

TCFD REPORT 2023



**TASK FORCE ON
CLIMATE-RELATED
FINANCIAL DISCLOSURES
REPORT 2023**

Thai Beverage Public Company Limited

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GOVERNANCE

Effective governance enables companies to consider and address the risks and opportunities associated with climate change in their decision-making in a timely manner, which then ensures the long-term sustainability and resilience of its business.

ThaiBev has integrated oversight of climate-related risks and opportunities into its governance structure, demonstrating a commitment to addressing the urgency of climate issues.

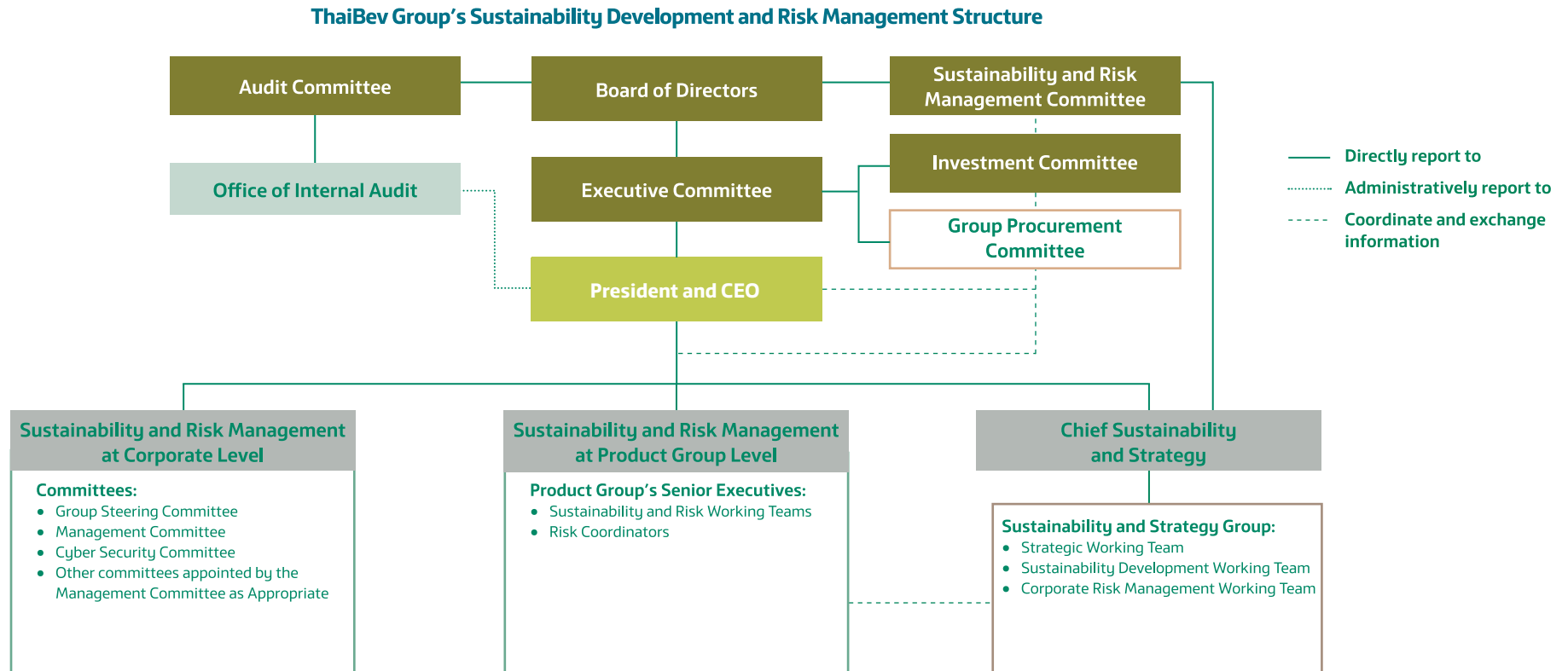


Figure 1: ThaiBev’s Climate-related Governance Structure



Board-level Governance

ThaiBev's Board of Directors oversees managerial performance, guides corporate strategy, and incorporates environmental and social standards to meet stakeholder interests. To address climate-related risks and opportunities at the corporate level, the Board of Directors established the Sustainability and Risk Management Committee (SRMC), which comprises advisors who are distinguished external experts, independent directors, executive directors, and senior executives, to support strategic planning for sustainable development while also managing the overall risks of ThaiBev. The SRMC reports directly to the Board of Directors. The Board of Directors is informed on sustainability issues in each quarter, including changes in sustainability and risk management frameworks along with the resulting effects from policy changes and new business developments.

FOCUS

In 2022, ThaiBev's Board of Directors approved the updated GHG emissions reduction targets aligned with the Science Based Targets initiative (1.5°C). Subsequently, in October 2022 ThaiBev announced a commitment to achieve net-zero greenhouse gas emissions by 2040 for Scopes 1 and 2 and by 2050 for Scope 3. ([ThaiBev Sustainability 2022](#))





Table 1: ThaiBev’s Board-Level Climate-Related Roles and Responsibilities

ThaiBev’s Function	Climate-related Roles and Responsibilities	Meeting Frequency
<p>Board of Directors</p>	<ul style="list-style-type: none"> Oversees climate-related risks and opportunities through a three-dimensional sustainability approach (environmental, social and governance) as part of ThaiBev’s overall corporate performance and operational risk management. Monitors and approves ThaiBev’s climate strategy, goals, and targets. This includes annual climate strategy revisions, strategic direction, and approvals of climate-related business and financial planning upon receiving reports from the SRMC. 	<p>Quarterly</p>
<p>Sustainability & Risk Management Committee (SRMC)</p>	<ul style="list-style-type: none"> Oversees, monitors, and manages climate-related risks and opportunities including policy development, risk management, and progress toward climate-related goals. Reports on climate risks and management to the Board of Directors and the Audit Committee quarterly. 	<p>Quarterly</p>

ThaiBev’s management-level leadership are responsible for the overall execution of the sustainability strategy, which includes climate-related issues and progress towards its climate-related goals and targets under the three pillars of ThaiBev’s Climate Strategy; (1) Adaptation, (2) Mitigation, and (3) Communities (for more information, please refer to the Strategy section).



