





2

Climate Strategy and Environmental Protection

-  2.1 Climate Action
-  2.2 Water Stewardship and Biodiversity
-  2.3 Waste Management
-  2.4 Hazardous Waste Management

Summary of 2022



Highlights Performance

PharmaEssentia's ECCS refers to international sustainability frameworks such as GRI, SASB, and TCFD to examine potential environmental impacts and effects as well as to disclose various environmental issues in a comprehensive manner. Regarding climate change, besides completing organizational greenhouse gas inventories and its associated emissions, identifying climate-related risks and opportunities that are physical and transitional, we also plan to introduce the ISO 14001:2015 environmental management system in 2023 to assist us in properly managing environmental impacts, reducing energy consumption, and minimizing waste in the life cycle assessment, ensuring that our operations meet environmental goals and actively cooperate with policies that are relevant to Taiwan's commitment to reaching NetZero by 2050.

Material Topic

- Climate Action
- Waste Management
- Hazardous Waste Management



TCFD

Implemented TCFD for the first time, and identified 10 climate-related risks and 7 opportunities



ISO 14064-1

The Taichung Plant completed the 2020-2021 ISO 14064-1:2018 greenhouse gas verification



0 violation

Zero leakage, zero penalty and zero emission



14.8%

Saved 8.724 million liters of process water recycling and reuse



Reduced water consumption at Taichung plant

53.5%

Reduction in unit product waste output intensity



62%

Reduction in unit product energy consumption intensity





2.1 Climate Action Material Topic

Climate change is a challenge faced by the entire world today. We are actively planning various climate actions, hoping that the implementation of internal operational strategies can help us be in line with world standards, move towards SDG13-Climate Action, and work with others to exert PharmaEssentia's influence and strive to mitigate climate change. In 2022, under the TCFD framework, we prioritized climate-related physical and transition-

al risk and opportunity identification as well as the GHG Inventories of our plants. In the future, we will continue to conduct scenario and quantitative financial impact analysis on major risk and opportunity projects, provide stakeholders with relevant and reliable financial measurement information, and work with others to help maintain the sustainable development of the environment.

GRI 3-3

<div data-bbox="152 544 286 667" data-label="Image"> </div> <div data-bbox="295 557 441 582" data-label="Section-Header"> <h3>Internal Policies</h3> </div> <div data-bbox="295 584 851 612" data-label="List-Group"> <ul style="list-style-type: none"> ● Environmental policies ● GHG Management Procedures </div> <div data-bbox="295 625 468 651" data-label="Section-Header"> <h3>External Guidelines</h3> </div> <div data-bbox="295 652 972 799" data-label="List-Group"> <ul style="list-style-type: none"> ● ISO14064-1: 2018 standard for GHG Inventories ● Climate Change Adaptation Act ● Corporate Governance 3.0 Evaluation System ● Items to be disclosed in the annual report of a publicly traded company ● Task Force on Climate-related Financial Disclosures (TCFD) ● Taiwan's 2050 NetZero commitment </div>	<div data-bbox="1070 544 1205 667" data-label="Image"> </div> <div data-bbox="1211 557 1456 582" data-label="Section-Header"> <h3>Short-term Targets for 2023</h3> </div> <div data-bbox="1211 584 2033 900" data-label="List-Group"> <ul style="list-style-type: none"> ● Continue operations for the 2022 GHG Inventories (included in the operation scope for Taichung Plant), and is expected to be verified by Q3 2023. ● Disclose information on climate change governance in the company's annual report and sustainability report in compliance with regulations and the company's governance 3.0 specification. ● Construct a complete TCFD framework in sequences, with the second phase to introduce operational processes related to significant climate-related risks and opportunities; evaluate how to integrate potential impacts of climate change into strategy planning, analysis, and risk management. ● Installation of the new magnetic levitation ice water machine at the Taichung Plant is expected to be completed in June 2023; installation of the new variable frequency air compressor is expected to be completed in March 2023. ● Implemented ISO 14001:2015 Environmental Management System. </div> <div data-bbox="1211 912 1525 938" data-label="Section-Header"> <h3>Medium-term Targets for 2024-2026</h3> </div> <div data-bbox="1211 940 2033 1227" data-label="List-Group"> <ul style="list-style-type: none"> ● Continue to conduct verification of the ISO14064-1:2018 Organizational GHG Inventories Management System. ● Track greenhouse gas emission control regulations, evaluate the company's operational risks, respond to regulatory control requirements in a timely manner, and revise management procedures and execution measures as needed. ● Complete the full construction of the TCFD framework; continuously integrate risks and opportunities related to significant climate-related issues into strategic objectives, financial planning impact analysis, and management; initiate analysis climate-related scenarios and financial impact to strengthen climate change response strategies. ● Continue to maintain ISO 14001:2015 Environmental Management System, utilize environmental impact assessment methods to reduce environmental impact risks, and seek related opportunities to achieve sustainability goals. </div> <div data-bbox="1211 1240 1538 1265" data-label="Section-Header"> <h3>Long-term Targets (2026 and beyond)</h3> </div> <div data-bbox="1211 1267 2020 1410" data-label="List-Group"> <ul style="list-style-type: none"> ● Implement the ISO14064-1:2018 Organizational GHG Inventories Management System, and pay attention to environmental assessment results, and follow-up on recommended improvements. ● Continuously optimize the TCFD framework, and roll out adjustments to company strategies and actions in strategic objectives, financial planning impact analysis, and risk management. </div>
<div data-bbox="152 831 286 954" data-label="Image"> </div> <div data-bbox="302 845 1135 994" data-label="Text"> <p>Aligned with the United Nations SDG 13 - Climate Action, we have sequentially introduced the TCFD framework for Task Force on Climate-related Financial Disclosures (TCFD), aiming to effectively manage the challenges and opportunities of climate change through climate governance, strategic planning, identification and risk management, and the establishment of indicators and targets. This provides reliable financial measurement information to stakeholders and contributes to the development of sustainable environments.</p> </div>	
<div data-bbox="152 1015 286 1137" data-label="Image"> </div> <div data-bbox="302 1035 985 1134" data-label="List-Group"> <ul style="list-style-type: none"> ● Board of Directors, Auditing Office, and Head of Corporate Governance ● ECCS - Environmental Friendliness Taskforce ● Taichung Plant - GHG Inventories Promotional Taskforce ● Taipei Headquarter - GHG Inventories Promotional Taskforce </div>	
<div data-bbox="152 1169 286 1292" data-label="Image"> </div> <div data-bbox="302 1190 1111 1410" data-label="List-Group"> <ul style="list-style-type: none"> ● Completed education and training on the Task Force on Climate-related Financial Disclosures (TCFD) and identified climate-related risks and opportunities. ● Continuously implemented and maintained ISO14064-1:2018 Organizational GHG Inventories Management System. ● Completed education and training on GHG Inventories. ● A total of 7 cross-functional departments and 22 employees participated in the GHG Inventories operation at the Taichung Plant. ● The Taichung Plant GHG Inventories project was executed, with external consultants and verification units commissioned at a cost of approximately NT\$307,000. </div>	



Management Evaluation Mechanism

- Conducted internal auditor training courses on the ISO14064-1 GHG Inventories management system.
- Obtained the ISO14064-1:2018 verification.
- Assessed against the Corporate Governance 3.0 evaluation indicators.
- Assessed against the Task Force on Climate-related Financial Disclosures (TCFD) framework criteria.
- Implemented the ISO 14001 environmental management system.

