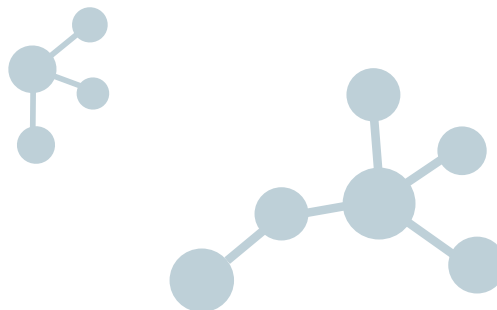


04

Sustainable Environment

Energy and Waste Management



- [4.1 Climate and Nature Actions](#)
- [4.2 Energy Management](#)
- [4.3 Water Stewardship](#)
- [4.4 Waste and Pollution Management](#)

04

PharmaEssentia's climate governance framework aligns with TCFD and ISO 14064-1 standards. We continually assess climate risks and opportunities while promoting carbon-reducing processes and managing emission intensities. We also improve energy efficiency and reduce operational emissions by implementing our ISO 14001 environmental management system and utilizing energy-saving equipment. In terms of water resource management, we continue to monitor water consumption and promote wastewater recycling/reuse to generate water recycling benefits. Our waste management measures focus on source reduction, recycling and reuse, and waste disposal compliance, as well as use of pollution prevention equipment to reduce potential environmental impacts from our operations. In 2025, we issued the "PharmaEssentia Biodiversity and No Deforestation Commitment" to ensure that our factory development and operating activities do not affect ecological environments, and we are working to form a comprehensive sustainability framework encompassing management of factors associated with climate, resources, and ecosystems.



Main Stakeholders



Shareholders and
Investors



Media



NPOs/NGOs

Achievement Highlights

- ✦ The Energy Efficiency Leadership Program at our Taichung Plant reduced electricity usage by **354,649 kWh** (approximately **168.1 tCO₂e**) in 2025
- ✦ Recycled water volumes for 2025 reached 10.05 million liters, an **increase of 3.31%** compared to the previous year (9.728 million liters of water were recycled in 2024)
- ✦ Waste intensity for 2025 was reduced by **12.5%** compared to 2024, and has been trending downward for the past three years
- ✦ Our Taipei Headquarters and Taichung Plant completed ISO 14064-1 certification audits in 2025
- ✦ Formulated "PharmaEssentia Biodiversity and No Deforestation Commitment"

Material Topics	Energy and Waste Management
Significance for PharmaEssentia	PharmaEssentia processes from product R&D, production, to logistics are associated with a number of environmental issues such as energy consumption, greenhouse gas emissions, water usage, and waste and pollution prevention. We demonstrate our commitment to the environment and sustainable operations by implementing multiple management systems that reduce negative environmental impacts.
Policies and Commitments	Environmental management is implemented through our Greenhouse Gas Management Procedures, Waste Management Procedures, Chemical Hazard Management Procedures, and other procedural documents. Additionally, the ISO 14001 environmental management system at our Taichung Plant mitigates environmental impacts, enhances environmental management efficiency, and reduces negative environmental impacts from production and operational processes.
Responsible Units	Taipei Headquarters: Occupational health and safety promotion team Taichung Plant: Greenhouse gas promotion team (GHG promotion team) Material sustainability topics: Compiled and managed by the Executive Center for Corporate Sustainability Environmentally Friendly Team
Response Strategies, Associated Measures, and Management Actions	• In 2025, PharmaEssentia invested NT\$8.32 million in environmental costs • Education and training: As of 2025, a total of 61 employees have obtained ISO 14064-1 internal auditor certification • TCFD/greenhouse gas inventory training hours: A total of 2 persons received 2 hours of training • Appointed dedicated personnel to participate in regulatory training, policy promotion, and professional environmental lectures hosted by competent authorities • Continued to control air pollutant emissions and ensure zero leakages • Increased waste reuse rates (including waste foam, waste glass, and waste plastic recycling volumes) to reduce waste incineration volumes and promote circular economy principles
Evaluation Mechanisms	• Short-, medium-, and long-term management indicators: Waste intensity, energy intensity, and greenhouse gas emissions intensity • Internal audits: • Non-periodic audits of waste handling vendors • Periodic inspections of internal waste storage areas • Periodic assessments of waste intensities at each unit • External audits: Inspect legality of routine items in accordance with regulations established by environmental authorities • Quarterly on-site promotion meetings with Taichung City Department of Environmental Protection and Central Taiwan Science Park Administration, as well as engagement through communications and meetings
Targets for 2025	• Complete construction on Zhubei Plant and apply for green building certification • Achieve an energy intensity of less than 5 GJ/NT\$ million • Achieve a greenhouse gas emission intensity of less than 1 tCO₂e/NT\$ million • Achieve a waste intensity of less than 0.01 metric ton/NT\$ million • Increase waste recycling and reuse ratios to reduce waste incineration/landfill volumes • Incur zero penalties associated with waste management • Incur zero penalties from environmental impact assessments of drug production processes
Achievements in 2025	• Completed main structure of Zhubei Plant and submitted green building certification applications • Achieved a waste intensity of 0.28 metric ton/NT\$ million, a 12.5% reduction compared to 2024 • Waste recycling and reuse volumes in 2025 were increased by 44.19% compared to 2024 • Zero pollution incidents associated with waste management • Zero pollution incidents associated with pollution prevention assessments
Short-Term Targets (1 Year)	• Incur zero penalties associated with waste management • Incur zero penalties from environmental impact assessments of drug production processes • Incur zero major environmental violations
Mid-Term Targets (3-5 Years)	• Continue to maintain and increase waste volumes transferred to solid recovered fuel vendors for reuse • Incorporate ISO 14001 environmental management system at Taipei Headquarters by 2027
Long-Term Targets (More Than 5 Years):	• Complete construction of Houli Plant, and begin providing smart pharmaceutical manufacturing and warehousing services to Taoyuan Aerotropolis • Incorporate green building concepts into new plants during planning and designing stages, and aim to obtain green building certifications

PharmaEssentia Environmental Management Indicators

To effectively manage environmental performance and reduce negative impacts, PharmaEssentia implemented ISO 14001 and ISO 14064-1 energy management systems to improve energy efficiency. We established metrics and targets adhering to the TCFD framework. Our waste management measures focus on reduction, recycling, and compliance, and we have established metrics and targets to balance operational growth and environmental responsibilities.