Table 2: ThaiBev’s Management and Operational-Level Climate-Related Roles and Responsibilities

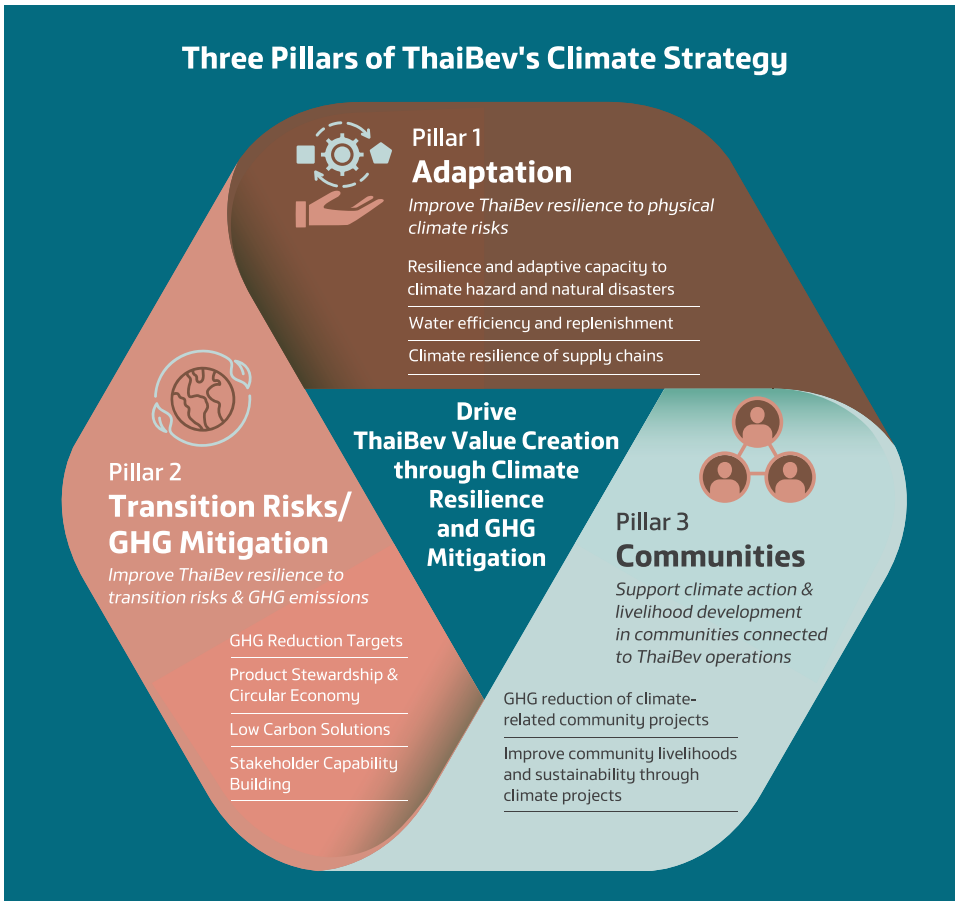
ThaiBev’s Function	Climate-related Roles and Responsibilities	Meeting Frequency
Executive Committee	<ul style="list-style-type: none"> The Executive Committee directly reports to the Board of Directors (BoD) and meets them monthly to determine and propose business strategies and plans, targets, and budgets to the BoD for approval, including climate-related strategies, plans, targets and budgets. Supervises, monitors, and approves matters relating to the Company’s operations. 	Monthly
President and Chief Executive Officer (CEO)	<ul style="list-style-type: none"> Oversees ThaiBev’s climate strategy implementation and monitors the progress of climate-related goals, targets, and programs/projects. Agrees on and proposes climate-related programs/projects under the three pillars of ThaiBev’s climate strategy to the SRMC, which will be approved by the BoD. Assigns responsibilities within ThaiBev’s functional groups toward the implementation of ThaiBev’s climate strategy. 	Quarterly (With the SRMC)
Chief Sustainability and Strategy	<ul style="list-style-type: none"> Oversees all sustainability related activities including climate-related activities within ThaiBev and orchestrates group strategy development, revision and implementation and transformation integrally with ThaiBev’s sustainability plans¹. Supervises the Sustainability and Strategy Group that consists of Sustainability Development Working Team (SDWT), Corporate Risk Management Working Team (CRMWT), and Strategic Working Team (SWT). 	Quarterly or as necessary

¹ http://thaibev.listedcompany.com/newsroom/20220816_005128_Y92_Q1P1F3XZUTKXAHU3.1.pdf



STRATEGY

ThaiBev has integrated climate change risks and opportunities into its strategy and operations to drive continuous improvement and to enhance its resilience toward climate change and value creation for ThaiBev’s business and connected communities.



Vision:
 Improve ThaiBev's climate resilience and support a low-carbon economy in line with the 1.5-2°C pathway.

Ambition:
 To adapt to and mitigate climate change while enhancing value creation for ThaiBev's business and connected communities.

ThaiBev has developed a climate strategy which steers projects to reduce the impact of climate change across its operations and value chain, while seeking to capture opportunities that arise from the transition to a low-carbon economy. The pillars under which initiatives such as the low carbon products, supplier engagement, and reforestation are defined by ThaiBev’s annual scenario analysis of climate-related risks and opportunities. Details of climate - related initiatives can be found in ThaiBev’s Annual Report 2023 and Sustainability Report 2023.

Figure 2 ThaiBev’s Three Pillars of Climate Strategy



Scenario Analysis of Climate Risks and Opportunities

In 2023, ThaiBev deepened the scenario analysis conducted for both physical risks and transition risks and opportunities. A Net Zero Emissions scenario (IEA NZE) was added to assess transition risks and the financial impact on the company was quantified at asset level to identify operational and supply chain vulnerabilities.

With regards to the overarching risks and opportunities identification and qualitative assessment, the drivers identified and assessed from 2022 remain relevant to ThaiBev. **Physical risks assessment** was conducted using Representative Concentration Pathway (RCP) scenarios from the Intergovernmental Panel on Climate Change (IPCC), and considered the following natural hazards: riverine floods, storms, water stress, sea water intrusion, and increasing temperature. In addition, ThaiBev has conducted a Water Sustainability Assessment (WSA) for its production plants, including both surface water and groundwater, for an in-depth assessment of any potential climate-related risks. **Transition risks assessment** was conducted based on the International Energy Agency (IEA)'s Stated Policies Scenario (STEPS) and Sustainable Development Scenario (SDS) (discontinued by IEA and replaced with Announced Policy Scenario (APS))².

ThaiBev has identified timeframes for climate-related physical and transition risks in line with the timeframes used for business operations. These timeframes are as follows: short term (1-3 years), medium term (3-10 years), and long-term (>10 years).

Physical Risks

ThaiBev conducted a desktop-based physical risk assessment of prominent natural hazards at 52 locations in Thailand, Vietnam, Scotland, and Myanmar based on the intensity and frequency of historical events/hazards and corresponding projected risk rating under RCP 2.6, RCP 4.5, and RCP 8.5 scenarios. The assessment was conducted for the baseline conditions, with RCP 2.6, RCP 4.5, and RCP 8.5 covering the 2030 time horizon, while RCP 2.6 also considered the longer-term 2050 and 2080 impacts as well, with the latter corresponding to the Paris Agreement goal to limit warming to 'well below 2°C' by the end of the century. ThaiBev will update the physical risks assessments when IPCC updates the scenario data. The scope of the physical risks assessment is outlined in [Table 3](#). The qualitative results of the scenario analysis conducted in 2019-2022 with adaptation measures is outlined in [Table 4](#) while [Table 5](#) and [Table 6](#) demonstrate the potential financial impact of physical risks on transportation and distribution logistics at asset level.

