



亞洲水泥

ASIA CEMENT CORPORATION

**Task Force on  
Climate-related  
Financial  
Disclosures**

**2025**

**Asia Cement Corporation**

**2025 Climate-related Financial  
Disclosure (TCFD) Report**

September 4, 2025

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## About 2025 TCFD Report

The consequences of climate change may have a significant effect on our business in many ways. The purpose of this report is to illustrate that Asia Cement Corporation (hereinafter referred to as “ACC” or “the Company”) established its TCFD Team under its Corporate Sustainability Committee according to the Recommendations of the Task Force on Climate-related Financial Disclosures promulgated by the TCFD in June 2017. The TCFD Team comprise relevant units working together to identify physical and transition risks and opportunities. By having multiple sessions of panel discussions whereby we come up with analysis results and revise procedures and content, and by incorporating the achievements of our corporate governance system and risk management system, we gradually gain insight into the risks and opportunities facing us and improve our ability to respond to and grasp climate change risks and opportunities.

The geographical boundaries cover the key business locations of the company in Taiwan related to climate change, with a coverage rate of 98.5%. This includes Asia Cement’s headquarters, Hualien Manufacturing Plant, Hsinchu Manufacturing Plant, various terminals for storage and distribution, regional offices, and its subsidiary Chiahui Power. The analysis is based on general principles applicable to potential scenarios and considers the regional environment, operational conditions, and related financial information impacting the company’s overall operations.

### Time Boundary of the Report ▼

The reporting period for this report is from January 1, 2023, to December 31, 2023. The report discloses the company’s climate-related financial information and serves as a basis for internal management of climate change issues. It also provides reliable public information to relevant stakeholders such as investment institutions, rating agencies, customers, and government departments.

### Contact Information for the Report ▼

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# 1. Company Profile

## 1.1 Foreword

Following the 1997 Kyoto Conference, advanced countries worldwide have developed strategies and measures to reduce greenhouse gas emissions. In recent years, there has been a growing global consensus on controlling greenhouse gas emissions. Asia Cement Corporation has also followed the government's "National Energy Conference Conclusions and Measures" to promote greenhouse gas inventory operations, establish a greenhouse gas inventory management system, and actively work on reducing greenhouse gas emissions in line with government policies to achieve the goal of reducing carbon dioxide emissions.

Based on its corporate vision of caring for life, using resources wisely, and contributing to society, and in fulfilling corporate responsibilities, Asia Cement Corporation has kept abreast of international standards for greenhouse gas control, particularly ISO developments. The company has completed systematic greenhouse gas inventory and documentation procedures in response to domestic and international pressure to reduce emissions. This includes internal documentation and verification processes, aimed at implementing cost-effective reduction measures. The company strives to balance resource efficiency, energy conservation, and environmental protection, promoting a sustainable energy future and low-carbon economy for the industry.

## 1.2 Company Profile

Responding to the Taiwan government's second four-year economic development plan, Asia Cement Corporation (ACC) was founded on March 21, 1957 by Mr. Y.Z. Hsu and others. It built its first manufacturing plant in Hengshan Township, Hsinchu County. In 1973, in response to the government's call to develop eastern Taiwan, the Company established its second plant in Hsincheng Township, Hualien County. Asia Cement and its "Skyscraper" brand cement have always occupied the core position in Taiwan's cement business. For now, these two plants can produce 5 million MT of clinker annually.

Asia Cement uses the most modern rotary kilns and introduces waste-heat recycling generators to transform waste heat and hot air into electricity. In addition, for lower cement transportation costs, Asia Cement established storage and transportation facilities in the Keelung, Taichung, Kaohsiung, and Hualien harbor. It also invested in the Group's U-Ming Marine Transport Co., Ltd., and began using U-Ming's bulk carriers to transport cement around Taiwan. Under the company's business strategy of "high quality, high efficiency, high environmental standards, and low cost," as well as "full production and full sales," its business performance is admired by industry peers.

Asia Cement believes that economic growth and environmental protection can be achieved in parallel. At the beginning of the establishment of the Hualien Plant, the Company invested a lot of manpower and material resources to set up a greenhouse seedling system in the quarry to cultivate various indigenous plants and transplant them to the remnant walls of the excavation sites. The greening results have outstanding performance and have been repeatedly recognized by experts. Asia Cement introduces the most advanced dust collection equipment to effectively control the dust fall, keeping it far below the national standard. The Company has won the Enterprise Environmental Protection Award for 3 years. The Hualien plant has invested in circular economy, energy saving, and carbon reduction in recent years, and has achieved remarkable results. The Hualien Plant is the first cement plant in the global cement industry to simultaneously obtain BS 8001 Circular Economy Maturity Optimization, ISO 14067 Product Carbon Footprint, and ISO 14046 Water Footprint certifications. In March 2021, Asia Cement passed the Science-Based Reduction Target Initiative (SBTi), becoming the fourth cement plant in the world with a well-below 2°C target. The Company joined the Global Cement and Concrete Association (GCCA), and jointly committee in Sep. 2020 to reach 2050 Carbon Neutral goal with global peer of cement and concrete industry. In addition, we have built a butterfly ecological park based on the existing beautified environment of the Hualien plant, luring thousands of visitors to experience the beauty of nature and receiving high recognition from the general public.

Asia Cement Corporation has achieved vertical integration in the construction market, encompassing mining, clinker, cement, ready-mix concrete, precast materials, and construction engineering, thereby enhancing the overall value of its cement business. The company is actively expanding its investments globally, with operations extending to Hong Kong, Singapore, Southeast Asia, the Americas, Africa, and the Middle East. In addition to cement, the company has invested in private power plants, stainless steel, and transportation industries, while also refining financial management and investment strategies. With Taiwan as its operational headquarters, Asia Cement Corporation aims for sustainable business growth with a focus on "Rooted in Taiwan, Deeply Cultivating Mainland China, and Expanding Globally."

## 1.3 Climate Change Policy

Addressing the challenges of climate change is a fundamental responsibility for Asia Cement Corporation. Through the Corporate Sustainability Committee, the company implements climate governance, strategies, risk management, and sets specific indicators and targets. This is all part of its long-term goal of achieving “Net Zero Emissions by 2050” across the entire company.

### Commitment



**We are committed to transforming into a low-carbon cement industry and moving towards “Net Zero by 2050”.**



**Commitment to not funding climate-denial or lobbying against climate regulations.**



**Commitment to stakeholder engagement and capacity building on environmental issues.**

### Strategy

#### Low-carbon sustainable products

Working with suppliers and customers to develop low-carbon sustainable products, Asia Cement produces low-carbon or even carbon-negative cement and concrete products, thereby promoting carbon reduction.



#### Climate change mitigation

Asia Cement’s mitigation measures include actively implementing circular economy practices by using alternative raw materials and fuels, developing low-carbon cementitious material technologies to reduce clinker ratios, promoting energy management to lower indirect emissions, employing carbon capture and utilization (CCU) technologies, and generating power through renewable energy sources.



#### Climate change adaptation

To prevent operations from being impacted by climate change and extreme weather, Asia Cement is proactively identifying climate-related risks. We also set up emergency response rules for drought, power shortage, floods, and wind disasters. All our operating bases and value chains have strengthened climate resilience according to the local environment, and taken defensive and response measures to minimize risks.



