. The collaboration also includes the preparedness for the disclosure of more complex quantitative data, formulation of a clear plan setting out data disclosure expectations under multiple standards, and the timeline for implementation. Support from regulating agencies in developing database systems and creating comprehensive data disclosure standards will be key to the long-term success of IFRS S2 implementation.

"In the future, implementing these guidelines is inevitable. Therefore, setting a clear timeline of implementation and clear communication will enable all parties to efficiently prepare. In addition, development, training, and education should be continuously initiated to ensure that everyone understands and is prepared to adapt."

A bank representative

Appendix

Appendix A:

Summary of Methods and Assessment Outcome of Climate-Related Disclosure Situation of Financial Institutions Worldwide

The TCFD and several other firms, including Ernst & Young (EY), KPMG and Accenture, conducted global climate assessments of financial institutions. In analysing the consistency between the documents of banking institutions and the TCFD's recommendations, these organizations designed different research methodologies in terms of the number of populations studied and the evaluation criteria. Therefore, the results of the studies showed both similarities and differences. Hence, to present an overview of the climate-related disclosure situation of financial institutions worldwide, the research team will present the design of the evaluation methodologies and the study results of the four organizations, as follows:

Assessment of the Climate-Related Disclosure Situation of Financial Institutions Worldwide by Ernst & Young

Ernst & Young analysed the climate-related disclosures of 1,500 companies, broken down by business categories, including financial institutions. It relied on two evaluation criteria: coverage and quality.

Results of the EY study found that financial institutions' overview of climate-related disclosure in 2023 has improved for both evaluation criteria, compared to 2022. Regarding the coverage criteria, the proportion of financial institutions that conducted TCFD-aligned disclosure increased from 77 percent to 86 percent. For the quality criteria, financial institutions' climate-related disclosure increased from 39 percent to 46 percent (EY, 2023).

Assessment of the Climate-Related Disclosure Situation of Financial Institutions Worldwide by TCFD

The TCFD used artificial intelligence (AI) to assess consistency between financial institutions' climate-related information and the TCFD's recommendations. AI was employed to review documents of financial institutions, including financial statements, annual reports, sustainability reports, TCFD Reports, and other relevant reports from a total of 235 entities in five regions: Asia, Europe, Latin America, North America, Africa, and the Middle East.

The results of the TCFD's study revealed that financial institutions worldwide have disclosed an average of five out of 11 recommended climate-related information disclosures in alignment with the TCFD's recommendations. The recommendation with highest compliance from financial institutions was Core Element 2: Strategy on Risk and Opportunity (69 percent), while the least complied-with was Core Element 2: Resilience of Strategy, which scored only 9 percent. The report also stated that Europe is the continent with the most compliant disclosures by financial institutions (6.9 out of 11 recommendations) as most countries or jurisdictions have laws that require large companies to disclose climate-related information (TCFD, 2023).

Assessment of the Climate-Related Disclosure Situation of Financial Institutions Worldwide by KPMG

KPMG designed a different assessment methodology from TCFD's. KPMG's report studied and assessed climate-related disclosures of 35 large financial institutions across four continents: Europe, Australia, North America and Asia. KPMG relied on a maturity scale for its analysis. There are three scale levels: Red (needs further improvement), Yellow (the disclosure is quite advanced), and Green (the disclosure is progressive).

Results of the study by KPMG indicated that TCFD-aligned disclosures by all 35 large financial institutions were assessed as progressive disclosure or Green for Core Elements 1 (Governance) and 3 (Risk Management). For Core Elements 2 (Strategy) and 4 (Metric and Targets), financial institutions still need to expedite the development of climate-related disclosure to align with TCFD's recommendations (KPMG, 2023).

Assessment of the Climate-Related Disclosure Situation of Financial Institutions Worldwide by Accenture

Accenture analysed documents from 257 financial institutions that adopted the TCFD's recommendations based on two criteria: industry coverage and maturity to determine an overview of progress in climate-related disclosure.

Results of Accenture's study in 2022—in respect of business sector coverage—there are 257 financial institutions that adopted the TCFD's recommendations. The figure constitutes 60 percent of the world's total financial institution assets (USD 108.3 trillion), with the Asia-Pacific region having a significantly higher number of financial institutions that adopted TCFD's recommendations. However, only 182 financial institutions conducted TCFD-aligned disclosure. Regarding the maturity criteria, Accenture concluded that the recommended disclosure most complied with by financial institutions was Core Element 4: Metrics and Targets of GHG emissions and GHG emission risks of organizations. The recommended disclosure that financial institutions should improve the most is Core Element 2: Strategy on the resilience of the organisation's strategy that considers the future impact of climate change. There is still a relatively low rate of disclosure by financial institutions that shows the integration of climate-related issues in their strategic planning and impact assessment of climate-related risks and opportunities (Accenture, 2022).