PharmaEssentia Environmental Management Indicators					
Management Aspect	Management Metric	Targets for 2025	Achievements in 2025	Short-Term Targets (1 Year)	Mid-Term Targets (3-5 Years)
Greenhouse gas emissions and energy usage	Energy intensity (GJ/NT\$ million)	≤ 5	3.35	≤ 5	≤ 5
	Greenhouse gas emission intensity (tCO ₂ e/NT\$ million)	<1	0.46	<1	<1
Waste management	Waste intensity (metric tons/NT\$ million)	<0.01	0.0028	<0.01	<0.01

4.1 Climate and Nature Actions

PharmaEssentia used the Task Force on Climate-Related Financial Disclosures (TCFD) framework to identify climate-related risks and opportunities, and also assessed potential financial impacts from climate-related risks and opportunities under different scenarios. PharmaEssentia climate actions and initiatives were categorized according to the four aspects of the TCFD framework: climate governance, strategy, risk management, and metrics and targets. Our internal operations and external environments underwent no major changes in 2025. We therefore continued to use climate-related risks and opportunities identified in 2024, and updated related metrics and targets using achievements from 2025. We also conducted organizational greenhouse gas inventories aligned with ISO 14064-1:2018 standards to support climate mitigation and adaptation through carbon management. Our Taichung Plant and Taipei Headquarters have both established ISO 14064-1:2018 greenhouse gas inventory management systems and obtained third-party certification.

Governance: Supervision and Management of Climate Issues by the Board of Directors and Senior Executives

The Board of Directors is the highest climate governance unit at PharmaEssentia, and is responsible for supervising and formulating strategies associated with climate change from a sustainable development perspective, as well as responding to domestic and foreign net zero initiatives. In 2025, PharmaEssentia pursued sustainable management while fulfilling corporate social responsibilities, established an [Environmental Policy](#), introduced an environmental management system aligned with ISO 14001 standards, and implemented environmental policies and goals to continuously enhance environmental performance. The Board authorized the Executive Center for Corporate Sustainability and the Environmentally Friendly Team to promote climate change management actions. Executive units include the environmental safety department and related units such as the R&D, production, logistics, warehousing, and engineering departments, which all implement different tasks. The environmental safety department convenes biweekly meetings/monthly factory meetings, and reports project progress to senior managers. The Executive Center for Corporate Sustainability presents ESG project progress reports to the Board every quarter.

PharmaEssentia Climate Governance Organizations



Board: Oversees and formulates climate governance strategies

Executive Center for Corporate Sustainability: Promotes and manages climate change responses and adaptation actions, and makes regular progress reports to the Board

Environmentally Friendly Team: Plans and implements various action plans

Strategy: PharmaEssentia Global Climate Strategies

To assess impacts on organizational operations from short-, medium-, and long-term climate-related risks and opportunities, PharmaEssentia and external consultants conducted interviews, surveys, and discussions with managers from related departments to identify climate-related risks and opportunities, and also worked with responsible departments to actively formulate solutions.

Physical Risks:

We assessed climate change impacts to our main operational sites and determined that the probability of operational interruptions from severe climate impacts was low to extremely low, as we had already considered flood and drought risks when constructing factories at our production sites. We will closely track operational impacts from climate-related risks and adjust inventory levels accordingly.

Transition Risks:

Taiwan has already established laws on 2050 net zero emissions targets, so short-term risks arising from carbon reporting obligations and carbon fees are highly probable. PharmaEssentia has already prepared for these risks by completing greenhouse gas inventories and verifications in advance of Financial Supervisory Commission requirements. Our Taichung Plant introduced an ISO 14001-compliant environmental management system in 2024 and implements annual PDCA maintenance procedures, enabling continuous improvement of environmental performance by taking “Plan (identify significant environmental aspects),” “Do (set goals and controls),” “Check (conduct internal audits),” and “Act” actions. We conduct internal audits and external re-evaluations every year to ensure system effectiveness and regulatory compliance, thereby reducing environmental risks as we make progress toward sustainable management. We plan to introduce an ISO 14001-compliant environmental management system at our Taipei Headquarters in 2027 to strengthen environmental and energy management.

Short-, Medium-, and Long-Term Climate Risks and Opportunities Matrix



Financial costs were estimated using current data based on price levels for 2023. Evaluation results may differ under other background conditions. Circle sizes represent financial cost volumes.

PharmaEssentia's climate risk management strategy focuses on managing and adapting to relatively significant climate risks over the short term (1-3 years), using management actions to reduce mid- to long-term risk impacts, and formulating possibilities for climate opportunities.

PharmaEssentia's short-term climate risks include "Raw Material Shortage Pressures," "Greenhouse Gas Management and Carbon Fees," and "Legally Mandated Net Zero Targets." We therefore prioritized management of these three risks. Mid- and long-term climate risks include "Legally Mandated Renewable Energy Proportions" and "Uncertainties in New Energy and Carbon Reduction Technologies"; we plan to observe conditions associated with these risks which are likely to occur over the medium to long term, and confirm whether immediate management is required for these risks when conducting assessments next year. In terms of climate opportunities, our Taichung Plant identified "Carbon Reduction Benefits from Resource Efficiency Enhancements" as a climate opportunity. We are planning to upgrade existing energy-saving equipment as well as install energy-saving equipment at our new factories.

Transition Risks	Physical Risks	Climate-Related Market Opportunities
1 Greenhouse gas management and carbon fees	6 Floods caused by extreme climatic conditions	A Carbon reduction benefits from resource efficiency enhancements
2 Legally mandated renewable energy proportions	7 Droughts caused by extreme climatic conditions	B Emerging business models under low-carbon and energy conservation trends
3 Legally mandated net zero targets	8 Rising temperatures	C Market opportunities generated by treatments for diseases caused by climate change
4 Uncertainties in new energy and carbon reduction technologies	9 Rising sea levels	D High-efficiency buildings
5 Raw material shortage pressures		E Investment in renewable energies or participation in carbon trading markets



Scenario Simulation Analysis

We assessed impacts from climate-related risks and opportunities under different scenarios, as well as possible response measures. We considered three of the United Nations Intergovernmental Panel on Climate Change (IPCC) Representative Concentration Pathway (RCP) scenarios (RCP 2.6, RCP 4.5, and RCP 8.5), and estimated impacts on our main facilities based on current climate data for Taiwan under each RCP scenario.

