Chapter 4
Environmental Sustainability and Climate Change

Performance Highlights

- Environmental Expenditure: approx. NT$106.18 million
- Electricity saving of 4,650,858 kWh, LNG saving of 333,379 cubic meters, equivalent to a carbon reduction of approximately 2,897 metric tons of CO_2e
- Water conservation of 6.20%
- Materials recycling rate of 14.4%
- Continuous implementation of ISO 14064-1 GHGs Inventory and Verification and Scope 4 inventory
- Received a B Management Level from CDP for both "Climate Change" and "Water Security" assessments
- Implementation of ISO 14067:2018 Carbon Footprint of Products and verification

Material topics in this chapter

Water resource management
Air pollution control
Waste management
Climate change and energy management

4.1 Environmental Management System

In 1998 we established the ISO 14001 environmental management system (EMS), with 100% coverage. EMS provides USI with a good environmental protection framework for controlling and reducing environmental impacts, preventing accidents from impacting the environment, and ensuring legal compliance. Following international trends, we have integrated the EMS and the health and safety system to draw up an HSE (health, safety, and environmental protection) policy and the "five zero goal". Environmental, Safety, and Health(EHS) Policy Cherish water resources and promote energy-saving and carbon reduction. Achieve zero environmental pollution. Ensure zero occupational safety hazards.

Upholding and realizing the business philosophy of the Chairman, we optimize occupational safety and health, process safety, and environmental protection to protect the health and safety of employees and maintain the environment and ecosystem. This is our wish and the responsibility of every employee. To promote sustainable development, fulfill ESG with due diligence, and support clean production and environmental protection, Kaohsiung Plant will make continual improvement of the workplace environment, operation safety, process waste reduction, water efficiency, energy conservation, and carbon reduction in order to achieve the “five zero goal: zero pollution, zero emission, zero accident, zero occupational hazard, and zero failure".

Environmental Objectives and Management Programs

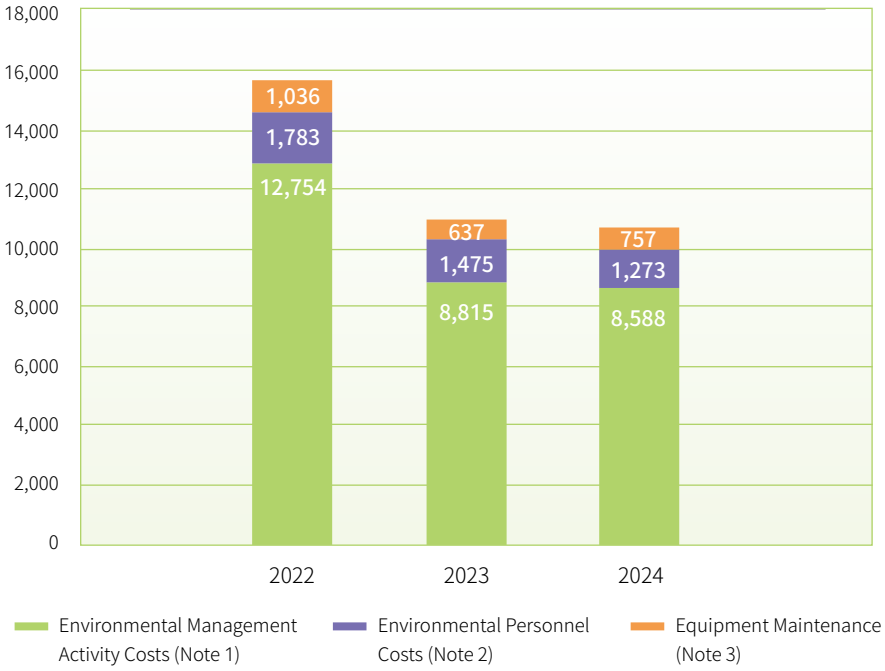
2024 Environmental Protection Targets and Management Programs

Policy	Goals	Program	Effectiveness	2025 Management Program
Zero emission	Zero emissions of air pollu-tants: Equipment/ component VOC leakage <0.5%	1. Reduce equipment/component for emission leakage of VOCs (Manufacturing Department I) 2. Reduce the annual leakage of VOCs (Manufacturing Department II) 3. VOCs Reduction Plan (Manufacturing Department III)	Reduced VOCs leakage of Manufacturing Department I/ Manufacturing Department II/Manufacturing Department III to 0.04% in 2024.	1. Reduce equipment/component for emission leakage of VOCs (Manufacturing Department I 2. Reduce the annual leakage of VOCs (Manufacturing Department II) 3. VOCs Reduction Plan (Manufacturing Department III)
	Zero Wastewater Emissions: Improve waste-water recovery rate by 2% (based on 2021 baseline)	Purchase the new float oil pump	2024 wastewater reclamation volume: 29,565 metric tons	Improve sludge treatment in wastewater pools
	Reduce GHGs Emissions by 1,560 metric tons of CO_2e	Implement 6 energy-saving projects	2024 cumulative energy savings: 4,650,858 kWh; LNG savings: 333,379 M^3; reduce GHGs by 2,897 metric tons of CO_2e	2025 estimated energy savings: 1,234,612 kWh, reducing GHGs by 585 metric tons of CO_2e
	Zero emissions of air pollutants: Greenhouse gas emissions and reduction estimates	1. Monthly greenhouse gas emissions and carbon fee estimates 2. Monthly carbon reduction estimates	1. Estimated carbon fee of NT$33,516,563 2. Electricity consumption and reduction in greenhouse gas emissions (4,359,422 kWh * 0.474 kg CO_2/kWh = 2,066,366 kg/CO_2)	Continuous implementation
	Reduce water discharge by 5,280 metric tons	Continuous monitoring and reclamation of effluents	2024 wastewater water reclamation: 29,565 metric tons	2025 estimated wastewater water reclamation: 24,600 metric tons
Zero pollution	Zero emissions of air pollutants: Reduce the leaked emissions of VOCs	Recover 31,500 kg/year from Manufacturing Department I V-404 VA tank	Reduce VA losses by 31,500 kg	The program was completed in 2024
	Zero air pollution: Replacement of pumps to reduce VOC emissions to the atmosphere	Added 1 new Modifier pump J-220E to the C-line Added 2 new Modifier pumps J-220P and J-220Q to the EF-line	1. Upon replacement of Modifier pumps, the emission coefficient was reduced from 0.00335kg/hour to 0.00008kg/hour, reducing 292.76 kg of VOC emissions to the atmosphere on the basis of 365-day operations 2. Upon replacement of Modifier pumps, the emission coefficient was reduced from 0.00335kg/hour to 0.00008kg/hour. Upon replacement of 2 pumps, a total of 585.52 kg of VOC emissions to the atmosphere were reduced on the basis of 365-day operations per pump	Add 1 new Modifier pump J-220E to the EF line (Manufacturing Department I)

Environmental Expenditures

Our environmental management costs include the cost for environmental management activities, environmental-protection-related personnel expenses, and equipment maintenance costs. In 2024, we actively implemented the reduction of leaked emissions of VOCs, water recycling and reuse, energy conservation and carbon reduction, and emissions reduction. The total amount of environmental expenditures in 2024 decreased by 2.9% over 2023 to about NT$106.18 million. The primary differences are due to a relative decrease in the cost of waste removal in 2024.

Environmental Expenditure Over the Past Three Years (Unit: 10,000)



Note 1: The cost for environmental management activities includes the fees for air pollution control, water pollution prevention, waste disposal, noise pollution prevention, management of toxic and concerned chemical substances, industrial safety improvement, depreciation of fixed assets and others (e.g., cleaning and mowing).

Note 2: Environmental-protection-related personnel expenses include personnel expenses and environmental protection-related training fees.

Note 3: Equipment maintenance cost includes the fees of environmental-related equipment and the fees for equipment maintenance.

4.2 Water Resource Management GRI 2-25, 3-3, SDGs 6

Impact Topics

Water shortages, production disruption due to torrential rain, water pollution, and collection of water consumption fee

2024 Achievements

1. Receiving a B rating from the CDP Water Security Management Assessment.
2. MRT Condensate Water Recycling Improvement and Rainwater Harvesting System with Detention Ponds: 61,980 metric tons/year, saving water by 6.20%
3. Collected 12 metric tons of plastic resin pellets through the Plastic Resin Pellet Collection Program.

2025 Goals

Wastewater treatment system, estimated water conservation with the MRT condensate recovery improvement and retention basic rainwater harvesting system: 50,000 metric tons/year, saving water by 5.06%.

Medium- & Long-Term Goals

Reducing water withdrawal and consumption and improving water quality to enhance water recycling and reuse.

Water Resource Management GRI 303-1:2018, 303-3:2018, 303-4:2018, 303-5:2018 RT-CH-140a.3

Goals and management units

The circular economy is an industrial system designed for recovery and regeneration to replace "end of life" with "recovery" in order to turn waste into resources and thereby achieve waste reduction. By continuously implementing the circular economy, we implement water conservation and drainage reduction through improvement programs to reclaim and recycle valuable water resources for reuse and set the annual water conservation target at "1%". The actual conservation in 2024 was 6.20%. The boundary of water resource and effluent management is the Kaohsiung Plant, with data coverage of 100%.

In 2023, to further strengthen water management, the head of the Kaohsiung plant designated the Technical Department as the responsible unit. They are tasked with reporting to the Board regularly as well as setting a reduction target for water consumption per unit and a reduction target for water recycling rate.

	2024 Achievements	2025 Short-term Goals	2027 Medium-term Goals	2030 Long-term Goals
Unit water consumption	3.48	4	3.9	3.8
Water recovery rate	92.20	90	90	93

Water resource

In terms of water stress distributions, we refer to the water stress by country in the 'Aqueduct Water Risk Atlas' published by the World Resources Institute (WRI). The Company defines an area under water stress as an area in which the water stress situation exceeds 40%, which is an important basis for water management and risk response. After investigation, USI's main source of water withdrawal is the Gaoping River Dike, which falls at the low to medium level, with water stress at 10-20%.

According to the 2023 water resources statistics published in the Water Resources Agency Register Statistical Report, MOEA, the water consumption of Kaohsiung City was 927,279.141 ML, including 349,667.41 ML of water for domestic use and public use, 242,403.883 ML of water for industrial use, and 335,197.848 ML of water for agricultural use. The 2024 total water withdrawal of Kaohsiung Plant was 938.423 ML, accounting for about 0.1% of Kaohsiung City's total water consumption. Kaohsiung Plant withdraws water mainly from tap water supplied by the Pingding Waterworks and Cheng Ching Lake Waterworks for product production, equipment cooling, boiler, domestic use of employees, and other uses. In 2024, due to a decrease in annual production, the water withdrawal decreased by about 31.1 ML to 938.423 ML compare to 2023.

2024 Water Withdrawal, Discharge, and Consumption

GRI 303-3:2018, 303-4:2018, 303-5:2018 | RT-CH-140a.1

Total withdrawal 938.423 ML

Low to medium water stress areas Water stress: 10-20%

- Third-party water - freshwater (≤ 1,000 mg/L TDS): 923.115 ML
- Surface water - Rainwater: 15.308 ML
- Water cart capacity: 0 ML
- No runoff, groundwater, seawater, output water

Note: The intake of third-party water is recorded based on meter readings (flow meter). The intake of rainwater is calculated according to the water resource recovery plan "Detention Ponds and Rainwater Harvesting in Tank Areas." The water cart capacity is based on data from the supplier's water withdrawal records.