2022 Evaluation Results

- Conducted 4 sessions of GHG Inventories management and internal auditor training courses at the Taichung Plant, with a total of 63 participants and 189 hours of training.
- Certified 13 new internal auditors at the Taichung Plant, in addition to 14 existing ones, for a total of 27 qualified members.
- Obtained ISO14064-1:2018 verification for 2020 and 2021 at the Taichung Plant.
- Conducted 2 sessions of GHG Inventories management and internal auditor training courses with Panco Healthcare, with a total of 52 participants and 312 hours of training, at PharmaEssentia Headquarters.
- Conducted TCFD education and training with Panco Healthcare, with a total of 100 participants and 250 hours of training, at PharmaEssentia Headquarters.
- Conducted the TCFD Environmental Sustainability Risk Questionnaire Identification across 31+ departments at PharmaEssentia Headquarters and our subsidiary, Panco Healthcare; 18 questionnaires were sent and the response rate was 100%; 10 significant risks and 7 significant opportunities were identified.
- Adjusted the cooling tower water level to increase the efficiency of using recycled water in the water tower. Water usage decreased by 8 tons/day compared to before the adjustment, reducing the overall water usage at the Taichung Plant by approximately 14.8%.



Climate Change Governance Framework TCFD Governance



















To actively support Taiwan's commitment to NetZero by 2050, in 2022, PharmaEssentia completed its first climate change risk and opportunity identification, laying the foundation for the first stage of climate governance. The Board of Directors is the unit at the highest level of sustainable governance, supervisory management, and decision-making, systematically reviewing the impact and implications of climate change from top to bottom. The ECCS and five functional taskforces (composed of executives and executives from all departments) are responsible for identifying climate-related risks and opportunities, implementing and promoting climate-related plans, and the ECCS's Environmental Friendliness Taskforce adheres to the regulations for a listed company's sustainable development roadmap and formulates the annual GHG Inventories disclosure schedule for the Taichung Plant. Starting from the second quarter of 2022, the progress of the GHG Inventories project has been included in the company's ESG sustainable execution progress. The ECCS will provide business reports to the Board of Directors every quarter. At the same time, important product manufacturing partners, warehouses, and distribution channels in the United States have committed to their own ESG public disclosure.

Strategy Planning and Execution GRI201-2 TCFD Strategy

In response to the issue of climate change and to support SDG 13 - Climate Action, PharmaEssentia has gradually developed a comprehensive strategy to address climate change and its impacts. In 2022, we formally adopted the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) framework and actively identified and took action to address the challenges and opportunities presented by climate change.

We have established Environment Policies as an internal guideline for preventing and responding to environmental impacts, and also created a GHG Management Procedures. Starting with our main production base, the Taichung Plant, we have conducted greenhouse gas inventories and completed third-party verification for the years 2019 to 2021.

We have made climate change a core topic and developed adaptation strategies in response to actual occurrences of climate disasters in recent years. Various climate actions concerning different environmental factors have been implemented, and we hope to build a comprehensive governance and strategy for climate change to ensure the sustainability of our operations in a changing climate.

Category	Physical Risks		Transition Risks		
	Immediate Disasters	Long-Term Disasters	Policy and Regulations		
Risk  Opportunity 	 Extreme weather events: heavy rain, typhoons, blizzards, earthquakes, pests	 Changes in average temperature  Water resource stress	 Carbon tax/fee  Fuel tax/energy tax  Total quantity control/emissions trading  Mandatory reporting	 Product labeling regulations and standards  Uncertainty in new regulations  International conventions/voluntary agreements	
Factors Likelihood	Occurred	Possible	Occurred	Occurred	
Impact					
Timeframe	Short-term	Long-term	Short-term	Medium-term	
Potential Financial Impact Potential Opportunity  Potential Cost 	<ul style="list-style-type: none"> Heavy rain may increase the risk of flooding at the Taichung Plant, increasing repair costs A blizzard in the United States could result in delayed shipments Extreme weather events can lead to damage to local operations, equipment, and personnel, increasing operating costs Disruption of raw material sources may hinder production and transportation of products, affecting operational revenue 	<ul style="list-style-type: none"> Increased temperatures affect the employees' working environment, increasing occupational safety and health risks Decreased availability of water resources affects pharmaceutical production, even interrupting production processes Long-term climate change results in reduced energy supply and increased operational costs 	<ul style="list-style-type: none"> Carbon taxes in overseas markets and the introduction of carbon fees and energy-related taxes in Taiwan increase operational costs Investments in greenhouse gas emission inspections, verifications and disclosures extend to product carbon footprints throughout the product life cycle, increasing operational costs 	<ul style="list-style-type: none"> Investments in response to emerging regulations and international conventions as well as setting carbon reduction targets increases operational costs 	
Response/Adaptation Actions	<ul style="list-style-type: none"> Investing in insurance to reduce property damage, and increasing flood prevention measures in the factory can mitigate flood risks. ▶ 5.4 Product Quality and Safety Maintaining a safe stock level of at least 4 months in the US can ensure a stable supply chain and reduce the risk of delays caused by weather events. ▶ 5.4 Product Quality and Safety Expanding drug registration in various regions can diversify the risk of weather events affecting production. ▶ PharmaEssentia's Company Introduction Committing to reducing energy intensity and dependence on energy sources can help mitigate climate change risks. ▶ 2.1 Climate Action Expanding production bases and improving raw material procurement can improve supply chain resilience. ▶ 5.2 Sustainable Supply Chain Management 	<ul style="list-style-type: none"> Implementing energy-efficient measures to reduce carbon emissions can reduce the company's contribution to global warming. ▶ 2.1 Climate Action The Taichung Plant recycles and reuses 8.724 million liters of process water. ▶ 2.2 Water Stewardship and Biodiversity Panco Healthcare has set up a rainwater collection tower in its medical facility to utilize water resources efficiently. ▶ 2.2 Water Stewardship and Biodiversity 	<ul style="list-style-type: none"> Conducting a GHG Inventories, analyzing emission levels and hotspots, and obtaining third-party verification ahead of regulatory requirements can help mitigate climate change risks. ▶ 2.1 Climate Action Implementing energy-efficient measures in administrative offices can reduce energy demand and carbon emissions. ▶ 2.1 Climate Action Replacing old air compressors and chillers with more efficient ones can increase energy efficiency and reduce energy consumption. ▶ 2.1 Climate Action 		