- RCP 2.6 is a mitigation scenario with extremely low radiative forcing, and represents a pathway where global warming is maintained at below 2°C above pre-industrial levels
- RCP 4.5 is a moderate and stabilized scenario
- RCP 8.5 is a scenario with high greenhouse gas emissions, and represents a pathway where all governments do not implement any greenhouse gas reduction measures

PharmaEssentia Scenario Simulation Analysis Results

RCP 2.6		RCP 4.5		RCP 8.5	
Taiwan (Taichung Plant)					
Average temperature increases of 0.3~2.1°C from 2031-2050	Average rainfall volumes from 2031-2050 -5.3~12%	Average temperature increases of 0.7~2.4° C from 2031-2050	Average rainfall volumes from 2031-2050 -4.7~13.6%	Average temperature increases of 1.0~3.1° C from 2031-2050	Average rainfall volumes from 2031-2050 -7.7~13%
Situation: Rising temperatures may increase the temperatures of factory and surrounding areas, and extreme climates may increase the probabilities of drought or heavy rainfall, but the depth and breadth of impacts are relatively limited under this temperature-controlled scenario.		Situation: Rising temperatures may increase the temperatures of factory and surrounding areas, lowering production efficiency. Extreme climates may lead to droughts or floods from heavy rainfall.		Situation: Very high temperatures and changes in annual average rainfall volumes intensify extreme climate impacts. Factories may encounter blackouts or be unable to operate due to droughts or floods, and therefore require additional costs for improvements.	
Responses: • PharmaEssentia: Our factories are currently located in science park areas, so risks are low. • Supply chain: Warn against possible supply delays due to natural disasters, and establish second/ third backup sources.		Responses: • PharmaEssentia: Our factories are currently located in science park areas, so risks are low. • Supply chain: Warn against possible supply delays due to natural disasters, and establish second/ third backup sources.		Responses: • PharmaEssentia: Apart from strengthening our own disaster prevention capabilities to meet extreme climate conditions, we also plan to conduct supply chain and transportation route disaster prevention drills and strengthen business continuity plans • Supply chain: Warn against possible supply delays due to natural disasters, establish second/third backup sources, switch materials, or rebuild supply chains	

Transition Risk Scenarios

In terms of transition risks, PharmaEssentia assessed transition risk scenarios using the Shared Socioeconomic Pathways (SSPs) detailed in the IPCC Sixth Assessment Report (AR6).

SSP Scenarios and Impacts to PharmaEssentia

Scenario	Low-risk scenario	Moderate-risk scenario	High-risk scenario
Scenario description	SP1-1.9 pathway: Orderly global transition to net zero by 2050.	SSP1-2.6 pathway: Delayed global transition toward Paris Agreement <2° C target.	SSP4-6.0 pathway: No new carbon reduction actions and all countries maintain current policies.
Temperature increase by century' s end	1.4° C	1.6° C	>3° C
Transition risks	Gradual implementation of climate policies starting from 2021	Rapid implementation of climate policies starting from 2031	Maintain status quo with no new policies
Impacts to PharmaEssentia	As the Taiwanese government has already legislated 2050 net zero targets, we plan to implement phased carbon reduction targets in accordance with national targets. We are already conducting ISO 14064-1:2018 organizational greenhouse gas inventories and plan to formulate carbon reduction plans based on inventory results.	PharmaEssentia will monitor implementations at all operational sites based on local market conditions.	PharmaEssentia will monitor implementations at all operational sites based on local market conditions.

Analysis of Financial Impacts from Climate Change

After considering organizational and operational impacts from the aforementioned climate-related risks and opportunities, PharmaEssentia actively formulated related responses and adaptation actions to enhance climate resilience.

Analysis of Financial Impacts on PharmaEssentia from Climate Change

	Transition Risks		Physical Risks	Climate-Related Opportunities	
Issues	- Greenhouse gas management and carbon fees - Legally mandated renewable energy proportions - Legally mandated net zero targets - Uncertainties in new energy and carbon reduction technologies	Raw material shortage pressures	- Floods caused by extreme climatic conditions - Droughts caused by extreme climatic conditions - Rising temperatures - Rising sea levels	- Carbon reduction benefits from resource efficiency enhancements - Emerging business models under low-carbon and energy conservation trends - Market opportunities generated by treatments for diseases caused by climate change	- High-efficiency buildings - Investment in renewable energies or participation in carbon trading markets
Potential financial impact	- Increases in operational costs associated with carbon management: Carbon taxes in overseas markets, carbon fees in Taiwan, and energy-related taxes will increase operational costs - Increased costs from investments in renewable energy planning and equipment purchases - Increased operational costs from investments in energy and carbon reduction resources; allocation of resources to inventory, verify, and disclose organizational greenhouse gas emissions; and further expansion of inventory scope to carbon footprints across entire product lifecycles	Raw material shortages and increased transportation costs due to climate change	- Natural disasters may cause operational interruptions or situations that exceed current emergency response measures, affecting production and leading to financial losses and revenue declines - Natural disasters (such as snowstorms in the US) may cause shipping delays, damage to local equipment, and personnel injuries, increasing operational costs - Natural disasters may disrupt raw material sources, halt production, interrupt product shipments, and affect operating income - Using insurance to reduce financial losses will increase factory flood prevention costs - Long-term temperature increases may increase energy consumption in factories or transportation cold chain costs	- In 2025, our Taichung Plant introduced an energy management system; and procurement costs amounted to NT\$6.2 million - Potential carbon assets derived from carbon management (carbon rights)	- Potential carbon assets derived from carbon management (carbon rights) - Potential market opportunities may arise from developing solutions associated with climate-related disease domain
Financial impact assessments	- Carbon fees: Assuming that PharmaEssentia's annual carbon emissions are less than 5,000 tCO₂e and carbon fees are NT\$300 per metric ton, annual costs would be around NT\$1.5 million - Greenhouse gas inventories: We are gradually introducing management systems at all factories and undergoing verifications; we estimate that annual costs will be lower than NT\$3 million - Greenhouse gas inventories, emission reductions, energy portfolios, and efficiency enhancements: We plan to calculate the costs associated with reducing greenhouse gases and enhancing energy efficiency at all factories	Our raw materials strictly comply with GMP regulations, so need verifications and certifications at each stage; increases in raw material costs are difficult to estimate, so we plan to avoid costs through advance preparation and by increasing inventory stock. We estimate that costs will increase by 10–20%, so our procurement costs will increase by NT\$10 million each year	- Our Taichung Plant has measures in place to overcome water shortages lasting 3–4 weeks, so production is unlikely to be affected; additional financial costs under this condition are extremely low - If natural disasters interrupt transportation in our supply chains, our safety stock can maintain operations for 3–6 months; additional financial costs under this condition are extremely low - Additional energy consumption costs and transportation costs from long-term temperature increases require further evaluation - We are actively applying for marketing authorizations in different regions around the globe to diversify regional climate risks - We strive to diversify production bases, increase raw material procurement sources, and make relevant preparations	- Greenhouse gas inventories, emission reductions, energy portfolios, and efficiency enhancements: We plan to further evaluate the benefits generated from reducing greenhouse gases and enhancing energy efficiency at all factories - We strive to lower energy intensities and reduce energy dependence	There is currently insufficient information to estimate financial performance from emerging solutions