Appendix B

Disclosure Assessment Criteria Based on TCFD recommendations

Governance

Recommended Disclosure	Good Disclosure Practices
a) Describe the oversight of the bank's board of directors on climate-related risks and opportunities	(1) Disclose processes and frequency by which the board and/or board committees (e.g., audit, risk, or other committees) are informed about climate-related issues
	(2) Disclose whether the board and/or board committees consider climate-related issues when reviewing and guiding strategy, major plans of action, risk management policies, annual budgets, and business plans
	(3) Disclose whether the board and/or board committees consider climate-related issues when setting the organization's performance objectives, monitoring implementation and performance, overseeing major capital expenditures, acquisitions, and divestitures
	(4) Describe how the board monitors and oversees progress against goals and targets for addressing climate-related issues
b) Describe management's role in assessing and managing climate-related risks and opportunities	(1) Disclose whether the organization has assigned climate-related responsibilities to management-level positions or committees
	(2) Disclose whether such management positions or committees report to the board or a committee of the board and whether those responsibilities include assessing and/or managing climate-related issues
	(3) Describe the associated organizational structure
	(4) Describe processes by which management is informed about climate-related issues
	(5) Describe how management (through specific positions and/or management committees) monitors climate-related issues

Strategy

Recommended Disclosure	Good Disclosure Practices
a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term	(1) Describe what they consider to be the relevant short-, medium-, and long- term time horizons
	(2) Describe the justification for the classification of the short-, medium-, and long- term time horizons
	(3) Describe the specific climate-related issues potentially arising in each time horizon (short, medium, and long term) that could have a material financial impact on the organization
	(4) Describe process(es) used to determine which risks and opportunities could have a material financial impact on the organization
	(5) Describe the significant concentration of credit exposure on carbon-related assets
	(6) Disclose climate-related risks (transition and physical) in their lending and other financial intermediary business activities
b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning	(1) Describe the impact on the organization's businesses, strategy, and financial planning in the area of products and services
	(2) Describe the impact on the organization's businesses, strategy, and financial planning in the area of supply chain and/or value chain
	(3) Describe the impact on the organization's businesses, strategy, and financial planning in the area of adaptation and mitigation activities
	(4) Describe the impact on the organization's businesses, strategy, and financial planning in the area of investment in research and development
	(5) Describe the impact on the organization's businesses, strategy, and financial planning in the area of operations (including types of operations and location of facilities)
	(6) Describe the impact on the organization's businesses, strategy, and financial planning in the area of acquisitions or divestments
	(7) Describe the impact on the organization's businesses, strategy, and financial planning in the area of access to capital.

Strategy

Recommended Disclosure	Good Disclosure Practices
	(8) Describe how climate-related issues serve as an input to financial planning process, indicate the time period(s) used, and how these risks and opportunities are prioritized. The organization's disclosures should reflect a holistic picture of the interdependencies among the factors that affect their ability to create value over time
	(9) Describe the impact of climate-related issues on their financial performance
	(10) Disclose climate-related scenarios analysis, if they were used to inform the organization's strategy and financial planning
	(11) Describe the transition plan to a low-carbon economy and which could include GHG emissions targets and specific intent to reduce GHG emissions
c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario	(1) Describe how resilient their strategies are to climate-related risks and opportunities, taking into consideration a transition to a low-carbon economy consistent with a 2°C or lower scenario and scenarios consistent with increased physical climate-related risks
	(2) Describe where they believe their strategies may be affected by climate-related risks and opportunities
	(3) Describe how their strategies might change to address such potential risks and opportunities
	(4) Describe climate-related scenarios and associated time horizon(s)

Note: The green boxes are the criteria from Supplemental Guidance for Banks.

Risk Management

Recommended Disclosure	Good Disclosure Practices
a) Describe the organization's processes for identifying and assessing climate-related risks	(1) Describe the risk management processes for identifying and assessing climate-related risks and determine the relative significance of climate-related risks in relation to other risks
	(2) Describe whether they consider existing and emerging regulatory requirements related to climate change as well as other relevant factors were considered
	(3) Disclosure processes for assessing the potential size and scope of identified climate-related risks
	(4) Describe definitions of risk terminology used or references to existing risk classification frameworks used
	(5) Characterise climate-related risks in the context of traditional banking industry categories such as credit risk, market risk, liquidity risk, and operational risk
	(6) Classify their risks based on the framework of Enhanced Disclosure Task Force
b) Describe the processes for managing climate-related risks	(1) Describe processes for managing climate-related risks, including how they make decisions to mitigate, transfer, accept, or control those risks
	(2) Describe the processes for prioritizing climate-related risks, including how materiality determinations are made within their organizations
	(3) Classify the risks by dividing them into transition risks and physical risks in the description of climate-related risks management process
c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management	(1) Describe how their processes for identifying, assessing, and managing climate-related risks are integrated into their overall risk management

Note: The green boxes are the criteria from Supplemental Guidance for Banks.