Total discharge 280.701 ML

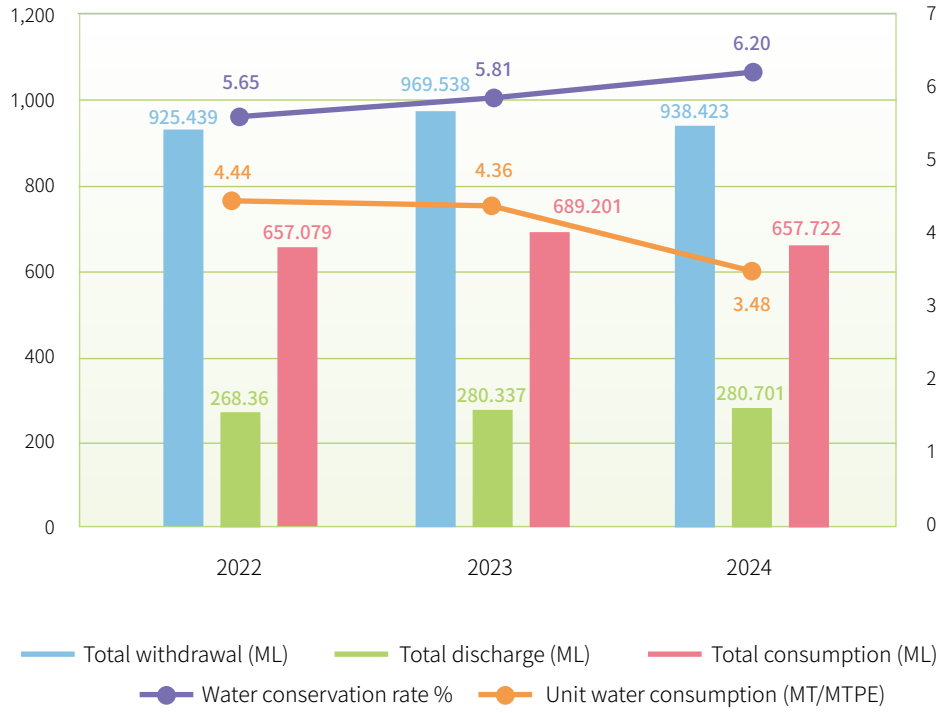
Total NH4 Control Area

- Runoff- fresh water (≦ 1,000mg/L TDS): 280.701ML
- Discharge contains no groundwater, seawater, and third-party water.
- NH4 in 2024H1 and 2024H2 was 1.54 mg/L and 0.80 mg/L, far below the effluent standard (20mg/L).

Note: Discharge is subject to the readings on the effluent meter (flow meter).

Total Consumption = Total Withdrawal – Total Discharge = 657.722ML

Water Status in the Last 3 Years



Water Conservation and Reclamation GRI 303-1:2018

Following the rising water demand, escalating climate change impact, and expanding sustainability pressure, we keep a constant track on water shortages and endeavor to reduce water consumption or enhance water reclamation in response.

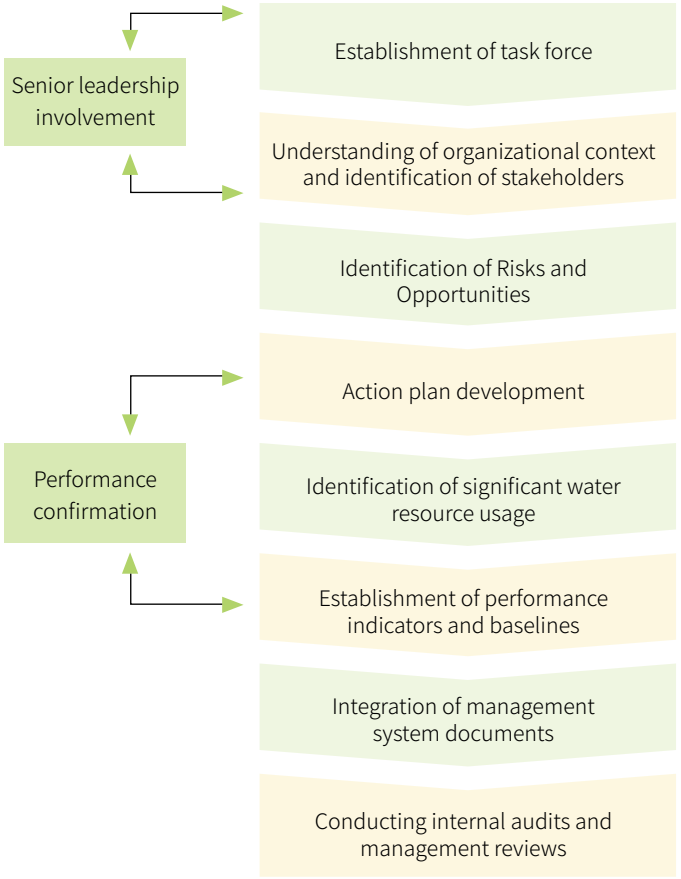
We began to build the water monitoring system in 2020 to keep constant track of the water supply. Based on the drought response measures, apart from cutting unnecessary water consumption, enhancing pipeline and switch tour inspection, and reducing cooling water discharge, we also get support for water in the fire fighting storage tanks, buying water with water trucks, following the government's 3-stage rationing measures, and actively implement various water improvement programs to reduce total water withdrawal each year.

Water reclamation program	Effectiveness
Continuous monitoring and reclamation of effluents	Continuous monitoring of the in-house effluent quality to enhance effluent treatment and response capacity and ensure that effluents comply with the discharge standards. After reclaiming by the system, effluents are treated before being transported to the cooling tower for re-use to reduce tap water consumption and process effluents. Calculation: According to the actual pump reading on-site, the total wastewater recycled in 2024 was 29,565 metric tons.
Detention basin and storm water reclamation channel	Pipelines will be installed from the existing detention basin and storm water reclamation channel to the cooling tower. After filtering by the storm water separator next to the cooling tower, storm water will be re-used by the cooling tower. Calculation: The project was completed in 2017 and started operation in 2018. The plant rainwater collection area is 3,500 m^2, the tank site dike area is 2,300 m^2, Kaohsiung's annual rainfall in 2024 was 2,932.5 cm (Note 2). Based on a reclamation rate of 90% (Note3), the estimated water reclamation in 2024 is about 15,308 metric tons.
MRT Steam Condensate Recovery	Steam condensate is recovered for reuse in the boiler to reduce tap water consumption. The project annual recovery is 17,107MT. Calculation: Steam condensate recovery at 2.4 metric tons/*24 hours/day. The number of workdays is 330 days/year* reclamation rate 90%. The annual recovery is thus 2.4×24×330*90%=17,107 (metric tons/year).

Note: 1. The estimated volume of reclaimed and recycled water in 2024 was 61,980 metric tons; the total water withdrawal was 938,423 metric tons; the volume of reclaimed and recycled water was 6.60% of the total water intake.
2. Annual rainfall data sourced from the "Central Weather Administration, Ministry of Transportation and Communications."
3. MRT Steam Condensate Recovery, detention basin and storm water reclamation channel - Due to possible losses from pumps, pipelines, and rainwater evaporation, the estimated recycling amount is calculated at 90% of the computed value.
4. MRT Steam Condensate Recovery - The time required for actual equipment maintenance or repair, the number of working days in the year is calculated as 90% of the 365 days in the year (based on 330 days).

Water Efficiency Management System GRI 303-1:2018

In 2021 we implemented the ISO 46001:2019 Water Efficiency Management System (Certificate valid from March 17, 2022 to May 17, 2025). By inventorying the current status and ways of water consumption across the plant, through identifying, planning, managing, and improving the risks and opportunities of water with systematic water consumption management, and thereby optimizing water demand management, we effectively achieved the goals of water conservation and discharge reduction to enhance water efficiency and reduce water costs.



In 2024, we enhanced wastewater system management and optimized operation to reduce wastewater discharge and increase wastewater reclamation. The actual volume of recycled water was 29,565 metric tons, and the wastewater recovery rate was 9.53%. (29.565/(29.565+280.701)=9.53%).

Additionally, about 15,308 metric tons of water was reclaimed within the retention basin and rainwater harvesting in the tank area. **The water conservation rate was 6.20%. In 2025, the estimated volume of recycled water was 50,000 metric tons, with an estimated wastewater recovery rate of 5.06%.**

External Verification of Water Recycling Rate

In 2024, Kaohsiung Plant requested the Foundation of Taiwan Industry Service to verify the plant-wide water recovery rate (excluding the amount of recycling in cooling water towers, commonly known as R2) in the previous year, and the recycling rate was 92.2% after the verification (please refer to the Statement of Verification for details), which was better than the industry range of 30~80%.

Effluents Management GRI 303-1:2018

Wastewater from the plant is the main source of effluents from USI. According to KSEPB's effluent runoff discharge permit, effluents that cannot be refused after treatment and comply with the environmental protection laws and regulations can be discharged to the surface water body -- Houjing River. The pollution of Kaohsiung Plant is below 0.00324 %.

Wastewater is transported to the water treatment plant for treatment via wastewater pipelines. The wastewater treatment system includes the pretreatment and primary (physical) treatment. Through trash screening, oil removal, sedimentation, and chemical treatment, and the sludge treatment unit for wastewater solid-liquid separation, effluents meet the drainage quality before discharge.

To reduce the environmental impact of discharge and promote waster recycling and reuse, besides complying with environmental protection laws and regulations, we optimized the functions of the wastewater (sewage) treatment plant in 2020, including adding the sludge concentration tank, improving the bottom sludge removal system of the sedimentary tank, and building the sludge rinsing system for the flotation system to enhance sludge treatment and collection efficiency.

Water Quality Monitoring and Management GRI 303-2:2018, 303-4:2018

Every half year, we hire environmental analysis organizations approved by the Environmental Analysis Laboratory (EAL) to examine water quality of effluents from our plants, including NH4 required for total volume control. Every year, effluent test items required for reporting are well-followed the effluent standard. According to previously amended and promulgated "Effluent Standards", the water quality control of discharge from the petrochemical industry includes 22 items, including 7 general water quality items and 15 specific water quality items. In our 2024 untreated wastewater and effluent quality tests and analysis, effluents met the effluent emission standard. Effluent quality: COD 51.6 mg/L and COD 28.1 mg/L in 2024H1 and 2024H2, respectively.

Results of Water Quality Examination in Last 3 Years

Water Quality Indicator	2022		2023		2024		Effluent Standard (Petrochemistry)
	H1	H2	H1	H2	H1	H2	
SS (mg/L)	8.0	9.7	8.6	14.2	13.8	8.5	30
Grease (mg/L)	9.5	5.7	5.3	4.3	7.8	8.7	10
COD (mg/L)	26.4	19.7	33.5	77.8	51.6	28.1	100
NH4 (mg/L)	0.2	0.63	0.13	0.06	1.54	0.8	20

Prevention and Management of Plastic Resin Pellet Leakage

The US Plastics Industry Association and American Chemistry Council co-promote the Operation Clean Sweep (OCS) campaign dedicated to preventing plastic resin pellets, flakes, and power loss from entering the ocean to cause environmental pollution.

