03 Create Friendly Environments

3.1 Eco-friendly Management
3.2 Climate Change and Energy Management
3.3 Water Resources Management
3.4 Air Pollution Control
3.5 Waste Management

Annual Material Topic	2024 Annual Goals	Performance Status
Climate Change and Energy Management	Reduce energy consumption per unit product by 3%	Achieved
	Greenhouse gas emissions reduced by 9% compared to the base year	Achieved
Water Resources Management	Reduce water consumption per unit of product by 3% compared to the base year	Achieved
	Discharge water quality meets the standard	Achieved

Annual Material Topic	2024 Annual Goals	Performance Status
Air Pollution Control	The number of fines for exceeding the limit of air pollutant emissions is 0	Not achieved
	VOCs emission per unit product reduced by 10% compared to the base year	Achieved
Waste Management	Implementation of waste inspection system	Achieved
	The proper waste handling rate is 100%	Achieved

TTC deeply recognizes the importance of biodiversity conservation in maintaining global ecosystem stability and the sustainable well-being of humanity; therefore, the Company actively promotes various initiatives to reduce the environmental impact of its operational activities.

TTC regularly uses biodiversity risk assessment tools to review the Company's dependence on and impact to the natural environment in its operations. Through assessment using the WWF Biodiversity Risk Filter tool, it was found that the Company's operational activities pose a high risk in the area of "pollution." Therefore, in line with the TNFD's Mitigation Hierarchy approach, TTC prioritizes "Avoidance" and "Minimization" measures. All manufacturing sites are located within industrial parks to "avoid" proximity to areas of global or national biodiversity importance, thereby reducing the risk of ecosystem disturbance. To "minimize" pollutant emissions, TTC strictly controls the quality of stack gas emissions and strengthens self-management of VOCs fugitive emissions. The Company has also established monitoring and testing equipment, along with estimation methods, to enable real-time emission control and prompt elimination of anomalies.

To strengthen pollution control, TTC continuously upgrades and installs new equipment across its plants. This includes adding flue gas denitrification systems to boilers, replacing baghouse dust collectors in incinerators, and modifying exhaust hoods in production areas to improve collection efficiency, all aimed at effectively reducing pollutant emissions. In addition, TTC effectively controls pollutant emissions through regular maintenance, calibration, and timely replacement of consumables for its air pollution control equipment.

Furthermore, TTC also prioritizes environmental information transparency and strengthens communication with stakeholders to enhance climate-related risk management and response measures. The Company actively participates in local environmental protection initiatives, taking concrete actions to improve the local ecosystem and promote sustainable community development.

3.1 Eco-friendly Management

Environmental protection and pollution prevention form an integral part of our corporate management strategy. Since June 1998, TTC has implemented the ISO 14001 Environmental Management System, providing a robust framework for environmental protection across all our plants. This approach not only controls and minimizes our environmental impact but also prevents accidents that might harm the environment, ensuring compliance with relevant regulations.

We have integrated the environmental management system with our occupational health and safety system, establishing a comprehensive environmental, health, and safety (EHS) policy. Regular EHS training sessions are conducted to cultivate a safe and healthy working environment.

Depending on the importance of our products, TTC evaluates its production processes in terms of hazardous substance management, pollution prevention, energy conservation, water saving, and carbon reduction. The objective is to achieve high safety standards and low pollution in production. Moreover, we set our environmental goals and targets, and devise management plans or other improvement measures. These initiatives are continually implemented, reviewed, and monitored to ensure best practices are consistently followed.

TTC's Environmental, Health, and Safety Policy Corporate Promise

3 Firm commitment to compliance with governmental regulations.

4 Fulfill Corporate Social Responsibility.

5 Effective implementation of management cycles.

6 Preventative measures to mitigate hazards and reduce risks.

7 Emphasis on the concept of responsible care.

8 Prioritizing the needs of employees and the public.

9 Continuous improvement to enhance performance.

: Ensuring sustainable business operations.

3.1.1 Environmental Management Organization

To effectively implement the environmental, health, and safety (EHS) management system and promote EHS awareness among employees, we have established the EHS Management Committee. The President serves as the chairman of this committee, and under its umbrella, there are EHS management sub-committees established at each plant. The EHS Management Committee convenes a management review meeting at least once a year. Meanwhile, the management sub-committees in each plant hold an occupational safety and health committee meeting at least once every three months and an EHS execution team meeting every two months. These meetings are dedicated to regular discussions and reviews of topics related to environmental, health, and safety issues.

3.1.2 EHS Grievance Channels GRI 2-25

The TTC has established, implemented, and maintained the "Operation Regulations for Occupational Safety, Health, Energy and Environment Information Collection and Communication" as channels and procedures for the communication, engagement, and consultation of environment-related topics for internal stakeholders (employees, employee welfare committee, labor/ management meetings, EHS execution team meetings, and occupational safety and health committee meetings) as well as external stakeholders (customers, suppliers, EHS competent authorities, community residents, and environmental groups).

Internal Complaint and Communication Procedures

23 Employees can consult and communicate on occupational safety, health, and environmental matters through channels such as the Occupational Safety and Health Committee meetings, Environmental and Safety meetings, and the employee complaint mailbox.

24 When employees have suggestions related to occupational safety, health, or environmental issues, they can also follow the proposal improvement system procedure.

25 If employees have complaints about occupational safety, health, or environmental concerns, they can address them through the administrative system or directly approach the Environment & Safety unit.

External Complaint and Communication Procedures

23 After receiving an EHS grievance from outside the organization over the phone (07-7040988), orally or in writing, TTC will refer the case to the responsible unit to verify the contents of the grievance and register it in the "Occupational Safety, Health and Environment Information Collection and Communication Form." After a case has been confirmed, a proper response will be made.

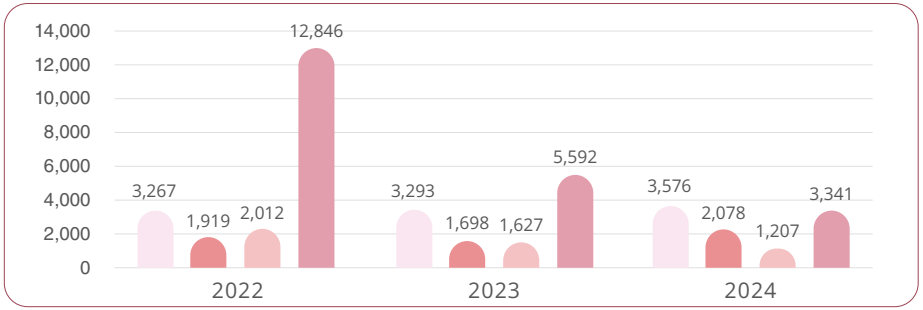
24 Information related to the EHS policy is available on the Company's website for public access and consultation.

3.1.3 Environmental Investment

In 2024, the environmental expenditure of TTC totaled NT$102.03 million, a 16.4% decrease from 2023. The expenditure categories associated with TTC's environmental management are as follows:

Environmental Management Expenditure Overview Table for the Last Three Years

(NT$10 thousand)



Note 1. Environmental Management Activity Costs: Includes costs related to air pollution control, water pollution control, waste disposal, noise control, and others (e.g., air pollution control expenses, soil and groundwater pollution control expenses, maintenance costs for setting up air quality monitoring facilities in the Linyuan Industrial Zone, etc.).

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

Note 3. Equipment Operation & Maintenance Costs: Encompasses expenses associated with the operation, maintenance, and upkeep of equipment for environmental protection and control.

Note 4. Environmental Improvement Project Costs: Covers the expenditure for projects related to environmental enhancements.

3.2 Climate Change and Energy Managemen

GRI 201 (201-2)、GRI 3-3、GRI 302 (302-1、302-3、302-4)、GRI 305 (305-1、305-2、305-3、305-4、305-5)

Material Topics

Climate Change and Energy Management

Material Reason

The global average temperature is on the rise due to climate change. This is closely linked to energy consumption. As TTC operates within an energy-intensive industry, the energy efficiency of our production processes is a primary focus. In addition to proactive management within our facilities, we continue to implement energy-saving and carbon-reducing measures. This is especially crucial as government agencies are stepping up their oversight of carbon emissions, preparing us to handle potential future impacts.

Impact Boundary

Government agencies, partners, community, and employees

Sustainability Principles and Corresponding SDGs

Create Friendly Environments/ SDGs 13 Climate Action

Management Approach

Management Approach	Reduce the environmental impact of energy and greenhouse gas emissions, meeting both national regulatory requirements for reductions and the Group's energy-saving and carbon reduction targets. With 2017 as the base year, we have set short-, medium-, and long-term reduction goals. Base year: The year 2017 is chosen as the reference because it reflects a period where most of our plants operated at optimal capacity utilization.
Objective	2024 Goals: (1) Reduce energy consumption per unit product by 3% (2) Greenhouse gas emissions reduced by 9% compared to the base year Mid-term goals in 2027: (1) Reduce energy consumption per unit product by 5% (2) Greenhouse gas emissions reduced by 16% compared to the base year Long-term goals in 2030: (1) Reduce energy consumption per unit product by 6% (2) Greenhouse gas emissions reduced by 27% compared to the base year Final Goal: Carbon neutrality by 2050
Management Plan	1. Introduce or update equipment to decrease energy consumption 2. Strictly monitor energy consumption in the plant. If anomalies arise, carry out maintenance or update equipment accordingly.
Evaluation of the Management	"Energy consumption per unit product" and "annual reduction rate of greenhouse gas emissions" are set as key performance indicators. An evaluation report is presented to the management, and a review meeting is held annually to assess the performance of the previous year. This helps in proposing improvement measures and verifying their effectiveness.
Assessment Mechanism	1. Conduct monthly statistical analysis on energy consumption to systematically understand the reasons for any increases or decreases. 2. Establish monitoring, testing equipment, and forecasting methods to observe plant energy consumption and control and eliminate anomalies in real-time. 3. Continuously implement the ISO 14064-1 greenhouse gas verification system to systematically survey greenhouse gas emission situations and periodically review various energy-saving and carbon-reducing plans. 4. Persistently carry out the ISO 50001 energy management system to manage energy wastage systematically.
Assessment Result	1. Energy consumption per unit product 2. GHG emissions
Negative Impact Remedies and Preventive Measures	1. In case of power shortages leading to production interruptions: Plans have been made to install generators to ensure backup power is available during power outages. 2. Participated in the Group's energy resource integration meetings to conduct rolling reviews and plan various energy-saving and carbon-reduction initiatives.
Policy Adjustment	Proposals for improvements concerning unmet targets are presented and reviewed during management review meetings.
Grievance Mechanism	Details can be found in Section 3.1.2 under EHS Grievance Channels.

3.2.1 Climate change

Climate Change Risk management

Climate change is a common challenge around the world. To keep up with the world and match the demand for sustainable development, Taiwan announced that the "Greenhouse Gas Reduction and Management Act" has been amended to the "Climate Change Response Act" on February 15, 2023.

Facing the impact of climate change, carbon reduction has become a global goal. To enhance carbon reduction, TTC's Taiwan plants have set the 2030 carbon reduction target which is "carbon reduction by 27% over 2017 by 2030" in early 2022 and set "Carbon neutrality by 2050" in 2023 as the final goals of the Corporation.

In order to achieve the corporate sustainability vision, TTC 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 accumulative on-grid capacity of solar PV sites has reached 8.6MW, generating approximately 10.73 million kWh of green electricity annually.

At TTC, the Board of Directors oversees climate management operations, with the ESG Committee as the highest governance body for climate management. Chaired by independent directors, the committee reviews the Company's climate change strategies and targets every year, manages the actions and reviews the performance in climate change risks and opportunities, and reports to the Board.

TTC based on the framework recommended by the Task Force on Climate-related Financial Disclosures (TCFD), we identify climate-related risks and opportunities, assess risks and opportunities from different departments, assess financial impacts and set responsive plans, plan overall assessment every three years, and review updates every year.