Impact  Low  medium-low  Medium  Medium-High  High

Note 1: Impact levels are defined as low (meaning operations are not affected), low to medium (meaning operations are affected but not changed), medium (meaning operations are affected and may change), medium to high (meaning operations are significantly affected, leading to changes in operations), and high (meaning operations are significantly affected, leading to operational disruptions).

Category	Opportunity	
	Resource Efficiency	Energy Sources
Risk and Opportunity ⚠️ Risk ★ Opportunity	★ Use more efficient production and distribution processes. ★ Reduce water usage and consumption. ★ Transition to more efficient buildings	★ Use low-carbon energy sources. ★ Adopt energy-related incentive policies. ★ Use new energy technologies. ★ Participate in carbon trading markets.
Factors Likelihood	Possible	Possible
Impact	●●●●●	●●●●●
Timeframe	Medium-term	Medium-term
Potential Financial Impact - Potential Opportunity + Potential Cost	+ Improving resource efficiency in the pharmaceutical production process reduces operational costs and enhances production resilience. + Adopting green/smart building designs in new facilities reduces daily operating costs and improves natural resource efficiency	+ Introducing renewable/low-carbon energy sources reduce potential carbon costs. + Using government incentives related to green energy reduces initial investment costs. + Establishing carbon capital and participating in carbon trading markets reduces exposure to rising energy prices. + Optimizing pharmaceutical processes and using green transportation to replace high-carbon emission transportation reduces carbon emissions and product carbon footprints for the entire organization, thereby reducing operational carbon costs.
Response/Adaptation Actions	<ul style="list-style-type: none"> ● Replacing old air compressors and chiller units with high-efficiency ones can improve energy efficiency and effectiveness, contributing to climate action. ▶ 2.1 Climate Action ● Implementing energy-efficient measures, such as energy monitoring systems, optimized task force process control, and waste heat recovery can improve energy efficiency and reduce carbon emissions. ▶ 2.1 Climate Action ● The Taichung Plant recycles and reuses 8.724 million liters of process water, with the goal of protecting water resources and biodiversity without harming the surrounding wildlife and plants. ▶ 2.2 Water Stewardship and Biodiversity ● The Pan-Asia Medical facility has installed a rainwater harvesting system to make the most of water resources. ▶ 2.2 Water Stewardship and Biodiversity 	<ul style="list-style-type: none"> ● The new Zhubei Plant is designed to meet the qualifications for the green building label, aiming to reduce the organization's carbon footprint and secure green building subsidies. ● Reducing waste and hazardous material production can lower the product's carbon footprint. ▶ 2.3 Waste Management ▶ 2.4 Hazardous Material Management

Impact ●●●●● Low ●●●●● medium-low ●●●●● Medium ●●●●● Medium-High ●●●●● High

Note 2: Time frames are defined as short-term, lasting 1-3 years; medium-term, lasting 3-10 years; and long-term, lasting over 10 years.

Risk Management TCFD Risk Management

We aim to integrate climate governance into our sustainable management and operational planning. We conduct enterprise risk identification and management in following with the enterprise risk management framework released by the COSO organization and the World Business Council for Sustainable Development (WBCSD) in 2018. With this framework as our foundation, we have explored responses to climate-related issues in-depth through the transition and physical risks and opportunities proposed by the TCFD.

In terms of our current sustainable governance organization, the units responsible for handling climate risks includes the Board of Directors, the audit department, the Head of Corporate Governance, the Environmental Friendliness Taskforce of the ECCS, the GHG Inventories Promotional Task Force of the Taichung Plant (7 cross-functional departments), and external professional consultants. Led by the ECCS's 5 cross-functional taskforces, various department heads and colleagues have considered industry characteristics and operational status, analyzed the impact of various risks and opportunities on operations (such as potential carbon cost increases, the cost of responding to stricter environmental regulations, changes in market preferences that reduce customer trust, losses caused by climate disasters, cost reductions due to efficient production, and many other impacts), and jointly identified material risks and opportunities based on three dimensions: likelihood, impact degree, and occurrence time. Further analysis of the risks' potential financial impact on company operations is conducted, an analysis upon which we formulate PharmaEssentia climate adaptation strategy and enhance our organization's climate resilience.

Climate-Related Risk and Opportunity Identification and Management Process

Unified consensus on education and training

Explain the implications and impacts of climate change issues and strengthen colleagues' climate issue knowledge and consistency in discernment.

- Training Participants: PharmaEssentia, Panco Healthcare
- Number of Participants: 100 people

Identification of Climate Risks and Opportunities

Assessment of climate-related risks and opportunities, evaluating likelihood, impact and timing

- Involving 31+ departments
- Issuing 18 questionnaires
- Achieving 100% response rate for questionnaire collection

Ranking by significance/importance

- Identify 17 major risks and opportunities based on their likelihood and impact level and categorize them into 5 major categories.
- Analyze the potential occurrence timeline.

Potential Financial Impact Analysis

- Analyze the questionnaire responses and industry trends.
- Explore the potential financial impacts of the 5 major risk and opportunity categories on PharmaEssentia, as a basis for future climate governance.
- Develop corresponding adaptation/mitigation actions.

Future Promotion Plan (Next 3-5 Years)

- Continuously delve into the impacts and transformation opportunities of each type of risk.
- By exploring climate-related risks and opportunities, re-examine the impact of climate on corporate finance and performance.
- Take concrete actions to face the challenges and opportunities brought about by climate change.

Energy Use and Emissions Analysis

TCFD Indicator and Target

In addition to establishing a comprehensive governance, strategy, and risk management framework, we have also analyzed energy use and greenhouse gas emissions in the backend. Through management, implementation and tracking, we have continuously reduced both energy intensity and greenhouse gas emissions intensity for three consecutive years, effectively reducing the environmental impact of our operations.