In 2020, we began implementing the measures for prevention and management of plastic resin pellet leakage and awareness education for in-house plastic resin pellet leakage management. In 2023, We performed the on-site walk-through inspection of contractors and comprehensive process area inventory to understand the methods that contractors and employees adopted to clean up and prevent the leakage of plastic resin pellets. We also established new or revised related control documents to ensure the collection of plastic resin pellets, flakes, and powder to prevent them from polluting the environment by rainfall or sewage. In 2024, we recovered a total of 10.4 metric tons of plastic resin pellets across the plant.

Year	Recovery Weight (kg)
2022	11,889.4
2023	11,996.9
2024	10,369.7

Operation management

- Site Inspection and Review
- Enhancing Employee Awareness
- Establishment of Procedure Documents
- Tracking Execution Results

Workplace

- Leveling of Site Ground
- Setting Up Barriers
- Providing Employees with Cleaning Equipment

Personnel Training

- Education/training
- Enhancing Colleague Compliance with Operating Procedures
- Workplace Advocacy

Management Measures

- Unloading Management
- Transportation Packaging Management
- Area Cleaning
- Collection Management

4.3 Air Pollution Control GRI 2-25, 3-3, SDG 11

Impact Topics

Air pollution

2024 Achievements

1. Reduced VOCs leakage of Manufacturing Department I/Manufacturing Department II/Manufacturing Department III to 0.04%.
2. A. Estimated carbon fee of NT$33,516,563.
3. B. Electricity consumption and reduction in greenhouse gas emissions (4,359,422 kWh * 0.474 kg CO_2/kWh = 2,066,366 kg/CO_2)
4. Reduce VA losses by 31,500 kg
5. Upon replacement of 2 Modifier pumps, a total of 585.52 kg of VOC emissions to the atmosphere were reduced on the basis of 365-day operations per pump

2025 Goals

1. Zero air pollution: Equipment/component VOC leakage <0.5%
2. Zero air pollution: Replacement of pumps to reduce VOC emissions to the atmosphere

Medium- & Long-Term Goals

1. Implement VOCs reduction programs
2. Reduction of equipment/component leakage
3. Reduction of pollutant emissions

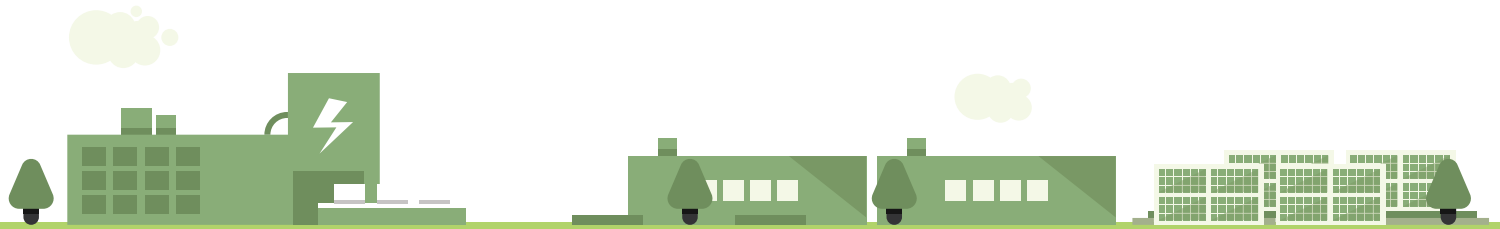
Management Approach Description

USI is located in Kaohsiung City within the Gaoping Total Volume Control Area and the level 3 control area of PM_{10}, $PM_{2.5}$, and O_3. Therefore, air quality improvement has always been our prime target. To fulfill our corporate social responsibility, we spare no effort in implementing environmental improvement, hoping to achieve the “zero pollution and zero emission” goals in the five zero’s policy and contribute to air quality improvement.

Management Targets

We constantly promote pollution reduction, replace fuels with clean energy, and effectively collect exhaust to control equipment for proper treatment. We also cooperate with the total volume control and reduction of the Gaoping River to achieve the goals of zero pollution and zero emissions. In 2024, 3 new pumps were added, including 1. addition of 1 new Modifier pump J-220E to the C-line, and 2. addition of 2 new Modifier pumps J-220P and J-220Q to the EF-line.

In addition, a V-404 VA tank condensate recovery project was implemented in the Manufacturing Department I, recovering 31,500 kg of VA/year, and reducing VA losses to the atmosphere.



Management Approach

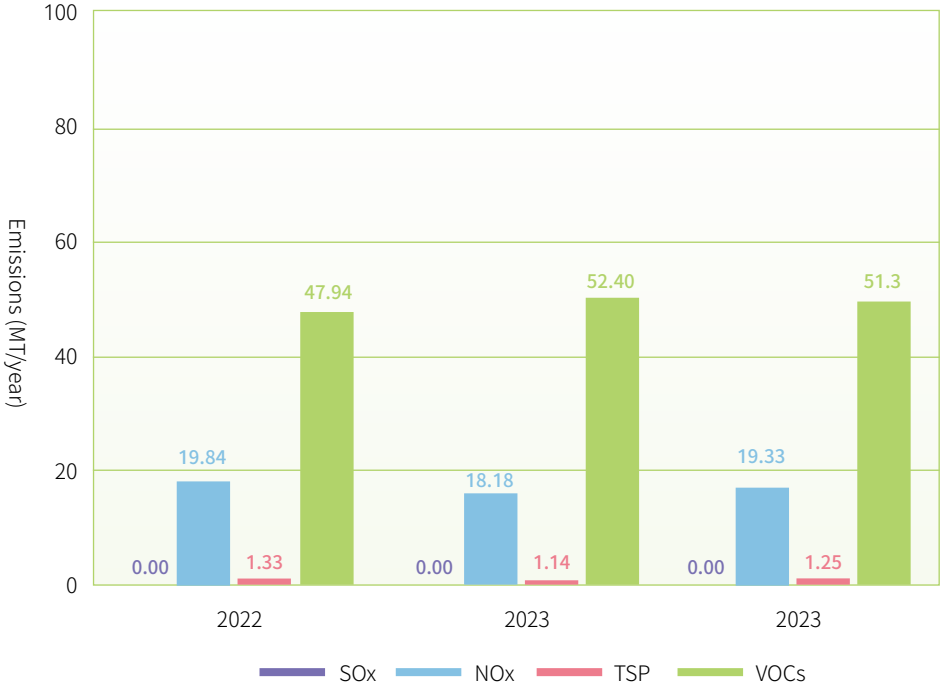
In addition to regularly testing and reporting air pollutants, we have planned the following reduction programs to effectively reduce air pollutants:

VOCs Reduction	We implemented the equipment/component management plan at Kaohsiung Plant. Besides establishing SOPs and creating master files for equipment/component management, outsourcing quarterly external inspection, and purchasing monitoring and measuring equipment and gauges and performing periodic instrument calibration, all plants also enhance equipment/component self-management, periodically review and follow up the inspection and service progress, run equipment maintenance and repair re-inspection, identify and improve equipment/component with a high leakage rate, reduce the quantity of equipment/component or replace with equipment/component with a lower leakage rate or leakage resistance, and enhance the inspection of equipment/component with a high leakage rate and more motions. In 2024, we continued to implement the management of the leaked emissions of VOCs for equipment/components. The Environmental Protection Section of the plant performed self-imposed equipment/component spot checks on 1,850 points and found leakage at 8 points. Improvement was completed immediately. Programs in 2024: a. Added 1 new Modifier pump J-220E to the C-line b. Added 2 new Modifier pumps J-220P and J-220Q to the EF-line The above pump replacements were completed in 2024.
Effective Treatment of VOCs	The RTO treats high-intensity VOCs in-house. In 2024, we commissioned an outsourced inspection. The results showed that the content of non-methane hydrocarbons (NMHC) before and after treatment was 783 ppm and 11 ppm respectively, with a removal rate of 98.6 %, better than the regulatory requirement of 95% or 150ppm. In 2024, we continued the equipment operation and maintenance training, management system establishment, and education and training.
Reduction of Pollutant Emissions	In 2024, it was planned to install a VA storage tank condenser and a finned condenser. By increasing the contact surface area, the condensation efficiency will be improved to increase VA recovery and reduce pollution. Programs in 2024: Recover 31.5 metric tons/year from Manufacturing Department I V-404 VA tank The above VA recovery was completed in 2024.
Emergency Response to Air Quality Deterioration	In 2020-2024, we implemented the air quality deterioration response drill to enhance the response ability of employees and review the opportunity for improvement after the drill. We also joined the LINE group of the Environmental Protection Bureau to keep updated with the air quality condition in Kaohsiung City at any time and take counteractions immediately.
Managing Hazardous Air Pollutants	In 2024, test of hazardous air pollutants (HAPs), the intensity of all other tested items was below 200ppb, except for xylene at 400ppb.

Management Performance GRI 305-7 RT-CH-120a.1

Major air pollutants emitted by USI include sulfur oxides (SOx), nitrogen oxides (NOx), total suspended particulate (TSP), and volatile organic compounds (VOCs). Fuel burning of the steam boiler is the main source of SOx, NOx and TSP detected in the plant, while RTO, flares, storage tanks, and equipment components are the main sources of VOCs emissions. Over the years, we hired EAL-accredited environmental engineering companies to test USI pipeline emissions, and the emission test results have been consistently well below the EPA emission standards announced by the Ministry of Environment.

Air Pollutant Emissions in Last 3 Years



Note: Air pollutant volume was reported based on the air pollution control fee.

Testing Results of Boiler Discharge Pipes in the Last 3 Years

Pollutant	2022	2023	2024	Emission Standard (announced 2020)
SOx (ppm)	ND	ND	ND	50
NOx (ppm)	88.9	92.6	78.1	100

Note 1: The results of VOCs emissions comply with the statutory requirements over the years, with a reduction rate over 95%.
Note 2: ND means not detected.

Testing Results of the RTO Discharge Pipes in the Last 3 Years

Pollutant	2022	2023	2024	Emission Standard
SOx (ppm)	ND	ND	ND	100
NOx (ppm)	2	1.4	1.0	150
TSP (mg/NM^3)	2	-	-	100
VOCs (ppm)	56	55	11	Reduction rate>95% or<150ppm

Note: The results of VOCs emissions comply with the statutory requirements over the years, with a reduction rate over 97%.

4.4 Waste Management GRI 2-25, 3-3, SDGs 11, 12

Impact Topics

Resource recycling, waste treatment

2024 Achievements

Random inspection was conducted on 11 waste removal manufacturers and 9 waste disposal manufacturers, and the inspection results were all in line with relevant laws and regulations.

2025 Goals

1. Continue to implement the waste audit and management systems.
2. Promote the reduction and recycling of packaging materials.