## 2. Governance on Climate Change

### 2.1 The board's oversight of climate-related risks and opportunities

A Corporate Sustainability Committee was founded under Asia Cement's Board of Directors and a Corporate Sustainability Implementation Committee was founded under President, the ESG team was formed by the members from all departments to promote and implement ESG issues. ESG team is required to report to Corporate Sustainability Implementation Committee quarterly and Corporate Sustainability Implementation Committee reports to Corporate Sustainability Committee the results of ESG every six months.

Corporate Sustainability Committee is required to consider climate related issues when reviewing and supervising strategies, important action plans, risk management policies, annual budget and commercial plans, and setting the operational targets of the organization, monitoring the status of implementation and supervising important capital expenditures. It also checks the status of reaching the target of Asia Cement's net zero emission in the Board Meetings every six months.

The Corporate Sustainability Committee convenes semi-annually. In 2024, meetings were held on May 8 and November 7. The Committee advanced key ESG-related matters, including confirming the ESG governance structure and reviewing strategies for ESG promotion. ESG task forces, through their respective conveners, reported on the planning of major action programs. The Committee reviewed and approved budgets, capital expenditures, and performance targets, while supervising and verifying the achievement of these objectives—for example, the progress toward the Science Based Targets initiative (SBTi) annual emission-reduction pathway.

### 2.2 Management's role in assessing and managing climate-related risks and opportunities

The president, a board director, is directly in charge of the management of Corporate Sustainability Implementation Committee and requests all production units and sales units to evaluate risks and opportunities relating to climate change, specifically the long-term impact to business operations by climate change, including the assets of the Plant, manufacturing process, transport of raw materials, even the laws, regulations and the change of consumers' preferences.

Corporate Sustainability Implementation Committee is created within Corporate Sustainability Committee and in charge of the entire risk management matters including integrating and coordinating cross-departmental common risk management issues, promoting and communicating significant risk management events, executing and tracing all resolution items of risk management assigned by the board of directors or Corporate Sustainability Committee, and submitting risk management reports.

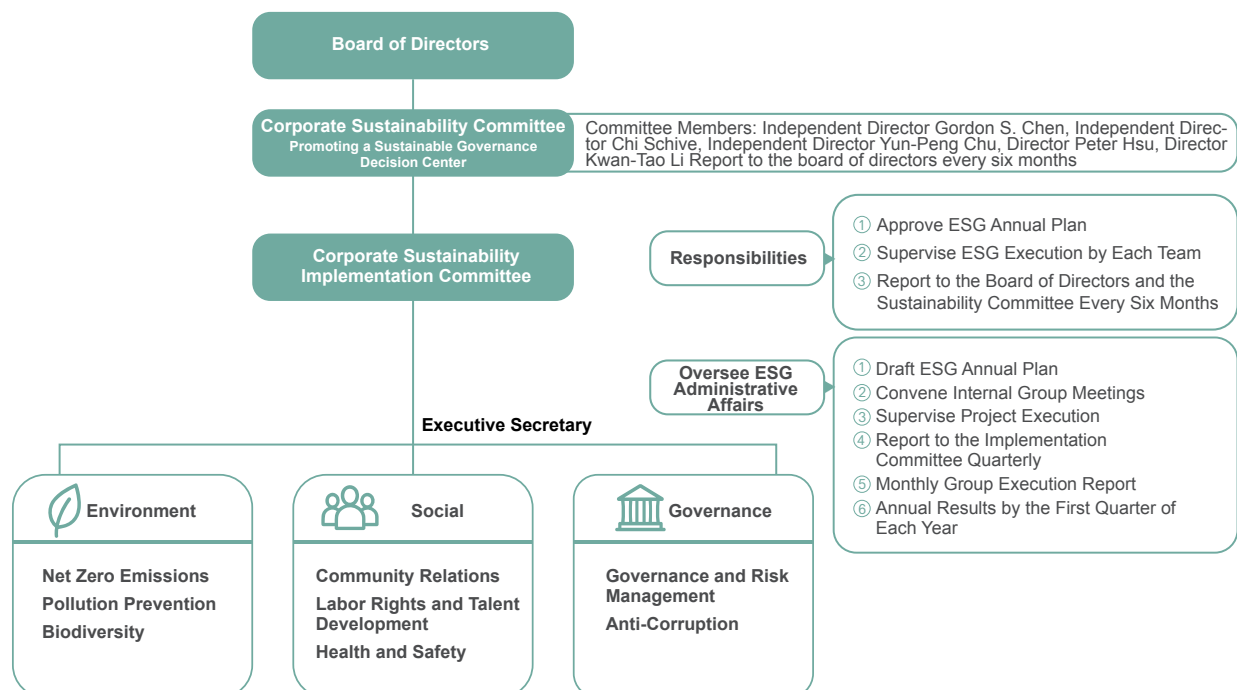


Figure 2.1 illustrates the ESG organizational structure of Asia Cement's Corporate Sustainability Committee

## 3. Climate Change Strategy

### 3.1 Climate-related risks and opportunities that organization has identified over the short, medium, and long term

Climate-related issues can have significant financial impacts on an organization in the short, medium, or long term. Under Asia Cement's risk management framework, climate-related risks and opportunities are identified and assessed at all operational sites in Taiwan. The assessment and reporting period is defined as short-term (0-3 years), medium-term (3-10 years), and long-term (over 10 years). The likelihood and financial impact of transitional and physical risks and opportunities are evaluated to ensure comprehensive risk management.

According to Asia Cement's "Risk Management Policies and Procedures," risk quantification guidelines are used to identify and measure the impact of major risks. These guidelines classify financial risk impact into five levels: "Very Low," "Low," "Medium," "High," and "Very High." Impacts classified as "High" are defined as affecting EBITDA by 4% to 5%, while impacts classified as "Very High" are those affecting EBITDA by more than 5%. These high and very high impacts are considered material to Asia Cement.

To manage the impact of climate risks on Asia Cement, the company launched the "Climate Change Adaptation Project" in 2016. This initiative involves assessing climate-related risks and opportunities from both operational and asset perspectives using the Task Force on Climate-related Financial Disclosures (TCFD) framework. The company conducts annual evaluations covering the entire value chain, including upstream and downstream stages. These evaluations analyze the likelihood, impact, and timing of risks and opportunities. The project also includes developing a risk-opportunity matrix, identifying key issues, and conducting subsequent financial impact analyses and mitigation strategies.

### 3.2 Climate-Related Risks and Opportunities in Asia Cement's Business, Strategy, and Financial Planning

Asia Cement's climate change strategy is formulated to cover the following aspects: products, supply chain, adaptation and mitigation, low-carbon investment, and operational activities. As shown in Table 3.1

Table 3.1 Impact and implementation of ACC's climate change response strategy

Strategy impact aspects	Implementation of ACC's strategy
<b>Product</b>	Cement is one of the essential materials in modern construction, with Portland cement being the most widely used type in the industry today. In response to the global trend toward net-zero carbon emissions, the domestic cement industry's net-zero pathway focuses on producing low-carbon cement as a highly feasible and effective carbon reduction strategy. Asia Cement has pioneered the domestic market by launching low-carbon products, "Portland Limestone Cement" for bulk cement used in concrete and "Masonry Cement" for bagged cement used in masonry work, leading the cement industry into a new era of low-carbon products. Asia Cement is also continuously developing other low-carbon products, such as ternary blended cement, which has similar applications to Portland cement but offers greater strength, lower permeability, higher corrosion resistance, and superior carbon reduction effects.
<b>Value chain</b>	Due to the impact of extreme weather conditions, major transportation routes may be disrupted by heavy rainfall, posing potential risks of supply chain interruptions. Additionally, government policies such as increased special taxes on minerals can lead to rising raw material prices, thereby increasing mining costs. To effectively address climate change, we assist our suppliers in risk management annually, aiming to achieve a green, low-carbon, and environmentally friendly supply chain. This allows us to better assess supplier risks. Moreover, we have diversified our procurement channels for alternative raw materials and fuels to increase resource substitution rates and diversity, thereby reducing the risk of future supply chain disruptions caused by extreme weather conditions.
<b>Investment in research and development</b>	Climate-related risks and opportunities have profoundly influenced Asia Cement's investment and technology development strategies. To achieve net-zero emissions, Asia Cement's investments in new technology development include research and development of LC <sup>3</sup> (Limestone Calcined Clay Cement), which can significantly reduce cement emissions. Additionally, the company is developing waste recarbonation technology, which utilizes the recarbonation reaction to absorb CO <sub>2</sub> using waste concrete or industrial by-products, producing artificial aggregates and reducing the amount of CO <sub>2</sub> released into the environment.