Metrics and Targets

Recommended Disclosure	Good Disclosure Practices
a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process	(1) Disclose key metrics used to measure and manage climate-related risks and opportunities
	(2) Disclose metrics that are consistent with the cross-industry, climate-related metric categories
	(3) Disclose metrics on climate-related risks associated with water, energy, land use, and waste management
	(4) Where climate-related issues are material, organizations should consider describing whether and how related performance metrics are incorporated into remuneration policies
	(5) Disclose internal carbon prices
	(6) Provide forward-looking metrics for the cross-industry, climate-related metric categories consistent with their business or strategic planning time horizons
	(7) Provide metrics used to assess impact of (transition and physical) climate-related risks on lending and other financial intermediary business activities in the short, medium, and long term. Such metrics may relate to credit exposure, equity and debt holding, trading positions, broken down by: industry, geography, credit quality, and average tenor
	(8) Provide the amount and percentage of carbon-related assets relative to total assets
	(9) Provide the amount of lending connected with climate-related opportunities
	(10) Describe the extent to which their lending and other financial intermediary business activities, where relevant, are aligned with a well below 2°C scenario, using whichever approach or metrics best suit their organizational context or capabilities
b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 GHG emissions, and the	(1) Disclose Scope 1 GHG emissions

Metrics and Targets

Recommended Disclosure	Good Disclosure Practices
related risks of the organization	(2) Disclose Scope 2 GHG emissions
	(3) Disclose Scope 3 GHG emissions
	(4) Disclose that the GHG emissions was calculated in line with the GHG Protocol methodology by providing industry-specific GHG efficiency ratios, as appropriate.
	(5) Provide GHG emissions and associated metrics for historical periods to allow for trend analysis
	(6) Disclose GHG emissions from its operation calculated in line with the Global GHG Accounting and Reporting Standard for the Financial Industry developed by Partnership for Carbon Accounting Financials (PCAF Standard)
c) Describe the targets used by the organization to manage climate-related risks, opportunities, and performance against targets	(1) Describe their key climate-related targets (GHG emissions, water usage, energy usage, etc.), consistent with the cross-industry, climate-related metric categories. If feasible, the description shall be associated with anticipated regulatory requirements or market constraints or other targets
	(2) Describe whether the target is absolute or intensity-based
	(3) Describe time frames over which the target applies and base year from which progress is measured
	(4) Describe key performance indicators used to assess progress against targets

Note: The green boxes are the criteria from Supplemental Guidance for Banks.

Bibliography

- Accenture. (2022). *Task Force on Climate-related Financial Disclosures (TCFD) Recommendations: Global Progress Report for the Banking Sector*. Retrieved from <https://www.accenture.com/content/dam/accenture/final/industry/banking/document/Accenture-Banking-TCFD-progress-report.pdf#zoom=40>
- BCBS. (2021, April). *Climate-related risk drivers and their transmission channels*. Retrieved from <https://www.bis.org/bcbs/publ/d517.pdf>
- Eckstein, David, Künzel, Vera & Schäfer, Laura. (2021). *Global Climate Risk Index 2021*. Bonn: Germanwatch.
- EY. (2023). *Global Climate Risk Barometer 2023*. Retrieved from https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/assurance/assurance-pdfs/ey-2023-global-climate-risk-disclosure-barometer-v1.pdf
- IFRS. (2023, July). *Comparison IFRS S2 Climate-related Disclosures with the TCFD Recommendations*. Retrieved from <https://www.ifrs.org/content/dam/ifrs/supporting-implementation/ifrs-s2/ifrs-s2-comparison-tcf-d-july2023.pdf>
- IFRS. (2024). *IFRS Foundation welcomes culmination of TCFD work and transfer of TCFD monitoring responsibilities to ISSB from 2024*. Retrieved from <https://www.ifrs.org/news-and-events/news/2023/07/foundation-welcomes-tcf-d-responsibilities-from-2024/>
- IPCC. (2021). *Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press. doi:10.1017/9781009157896.001.
- Kasikornthai. (2024). *KBank's TCFD Report 2023*. Bangkok: Kasikornthai.
- KPMG. (2023, June). *Banks' Climate-Related Disclosures (Phase 2)*. Retrieved from <https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2023/06/isg-banks-climate-related-disclosures-report-phase2.pdf>
- Krungthai. (2023). *Krungthai Climate-related Financial Disclosure 2022*. Bangkok: Krungthai.
- SCBX. (2024). *SCBX Climate Report 2023*. Bangkok: SCBX.
- TCFD. (2017, June 15). *Recommendations of the Task Force on Climate-related Financial Disclosures*. Retrieved from <https://assets.bbhub.io/company/sites/60/2021/10/FINAL-2017-TCFD-Report.pdf>
- TCFD. (2021, October). *Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures*. Retrieved from https://assets.bbhub.io/company/sites/60/2021/07/2021-TCFD-Implementing_Guidance.pdf
- TCFD. (2023, October 12). *2023 TCFD Status Report: Task Force on Climate-related Financial Disclosures*. Retrieved from <https://www.fsb.org/2023/10/2023-tcf-d-status-report-task-force-on-climate-related-financial-disclosures/>
- TCFD. (n.d.). Retrieved from About us: <https://www.fsb-tcf-d.org/about/#our-work>
- The Economist Intelligence Unit Limited. (2015). *The Cost of Inaction: Recognising the Value at Risk from Climate Change*. Retrieved from https://impact.economist.com/perspectives/sites/default/files/The%20cost%20of%20inaction_0.pdf