In response to the aforementioned financial analyses, we compiled the following climate-related risk and opportunity topics, and formulated PharmaEssentia's key response strategies as well as responses for all departments:

Analysis of Financial Impacts on PharmaEssentia from Climate Change

	Transition Risks		Physical Risks	Climate-Related Opportunities	
Issues	- Carbon management - Greenhouse gas inventory and reduction - Energy portfolios and efficiency enhancements	Raw material management	Operational damage caused by hurricanes, floods, and other extreme climate events, triggering the need to strengthen factory emergency response capabilities	Resource efficiency enhancements	Satisfy unmet medical needs
PharmaEssentia key response strategies	- Strengthen PharmaEssentia carbon management capabilities through continued implementation of: - Greenhouse gas inventories at all operational sites. - Phased greenhouse gas reduction targets. - Assessments of benefits from carbon neutrality or 2050 net zero targets through comprehensive consideration of carbon management costs and revenues.	- Increase raw material sources and evaluate new suppliers to enhance raw material management. - Incorporate climate change considerations in future R&D processes and add alternate options.	- Regularly assess factory response capabilities, provide risk warning and identification, and increase factory emergency response capabilities - New Zhubei Plant: PharmaEssentia's new Zhubei Plant adheres to green building standards and was built to withstand climate risks and impacts - Regular training and internal process improvements enhance climate resilience and response capabilities of all PharmaEssentia sites around the world	- Evaluate resource efficiency enhancements from upgraded or replaced equipment. - Evaluate benefits from renewable energy installations or participation in carbon trading markets.	- Diseases caused by climate change will become a future R&D focus of the biopharmaceutical industry. PharmaEssentia is also continuing to focus on associated trends while assessing unmet needs caused by climate-related diseases and feasibility of R&D innovations. - Panco is undertaking projects that require cold chain transportation services, and purchased temperature-controlled boxes in 2024 to reduce use of polystyrene boxes.
Departmental responses	Production/environmental safety department: Our "Environmental Policy" serves as an internal guideline for environmental impact prevention and response, and we have also established "Greenhouse Gas Management Procedures"; our Taichung Plant, which is our main production site, was the first location where we conducted greenhouse gas inventories. We achieved carbon reduction milestone targets by enhancing current measures for improving resource efficiency.	- Procurement department: Conducts assessments based on raw material categories and source locales, expands backup procurement sources, seeks out green supply chains, and requires the top five suppliers by annual transaction volumes to reduce carbon emissions. - R&D department: Reduces environmental impacts through incorporation of bioengineering and digital transformation technologies, including: - Reducing use of materials (reagents/solvents/toxicants) - Assessing energy consumption and temperature controls in equipment/production methods/all production stages/all storage, transportation, and preservation processes - Using eco-friendly and recyclable materials - Production department: Develops automated production processes as needed.	- Environmental safety department: Assesses possible impact levels and corresponding emergency response measures, and increases assessment frequencies. Our Taichung Plant has established the "Factory Facility Emergency Response Management Standards" and associated emergency response mechanisms to ensure that all equipment can operate normally when natural disasters, equipment malfunctions, and hazard incidents occur so all personnel can conduct production processes in safe environments. - In general, we adhere to Central Taiwan Science Park and Hsinchu Science Park's response and management measures for preventing physical risks	- Our Taichung Plant introduced an energy management system in 2025 to enhance energy efficiency. Chiller motor startup and shutdown operations were synchronized with chiller equipment to optimize motor operations. We also added refrigerant reclamation systems and variable frequency motors to conserve energy and enhance performance. - Our Zhubei Plant is working to obtain green building certification, apply for green building subsidies, and reduce organizational carbon emissions - We developed a contractor construction order system to digitalize information and reduce paper consumption	The R&D department and Executive Center for Corporate Sustainability Access to Medicine Team and Product Ethics & Safety Team jointly and regularly monitor related issues

Risk Management of Climate-Related Issues

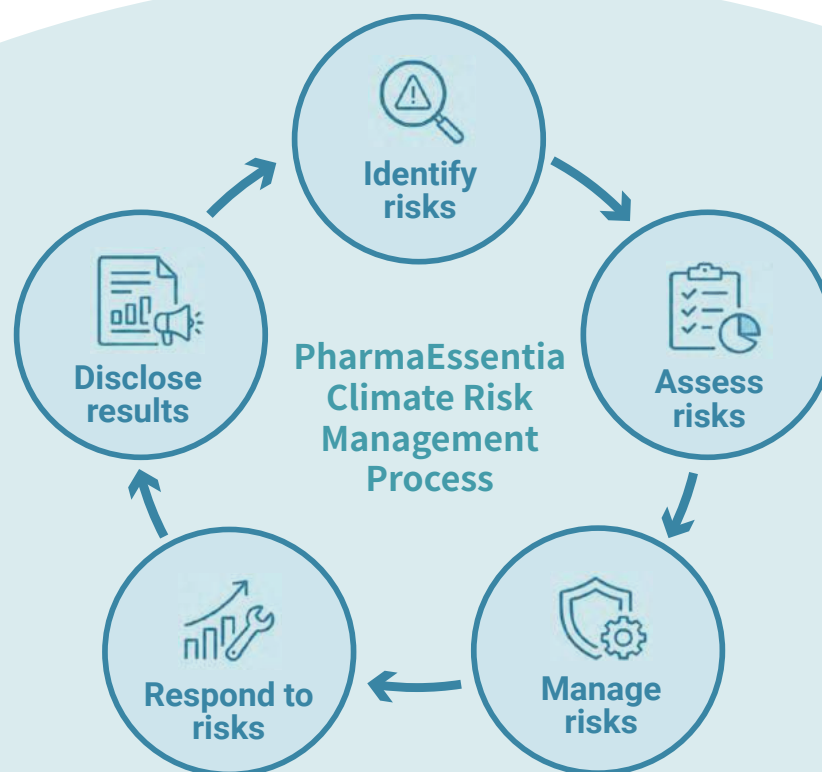
2.3 Risk Management describes our corporate risk management mechanisms and measures for lowering corporate impacts from different risk categories. This section further describes our management mechanisms and actions toward climate risks in accordance with the TCFD framework.

Risk Management Guidelines and Practices for Climate-Related Issues

We have established internal risk management policies, procedures, and internal controls based on related regulations to appropriately manage all risk issues, impacts, and corresponding material topics. Every year, the Board approves overall corporate risk management targets and policies, and assigns senior executives to oversee promotion and execution of various issues, as well as monitor risk management mechanisms to ensure that they are operating effectively.