Medium- & Long-Term Goals

1. Strengthen the waste audit and management systems.
2. Promote waste reduction.

Management Approach Description

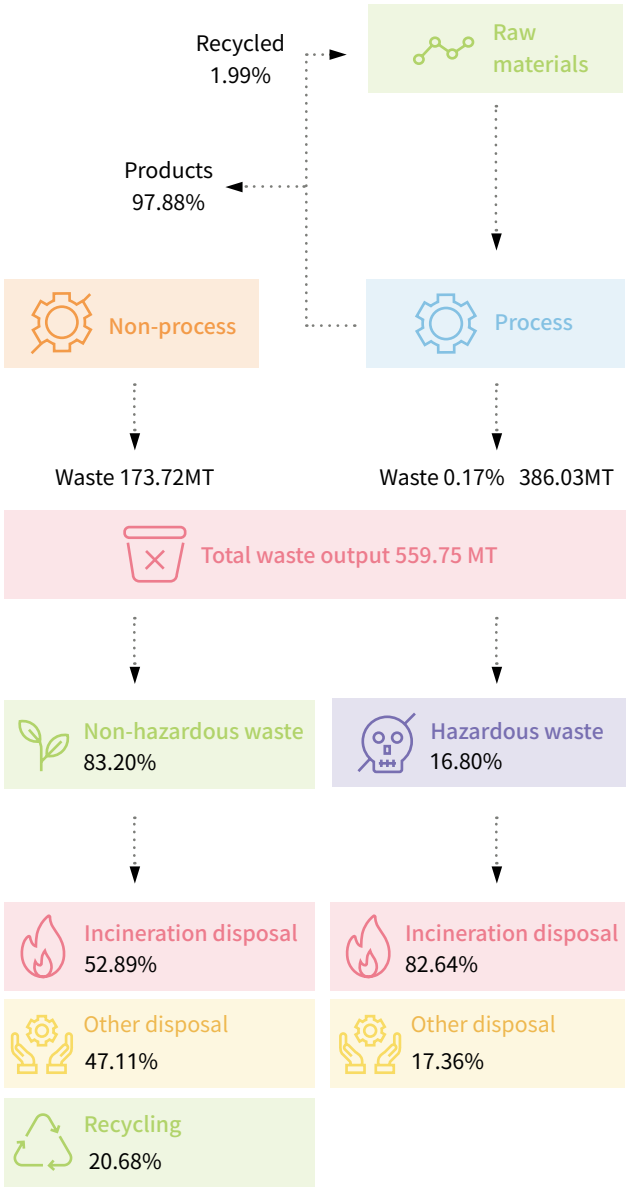
For proper waste disposal, we hire licensed contractors to dispose of such waste according to laws and regulations related to waste disposal. Apart from reviewing the qualifications of contractors and requesting them to provide support documents for proper waste disposal on a regular basis, we perform onsite inspections on contractors to verify their waste disposal performance, in order to perform our supervision obligation.

Management Approach

We produce mostly general industrial waste and dispose of such waste by incineration, physical treatment and cleaning. In recent years, the QC lab has been constantly assessed the reviewed the methods for analyzing hazardous waste management to reduce solvent consumption and effectively reduce the output of hazardous industrial waste. In addition, after washing and processing by qualified contractors, waste plastic containers are crushed and sliced for recycling to achieve the circular economy of resources.

We continue to conduct comprehensive review of waste legitimacy on an annual basis, as well as compare and proofread the monthly report data to facilitate the accurate control of waste information. Additionally, industrial waste is sorted by the property of major composition before storing in the storage site, and the storage sites, containers, and facilities are properly labeled. We also built covered waste storage sites equipped with blocking ditches to prevent groundwater and water from runoff contaminations. In 2024, we audited waste storage sites every month, and all sites complied with the related regulations.

Waste Management Process GRI 306-1:2020 RT-CH-150a.1



Usage of waste output/resources

- Waste collection and classification management
- Regular online reporting of waste output and storage conditions
- Monthly regular inspection of storage areas to confirm compliance with regulations
- Source management review to reduce waste generation
- Promotion of waste reduction schemes

Waste transportation management

- Online declaration of waste weight cleared from the factory
- Real-time tracking system for transportation equipment (GPS positioning)
- Commissioning of joint disposal control delivery slips for record keeping
- Management of waste disposal vendors audits

Waste disposal management / resource utilization

- Online declaration by disposal vendors of the weight of waste received
- Proper cleanup record keeping for reference
- Management of disposal vendor audits
- Compilation of records for resource utilization

Waste Disposal Contractors Audit and Management GRI 306-2:2020

We only hire licensed waste disposal contractors to clean up and dispose of waste by law. Since 2021, in accordance with the "Regulations Governing Determination of Reasonable Due Care Obligation of Enterprises Commissioning Waste Clearance" (amended on February 23, 2021), 11 waste cleanup contractors and 9 waste disposal contractors with the items listed in Annex 2 of the regulations were inspected in 2024. The inspections aimed to understand the storage, removal, disposal, and recycling of waste of disposal contractors, and no nonconformity was found.

Basic document review

Environmental Protection Contractor Permit
ISO management system

Waste storage/disposal

Degree of legal compliance
Compliance with disposal methods and contractors/receipts

Waste final disposal

Verification of final disposal methods and flow
Compliance with final disposal methods and contractors/receipts

Management

GRI 306-3:2020, 306-4:2020, 306-5:2020

We are also committed to waste sorting to categorize, collect, and manage recyclable resources. Apart from weighing and recording waste before shipping out of the plant, we hire licensed contractors to recycle waste metal. In 2024, we recovered 173.13 metric tons of waste metal, and 0.59 metric tons of paper waste was disposed of by nearby resource recycling contractors. The recycling rate for non-hazardous waste reached 48.22%, an increase of 23.95% from 2023. Although the amounts of recovered waste paper decreased by 0.9 metric tons in 2024 compared to 2023, the amount of plastic waste and waste metal recycled increased by 10.96 metric tons and 105.23 metric tons compared to 2023. Additionally, in 2024, the total waste production was 559.75 metric tons. No spill of oils, fuels, waste, or chemical substances was reported in 2024.

Waste Production, Transfer, and Disposal in the Last 3 Years

Waste		Disposal/Recycling	2022	2023	2024
Hazardous waste	Toxic Industrial Waste Direct disposal	Incineration (including nonrecyclable waste)	47.5	60.46	77.71
		Other treatment	15.85	17.76	16.32
Total weight of hazardous waste			63.35	78.22	94.03
Non-hazardous waste	General Industrial Waste Direct disposal	Incineration (including nonrecyclable waste)	248.95	275.91	177.72
		Other treatment	70.16	65.06	63.44
	Total weight of non-hazardous waste		319.11	340.97	241.16
	Recycling	Recycling for reuse	98.20	109.27	224.56
		Resource recycling rate (%)	20.40	24.27	48.22
Total weight of non-hazardous waste			417.31	450.24	465.72
Total weight of waste (metric tons)			480.66	528.46	559.75

Note 1: Data regarding the production, transfer, and disposal of waste were extracted from the Waste Report and Management Information System of the Ministry of Environment. Data of recycling were extracted from in-house records and accounting documents.

Note 2: Waste is transported by licensed cleanup contractors to the qualified disposal contractors for disposal. Waste for recycling was recycled for reuse outside of the plant. Waste for recycling was recycled for reuse outside of the plant.

Waste reduction programs

Reinforcement of Awareness Education

Reinforce the awareness education of the need for waste sorting and labeling to increase waste recovery volume and reduce the disposal volume of general waste.

Clean Production

Strengthen process management to minimize end-of-pipe treatment and reduce the output of sludge and other industrial waste.

Hazardous Waste Reduction Management

1. After washing and processing by qualified contractors, waste plastic containers are crushed and sliced for recycling.
2. In analysis method improvement, the QC lab skipped the extraction process in inhibitor analysis to stop using solvents. As a result, solvent consumption reduced significantly. In addition, solvents are recovered for reuse in washing to reduce the consumption of washing solvents. In the future, we will continue to assess and review the analysis methods to effectively promote the reduction of hazardous waste.

4.5 Climate Change and Energy Management GRI 2-25, 3-3, SDGs 7, 13

Impact Topics

Green power, carbon emission reduction

2024 Achievements

1. Annual electricity savings rate: 1.88% (Average electricity savings rate from 2015 to 2024: 1.45%).
2. A total of six energy-saving and carbon reduction projects were implemented, achieving a total carbon reduction of 2,897 metric tons CO_2e.
3. Completing GHG inventory and assurance for subsidiaries in the consolidated statements in advance.
4. The cumulative grid-connected capacity of the invested solar energy field has reached 8.6 MW.

2025 Goals

1. Annual electricity savings rate: 1.51%.
2. Four energy conservation and carbon reduction programs are planned for 2025, with an estimated carbon reduction of 585 metric tons of CO_2e.
3. Install solar panels and utilize about 3.698 million kWh of solar green power in accordance with the law.

Medium- & Long-Term Goals

1. Build AI intelligent management platform to provide recommendations on energy-saving operations.
2. Continuously implement energy-saving planning to enhance energy efficiency, and save 1.5% of electricity per year.
3. Continuous green power planning and implementation.

Management Performance

Climate Change: Addressing climate change brings the opportunities for sustainable development

TCFD climate change risk management

Climate change poses a global challenge. In alignment with international efforts and the pursuit of sustainable development, Taiwan promulgated the amended Climate Change Response Act - formerly the Greenhouse Gas Reduction and Management Act on February 15, 2023. In response to the impacts of climate change, carbon reduction has become a universal goal. In early 2022, USIG established the carbon reduction target for 2030 to “reduce carbon emissions by 27% by 2030 compared to 2017 levels”. In 2023, the Company further set the long-term corporate goal of achieving “carbon neutrality by 2050”.

In order to achieve the corporate sustainability vision, USIG has actively implemented corresponding response strategies and management mechanisms with practical actions. The group's domestic plants continue to implement ISO 14064-1 GHG Inventory and Verification, and plan and implement carbon reduction programs. The group also actively develops external renewable energy sites. By the end of 2024, the cumulative grid-connected capacity of the invested solar energy field has reached 8.6 MW, which will generate about 10.73 million KWH of green electricity every year.

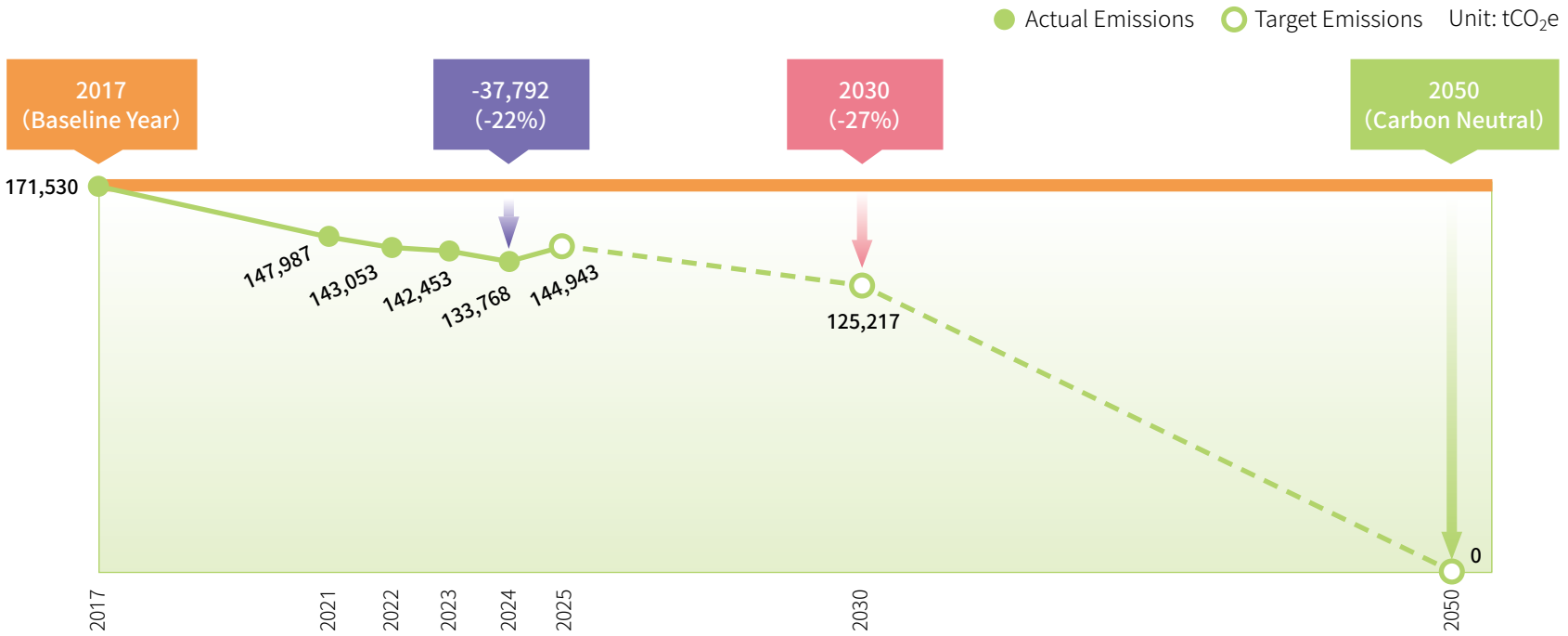
We plan our carbon reduction pathway according to the group’s 2030 carbon reduction target. Our 2024 GHG reduction already reached 20.3% over the baseline year (2017). In the future, we will implement energy conservation and carbon reduction programs more actively. The medium-term carbon reduction strategy will proceed towards the transition to low-carbon energy, enhancement of energy efficiency, intelligent monitoring, and the setup and use of renewable energy. The long-term carbon reduction strategy will continuously focus on low-carbon fuels, carbon capture, reuse technology, and negative carbon emissions technology, to implement the carbon neutrality goals and promote sustainable development.

