4.2 Climate Action

TCFD

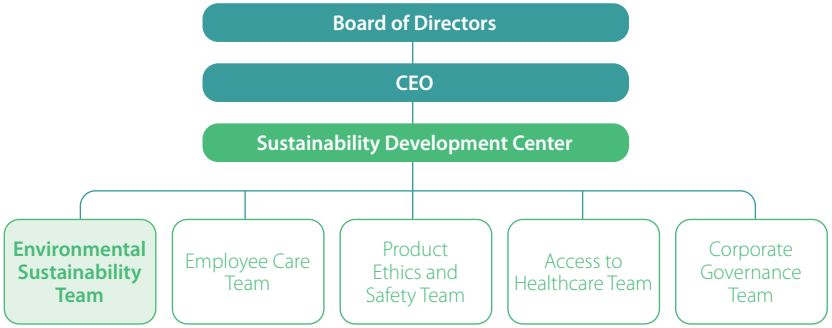
Continued Alignment with Government

Under the impact of global climate change, businesses face significant challenges. The risks and opportunities brought about by climate change can have substantial impacts on corporate value chains. In 2017, the Financial Stability Board (FSB) introduced guidelines from the Task Force on Climate-related Financial Disclosures (TCFD), aimed at providing businesses with guidance to identify climate-related risks and opportunities. PharmaEssentia first adopted the TCFD guidelines in 2022 to identify climate-related risks and opportunities and in 2023 further assessed the financial impacts of these risks and opportunities under different scenarios according to these guidelines. Additionally, we initiated the ISO 14064-1: 2018 organizational greenhouse gas inventory to address and adapt to climate change from a carbon management perspective. Below, we describe PharmaEssentia's climate actions and efforts in four areas as guided by the TCFD: climate governance, strategy, risk management, and metrics and targets.

Governance: Board and Senior Management Oversight and Management of Climate Issues

The Board of Directors is the highest climate governance body at PharmaEssentia, overseeing and formulating strategies related to climate change from a sustainability perspective and responding to domestic and international net-zero commitments. The Board authorizes the Sustainability Development Center and the Eco-Friendly Team to promote various climate change management activities. Execution units include the EHS (Environmental, Health, and Safety) department and other relevant departments such as R&D, production, logistics, warehousing, and engineering, each with specific tasks. The EHS department conducts bi-weekly meetings/factory affairs meetings to report progress on various projects to senior management. Every quarter, a representative from the Sustainability Development Center reports overall ESG project progress to the Board. Plans are in place to implement ISO 14001 in 2024 to establish an environmental management system.

PharmaEssentia Climate Governance Organization



- **Board of Directors:** Oversees and develops strategies related to climate governance.
- **Sustainability Development Center:** Drives and manages actions for responding to and adapting to climate change, and regularly reports outcomes to the Board of Directors.
- **Eco-Friendly Team:** Executes various action plans.