Climate Change Management Framework

Category	Management Strategy and Action
Governance	· **ESG Committee:** As the highest governance body of climate change management chaired by independent directors, it reports climate change planning, implementation and performance to the Board every year. · **Operations Management Meeting:** Chaired by the Chairman, it plans and implements material policies for energy conservation and carbon reduction and reports the results from time to time. · **Group Predict Maintenance & Environmental Risk Management Division 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 every month. · **Other functional committees overseen by the Board:** Includes the Audit Committee. The Risk Management Team submits its risk identification results to the Board. Each year, the Team assesses risks arising from global climate change, energy issues, and related financial and taxation matters.
Strategy	· **Identification of risks and opportunities:** Identify material risks and opportunities based on their likelihood and impact. · **Assessment of risks and opportunities:** 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	· **Implementation of TCFD:** Identify risks and opportunities based on the TCFD recommended framework, communicate with all responsible units, and confirmed by senior management. · **Report of identification results:** Include them in the annual risk assessment. The President reports the control measures and management performance to the Audit Committee and Board every year.
Indicators and Targets	· Set energy management targets within the Group's carbon reduction initiative, with 2017 as the base year, aiming for a 27% reduction goal by 2030, and achieving carbon neutrality by 2050 · **Climate Response Strategies:** Equipment replacement, construction of renewables facilities, optimization of production scheduling, planning building air conditioning, energy management system, extreme weather events contingency plans · **GHG emissions disclosure:** Disclose Scope 1, Scope 2, and Scope 3 emission data annually in the ESG report

Identification of Climate Risks and Opportunities

In response to intensifying global climate change, TTC continues to adopt optimal TCFD framework to deepen the understanding of potential risk items that may be faced under extreme climate conditions, and capture new business opportunities. Referencing the Taiwan Climate Change Projection Information and Adaptation Knowledge Platform (TCCIP) and the National Science and Technology Center for Disaster Reduction, analyze the projected changes in temperature, rainfall, flooding, and drought from 2016 to 2035 under the RCP 8.5 scenario and identify three physical risk issues. Also, identified nine transition risks and 12 opportunity issues, totaling 24 potential risk and opportunity issues, based on the Group's strategy, industry characteristics, Intended Nationally Determined Contribution (INDC), and TCFD indicators.

In 2023, we conducted a survey for the ESG Committee and senior unit managers to assess the relevance of each risk to the Company's operations and the duration of potential impacts, as well as the development and viability of each opportunity. We collected 10 responses in total. After statistical analysis by the group, we identified 11 material climate issues (1 item of physical risk, 5 items of transition risk, and 5 items of opportunity).

TC evaluates potential financial impacts from the 11 material risk and opportunity items, devises corresponding strategies, and establishes management mechanisms. The aim is to understand the potential effects of climate change across various aspects, reduce operational disruptions caused by extreme weather events and foster a resilient climate change culture. The climate change risks and opportunities by the identified duration are tabulated below:

Overview Table of Short, Medium, and Long-Term Climate Change Risks and Opportunities Type.

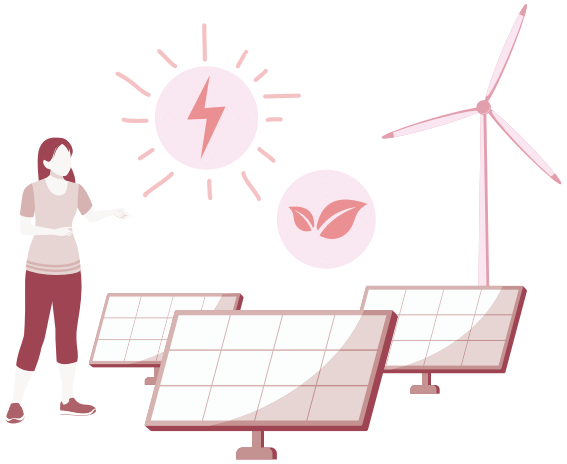
Type	Item	Duration
Physical Risk	Drought	Short-term (<3 years)
Transition Risk	Government regulation or supervision - Levy of water conservation	Short-term (<3 years)
	Carbon Fee	Short-term (<3 years)
	Renewable Energy Regulations - Risk of energy-heavy industries clause	Short-term (<3 years)
	Transition of low-carbon technology	Short-term (<3 years)
	Increased raw materials price	Short-term (<3 years)

Type	Item	Developmental	Technical Feasibility
Opportunity	High-efficiency production	Progressive and aligned with the existing policies of the Company	Expanding development
	Recycling and reuse - Circular economy	Progressive and aligned with the existing policies of the Company	Expanding development
	Reduce water use and water consumption	Progressive and aligned with the existing policies of the Company	Matured
	Use low-carbon energy	Progressive and aligned with the existing policies of the Company	Matured
	R&D and innovation of new products and services - research and development of low-carbon and energy-saving products	Progressive and aligned with the existing policies of the Company	Expanding development

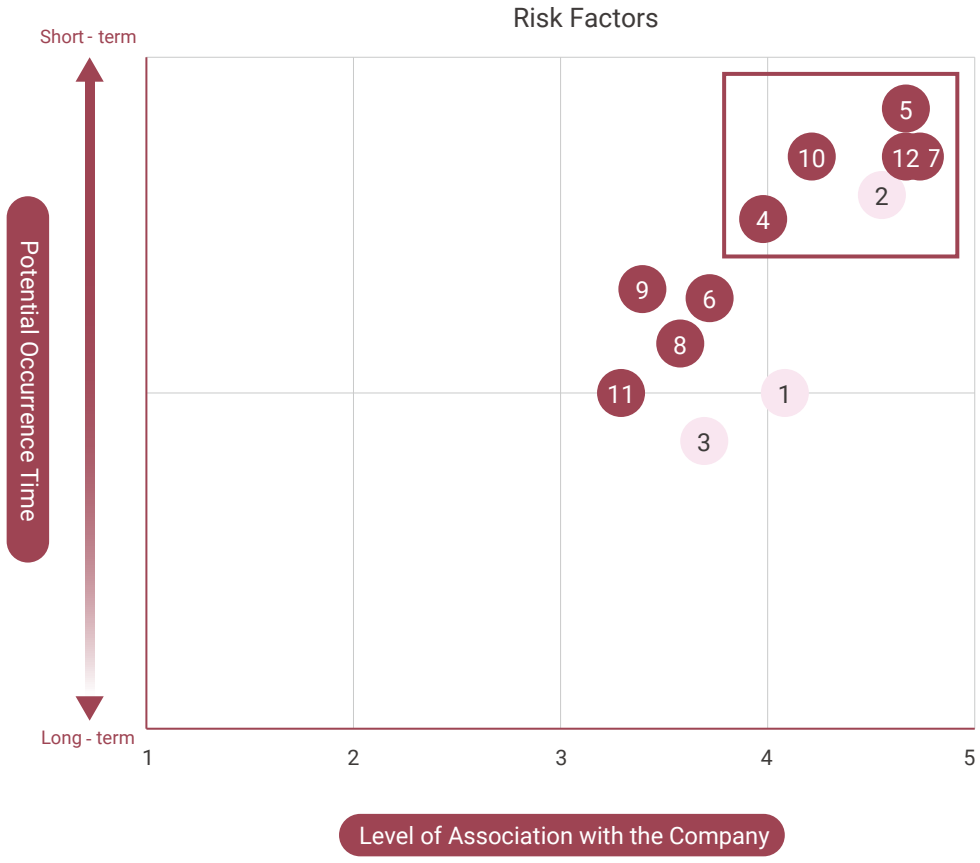
Overview Table of Short, Medium, and Long-Term Climate Change Risks and Opportunities Type.

Risk

Item	Risk Topics	Level of Association with the Company	Potential Occurrence Time
1	Flood inundation	4.06	1.99
2	Drought	4.59	2.62
3	High Temperature	3.75	1.87
4	Government regulation or supervision	3.97	2.52
5	Carbon Tax/Fee	4.70	2.82
6	Product efficiency regulations and standards	3.76	2.28
7	Renewable Energy Regulations	4.70	2.72
8	Changes in customer preferences	3.65	2.19
9	Credit risk	3.46	2.31
10	Transition of low-carbon technology	4.17	2.72
11	Uncertainty of market information	3.35	1.99
12	Changes in raw materials price	4.69	2.72



Climate Change Risk Matrix

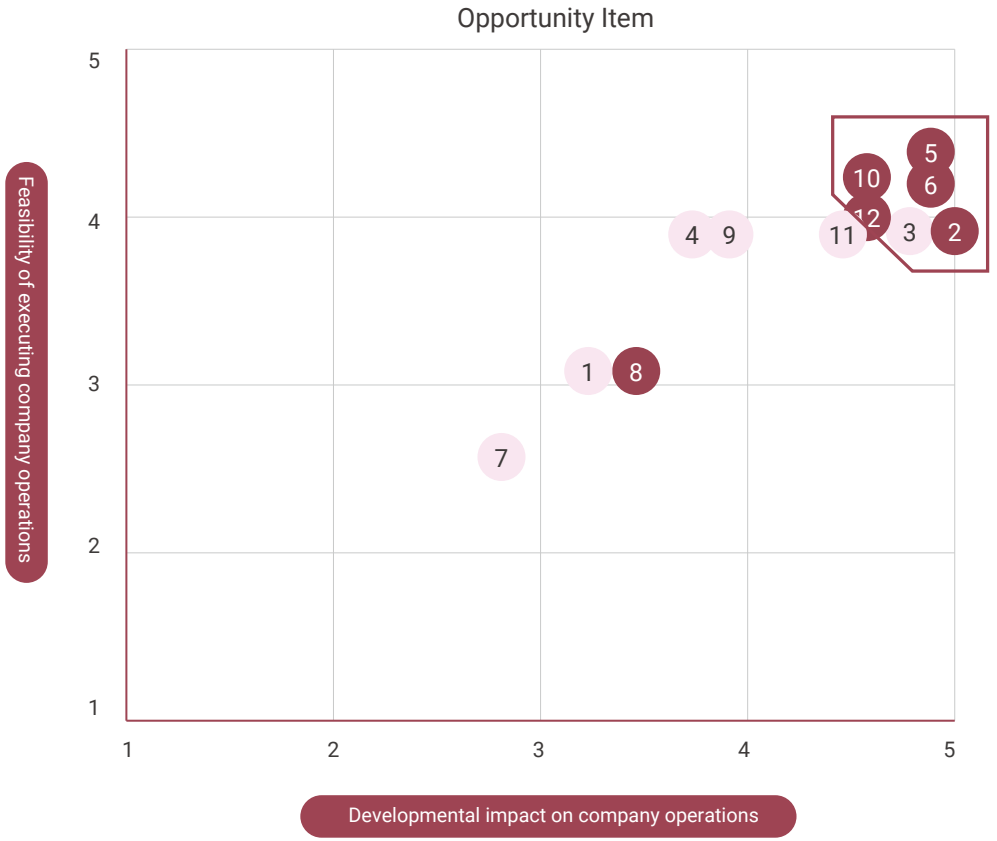


Overview Table of Short, Medium, and Long-Term Climate Change Risks and Opportunities Type.