Risk Management Processes for Climate-Related Issues

We lowered operational impacts from climate risks by adhering to climate-related risk management policies, assessment methodologies, and preventive measures. We continued to inventory major operational risks in 2025, implemented climate risk assessment processes and environmental risk training, and ensured that all departments implemented specific practices for handling various risks. We plan to conduct these processes every year to ensure full understanding and tracking of changes in associated risks, and will formulate relevant risk management procedures and measures as appropriate. We have established risk management targets and policies, and continue to monitor our risk management mechanisms to ensure that they are operating effectively.



Metrics and Targets

The biopharmaceutical industry's main climate change response actions are focused on carbon reduction. PharmaEssentia strives to reduce carbon emissions at all stages to achieve carbon reduction. We adhere to ISO 14064-1 greenhouse gas inventory standards, regularly inventory greenhouse gas emissions at all operational sites, manage key climate metrics, and have disclosed Scope 3 emissions data. We review climate risks and actions each year to determine whether revisions are required. We also actively invest in research of diseases caused by climate change, and work to find more solutions at the source through medical research.



Metrics and Targets for Main Topics

Issues	Carbon management	Rising raw material costs	Increasing severity of typhoons, floods, and other extreme weather events
Responses	- Scope 1, Scope 2, and Scope 3 greenhouse gas emissions and related risks - PharmaEssentia's greenhouse gas emissions primarily stem from Scope 2 emissions associated with purchased electricity. In 2025, our Scope 1 and Scope 2 greenhouse gas emissions were lower than 5,000 tCO₂e - Our greenhouse gas emissions policy adheres to national 2050 net zero targets and the National Development Council's goal to achieve a 28% reduction in overall carbon emissions by 2030	We track material usage by monitoring raw material consumption volumes/revenues.	- We regularly assess factory response capabilities, provide risk warning and identification, and strengthen factory emergency response capabilities. - New Zhubei Plant: PharmaEssentia's new Zhubei Plant adheres to green building standards and was built to withstand climate risks and impacts
Metrics and targets	Greenhouse gas emission intensity (tCO₂e/NT\$ million)	- Raw material consumption intensity: Raw material consumption volumes (g)/revenues (NT\$ thousand) - Improved resilience: Reduce raw material procurement risks from environmental impacts.	Regular implementation of emergency response measures
Achievements in 2025	- Combined greenhouse gas emissions intensity for PharmaEssentia (Taiwan) and Panco was 0.46 (tCO₂e/NT\$ million) - For more information on carbon emissions and carbon intensity calculation formulas, please refer to 4.3 Energy Management	Raw material consumption intensity in 2025 was 0.74 g/NT\$ thousand, lower than the 2024 value of 1.06 g/NT\$ thousand	- Carried out prevention measures aligned with Central Taiwan Science Park requirements - Assessed and adjusted US market safety stock

Operational Sites and Biodiversity Conservation

PharmaEssentia's production base (Taichung Plant) is located in the Central Taiwan Science Park Taichung Science Park. We are currently constructing our Zhubei Plant in the Hsinchu Biomedical Science Park and are formulating plans to construct our Houli Plant at the Central Taiwan Science Park Houli Science Park (7th Redevelopment Zone section). These three factories are not located in environmental protection areas or protected species/restoration habitats, and therefore do not have direct biodiversity impacts. PharmaEssentia continues to track local environmental and conservation issues through the Central Taiwan Science Park Sustainable Development website, and supports conservation and environmental actions. In 2025, we continued to sponsor Jane Goodall Institute charity projects, and worked to enhance biodiversity and conservation awareness in schoolchildren as part of our biodiversity outreach initiative (please refer to 6.3 Philanthropic Activities). We issued the "[Biodiversity and No Deforestation Commitment](#)" in 2025 to serve as a management guideline for related issues, demonstrating our commitment to biodiversity protection.

4.2 Energy Management

Energy Usage

PharmaEssentia's energy consumption mainly stems from purchased electricity and natural gas. We continue to improve energy efficiency in production processes and are assessing investments in energy-saving equipment, including, but not limited to, magnetic suspension chillers, variable frequency air compressors, and energy-efficient equipment to reduce energy consumption and comply with Good Manufacturing Practice (GMP) requirements, which stipulate that production environments should maintain certain cleanliness and quality control standards. Specific achievements in 2025 included introducing an energy management system, optimizing chiller operations, adding refrigerant reclamation systems, and installing variable frequency motors to conserve energy and improve performance. Total investments amounted to NT\$6.2 million, and we reduced energy usage by 354,649 kWh, equivalent to 168.1 tCO₂e of carbon emissions.

Greenhouse Gas Emissions

PharmaEssentia's largest source of greenhouse gas emissions is Scope 2 emissions associated with purchased electricity. ISO 14064-1 greenhouse gas inventories have been conducted at our Taipei Headquarters, our Taichung Plant, and Panco. We obtained third-party verification of 2025 greenhouse gas emissions data in 2026, and are currently working to obtain greenhouse gas emissions verifications for 2026. Greenhouse gas inventory results are used as a reference for continued improvement of energy efficiency to achieve our target of lowering greenhouse gas emission intensities.

PharmaEssentia Energy Consumption Data

Energy type	Unit	2022	2023	2024	2025
Purchased electricity	GJ	24,383.01	24,697.91	32,570.99	37,882.04
Natural gas		9,499.14	11,287.08	13,976.93	14,470.60
Diesel		18.44	9.28	17.50	4.24
Gasoline		19.99	10.15	7.95	6.75
Total energy consumption		33920.58	36,004.43	46,573.36	52,363.63

PharmaEssentia Energy Intensities

Indicator	Unit	2023	2024	2025
Energy intensity	GJ/NT\$ million of revenue	7.05	4.78	3.35
Change in energy intensity compared to previous year	%	-40%	-32%	-28.7%

PharmaEssentia Greenhouse Gas Emissions

Item	ISO 14064-1	Description	Unit	2023	2024	2025
Scope 1	Category 1	Stationary/mobile combustion source emissions, process emissions, fugitive emissions	tCO ₂ e	716.10	1,152.19	953.80
Scope 2	Category 2	Electricity from Taiwan Power Company		4131.03	4,368.18	4,605.61
Scope 3	Category 3	Upstream raw material transportation, downstream product transportation, employee commuting, business travel		123.22	343.48	211.82
	Category 4	Purchased goods, waste treatment, delivery services		994.97	821.91	1,344.77
Total				5,965.32	6,685.76	7,116.00

PharmaEssentia Greenhouse Gas Intensities

Indicator	Unit	2023	2024	2025
Greenhouse gas emissions intensity	tCO ₂ e/NT\$ million	1.16	0.69	0.46
Change in greenhouse gas emission intensity compared to previous year	%	-	-40.95%	-33.74%

Note 1: The reporting boundaries of greenhouse gas data shown in this table were as follows: 2023–2024 encompassed PharmaEssentia (Taiwan) and Panco; 2025 encompassed PharmaEssentia Taiwan, Panco, and the Panco Logistics Center. Revenue figures used for calculating intensities encompassed the entire Company.