Strategy impact aspects	Implementation of ACC's strategy
<p><b>Operating activities</b></p>	<p>The cement manufacturing process at Asia Cement features superior 3T characteristics: high temperature, long retention time, and strong turbulence. These properties allow for the thorough decomposition of waste and high-pollution hazardous substances. As a result, utilizing cement plants for a circular economy is a crucial strategic direction. Asia Cement's circular economy initiatives include two main categories: waste recycling and products derived from waste resources. These efforts assist public and private sectors in Taiwan with effective waste reduction and resource reuse.</p> <p>Asia Cement has standardized its circular economy processes by establishing the "Regulation for Acquisition and Reuse of Circular Economy-promoting Raw Materials and Fuel" and the "Circular Economy Management Procedure." These documents serve as the basis for implementing circular economy initiatives. Additionally, the Hualien Manufacturing Plant has been certified under BS 8001:2017, achieving the highest maturity level for its circular economy model.</p> <p>Asia Cement is also actively promoting low-carbon cement, aiming to increase its sales volume and market share.</p>

## • Financial Impacts and Planning for Climate-Related Physical Risks and Opportunities

 <p><b>Risk 1</b></p> <p><b>Transition Risk (Current Regulations)</b></p> <p>↓</p> <p><b>Increase in Direct Costs</b></p>	<p>In line with the Climate Change Response Act, the pricing of greenhouse gas emissions is expected to increase. Beginning in 2024, a carbon management fee of NT\$300 per ton of CO<sub>2</sub>e will be levied on Scope 1 and Scope 2 emissions. Asia Cement's Hualien Plant is planning to submit a voluntary emission reduction program to apply for preferential rates in order to reduce carbon fee expenditures. This risk is expected to directly increase operating costs: estimated at NT\$130 million in the short term (2025–2026) and NT\$550 million in the medium term (2026–2030).</p> <p><b>Response Measures</b></p> <p>To address this risk, Asia Cement is implementing net-zero initiatives such as circular economy practices, renewable energy adoption, and energy efficiency improvements. These measures will directly increase capital expenditures on net-zero solutions, estimated at NT\$380 million in the short term (2025–2026) and NT\$50 million in the medium term (2027–2030).</p> <p>Capital Expenditure in Reporting Year 2024 For the 2024 reporting year, related capital expenditures amounted to NT\$580 million, fully funded by Asia Cement's own resources.</p>
 <p><b>Risk 2</b></p> <p><b>Transition Risk (Market)</b></p> <p>↓</p> <p><b>Rising Raw Material and Electricity Costs</b></p>	<p>Electricity prices in Taiwan currently do not adequately incentivize demand reduction, making it difficult to achieve national carbon-reduction targets. Consequently, electricity price hikes increase Asia Cement's operating costs. Estimated additional costs are NT\$220 million in the short term (2025–2026) and NT\$1.49 billion in the medium term (2027–2030). In the 2024 reporting year, electricity tariffs rose by approximately 11% starting in October, resulting in an additional NT\$81 million in electricity expenses compared with 2023.</p> <p><b>Response Measures</b></p> <p>Asia Cement is implementing the ISO 50001 Energy Management System to ensure continuous annual improvements in energy efficiency. This will increase capital expenditures on energy efficiency enhancement projects, estimated at NT\$340 million in the short term (2025–2026) and NT\$170 million in the medium term (2027–2030).</p>
 <p><b>Risk 3</b></p> <p><b>Physical Risk</b></p> <p>↓</p> <p><b>Typhoons and Heavy Rainfall Leading to Reduced Revenue and Higher Operating Costs</b></p>	<p><b>Operational Impact</b></p> <p>Severe typhoons and heavy rainfall cause raw materials to become wet and sticky, as well as coal slumping, which in turn reduces production capacity and damages plant facilities.</p> <p>Supply Chain Impact: Typhoons disrupt the arrival of imported raw materials, affecting on-site inventory. Strong winds and heavy rainfall also cause interruptions to the Suhua Highway, hindering both raw material supply and product distribution. The estimated short-term financial impact (2025–2026) is NT\$27 million.</p> <p><b>Response Measures</b></p> <p>Asia Cement has upgraded coal yards #2 and #3, as well as other outdoor storage facilities, to indoor storage in order to protect materials and secure higher inventory safety levels. The estimated cost of these measures is NT\$1.32 billion in the short term (2025–2026).</p>



Opportunity 1

**Resource Efficiency**

↓

**Recycling and Reuse (Alternative Raw Material) to Increase Treatment Fee Revenue**


Asia Cement promotes circular economy initiatives by recycling and reusing industrial waste from upstream industries as alternative raw material for cement production. In line with its Climate Transition Plan, the company has set annual targets to increase the use of alternative raw material. This will directly generate additional treatment fee revenues while reducing process-related greenhouse gas emissions. The estimated financial benefits are NT\$310 million in the short term (2025–2026), NT\$930 million in the medium term (2027–2030), and NT\$1.12 billion in the long term (2031–2035).

**Response Measures**

The facilities for alternative raw material utilization have already been completed; therefore, no further investments are required in the short, medium, or long term.

**Capital Expenditure in Reporting Year 2024**

In the 2024 reporting year, Asia Cement also incurred no such related expenditures.



Opportunity 2

**Energy Source**

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**Use of Low-Carbon Energy (Alternative Fuel) to Increase Treatment Fee Revenue and Reduce Coal Costs**

Asia Cement promotes circular economy practices by recycling and reusing industrial waste from upstream industries as alternative fuel. According to its Climate Transition Plan, the company has set annual targets to increase the use of alternative fuel. This initiative will directly increase treatment fee revenues, reduce coal expenses, and lower stationary-source greenhouse gas emissions. The estimated financial benefits are NT\$660 million in the short term (2025–2026), NT\$2.41 billion in the medium term (2027–2030), and NT\$3.72 billion in the long term (2031–2035).

**Response Measures**

To expand alternative fuel utilization, Asia Cement is investing in projects such as a preheater alternative fuel feeding system, combustion time optimization, an intelligent alternative fuel analysis system, and additional storage and conveying facilities. These projects will increase capital expenditures, with cumulative fixed and variable costs for alternative fuel facilities estimated at NT\$360 million in the short to medium term, fully funded by Asia Cement's own resources.

**Capital Expenditure in Reporting Year 2024**

In the 2024 reporting year, Asia Cement implemented a staged burner installation project for Preheaters No. 1–3, with capital expenditures of approximately NT\$79 million, fully funded by the company's own resources.



