



ธนาคารกสิกรไทย
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Climate Scenario Analysis Executive Summary

Power Utilities Climate Financial
Driver Analysis 2021

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EXECUTIVE SUMMARY

Climate Scenario Analysis Background

In view of recent events in COP 26, there has been a greater global recognition for the need to shift the world towards global Net Zero Emission no later than 2050, in order to avoid global average temperature increase of over 1.5 degrees Celsius (1.5C) vs. pre-industrial levels. This shift is needed to avoid irreversible impacts to global physical climate change. KBank's role in this transformation is to help financing a low carbon transition.

Significant global changes, either through increased physical impacts if national or through company level 1.5C targets are not met, or transition risks from a transition to a lower carbon economy have potential for significant impacts especially 20 or more years in the future. KBank has targets for Net Zero Emission by 2030 for Scope 1 and 2 from our own operations and net zero emission in our financed portfolio in line with Thailand's aspirations. In view of Net Zero targets, the Bank view that there is a possibility of a transition to a low carbon economy in Thailand and ASEAN. This kind of systemic change though low carbon economy transition has potential to affect customers and counterparties both negatively (for those with high carbon footprint businesses) and positively (for those with low carbon footprint).

For the past few years, KBank has been analysing the potential future impacts to power sector lending in line with the Task Force for Climate-related Financial Disclosures (TCFD) in terms of climate related risks. In the future, the Bank may also expand the assessment to cover more sectors and to cover physical risks. This is in line with the Bank of Thailand's requirements for TCFD reporting.

As a part of scenario analysis, Kbank has updated the Sustainable Development Scenario (SDS) to International Energy Agency World Energy Outlook 2021. SDS for ASEAN, equivalent to Well-below 2 Degrees Celsius (WB2C), as the main transition scenario. In 2021, International Energy Agency (IEA) released its first Net Zero Emissions (NZE) scenario, though this scenario is not completed in terms of indicators and localization to ASEAN, it provides KBank with a view on the potential changes which impact customers and counterparties if the world achieves Net Zero. In addition, the Bank uses the NZE scenario to understand potential increase or decrease of risk when compared to WB2C scenario.

Ultimately, the scenario analysis aims to understand impacts to counterparties in terms of revenue and cost changes due to climate change. This in turn affects the credit rating of counterparties. In the future, once the Bank analyse the whole lending portfolio then it can be understood which sectors the Bank should focus on and how to manage as part of longer term account plan from 2022 onwards.

Climate Scenario Analysis Objectives

The objectives of scenario analysis include:

1. Piloting an analytical process and framework (Climate Financial Driver Analysis 'CFDA'), for assessing climate-related financial risk and opportunity, associated with the Bank's business, which could later be applied across the Bank's lending portfolio. Whilst the pilot focuses on Transition climate factors, it could be also be applied to Physical climate factors in future.
2. Building capacity within the Bank to develop scenario-based climate analysis in line with the recommendations of the Financial Stability Board's Taskforce on Climate-related Financial Disclosure (TCFD).
3. Identifying climate-related financial risks and opportunities associated with three sub-sectors of the Bank's power sector lending portfolio, as summarised in the table below.

4. Translating the financial findings of the CFDA, in terms of sub-sector level impacts to revenue and costs, to counterparties operating in these sub-sectors. This step takes the form of alternative counterparty financial inputs to the counterparty assessment process, such that the Bank can begin to see the effects of the low-carbon scenario on lending.

KBank Power Utilities Sector Exposures

Sub-sectors	Percentage of Sector lending
Biomass	3.70%
Hydropower	16.44%
Natural Gas	53.70%
Other power utilities segments (not covered in this project)	26.16%

Data as of December 2020

CFDA Methodology

A summary of the CFDA methodology is as follows:

- Evaluate what are the relevant Climate Factors (drivers of climate-related transition risk/opportunity) for KBank's lending sectors and sub-sectors
- Link Climate Factors with Financial Drivers (drivers of revenues and costs for counterparties in the sub-sectors)
- Analyse data from publicly available datasets (e.g. IEA-International Energy Agency) to measure future changes in Financial Drivers comprised of two scenarios (1) WB2C: 'Scenario Delta' between the Business as Usual (BAU) scenario and Well-below 2 Degrees Celsius (WB2C) scenario for ASEAN and (2) NZE: 'Scenario Delta' between the Business as Usual (BAU) scenario and Net Zero Emissions (NZE) scenario, calculated using changes between NZE of World data and BAU of World data as a proxy for understanding changes in WB2C and NZE scenarios for ASEAN. The NZE scenario is in line with 1.5C by 2050.
- Use the trends of Financial Drivers as proxies for revenue/cost trend for lending sectors/sub-sectors to evaluate risk and opportunity in revenue / cost for sub-sectors
- Once the CFDA is completed, the next step is the counterparty analysis to evaluate the impacts from CFDA analysis on specific counterparties