- The Thai Bankers' Association. (2023). *Industry Handbook*. Bangkok: The Thai Bankers' Association.
- TTB. (2024). *TTB TCFD Report 2023*. Bangkok: TTB.
- United Nations. (n.d.). *The Paris Agreement*. Retrieved from <https://unfccc.int/process-and-meetings/the-paris-agreement>
- ธนาคารกรุงเทพ จำกัด (มหาชน). (2567). *การเปิดเผยข้อมูลทางการเงินที่เกี่ยวข้องกับสภาพภูมิอากาศ (Task Force on Climate-related Financial Disclosures: TCFD) 2566*. กรุงเทพฯ: ธนาคารกรุงเทพ จำกัด (มหาชน).
- ธนาคารกรุงศรีอยุธยา. (2566). *รายงานความยั่งยืน 2566*. รายงานการพัฒนาด้านสิ่งแวดล้อม สังคม และธรรมาภิบาลสู่ความยั่งยืน. กรุงเทพฯ: ธนาคารกรุงศรีอยุธยา จำกัด (มหาชน).
- ธนาคารเกียรตินาคินภัทร. (2567). *รายงานความยั่งยืน 2566*. กรุงเทพฯ: ธนาคารเกียรตินาคินภัทร.
- ธนาคารทีสโก้. (2567). *รายงานความยั่งยืน 2566*. กรุงเทพฯ: ธนาคารทีสโก้.
- ธนาคารแห่งประเทศไทย. (2566, กุมภาพันธ์ 15). *แนวนโยบายธนาคารแห่งประเทศไทย เรื่องการดำเนินธุรกิจสถาบันการเงินโดยคำนึงถึงมิติด้านสิ่งแวดล้อมและการเปลี่ยนแปลงสภาพภูมิอากาศ*. เข้าถึงได้จาก https://www.bot.or.th/content/dam/bot/financial-innovation/sustainable-finance/green/Policy-20230215-Internalizing_Environmental_and_Climate_Change_Aspects_into_Financial_Institution_Business_TH.pdf
- ธนาคารแห่งประเทศไทย. (2566, กุมภาพันธ์ 15). *นำส่งแนวนโยบายธนาคารแห่งประเทศไทย เรื่องการดำเนินธุรกิจสถาบันการเงินโดยคำนึงถึงมิติด้านสิ่งแวดล้อมและการเปลี่ยนแปลงสภาพภูมิอากาศ*. กรุงเทพฯ: ธนาคารแห่งประเทศไทย.
- ธนาคารออมสิน. (2567). *รายงานการเปลี่ยนแปลงสภาพภูมิอากาศ ธนาคารออมสิน ประจำปี 2566*. กรุงเทพฯ: ธนาคารออมสิน.
- สมาคมธนาคารไทย. (2566, ตุลาคม). *เอกสารคู่มือ เรื่องการดำเนินธุรกิจสถาบันการเงินโดยคำนึงถึงมิติด้านสิ่งแวดล้อมและการเปลี่ยนแปลงสภาพภูมิอากาศ*. เข้าถึงได้จาก https://www.bot.or.th/content/dam/bot/financial-innovation/sustainable-finance/green/TBA_TH_Industry_Handbook.pdf