²[Understanding GEC Model scenarios – Global Energy and Climate Model – Analysis - IEA](#)

**Table 3:** ThaiBev Physical Risk Scenario Analysis Parameters

Purpose	To analyze whether physical related risks (both acute and chronic) have a significant impact on ThaiBev’s business in the future, and the mitigation measures/adaptation plan required for significant risks.
Scenarios³	<p><u>RCP 2.6 / SSP1-2.6 scenario</u>: A low emissions pathway limiting warming to below 2 °C.</p> <p><u>RCP 4.5 scenario</u>: An intermediate emissions pathway where global temperature rises by 2.5 - 3 °C.</p> <p><u>RCP 8.5 scenario</u>: High emissions. A pathway that represents a baseline where no additional mitigation measures are implemented, assuming that increase in temperature will be about 4.3 °C by 2100.</p>
Scenario time horizons	<ul style="list-style-type: none"> • 2030 (near-term): covers “Short-term” and “Medium-term” timeframes.* • 2050 and 2080 (long-term): covers “Long-term” timeframe – where long-term is only covered for RCP 2.6/ SSP1-2.6. <p>These scenario time horizons are aligned with ThaiBev’s timeframes for risk and opportunity identification.</p>
Scope of assessment	<ul style="list-style-type: none"> • 52 locations in Thailand, Vietnam, Scotland, and Myanmar, accounting for 100% of the total number of factories.
Target area of financial analysis	Operations and supply chain, transportation disruptions from factory to distributed dealers.*

*Represents additional scopes/target areas for risk assessments conducted in 2023

³https://www.ipcc-data.org/guidelines/pages/glossary/glossary_r.html

<https://climatenexus.org/climate-change-news/rcp-8-5-business-as-usual-or-a-worst-case-scenario/and>

IPCC Climate Change 2021: The Physical Science Basis: Technical Summary (https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_TS.pdf)

**Table 4:** ThaiBev Physical Risks Assessment and Adaptation Measures

Climate Physical Risks	Timeframe	Impact	Description	Adaptation Measures*
Acute				
Riverine Floods	Medium term (3-10 years)	Medium to high	The extreme precipitation events, such as one-day maximum rainfall and number of days with heavy rainfall, are likely to increase the probability of floods causing damage to ThaiBev's assets and increasing the costs of production due to supply chain disruptions.	<p>ThaiBev conducted a flood risk assessment in areas prone to flooding for all key assets, and highlighted areas that were the most likely to be affected. To mitigate any impacts ThaiBev constructed flood barriers, storm water draining, or pumping stations in the areas highlighted.</p> <p>Further, alternative transportation routes are planned to minimize supply chain disruption due to potential floods.</p>
Storms (Cyclones & Wind)	Medium term (3-10 years)	Medium to high	Greater probability of disruptions within the operations, supply chain, and finished goods inventory due to storms.	Each production site tracks and monitors the weather forecast including the storm and earthquake reports from the Thai Meteorological Department to receive the earliest warnings. All production sites shall ensure that the external roofing or solar rooftop systems are in adequate condition and implement response mechanisms to reduce impacts during the storms.
Landslides	Medium term (3-10 years)	Low	ThaiBev assets located in areas with exposure to landslides may risk increasing cost of production due to supply chain disruptions and damages to assets.	ThaiBev conducted a landslide risk assessment for all assets and found that landslides do not present a risk to the majority of ThaiBev assets.



Climate Physical Risks	Timeframe	Impact	Description	Adaptation Measures*
Chronic				
Water Stress	Long term (>10 years)	Medium to high	Changes in water availability can affect ThaiBev's production lines, supply chain, and revenue, especially when factories operate in high water stressed areas.	<p>ThaiBev has initiated the Water Sustainability Assessment (WSA) for both surface water and groundwater, which covers all production sites in Thailand, in order to conduct an in-depth assessment of present and future risks and opportunities.</p> <p>The assessment has led to the development of Integrated Water Resources Management Plan (IWRM) for each assessed factory, focusing on implementing a long-term adaptation and mitigation plan.</p>
Sea Level Rise	Long term (>10 years)	Low to medium (for coastal locations)	<p>Seawater intrusion into natural water sources such as rivers and aquifers can cause disruption to ThaiBev's production, leading to more spending on the operational cost of buying fresh water.</p> <p>ThaiBev's assets located in coastal areas may be impacted, resulting in increased costs of production as well as supply chain disruptions.</p>	<p>Seawater intrusion into aquifers: ThaiBev will engage with local communities and governmental authorities near the identified high-risk areas to improve the groundwater wells.</p> <p>Seawater intrusion into rivers: Expand freshwater stock facilities and implement a management plan to ensure sufficient fresh water supply by using water saving technology, water recycling systems, and rainwater harvesting systems.</p> <p>Adaptation measures for coastal floods are drawn from our adaptation measures for riverine flood risks.</p>
Increasing Temperature	Long term (>10 years)	Low to medium	Changes in air temperature will decrease crop yields throughout ThaiBev's supply chain, which may cause a higher cost of material sourcing.	ThaiBev has continued the educational and training initiative with farmers to help conserve resources, prepare for natural disasters and adopt technology for production efficiency.

*ThaiBev adaptation measures will be completed by 2030. Some of the measures will be completed within 2-3 years, e.g., WSA for both surface water and groundwater for all production sites.



As flooding was identified as one of the most material physical risks to ThaiBev’s operations, ThaiBev conducted further scenario analysis to quantify the financial impacts of flooding on transportation disruptions for 2030 (medium-term time horizon) against RCP 2.6, RCP 4.5, and RCP 8.5 scenarios using the Aqueduct Floods Hazard maps for evaluating flood depth. To determine the size and scope of climate-related financial impacts, substantive financial or strategic impact is defined through ThaiBev’s Risk Parameter and Risk Matrix, comprising two components: severity (defined as impact to profit) and probability. Risk levels (categorized as Low, Moderate, High, and Very High) are assessed by combining estimates of likelihood

and financial impact to determine level of significance. It was determined that the 52 assets assessed (covering Spirit, Beer, Food, and Non-Alcoholic Beverages product groups) were sufficiently equipped to mitigate the risk of flooding. This is due to the construction of flood barriers, storm water draining, and pumping stations at ThaiBev’s assets.

Refer to [Table 4](#) for the assumptions applied and Table 5 for the full results on risk level and financial impact by BUs.