Opportunity

Item	Opportunity Topics	Developmental impact on company operations	Feasibility of executing company operations
1	Adoption of higher efficient transportation methods	3.23	3.14
2	Use of higher efficient production and distribution processes	4.98	3.95
3	Recycling and reuse	4.77	3.94
4	Transition to higher efficient buildings	3.73	3.85
5	Reduce water use and water consumption	4.88	4.26
6	Use low-carbon energy	4.89	4.27
7	Use new technology	2.80	2.60
8	Participation in carbon trade	3.43	3.12
9	Develop and/or increase low-carbon products and services	3.85	3.86
10	R&D and innovation of new products and services	4.57	4.06
11	Enter new markets	4.47	3.85
12	Utilize public sector incentives regulations	4.57	3.94

Climate Change Risk Matrix



Overview Table of Potential Financial Impact of Risks and Opportunities and Countermeasures

Climate Change Issues	Category	Description of Risk & Opportunity Items	Potential Financial Risk	Company Strategy and Response Measures
Drought	Physical Risk/ Chronic	Due to global warming caused by climate change, weather patterns have become irregular. In particular, southern Taiwan has experienced extended periods without rainfall, requiring careful water usage monitoring.	**Increase in operating costs** If there is a water shortage, it is necessary to outsource water trucks. In severe cases, production lines will be reduced or completely halted, with an estimated increase in the cost of purchased water by NT$24,000 per day.	· Monitor water conditions and establish emergency response procedures · Stop non-essential water use, and strengthen inspections of pipelines and switches. · Implement water improvement measures to reduce total water withdrawal annually.
Government regulation or supervision - Levy of water conservation	Transition Risk/ Policy & Legal	In January 2023, the Ministry of Economic Affairs announced the "Water Consumption Fee Collection Regulations." During dry seasons (January-April and November-December), large users with monthly water consumption exceeding 9,000 m will be charged a water consumption fee per cubic meter.	**Increase in operating costs** Based on actual water usage and water recycling rate from November 2023 to April 2024 during the dry spell, the estimated water conservation charge is NT$340,000/year (subject to a 50% discount before 2025).	· Set targets for water consumption per unit product and achieve reduction goals annually. · Improve the wastewater recycling system and strengthen operational management to increase the volume of recycled water and reduce water consumption.
Carbon Fee	Transition Risk/ Policy & Legal	In August 2024, the Ministry of Environment announced the "Regulations Governing the Collection of Carbon Fees" and two related sub-laws. Starting in 2025, large emitters with annual emissions exceeding 25,000 metric tons will be subject to carbon fees.	**High initial investment cost** Lower carbon emissions in the long term will reduce operating expenses. Based on the 2024 emissions at TTC's Linyuan Plant and a carbon fee rate of NT$300 per metric ton, the estimated annual carbon fee is NT$4 million.	· Incorporate carbon costs into investment assessments to increase the execution opportunities of carbon reduction items · Plan and implement energy-saving and carbon-reduction measures for 2025-2030, including equipment upgrades and energy efficiency improvements within the plant.
Renewable Energy Regulations - Risk of energy-heavy industries clause	Transition Risk/ Policy & Legal	· According to the Ministry of Economic Affairs' "Regulations for the Management of Setting up Renewable Energy Power Generation Equipment of Power Users above a Certain Contract Capacity," electricity users with a contracted capacity above 5,000 kW must install renewable energy equipment equivalent to 10% of their contracted capacity by 2025. · In 2025, the Ministry of Economic Affairs will announce the energy-saving targets for large users for 2025-2028. Users with contracted capacity between 801 and 10,000 kW must achieve an average annual energy saving rate of 1%, while those exceeding 10,000 kW must meet a 1.5% target.	**Increase in operating costs** TTC will purchase green electricity from its Group subsidiary, USI Green Energy Corporation, to meet regulatory requirements。	· Plan and implement energy-saving and carbon-reduction measures for 2025-2030, including equipment upgrades and energy efficiency improvements within the plant. · USI Green Energy Corporation actively seeks suitable sites for green electricity development. The cumulative capacity of installed solar photovoltaic reached 8.6MW in 2024, with an annual electricity generation of up to 10.73 million kWh. TTC estimates to purchase 830,000 kWh of green electricity from USI Green Energy Corporation.
Transition of low-carbon technology	Transition Risk/Energy, Technology	To reduce carbon emissions, enterprises must invest in energy transition, efficiency improvement, and fuel substitution, leading to increased investment in low-carbon technologies.	**Increased capital expenditure and decreased in operating costs** Implemented 18 energy-saving and carbon reduction measures in 2024, total investing NT$14.20 million, which is estimated to saved 1.47 million kWh of power and reduced carbon emissions by 695 tCO_2e.	Continue to plan and implement energy-saving and carbon-reduction measures for 2025-2030, including equipment upgrades and energy efficiency improvements within the plant.

Climate Change Issues	Category	Description of Risk & Opportunity Items	Potential Financial Risk	Company Strategy and Response Measures
Increased raw materials price	Transition Risk/ Market	· Under the consideration of future carbon tax levies, the raw material will include the cost of carbon emissions, leading to a rise in prices. · Extreme weather may cause uncertainty in transportation costs and delivery times for raw materials.	**Increase in operating costs** Increased operating costs due to rising prices of raw materials and product transportation.	· Continue to promote the recycling and reuse of secondary materials · Evaluate the feasibility of implement AI intelligence scheduling systems within the plant.
High-efficiency production	Opportunity/ Resource Efficiency	By leveraging tools such as AI-based smart manufacturing, industrial motors, and automated packaging, overall production efficiency can be improved and energy consumption reduced.	**Increased capital expenditure and decreased in operating costs** Increase production through proper equipment maintenance and operational optimization to improve the energy efficiency per unit product and reduce greenhouse gas emissions.	· Participate in the 2025 Smart Petrochemical Safety Upgrade Subsidy Program. AI implementation projects include: gas detection data analysis and management, human-vehicle-environment image recognition, abnormal behavior/personnel identification and tracking, equipment/pipeline monitoring system, plant operation management platform, and smart inspection system, all to enhance plant safety and operational efficiency.
Recycling and reuse - Circular Economy	Opportunity/ Resource Efficiency	ased on the three core principles of the circular economy (3Rs): Reduce, Reuse, and Recycle. Aims to lower waste disposal costs or reduce raw material usage.	**Increase in revenue** · Glass wool raw materials are procured by recycling waste glass for use in production processes. · Reuse of ABS scrap in the Linyuan Plant.	· Focus on research and development of sustainable products, transforming waste glass into fire-resistant, thermal-insulating, and soundproofing glass wool. These products have obtained the Green Building Material Label. · Recover product powder from the wastewater in the processing area for reuse. · ABS scrap in the Linyuan Plant is recycled into TAIECOR™ material, which is ISO 14021 certified.
Reduce water use and water consumption	Opportunity/ Resource Efficiency	Water is an indispensable resource in the production process. Reducing factory water leakage and increasing the rate of wastewater reuse can lower operational costs and enhance factory resilience.	**Reduction of operational costs** · Save water and recycle wastewater through process improvements. · Include water usage in monthly key performance indicators monitoring. Statistical analysis and comparisons on water consumption are performed. If any anomalies in water usage are detected, an immediate cause investigation is conducted, followed by improvement measures.	· Plan to improve wastewater recycling facilities. · Improve process equipment and operation to reduce steam use. · Continuously develop water-saving and consumption reduction measures.
Reduce water use and water consumption	Opportunity/ Resource Efficiency	Promote coal-to-gas transition and increase the proportion of renewable energy usage to reduce carbon costs and lower product carbon footprints.	**Increase in operating costs, reduction in carbon fees** Continuous investment in carbon reduction, cost efficiency, and benefits realization.	· Installation of rooftop solar photovoltaic systems · Prioritize procurement of steam from natural gas sources. · Monitor and participate in the renewable energy market. · Implemented 18 energy-saving and carbon reduction measures in 2024, total investing NT$14.20 million, which is estimated to saved 1.47 million kWh of power and reduced carbon emissions by 695 tCO_2e
R&D and innovation of new products and services - research and development of low-carbon and energy-saving products	Opportunity/ Product and Service	Focus R&D on product development aligned with circular economy principles, low-carbon, and energy-saving goals. Apply a life cycle perspective in technology investment to develop low-carbon products.	**Increase in revenue** · Toufen Plant: The insulating properties of glass wool can reduce indoor air conditioning temperatures by 2 to 3 degrees Celsius, helping to save on air conditioning usage. · The Linyuan Plant recycles production scrap to improve product quality.	· The Toufen Plant's glass wool made from recycled waste glass possesses fire-resistant, thermal-insulating, insulating, and soundproofing properties. It has passed various CNS standards tests, meeting the requirements for flame resistance and high sound absorption, and obtained Healthy Green Building Material certification. · ABS scrap in the Linyuan Plant is recycled into TAIECOR™ material, which is ISO 14021 certified.

In Response to the IFRS Sustainability Disclosure Standards

The "Roadmap for Taiwan listed companies to align with IFRS Sustainability Disclosure Standards" was published in August 2023. Starting in 2026, TWSE- and TPEx-listed companies will adopt the IFRS Sustainability Disclosure Standards in three stages. In 2024, USI Group established a cross-departmental IFRS project team, and the implementation status is reported quarterly to USI Board of Directors for oversight. The IFRS project team is organized and led by the Group CFO and involves cross-departmental collaboration between the "operational impact team" and the "financial impact team." The teams assess the potential financial impacts and effects of significant risks and opportunities on the Company. TTC is a member of the operational impact team. The project team was established, IFRS standards gap analysis was completed, and the introduction Plan was formulated in 2024.

Implementation Work Plan

Stage tasks	Stage I Analysis and planning	Stage II Design and execution		Stage III Implementation	Stage IV Adjustment and improvement
Timeline	2024 Q4	2025 Q2	2025 Q3	2025 Q4	2026 Q3 ~ Q4	2027 Q1
Summary of project implementatio	▪ Establish a cross-departmental project team to adopt the IFRS Sustainability Disclosure Standards. ▪ Initially identify the significant differences and impacts between the current sustainability information and the IFRS Sustainability Disclosure Standards. ▪ Initial identification of the reporting entity. ▪ Formulate the implementation plan.	▪ Identify sustainability topics related risks and opportunities. ▪ Assess the potential impact of sustainability-related risks and opportunities on the current and anticipated financial condition. ▪ Assess whether sustainability-related information constitutes material financial information for inclusion in disclosures related to indicators and targets, risk management, and strategy aspects.	▪ Inventory the sustainability-related data that needs to be collected within the Company's reporting boundaries and across the value chain. ▪ Establish the linkage between sustainability-related data and the data used in financial reporting (such as input values and parameters).	▪ Revise and adjust company processes, financial and non-financial reporting processes, information systems, supply chain management processes, internal control, and the daily operations of each department.	▪ Pilot the preparation of a dedicated section on sustainability information in the Annual Report. ▪ Constantly update the internal control operation manual related to IFRS sustainability information and conduct training and education.	▪ According to the IFRS Sustainability Disclosure Standards, disclose relevant information in the special section on sustainability information in the 2026 Annual Report and simultaneously complete the announcement and filing with the 2026 financial statements.

Group's Promotion of Internal Carbon Pricing

Taiwan officially announced the implementation of three subordinate regulations for carbon fees on August 29, 2024, and announced the carbon fee rate on October 21, 2024. Starting in 2025, carbon emissions will be formally included in the carbon fee calculation, marking the beginning of the carbon pricing era.

To proactively align with government policies, effectively address climate change, and reduce carbon risks, TTC introduced an internal carbon pricing mechanism in 2024. The initial internal carbon price is set at NT$300 per metric ton, referencing the domestic carbon fee pricing benchmark, with a phased increase to be reviewed and adjusted periodically. This mechanism integrates carbon costs into corporate decision-making and investment evaluation processes, assesses the impact of carbon emissions on business operations, accelerates the implementation of carbon reduction measures, and drives low-carbon investments.

In July 2024, the Group organized two training sessions to help relevant departments understand the concept and application of internal carbon pricing, supporting each plant in promptly implementing the system. Additionally, a general knowledge course on carbon-related topics was held in September, inviting all Group employees to participate. These initiatives aim to enhance overall carbon reduction awareness and professional capabilities, fostering collective efforts toward achieving the Group's carbon reduction targets.