Note 2: Inventoried greenhouse gases included carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆), and trifluoride nitrogen (NF₃).

Note 3: These figures were calculated using the “emission factor method.” The emission factors for purchased electricity referenced information released by the Ministry of Economic Affairs Energy Administration. Electricity emission factors for 2022, 2023, and 2024 were 0.495, 0.494, and 0.474 kgCO₂e/kWh, respectively. Electricity emissions factors for 2025 have not yet been released. Greenhouse gas emissions from natural gas combustion were calculated using the lower heating value and emission factor announced by the Ministry of Environment, then converted to CO₂e values using the Global Warming Potential (GWP) values in the IPCC Sixth Assessment Report (AR6) released in 2021.

Note 4: Total product sales for the year (NT\$ million) were used to measure usage intensity and emission intensity.

Energy Management Highlight for 2025:
Technologically Driven Digital Transformation

PharmaEssentia's Taichung Plant launched the Energy Efficiency Leadership Plan in 2025 amid steadily expanding production capacity, and saved 354,649 kWh of electricity in 2025 by introducing an energy management system and utilizing low-carbon technologies. These electricity savings represented a 5.9% reduction compared with 2024, and carbon reductions for the year amounted to 168.1 tCO₂e. Core strategies and technological implementations included:

01

**Cutting-edge energy conservation technologies:
Refrigerant reclamation system optimizations**

Adopted an industry-first strategy of installing refrigerant reclamation systems which utilized free electron technology to prevent molecular clustering in refrigerant pipes, significantly improving heat exchange efficiency and reducing compressor load by optimizing refrigerant molecular structures. This not only extended equipment service lives, but also reduced energy consumption at the source without affecting the low temperatures required by operational processes.

02

**Dynamic system transformations: Chiller flow optimizations**

Completely eliminated pump system fixed-frequency (60 Hz) operational modes in response to chiller load fluctuations caused by seasonal and production conditions. We achieved intelligent “cooling-on-demand” variable-flow control by installing variable frequency drives (VFDs) that enabled precise monitoring of supply and return water temperature differentials. This dynamic mechanism ensures that motor speeds automatically match on-site loads, maximizing energy utilization.

03

**Digital governance enhancements:
Energy management system (EMS) situation room**

We established a real-time energy information dashboard and big data platform in our central control room to enable visualizations of energy management information. Our “energy management situation room” integrates different types of energy consumption data to enhance transparency of energy use, which not only improves monitoring efficiency, but also provides a scientific basis for subsequent energy optimizations.

4.3 Water Stewardship

Water Withdrawal, Water Discharge, and Recycled Water

Tap water was the main water withdrawal source for PharmaEssentia operational sites in Taiwan and Panco. According to the World Resources Institute water risk mapping tool, our operational sites were all located in areas with low to moderate water stress in 2025.

Our Taichung Plant is our main production site. Water withdrawal volumes included water used for production processes and domestic usage; wastewater was discharged through the Central Taiwan Science Park Taichung Science Park sewage treatment plant. Our Taichung Plant regularly renews its water pollution control permits in accordance with relevant regulations, conducts production operations and related filing procedures in accordance with permit requirements, and commissions testing institutes certified by the Ministry of Environment Environmental Management Administration to conduct water quality tests on discharged water every six months to ensure compliance with Ministry of Environment and Central Taiwan Science Park Administration discharge standards. Our Taichung Plant recycles process reverse osmosis brine and wastewater for use in air-conditioner cooling towers to enhance water reuse efficiency. In 2025, we recycled 10.05 million liters of water, an increase of 9.728 million liters (3.31%) compared to 2024. PharmaEssentia's Executive Center for Corporate Sustainability also collaborates with environmental health and safety units to disseminate environmental awareness announcements and strengthen promotion activities associated with water resource protection.

Both our Taipei Headquarters and Taichung Plant saw reductions in total water withdrawal volumes compared with the previous year; please refer to the following table for more information.

Water Consumption Data for PharmaEssentia Main Operational Sites

		2023			2024			2025		
Operational sites	Unit	Water withdrawal	Water discharge	Water consumption	Water withdrawal	Water discharge	Water consumption	Water withdrawal	Water discharge	Water consumption
Taipei Office	Million liters	7.63	7.63	-	22.89	22.89	-	13.15	0.01	13.14
Taichung Plant		14.13	5.74	8.98	22.97	9.77	13.2	21.90	0.01	21.89
Panco		1.4	1.4	-	0.11	0.11	-	0.12	0.12	-
Total		23.16	14.77	8.98	45.97	32.77	13.2	35.17	0.14	35.03

Water Pollution Control and Wastewater Discharge Metrics

Wastewater discharged from our Taichung Plant undergoes appropriate treatment at the Central Taiwan Science Park Administration (Taichung Science Park) sewage treatment plant before being discharged. Water quality is monitored once every six months by certified testing institutes in accordance with Ministry of Environment regulations. Test results for 2025 all complied with applicable discharge standards and there were no significant material environmental pollution risks.

Taichung Plant Water Discharge Management

Factory	Operations Center	Manufacturing Center
Discharge handling method	Regulated discharge	Regulated discharge
Inspection items	None	pH, COD, BOD, SS, water temperature, true color, free available residual chlorine
Discharge standards and standard sources (Environmental indicators and regulatory compliance)	Taichung Science Park underground sewage discharge standards	Taichung Science Park underground sewage discharge standards
Discharge location	Commercial building	3F, No. 28, Keya West Road, Hengshan Village, Daya District, Taichung City (Taichung Plant)

4.4 Waste and Pollution Management

In 2025, PharmaEssentia's total investments in waste management and air pollution management amounted to approximately NT\$8.32 million, and included investments in pollution prevention equipment, waste treatment (such as for biopharmaceutical waste), management activity expenditures, and pollution prevention expenditures. PharmaEssentia regularly attends Taichung City Department of Environmental Protection, Central Taiwan Science Park Administration, and on-site facility promotion meetings to implement management measures and reduce negative environmental impacts.