Opportunity 3

**Development and/or Expansion of Low-Carbon Products and Services**

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**Increased Revenue from Low-Carbon Cement Sales**

Asia Cement develops and markets low-carbon cement products, including Yang House Brand Masonry Cement, Portland Limestone Cement, and Ternary Blended Cement, to increase sales volume and revenue from low-carbon cement. The estimated financial benefit in the short term (2025–2026) is NT\$3.54 billion.

**Response Measures**

To capture this opportunity, Asia Cement will increase investments in R&D and sales promotion for low-carbon cement. The cumulative short-, medium-, and long-term costs of low-carbon cement R&D and promotion are estimated at NT\$20 million.

**Capital Expenditure in Reporting Year 2024**

In the 2024 reporting year, Asia Cement's indirect operating expenditures for low-carbon cement R&D and promotion amounted to approximately NT\$10 million, fully funded by the company's own resources.



### 3.3 Organizational resilience in strategy, considering climate-related scenarios

- Transition Scenario IEA B2DS - Transition Risk Assessment**

Asia Cement undertook the assessment of transit risk based on the “Beyond 2°C Scenario, B2DS” proposed by International Energy Agency (IEA). The result of analyzing IEA B2DS was as follows: Asia Cement joined the initiative of Science-Based Targets for carbon reduction and set the carbon reduction target scenario by department based on IEA B2DS scenario. The first phase is by 2025, comparing to 2019, the scope 1 plus scope 2 GHG emission intensity per ton of cementitious materials will be reduced by 8%.

Impact of IEA B2DS Scenario on Targets and Strategy: Based on the IEA B2DS scenario analysis, Asia Cement has set annual reduction targets, with the reduction boundary covering cementitious material production sites (Hsinchu Plant and Hualien Plant) as well as the headquarters. Achieving these reduction targets serves as the core of Asia Cement’s low-carbon transition strategy. The main strategies include implementing a circular economy through the substitution of raw materials and fuels, improving energy efficiency, producing low-carbon cement, and installing renewable energy sources.

- Transition Scenario – IEA NZE 2050: Transition Risk Assessment**

The International Energy Agency’s (IEA) Net Zero Emissions by 2050 Scenario (IEA NZE 2050) assumes that global enterprises will achieve net zero emissions by 2050 and provides an emissions pathway with a 50% probability of limiting global warming to within 1.5°C. Asia Cement actively supports the global net-zero transition. In its second-stage scenario analysis, the company adopted the IEA NZE 2050 framework and referenced the SBTi Net-Zero Standard tool, using 2021 as the base year. Asia Cement has set science-based targets to reduce emission intensity by 22.9% by 2030 and by 43.5% by 2035, and to achieve net-zero carbon emissions by 2050.

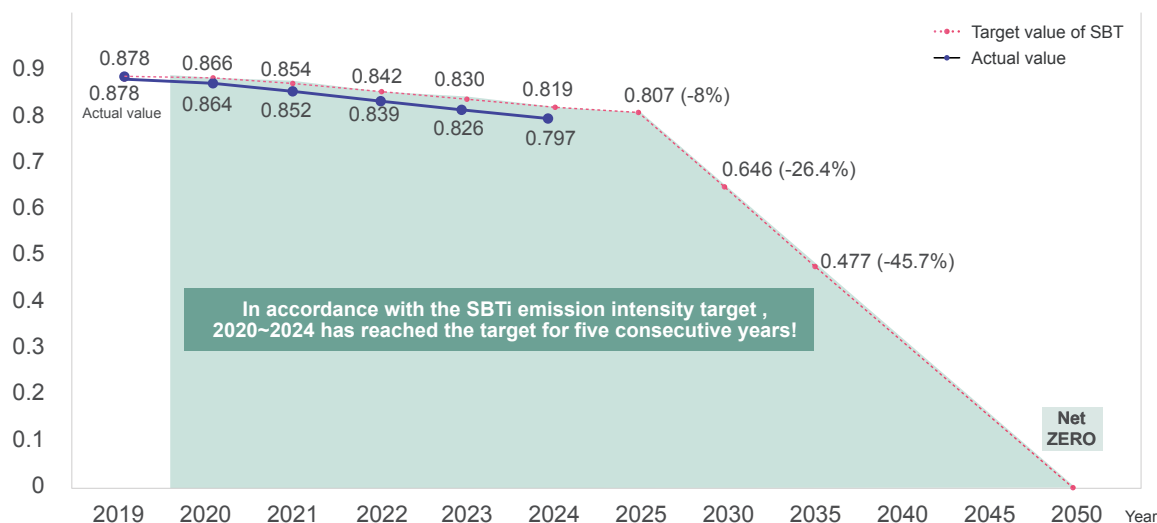


Figure 3.1 Asia Cement SBT Reduction Pathway

- SSP5-8.5 – Physical Risk Scenario Assessment**

Asia Cement adopted the Shared Socioeconomic Pathways (SSPs) framework to simulate the SSP5-8.5 scenario. Under SSP5-8.5, the company assessed risks by multiplying hazard factors with vulnerability factors to develop a risk matrix for guiding mitigation and adaptation measures. The risk matrix identified major risk items including slope disasters and strong wind threats. The primary impacts are expected on systems such as the auxiliary raw material (clay) transportation system, the raw mill system, and the rotary kiln system.

Impact of SSP5-8.5 Scenario on Targets and Strategies: Based on the Representative Concentration Pathway (RCP) 8.5 scenario analysis, Asia Cement has established disaster emergency response plans and continues to monitor relevant climate risks on an ongoing basis.

## 4. Climate Risk and Opportunity Management

### 4.1 Organization's processes for identifying and assessing climaterelated risks

#### • Background check

To gain a reference point for Asia Cement, the TCFD Team first conducted a background survey on historical impact of climate change, typically by examining the past 5 years when the Company or its plant had encountered physical risks or transition risk; the team also examined the Company's internal and external environment, and the climate-related financial impact facing international peers, so as to gain a basis for planning of risk and opportunity assessment. Figure 4.1 illustrates the background review process.

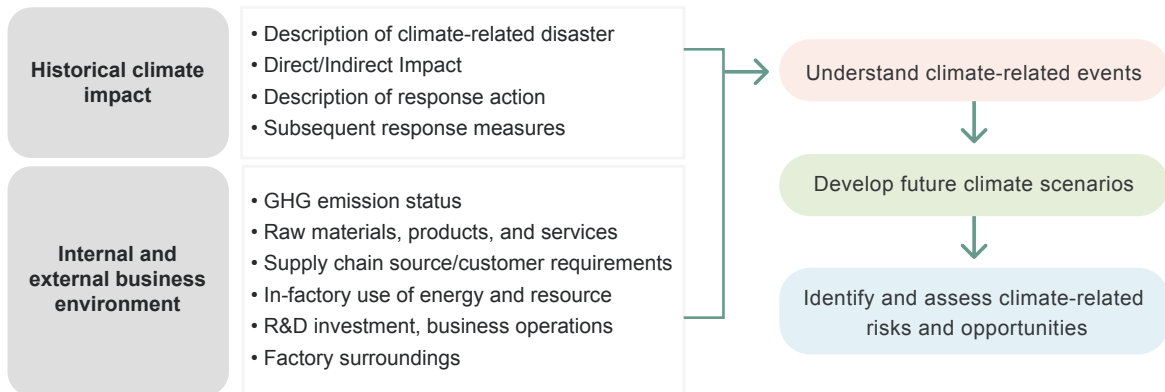


Figure 4.1 Flow chart of climate-related background review

#### • Set climate scenarios

Transition risks and opportunities were estimated under the climate scenarios in Taiwan's Pathway to Net-Zero Emissions in 2050, i.e., achieving low-carbon in the short-term (~ 2030) and heading towards net-zero in the long-term (~ 2050); physical risks and opportunities were assessed under the AR6 SSP5-8.5 climate scenario, a very high emission scenario that assumes absence of any climate policy, and by referencing the scenarios in Taiwan Climate Change Key Indices.