Carbon Data Management Platform Development

To enhance the timeliness and accuracy of carbon emissions data, the USIG launched the development of a carbon data management platform starting in 2024. This initiative aims to strengthen internal carbon inventory processes and data integration capabilities across the Group. In the first phase, the platform covers five plants in Taiwan, with TTC Linyuan Plant as the pilot site, primarily focusing on systematic collection of Scope 1 and Scope 2 emissions, while gradually incorporating selected Scope 3 items. The system is designed to integrate with the existing monthly reporting mechanism and certificate upload processes, ensuring data consistency and traceability between activity data and original documentation. It features flexible export functions to support reporting in various required formats. Through the implementation of this platform, USIG enhances its carbon management efficiency, demonstrating a data-driven approach to carbon reduction while improving information transparency and climate resilience.

3.2.2 Energy Usage and Management

TTC's Energy Management Goals

The Company 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 set Carbon neutrality by 2050 in 2023. The three core manufacturing 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 the Group's influence and so to lower environmental impact.

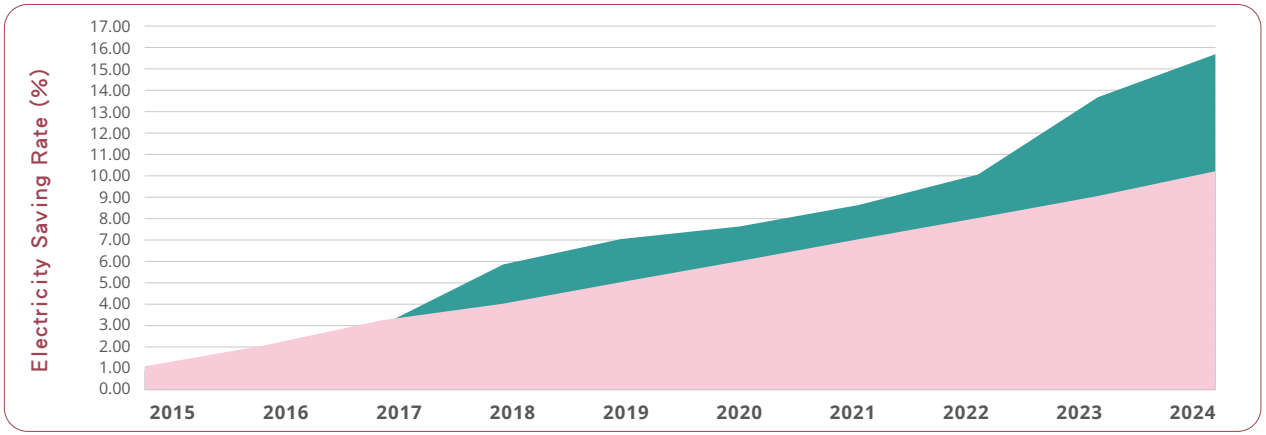
Group Technical Exchange Meeting

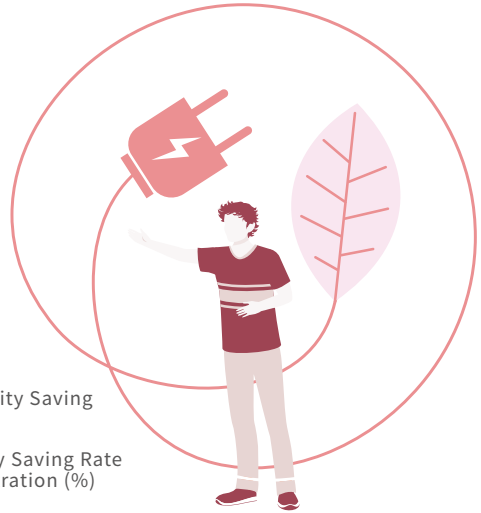
Every year TTC participates in the "plant technology exchange meeting" held by USIG and several "northern/Kaohsiung plants resource integration meetings" for plants to share resources and exchange technologies to improve performance in energy conservation and carbon reduction. In 2024 the "plant technology exchange meeting" was held in November. Case presentations with themes including "industrial safety and environmental protection", "equipment preventive maintenance," and "energy conservation and carbon reduction" were conducted through competitions. Through plan technology case submission and documentary review, a total of 7 cases entered the final. Senior USIG officers and plant representatives elected the three best cases. The USIG Chairman presented the certificates and bonuses to the winners. Through ratings and encouragement, sharing, and mutual learning, we aim to advance technology in the Group.

TTC's Commitment to the Group's Energy Management Goals

TTC has been actively engaged in energy-saving and carbon reduction projects. The electricity-saving performance of its Taiwan plants is summarized in the table below, meeting the Energy Administration's requirement for large electricity users to achieve an average annual energy-saving rate of over 1% from 2015 to 2024. In 2024, TTC continued to promote various energy-saving projects, with each plant implementing initiatives such as the replacement of high-efficiency energy-saving motors and the phased renewal of air compressors. These measures are reviewed periodically with the goal of further contributing to the Group's overall energy-saving and carbon reduction targets.

Cumulative Electricity Saving Rate (Taiwan Plants)

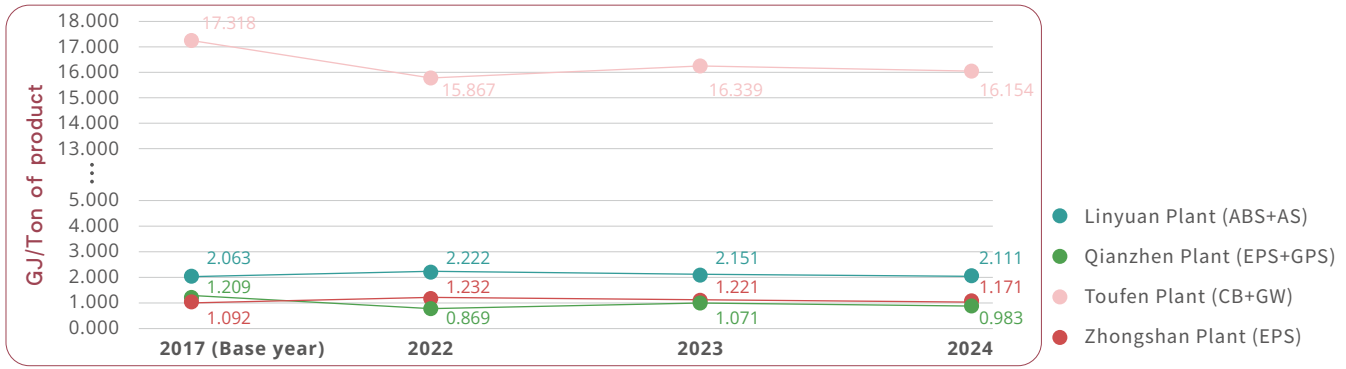




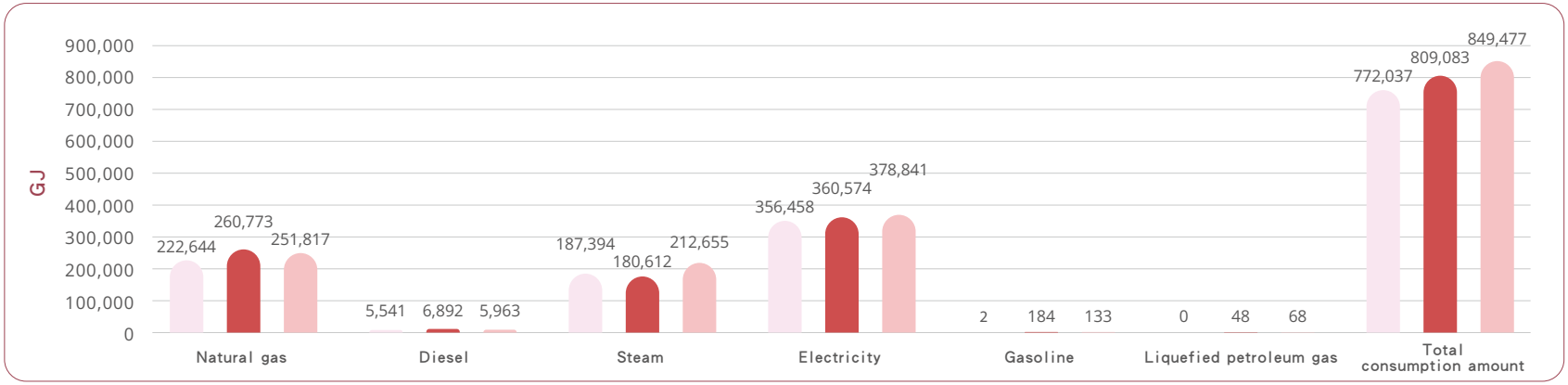
Energy Usage Details

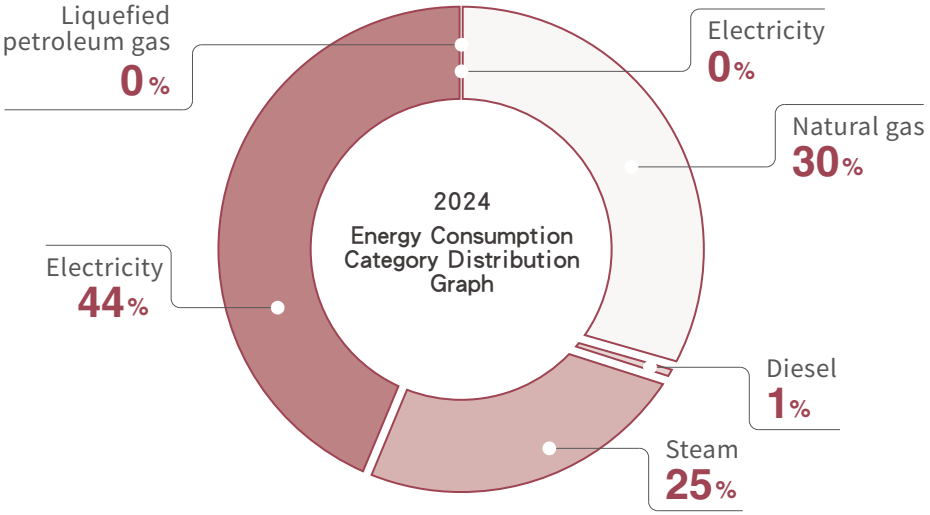
In 2024, the energy consumption calculation of TTC covered Linyuan Plant, Qianzhen Plant, Toufen Plant, and Zhongshan Plant, achieving a coverage rate of 100%. Compared to 2023, the total energy consumption in 2024 increased slightly by approximately 5%, mainly due to the increased production capacity at the Linyuan Plant, which led to higher consumption of natural gas, electricity, and steam. In terms of energy consumption per unit of product, all plants recorded a decrease in energy intensity compared to 2023. Relative to the 2017 base year, the overall average energy intensity decreased by 5.82%, achieving the target of reducing energy consumption per unit of product by 3%.

Energy Consumption Intensity by Product Category



Energy Usage for the Last Three Years





Note 1. Referring to the conversion factors for electricity, diesel, gasoline, and liquefied petroleum gas announced by the Energy Administration, Ministry of Economic Affairs, they are 860 Kcal/KWh, 8,400 Kcal/L, 7,800 Kcal/L and 6,635 Kcal/L respectively, where 1 Kcal equals 4.187 KJ.

Note 2. Referencing the steam calorific value tables from THERMOPEDIA, the calorific value of steam usage at an average furnace pressure of about 12.5 atmospheric pressures is calculated as 665,345 Kcal/m3.

Note 3. The reference calorific value for natural gas used by electricity generation customers from CPC Corporation is 9,700 Kcal/m3.

Note 4. The table above lists energy consumption and production data sources— site unit consumption reports.

Note 5. Electricity accounts for 44.60% of the total energy used by the Company, all of which is purchased electricity (100%), with no use of renewable energy (0%) or self-generated energy (0%).

Note 6. Gasoline and liquefied petroleum gas have been included in the statistics starting from 2023.