Air Pollution Prevention

PharmaEssentia does not use or discharge ozone-depleting substances (ODS) listed in the Montreal Protocol or any persistent organic pollutants (POPs). We conduct regular tests and file reports on stationary air pollution sources in accordance with Ministry of Environment regulations. All test results showed our discharged air pollutants were lower than regulatory limits. Our overall discharge volumes have increased as global sales demands have driven an increase in total production volumes, but pollutant discharge volumes remain lower than regulatory limits. PharmaEssentia did not violate any air pollution regulations in 2025.

PharmaEssentia Primary Discharged Gas Volumes

Discharged gas	Unit	2023	2024	2025
NOx	kg	425.7	578.4	612.54
SOx		32.3	30.4	0
Volatile organic compounds (VOCs)		17.1	12.6	19.41
Hazardous Air Pollutants (HAPs)		607.9	700.4	1,130.13
Particulate matter (PM)		7.4	9.8	18.36
Hydrogen chloride (HCl)		0.2	0.6	162.5
Total		1,090.6	1,332.2	1,942.94

Note 1: The data in this table were taken from PharmaEssentia's Taichung Plant; Panco Healthcare did not discharge any of the air pollutants listed in this table.

Waste Management and Circular Economy Principles

PharmaEssentia is gradually establishing a global footprint, and our production capacity and efficiency have improved significantly. We remain deeply committed to sustainable resource use as we pursue excellence in production, and have set "reduce waste volumes, improve unit output efficiency, and lower unit waste intensity" as our core management targets. We adhere to clear short-, medium-, and long-term action pathways when refining management guidelines for our factories and implementing practical actions.

Waste generated at PharmaEssentia mainly encompasses general industrial waste from production and manufacturing, as well as small amounts of chemicals used for R&D and experiments. All waste is strictly separated, recorded, and properly handled in accordance with local environmental regulations to minimize environmental pollution risks. We also continue to monitor international circular economy regulations and policy trends as we work to integrate "circular economy" concepts into our manufacturing processes and product lifecycle management.

Current Circular Economy Actions

PharmaEssentia commits to source reduction through R&D, process design adjustments, Design for Environment processes, and selection of eco-friendly supplementary materials and recyclable structural designs to overturn traditional linear "extraction, manufacturing, use, disposal" models and transition to sustainable "closed-loop resource cycle" operations while adhering to Current Good Manufacturing Practice (cGMP) standards and ensuring product quality and patient safety.

We not only commit to optimizing circular use of factory resources within our operational control boundaries and improving the utilization rates of consumable materials, but also proactively leverage our core advantages. We work with value chain partners to promote safe disposal of downstream medical waste and recovery of energy resources as part of our eco-friendly practices and ecological protection actions that adhere to our sustainable development commitment.

Waste Generation and Treatment

PharmaEssentia reviewed waste generation, disposal, treatment, recycling, and other processes from a product lifecycle perspective, and carefully recorded input material amounts and generated waste amounts. We also commissioned a qualified third-party waste treatment company to dispose of our waste.

Inputs and Outputs

Input characteristics	Activity records	Impact assessments
Waste is generated from manufacturing and production processes, QC test analyses, and laboratory R&D work. Hazardous waste (which includes small amounts of toxicants used in laboratories) and infectious waste is first sterilized under high heat in our factories and laboratories. Infectious waste is usually treated as general waste following this sterilization process, but we still treat hazardous waste as infectious waste following sterilization to ensure compliance with related control measures.	We carefully record usage and inventory amounts for toxic chemicals, and also calculate generated waste volumes. In 2025, we generated 53.72 metric tons of waste; volumes were higher than the previous year mainly due to increases in process production batches.	Factory production processes, QC test analyses, and laboratory R&D work all adhere to pharmacopeia regulations. Raw materials used cannot be arbitrarily replaced by toxic compounds, and all processes must comply with GMP regulations to prevent process contamination and impacts on subsequent drug quality. Waste is recycled from back-end processes to reduce environmental impacts.

Handling and Monitoring

Categorization and handling	Monitoring by multiple parties
Hazardous waste, biopharmaceutical infectious hazardous waste, solid/liquid hazardous waste, and non-hazardous waste are handled separately.	Our contracted waste treatment vendors are all legally established Class A or Class B certified waste disposal/treatment vendors. We also use a “linked three-party cross-check process” that requires relevant forms to be confirmed by PharmaEssentia, waste handling companies, and final treatment companies before reports can be filed and completed on the Environmental Protection Administration official website. This enables us to control and manage final waste destinations. We organize annual vendor audits on disposal/treatment processes and also conduct route inspections each year to ensure that waste is handled appropriately. We did not discover any legal violations incurred by vendors during previous audits.

Generated Waste Volumes

PharmaEssentia's waste reuse and resource recycling volumes for 2025 increased by 44.19% compared with 2024. Waste intensity for 2025 decreased by 12.5% compared with the previous year, and has decreased year over year.

PharmaEssentia Waste Volumes

Waste Category		Unit	2024	2025
Non-hazardous waste	Recycling and reuse	metric tons	6.63	9.56
	Landfill		-	-
	Incineration		22.81	33.43
	Other		-	-
	Total		29.44	42.99
Hazardous waste	Recycling and reuse		-	-
	Recycled resources		-	-
	Landfill		-	-
	Incineration, biopharmaceutical waste		2.10	2.48
	Incineration, organic liquid waste		5.84	8.22
	Incineration, non-organic liquid waste		0.53	0.03
	Other		-	-
	Total		8.47	10.73
Total waste volumes		metric tons	37.91	53.72
Total recycled/reused waste volumes			6.63	9.56
Proportion of recycled/reused waste		ratio	17.49%	17.8%

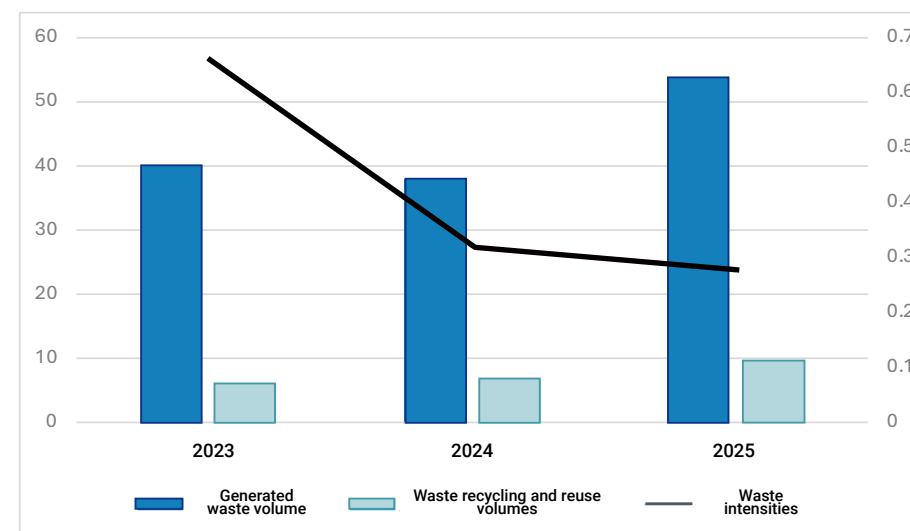
Note: The data in this table were taken from our PharmaEssentia headquarters, Panco, and our Taichung Plant.