#### • Identify and assess climate change risks and opportunities

The climate-related risk and opportunity identification and assessment process carried out by the TCFD Team, shown in Figure 4.2, is based on the impact of climate change on the Company's overall operations and by reference to the "TCFD Reporting Framework". A background review examined internal and external business environment, physical risks or transition risk events encountered in the past, and climate-related financial impacts facing international peers. Moreover, by considering the impact on business strategy from the Company's products and services, supply chain and/or value chain, adaptation and mitigation activities, and R&D investment, and business operations in the event of climate change, we have identified 8 transformation risks, 3 physical risks, and 6 opportunities, shown in Table 4.1 and Table 4.2.

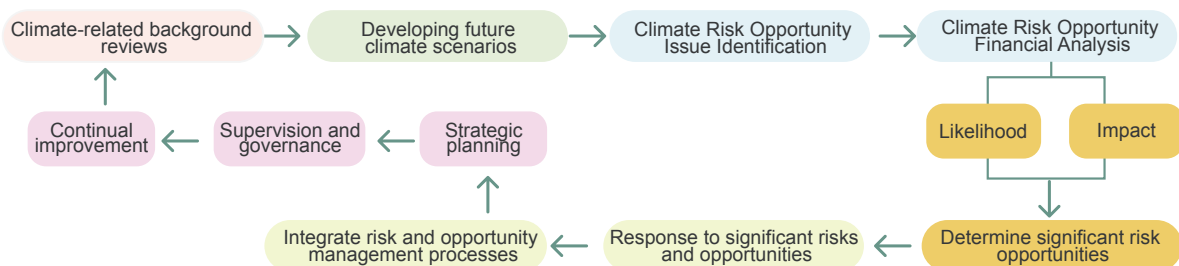


Figure 4.2 Flowchart of identification and assessment of Climate-related risks and opportunities

Table 4.1 Asia Cement Identified Climate-Related Risk Issues

Risk Type	Risk Item	Climate-Related Risk Issues (Risk Drivers)
Transition Risk	Policy and Legal	R1 Increased pricing of GHG emissions
		R2 Enhanced emissions-reporting obligations
		R3 Mandates on and regulation of existing products and services-CO <sub>2</sub> e
	Technology	R4 Costs to transition to lower emissions technology
	Market	R5 Changing customer behavior
		R6 Increased cost of raw materials
	Reputation	R7 Increased stakeholder concern or negative stakeholder feedback
Policy and Legal	R11 Mandates on and regulation of existing products and services-Water fee	
Physical Risk	Acute	R8 Typhoon
		R9 Heavy rainfall
	Chronic	R10 Water shortage

Table 4.2 Asia Cement Identified Climate-Related Opportunity Issues

Opportunity Type	Climate-Related Opportunity Issues (Opportunity Drivers)	
Opportunity	Resource Efficiency	O1 Recycling and Reuse (Alternative Material )
		O2 Reduction of Water Use and Consumption
	Energy Source	O3 Use of Low-Carbon Energy (Waste Heat Recovery and Fuel Alternative)
	Products and Services	O4 Development and/or Increase of Low-Carbon Products and Services
	Markets	O5 Utilization of Public Sector Incentives
	Resilience	O6 Participation in renewable energy programs and adoption of energyefficiency measures

## 4.2 Organization's processes for managing climate-related risks

Asia Cement's approach to dealing with climate change involves three stages: stage 1: Identify and assess existing risks and opportunities; stage 2: Define material risks and opportunities; and stage 3: Analyze financial impacts and countermeasures and estimate costs.

### • Stage 1: Identify and assess existing risks and opportunities

The Company grades TCFD transition and physical risks and opportunities by their relevance, impact, and life cycle and establishes a risk and opportunity assessment matrix every year.

The terms short-, medium-, and long-term with respect to the occurrence of risks and opportunities denote the period of 2025-2026, the period of 2027-2030, and the period of 2031-2035, respectively.

The likelihood and impact magnitude assessment criteria for each risk and opportunity issue are detailed in Tables 4-3 to 4-5.

Table 4-3 Criteria for Assessing the Likelihood of Occurrence for Risk and Opportunity Issues

Likelihood	Probability of Occurrence	Score
Virtually certain	More than 95%	7
Very likely	80~95%	6
Likely	65~80%	5
More likely than not	50~65%	4
About as likely as not	35~50%	3
Unlikely	20~35%	2
Very unlikely	5~20%	1
Exceptionally unlikely	Below 5%	0

Table 4-4 Criteria for Assessing the Magnitude of Financial **Negative** Impact from Risk Issues

Magnitude	Financial Impact Amount ( <b>Negative</b> )	Score
<b>Very High</b>	More than 5% of EBITDA: Amount exceeding NT\$620 million	5
<b>High</b>	4-5% of EBITDA: Amount between NT\$500 million and NT\$610 million	4
<b>Medium</b>	3-4% of EBITDA: Amount between NT\$370 million and NT\$490 million	3
<b>Low</b>	2-3% of EBITDA: Amount between NT\$250 million and NT\$360 million	2
<b>Very Low</b>	Less than 2% of EBITDA: Amount below NT\$120 million	1
<b>Unknown</b>	Unknown	0

 Table 4-5 Criteria for Assessing the Scale of Financial **Positive** Impact from Opportunity Issues

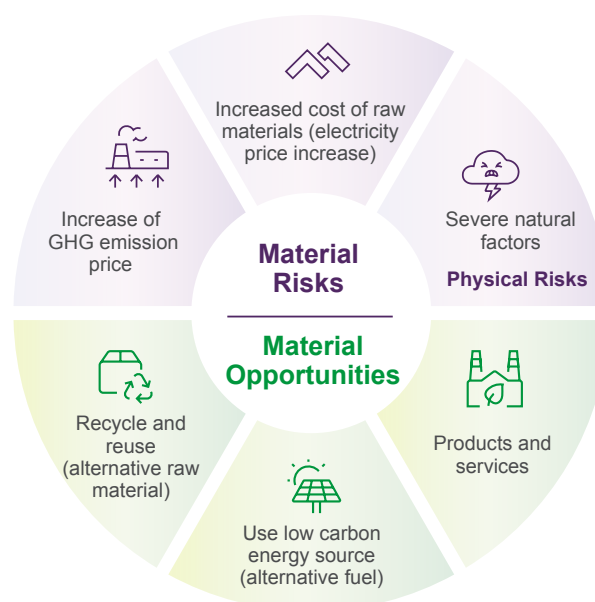
Magnitude	Financial Impact Amount ( <b>Positive</b> )	Score
<b>Very High</b>	More than 5% of EBITDA: Amount exceeding NT\$620 million	5
<b>High</b>	4-5% of EBITDA: Amount between NT\$500 million and NT\$610 million	4
<b>Medium</b>	3-4% of EBITDA: Amount between NT\$370 million and NT\$490 million	3
<b>Low</b>	2-3% of EBITDA: Amount between NT\$250 million and NT\$360 million	2
<b>Very Low</b>	Less than 2% of EBITDA: Amount below NT\$120 million	1
<b>Unknown</b>	Unknown	0

## • Step 2: Defining Material Risks and Opportunities and Analyzing Financial Impacts

In accordance with Asia Cement's Risk Management Policy and Procedures, major risks are identified and quantified based on established risk quantification criteria. Financial risk impacts are defined across five levels: very low, low, medium, high, and very high. Impacts assessed as high or very high are considered material to Asia Cement. Specifically, an impact of 4% to 5% of EBITDA is defined as high, while an impact exceeding 5% of EBITDA is defined as very high. With Asia Cement's 2024 EBITDA estimated at approximately NT\$15 billion, materiality is defined as financial impacts exceeding NT\$600 million ( $\approx 4\%$  of EBITDA).