USI 2030 Carbon Reduction Pathway Planning

As indirect GHG emissions from purchased electricity accounts for over 80% at USI, green power deployment is an important strategy:

- **Solar PV:** Installed capacity reached 8.6MW in 2024 and will increase to 20MW in 2027.
- **Geothermal:** We have selected sites in Taitung, and terminal survey is in progress.
- **Offshore wind power:** We have formed CURE (Chem Union Renewable Energy Corporation) with other petrochemical companies to discuss electricity purchase with wind power developers.

GHG emissions



2024 Target Emissions (10,000 tons)	2024 Actual Emissions (10,000 tons)	2024 Achievement Rate	2025 Target Emissions (10,000 tons)
14.08	13.38	105 %	14.49

Note 1: Achievement Rate = Target Emissions for 2024 / Actual Emissions for 2024
Note 2: The carbon reduction contribution (TPC) from purchased electricity was not included in the carbon reduction pathway planning.
Note 3: As full plant operation started in 2017 after the completion of new production lines, we set 2017 the baseline year for energy consumption and total GHG emissions.
Note 4: The data of TPCS is from Scopes 1 and 2 of Kaohsiung Plant.

In response to the global emphasis on environmental (E), social (S), and governance (G) issues, the Company follows the "Sustainability Development Roadmap for TWSE/TPEx Listed Companies" issued by the Financial Supervisory Commission to progressively disclose greenhouse gas inventory and assurance information, and to build internal GHG inventory capabilities. The Company has completed GHG inventory and assurance for both parent and subsidiaries under the consolidated financial statements. Each year, specific measures are reported and reviewed, with directors providing recommendations.

In addition to continuously enhancing corporate governance effectiveness, the Company is prudently planning and implementing measures to achieve carbon reduction targets and develop green power strategies. The use of AI technologies improves management efficiency, helping reduce corporate risks and issues, aiming to meet international standards and realize long-term corporate sustainability goals.

Climate change management framework

Category	Management strategy and action
Governance	· ESG Committee: The Board of Directors oversees the USI's climate change management initiatives. The ESG Committee under the Board is the highest governance body of climate change management and chaired by independent directors. It reports climate change planning, implementation and performance to the Board every year. · Operations Management Meeting: Chaired by the Board chairman, it plans and implements material policies for energy conservation and carbon reduction and reports the results from time to time. · Division of Equipment Preventive Maintenance and Environmental Risk Control Quarterly Meeting: As the highest governance body of the Group's energy management, it reports the planning and progress to the Group's chairman each quarter and makes decisions on energy management. · Group Green Power Team: As the Group's responsible unit for green power promotion, it reports the status of and future plans for green power development to the chairman of the Board. · Other functional committees under the Board, such as the Audit Committee, report the identification results of the Risk Management Group to the Board. The Risk Management Group identifies risks arising from global climate change, energy and related fiscal issues on an annual basis.
Strategy	· Identification of risks and opportunities: Identify material risks and opportunities based on their likelihood and impact. · Assessment of potential financial impacts: Assess the potential financial impacts of identified material risks and opportunities. · Scenario analysis: Set plans to achieve net zero emissions in different scenarios.
Risk Management	· Introduction of TCFD: Identify risks and opportunities based on the TCFD-recommended framework, communicate with all responsible units, and confirm by senior management. · Report of identification results: Included in the annual risk assessment. Each year, personnel designated by the president reports the control measures and management performance to the Audit Committee and Board.
Indicators and Targets	· Group carbon reduction target: 27% less than 2017 (baseline year) by 2030 and achieve carbon neutrality by 2050. · Climate change countermeasures: Equipment replacement, installation of renewable energy equipment, optimization of production schedules, air conditioning planning of buildings, energy management systems, and extreme climate emergency response plans. · GHG emissions disclosures: Disclose the data of Scopes 1, 2 and 3 emissions in the ESG report every year and review the causes for changes periodically.

Note: Please refer to 2.3 Risk Management for the details of the risk management process and mechanism.

Identification of Climate Risks and Opportunities

In response to the intensifying global climate change, the Company continues to adopt the TCFD framework to assess risks associated with extreme weather events and identify emerging business opportunities. Referring to the Taiwan Climate Change Estimation Information and Adaptation Knowledge Platform (TCCIP) and the National Center for Disaster Prevention and Relief Technology (NCDPRT), 3 physical risk issues are listed for the scenarios of RCP 8.5, estimating the temperature increase, rainfall, flooding, and drought in 2016-2035; and 9 transformation risks and 12 opportunity issues are listed based on the group's strategy, industry characteristics, and the nation's self-defined expected contribution target (INDC) and TCFD indicators, making a total of 24 potential risk and opportunity issues.

In 2023, a questionnaire survey was conducted among the ESG Committee and senior unit executives to assess the relevance of each risk to the Company's operations and the timing of its possible impact, as well as the development and implementability of each opportunity. 14 questionnaires were returned, which were statistically analyzed by the team to identify 12 significant climate issues (1 physical risk item, 5 transformation risk items, and 6 opportunity items).

USI assessed the potential financial impacts of the 12 significant risks and opportunities and formulated a response strategy and management mechanism to understand the possible impacts of climate change in various aspects, reduce the possible operational impacts of extreme weather and establish a resilient climate change culture.

Climate-related risk items are categorized into three time horizons based on the expected time of impact: short-term (< 3 years), medium-term (3–5 years), and long-term (> 5 years). Climate-related opportunities are categorized into five levels based on their potential impact on company development and technical feasibility, as detailed in the following table:

Type	Item	Time Horizon
Physical Risks	Aridity	Short Term (< 3 years)
Transformation Risks	Government regulation or oversight - levy of water consumption charges	Short Term (< 3 years)
	Carbon fee	Short Term (< 3 years)
	Renewable Energy Regulations - Large Consumers Clause Risks	Short Term (< 3 years)
	Low Carbon Technology Transition	Short Term (< 3 years)
	Rising Raw Material Prices	Short Term (< 3 years)

Type	Item	Development Potential	Technical Feasibility
Opportunities	Highly efficient production	Promising and aligned with existing company policy	Under expansion
	Recycling - Circular Economy	Promising and aligned with existing company policy	Under expansion
	Reduction of water use and water consumption	Promising and aligned with existing company policy	Mature
	Use of low-carbon energy	Promising and aligned with existing company policy	Mature
	Developing Low Carbon Goods and Services - Investing in Renewable Energy Markets	Promising and aligned with existing company policy	Under expansion
	Development of new products and R&D and innovation of services - Research and Development of Low Carbon Energy Saving Products	Promising and aligned with existing company policy	Under expansion

Potential Financial Impact of Risks and Response Measures GRI 201-2

Climate change issue	Type	Risks and opportunities item	Potential financial impact	Strategy and response of the Company
Aridity	Physical risk / Chronic	1. Based on the base period of 1986-2005, it is estimated that the recent climate conditions of the USI Kaohsiung Plant (2016-2035) will have a maximum number of consecutive days without rainfall of 58 days per year, which may lead to water shortage or drought. 2. In response to the abnormal climate, the plant will limit water or lack of water, and the production line will be reduced or completely shut down in serious cases.	Increased cost of operations In case of water deficiency, the Company will buy water trucks. If the situation is severe, the Company will reduce production line output or suspend all productions. The water purchasing cost is expected to rise by NT$0.1 million every day. If it is necessary to stop a single production line, the loss will reach some NT$2.50 million per day, and given a comprehensive business suspension, the loss will exceed NT$10 million per day.	USI has established an AI water monitoring system since 2020 to keep an eye on water supply. In addition to stopping non-essential water use, strengthening inspection of pipelines and switches, and reducing cooling water discharge, there are also fire tanks to store water buffer, water trucks to buy water, and actively implement various water improvement programs to reduce the total water withdrawal year by year.
Government regulation or oversight - levy of water consumption charges	Transition risk / Policy and law	The Water Resources Administration of the Ministry of Econo-mic Affairs promulgated the "Measures on Water Consumption Charge" in January 2023 which came into effect on February 1, 2023. A "water consumption charge" of NT$3 per kilowatt-hour will be levied on heavy water users whose monthly water consumption exceeds 9,000 kilowatt-hour during the dry season (January to April, November to December). However, if the recovery rate meets the announced standard, the rate can be reduced to NT$2 or NT$1.	Increased cost of operations The water consumption fee paid in from November 2023 to April 2024 was NT$[544,000].	1. Promote ISO 46001 water efficiency management systems. 2. Improve the wastewater recycling system and strengthen the operation management to increase the amount of recycled water.
Carbon fee	Transition risk / Policy and law	In August 2024, the Ministry of Environment issued the "Regulations Governing the Collection of Carbon Fees and Other Three Sub-regulations", which will introduce a carbon fee from 2025 onwards for large carbon emitters whose annual emissions exceed 25,000 tons.	The early input cost is high, the later carbon emissions are low, and the operating cost is reduced Based on the USI's estimated carbon emissions for 2024, assuming a carbon fee of NT$300 per tonne, the estimated carbon fee would amount to NT$33.52 million.	1. USI introduced internal carbon pricing in 2024, and used shadow pricing to incorporate carbon costs into investment appraisals to enhance the execution opportunities of carbon reduction projects. 2. Set up an energy management system and analyse the figures for room for improvement. 3. Rooftop solar panel systems for self-consumption are being installed and are scheduled for completion in 2026.
Renewable Energy Regulations - Large consumers clause risks	Transition risk / Policy and law	1. The Ministry of Economic Affairs (MOEA) implemented the "Regulations on the Installation of Renewable Energy Power Generation Facilities for Electricity Consumers with Contracted Capacities Above a Certain Level" in 2021, which requires that large-scale users with contracted capacity of 5,000 kW or more must install renewable energy facilities with a contracted capacity of 10% of the total contracted capacity by 2025. 2. In 2025, the Ministry of Economic Affairs announced the energy saving targets for large power users from 2025 to 2028, with the average annual energy saving target remaining at 1% for contracted capacity of 801-10,000 kilowatts, and increasing to 1.5% for capacity above 10,000 kilowatts. USI's contracted electricity consumption exceeds 10,000 kilowatts and is subject to a 1.5% energy saving target.	Increased cost of operations USI owns 100% of the shares of USI Green Energy Corporation with a capital of NT$366 million. USI Green Energy Corporation will continue to develop the plant with a target of completing the installation of a 20MW plant in 2027, and will continue to develop the plant in the future. In April 2024, TPC increased tariff by 7%. However, the electricity consumption decreased by 7.53% due to more downtime. The tariff for 2024 increased by 2.61% over the previous year.	USI established USI Green Energy Corporation to actively find an appropriate site and implement the green power development plan. In 2024, the accumulated capacity of solar photovoltaic installations reached 8.6 MW, generating approximately 10.73 million kWh of green electricity per year.