The CFDA framework seeks to link Climate Factors (drivers of climate-related transition risk/opportunity) with Financial Drivers (drivers of revenues and costs for counterparties in the sub-sectors) to identify the key drivers of climate-related financial risk/opportunity for each of the sub-sectors within the sector. Scenario Indicators are selected from publicly available scenario datasets as proxies to measure the risk/opportunity associated with the Financial Drivers. To calculate the scenario delta, the Scenario Delta at the selected time periods is then multiplied by the Financial Driver Relevance Weighting and the Scenario Indicator Confidence Score to give the risk or opportunity rating for that financial driver.

Aligned to the recommendations of the TCFD, as a '2 degrees Celsius' (2C) scenario or lower scenarios (WB2C and NZE scenarios) and BAU scenario are utilised in the analysis. The 2C scenario assumes accelerated policy effort is made to achieve the aims of the Paris Agreement of limiting global mean temperature rise to within 2C. The WB2C scenario is based on a surge in clean energy policies and investment that puts the energy system on track for key SDGs. In this scenario, all current net zero pledges are achieved in full, and there are extensive efforts to realise near-term emissions reductions; advanced economies reach net zero emissions by 2050, China around 2060, and all other countries by 2070 at the latest. WB2C scenario is consistent with limiting the global temperature rise to 1.65 °C (with a 50% probability). Therefore, under WB2C scenario - Net Zero Emissions is achieved globally after 2050.

The Net Zero Emissions or NZE (1.5C) by 2050 scenario is a normative IEA scenario that shows a narrow but achievable pathway for the global energy sector to achieve net zero CO₂ emissions by 2050, with advanced economies reaching net zero emissions in advance of others, in particular by achieving universal energy access by 2030, while globally achieving Net Zero Emissions by 2050. The scenario is consistent with limiting the global temperature rise to 1.5C without a temperature overshoot (with a 50% probability), in line with reductions assessed in the IPCC in its Special Report on Global Warming of 1.5C.

The business as usual (BAU) or Stated Policies Scenario (STEPS) explores which direction the energy system might go without a major additional steer from policy makers. It provides a more conservative benchmark for the future, because it does not take it for granted that governments will reach all announced goals. Instead, it takes a more granular, sector-by-sector look at what has actually been put in place to reach these and other energy-related objectives, taking account not just of existing policies and measures but also of those that are under development.

During the COP26, there is a target for carbon neutrality in Thailand by 2050 and Net Zero Emissions by around 2065³. Regarding to Thailand's long-term greenhouse gas emission development strategy, the country aims to reduce GHG by 40% by 2030 with the international support and to achieve carbon neutrality by 2050 with the aim of 50% share of renewable electricity generation of new power generation capacity. However, the specific policy measures that aim to achieve this target are still being developed. An example of Thailand national policy relevant to the power sector is the Power Development Plan 2018 to 2037. The PDP 2018 increases the use of renewable energy and reduces reliance on natural gas by 2037. About 37% of electrical energy production will be derived from other sources than fossil fuels, including hydropower (9%), renewable energy (21%), and energy efficiency (6%). The share of natural gas in the energy mix was 64% and is planned to be reduced to 53% in 2037.

The business impacts of the current policy and market trajectories should already be factored into risk management, and company strategies. However, the WB2C and NZE scenarios pose an additional set of risks (and opportunities) to businesses in terms of policies/regulations, market, and technology factors. Climate-related scenario analysis seeks to uncover the scale of this additional risk, so that organisations can start to mitigate the risks that the low-carbon energy transition poses.

To measure the climate-related risk/opportunity exposure of a Financial Driver, the difference in value between Scenario Indicators between the two scenarios is calculated, known as the 'Scenario Delta'. This is then weighted based on factors agreed within the Project Team. Whilst the actual future pathway is uncertain, being dependant on a wide range of policy, technology and market developments, the two scenarios selected for this pilot are intended to provide the widest 'envelope' of risk/opportunity, driven by moving from a business as usual trajectory to 2C trajectory and 1.5C trajectory.

The Scenario Delta is measured at 2030, 2035, 2040, 2050; thus providing a view on the risks/opportunities for the sector and sub-sectors in the short, medium, and long term, aligning with the TCFD's recommendations and considering the range of tenure of the Bank's exposures combined with a longer-term outlook.