Strategy: PharmaEssentia's Global Climate Strategy

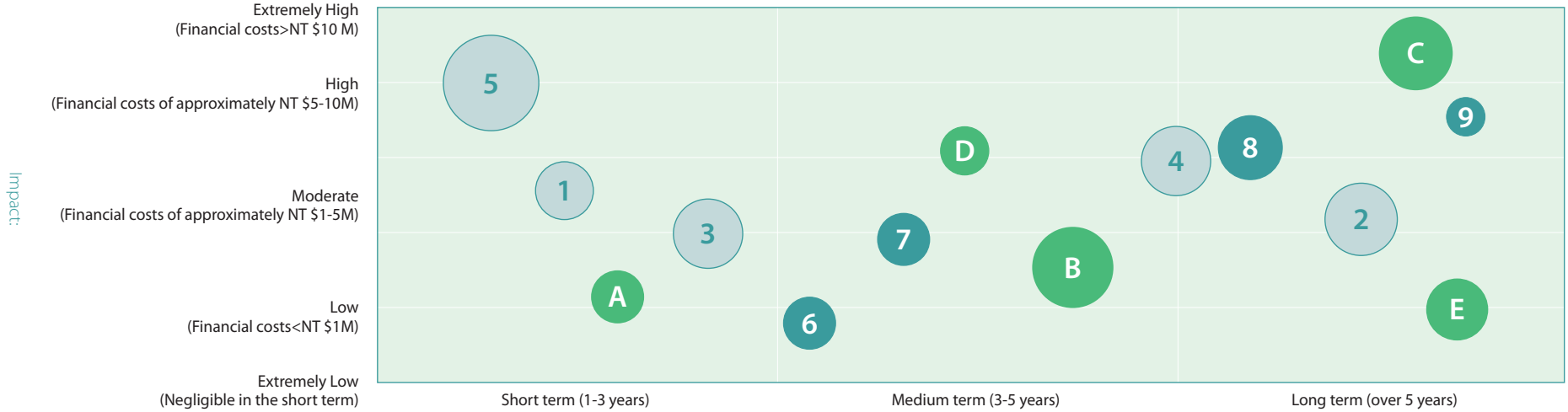
To assess the short-, medium-, and long-term impacts of climate-related risks and opportunities on organizational operations, the PharmaEssentia Sustainability Development Center, in collaboration with external consultants, conducts interviews with managers and surveys to discuss and identify climate-related risks and opportunities with relevant department heads. Through departmental discussions, proactive solution development is undertaken.

In terms of physical risks, we have assessed that our main operational sites are at low to very low risk of operational disruptions caused by extreme weather conditions due to climate change, as considerations for risks such as flooding or drought were made during the site selection process. In 2023, a natural disaster in the U.S. market caused a temporary disruption in transportation, but fortunately, it did not impact operations. Going forward, the company will closely monitor the impact of climate-related risks on operational activities and adjust inventory levels accordingly.

Regarding transition risks, our country has legislated the target of net-zero emissions by 2050, and enhanced obligations for carbon emission reporting and carbon charges are likely short-term risks. Additionally, PharmaEssentia has proactively aligned with financial regulatory requirements by completing greenhouse gas inventories and verifications ahead of schedule. We also plan to implement the ISO 14001 Environmental Management System starting in 2024 to strengthen enterprise management of environmental and energy resources.

According to international studies, climate change may increase the incidence of contagious diseases or cancer-related illnesses. PharmaEssentia will closely monitor this trend and invest in research resources to address unmet market needs potentially arising from climate change. Furthermore, our new facilities have applied for green building certifications, which are expected to yield carbon reduction benefits due to improved resource efficiency.

Short-, Medium-, and Long-Term Climate Risk and Opportunity Matrixs



Transition Risks

1. GHG Management and Carbon Fees
2. Legislative Requirements for Renewable Energy Usage Ratios
3. Legislative Requirements for Phased Net-Zero Carbon Emission Targets
4. Uncertainty in New Energy-Efficient and Carbon Reduction Technologies
5. Raw Material Supply Shortages

Physical Risks

6. Extreme Weather Causing Floods
7. Extreme Weather Causing Droughts
8. Temperature Increases
9. Sea Level Rise

Climate-Related Market Opportunities

A. Carbon Reduction Benefits from Improved Resource Efficiency
B. Emerging Business Models in the Low-Carbon, Energy-Saving Trend
C. Market Opportunities Arising from Solutions to Diseases Caused by Climate Change
D. Adoption of More Efficient Buildings
E. Investment in Renewable Energy or Participation in Carbon Trading Markets

Note: Financial costs are estimated based on the price levels of 2023 and existing data. Different assessments may arise under varying temporal and spatial conditions. The size of the circle represents the financial cost.

PharmaEssentia's climate risk management strategy focuses on managing and adapting to short-term (1-3 years) high-impact climate risks; through management actions, we aim to mitigate the immediate and medium-term impacts and plan for potential climate-related opportunities. We have identified high-impact short-term climate risks including "#5. Raw Material Supply Shortages" and "#1. Greenhouse Gas Management and Carbon Fees," as well as preparations needed in response to "#3. Legislative Requirements for Phased Net-Zero Carbon Emission Targets." These three are prioritized for management.