3.2.3 GHG Management

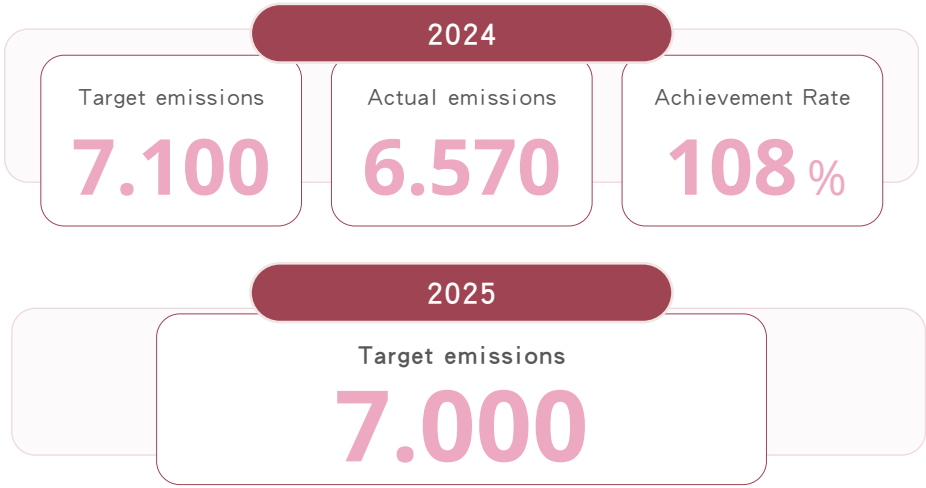
TTC follows the 2030 carbon reduction goals set in early 2022 that GHG emissions should 27% less than 2017 base year by 2030, and further set carbon neutrality by 2050 goal in 2023. This is reviewed regularly to ensure we meet annual emission targets. This goal is realized through the execution of various energy-saving initiatives and plans to reduce greenhouse gas emissions. Each plant has proposed measures like reducing process energy consumption, waste heat recovery and reuse, improving equipment efficiency, and energy management. There's also an integrated plan for energy and resource sharing across different plants to maximize resource use, further aiming to reduce emissions.

In alignment with the Group's 2050 carbon reduction target, a decarbonization roadmap has been planned. In 2024, the total greenhouse gas (GHG) emissions from the Taiwan plants amounted to 65,700 tons CO_2e. Due to a production capacity increase of 34,000 tons at the Linyuan Plant, total emissions rose by 0.4% compared to 2023. 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.

TTC began promoting the adoption of ISO 14064-1 in 2021: In 2018, greenhouse gas inventory operations were carried out (Zhongshan and Tianjin subsidiaries in the TTC consolidated report have completed their verification in 2024). Third-party guidance and verification have ensured the accuracy and reasonableness of greenhouse gas emission data. In 2024, the overall emissions (Scope 1 + Scope 2) of the Taiwan plants decreased by 17.57% compared to the base year, achieving the target of 9% reduction. Furthermore, the Company's average GHG emissions per unit product decreased by 24.52% compared to the base year.

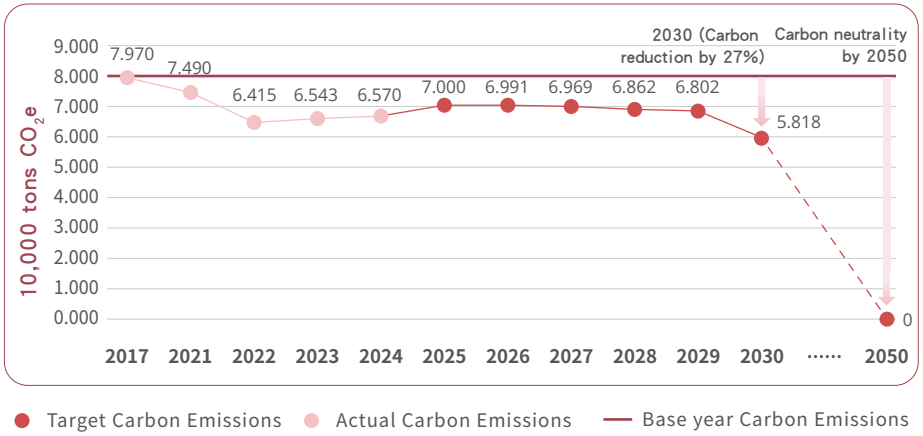
The total emissions of the merged company Scope 1 in 2024 are 16,989 metric tons CO_2e， Scope 2 emissions 60,652 metric tons CO_2e， Total 77,641 metric tons CO_2e，And obtain an external confirmation report.

TTC's Taiwan Plant Carbon Reduction Pathway Targets (10,000 tons CO_2e)

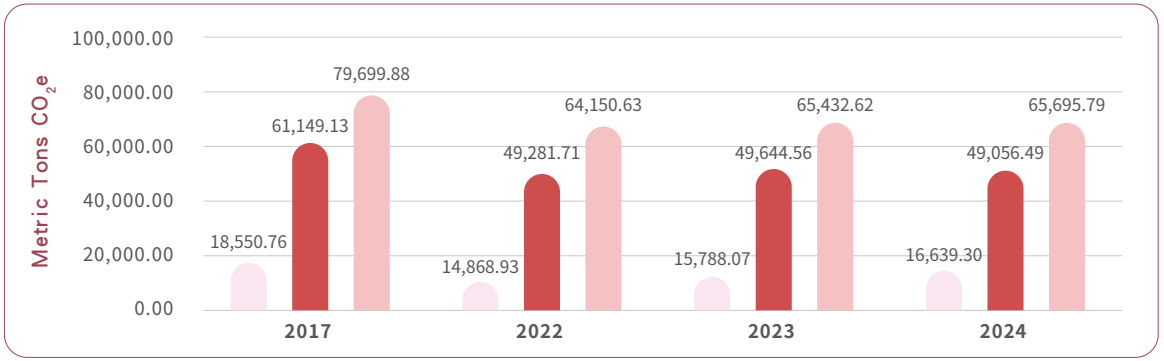


Note: Achievement Rate = 2024 Target Emissions/2024 Actual Emissions

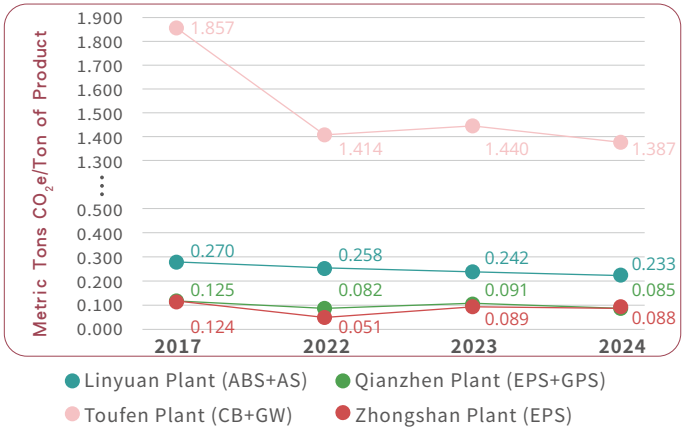
TTC's Taiwan Plant Carbon Reduction Pathway Targets Graph



TTC Taiwan Plants Carbon Emissions



Carbon Emission Intensity by Product Category



Note 1. The product unit carbon emission values disclosed in this report are self-estimated
Note 2. Carbon emissions in the 2017 base year were recalculated using external verification methods but were not audited by a third party

Scope 3 Other indirect emissions, covering Taipei headquarters, Qianzhen factory, Linyuan factory, Toufen factory, Zhongshan factory, and Tianjin factory, including greenhouse gas emissions caused by the organization's outsourced upstream and downstream supply chains, transportation and distribution of raw materials and goods, product use and disposal, as well as the organization's business travel and employee commuting. In 2024, due to the expansion of export markets, Scope 3 emissions amounted to 82,509 tons CO_2e per year, representing a 2.57% increase compared to 2023.

TTC Scope 1 to Scope 3 Carbon Emissions by Site

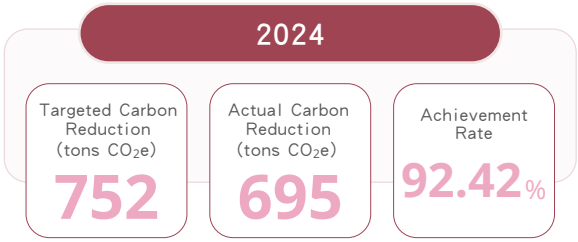
Note 1. The emission factors are based on Version 6.0.4 of the Greenhouse Gas Emission Coefficient Management Table announced by the Ministry of Environment, as well as the Global Warming Potential (GWP) values from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) published in 2014.
Note 2. The types of greenhouse gases include CO_2, CH_4, N_2O, and HFCs.

Promotion of Energy-Saving and Carbon Reduction Initiatives

TTC has established energy-saving and carbon-reduction committees in all its Taiwan-based plants. They convene regular Energy Resource Integration Meetings to share experiences and collaboratively drive effective and pragmatic energy-saving and carbon-reduction initiatives. The plants set energy-saving and carbon-reduction strategies, as well as plant-wide reduction targets, and review the performance on a quarterly basis.

Every two months, each plant's Environmental, Health, and Safety (EHS) team convenes an EHS implementation meeting. This meeting tracks the progress of energy-saving and carbon-reduction initiatives, evaluates compliance with applicable regulations, and actively urges each plant to fulfill its energy-saving and carbon-reduction responsibilities. In mainland China, the Zhongshan Plant holds annual energy-saving and carbon-reduction meetings, aligning with the government's carbon-reduction policies. They establish strategies and targets for each unit, which are reported to the Zhongshan Development Zone government every year.

In 2024, a total of 18 energy-saving and carbon reduction projects were implemented across the Taiwan plants. The execution results are summarized in the table below:



Note: Achievement Rate=2024 Actual Carbon Reduction/2024 Targeted Carbon Reduction

2024 Performance Overview Table of Energy-Saving and Carbon-Reduction Measures

Plant	Measures	2024 Performance	
		Power Saved (kWh)	Carbon Reduction (tons CO_2e)
Linyuan Plant	· Swapped outlet pipelines for B3403-6 and B3403-7 in Area 34 (SAN storage tank area), with corresponding adjustments in DCS control and interlock systems · Decommissioned EP (Z3285-2) and B3285-2 units in Area 32 · Replaced exhaust fan B3220 in Area 32 mold head section (upgrading from Dafeng RS-250 to Dafeng RS-150 model) · Replaced circulation pump P2572-2 in Area 25 with a high-efficiency motor · Replaced P6210-4 pump with a high-efficiency model	228,075	108
Qianzhen Plant	· EPS energy-saving air dryer replacement project · Replacement of EPS section C2910-4 air compressor · Replacement of five gear motors on EPS reactors and washing tanks with IE3 motors · Replacement of four motors on dryers and mixers with IE3 motors · Replacement of NOVA chiller EK660-1 with an IE3 motor	731,891	347
Toufen Plant	· Adoption of IE3 high-efficiency energy-saving motors (19 units/185 HP) · Lighting improvement by replacing 10 lamps in 4 areas with LED lights, reducing total power from 1,232W to 940W · Removal of upper layer bridging roller motor (5HP, 6P) · Piping modifications to improve system efficiency and decommissioning of #5 dryer · Cooling fan adjustment measures for six auxiliary transformers at the preheating furnace · Complete reconstruction of the hardening furnace to enhance production efficiency · Molding system reconstruction (11/4~11/7) · Energy-saving improvement for #3 air compressor cooling water system (10/17)	506,279	240
Total		1,466,244	695

Note 1. Unit conversion factor: 1 kWh=0.474 kg CO_2e

A total of 15 measures are scheduled for implementation in 2025 at Taiwan Plants for energy-saving and carbon reduction projects. A summary of these projects is presented in the table below:

Overview Table of Planned Energy-Saving and Carbon-Reduction Measures for 2025

Plant	Measures	2025 Goals	
		Power Saved (kWh)	Carbon Reduction (tons CO_2e)
Linyuan Plant	· Replacement of B2644A-1 Roots blower in Area 26 (ABS Process Area) · Specification upgrade and replacement of B3403-3 Roots blower in Area 34 (SAN Storage Area) · Specification upgrade and replacement of B3403-4 Roots blower in Area 34 (SAN Storage Area) · Specification upgrade and replacement of B3403-5 Roots blower in Area 34 (SAN Storage Area) · Modification of bottom discharge piping of flotation tank at B-line in Area 82 (Wastewater Treatment Area) and partial process modification of wastewater flow at B-line in Area 82	278,430	132
Qianzhen Plant	· Replace four EPS reactor gearbox motors with IE3 motors · Install five air receivers with zero-loss automatic drain valves · Upgrade old cooling towers with new ones that offer enhanced energy-saving and carbon reduction efficiency	472,836	227
Toufen Plant	· Replace #1 air compressor (200 HP) with a IE3 motor · Combine piping of two second-floor office chillers, switching to one-in-use and one-standby operation (12.8 kW) · Lighting upgrade (replace ten 100W skylight lamps with 80W energy-saving lamps) · Install high-efficiency IE3 motors (9 motors totaling 59.5 HP) · Energy-saving improvement for #1 air compressor cooling water system · Reconstruct melting furnace to enhance production efficiency · Replace main furnace transformer	1,355,698	643
Total		2,106,964	1,001

Note 1. Unit conversion factor: 1 kWh=0.474 kg CO_2e

3.3 Water Resources Management GRI 3-3、GRI 303 (303-1、303-2、303-3、303-4、303-5)

3.3.1 Water Resources Management

Material Topics

Water Resources Management

Material Reason

Water resources are essential for operational development. As the risks of water scarcity and water-related disasters increase, ensuring a stable water supply has become a crucial issue for our company. Wastewater discharge has exceeded the natural purification capacity of water bodies in recent years, leading to water pollution issues and affecting the use of water resources.