Based on the 2024 assessment, Asia Cement identified the following material risks and opportunities (see Figure 4.3):

- Transition Risks (2 items):
  1. Policy and regulatory increases in greenhouse gas emission pricing
  2. Rising market material costs (e.g., electricity price hikes)
- Physical Risk (1 item):
  1. Severe natural hazards such as typhoons leading to reduced productivity, facility damage, and supply chain disruptions
- Opportunities (3 items):
  1. Resource efficiency through recycling and reuse (alternative raw material)
  2. Use of low-carbon energy sources (alternative fuel)
  3. Development and/or expansion of low-carbon products and services



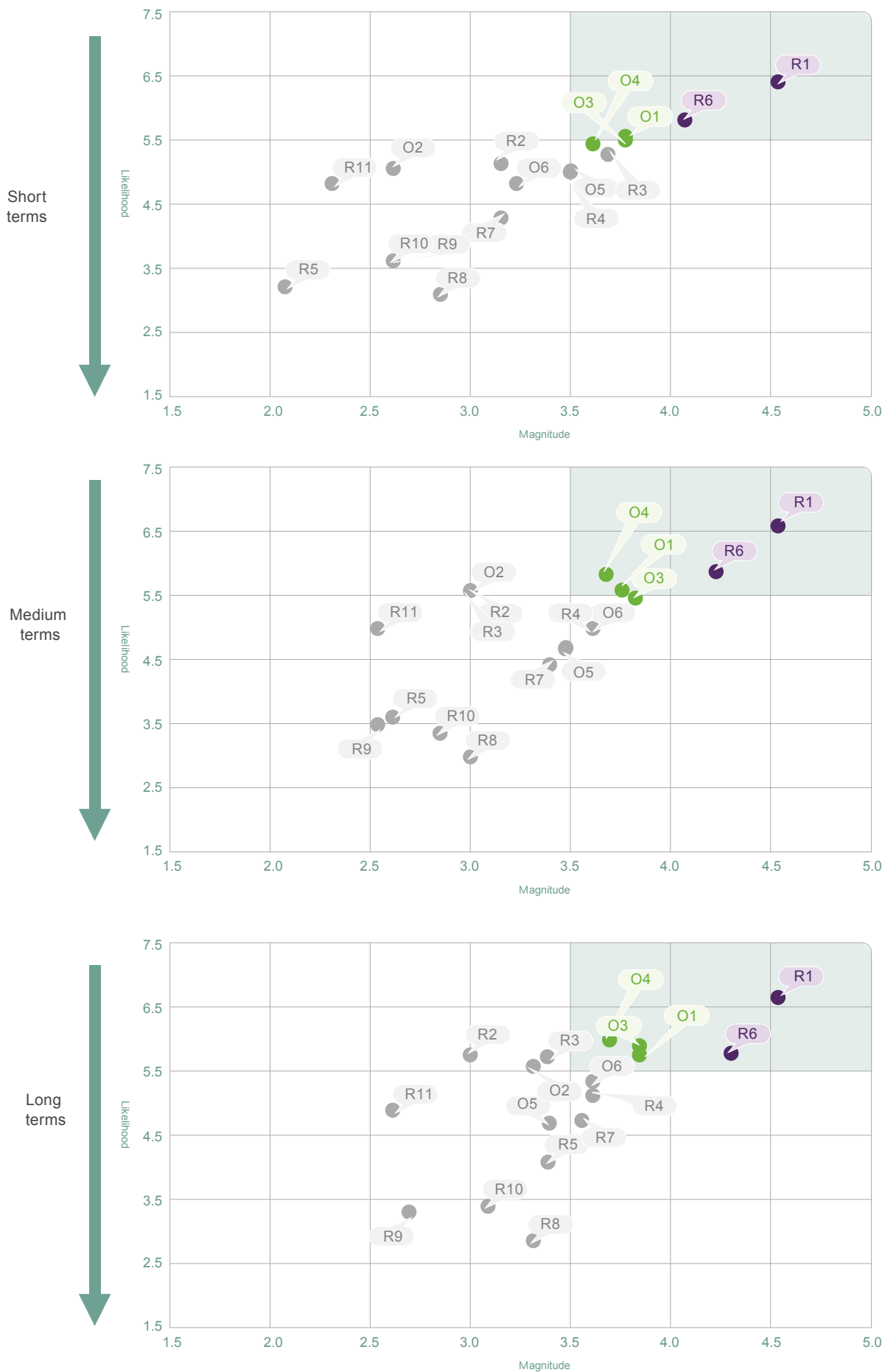


Figure 4.3: Asia Cement's Short, Medium, and Long-Term Climate Change Risk and Opportunity Matrix

### Step 3: Response Measures and Cost Estimation

For each identified Material risk and opportunity, Asia Cement evaluates the corresponding actions and costs to ensure the effectiveness of the anticipated outcomes.

Table 4.3 illustrates the evaluation of potential financial impacts and risk management measures for the three Material risks.

Table 4.3 Financial Impact and Risk Management Measures for Asia Cement's Material Climate Change Risks (Transition Risks)







Risk Item	 Increase in GHG Pricing	 Rising Market Raw Material Costs (Electricity Price Increase)	 Severe Natural Factors Impacting Operations
Risk Type	<b>Transition Risk</b> Current Regulations	<b>Transition Risk</b> Technology	<b>Physical Risk</b> Immediate - Typhoons and Heavy Rainfall
Risk Description	According to the Climate Change Act, Scope 1 and Scope 2 carbon fees are expected to be levied in 2025.	Currently, electricity pricing cannot effectively reduce usage through price mechanisms, making it difficult to meet Taiwan's carbon reduction targets.	<b>Operational aspect</b> Strong typhoons and heavy rainfall cause raw materials to become sticky, coal to collapse.
Stage of Value Chain	Direct Operations	Upstream Supply Chain	Operations and Supply Chain
Risk Drivers	Carbon Pricing Mechanism	Rising Raw Material Costs (Electricity Price Increase)	Decreased Productivity and Operational Loss
Potential Financial Impact	Increased Operating Costs	Rising Material Costs	Reduced Revenue and Increased Operating
Timeframe	<b>Short Term</b> <b>Medium Term</b>	<b>Short Term</b> <b>Medium Term</b>	<b>Short Term</b>
Financial Impact Amount	<b>Short Term</b> (2025~2026): NT\$ 130 million <b>Medium Term</b> (2027~2030): NT\$ 550 million	<b>Short Term</b> (2025~2026): NT\$ 220 million <b>Medium Term</b> (2027~2030): NT\$ 1.49 billion	<b>Short Term</b> (2025~2026): NT\$ 27 million
Risk Response Measures	The Company has proposed a voluntary reduction plan, implementing circular economy practices and producing low-carbon cement as part of its net zero initiatives.	Implement ISO 50001 Energy Management System to improve energy efficiency annually.	Increase raw material safety stock and renovate plant areas to cope with heavy
Estimated Response Costs	<b>Short Term</b> (2025~2026): NT\$ 380 million <b>Medium Term</b> (2027~2030): NT\$ 50 million	<b>Short Term</b> (2025~2026): NT\$ 340 million <b>Medium Term</b> (2027~2030): NT\$ 170 million	<b>Short Term</b> (2025~2026): NT\$ 1.32 billion

Table 4.4 illustrates the evaluation of potential financial impacts and opportunity management measures for the three Material opportunities.