Table 5: Key Assumptions Applied to Flooding Financial Impact Quantification

Flood Depth	Impact Level	Flooding Occurrence (times per year)			Flood Duration (days per incident)
		RCP8.5	RCP4.5	RCP2.6	
>0.5m	High	2	1	0	5
0.15m < X < 0.5m	Medium	2	1	0	3
< 0.15m	Low	2	1	0	0

Remarks:

- Consider impact level from flood depth evaluated from the tool
- Following assumptions are according to the impact level
- Additional cost (THB/day) for transportation is varied by locations
- Does not consider financial impacts at ‘Low’ impact level



Table 6: Flooding Scenario Analysis Risk Level and Financial Impact Results

Scenario	Probability		Severity (s) at 2030			Risk Level at 2030		Financial Impact (Million THB)				
	%	Level	%	MTHB	Level	MTHB	Level	Spirit	Beer	Food	NAB	Total
Scenario 1: High emissions (RCP 8.5)	20%	Unlikely	0.00%	3.51	Insignificant	0.70	Low	3.19	0.00	0.00	0.32	3.51
Scenario 2: Intermediate emissions (RCP 4.5)	50%	Medium	0.00%	1.64	Insignificant	0.82	Low	1.44	0.00	0.00	0.20	1.64
Scenario 3: Low emissions (RCP 2.6)	30%	Unlikely	0.00%	0.00	Insignificant	0.00	Low	0.00	0.00	0.00	0.00	0.00
Financial impact and risk level for each product group								1.36	0.00	0.00	0.16	1.52
								Low	Low	Low	Low	Low

Impact to Profit	Risk Level
0 – 20 Million THB	Low
20 – 100 Million THB	Medium
100 – 500 Million THB	High
500 – 2,000 Million THBB	Very High



Transition Risks and Opportunities

In 2022, ThaiBev conducted a scenario analysis for **transition risks and opportunities** covering two scenarios from the IEA and assessed five drivers over two main time horizons between 2030 and 2050, in order to evaluate the financial impact of key drivers on its organization⁴. In increasing the breadth and depth of ThaiBev's transition scenario analysis, certain transition risk and opportunity assessments were extended to include upstream and downstream activities in the value chain. For instance, the carbon tax in the supply chain from agricultural supplies was included in the financial impact analysis, while ThaiBev also assessed the downstream opportunities in material and packaging circularity.

In 2023, against the backdrop of Thailand's Revenue Department announcing the possible introduction of a carbon tax in the future, ThaiBev identified a carbon tax to be a potential material risk with high financial impact. While fully noting that transition drivers and scenarios are subject to fast-paced change, ThaiBev has determined that the qualitative results of the scenario analysis remain relevant, but has prioritised conducting a quantitative scenario analysis for carbon tax using the International Energy Agency's (IEA's) STEPS, APS, and NZE scenarios as a result of changes in the external environment. These results may serve as inputs to ThaiBev's climate strategy and transition plan in its net zero journey which seeks to enhance the Company's resilience against climate-related risks and opportunities. The scope of the scenario analysis can be found in [Table 7](#) and the results in *Scenario Drivers, Business Impacts, and Response Measures* in [Table 8](#).

⁴ Drivers are critical forces/factors that lead to certain changes in an identified situation.

**Table 7:** ThaiBev’s Transition Risk and Opportunity Scenario Analysis (2022-23)

Purpose	To analyze whether transition related drivers (policy/legal, market, technology, reputation) have a significant impact on ThaiBev’s business in the future, and what risk mitigation actions are required for significant risks.
Scenarios	<ol style="list-style-type: none"> 1. IEA STEPS⁵: IEA’s stated policies scenario, which expects a 2.5-3.3°C rise in global temperatures by 2100. This scenario acts as a base case for transition scenario analysis. 2. IEA SDS⁶: IEA’s sustainable development scenario, which aligns with a global trajectory that meets the ambitions of the Paris Agreement, forecasting a well-below 2°C rise in global temperatures, with efforts to limit the rise to 1.5°C by 2100. 3. IEA APS⁷ (For carbon pricing only): IEA’s announced pledges scenario includes all recent major announcements (as of September 2022) for 2030 climate targets and longer-term net zero pledges. 4. IEA NZE 2050⁸ (For carbon pricing only): A net zero emissions scenario which sets out a narrow but achievable pathway for the global energy sector to achieve net zero emissions by 2050.
Scenario Time Horizons	<ul style="list-style-type: none"> • 2030 (near-term): covered “Short-term” and “Medium-term” timeframes • 2050 (long-term): covered “Long-term” timeframe <p>These scenario time horizons are aligned with ThaiBev’s risks and opportunities identification timeframes.</p>
Target area of analysis	Operations and value chain
Scope of financial impact calculations	ThaiBev Group

⁵<https://www.iea.org/reports/world-energy-model/stated-policies-scenario-steps>

⁶<https://www.iea.org/reports/world-energy-model/sustainable-development-scenario-sds#abstract>

⁷<https://www.iea.org/reports/global-energy-and-climate-model/announced-pledges-scenario-aps>

⁸<https://www.iea.org/reports/global-energy-and-climate-model/net-zero-emissions-by-2050-scenario-nze>



ThaiBev has identified a list of transition risks and opportunities that are considered relevant and are used in scenario analysis:

Risk Category		Opportunity Category	
Policy and Legal	Water Tariff: possibility of increased production costs of beverage products caused by an increased water tariff in Thailand.	Technology Advances	Material Circularity: increasing financial feasibility of recycling technologies where recycled materials become cheaper than virgin materials.
	Carbon Pricing (operational and upstream): carbon pricing policies that are already in place in markets of ThaiBev’s supply chain and expected policies in operational areas.		Resource Efficiency: utilizing/ investing in energy efficient and emissions reduction technologies/ machineries to potentially reduce future costs.
Market Changes	Consumer Trends on Low Carbon Products: changing consumer and market preferences towards products seen as better for the environment.	Market Changes	Development of Low-Carbon Products: ThaiBev increasing the share of products that receive an approval for the Carbon Footprint of Products ⁹ and Carbon Footprint Reduction Label . ¹⁰
Technology Advances	Low Carbon Refrigerants: emergence of new refrigerants with lower global warming potential to replace existing refrigerants. However, no material risk from high emission refrigerants and climate-related reputation is identified due to less exposure and usage.	Reputation	Reducing Costs of Renewable Electricity: due to increased demand from the market-place and economies of scale while investing in these materials.
			Stakeholder Sentiment: increased stakeholder expectations on climate action, especially amount investors, shareholders, consumers, and societal expectations.

⁹ [http://thaicarbonlabel.tgo.or.th/index.php?lang=EN&mod=Y0hKdplVmpkSE5mYVhNPO#:~:text=Carbon%20Footprint%20of%20Products%20\(CFP,each%20stage%20of%20the%20product](http://thaicarbonlabel.tgo.or.th/index.php?lang=EN&mod=Y0hKdplVmpkSE5mYVhNPO#:~:text=Carbon%20Footprint%20of%20Products%20(CFP,each%20stage%20of%20the%20product)

¹⁰ <http://thaicarbonlabel.tgo.or.th/index.php?lang=EN&mod=Y21Wa2RXTjBhVzI1WDJseq>



ThaiBev conducted group-wide workshops to prioritize transition risks and opportunities for each scenario and time horizon, resulting in the risk and opportunity matrix below:

2030 - OPPORTUNITY ASSESSMENT

- O1. Material Circularity
- O2. Reducing Cost of Renewable Energy
- O3. Resource Efficiency
- O4. Development of Low Carbon Products
- O5. Stakeholder Sentiments

2050 - OPPORTUNITY ASSESSMENT

- O1. Material Circularity
- O2. Reducing Cost of Renewable Energy
- O3. Resource Efficiency
- O4. Development of Low Carbon Products
- O5. Stakeholder Sentiments