Impact Boundary

Government agencies, local communities, employees

Sustainability Principles and Corresponding SDGs

Create Friendly Environments / SDGs 6 Clean Water and Sanitation

Management Approach

Policy Purpose	Reduce water consumption to lessen production costs and the environmental impact of wastewater discharge. Objectives are set with 2017 as the base year for short, medium, and long-term reduction.
Objective	2024 Goals: (1) Reduce water consumption per unit of product by 3% compared to the base year (2) Discharge water quality meets the standard Mid-term goals in 2027: (1) Reduce water consumption per unit of product by 7% compared to the base year (2) Discharge water quality meets the standard Long-term goals in 2030: (1) Reduce water consumption per unit of product by 15% compared to the base year (2) Discharge water quality meets the standard
Management Plan	1. Introduce or upgrade equipment, and reuse wastewater to reduce water consumption 2. Strictly regulate water usage in the plant to prevent water wastage and increased wastewater discharge.
Evaluation of the Management	Monitor "water consumption per unit of product" and "rate of exceeding water discharge quality standards" as key performance indicators. Present reports to management and conduct an annual review to assess the previous year's performance and suggest improvements.
Assessment Mechanism	Continuously implement the ISO 14001 Environmental Management System for systematic management of water resource usage.
Assessment Result	✔1. In 2024, water consumption per product unit decreased by 20.33% compared to 2017, achieving the goal ✔2. All plants met the regulatory standards for wastewater discharge.
Negative Impact Remedies and Preventive Measures	1. Water reservoir shortage leading to production interruption: Participate in public sector water-saving plans and explore alternative water sourcing methods 2. Review of water resource reduction and improvement measures plan
Policy Adjustment	Proposals for improvements concerning unmet targets are presented and reviewed during management review meetings.
Grievance Mechanism	Details can be found in Section 3.1.2 under EHS Grievance Channels.

TTC employs the water risk assessment tool developed by the World Resources Institute (WRI). In conjunction with the water source distribution of each plant site, the Company uses the Aqueduct Tool as its method for water risk assessment, pinpointing the water stress situation of each plant's water intake location. The analysis indicates that the Linyuan Plant and Qianzhen Plant are regions with relatively higher risk for TTC. Apart from utilizing the TCFD framework to assess the impact of climate change on water resources, the Company continually enhances its in-plant water recovery rate, thereby bolstering its adaptive capacity in the face of risks. The water sources for all plants in Taiwan are supplied by municipal water plants, while the Zhongshan Plant procures its water supply from a nearby local factory. Within the Company, areas where water consumption pressure exceeds 40% are defined as regions with water resource stress, serving as a key basis for water management and risk response.

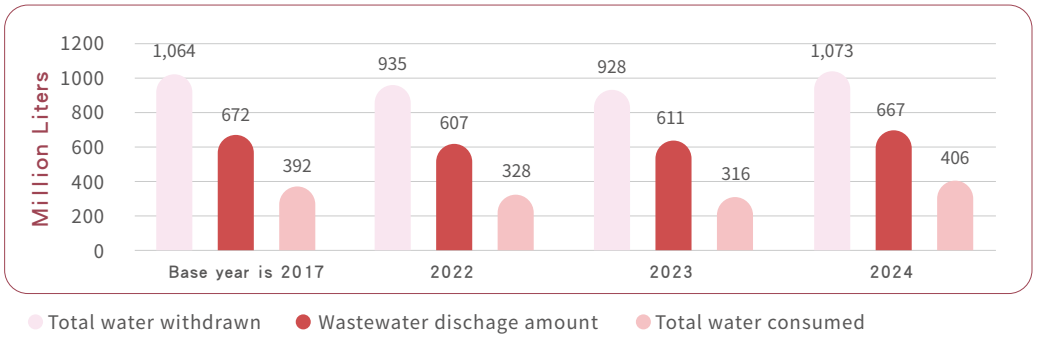
Plant	Linyuan Plant	Qianzhen Plant	Toufen Plant	Zhongshan Plant	Total
Primary Water Sources	Fengshan Reservoir	Fengshan Reservoir	Yonghe Mountain Reservoir	Hengmen Canal	
Water Stress Situation	Low to Moderate (10 - 20%)	Low to Moderate (10 - 20%)	Low to Moderate (10 - 20%)	Moderate to High (20 - 30%)	
Water Intake (Million Liters)	276	526	20	251	1,073

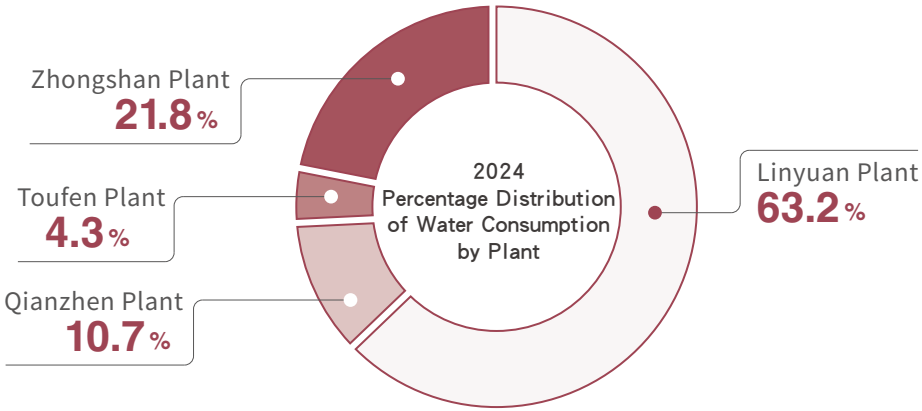
Note 1. The WRI (Water Resources Institute) Aqueduct Tool is used for water risk assessment. http://www.wri.org/our-work/project/aqueduct/aqueduct-atlas

The scope of water resource management covers the Linyuan, Qianzhen, Toufen, and Zhongshan plants, achieving 100% coverage. TTC leverages its existing technologies and expertise, adhering to principles of source management, waste reduction in processes, and end-point controls, to minimize water demand and reinforce water resource reuse and accelerated recovery processes.

In 2024, the total water intake was 1,073 million liters, total wastewater discharge was 667 million liters, and total water consumption was 406 million liters, representing an increase of approximately 3.73% compared to the 2017 base year. This increase was mainly due to higher production capacities at the Linyuan and Zhongshan plants. For the water consumption of products in each plant, the Linyuan Plant accounts for the highest proportion at approximately 63.2%, followed by the Zhongshan Plant with about 21.8%.

Water Usage for the Last Three Years

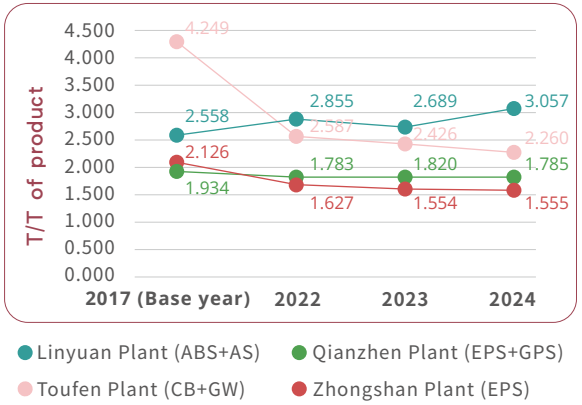




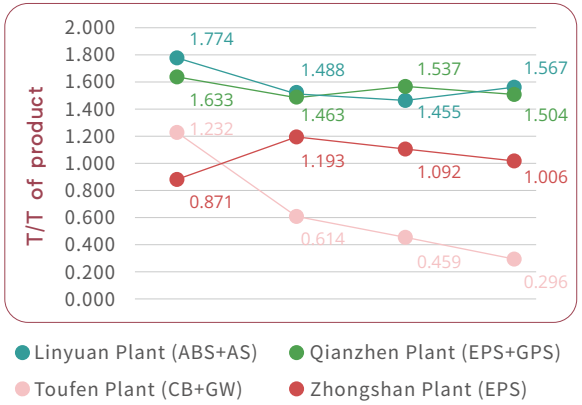
Water Resource Intensity

Compared to 2023, the water consumption per unit product and unit wastewater discharge per product in 2024 decreased or remained stable across all plants except for the Linyuan Plant, which experienced an increase. Overall, the average unit water consumption decreased by 20.33% compared to the 2017 base year, achieving the target of reducing unit water consumption by 3% from the baseline. Similarly, the average unit wastewater discharge per product decreased by 20.66% compared to 2017.

Water Consumption Intensity by Product Type



Water Discharge Intensity by Product Type



Water-saving Measures

TTC actively manages water resources by achieving water-saving results through measures such as conserving water in processes, wastewater recycling and reuse, and rainwater collection and reuse.Through improvements in water-saving processes and multiple schemes like wastewater recycling and reuse, there's a significant increase in the wastewater reuse rate. Beyond implementing water-saving plans, water usage has further been included in the monthly key performance indicator monitoring. Statistics and analysis are performed on water usage. If any anomalies in water consumption are detected, an immediate investigation into the cause is initiated, followed by necessary improvements.

TTC's Water Recycling and Reuse Percentage for 2024:

Linyuan Plant	Total Amount of Water Resource Recycling and Reuse (tons)	478.260
	Water Resource Recovery Rate R2 (%)	37.52

Note: The Water Resource Recovery Rate (R2) is calculated according to the formula provided by the Water Resources Agency

All the plants under TTC properly handle process wastewater and other wastewater. For wastewater discharge, each plant operates at standards that surpass regulatory requirements. The wastewater from Toufen Plant is treated by CGPC. In 2024, no violations or exceedances of water quality standards were recorded at any plant, achieving the target of compliant effluent quality.

Wastewater Discharge Status at Each Plant

Plant	Wastewater Discharge Standard	Discharge Destination
Linyuan Plant	Secondary biological treatment up to the industrial area's joint wastewater treatment plant standard	Discharged via underground pipelines to the joint wastewater treatment plant and subsequently discharged into the ocean after treatment.
Qianzhen Plant	Secondary biological treatment up to the standard for water discharge.	Discharged to an external open drain and then discharged into the Kaohsiung port.
Toufen Plant	The glass wool production process is an environmentally friendly process with no wastewater. Water used in the process is filtered and recycled. Rainwater is also filtered and used in the glass wool production process. Wastewater generated from the curved printing process is treated by CGPC up to the water discharge standard.	Discharged jointly with CGPC into the Zhonggang River.
Zhongshan Plant	Treated in accordance with the national standard GB31572-2015 "Pollutant Emission Standards for the Synthetic Resin Industry."	Discharged into the Hengmen Canal.