Overlaying the KBank Portfolio

It is significant to view the Climate Financial Driver Analysis (CFDA) findings in the context of KBank's portfolio because the analysis results show that the KBank portfolio is weighted majority towards the Natural gas sub-sector and relatively smaller exposures to the two sub-sectors; Biomass and Hydropower. In addition to applied assumption, portfolio percentage exposures were held constant through the analysed period as presented in page 2. The bubble in vertical position relates to individual sub-sector Net Risk/Opportunity Scores shown in the Figure 1 and 2

The results of the WB2C Scenario Analysis are as follows. Natural gas sub-sector showed limited risks/opportunities in near-term (2021-2030) and low to high risk in long-term (2040-2050). In long-term impacts are due to projection of carbon pricing around 35-95 USD/tCO₂ at 2040-2050⁴ and followed by lower on plant utilisation/generation of Natural Gas Plants. In the meantime, hydropower showed limited risks/opportunities in near-term but moderate to high opportunity in long-term due to higher plant utilization/generation expected 2040-2050 (64% to 125% Delta). The biomass sub-sector's short-term risks/opportunities were limited until 2050 when its plant utilization – generation were expected to higher, although offset by lower anticipated power price.

Simultaneously, the differences in NZE scenario results in higher plant utilisation/generation in hydropower sub-sector from 2030 to 2050 (Low to High Opportunity). Natural gas sub-sector showed moderate to high risk from 2040 to 2050 due to lower plant utilisation/generation than WB2C scenario. However, carbon pricing was projected around 35-55 USD/tCO₂ at 2040-2050⁴ (lower than WB2C scenario) because IEA assumes that developing countries will be pursuing more direct policies to adapt and transform the energy systems. Therefore, it leads to lower carbon price than needed under WB2C scenario that relies more heavily on carbon price to change energy systems.

This analysis can support efforts by the bank to set limits or thresholds for lending to 'at risk' sub-sectors, namely natural gas, by a future point of time (e.g. before 2040); essentially generating 'portfolio alignment' with the WB2C and NZE scenarios. By limiting lending to natural gas sectors, KBank could avoid the negative financial impacts that transformation to low carbon economy could entail. It is important to do this in advance for sectors such as power utilities since the timeframe of loan and life time of power plant ranges from 20 years (wind), 25 years (natural gas) to 64 years (hydro), and its financial impact to counterparties could still be relevant in 2050. Therefore, actions to start limiting lending to new clients in natural gas sector should start as soon as possible, if KBank sets the directive to limit lending to carbon heavy assets.

Sub-Sector Net Risk Opportunity and Exposure 2025 to 2050

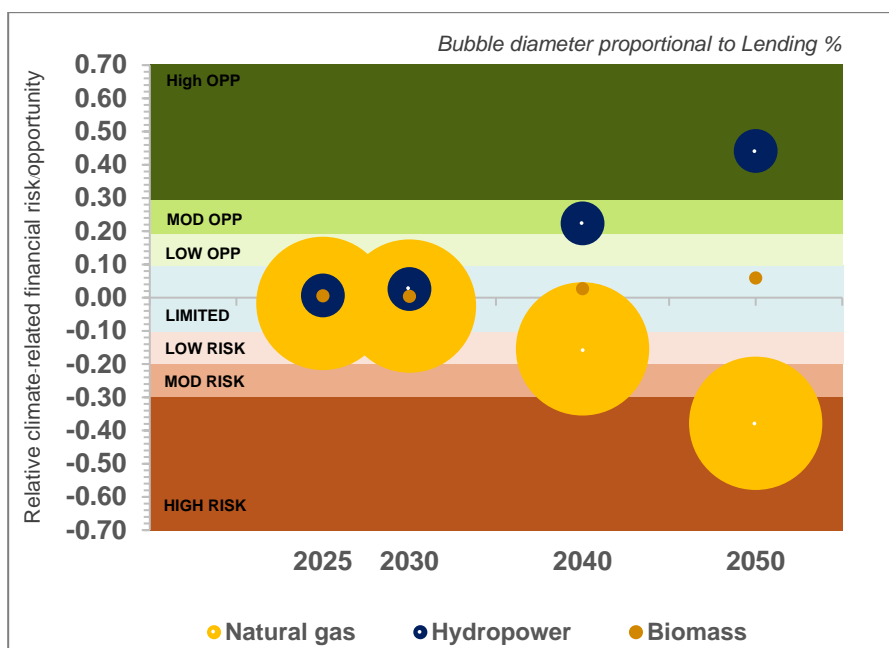


Figure 1 Well-below 2C Scenario (WB2C)