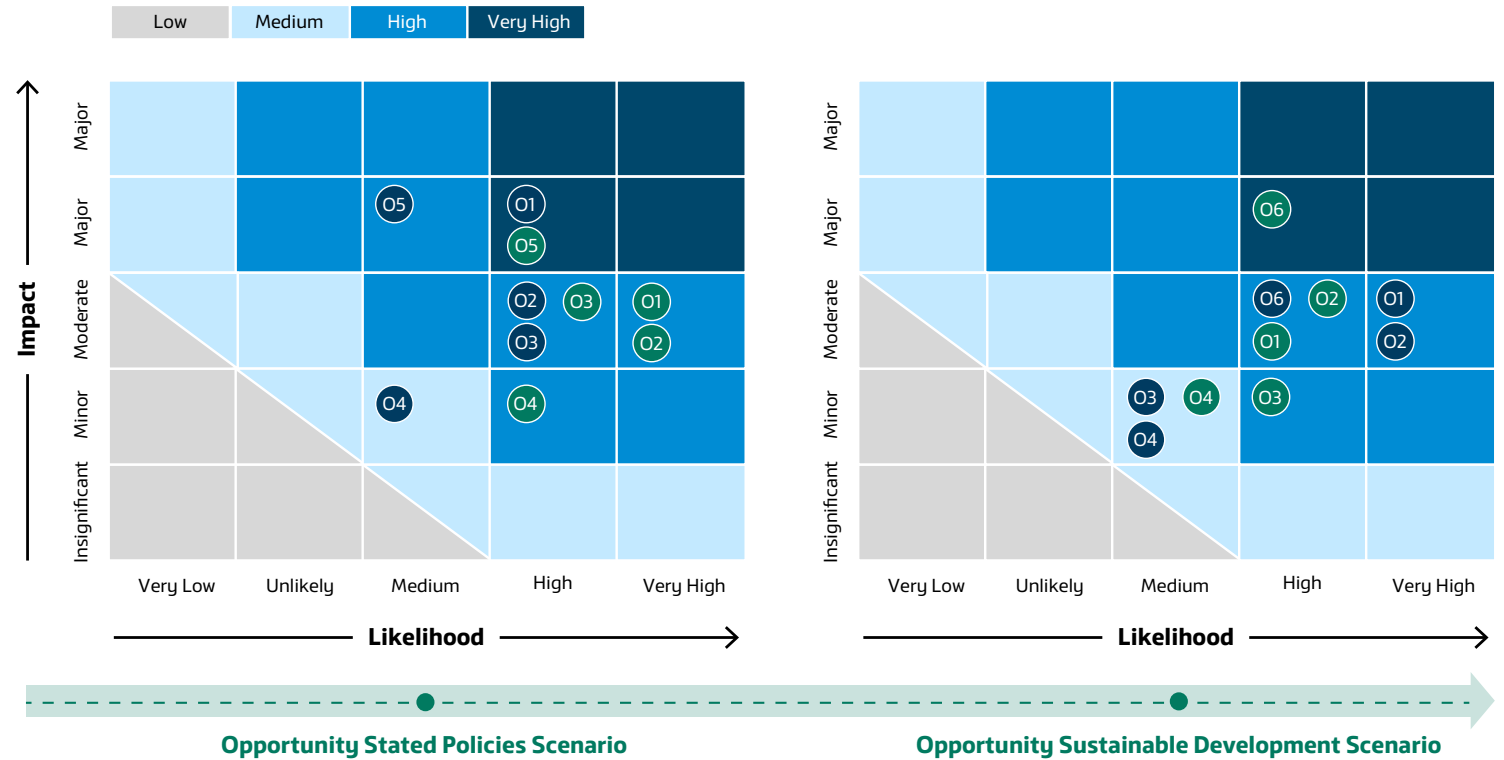


Figure 3: Results of Transition Opportunities Scenario Analysis



2030 - Risk ASSESSMENT

- R1. Water Tariff
- R2. Carbon Pricing (Operational)
- R3. Carbon Pricing (Upstream)
- R4. Low Carbon Refrigerants
- R5. Consumer Trends on Low Carbon Products

2050 - Risk ASSESSMENT

- R1. Water Tariff
- R2. Carbon Pricing (Operational)
- R3. Carbon Pricing (Upstream)
- R4. Low Carbon Refrigerants
- R5. Consumer Trends on Low Carbon Products