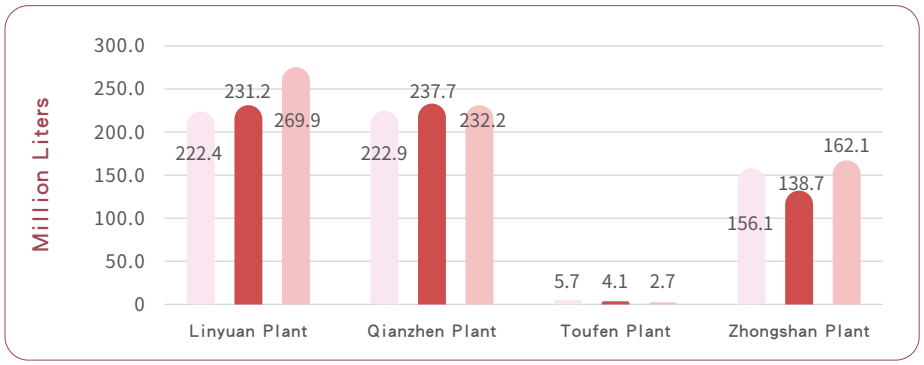
In 2024, the total wastewater discharge of TTC increased by 9.02% compared to 2023, primarily due to production capacity increases at the Linyuan and Zhongshan Plants. However, all plants operate wastewater treatment processes that exceed regulatory standards. In addition to regular reviews, improvement plans are formulated annually. Water quality testing over the past three years has consistently met regulatory discharge standards.

Self-tested Results on Main Water Quality Parameters by Each Plant Overview Table for the Last Three Years

Plant	Water Quality	2022	2023	2024	Emission Standard
Linyuan Plant	pH value	7.2	7.1	7.3	6~9
	COD (mg/L)	45.55	38.6	68.9	100
	SS (mg/L)	11.4	9.1	11.4	30
Qianzhen Plant	pH value	7.2	7.3	7.3	6~9
	COD (mg/L)	26.2	24.3	17.45	100
	SS (mg/L)	12.6	5.65	4.65	30
Zhongshan Plant	pH value	7.32	7.2	7.4	6~9
	COD (mg/L)	19.19	29.4	20.93	60
	SS (mg/L)	9.2	9	4	30

Note: All the wastewater discharged by the factories of TTC, after treatment, is freshwater.
Note: The water quality test values are averaged from two tests conducted per year.

Wastewater discharge volume by Plant



Wastewater Improvement Plans for 2024~2025

Plant	2024 Improvement Initiatives	2025 Planned Initiatives
Linyuan Plant	Sand filtration equipment has been planned to decrease the amount of suspended solids (SS) in the discharge water in Zone 82.	The wastewater discharge in Zone 82 was improved by replacing the sand filtration equipment with long-fiber filtration, reducing the suspended solids (SS) content in the discharged water.
Qianzhen Plant	N/A.	Process cooling water towers were upgraded to reduce water loss from evaporation.
Toufen Plant	· Renovation of Domestic Wastewater Pipeline. · Rainwater collection pipelines were installed to supply rainwater for process reuse, thereby reducing freshwater withdrawal. · Modification of overflow prevention for T02-5 water storage tank.	Plan to install a cover on the domestic sewage tank to prevent odor dispersion.
Zhongshan Plant	Wastewater treatment plant water reuse (approximately 46%) technology improvement project.	Continue advancing technical improvements for the reuse of treated wastewater (approximately 46%) at the sewage treatment plant.

3.4 Air Pollution Control GRI 3-3、GRI 305(305-7)

Material Topics

Air pollution control

Material Reason

Air pollution emissions have always been a key concern for government agencies and the public. As a traditional manufacturing company, TTC's plants emit air pollutants during the use of raw materials and production processes, including particulates (Par), sulfur oxides (SOx), nitrogen oxides (NOx), volatile organic compounds (VOCs), and hazardous air pollutants (HAPs). Managing these pollution sources and their emissions is a responsibility and obligation that the Company takes seriously.

Impact Scope

The air pollutants emitted during the production processes have significant impacts on the environment and human health. In recent years, fine particulate matter has been identified to have a profound effect on human health. Nitrogen oxides appear reddish-brown in the air, contribute to acid rain, and can potentially lead to respiratory diseases in humans.

Impact Boundary

Government agencies, partners, community, and employees

Sustainability Principles and Corresponding SDGs

Create Friendly Environments/ SDGs 11 Sustainable Cities and Communities

Management Approach

Policy Purpose	To mitigate the environmental impact of air pollution emissions and, during operations, minimize the factors endangering the health of employees and residents living near the plant areas; the emissions base year is 2017.
Objective	2024 Goals: Zero fines for air pollutant emissions exceeding limits; VOCs emissions per unit product reduced by 10% compared to the base year. Mid-term goals in 2027: Zero fines for air pollutant emissions exceeding limits; VOCs emissions per unit product reduced by 17% compared to the base year. Long-term goals in 2030: Zero fines for air pollutant emissions exceeding limits; VOCs emissions per unit product reduced by 25% compared to the base year.
Management Plan	1. Add or update equipment to reduce pollutant emissions 2. Strictly control the emission quality of flue gases from plants and strengthen autonomous management of VOCs emissions
Evaluation of the Management	The "number of fines for exceeding air pollutant emission limits" and the "number of cases of abnormal mass emissions" are listed as key performance indicators. A review report will be presented to the management level. An annual review meeting is convened to assess the performance of the previous year, aiming to propose improvement measures and evaluate their effectiveness.
Assessment Mechanism	1. Continuously implement the ISO 14001 environmental management system for a systematic management of emissions 2. Regularly monitor plant emission concentrations to enable real-time control of emissions and prompt correction of any abnormalities.
Assessment Result	1. Annual emissions of various pollutants over the last three years 2. Environmental-related fines
Grievance Mechanism	As explained in the "EHS Grievance Channels" section 3.1.2.

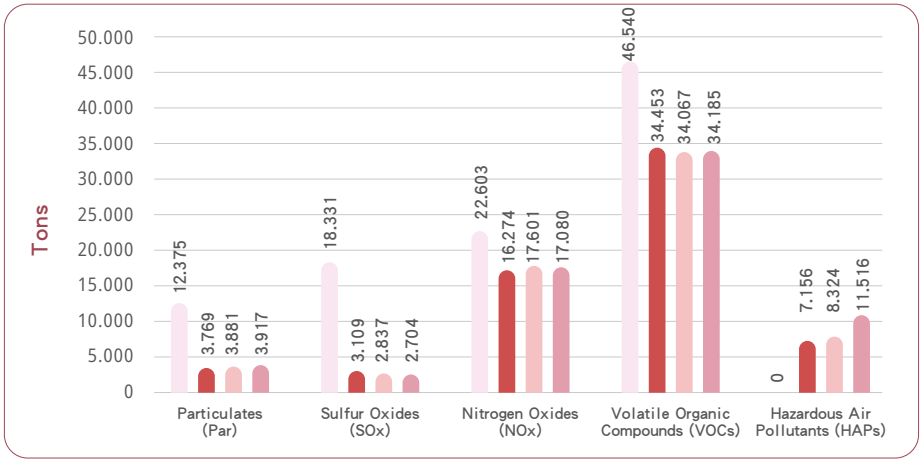
The sources of air pollutant emissions from TTC are outlined in the table below. Petrochemical plants are equipped with RTO systems to ensure the reduction of volatile organic compounds (VOCs). In addition, in response to recent regulatory requirements for hazardous air pollutants (HAPs), the Company has added disclosures on HAPs emissions.

Overview Table of Main Air Pollutants and Their Sources in Each Plant

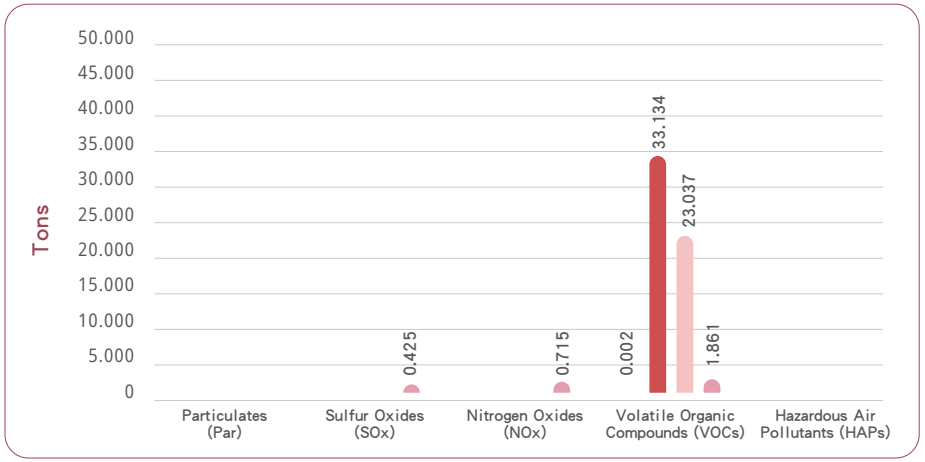
Plant	Main Air Pollutants	Primary Sources
Linyuan Plant	Particulates, SOx, NOx	Emissions from thermal media boilers, incinerators, and exhaust combustion towers.
Linyuan Plant	VOCs, HAPs	Emissions from exhaust combustion towers, storage tanks, equipment components, process exhaust ducts, wastewater treatment plants, and regenerative incinerators.
Toufen Plant	Particulates, SOx, NOx	Emissions from fiberglass formation and drying ovens.
Toufen Plant	Particulates, SOx, NOx	Styrene emissions from the production process, which are annually tested by third-party contractors. The emission results comply with the "Pollutant Emission Standards for the Synthetic Resin Industry" (GB 31572-2015).

In 2024, compared to the 2017 base year, the Taiwan plants of TTC achieved the following reductions in air pollutant emissions: a 68.34% reduction in particulates (Par), an 85.25% reduction in sulfur oxides (SOx), a 24.44% reduction in nitrogen oxides (NOx), and a 26.55% reduction in volatile organic compounds (VOCs). For the Zhongshan Plant in mainland China, starting from 2024, monitoring of SOx and NOx emissions has been conducted in accordance with local regulations, and with the addition of RTO (Regenerative Thermal Oxidizer) equipment, VOC emissions have significantly decreased by 91.92% compared to 2023.