Furthermore, medium to long-term climate risks such as "#2. Legislative Requirements for Renewable Energy Usage Ratios" and "#4. Uncertainty in New Energy-Efficient and Carbon Reduction Technologies" are expected to materialize in the medium to long term. We will initially observe these risks and reassess whether immediate management is necessary in future annual evaluations.

Regarding climate-related opportunities, "A. Carbon Reduction Benefits from Improved Resource Efficiency" has been identified as a relevant opportunity at our Taichung facility. We have already planned updates to energy-saving equipment and are implementing energy-saving devices at new plant locations.

Scenario Analysis

We assess the impact of different scenarios on climate-related risks and opportunities, as well as possible response strategies for PharmaEssentia. We have considered three scenarios proposed by the Intergovernmental Panel on Climate Change (IPCC) under Representative Concentration Pathways (RCPs): RCP2.6, RCP4.5, and RCP8.5. Based on existing climate data for Taiwan, we estimate the effects on PharmaEssentia's major manufacturing sites under these scenarios.

- RCP2.6 represents a scenario with very low radiative forcing, aiming to limit global warming to within 2 degrees Celsius above pre-industrial levels, which is considered a mitigation scenario.
- RCP4.5 is a scenario of moderate stabilization.
- RCP8.5 represents a high greenhouse gas emissions scenario, assuming that no efforts are made to reduce greenhouse gas emissions globally.

RCP 2.6	RCP 4.5	RCP 8.5
Taiwan (Taichung Plant)	Taiwan (Taichung Plant)	Taiwan (Taichung Plant)
Average Temperature Increase, 2031-2050: 0.3~2.1°C	Average Temperature Increase, 2031-2050: 0.7~2.4°C	Average Temperature Increase, 2031-2050: 1.0~3.1°C
Average Precipitation, 2031-2050: -5.3~12%	Average Precipitation, 2031-2050: -4.7~13.6%	Average Precipitation, 2031-2050: -7.7~13%
Scenario: The increase in temperatures could result in higher ambient temperatures around the factory; due to extreme weather conditions, the probability of droughts or intense rainfall could increase, but the impacts and scale are less severe under controlled temperature rise.	Scenario: An increase in temperatures could raise the ambient temperature around the factory, potentially reducing production efficiency. Extreme weather conditions, such as droughts or sudden heavy rains, could lead to flooding.	Scenario: Under conditions of extremely high temperatures and increased variability in annual rainfall, the impacts of extreme weather become more pronounced. Droughts or floods could lead to power outages or operational disruptions at the factory, necessitating higher costs for improvements.
Responses: • PharmaEssentia itself: The factory is located in a science park, where the risk is relatively low. • Supply Chain: Alerts are set up for potential delivery delays caused by natural disasters, with plans to establish secondary and tertiary sources of supply.	Responses: • PharmaEssentia itself: The factory is currently located in a science park, where the risk is relatively low. • Supply Chain: Measures are in place to alert for potential shipment delays due to natural disasters, with contingency plans involving the establishment of secondary and tertiary sources of supply.	Responses: • PharmaEssentia itself: In addition to strengthening PharmaEssentia's own disaster prevention capabilities under extreme climate conditions, it is necessary to enhance disaster preparedness drills and business continuity plans for both the supply chain and transportation routes. • Supply Chain: Alerts are in place for potential shipment delays caused by natural disasters, with contingency plans involving the establishment of secondary and tertiary supply sources, and even changing materials or reconfiguring the supply chain.

Data Source: TCCIP - Taiwan Climate Change Projection Information and Adaptation Knowledge Platform

Transition Risk Scenarios

In terms of transition risks, PharmaEssentia evaluates scenarios using the "Shared Socioeconomic Pathways" (SSPs) assessment methodology proposed in the IPCC's Sixth Assessment Report (AR6). This approach helps assess the potential scenarios related to climate change transition risks.