Climate change issue	Type	Risks and opportunities item	Potential financial impact	Strategy and response of the Company
Low carbon technology transition	Transition risk / Energy, technology	Investing in the development of low-carbon technologies such as energy transformation, efficiency enhancement and fuel substitution for the purpose of carbon reduction has led to an increase in the cost of technology investment by enterprises	Higher capital expenditure and lower operating costs In 2024, the Company implemented a total of six energy-saving and carbon-reduction projects, with a total investment of NT$8.183 million, achieving electricity savings of 4,650,858 kWh and a reduction of 333,379 cubic meters of LNG consumption. The quantified benefit amounts to NT$21.44 million per year.	The Company continues to plan energy-saving and carbon-reduction measures, including equipment upgrades and improvements in energy efficiency.
Rising raw material prices	Transition risk / Market	In the future, under the consideration of carbon tax, the cost of raw materials will be added to the cost of carbon emission, and the price will increase.	Increased cost of operations Ethylene is the major raw material for USI's products. To diversify import sources of ethylene, USI invested nearly NT$8 billion and NT$906 million in Gulei and the ethylene storage tank project of the Kaohsiung Intercontinental Dock, respectively.	1. The Company will accelerate the schedule for AI introduction, improve the efficiency and reduce the loss from specification change of raw materials. 2. Carried out chiller system renewal and related improvement projects to enhance the recovery rate of the original vinyl acetate condenser and increase the recovery rate of raw materials. 3. Implementation of ISCC Certification for Bio-Ethylene 4. The 2024 feedstock recovery rate of 14.4 % was about NT$757 million.
Highly efficient production	Opportunity / Resource efficiency	Enhance overall production efficiency and reduce energy consumption through production tools such as AI intelligent production, industrial motors, and automatic packaging.	Higher capital expenditure and lower operating costs In recent years, total investment in various AI projects has amounted to approximately NT$30 million.	Implementation of various efficiency improvement and AI projects includes construction of the DCS + field data system, real-time vibration condition monitoring and development for high-pressure reactors, AI-based quality prediction, black smoke detection system, digital graphic and text management system, white smoke and open flame recognition system, and an energy dashboard system, totaling six initiatives.
Recycling - Circular economy	Opportunity / Resource efficiency	Based on the three principles of circular economy (3Rs): Reduce, Reuse and Recycle. Reduce the cost of waste disposal, or the amount of raw materials used.	Higher capital expenditure and lower operating expenditure The cost of wax recovery equipment was NT$776,574. In 2024, the wax recovery generated a profit of approximately NT$36,000.	1. Wax processing for reuse. 2. USI cooperates with the team of University of Taiwan and National Taiwan University of Science and Technology to carry out the industry-academia co-operation project of virtual-reality integration technology development, applying AI technology to carry out quality prediction, reduce the generation of second-grade materials, and enhance the utilization rate of raw materials.

Climate change issue	Type	Risks and opportunities item	Potential financial impact	Strategy and response of the Company
Reduction of water use and water consumption	Opportunity / Resource efficiency	Water is an irreplaceable resource in the manufacturing process. Reducing plant water leakage and increasing the proportion of water recycling will save operating costs and enhance the resilience of the plant.	Higher capital expenditure and lower operating expenditure 1. Invested about NT$16 million in a continuous wastewater monitoring system. 2. Invested about NT$1.2 million in detention ponds and tank area rainwater recycling. 3. Invested NT$1.6 million in process improvement for steam condensate recovery with an annual recovery rate of 17,500 metric tons. 4. Improvement of process operations in 2024 will result in steam reduction and water savings of 61,980 tonnes/year, saving approximately NT$743,760. 5. With 29,565 metric tonnes of water recovered in 2024, the savings would be NT$354,780 based on a NT$12/kWh tap water rate.	1. Investments in wastewater treatment systems, MRT condensate reclamation improvements and stormwater reclamation systems in retention ponds. 2. Improvements in process equipment and operation have resulted in vapour reduction. 3. Continuously develop reduction plans for water consumption.
Use of low-carbon energy	Opportunity / Resilience, energy source	Promote coal-to-gas conversion and increase the use of renewable energy to reduce carbon costs and lower the carbon footprint of products.	Higher Operating Costs and lower Carbon Fees Project Inputs Carbon Reduction, Costs, Benefits In 2024, investments in equipment and projects totaled NT$8.183 million, resulting in a carbon reduction of 2,897 tons. Based on a carbon fee of NT$300 per ton, this equates to a cost reduction of approximately NT$869,000.	1. Developing self-built solar farms. 2. Natural gas is preferred as the source of steam supply. 3. To be aware of and participate in the renewable electricity market.
Developing Low Carbon Goods and Services - Investing in Renewable Energy Markets	Opportunities / Products and Services, Resilience	Invest in renewable energy development and power purchase and sale platforms, and lower the threshold for acquiring green power.	Higher capital expenditures and higher revenues 1. USI holds 100% of the shares of USI Green Energy Corporation, which has a capital of NT$366 million. 2. USI owns 33.3% of the shares of Chemical Union Corporation, which has a capital of NT$30 million. 3. The 2024 renewable energy installations amounted to approximately NT$59.2 million, with renewable energy electricity sales generating around NT$45.16 million in revenue.	1. USI established USI Green Energy Corporation to actively find an appropriate site and implement the green power development plan: · Photovoltaic: Cumulative installed capacity reached 8.6 MW in 2024, generating approximately 10.73 million kWh of green electricity per year. · Geothermal: The site is located in Taitung and is undergoing exploration. 2. USI formed Chemical Union Corporation with the petrochemical industry and negotiated with wind power developers for the purchase of electricity.
Development of new products and R&D and innovation of services - Research and Development of Low Carbon Energy Saving Products	Opportunity / Products and services	R&D is geared towards the development of circular economy, low-carbon and energy-saving products, and technological investment is made from the perspective of the complete life cycle of products and services to develop low-carbon products.	Higher R&D expenses and higher revenue USI's transformation products include the CBC sterilized water bottle, water filter pitcher, and USii liquid insulation film, with estimated short-term revenue of approximately NT$100 million, and projected to exceed NT$500 million by 2028.	Development of new products to actively transform and penetrate the B2C market includes: 1. ISO 14021 certified international recycled products. 2. ACIN240 Energy-Saving Thermal Insulation Coating. 3. Halogen-free eco-friendly flame retardants

Promote group internal carbon pricing

On August 29, 2024, the government announced the implementation of three sub-laws related to carbon fees, followed by the publication of the official carbon fee rate on October 21. Starting in 2025, emissions will be formally included in carbon fee calculations, marking the beginning of a carbon-pricing era.

To proactively align with governmental policies, address climate change, and mitigate carbon-related risks, USI introduced an internal carbon pricing mechanism in 2024. The initial internal carbon price was set at NT$300 per metric ton, based on the domestic carbon fee benchmark, with plans for periodic reviews and phased adjustments. This mechanism aims to integrate carbon costs into corporate decision-making and investment evaluation processes, enabling the Company to assess the operational impact of emissions, accelerate the implementation of reduction measures, and stimulate low-carbon investments.

In July 2024, the Group conducted two training sessions to educate relevant departments on the concept and application of internal carbon pricing, supporting swift implementation across all sites. In September, a general training on carbon-related knowledge was held to engage employees of the Group and raise group-wide awareness and expertise in carbon reduction, fostering collective efforts toward achieving emission reduction targets of the Group.

The Company continues to invest in innovative materials and products to reduce the impact of climate change. For details, please refer to 3.1 Technology R&D

TNFD (The Taskforce on Nature-related Financial Disclosures)

USI recognizes that conserving biodiversity is critical to the stability of global ecosystems and to long-term human well-being. We therefore take proactive actions to reduce the impacts of our operations on the natural environment.

We regularly use biodiversity-risk assessment tools to examine our dependencies and impacts on nature. Assessment with WWF's Biodiversity Risk Filter indicated that our operations fall into a higher-risk category under the "Pollution" theme. In response, USI follows the TNFD mitigation hierarchy, prioritizing avoid and minimize measures: avoiding siting or operating near areas of national or global biodiversity importance; incorporating environmental risk controls into design and operations; and minimizing pollutant emissions by strengthening emission-control and monitoring mechanisms.

In addition, USI values transparency and completeness in environmental information disclosure, and we are enhancing climate-hazard risk management and preparedness measures.

To further demonstrate our commitment to nature, USI collaborates with the College of Bioresources and Agriculture at National Taiwan University to advance ecological surveys, conservation, and restoration, and to continuously improve biodiversity management.

Response to IFRS Sustainability Disclosure Standards

In response to the "Roadmap for Promoting the Adoption of IFRS Sustainability Disclosure Standards in Taiwan" released in August 2023, listed companies in Taiwan will be required to adopt IFRS Sustainability Disclosure Standards in three phases starting from 2026. In 2024, the USIG established a cross-functional IFRS project team, with quarterly implementation progress reported to the Board of Directors of USI for oversight. The project team is led by the Group Chief Financial Officer and comprises the "Operational Impact Task Force" and the "Financial Impact Task Force" to jointly assess the potential financial implications and impacts of material risks and opportunities. USI serves as a member of the Operational Impact Task Force. In 2024, the establishment of the project team, gap analysis with IFRS standards, and formulation of an implementation plan were completed.

Implementation Work Plan

Stage Tasks	Stage 1 Analysis and Planning	Stage 2 Design and Execution			Stage 3 Implementation	Stage 4 Adjustment and Improvement
Schedule	2024 Q4	2025 Q2	2025 Q3	2025 Q4	2026 Q3 ~ Q4	2027 Q1
Summary of Implementation Tasks	· Establishment of a cross-functional project team for the adoption of IFRS Sustainability Disclosure Standards. · Preliminary identification of key differences and impacts between existing sustainability information and IFRS Sustainability Disclosure Standards. · Preliminary identification of the reporting entity. · Formulation of an implementation plan.	· Identification of sus-tainability-related risk and opportunity topics. · Assessment of the potential impacts of sustainability-related risks and opportunities on current and anticipated financial positions. · Evaluation of whether sustainability-related information constitutes material financial information, incorporating disclosure areas such as metrics and targets, risk mana-gement, and strategy.	· Inventory of sustainability-related data required within the company's reporting boundary and across the value chain. · Establishing linkages between sustainability-related data and information used in financial reporting (e.g., input values and parameters.)	· Adjustment of corporate processes including financial and non-financial reporting procedures, information systems, supply chain management processes, internal controls, and daily operations across departments.	· Pilot preparation of the sustainability section in the annual report. · Continuous updates to internal control manuals related to IFRS sustainability information and provision of relevant training.	· Disclosure of sustainability information in accordance with IFRS Sustainability Disclosure Standards in the 2026 annual report, to be announced and filed simultaneously with the 2026 financial statements.