PharmaEssentia Waste Intensities

Indicator	Unit	2023	2024	2025
Waste intensity	metric ton/NT\$ million	0.0066	0.0032	0.0028
Change in waste intensity compared to previous year	%	-26%	-51%	-12.5%

Note: Waste intensity = (Total waste volumes - Total recycled and reused waste volumes)/NT\$ million in revenue for the year

Generated waste volumes, recycling and reuse volumes, and intensities over past three years



Production and Packaging Management

Our Taichung Plant is a Good Manufacturing Practice (GMP) factory. In order to comply with regulatory requirements, many of the materials used during operating processes must be disposable, particularly materials used for packaging semi-finished or completed products. To prevent cross-contamination and ensure that products are adequately protected, we avoid reusing these packaging materials. Non-renewable materials used in 2025 primarily included disposable bags used during production processes, as well as pipe fittings/filters and other consumables that come into contact with products, accounting for 81.47% of all materials. Renewable materials mainly included cardboard boxes/package inserts and other packaging materials.

PharmaEssentia Product Packaging Materials

Category	Sub-categories	Unit	2023	2024	2025
Renewable materials	Cardboard boxes/package inserts (FP)	metric tons	0.1	0.14	0.386
Non-renewable materials	Disposable consumables used during production processes (FP)		0.09	0.11	0.13
	Blister packs/syringe labels/plunger rods/safety needles (FP)		0.1	0.13	0.287
	Disposable bags used during production processes		1.35	1.29	1.28
	Total non-renewable materials		1.54	1.53	1.697

Note 1: The data in this table was taken from our Taichung Plant.

Management of Toxic Chemicals and Chemical Substances of Concern

PharmaEssentia uses small amounts of toxic chemicals and chemical substances of concern listed by the Ministry of Environment during R&D and production processes (including machine cleaning processes). We therefore pay special attention to source control when managing these substances, properly classify and store all substances, and keep written records of amounts used to monitor usage, prevent environmental pollution, and prevent hazards to human health. No incidents involving spills of chemical substances or waste occurred in 2024.

Toxicant Categorization and Controls

PharmaEssentia categorizes chemical substances in accordance with the “Toxic and Concerned Chemical Substances Control Act” and stores toxicants in laboratory fume hoods by category. As we use many different types of chemicals, we have established the “Chemical Hazard Management Procedures” to regulate the procurement, usage, storage, and disposal of toxicants; stipulate clear responsibilities and control measures; and ensure accurate recordkeeping of used and stored chemical amounts.

Our subsidiary Panco is a logistics center which uses no chemicals and is mainly engaged in processing and labeling activities. Panco has established the “Cleanup Procedures for Processing and Labeling Lines” to ensure proper on-site handling of pharmaceutical breakages and spill incidents that may occur during processing and labeling activities. No pharmaceutical breakage incidents occurred at PharmaEssentia or Panco in 2025.

Toxicant Disaster Response Actions

PharmaEssentia has 16 general-level professional response personnel and has established “Chemical Spill Emergency Response Standard Operating Procedures” to enable safe and rapid completion of response procedures by our colleagues. Our laboratories are equipped with comprehensive emergency response equipment, and we check equipment conditions and safety stock every month to ensure they can be used instantly in the event of an emergency.

We conduct annual toxicant spill and disaster handling drills each year to enhance employee emergency response capabilities and minimize disaster impacts. We have established professional toxicant response personnel at our factories in accordance with the “Regulations for Management of Professional Response Personnel for Toxic Chemicals and Chemical Substances of Concern”; disaster units are responsible for adopting protection, response, and disposal measures when emergencies occur, and professional response personnel from other units carry out supporting disaster response tasks. We continue to implement in-facility management of toxicant disaster response procedures and training for personnel handling toxicants. PharmaEssentia conducted a toxicant disaster response drill in December 2025 which simulated a scenario where a QC staff member retrieved a toxic substance from the toxic chemical storage cabinet in the chemical laboratory, but caused an acetonitrile bottle to fall to the floor due to improper handling, resulting in an acetonitrile spill. The drill covered donning of protective clothing, containment of the toxic spill, clean-up procedures, and other response measures. To strengthen emergency response capabilities, PharmaEssentia also participates in biennial official disaster drills jointly hosted by science park administrations and fire departments for different toxic substances.

Additionally, our Taipei Headquarters and Taichung Plant have both joined regional joint defense organizations and regularly assign staff to attend seminars hosted by these organizations to acquire the latest emergency response knowledge and training. PharmaEssentia complies with regulations issued by competent authorities and rigorously manages storage and handling of toxic chemicals and chemical substances of concern. In addition to installing lockable explosion-proof fume hoods and assigning dedicated management and inventory personnel, we also file monthly operating volume reports on the official website designated by competent authorities. In 2025, we achieved a record of zero violations and zero defects during competent authority audits, and the Taipei City Department of Environmental Protection nominated us for the Ministry of Environment Outstanding Operators Commendation, which recognized us as one of the ten outstanding operators in the nation.

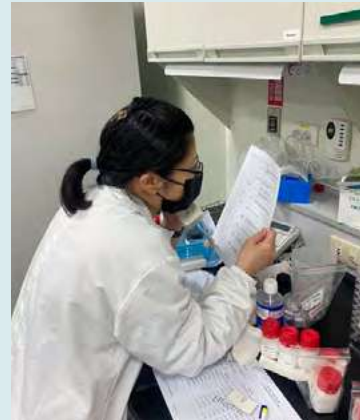
**PharmaEssentia Ministry
of Environment 2025
Outstanding Operators
Commendation Award**



PharmaEssentia 2025 Toxic Chemical Disaster Response Drill



Toxic chemical spill



Report spill



Delineate controlled area



Response team dons protective clothing



Containment of spill area



Removal of toxic chemical from spill area; waste collection and treatment



PPE decontamination and cleaning



PPE removal