As we expand our operations and plan to build a new plant, we anticipate an increase in both energy use and emissions. The new plant will be located in the Hsinchu Biomedical Science Park, where we hope to leverage the advantages of the Hsinchu Science Park and the ICT industry to create a cluster effect. *We will prioritize constructing an environmentally-friendly factory by applying for green building qualifications for the new plant.*

GHG Emissions Analysis

GRI 305-1~305-4



59%

Greenhouse gas emissions intensity Decreased



2021 Statement on GHG Inventories

We have established a greenhouse gas (GHG) task force at our main production base in Taichung Plant, which takes charge of managing our backend emissions. Using 2019 as the base year, we have developed a "Greenhouse Gas Management Procedure Manual" as a pilot for the Group's introduction of climate governance ISO 14064-1:2018 GHG Inventories. As of the end of 2022, Taichung Plant has completed the GHG Inventories for 2019-2021 and obtained certification from third-party organizations. The inventory data for 2022 is also going to be verified externally in Q3 2022, which will serve as the basis for tracking and setting targets for the Task Force on Climate-related Financial Disclosures (TCFD).

For PharmaEssentia, Category 1 - Direct Emissions Sources, including gas boilers, process emissions, diesel generators, fuel for official vehicles and various refrigerants, account for about 13% of emissions. Category 2 - Indirect Emissions from Purchased Electricity account for about 71% of emissions. Categories 3-6 include Category 3 - Indirect Emissions from Transportation (raw material transportation, product transportation, waste transportation, and employee travel), and Category 4 - Indirect Emissions from Use of Materials/ Services (upstream raw materials and waste disposal), which together account for about 16% of emissions. With the steady growth of commercial production, the greenhouse gas emissions intensity has been decreasing year by year over the past 3 years, with a **reduction of 59%** by the end of 2022 compared to the previous year.

Greenhouse Gas Emissions Statistics at PharmaEssentia Taichung Plant in the Past 3 Years

		2019 (Base Year)	2020	2021	2022 (Self-Reported Figures)
Category 1		707.2290	503.2129	510.9479	569.4792
Category 2	ton-CO ₂ e	3054.9956	3094.3151	3029.609	3085.5974
Category 3-6		822.8025	814.5347	785.3639	711.5122
Total	ton-CO ₂ e	4,585.0271	4,412.0630	4,325.9210	4,366.5900
Intensity	ton-CO ₂ e/g	74.80	102.56	67.95	27.70
	Compared to the previous year	-	37%	-34%	-59%

Note 1: The data in this table is within the scope of the Taichung Production Manufacturing Plant of PharmaEssentia.

Note 2: GHG Inventories follows the ISO14064-1:2018 standard, and the data from 2019 to 2021 has obtained an SGS verification statement.

Note 3: The types of greenhouse gases included in the GHG Inventories include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆), and nitrogen trifluoride (NF₃).

Note 4: The emission coefficient method is used for statistical analysis, and the emission coefficients for externally purchased electricity follow the carbon emission coefficient for electricity announced by the Bureau of Energy of the Ministry of Economic Affairs. The coefficients for 2020 and 2021 were 0.502 (kgCO₂e/kWh) and 0.509 (kgCO₂e/kWh), respectively. The greenhouse gas emission coefficient required for natural gas emissions is based on the global warming potential (GWP) of various GHGs in the IPCC AR6 (2021) report.

Note 5: The intensity is measured by the total production volume (g) of products per year.

Note 6: The inventory for 2022 is still in progress, and the emissions from Categories 3 to 6 have not yet included the transportation of raw materials, employee business travel, electricity consumption in central laboratories, water consumption, and wastewater generation.



Energy Use Analysis GRI 302-1/302-3

Our company's energy consumption is mostly composed of two categories: externally purchased electricity and natural gas. To comply with the Good Manufacturing Practice (GMP) requirements for maintaining a certain level of cleanliness and quality control during non-production periods, our reduction in baseline electricity consumption is limited. Therefore, we have implemented multiple energy-saving measures and regularly reviewed the effectiveness of equipment, appliances, and electricity-saving initiatives. Through tracking mechanisms and differential analyses, we have formulated improvement strategies to continuously move towards our goal of reducing energy consumption intensity. The main reason for the decrease in our energy intensity is due to the increase in production volume. As of 2022, our products have been launched in 38 countries/markets, and as our global market expansion plans continue to unfold, our production volume continues to increase. As a result, our energy intensity has also decreased over the past three years, **with a reduction of 62%** compared to the previous year as of 2022.

Our US subsidiary actively planned its operations after obtaining a pharmaceutical license in 2021. We use data collection on resource usage as the basis for energy management, and plan to expand the scope of data collection to align with that of PharmaEssentia Headquarters in the future.

PharmaEssentia and Panco Healthcare's Energy Consumption in the Past 3 Years

		2020	2021	2022
Purchased electricity (GJ)	Renewable energy use (GJ)	0.00	0.00	0.00
	Non-renewable energy use (GJ)	24,839.53	27,277.60	23,454.71
Natural gas (GJ)	Natural gas (GJ)	8,395.93	7,339.11	9,045.06
Petroleum (GJ)	Petroleum (GJ)	-	-	19.58
Total (GJ)	Total energy use (GJ)	33,235.46	34,616.71	32,519.36
Intensity	Energy intensity (GJ/g)	772.56	543.77	206.29
	Comparison with the previous year	-	-30%	-62%

Note 1: Energy consumption data includes PharmaEssentia and Panco Healthcare.
 Note 2: The renewable energy consumption data in this table has been corrected in the 2021 sustainability report after being verified by an external organization. The original renewable energy consumption (2,789.56 GJ) was found to include non-renewable energy sources and has been added to the non-renewable energy consumption (2,789.56 + 24,488.04 = 27,277.60 GJ).
 Note 3: Starting from 2022, the petroleum (including diesel and gasoline) category has been included in the statistics.
 Note 4: Energy intensity is a metric that measures the intensity of energy use and greenhouse gas emissions per unit of product output (g) produced annually.

Resource Usage Statistics Table for US Subsidiary in 2022

Resource Use Category	Original Amount		Converted Amount	
	Usage	Unit	Usage	Unit
Electricity	1,596,640	kwh	5,747.90	GJ
Water Resources	715,830	Gallons	3.78	ML
Natural Gas	6,431	Therms	678.51	GJ

Note: The statistics for electricity and natural gas for the US subsidiary are from January 2022 to December 2022, while the statistics for water resources are based on the billing cycle, from October 2021 to July 2022.