Table 4.4 Financial Impact and Opportunity Management Measures for Asia Cement's Material Climate Change Opportunities

Opportunity Item	 Recycling (Alternative raw material)	 Use of Low-Carbon Energy (Alternative fuel)	 Products and Services
Opportunity Type	Resource Efficiency	Energy Source	Developing and/or Increasing Low-Carbon Goods and Services
Opportunity Description	Asia Cement implements a circular economy by recycling industrial waste (upstream) to substitute cement raw materials.	Asia Cement implements a circular economy by recycling industrial waste (upstream) to substitute fuel.	With the market moving toward low-carbon transition, sales of the company's low-carbon cement have increased.
Stage of Value Chain	Direct Operations	Direct Operations	Operations and Downstream Customers
Opportunity Drivers	Circular Economy through Recycling and Reuse	Use of Low-Carbon Energy	Development and Expansion of Low-Emission Products
Potential Financial Impact	Increase in processing fee income	Increase in processing fee income and reduction of coal costs	Increase in revenue
Timeframe	<b>Short Term</b> <b>Medium Term</b> <b>Long Term</b>	<b>Short Term</b> <b>Medium Term</b> <b>Long Term</b>	<b>Short Term</b> <b>Medium Term</b> <b>Long Term</b>
Financial Impact Amount	<b>Short Term</b> (2025~2026): NT\$ 310 million <b>Medium Term</b> (2027~2030): NT\$ 930 million <b>Long Term</b> (2031~2035): NT\$ 1.12 billion	<b>Short Term</b> (2025~2026): NT\$ 660 million <b>Medium Term</b> (2027~2030): NT\$ 2.41 billion <b>Long Term</b> (2031~2035): NT\$ 3.72 billion	<b>Short Term</b> (2025~2026): NT\$ 3.54 billion
Opportunity Response Measures	<ul style="list-style-type: none"> <li>Construction of additional storage for alternative raw materials</li> <li>Smart raw meal batching analysis system</li> </ul>	<ul style="list-style-type: none"> <li>Installation of staged burners on preheaters No.1~3</li> <li>Improvement project for cooler No.3</li> <li>Installation of alternative fuel conveying and feeding systems</li> <li>Increasing alternative fuel substitution rate in preheater No.3</li> </ul>	<ul style="list-style-type: none"> <li>R&amp;D and marketing of House Brand Masonry Cement, Portland Limestone Cement, and Ternary Blended Cement</li> <li>Development of new supplementary cementing materials</li> </ul>
Estimated Response Costs	The equipment for alternative raw materials has been completed; no investment cost in short, medium, and long term.	Short-term estimated fixed and variable costs for alternative fuel equipment are NT\$ 360 million.	Cumulative short to long-term R&D and promotion costs are estimated at NT\$ 20 million.

### 4.3 Processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management

To enhance corporate governance and promote sustainable development, Asia Cement has established a robust risk management mechanism. This system controls operational, financial, hazard, cybersecurity, compliance, climate, natural, and other risks within acceptable limits. The Board of Directors strengthens risk management through an "Internal Control System" and has established "Risk Management Policies and Procedures." These policies guide the Board, Corporate Sustainability Committee, and relevant departments in ensuring sound business operations and achieving corporate objectives.

The TCFD Working Group at Asia Cement identifies, evaluates, and manages climate-related risks, coordinated by the Corporate Sustainability Implementation Committee. This process is integrated into Asia Cement's risk management policies and procedures, as well as the ISO management systems of various plants. Issues identified as material risks and opportunities are addressed by relevant departments, which develop response measures and management plans. These are reported and discussed at quarterly ESG committee meetings to strategize on mitigating, transferring, accepting, or controlling risks and capitalizing on opportunities.

The aforementioned short, medium, and long-term response measures and management plans are also incorporated into regular supervision or integrated with the company's Quality Management System (ISO 9001), Environmental Management System (ISO 14001), and Energy Management System (ISO 50001) operational processes. This integration ensures that all aspects of the company's risk management are addressed. The implementation of these measures is monitored and managed through ISO-related meetings and company management meetings. Additionally, climate-related issues such as air, energy, water resources, and waste management are addressed by setting relevant targets aligned with the company's ESG performance indicators. These targets are also incorporated into the company's proposal improvement system, bonuses, performance evaluations, and group bonus policies.



## 5. Metrics and Targets

### 5.1 Metrics used by the organization to assess climate related risks and opportunities in line with its strategy and risk management process

The KPIs stipulated by Asia Cement for climate change included: water, energy, wastes management and GHG emission. The KPIs and targets were formulated by referring to TCFD Guide for Building Material Sector. Please refer to the details in each chapter for explanation on why the targets were not met.

### 5.2 Scope 1&2, and, Scope 3 greenhouse gas (GHG) emissions, and the related risks

**Greenhouse Gas Inventory and Verification:** In accordance with the guidelines and requirements announced by the Ministry of Environment, Asia Cement conducts annual greenhouse gas (GHG) inventories, third-party verification, and registration. In 2024, the company's GHG emissions were: Scope 1 – 2,481,520 tCO<sub>2</sub>e and Scope 2 – 146,192 tCO<sub>2</sub>e.

Asia Cement also established a Procedure for Identifying Significant Indirect GHG Emissions with reference to ISO 14064-1:2018. The assessment considers four factors—intended users, emission contribution, level of impact, and data quality—to identify significant indirect emissions. Based on this evaluation, the significant Scope 3 emission categories for the company are: purchased goods, upstream fuel and energy, and waste generated in operations.

As shown in Figure 5.1, the 2024 Scope 3 emissions across categories were fully verified, achieving a 100% verification rate.

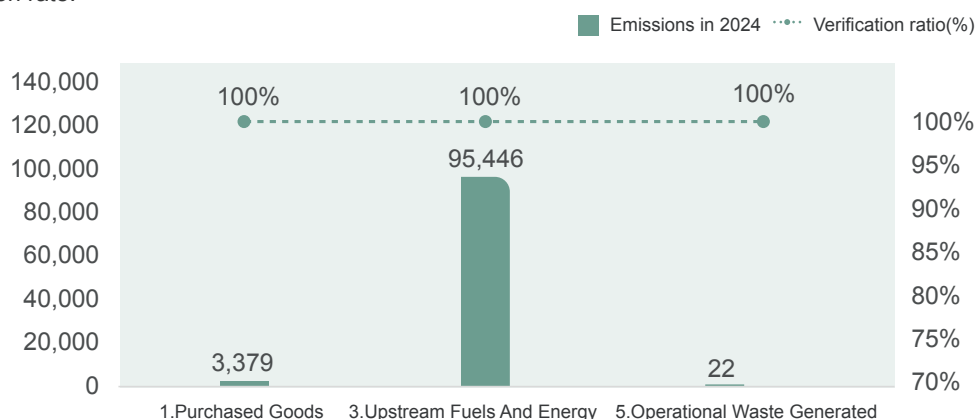


Figure 5.1 Asia Cement 2023 Scope 3 Emissions and Verification by Category (tons CO<sub>2</sub>e)

When Asia Cement set its Science Based Targets (SBTs) in 2020, it conducted a comprehensive inventory of Scope 3 emissions. However, since Scope 3 emissions did not exceed 40% of the company's total emissions, no formal SBT reduction target was required. Nevertheless, to advance value chain decarbonization, Asia Cement voluntarily set a reduction target using 2021 as the base year—aiming for a 5% reduction by 2025 (equivalent to 1.25% reduction per year). In 2024, Scope 3 emissions totaled 98,847 tCO<sub>2</sub>e, meeting the annual self-defined reduction target.