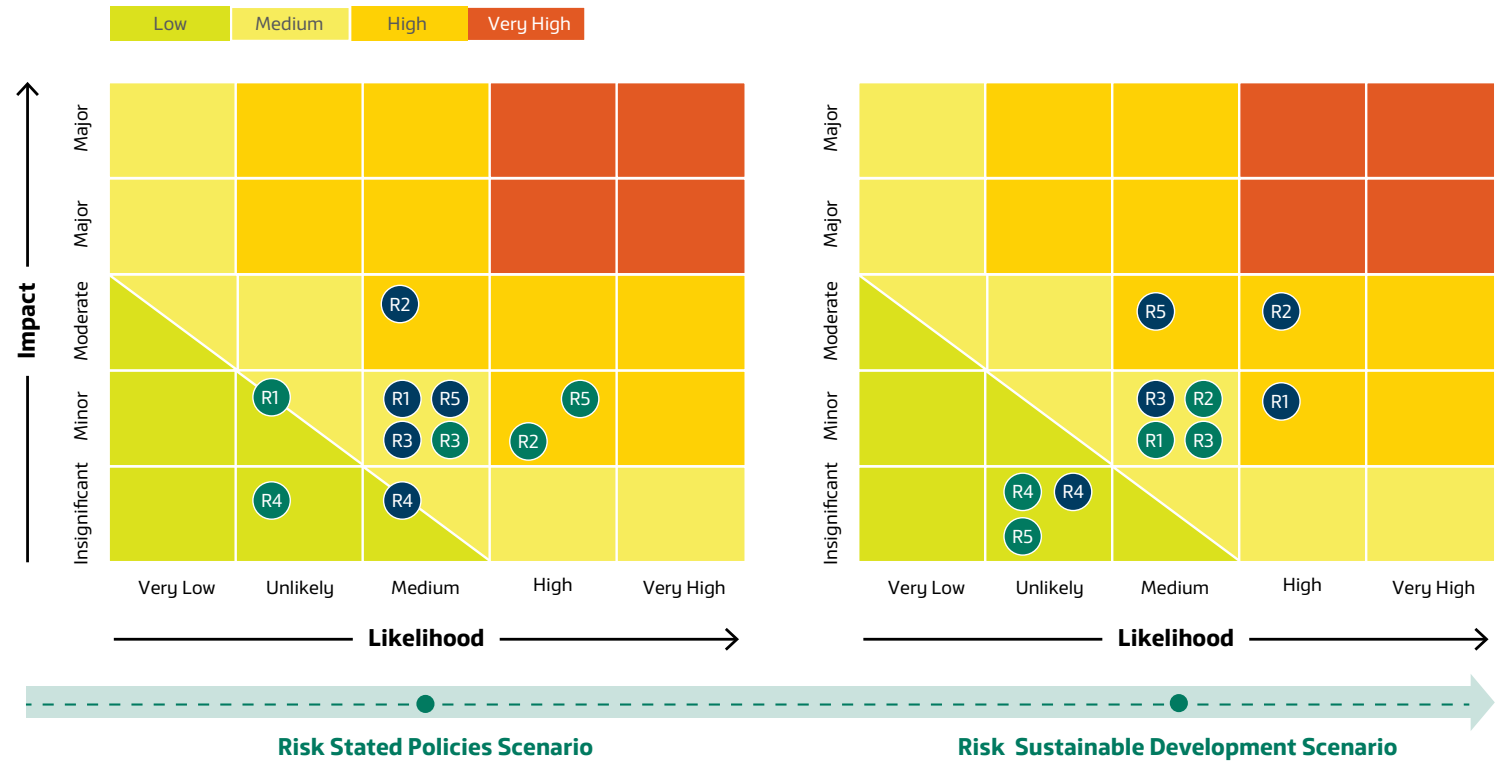


Figure 4: Results of Transition Risks Scenario Analysis Table



Consequently, ThaiBev dived deeper into higher priority and most material transition risks and opportunities, as presented in Table 8.

Table 8: Scenario Drivers, Business Impacts, and Response Measures

Driver	Timeframe	Business Implications (Impact to Business)	Response Measures
Carbon Pricing (operational and value chain)	Medium term (3-10 years)	<p>The application of carbon-pricing in Thailand would mean a company with high emissions would bear more operation costs, potentially affecting ThaiBev in the following ways:</p> <ul style="list-style-type: none"> • Increasing raw material and production costs, especially agricultural products due to transfer of carbon price costs by suppliers, and • Increasing operational costs from regulatory carbon pricing and investment costs to install clean energy system. 	<ul style="list-style-type: none"> • Engage with suppliers that may be implementing carbon pricing to reduce impacts. • Implement initiatives towards a net zero goal and reduce emissions.
Water Tariff	Short term (0-3 years)	<p>Thailand is in the process of developing a water tariff, according to the Water Resources Act, B.E. 2561 (2018). The level of expected impact is subject to the amount of water consumption and agreed upon national regulations on the water tariff.</p> <p>It is assumed that tariff rates increases may not be frequent and that Thailand may be less impacted by on droughts due to the government’s active strategy and mitigation measures.</p> <p>Nonetheless, increasing investment costs in innovation for water efficiency are expected.</p>	<ul style="list-style-type: none"> • Assessing operation sites for potential risks and developing a management/mitigation plan. • Establishing a clear climate & water strategy to address the issue, including channels for water recycling and water efficiency. • Mapping market expansion and assessing the water requirements.



Driver	Timeframe	Business Implications (Impact to Business)	Response Measures
<p>Consumer Trends on Low Carbon Products</p>	<p>Medium term (3-10 years)</p>	<ul style="list-style-type: none"> • Development of a low carbon portfolio indirectly suggests increasing production efficiency to reduce company emissions per product. • Shifting consumer trends may influence demand for ThaiBev's products, thus impacting revenue. 	<ul style="list-style-type: none"> • Monitoring domestic consumer trends to meet domestic demands and international patterns for upcoming trends and adapting marketing campaigns to emphasize ThaiBev's low carbon products in regions with demand for such products. • Continue developing low carbon products and having them certified to meet customers' demands, while expanding the low carbon products in the beer and non-alcoholic beverage business. • Conduct feasibility studies for low-carbon technologies, including how they may be integrated with current and future ThaiBev products or operating procedures.
<p>Material Circularity</p>	<p>Short term (0-3 years)</p>	<p>Thai Beverage Recycle Co., Ltd. (TBR) focuses on adding more value to recycled and waste materials to supply the group companies and external clients. This action aligns with the national strategy of the Bio-Circular-Green Economic Model, which aims to maximize resources efficiency and circular to assist business growth.</p> <ul style="list-style-type: none"> • High investment costs of technology for an early transition to a low carbon business. • Increasing opportunities to reduce cost of using secondary materials. • Potentially increasing the number of clients, which results in business growth. 	<ul style="list-style-type: none"> • Engaging with researchers and partnering with innovators to initiate low carbon and take back technology customised for ThaiBev's business. • Expand and increase engagement in collection/ take back campaigns of product packaging, including educational and awareness campaigns on packaging indicating how each product can be recycled.



Driver	Timeframe	Business Implications (Impact to Business)	Response Measures
Reducing Cost of Renewable Energy	Medium term (3-10 years)	<ul style="list-style-type: none"> Increasing demands and viability of renewable energy in operations. Increasing the cost saving of renewable electricity generation according to levelized cost of electricity (LCOE). 	<ul style="list-style-type: none"> Expanding self-generating renewable energy initiatives/investment. Exploring and preparing to purchase renewable energy certificates (REC) within company financial planning for assets that cannot access direct sourcing of renewable energy.
Shareholder and Stakeholder Sentiment	Medium term (3-10 years)	<ul style="list-style-type: none"> Stakeholders globally, including shareholders and investors, are increasingly aware of the Paris Agreement. It is considered that ThaiBev's reputation and access to capital may be impacted by stakeholder demands for climate action. Consumers are more environmentally conscious and expect companies to consider environment issues. 	<ul style="list-style-type: none"> Continue ThaiBev's sustainability & climate journey disclosure through a credible framework, such as TCFD. Continue engaging with key stakeholders and policy makers to encourage the transition to a low carbon society.

Remark: ThaiBev considers high and very high impact as affecting profits by 3-15 million USD and 15-60 million USD, respectively, and as material financial impacts for the organisation.



FOCUS: Internal Carbon Pricing informs the Investment Committee on their investment decisions

Resulting from the changing policy environment and the assessment of ThaiBev’s vulnerability to carbon pricing across scenarios and timeframes, ThaiBev uses Internal Carbon Pricing (ICP) during the decision-making process to invest in low carbon technology to assess the potential impacts of carbon emissions on its operations, including risks and opportunities. The company also uses the ICP to comprehend how the carbon value of the company’s total carbon footprint relates to overall operating costs, profit margins, and turnover.

The investment committee employed ICP as a shadow pricing to help in terms of CAPEX investment decisions in green projects and prevent **CAPEX investment decisions in high-emission projects**. (SR2023 p.41).

2020 – 2024	2025 – 2030
20 USD/tCO ₂ e for investment of more than 10,000,000 THB per project	32 USD/tCO ₂ e for project investment more than 5,000,000 THB

As Thailand is expected to introduce carbon pricing within the next two to three years, it is determined to be a key transition risk for ThaiBev. Hence, ThaiBev conducted further scenario analysis to quantify the financial impacts of carbon tax for 2030 (medium-term time horizon) across all ThaiBev operations against the STEPS, APS, and NZE scenarios. ThaiBev’s Risk Parameter and Risk Matrix was used to determine the size and scope of the financial impact related to carbon pricing. As part of the scenario analysis, the following assumptions were applied to each of the selected scenarios: no carbon tax within 2030 (STEPS), carbon tax at 5 USD/tCO₂e within 2030 (APS), and carbon tax at 10-15 USD/tCO₂e within 2030 (NZE). The overall results show that ThaiBev is expected to face a financial impact of 430.87 MTHB, which is assessed to be at a “high” risk level. Please see [Table 9](#) for the full results on the risk level and financial impact by BUs.