Energy-Saving And Carbon Reduction

GRI 302-4/305-5

PharmaEssentia has implemented multiple energy-saving measures to reduce operational and production energy consumption and greenhouse gas emissions, and continues to better energy conservation and carbon reduction in administrative areas. These measures include advocating for the unplugging of unused electrical appliances, turning off electrical power during long vacations, and using public transportation for business trips. Using 2021 as the basis, despite laboratory expansion and an increase in the number of employees, electricity consumption was reduced by 3.91%, and water consumption was reduced by 4.72%. In the Taichung Plant, adjusting the cooling tower water level and increasing the use of recycled water in water cooling towers have increased water usage efficiency, resulting in a reduction in water consumption by 8 tons per day and a decrease in overall water usage at the Taichung Plant by approximately 14.8%. Furthermore, PharmaEssentia plans to complete the installation of a variable frequency air compressor by March 2023 and a magnetic levitation ice water machine by June 2023. The company is also evaluating the adoption of an energy monitoring system to reduce electricity consumption as well as improve task force process control/optimization and waste heat recovery, so that the usage of natural gas can be reduced and energy efficiency can be improved.

Air Pollutant Emissions Statistics

GRI 305-6~7

Our company uses boilers in our production processes, primarily fueled by natural gas. The combustion of natural gas in the boilers results in air pollutants, such as nitrogen oxides, sulfur oxides, and particulate matter. However, the concentration of these pollutants in our emissions is below the regulatory limits set by environmental laws, so we do not need to install any pollution control equipment. We are also committed to not using or emitting any substances that are controlled under the Montreal Protocol, which aims to protect the ozone layer, or any persistent organic pollutants (POPs). We comply with regulations set by the Environmental Protection Administration (EPA) by conducting regular inspections and reporting on our fixed air pollution sources. We outsource this inspection to an EPA-approved testing institution, Jichuan Environmental Technology Co., Ltd., which conducts inspections in accordance with the regulations. The results of the inspection show that our air pollutant emissions are below regulatory limits and that we have not violated any environmental regulations. We are dedicated to fulfilling our environmental responsibilities in our production processes.

Air Pollutants Emissions Statistics of PharmaEssentia in the Past 3 Years

Air Pollutants	(Unit: kg)		
	2020	2021	2022
Nitrogen Oxides (NOx)	415.7	352.41	444.2
Sulfur Oxides (SOx)	29.6	0	34
Volatile Organic Compounds (VOCs)	13.3	734.31	9.3
Hazardous Air Pollutants (HAPs)	Estimation of Non-Detects	168.54	434.2
Particulate Matter (PM)	7	14.77	7.8
Hydrochloric Acid	-	-	93.4

Note 1: The data in this table only applies to PharmaEssentia Taichung Plant; Panco Healthcare has no emissions of air pollutants listed in this table.

Note 2: The emissions of nitrogen oxides (NOx), sulfur oxides (SOx), and particulate matter (PM) were not measured in 2022 and are estimated based on the data from 2020. Hydrogen chloride emissions are included in the 2022 data.

2.2 Water Stewardship and Biodiversity

GRI303-3/303-4/303-5

Our company does not consume a large amount of water resources in its operations, and we actively implement water conservation measures. Regarding our Taichung plant, which uses the most water resources, the source of the water intake is all third-party freshwater, and the wastewater is discharged through the third-party Central Taiwan Science Park Taichung Park Wastewater Treatment Plant. The water quality of the discharged water is monitored annually in accordance with the regulations of the Environmental Protection Administration. A third-party testing organization accredited by the Environmental Protection Administration conducts testing every six months to ensure compliance with management standards and discharge standards set by the Central Taiwan Science Park Administration. The process of wastewater treatment is detailed in [our 2020 Sustainability Report](#) on page 113.

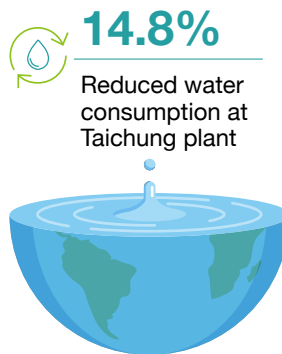
PharmaEssentia's Water Resource Statistics for the Past 3 Years

(Unit: Million Liters)

	Location	2020	2021	2022
Water Withdrawal	Taichung Plant	15.64	16.1	18.11
	Taipei Headquarter	10	7.78	10.00
Water Discharge	Taichung Plant	9.46	10.5	9.127
Water Consumption	Taichung Plant	6.18	5.6	8.983

Note 1: The data in this table mainly covers PharmaEssentia's Taichung Plant. The water discharge and consumption of PharmaEssentia Headquarters and Panco Healthcare are not applicable since they are administrative offices that do not have production processes.

Note 2: The water intake source of PharmaEssentia is from a third-party freshwater supplier, and the discharge is treated by the wastewater treatment plant of Central Taiwan Science Park, Taichung Park.



Water Conservation Initiatives in Taichung Plant

Through the reuse of reverse osmosis brine and wastewater from the production process as cooling tower makeup water in the air conditioning system, we have improved the efficiency of water resource recycling. In 2022, the plant invested in 8 employees to execute the plan, and the total amount of water recycled was 8.724 million liters, resulting in a water savings of 14.8%.

Water Conservation Measures in Panco Healthcare

When designing the logistics center, water resource utilization was taken into consideration from the outset. Tap water is supplied for internal sanitation use, while a rainwater collection system is installed to supply water for external use and toilet flushing. If rainwater is insufficient, tap water is supplied to conserve water.

Protection Biodiversity in Taichung Science Park

To ensure the protection of water resources, PharmaEssentia has applied for a water pollution control permit, and complies with its production operations and reporting requirements. Regular sampling and testing reports are within the standards, with no material environmental impact risks. The goal of preventing and monitoring the quality of wastewater discharge is to manage it in a way that does not harm surrounding flora and fauna. PharmaEssentia is committed to protecting natural resources and implementing various environmentally-friendly measures in the hope of contributing to the preservation of biodiversity.