Energy Management

Group Energy Management Targets

USIG voluntarily set energy management targets in 2016 and began to make dynamic target reviews in accordance with the country's energy development policies and by keeping track on the internal trends and domestic laws and regulations. After measuring the internal and external factors, we set the 2030 carbon reduction target in early 2022, and further set a carbon neutrality target by 2050 in 2023. The 9 USIG core production plants in Taiwan began to implement the ISO 50001 energy management system and obtained the certificate on after another in 2018 to effectively manage energy performance and continuously improve energy conservation and carbon reduction, hoping to demonstrate USIG's influence and so to lower environmental impact.

USIG 2030 Carbon Reduction Goals

Carbon reduction by 27% over 2017 by 2030

Carbon inventory/ carbon footprint

- By 2022, all listed companies in the Group completed GHG inventories and verification for Taiwan sites; in 2024, the Group (parent and subsidiaries on a consolidated basis) completed the GHG inventory and limited assurance.
- Product carbon footprint in 2021 USI promotes EVA, in 2022 CGPC and CGPCPOL promote PVC powder, PVC cloth, PVC leather, TPE, in 2023 Taiwan VCM promotes VCM and in 2024 CGPC promote Hydrochloric Acid, Sodium Hydroxide, and Sodium Hypochlorite Solution.

Energy saving and carbon reduction in the plant

- By 2021, all plants in Taiwan of the group's listed cabinet company have passed ISO 50001 energy management system verification
- Taiwan plants have continued to implement energy-saving and carbon-reduction measures. From 2022 to 2023 these measures achieved a cumulative reduction of 24,000 tCO_2e.
- The Group hosts an annual conference to share energy-saving best practices and accelerate the deployment of carbon-reduction technologies.

Pioneer renewable energy

- A Green Electricity Taskforce was established in 2020 to plan and execute renewable energy strategy.
- As of 2024, the Group's invested solar projects have an installed capacity of 8.6 MW, generating about 10.73 million kWh annually—equivalent to ~5,300 tCO_2e avoided emissions per year.
- We continue to expand green and diversified renewable energy to enhance the resilience of our future energy use.

Every year, USIG holds the "plant technology exchange meeting" and several "northern/Kaohsiung plants resource integration meetings" for plants to share resources and exchange technologies to improve performance in energy conservation and carbon reduction. In 2024, the plant technology exchange meeting was held on November 14 at USI's Linyuan plant. Continuing last year's themes of "industrial safety and environmental protection", "equipment preventive maintenance", and "energy conservation and carbon reduction", each of 12 plants in Taiwan presented more than 1 technology case for written review, and 7 plant cases entered the final. The finalists were voted on by the Group's senior executives and representatives of the presenting plants to select the outstanding technical case of the year.

Under the solid presentation and prudent evaluation, USI's Kaohsiung Plant won the first place for the "RECYCLE COOLER Internal Management Improvement Sharing". The certificate and bonus were presented by Chairman Wu. (Latest News)

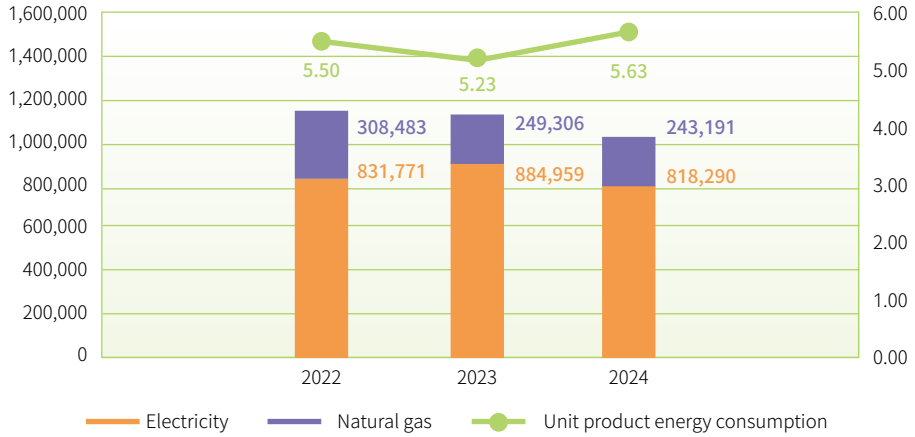
Photo of 2024 group factory technical case presentation meeting

Kaohsiung Plant won the first place in technical case presentation

USI Energy Consumption GRI 302-3

In 2023, total electricity consumption increased due to higher production volumes, and energy consumption per unit of product was high due to the production of HV products. In 2024, equipment failures led to production line shutdowns, resulting in increased natural gas consumption and higher energy intensity per unit.

Energy Consumption(GJ) and Unit Product Energy Consumption(GJ/MT PE) of USI Kaohsiung Plant in Last 3 Years



Note: Since the usage of diesel and gasoline is much lower than that of electricity and natural gas, their data cannot be shown in the above chart. Please refer to the table below.

Energy Consumption and Unit Product Energy Consumption in Last 3 Years GRI 302-1 RT-CH-130a.2

Energy Type	Unit	2022	2023	2024
Electricity	GJ	831,771	884,958	818,290
Natural gas	GJ	308,483	249,306	243,191
Diesel	GJ	415	502	555
Gasoline	GJ	266	312	322
Total consumption	GJ	1,140,935	1,135,078	1,062,358
Production	MT	207,413	217,173	188,691
Unit product energy consumption	GJ/MT	5.50	5.23	5.63

Note 1: Referring to the Energy Heating Value Per Unit Product Table announced by the Energy Administration, Ministry of Economic Affairs, the conversion factor of energy consumption of electricity, LNG, and diesel is as follows: 860 kcal/kWh, 9,000kcal/m3, 8,400 kcal/L, and 7,800 kcal/L; where 1 kcal = 4.187 kJ.
Note 2: Sources of natural gas and electricity consumption: fuel bill statistics; Source of diesel consumption: Material collection forms; Source of Gasoline: Purchase invoices.
Note 3: Only non-renewables are used.
Note 4: Energy data coverage rate = 100%.
Note 5: Information recoding explanation: In 2022, the addition of gasoline as an energy category aligns with the temperature disk. (GRI 2-4)

Electricity Conservation Rate in the Past 3 Years

Item	2022	2023	2024
Electricity Conservation (%)	1.21	1.72	1.88

Note 1: Source: Based on the 2024 Report on the Annual Energy Saving Audit System of Energy Users of the Energy Administration.
Note 2: Subject to the energy audit equation of the Energy Administration, reported energy saved divided by the total electricity consumption.

From 2015 to 2024, the Company achieved an average annual electricity savings rate of 1.45%, surpassing the 1% minimum average annual target set by the Bureau of Energy, Ministry of Economic Affairs, for energy users during the same period.

The 2024 target and performance of electricity conservation and the planned 2025 target are tabulated below:

Year	2024		2025
Item	Planned Target	Actual Result	Planned Target
Reduction (%)	1.18	1.88	1.51

GHG Management

GRI 302-2, 305-1, 305-2, 305-3 RT-CH-110a.1

Based on the ISO 14064-1:2018 GHG inventory standard and the GHG Emissions Inventory and Registration Guidelines of the Ministry of Environment, we performed GHG inventory, consolidation, and system establishment with the assistance of external experts. We set organizational boundary for GHG inventory based on the "operational control method." The organization has 100% of GHG emissions from facilities under its operational control. GHGs under inventory include CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, and NF_3. The emission coefficients are cited from Ministry of Environment's GHG Emission Coefficient Management Table V.6.0.4, and the global warming potential (GWP) is reported based on IPCC's AR6 (2021).

The Company has always attached importance to greenhouse gas management, and has been conducting greenhouse gas inventories on a voluntary basis since the early days. In addition, the Company has also conducted external verification for the year 2019 since 2020. In line with the FSC's sustainable development roadmap for listed companies, the Company the Company is actively planning ahead to complete individual entity inventory and assurance in 2023 (ahead of the 2024 regulatory schedule), and completed the inventory and assurance for consolidated subsidiaries in November 2024 (ahead of the 2027 regulatory schedule).

The boundary of the individual company inventory in 2024 is Kaohsiung Plant. Guishan R&D Division and Taipei HQ continue to use the 2023 inventory report. In 2024, GHG emissions from USI's Kaohsiung Plant Guishan R&D Division and Taipei HQ included Scope 1 - 26,080 tons of CO_2e, Scope 2 - 107,890 tons of CO_2e, Scope 3 - 470,400 tons of CO_2e.

The Scope 1 and Scope 2 GHG emissions of the consolidated subsidiaries amounted to 760,420 tons of CO_2e in 2023 and 697,020 tons of CO_2e in 2024, reflecting a reduction of 63,400 tons of CO_2e in 2024 compared to 2023.

Scopes 1 and 2 Emissions from Each Site of USI Consolidated Entities

Site No.	Company	Site Type	Scope 1 (tCO_2e)	Scope 1 Share (%)	Scope 2 (tCO_2e)	Scope 2 Share (%)	Total (tCO_2e)
1	USI – Taipei Headquarters	Office	19.3247	16.2530	99.5745	83.7470	118.899
2	USI – Guishan R&D Center	R&D Center	9.9015	9.6108	93.1234	90.3892	103.025
3	USI – Kaohsiung Plant	Plant	26,050.5645	19.4745	107,717.0688	80.5255	133,767.633

Note 1: The emissions from Taipei Office and Taoyuan Guishan Laboratory were far below 1%, and the 2023 inventory results will be used in the future in accordance with the materiality principle.
Note 2: Kaohsiung Plant adopts 2024 inventory results.

GHGs inventory in the past two years

Unit: 10,000 metric tons of CO_2e/year

	Kaohsiung Plant		Guishan R&D Division		Taipei HQ	
Year	2023	2024	2023	2024	2023	2024
Scope 1	0.002	0.002	0.001	0.001	2.104	2.605
Scope 2	0.01	0.01	0.009	0.009	12.141	10.77
Scope 3 (Cat. 3) Transportation Indirect Emissions	0.001	0.001	0	0	0.024	0.024
Scope 3 (Cat. 4) Indirect Emissions from Products Used by the Company	0.003	0.003	0.002	0.002	49.338	47.01
Total	0.016	0.016	0.012	0.012	63.607	60.409

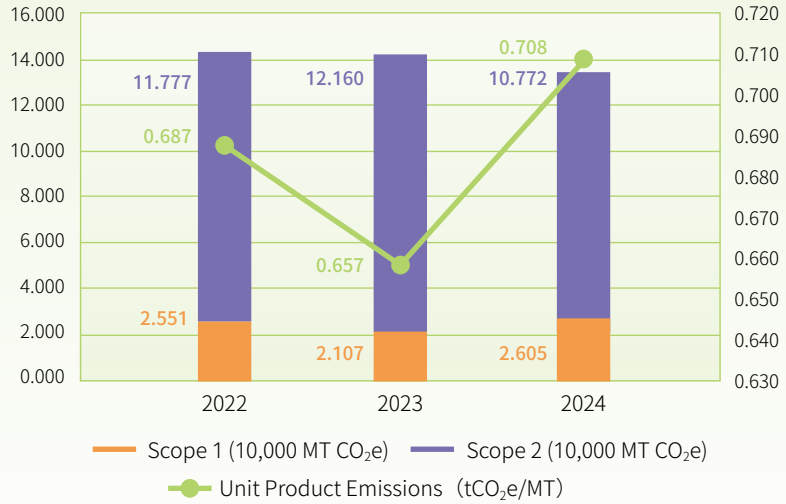
Note 1: Scope 1 refers to the direct emissions from stationary combustion sources, direction emissions from combustion sources, direct process emissions from industrial manufacturing processes, and direct leaked emissions from GHGs generated by artificial systems.
Scope 2 refers to the indirect emissions of purchased electricity.
Scope 3 refers to other indirect emissions:
- Indirect emissions from the disposal of solid and liquid waste.
- Emissions from transportation: carbon emissions generated by employee commuting and business.
- Carbon emissions from the production process of raw materials such as ethylene and vinyl acetate.