Low-Risk Scenario

Scenario Description Projected Temperature Increase by the End of the Century:

SSP1-1.9 Pathway

Projected Temperature Increase by the End of the Century:

1.4 degrees Celsius

Orderly Global Transition to Net Zero by 2050

Explanation of Transition Risks:

Gradual Implementation of Climate Policies Starting in 2021: Climate policies are being implemented step by step.

Impact on PharmaEssentia:

For PharmaEssentia, Based in Taiwan:
Given that the government has already legislated the 2050 net-zero target, PharmaEssentia will follow national objectives to set phased carbon reduction targets.
PharmaEssentia has already completed the ISO 14064-1: 2018 organizational greenhouse gas inventory and will use these results to plan further carbon reduction initiatives.

Moderate-Risk Scenario

Scenario Description Projected Temperature Increase by the End of the Century:

SSP1-2.6 Pathway

Projected Temperature Increase by the End of the Century:

1.6 degrees Celsius

Delayed Implementation of Transition: A gradual approach is taken towards shifting policies and technologies.
Global Achievement of the Paris Agreement's Sub-2 Degrees Celsius Target

Explanation of Transition Risks

Urgent Implementation of Climate Policies Starting in 2031.

Impact on PharmaEssentia:

PharmaEssentia will monitor the implementation at each operational site according to local market conditions.

High-Risk Scenario

Scenario Description Projected Temperature Increase by the End of the Century:

SSP4-6.0 Pathway

Projected Temperature Increase by the End of the Century:

>3 degrees Celsius

No Additional Carbon Reduction Measures
Countries Maintain Existing Policie

Explanation of Transition Risks

Status Quo, No New Policies Issued: There is no introduction of new climate policies, maintaining the current approach.

Impact on PharmaEssentia:

PharmaEssentia will monitor the implementation at each operational site according to local market conditions.

Financial Impact Analysis of Climate Change

Considering the above climate-related risks and opportunities and their impact on organizational operations, PharmaEssentia is actively formulating response and adaptation measures to enhance climate resilience. In 2023, the company implemented the ISO 14064-1: 2018 organizational inventory process, laying a solid foundation for future carbon management capabilities.

Category	Transition Risks		Physical Risks
Content of Risk/ Opportunity ! Risk factors ☆ Opportunity factors	! GHG Management and Carbon Fee Levies ! Legislative Requirements for Renewable Energy Usage Ratios ! Legislative Requirements for Phased Net-Zero Carbon Emission Targets ! Uncertainty in New Energy-Saving and Carbon Reduction Technologies	! Raw Material Shortage Pressures	! Extreme Weather Leading to Flooding ! Extreme Weather Leading to Drought ! Temperature Rise ! Sea Level Rise
Potential Financial Impact ⊕ Potential Opportunity ⊖ Potential Cost	⊖ Increased Operational Costs Due to Carbon Management: Introduction of carbon taxes in international markets and the levying of carbon fees and energy-related taxes in Taiwan have led to increased operational costs. ⊖ Investment in Renewable Energy Planning and Equipment Leads to Higher Costs, ⊖ Investment in Energy Efficiency and Carbon Reduction Resources: Allocating resources to inventory, verify, and disclose organizational greenhouse gas emissions, extending further to include the carbon footprint of products throughout their lifecycle, also increases operational costs.	⊖ Material Shortages and Increased Transportation Costs Due to Climate Change: Climate change causing raw material shortages or increased transportation costs.	⊖ Operational Interruptions Due to Natural Disasters: Natural disasters leading to operational disruptions or exceeding existing emergency response measures, impacting production, causing financial losses, and decreasing revenue. ⊖ Natural Disasters (e.g., Snowstorms in the USA): May lead to shipment delays or damage to local operational equipment and personnel injuries, increasing operational costs. ⊖ Natural Disasters Disrupting Raw Material Supply: Interruptions in raw material supply due to natural disasters can hinder production operations and disrupt product transportation, affecting operational revenue. ⊖ Costs Associated with Insurance and Flood Prevention Measures: The company mitigates financial losses due to property damage via insurance and increase costs for installing flood prevention measures at facilities. ⊖ Increased Energy Use or Cold Chain Costs Due to Rising Temperatures: Long-term temperature increases may lead to higher energy usage in facilities or increased costs in the transportation cold chain.
Explanation of Financial Impact Assessment	▶ Carbon Fee: The annual estimated CO_2e emissions of PharmaEssenia are less than 5,000 metric tons. With a carbon fee set at NT$300 per metric ton, the annual cost will increase by NT$1.5 million. ▶ GHG Inventory: Each plant is gradually implementing management systems and inspection procedures, with an estimated annual cost not exceeding NT$3 million. ▶ GHG Inventory Reduction, Energy Portfolio, and Efficiency Enhancement: Further assessment is needed to evaluate the costs associated with emission reduction and energy efficiency improvements across various factory sites.	▶ Due to the stringent requirements of Good Manufacturing Practice (GMP) for pharmaceutical ingredients, thorough inspections and certifications are necessary at each stage. The cost increase of raw materials is difficult to predict. To mitigate this, early procurement or increased inventory will be implemented. It is estimated that costs will increase by 10% to 20%, resulting in an annual increase of over NT$10 million in procurement costs.	▶ The Taichung plant has measures in place to sustain operations for approximately three to four weeks in case of water shortage. Therefore, production is unlikely to be affected, and the additional financial costs incurred under this scenario are minimal. ▶ In the event of natural disasters disrupting transportation, the current safety stock should be able to sustain operations for three to six months. Consequently, the additional financial costs incurred under this scenario are minimal. ▶ Further evaluation is needed to assess the long-term financial implications of increased energy usage or transportation costs due to rising temperatures. ▶ Actively pursuing pharmaceutical approvals in various regions worldwide to diversify climate-related risks associated with regional climate conditions. ▶ Commitment to diversifying production bases and enhancing the sourcing and preparation of raw materials.