2.3 Waste Management Material Topic

GRI 3-3



Management Policy

Internal Policies

- Environmental Safety and Health Policy
- Hazardous Waste Management Procedures and **Waste Management Procedures**

External Guidelines

- Central regulations and standards for environmental protection
- Local environmental authorities' public announcements



Input Resource

- The 2022 cost of business waste removal and treatment was approximately NT\$1.091 million, an increase of 79% from last year.
- The waste output of the company is entrusted to the competent authority for approval of the removal and treatment by the waste treatment company responsible.
- Conduct inspections of temporary waste storage areas and annual audits of waste removal and treatment companies.
- Review the characteristics, sources, and weight of waste production, submit applications for changes to the business waste cleaning plan in a timely manner, and seek more suitable contractors.



Evaluation of Management Policy

Management Evaluation Mechanism

- **Internal auditing:** Conduct periodic audits of waste management vendors, and **review internal waste sorting and storage processes**. Regularly evaluate the intensity of waste generation by units.
- External auditing: **Implement legal compliance checks for routine items** according to environmental regulatory agencies.

2022 Evaluation Results

- External auditing: **Implement legal compliance checks for routine items** according to environmental regulatory agencies.
- Conform to the specifications of **the waste management procedure manual**, and periodically review and amend the company's waste processing plan to comply with legal requirements.
- In 2022, due to the inability of the processing plant to accept waste chemicals (including toxic substances) produced by the Taichung Plant, waste disposal was postponed to 2023 (the Environmental Protection Administration also agreed due to the type and weight of the hazardous waste).
- In 2022, four deficiencies in compliance with regulations by the environmental regulatory agencies (the Environmental Protection Bureau of Taichung City Government and Central Taiwan Science Park Administration) were rectified.



Management Commitment

- Complying with environmental regulations and requiring manufacturers to jointly implement waste management and control, and realizing our commitment to environmentally-friendly measures to protect the environment



Accountable Units

- ECCS - Environmental Friendliness Taskforce
- The Environment and Safety Group is responsible for formulating, planning, and promoting waste management goals, together with each output unit, to jointly implement the responsibility for environmental protection



Targets

Short-term Targets for 2023

- Continuously monitor the output of waste chemicals (including toxic substances) and subsequent processes to comply with environmental regulations.
- Continuously disclose information on waste production and resource recovery over the years in accordance with legal requirements.
- Track environmental protection regulations, evaluate the company's operating risks, and respond to regulatory requirements in a timely manner by controlling or revising waste management procedures and implementation measures.
- Introduce the ISO 14001:2015 Environmental Management System.
- Take the lead in obtaining relevant information on the Taipei GHG Inventories.

Medium-term Targets for 2024-2026

- Take on greater responsibility for in-house environmental management and incorporate environmental sustainability concepts.
- Through LCA and PDCA management, evaluate the downstream destination of waste, prioritize the implementation of recycling and reusing goals to reduce environmental impact.
- Strengthen audits and evaluations of vendors, and have "compliance with regulations and prioritizing the reuse of materials" as a criteria for selecting vendors in the future.
- Have PharmaEssentia Headquarters learn from Taichung Plant in executing the ISO 14001:2015 Environmental Management System.

Long-term Targets (2026 and beyond)

- Continuously maintain the ISO 14001:2015 Environmental Management System, use environmental impact assessment methods to reduce risks to the environment, seek relevant opportunities, and achieve sustainable environmental goals.

The types of waste generated by our company are mostly general waste produced during operations, as well as waste chemicals generated during production processes. To effectively manage our waste, we have implemented a systematic waste management policy to avoid any legal issues or environmental risks that may arise from improper disposal. At the same time, we actively monitor various environmental regulations to ensure that we stay up to date with the latest trends and changes in the industry. By promoting source reduction, adjusting process design, and improving material utilization, we can effectively address changes in regulations while also achieving environmentally friendly practices. Starting in 2020, the waste production intensity of our products has decreased continuously for three years, and **in 2022, the waste production intensity has decreased by 53.5% compared to 2021.** Details on the company's environmental expenses can be found in our annual report.

Decreased continuously for 3 years

Decreased by 53.5%




Waste Generation and Disposal

GRI 306-1~2

The R&D and production processes of PharmaEssentia are precise and generate a low amount of total waste. However, we continue to strengthen the management of waste impact due to the presence of hazardous waste. We examine the details of the waste generation, removal, treatment, and recycling at different stages from the perspective of the product life cycle. We record the input of materials and the output of waste in detail, classify and dispose of different types of waste after impact assessment, and collaborate with third-party vendors to monitor and audit their practices to ensure that waste impact is properly managed.

Investment and Output

Input Characteristics

Production and quality control testing and analyses, as well as laboratory research and development, require raw materials that are classified as hazardous substances under the Environmental Protection Administration's regulations. According to the regulations for the biopharmaceutical industry, the resulting waste is considered hazardous waste and must be disposed of by authorized waste disposal companies. Some of the hazardous waste generated is classified as infectious waste, which is first subjected to high-temperature sterilization in the factory and laboratory. After sterilization, it can be considered general waste, but it is still treated as infectious waste to ensure proper control measures.

Activity Record

The usage and inventory of toxic chemicals are recorded in detail, and the amount of waste generated is calculated. In 2022, the total amount of waste generated was 24.911 tons, and the waste intensity per unit of product has been decreasing year by year.

Impact Assessment

Production and quality control testing and analyses, as well as laboratory research and development, are all carried out according to the regulations for the biopharmaceutical industry, and the raw materials cannot be arbitrarily substituted (including toxic substances). At the same time, the Good Manufacturing Practice regulations must be followed to avoid the reuse of pollutants that may affect the quality of subsequent drugs. The only option is to try to recycle the disposed-of waste to reduce the impact on the environment.

Disposal and Monitoring

Classification and Disposal

The disposal of hazardous waste, infectious waste related to biomedicine, liquid hazardous waste and non-hazardous waste are handled separately.