Note 2: The Kaohsiung Plant is a GHG emission control unit under the Ministry of Environment, with Scope 1 emissions accounting for 99.9% of USI's individual emissions.

Note 3: All figures are aggregated from the original audit data and displayed to three decimal places.

Analyzing the intensity of GHG emissions in 2024, emissions per unit of product have increased due to declining production capacity. GRI 305-4

GHGs emissions in the past three years



Year	2022	2023	2024
GHG emissions of Scope 1 + Scope 2 (10,000 metric tons of CO_2e)	14.328	14.267	13.377
Production (metric tons)	208,648	217,172	188,986
Emission Intensity per unit product (metric tons of CO_2e/metric tons)	0.687	0.657	0.708

Note 1: The calculation boundary includes USI's Scope 1 and Scope 2 GHG emissions.

Note 2: The carbon emission coefficient for electricity is based on the latest data published by the Energy Administration: 0.495 metric tons of CO_2e per kWh in 2022, 0.494 metric tons of CO_2e per kWh in 2023, and 0.474 metric tons of CO_2e per kWh in 2024.

Note 3: In 2024, diesel without biofuels was used, resulting in 0 $kgCO_2e$ emissions from biofuel combustion.

Note 4: Compliance with ISO 14064-1:2018 standards are required, and AFNOR Asia Ltd. has been commissioned for verification.

Energy Conservation and Carbon Emissions Targets and Performance GRI 302-4 RT-CH-110a.2

The energy conservation and carbon reduction programs in 2024 and their performance are tabulated below. A total of 6 energy conservation and carbon reduction programs with a total investment of NT$8.183 million were implemented to reduce carbon by 2,897 metric tons of CO_2e. GRI 305-5

No.	Program	Category	Energy Saved	Carbon Reduced (metric tons of CO_2e/year)	Investment amount (NT$1,000)
1	Steam cooler replacement	LNG Saving	145,200 cubic meters	301.7	51
2	Steam line insulation replacement	LNG Saving	188,179 cubic meters	391.0	4,000
3	Reactor pressure reduction	Electricity Saving	56,450 kWh	26.8	44
4	Cooling line maintenance (chiller energy saving)	Electricity Saving	113,256 kWh	53.7	4,000
5	CBC plant shut down, chilled water supplied by other means	Electricity Saving	4,057,317 kWh	1,923.2	44
6	Reactor pressure reduction	Electricity Saving	423,835 kWh	200.9	44
Total		LNG Saving of 333,379 cubic meters Electricity Saving of 4,650,858 kWh		2,897	8,183

Note 1: Carbon emission factor of electricity as 0.474 metric tons of CO_2e/MWh.
Note 2: Source: Based on the 2024 Report on the Annual Energy Saving Audit System of Energy Users of the Energy Administration, with annualized carbon reduction benefits counted directly in the year of implementation, without dividing months and across-year calculation.
Note 3: Items 1 and 2 calculation method: Calculate LNG savings based on assumed steam savings and operating time.
Note 4: Items 3 and 6 calculation method: Calculate energy savings based on the operating current values and operating times before and after adjusting the operating pressure of the secondary compressor.
Note 5: Item 4 calculation method: Calculate energy savings based on the actual measurement difference of the equipment before and after the improvement and the operating time.
Note 6: Item 5 calculation method: Calculate energy savings based on equipment specifications and the time the production line is idle.

In 2025, we plan to implement 4 energy saving programs with an estimated 1,234,612 kWh of energy savings, 585 metric tons of CO_2e of carbon reduction, and a budget of NT$9.944 million.

2025 Energy Conservation Programs and Estimated Targets

No.	Program	Category	Energy Saved	Unit	Carbon Reduced (metric tons of CO_2e/year)	Investment amount (NT$1,000)
1	Addition of modifier injection points for secondary compressor inlet engineering for B Line at the Manufacturing Department I	Electricity Saving	37,729	kWh	18	100
2	Adjustment of B Line LDV valve to reduce the loading of the secondary compressor	Electricity Saving	1,045,419	kWh	496	4.4
3	Replacement of cooling tower fan materials	Electricity Saving	79,680	kWh	38	200
4	Upgrade of the air compressor at the Manufacturing Department II	Electricity Saving	71,784	kWh	34	690
	Total	Electricity Saving	1,234,612	kWh	585	994.4

Energy conservation and carbon reduction plan

Forestation Adoption Program


國立臺灣大學 生物資源暨農學院 實驗林管理處

認養證書

台灣聚合化學品股份有限公司
認養本處溪頭營林區 2 林班 111-1 號；內茅埔營林區 20 林班 111-1 號造林地 1,500 株苗木，面積約計 1 公頃。
認養期自捐款日起至 134 年 12 月 31 日止
特此證明

中華民國 113 年 1 月 28 日

- In response to energy conservation, carbon reduction, and environmental protection, we promoted the Forestation Adoption Program in collaboration with the Experimental Forest, College of Bio-Resources and Agriculture, National Taiwan University to grow more trees with the technical assistance of professional teams. Additionally, the program allows the public to understand the benefits of growing trees for CO_2 adsorption by soil and water and its importance to environmental protection.
- In December 2021 we signed the agreement to donate NT$9 million for forestation through adopting 7,500 trees occupying an area of about 5 hectares for a term of 20 years, with a total carbon fixation capacity of 1,350 metric tons of CO_2e, equivalent to the capacity of about 3.5 Daan Parks. (According to the Council of Agriculture, the per hectare carbon adsorption of forests is 15 metric tons of CO_2e/year. The area of Daan Park is 25.8 hectares, i.e., its annual carbon adsorption capacity is about 387 metric tons of CO_2e.)
- Completion of the Forestation Adoption Program Phase IV Donation

Supported "Earth Hour", a global energy conservation activity.

- We began supporting this event in 2018. During 20:30-21:30 on March 26, 2024, we joined the “Earth Hour” activity with the world by turning off the landscaping lights of the plant’s exterior walls and unnecessary lighting fixtures.We supported the government's energy conservation and carbon reduction policies and activities in real action. Besides reducing energy use and lowering the cost, we also hope to encourage the public and businesses to value energy conservation and carbon reduction by setting an example through participating in Earth Hour.

Product Carbon Footprint

We started to promote product carbon footprint verification (CFV) in 2021, and has successively conducted inventories on key products. Based on the data of lifecycle assessment, the GHG emissions from direct and indirect activities or accumulated in the product is considered according to the product lifecycle from materials acquisition or natural resource production to disposal at the end of life is considered. Verification for conformity to the ISO 14067:2018 product carbon footprint standard was completed on EVA, the target product, according to ISO 14064-3:2006. The declared/functional unit is per kilogram (including package).

According to the FSC's Guiding Principles for Determining Sustainable Economic Activities, the technical screening standard for standard polyethylene in the petrochemical industry must be less than 1.0823 metric tons of CO_2e/ metric tons, and the Company's polyethylene products are less than the standard on the manufacturing side, which meets the criteria for determining sustainable economic activities.

Raw material stage → **Manufacturing stage** → **Distribution and sales stage** → **Usage stage** → **Waste disposal stage**

Lifecycle GHG Emissions

Declared Unit of Emissions of Target Verification Product (Unit: $kgCO_2e$)				Functional Unit Emissions (Unit: $kgCO_2e$)
Lifecycle Stage	Materials	Manufacturing	Total	
EVA®UE2828	2.270	0.689	2.96	2.96
EVA®UE649-04	2.128	0.689	2.82	2.82
EVA®UE659	2.223	0.689	2.91	2.91


SGS

碳足跡查證聲明書

台灣聚合化學品股份有限公司高雄廠

ISO 14067:2018

In 2025, we added the carbon footprint inventory and assurance for the new HDPE LH5920. The total carbon footprint is 2.0446 $kgCO_2e/kg$ (including upstream materials).

4.6 Raw Material Management

Our main products are: LDPE, EVA, HDPE, and LLDPE. Major raw materials include ethylene, VAM, and butene. Major secondary materials include Iso-Paraffin Solvent, propylene, n-Hexane, and isopentane. Raw materials are only used by Kaohsiung Plant, with a coverage rate of 100%.

Ethylene usage in 2024 amounted to approximately 195,000 tons, accounting for approximately 81.5% of all major raw material usage, followed by VAM at approximately 16.4%. 76% of ethylene is locally sourced in Taiwan. Please refer to 3.3 Supply Chain Management for details. GRI 301-1

Packaging Materials Management

Based on the weight of packaging bags of each product in the Kaohsiung Plant, the use of packaging materials is estimated to be 898 tons in 2024 based on the sales volume. Customers with large sales volume use tank trucks for transportation to save packaging materials.

2024 Packaging Weight

Unit: Kg

	PE Packing Bag	Bulk Bag	Paper Bag
Manufacturing Department I	548,153	35,729	0
Manufacturing Department II	163,064	100,951	38,316
Manufacturing Department III	11,442.8	0	0
Subtotal	722,660	136,680	38,316
Total Weight			897,656

Packaging materials are not recycled due to pollution concerns. For the direction of packaging materials and reduction testing: The use of recycled plastic bags mixed with recycled materials and change the shrink-wrapped packaging to bare packaging to save cartons.

Raw material recycling GRI 301-1

The Company's product manufacturing process is committed to improving the efficiency of raw material recovery, hoping to reduce raw material consumption. The recovery methods included high pressure recovery system improvement project of the second plant, setting of Monomer Refine Tower (MRT), connecting new Tower tank with old tower tank, Ethylene Purification Tower (EPT) is equipped with a condenser at the front end and a new compressor leak gas recovery system. The recovery rate of raw materials was 14.4% in 2024, with approximately 27.83 million tons of VAM and Butane-1+isopentane recovered, resulting in savings of NT$757 million.

Application for ISO 14021 PIR (Pre-Consumer Material) Certification

Waste materials (EVA/HDPE) generated during the production process are recycled and reused as plastic raw materials. Certification under ISO 14021 is expected to be obtained in 2025. For details, please refer to Section 3.1 Technology R&D.

Implementation of ISCC Certification for Bio-Ethylene

Bio-ethylene is derived from renewable resources and serves as an alternative to conventional petrochemical-based ethylene. It offers advantages such as reduced carbon emissions, lower carbon footprint, renewability, biodegradability, decreased reliance on fossil fuels, and support for a green economy and the use of renewable resources. As a recoverable and renewable green alternative material, bio-ethylene contributes to carbon reduction and environmental protection, playing a significant role in promoting sustainable economic development. It is expected that the Kaohsiung Plant will complete ISCC certification for bio-ethylene by the end of 2025.