Category	Climate-Related Opportunities	
Content of Risk/ Opportunity ! Risk factors ☆ Opportunity factors	☆ Carbon Reduction Benefits from Improved Resource Efficiency: Enhancing resource efficiency to reduce carbon footprint. ☆ Adoption of More Efficient Buildings: Using higher efficiency buildings to decrease energy consumption. ☆ Market Opportunities from Investing in Renewable Energy or Participating in Carbon Trading Markets.	☆ Market Opportunities from Investing in Renewable Energy or Participating in Carbon Trading Markets: Engaging in renewable energy projects or carbon trading to capitalize on market trends. ☆ Emerging Business Models Under Low-Carbon, Energy-Saving Trends: Innovating new business models that align with the shift towards energy conservation and reduced carbon emissions. ☆ Market Opportunities Arising from Solutions to Climate Change-Induced Diseases: Developing solutions for diseases exacerbated by climate change to meet emerging healthcare needs.
Potential Financial Impact ⊕ Potential Opportunity ⊖ Potential Cost	⊖ 2024 Estimated Equipment Replacement: The anticipated cost is projected to be under NT$5 million. ⊕ Potential Carbon Assets from Carbon Management: This includes benefits derived from carbon credits.	⊕ Potential Carbon Assets from Carbon Management: Benefits derived from carbon rights, potentially increasing the company's value through enhanced sustainability practices. ⊕ Investment in Climate-Related Disease Solutions: Potential market opportunities from developing solutions for health issues exacerbated by climate change.
Explanation of Financial Impact Assessment	▶ Further assessment is required to evaluate the benefits generated from reducing emissions and enhancing energy efficiency across various factory sites. ▶ Commitment to Decreasing Energy Intensity and minimizing reliance on energy resources.	▶ There are currently no specific data available to estimate the financial benefits of emerging solutions.