Multiple Monitoring

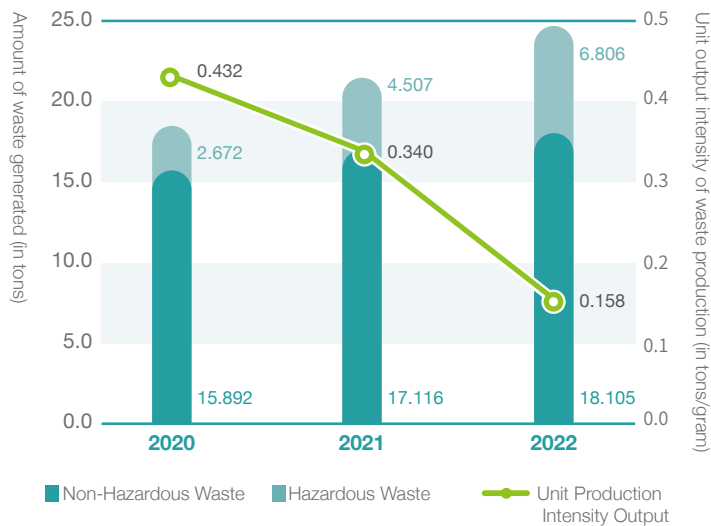
- The waste disposal vendor contracted by the company are all legally-registered Class A waste clearance/disposal companies. The operation is carried out through a three-party joint-declaration process, which requires the completion of signatures from PharmaEssentia, the waste disposal vendor and the final disposal vendor, and the completion of the process is reported on the Environmental Protection Administration's website to control and manage the final destination of the waste.
- Waste disposal companies are audited (clearance/disposal process) and regularly checked every year to ensure proper waste disposal. **No violations of the law were found during past audits.**



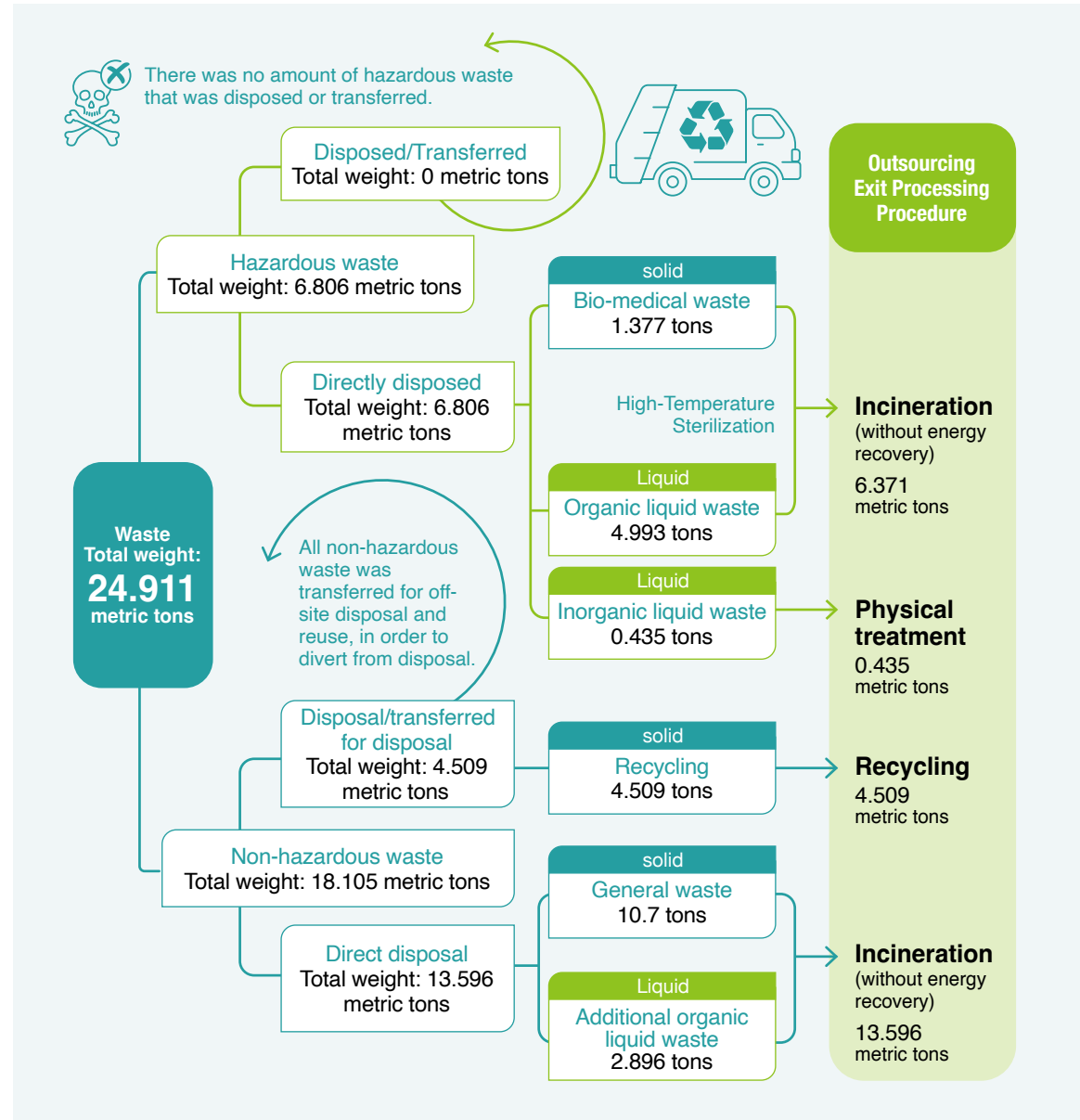
Amount of Waste Generated GRI 306-3~5

As the global layout of PharmaEssentia continues to improve, and production capacity and efficiency continue to increase, the intensity of waste production per unit product has been decreasing for three consecutive years. In 2022, the intensity of waste production **decreased by 53.5%** compared to 2021. We continue to focus on waste reduction and improving unit production efficiency with the goal of reducing the intensity of waste production per unit. We follow short, medium, and long-term goals as well as action plans to improve our management practices and implement management measures.

PharmaEssentia and Panco Healthcare Waste Production and Unit Output Intensity Statistics in the Past 3 Years



Note: The waste data includes both PharmaEssentia and Panco Healthcare, but Panco Healthcare did not produce any hazardous waste, only generating municipal solid waste, with a monthly amount lower than the minimum quantity specified by the waste disposal company of 0.5 tons. The waste has been entrusted to a qualified vendor for transportation and incineration.





2.4 Hazardous Waste Management Material Topic

In the production process, PharmaEssentia uses chemicals classified as toxic and hazardous by the Environmental Protection Administration (EPA). Therefore, the company places great emphasis on the source control of toxic substances and their proper classification, storage, and use. PharmaEssentia also uses written records to monitor the use of chemicals, trace the flow of chemicals, and prevent environmental pollution and harm to human health. **Over the past three years, the company has achieved zero incidents of chemical or waste leaks.**

GRI 3-3



Internal Policies

- Environmental Safety and Health Policy
- Hazardous Waste Management Procedures

External Guidelines

- Central regulations for environmental protection
- Local environmental agencies' announcements



Compliance with environmental regulations; and implementation of the management of chemicals and toxic chemicals, and precursor chemicals to avoid major disasters that can cause environmental pollution and harm to human health.