**Table 9:** Carbon Tax Scenario Analysis Risk Level and Financial Impact Results

Scenario	Probability		Severity at 2030			Risk Level at 2030		Financial Impact (Million THB)				
	%	Level	%	MTHB	Level	MTHB	Level	Spirit	Beer	Food	NAB	Total
Scenario 1: High emissions (STEPS)	30%	Unlikely	0.00%	0	Insignificant	0	Low	0	0	0	0	0
Scenario 2: Intermediate emissions (APS)	50%	Medium	0.45%	392	Moderate	196	High	168	176	24	24	392
Scenario 3: Low emissions (NZE)	20%	Unlikely	1.35%	1,175	Very / Significant	235	High	505	529	71	71	1,175
Financial impact and risk level for product group								185.27	193.89	25.85	25.85	430.87
								High	High	Medium	Medium	High

Impact to Profit	Risk Level
0 – 20 Million THB	Low
20 – 100 Million THB	Medium
100 – 500 Million THB	High
500 – 2,000 Million THB	Very High



RISK MANAGEMENT

ThaiBev's Climate-related Issues Prioritization and Management

ThaiBev has integrated climate-related risks into its multi-disciplinary company-wide risk management processes through the four steps in ThaiBev's risk management process (Refer to [Annual Report 2023](#) pg. 136-138).

The SRMC is responsible for ensuring sound risk and sustainability management across ThaiBev's operations in Thailand, United Kingdom, Myanmar, and Vietnam – monitoring possible impacts of climate change on company operations, planning, and taking actions to mitigate these risks. To ensure comprehensive oversight and group-wide monitoring, climate-related risks management is embedded into ThaiBev's risk management process, which is aligned with the Committee of Sponsoring Organizations of the Treadway Commission (COSO) Enterprise Risk Management Framework. An overview of roles and responsibilities related to climate-related issues is presented in [Figure 5](#).

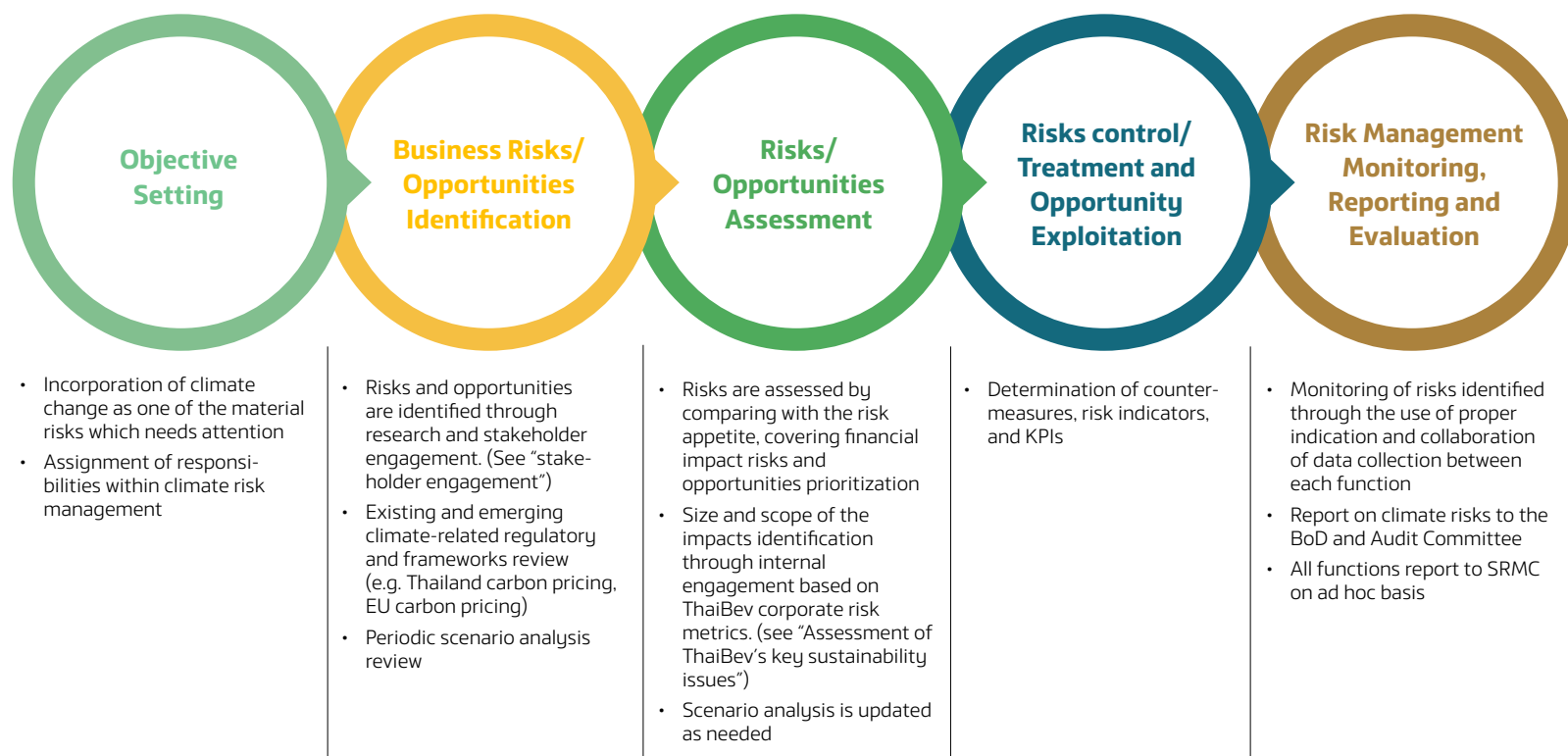


Figure 5: Risk Management Process Relevant to Climate-related Risks and Opportunities

The identified climate-related risks are prioritized via the following primary activities to develop effective risk management measures:

- Stakeholder engagements with senior ThaiBev executives to assess the impact of identified climate-related risks on the organization across three key aspects: finance, operations, and reputation.
- Interviews to evaluate the significance of potential climate-related impacts across eight key stakeholder groups: customers, consumers, investors, communities, regulators, employees, and suppliers.

Climate-related issues that were ranked as “very important” by ThaiBev and its relevant stakeholders were considered material sustainability issues.

As part of the ranking, assessment, scoping, prioritization, and monitoring of identified risks, emerging regulatory risks are also considered. In line with the potential implementation of a carbon trading scheme proposed by the Thailand Greenhouse Gas Management Organization (TGO), carbon-pricing policies may be applied in Thailand in the future, which will affect ThaiBev’s operational cost in a medium term between three and 10 years.