In response to the financial assessment above, we have categorized climate-related risks and opportunities into the following issues. Key strategies and departmental responses of PharmaEssentia Pharmaceutical are outlined below:

Category	Transition Risks		Physical Risks
Climate-Related Risks and Opportunities	GHG Emission Control · GHG Inventory and Reduction · Energy Portfolio and Efficiency Enhancement	Raw Material Management	Strengthening Emergency Response Capabilities at Plant Sites due to Extreme Weather Events such as Hurricanes and Floods, which can lead to operational disruptions.
Key Strategy of PharmaEssentia	Enhancing GHG Emission Control Capabilities at PharmaEssentia; Continuously Implementing: (1) GrHG Inventories at each operational site. (2) Setting phased targets for greenhouse gas reduction (3) Evaluating the benefits of achieving interim actions towards carbon neutrality or net zero by 2050, considering the cost and benefits of carbon management.	• In terms of raw material management, we will increase the registration of raw material sources and evaluate new suppliers. • In future research and development, we will incorporate considerations of climate change impacts to provide more options.	• Regularly assess the contingency capabilities of the plant sites, provide risk alerts and identification, and enhance emergency response capabilities at the plant sites. • Construction of a new plant in Zhubei: PharmaEssentia will adopt green building standards for the construction of a new plant in the Zhubei Industrial Park, and has prepared for climate risks and impacts. • Regularly enhance climate resilience and response capabilities at PharmaEssentia's global operational sites through education, training, and internal process improvements.
Departmental Responses	• **Production/Environmental Safety Department:** Utilizes the "Environmental Policy" as an internal guideline for preventing and addressing environmental impacts and has established the "Greenhouse Gas Management Procedure Manual." The primary production base, the Taichung Plant, serves as the first site to conduct greenhouse gas inventory operations. We have completed the inventory operations for the year 2022 and undergone third-party verification. We will continue to progress along the path of carbon reduction, achieving phased reduction targets through improvements in resource efficiency in existing facilities.	• **Procurement:** Conduct assessments based on material categories and geographical sources to increase sourcing contingency plans; seek green supply chains; or request carbon reduction from the top five suppliers by annual transaction amount. • **Research and Development:** Reduce environmental impact by incorporating concepts of biotechnology and digital transformation, including: · Reducing materials (reagents/solvents/reducing the use of toxic substances, etc.) · Energy usage and temperature control at each stage of equipment/production methods/processes/storage, transportation, and preservation · Use of environmentally friendly and recyclable materials (lightweight, thin, short) • **Production:** Depending on the situation, move towards automated production.	• **Environmental Safety:** Evaluate the potential impact and corresponding emergency response measures; increase assessment frequency. The Taichung plant has established the "Emergency Response Management Standard for Plant Facilities" to implement emergency response mechanisms. In the event of natural disasters or equipment abnormalities, ensure normal equipment operation and conduct process operations in a safe environment for all personnel. • Overall, we will cooperate with the Central Taiwan Science Park and Hsinchu Science Park to prevent and manage physical risks.

Category	Climate-Related Opportunities	
Climate-Related Risks and Opportunities	Enhancing Resource Efficiency.	Meeting Unmet Medical Needs.
Key Strategy of PharmaEssentia	• Evaluate the resource efficiency improvements resulting from equipment updates or replacements. • Assess the benefits of installing renewable energy or participating in carbon trading markets.	• Diseases resulting from climate change will become a key focus of future biopharmaceutical industry research and development. PharmaEssentia will continue to monitor this trend and assess the feasibility of addressing unmet needs related to climate-related diseases and PharmaEssentia's R&D direction. • PharmaEssentia also undertakes other projects requiring cold chain transportation services. Currently, plans are being devised on how to provide more efficient transportation methods or containers to increase additional services or revenue.
Departmental Responses	• Our Taichung plant's future plans involve replacing high-energy-consuming equipment (such as air compressors and chillers) to improve energy efficiency. • Planning for an energy monitoring system, optimizing steam process control, and waste heat recovery. • The new plant in Zhubei plans to apply for green building certification, aiming to obtain subsidies for green buildings and reduce the organization's carbon emissions.	• The Research and Development Department, in collaboration with the Sustainability Development Center, the Access to Healthcare Team, and the Product Ethics and Safety Team, will jointly be included as regularly monitored topics.