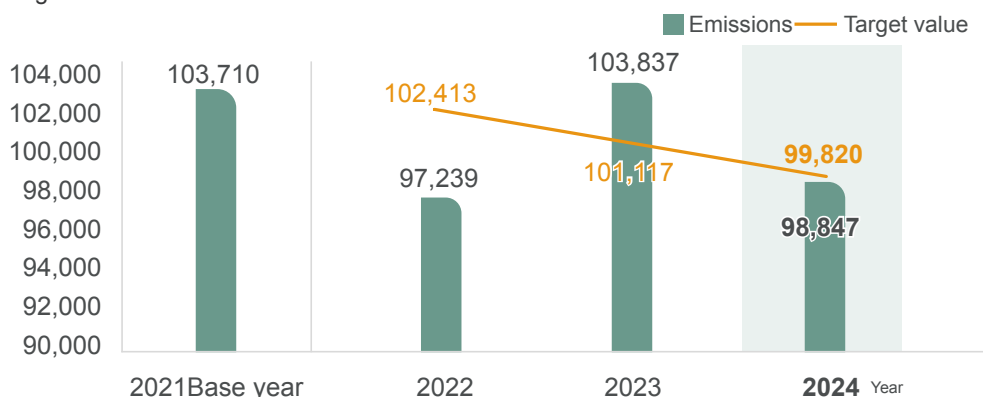
























Figure 5.2 Asia Cement's Scope 3 emissions and reduction targets (tons of CO<sub>2</sub>e)

## 5.3 Targets used by the organization to manage climate-related risks and opportunities and performance against targets




The achievement status of Asia Cement's 2024 performance indicators and targets is shown in Table 5.1

Table 5.1 Asia Cement's 2024 Target Achievement Status

Type	Indicator	Unit	Target	Actual 2024	2024 Target Achievement	Compared to base year
 Energy	Total energy consumption	MWh	Reduce total energy use and intensity by 1% annually from 2019 base year	3,251,589 MWh		 15%
		MWh/ton cementitious material		0.99 MWh/ton cementitious material		 6%
 Greenhouse Gas Emissions	Cementitious material emission intensity	tons CO <sub>2</sub> e/ton cementitious	From 2019 base year, by 2025 reduce Scope 1+2 emissions intensity by 8% (SBT target)	0.797 tons CO <sub>2</sub> e/ton cementitious		 9%
 Alternative Materials & Fuels	Percentage of replacing raw material and fuel	kg/ton cementitious material	By 2030: 183 kg/ton cementitious; biomass thermal substitution 10.2%; non-biomass 19.3%	152 kg/ton cementitious		-
		%		Biomass 3.0%		-
		%		Non-biomass 3.2%		-
 Water	Process water recycling rate	%	Maintain above 85%	81.3%		-
 Water Efficiency	Water intake per ton cementitious material	Tons water/ton cementitious	From 2024 base year, reduce by 6% by 2030 and 11% by 2035	0.852 tons water/ton cementitious		-
 Water	Net freshwater consumption	Thousand tons (ML)	From 2024 base year, reduce by 6% by 2030 and 11% by 2035	2,589 thousand tons (ML)		-
 Wastes	Waste recycling rate	%	Maintain annual recycling rate above 90%	98%		-
 Waste Heat Recovery	Waste heat power generation as % of external power	%	Hualien Plant: above 20% of external power from waste heat recovery	23%		-

The short, medium, and long-term planning for Asia Cement's climate change indicators and targets are outlined in Table 5.2.

Table 5.2 Asia Cement's Short, Medium, and Long-Term Planning for Climate Change Indicators and Targets

Type	Indicator	Unit	Short-term Target (2025)	Medium-term Target (2030)	Long-term Target (2035)
 Energy	Energy consumption intensity	MWh/ton cementitious material	0.99	0.93	0.88
 Greenhouse Gas Emissions	Cementitious material emission intensity	tCO <sub>2</sub> e/ton cementitious material	0.857	0.657	0.482
 Alternative Materials & Fuels	Alternative raw material/fuel ratio	kg/ton cementitious material	159	173	185
	Biomass alternative fuel heat ratio	%	4.5%	7.4%	8.3%
	Non-biomass alternative fuel heat ratio	%	3.5%	6.5%	7.3%
 Water	Process water recycling rate	%	85%	85%	85%
 Water Efficiency	Water withdrawal intensity	ton water/ton cementitious material	0.843	0.800	0.758
 Water	Net freshwater consumption	ktons (ML)	2,563	2,433	2,304
 Wastes	Waste recycling rate	%	≥90%	≥90%	≥90%
 Waste Heat Recovery	Share of WHR in purchased electricity	%	≥20%	≥20%	≥20%



## Annex, TCFD indicator comparison table

TCFD	General Industry Guidan	Reporting	Page
<b>Governance</b>	a) Describe the board's oversight of climate-related risks and opportunities.	2.1	p.06
	b) Describe management's role in assessing and managing climate-related risks and opportunities.	2.2	p.06
<b>Strategy</b>	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	3.1	p.07
	b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	3.2	pp.07~09
	c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	3.3	p.10
<b>Risk Management</b>	a) Describe the organization's processes for identifying and assessing climate-related risks.	4.1	pp.11~12
	b) Describe the organization's processes for managing climate-related risks.	4.2	pp.12~15
	c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	4.3	p.16
<b>Metrics and Targets</b>	a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	5.1	p.17
	b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	5.2	p.17
	c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	5.3	p.18

Core element	Sector Specific Guidance	Corresponding chapter	Page
<b>Strategy</b>	b) Organizations should consider factoring in climate-related risks and opportunities when making decisions and developing strategy at present.	3.2	pp.07~09
	c) Organizations with annual revenues in excess of USD 1 billion should consider adopting a more robust scenario when analyzing the resilience of their strategies to various climate-related scenarios.	3.3	p.10
	c) Organizations should assess the effectiveness of implementation of their strategy by considering the implications of different policy assumptions, macroeconomic trends, energy pathways, and technology assumptions used in climate-related scenarios.	3.3	p.10
	c) For climate-related projects employed, an organization should consider providing information on factors to facilitate the investors' and others' understanding as to how the conclusion is drawn from the project analysis.	About this Report	p.03
<b>Indicators and Goals</b>	a) An organization should contemplate presenting both past trends and future forecasts when assessing any relevant indicator.	5.3	p.18
	a) An organization should consider providing key indicators related green house gas emissions, energy, water, land use, and, if applicable, investment in climate adaptation and mitigation, so as to address potential financial issues in the event of changes in demand, expenditure, asset valuation, and financing costs.	3.2	pp.07~09



**Task Force on  
Climate-related  
Financial  
Disclosures**



**亞洲水泥**

ASIA CEMENT CORPORATION