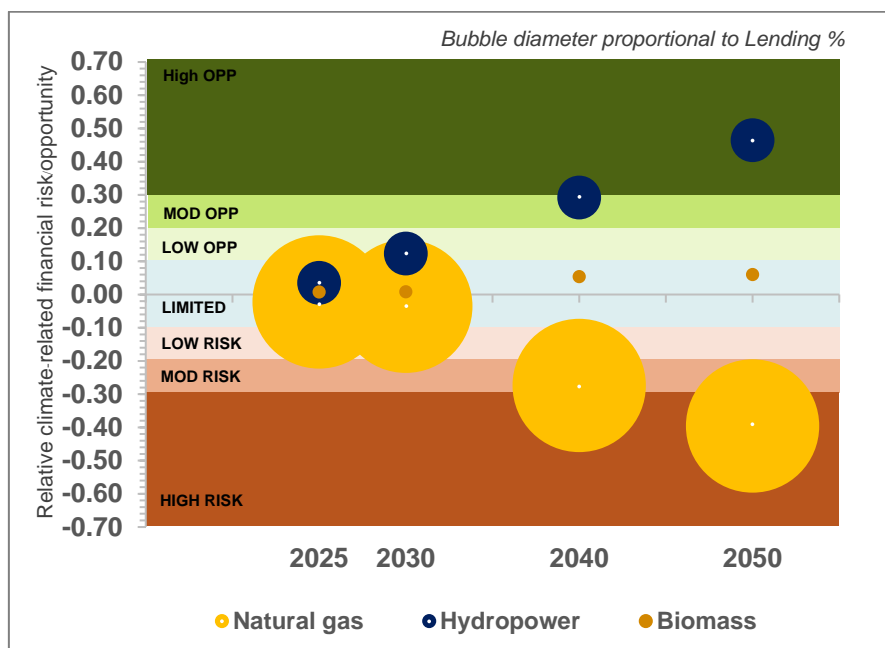


Figure 2 Net Zero Emissions Scenario (NZE)

Leveraging the CFDA

At the sector level, the analysis findings can be used to identify strategic and commercial responses and implementation of appropriate risk management for the ‘at risk’ and ‘opportunity’ sub-sector. Aligned with the development of the risk/opportunity ratings, strategic portfolio management could be implemented, influencing appetite statements, and ultimately starting to incorporate the climate-related risk adjustment in the Bank portfolio overtime, aligning more towards opportunity and the goals of the WB2C and NZE scenarios. These actions can be driven by analysing ‘signposts’. ‘Signposts’ are indicators that show whether a country or the world is moving towards WB2C, preferably to 1.5C as targeted by the Paris Agreement. When ‘signposts’ indicate that a Well-below 2 Degrees world is getting closer to reality, then the Bank can know how to act on actions that will help to reduce risks or increase opportunities in the lending portfolio. Examples of signpost include Thailand targets for renewable energy and % of renewable electricity generation across different regions (e.g. EMEA, US, APAC).

At the sub-sector level, identification of material risk/opportunity Financial Drivers can help the Bank to develop a suite of parameters on which to engage with counterparties in the counterparty assessment process. Over time, a database of counterparty risk/opportunity exposure and strategic responses can be developed.

Counterparty Financial Impacts

In addition to the ways in which the CFDA analysis findings can be used, discussed above, the sub-sector level findings on financial impacts to revenues and costs can be translated into counterparty financial impacts.

This step leverages counterparty data, on revenue, operating cost (OPEX) and capital expenditure (CAPEX). The CFDA findings can be translated into future impacts to counterparty revenues and costs, which the Bank can then use as alternative inputs to the counterparty assessment process to start to understand how the WB2C and NZE scenarios could affect counterparty financial resilience, and ability

to service debt. It is possible to apply the findings of the CFDA, to develop an alternative, forward looking view of what counterparty financial metrics could look like in a WB2C and NZE scenarios.

These alternative financial metrics can be used as inputs to the Bank's counterparty assessment process, particularly credit assessments. The assessment shows that it is possible to see how the WB2C and NZE scenarios could affect counterparties. The natural gas counterparties, due to decreasing revenue and increasing costs, could suffer a deterioration in terms of ability in future to service debt. For the Biomass and Hydropower counterparties, the assessment of the banking financial ratios indicates that these counterparties could be resilient to the effects of the WB2C and NZE scenarios.

Next Steps

Potential next steps include:

1. **Expand CFDA to other sectors:** From the above screening consider further sectors/ sub-sectors on which to apply the CFDA framework, if there are other significant sub-sectors to be concerned subject to data / reference scenarios availability.
2. **Climate Related Scorecard deployment:** Consider the development and application of counterparty 'scorecards' for the Power Utilities sector, leveraging the CFDA. However initially these 'scorecards' may not be used in actual credit decision processes.
3. **Communication** of the CFDA process within the Bank, upskilling of potential users of the framework and methodology.
4. **Internal system improvements** to align the Bank's internal Power Utilities portfolio data to different sectors relevant for climate change and broader E&S analysis purposes.
5. **Alignment** of scenario analysis with KBank's other Sustainable Finance initiatives.