Risk Management

Climate Risk Identification and Assessment Process

In addition to the risk management mechanism described in section 2.3, which categorizes different types of risks and implements corresponding measures to reduce their impact on the company, this section will further explain the company's management mechanism and actions regarding climate risks, which have been gradually introduced in accordance with the TCFD framework guidelines:

Risk Governance Unit

The board of directors serves as the highest supervisory and decision-making unit for risk management. Through its audit committee, audit department, and corporate governance department, it assists in supervising, controlling existing or potential risk issues to reduce company risks or early positioning, minimize negative impacts, and avoid financial losses. Additionally, the board of directors assigns senior management to be responsible for promoting and operating various issues, implementing risk management through regular management supervision.

Risk Management Policies and Practices

The company establishes internal risk management policies, procedures, and internal control systems in accordance with relevant regulations to properly manage all risk issues, impact items, and corresponding highly material topics. Annually, the board of directors approves the company's overall risk management goals and policies, assigns senior management to be responsible for the promotion and operation of various issues, and continuously ensures the effective operation of risk management mechanisms through regular supervision.

Climate Risk Management Process

We consider climate-related risk management policies, actual assessment practices, and pre-response measures to mitigate the impact of climate risks on operations. We began conducting major operational risk assessments, including the assessment process for climate risks within environmental risks, education and training, and implementation of specific practices to address various risks in each department starting in 2023. These assessments are expected to be conducted regularly each year to ensure a thorough understanding and timely adaptation to changes in these risks, and to develop relevant reduction management methods and measures as needed as well as risk management objectives and policies as needed, and to continue to implement and supervise the effective operation of the risk management mechanism.

Indicators and Targets

In the biotechnology industry, the main response to climate change is primarily focused on carbon reduction. In order to achieve the above goals, PharmaEssentia strives to reduce carbon emissions at each stage. We have already implemented the ISO-14064-1 Greenhouse Gas Inventory Standard, conducting regular inventories of greenhouse gas emissions at each operational site and managing climate-related key indicators. In 2023, we also disclosed inventory data for Scope 3 emissions for the first time. In the future, we will continue to assess whether updates to response plans are needed based on annual climate risk evaluations and actions. We will actively engage in research in areas related to climate change-induced diseases, striving to find more solutions from the source through pharmaceutical research and development.

ESG Matters	Carbon Management	Rising Costs of Raw Materials	Severity of Extreme Weather Events such as Hurricanes and Floods
Response Measures	**Scope 1, Scope 2, and Scope 3 Greenhouse Gas Emissions and Associated Risks** • PharmaEssentia's primary source of greenhouse gas emissions is Scope 2, from purchased electricity. In 2023, Scope 1 and Scope 2 emissions were less than 5,000 metric tons of CO_2e. • Regarding greenhouse gas emission policies, the company aims to align with the national target of net-zero by 2050 and the National Development Council's goal of reducing overall emissions by 24% by 2030.	• Tracking Raw Material Usage through the Indicator of Material Consumption per Revenue: This metric is used to monitor the use of raw materials in relation to business turnover.	• Regular Assessment of Facility Response Capabilities: Periodic evaluations are conducted to enhance risk warning and identification, increasing emergency response capabilities at the facility. • New Facility Construction in Zhubei Factory: PharmaEssentia is constructing a new facility in the Zhubei Park using green building standards and has made preparations for climate risks and impacts.
Indicators and Objectives	• Carbon Intensity (t CO_2e per NT$ Million)	• Raw Material Consumption per Revenue • Enhancing Resilience: Reducing the risk associated with raw material procurement due to environmental impacts.	• Regular Implementation of Emergency Response Measures
Risk Governance Unit	• Carbon Intensity of 0.86 (t CO_2e/NT$ million), down by 42% vs 2022 • For details on carbon emissions and the calculation of carbon intensity, please refer to 4.3 Energy Management	• 0.30 g/NT$K in 2023, lower than 0.50 g/NT$K in 2022	• Cooperate with Taichung Science Park to carry out preventive measures • Assess and adjust the level of safety stock in the U.S. market