CLIMATE-RELATED METRICS AND TARGETS

Climate-related Targets

ThaiBev has set targets for its operations and value chain to raise its ambition level in its mitigation and adaptation efforts. Beyond GHG emission reduction targets, ThaiBev has also set targets regarding the use of renewable energy as well as efforts towards reducing water withdrawal. While this section focuses on climate change mitigation, other targets can be found in ThaiBev’s [Sustainability Report 2023](#).

GHG Emissions Reduction Targets

In 2022, ThaiBev increased its ambition level to further reduce its GHG emissions in the near-term as well as to set net zero targets for the organization in the long term. ThaiBev has been reducing emissions primarily through the installation of solar panels on factory rooftops, as well as the use of biogas produced from wastewater treatment in the production process. ThaiBev will be providing additional details regarding the roadmap towards meeting near term targets within the next reporting year, while emission reduction initiatives in the reporting year can be found in ThaiBev’s [Sustainability Report 2023](#). Table 10 GHG Emissions Data.

2030 Targets



50% reduction of GHG emissions for Scope 1 & 2, compared to 2019 base year



> 50% renewable energy by 2030

2040-2050 Targets



Net-zero GHG emissions for Scope 1 & 2 by 2040

Net-zero GHG emissions for Scope 3 by 2050



GHG Emissions Data

Table 10: GHG Emissions Data

Performance	Unit	2020	2021	2022	2023 w/o Vietnam	2023 w/ Vietnam
Scope 1 GHG emissions	Metric tons CO ₂ e	906,081	800,393	742,488	803,624	838,400
Biogenic CO ₂ emissions	Metric tons CO ₂ e	394,559	418,483	452,007	444,751	445,076
GHG Scope 2 emissions	Metric tons CO ₂ e	180,371	174,889	194,733	140,318	220,067
GHG Scope 1 and Scope 2 emissions	Metric tons CO ₂ e	1,086,452	975,282	937,221	943,942	1,058,467
GHG Scope 3 emissions	Metric tons CO ₂ e	741,679	1,404,457	1,330,365	1,956,471	1,956,471

Notes:

1. ThaiBev's GHG inventory and calculation are in line with GHG protocol framework and methodology, and Thailand National Guideline on carbon footprint for organization.
2. Biogenic emissions are emissions from combustion of bio-based fuels or substances that are reported separately from the Scopes as per GHG Protocol requirement.
3. Scope 1 and 2 emissions do not include biogenic emissions as per GHG Protocol requirements to report biogenic emissions separately from the scopes.
4. Scope 3: please see breakdown by category on page 42 of ThaiBev's Sustainability Report 2023.



Climate-related Risk and Opportunity Metrics and Targets

Table 11: Climate-related Risks and Opportunities Metrics

Transition Risk and Opportunity	2020	2021	2022	2023
Low Carbon Products				
Revenue from low carbon products (% of total revenue)	15%	19%	8%	9%
Number of products with Carbon Footprint of Product (CFP) certification	105	107	88	91
Number of products with Carbon Footprint Reduction (CFR) certification	19	38	47	53
Renewable Energy				
Target: To increase the share of renewable energy in energy consumption to 50% by 2030				
Renewable energy generation (MWh)	632,877	648,802	868,429	755,148
% of Renewable Energy Consumption out of Total Energy Consumption	30.8%	31.9%	42.8%	37.0%



Methodology

Reporting Coverage

The data in this report, which pertains to ThaiBev Group in Thailand and abroad, was taken from the fiscal year 2023, dating October 2022 to September 2023.

Data were collected from 27 distilleries (19 in Thailand, 6 in the United Kingdom, and 2 in Myanmar), 14 breweries (3 in Thailand and 11 in Vietnam), 11 non-alcoholic beverage production facilities, 1 food production facility, and 11 distribution centres.

Data Collection

ThaiBev utilizes its own environmental data collection tool across the ThaiBev Group to ensure standardized data collection and calculation. This tool collects energy, emissions, water, wastewater, waste, and environmental compliance data.

The tool quantifies the following Scope 1 GHG emissions activities:

- Stationary combustion (including biogenic emissions)
- Mobile combustion (including biogenic emissions)
- Biogas flaring
- CO₂ from carbonation (direct emissions)
- Fugitive emissions of Hydrofluorocarbons (HFCs) and Sulfur hexafluoride (SF₆)
- Fugitive emissions from wastewater treatment

The tool quantifies the following Scope 2 GHG emissions activities:

- Purchased electricity and steam, where both location-based (solely grid-based emission factors) and market-based (a combination of emission factor from the grid and market-based instruments) methodologies are used to calculate Scope 2 emissions.

ThaiBev's operating plants measure ozone-depleting substances, CO, NO_x, and SO_x, including Total Suspended Particles (TSP) from boiler stacks every six months, in compliance with the regulations of the Industrial Works Department, the Ministry of Industry. ThaiBev has long collaborated with suppliers and business partners to reduce Scope 3 GHG emissions, through application of the CROSS Procurement solution with the Supplier Life Cycle Management (SLCM) system. Given ThaiBev's commitment to the 1.5–2°C temperature limit this century, it has expanded its GHG accounting to all material Scope 3 emission categories based on the GHG Protocol.



A screening assessment of relevant Scope 3 GHG emission categories was first performed in FY2019. ThaiBev began accounting for public disclosure for the first time in FY2021, allowing a base year to be set and incorporation of the Scope 3 GHG emissions total into ThaiBev's target of net-zero Scope 3 GHG emissions by 2050. Other climate-related metrics and targets for energy, water, waste, and post-consumption packaging management can be found in Sustainability Report 2023. From FY2021, ThaiBev started reporting other indirect (Scope 3) GHG emissions in line with the reporting requirements of GHG Protocol.

Emission Factor

For Scope 1 and 2, ThaiBev uses emission factors from the 2022 IPCC Guidelines for National Greenhouse Gas Inventories and the United States Environmental Protection Agency (US EPA). For Scope 3 emissions, the Company uses emission factors from Thailand Greenhouse Gas Management Organization, UK Government GHG Conversion Factors for Company Reporting, and other literature-based emission factors. For energy conversions, Net Calorific Values (NCVs) sourced from the IPCC and Thailand's Ministry of Energy were used. Global warming potentials (100-year) from the IPCC 6th Assessment Report, 2022, were used. Our GHG data undergoes annual third-party assurance as part of our sustainability reporting process (see page 188-189 of ThaiBev's Sustainability Report 2023)

Third-party Verification

ThaiBev has completed its assessment of Scope 3 emissions which has also been third-party verified. The climate-related parameters that are being verified are Scope 1, Scope 2, Scope 3 (Category 1-7, 9, 11, 12, 15 only) GHG emissions as well as climate-related metrics on energy consumption, energy intensity and water consumption with reference to GRI Standards 2021.

The Company plans to incorporate these data into its science-based targets in the future. The breakdown by Scope 3 category can be found on page 42 of ThaiBev's Sustainability Report 2023. The assurance report can be found on page 188-189 of ThaiBev's Sustainability Report 2023.