- ECCS - Environmental Friendliness Taskforce
- Management of the use, maintenance, and operation of chemicals, toxic chemicals, and precursor chemicals are assigned to personnel responsible for operation by the user unit, with assistance from the environmental and safety unit, to jointly assume management responsibilities.



- Two personnel from the toxic substance operation unit participated in the emergency response personnel training for toxic chemicals held by the Environmental Protection Administration, and successfully passed the test to obtain a professional emergency response personnel certificate.
- The QC unit holds annual training sessions for emergency response equipment as well as annual disaster rescue and response exercises to enhance disaster response skills for the personnel of operating units.
- Continuously follow up on the operating specifications for toxic chemicals, and report the operating volume every month as required to reduce the risk of violating regulations.



Short-term Targets for 2023

- Implementation of the ISO 14001: 2015 Environmental Management System and the ISO 45001: 2018 Occupational Safety Management System
- To have units continuously assign personnel to participate in emergency response personnel training courses for toxic chemicals, so as to enhance the skills of the operating unit in responding to disasters.

Medium-term Targets for 2024-2026

- Continuously implement the ISO 14001: 2015 Environmental Management System and the ISO 45001: 2018 Occupational Safety Management System, and follow up on the environmental assessment methods to reduce environmental impact risks, and recommended measures for improvement.
- Strengthening awareness of hazards from toxic substances, risk assessments and disaster emergency response management within the factory to reduce the impact of toxic substance operations on the environment.

Long-term Targets (2026 and beyond)

- Maintaining the ISO 14001: 2015 Environmental Management System, using environmental impact assessment methods to reduce environmental impact risks, and seeking relevant opportunities to achieve sustainable environmental goals.



Management Evaluation Mechanism

- Internal audit: Regular monthly reporting of monthly operating volume
- External audit: Conduct legal compliance audits on routine items as required by the competent authority

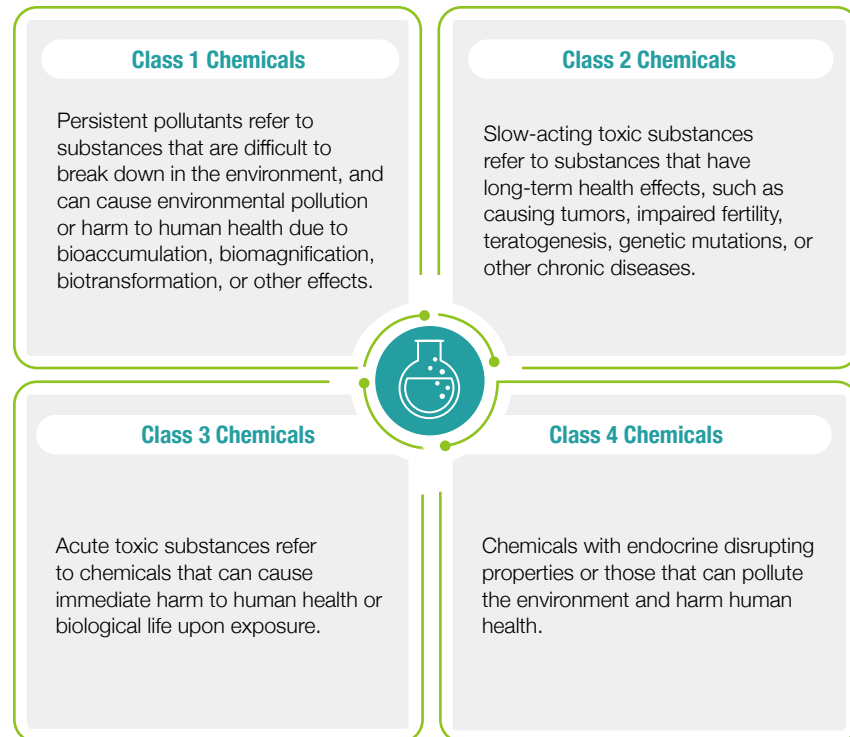
2022 Evaluation Results

- Comply with legal regulations and regularly report operating volume and storage requirements for hazardous materials
- In 2022, environmental agencies (Environmental Protection Bureaus of Taipei City Government and Taichung City Government) conducted compliance audits, and no deficiencies were found.

Classification and Control of Toxic Substances

Per the Toxic and Concerned Chemical Substances Control Act, which is regulated by the Environmental Protection Administration (EPA), PharmaEssentia classifies toxic substances and stores them in explosion-proof fume hoods in the laboratory based on their category. Since we use a wide range of chemicals, we have developed the Chemical Hazard Management Procedures to clearly define responsibilities and control measures for the purchase, use, storage, and disposal of toxic substances. We also maintain accurate records of the quantities and inventory of our chemicals. Our classification and control measures are as follows:

Classification



Management Measures

Access Control

Restricting personnel access to the laboratory

Drug Cabinet Control

Locking the drug cabinet and assigning a specific person to manage the key

Usage Control

Users are required to fill out a usage record form, and the monthly usage amount is compiled by the environmental and safety department and reported accordingly

Panco Healthcare is a logistics center rather than a manufacturing plant, so no chemicals are used there, and there is no Hazardous Waste Management Procedures, either. However, the logistics center does engage in processing and labeling operations. During the labeling process, there is a possibility of drug breakage or spillage, and thus an on-site cleanup is necessary. Therefore, the company has developed a “Cleaning Operation Procedure for Processing and Labeling Lines” to ensure proper handling of drug spillages.

Emergency Response Measures for Hazardous Substances

To ensure the safety of employees, PharmaEssentia has established the “Standard Operating Procedures for an Emergency Response to Chemical Spills” to respond to emergencies quickly and effectively. The laboratory is equipped with a comprehensive set of emergency response equipment for employees to use in case of emergencies. The equipment is checked every month to ensure that it is in good condition and there is a sufficient supply of safety equipment. Additionally, the company conducts an annual drill for toxic chemical spills to ensure that employees can respond quickly in case of emergencies and

minimize the impact of disasters. In the future, the company plans to establish professional response personnel for toxic substances in accordance with the “Professional Management Measures for Responders of Toxic Chemical Leakages”. In case of accidents, the disaster response unit will be responsible for taking the necessary action to respond to the emergency and the subsequent cleanup, and the emergency response personnel of other units will be responsible for supporting the main disaster response unit to implement the company's toxic disaster response procedures and train the toxic substance handlers.

2022 Chemical Hazardous Material Spill Emergency Response Drill

Emergency response personnel dressing training



Leakage and Hazardous Material Spill Rescue Exercise (QC Lab Acetonitrile Spill Emergency Response)