Taiwan plants air pollutant emission information by type:



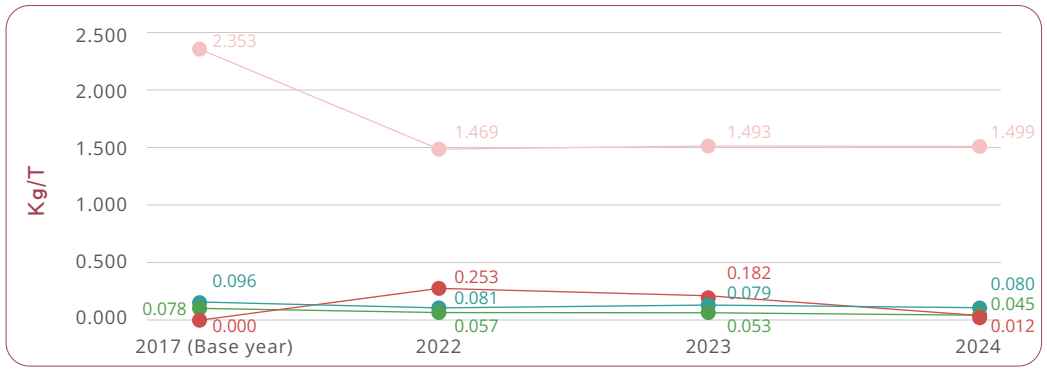
Mainland China Zhongshan Plant air pollutant emission information by type



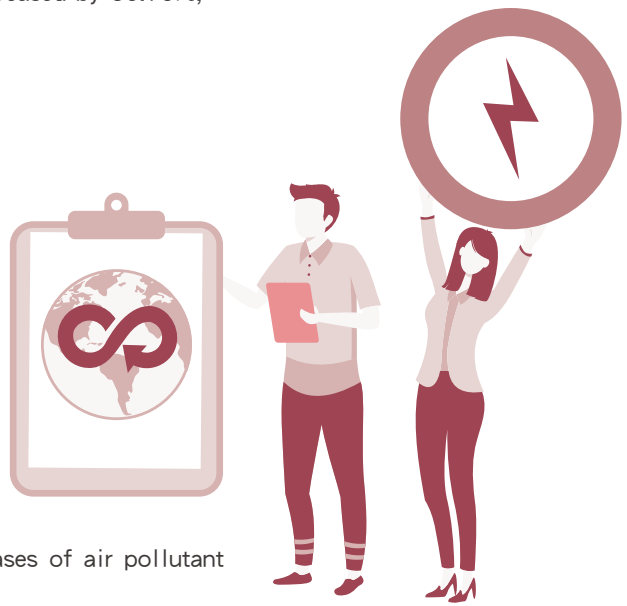
Note: In mainland China, there is currently no established regulatory mechanism for Hazardous Air Pollutants (HAPs). Therefore, HAPs emission data for the Zhongshan Plant is not disclosed.

In terms of VOCs emissions per unit product, using 2017 as the base year, the overall average for the Taiwan plants decreased by 35.76%, successfully achieving the target of a 10% reduction in VOCs emissions per unit product compared to the base year.

VOCs Emission Intensity by Product Category



Note: There is no VOCs emission data for the Zhongshan Plant in the year 2017.



In 2024, TTC recorded two air pollution violation incidents at the Linyuan Plant, failing to meet the target of zero cases of air pollutant exceedance fines. The details of the violations and corrective actions are as follows:

Air Pollutant Emission Improvement Plan for 2024

Plant	Situation in 2024	Explanation (including reasons for non-achievement)	Improvement Plan for 2024
Linyuan Plant	2 cases of violations	On March 27, 2024, the Kaohsiung Environmental Protection Bureau's Inspection Division conducted an inspection of the plant's emission ducts. It was found that black smoke was emitted from the RTO duct in Area 26 of the plant. In accordance with Article 32, Paragraph 1, Subparagraph 1 of the Air Pollution Control Act, the Company was fined NT$225,000.	All process and utility areas within the plant are required to notify the Area 26 shift supervisor prior to start-up and shutdown operations. During these periods, the supervisor is responsible for monitoring the operation of the RTO and adjusting its operating parameters as necessary.
		On July 04, 2024, the Kaohsiung City Environmental Protection Bureau dispatched inspectors to the Plant to conduct inspection checks on equipment components. The inspection revealed that two points of equipment components had leak concentrations exceeding the "Kaohsiung City Equipment Component Volatile Organic Compounds Control and Emission Standards", set at 2000ppm. A fine of NT$300,000 was imposed under Paragraph 1, Article 20 of the Air Pollution Control Act.	· VOC concentrations exceeded standards at the cover gap of the water seal tank (P2238(O01)) in Area 22. The cover sealing has been improved, with regular replacement of water in the seal tank. A follow-up inspection by a third-party testing company was arranged on July 5, and the improvement results have been submitted to the Environmental Protection Bureau for completion confirmation. · VOC concentrations exceeded standards at the drainage bucket of the settling tank (A04-O01) in Area 24. Drainage operation procedures have been revised: after discharge, the bucket is immediately removed from the production area, emptied into the wastewater treatment facility, and covered when empty. A follow-up inspection by a third-party testing company was arranged on July 5, and the improvement results have been submitted to the Environmental Protection Bureau for completion confirmation.

Air Pollutant Emission Improvement Plan for 2024 and 2025

Plant	2024 Improvement Initiatives	2025 Planned Initiatives
Linyuan Plant	· Continue to add flue gas denitration control equipment (selective catalyst) to boilers to reduce the emission concentration of nitrogen oxides. · The baghouse dust collector in the waste incineration furnace has been updated to enhance the efficiency of air pollutant control equipment.	· Continue to add flue gas denitration control equipment (selective catalyst) to boilers to reduce the emission concentration of nitrogen oxides. · Improve the exhaust gas collection system in the process area to prevent odor dispersion to the surrounding environment.
Qianzhen Plant	Regenerative Thermal Oxidizer (RTO) is expected to have its metal Pall rings replaced to prevent an increase in pressure differential and ensure that there are no gas leaks.	Cleaning of insulators in the electrostatic precipitator.
Toufen Plant	· Energy methods in the ceiling line dryers are being improved to comply with air pollution emission standards. · Updated the post-furnace cooling blower. · Improvement of electrostatic precipitator drainage.	Planning to install scrubbing and cooling equipment on pipelines P006 and P007 to prevent abnormal smoke emissions and ensure compliance with air pollution control standards.

3.5 Waste Management GRI 3-3、GRI 306(306-1、306-2、306-3、306-4、306-5)

Material Topics

Waste Management

Material Reason

The government enforces strict requirements for the industry to ensure proper waste disposal and traceability. With the existing waste landfill sites nearing capacity, the prices for processing facilities are increasing. Qualified waste disposal companies are hard to find, which affects waste processing for various plants.

Impact Scope

If waste produced during the manufacturing process isn't properly handled, it will impact the environment.

Impact Boundary

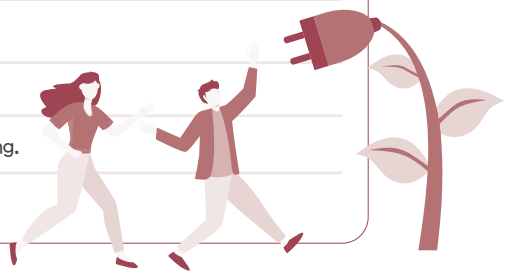
Government agencies
communities
employees

Sustainability Principles and Corresponding SDGs

Create Friendly Environments/ SDGs 12 Responsible Consumption and Production

Management Approach

Policy Purpose	Comply with waste-related regulations, fulfill our duties with due diligence, and minimize waste generated during the production process.
Objective	2024 Goals: Implementation of the waste patrol inspection system; The proper treatment rate of waste is 100% Mid-term goals in 2027: Implementation of the waste patrol inspection system; The proper treatment rate of waste is 100% Long-term goals in 2030: Implementation of the waste patrol inspection system; The proper treatment rate of waste is 100%
Management Plan	1. Establish a waste audit management system. 2. Strictly control waste treatment in the plant and commission legitimate vendors for disposal. 3. With the addition or update of equipment, promote waste reduction plans to decrease the amount of waste.
Evaluation of the Management	Implement autonomous inspections of industrial waste and legally dispose of industrial waste. An annual review report is presented to management during the yearly management review meeting to assess the previous year's performance, propose improvement measures, and evaluate the effectiveness of these improvements.
Assessment Mechanism	Continuously implement the ISO 14001 Environmental Management System to systematically manage waste treatment.
Assessment Result	Annual waste generation and proper handling ratio.
Policy Adjustment	For unmet targets or proposed improvement plans, reviews and adjustments will be presented during the management review meeting.
Grievance Mechanism	Details can be found in Section 3.1.2 under EHS Grievance Channels.



TTC produces waste during production and processing stages of product manufacturing. In recent years, in response to increasingly strict standards imposed on waste disposal contractors, each facility, besides intensifying the advocacy of proper waste classification, storage, and labeling, also endeavors to reduce waste production. This ensures that waste disposal aligns with legal regulations.

TTC adheres to waste management regulations, commissioning certified disposal organizations for waste treatment. We require these operators to provide proper handling documents, periodically check on the commissioned waste management status, and report on disposal volumes. Using the Global Positioning System (GPS) installed on waste disposal vehicles, we verify if the transportation routes align with the designated waste treatment facilities, conducting random vehicle inspections and establishing an autonomous waste inspection system to diligently fulfill our responsibilities. In 2024, a total of 18 inspections were conducted. The results complied with relevant legal stipulations, and the waste inspection system continues to be effectively implemented. Each facility's waste generation and proper handling rate was 100% (Note: The proper waste handling rate indicates that all plant waste is properly treated by certified disposal contractors as per regulations) , achieving the goal of a 100% proper waste treatment rate.

Waste Generation and Disposal Process

In 2024, TTC's total waste generation amounted to 4,696.5 metric tons, representing a 27.22% increase compared to 2017. This increase is primarily attributed to the change in calculation scope—while previous years mainly accounted for bulk waste from each plant, from 2023 onwards, all reported quantities on the official waste reporting platform have been included to effectively track waste flows. The majority of waste generated by each facility is classified as non-hazardous industrial waste. Regarding disposal methods for general industrial waste, 19.83% was incinerated (excluding energy recovery), 15.42% was landfilled, and 0.49% was subjected to other disposal methods. In terms of recycling, 0% was prepared for re-use, 60.95% was recycled, and 3.31% underwent other recycling operations, resulting in an overall recycling rate of 64.26%.

TTC's Waste Production, Transfer, and Disposal in the Last 3 Years

Unit: Tons (T)

Plant	Hazardous/ Non-hazardous	Type of Disposal	Method of Disposal	2022	2023	2024
Linyuan Plant	Non-hazardous waste	Direct Treatment of General Industrial Waste	Incineration (excluding energy recovery)	542.9	316.1	641.5
			Landfill	0.0	10.0	4.2
			Other disposal methods	0.0	0.0	0.0
		Total weight of non-hazardous waste		542.9	326.1	645.7
		Recycling operations	Preparation for reuse	0.0	0.0	0.0
			Recycling for reuse	914.6	907.0	1,166.2
			Other recycling operations	26.5	20.2	84.4
		Total weight of non-hazardous waste		1,484.0	1,253.2	1,896.3
Linyuan Plant	Non-hazardous waste	Direct Treatment of General Industrial Waste	Incineration (excluding energy recovery)	72.1	83.6	88.4
			Landfill	0.0	0.0	0.0
			Other disposal methods	0.0	0.0	0.0
		Total weight of non-hazardous waste		72.1	83.6	88.4
		Recycling operations	Preparation for reuse	0.0	0.0	0.0
			Recycling for reuse	292.8	324.0	341.2
			Other recycling operations	68.8	82.5	60.2
		Total weight of non-hazardous waste		433.7	490.2	489.8

Plant	Hazardous/ Non-hazardous	Type of Disposal	Method of Disposal	2022	2023	2024
Toufen Plant	Non-hazardous waste	Direct Treatment of General Industrial Waste	Incineration (excluding energy recovery)	50.6	39.3	26.7
			Landfill	0.0	0.0	0.0
			Other disposal methods	0.0	0.0	0.0
		Total weight of non-hazardous waste		50.6	39.3	26.7
		Recycling operations	Preparation for reuse	0.0	0.0	0.0
			Recycling for reuse	664.4	1,106.5	1,355.0
			Other recycling operations	2.1	10.6	10.8
		Total weight of non-hazardous waste		717.1	1,156.4	1,392.5
Zhongshan Plant	Non-hazardous waste	Direct Treatment of General Industrial Waste	Incineration (excluding energy recovery)	157.9	162.3	174.9
			Landfill	702.0	924.8	719.8
			Other disposal methods	0.0	0.0	23.2
		Total weight of non-hazardous waste		859.9	1,087.0	917.9
		Recycling operations	Preparation for reuse	0.0	0.0	0.0
			Recycling for reuse	0.0	0.0	0.0
			Other recycling operations	0.0	0.0	0.0
		Total weight of non-hazardous waste		859.9	1,087.0	917.9

Note: The "Other Recycling Operations" refers to the resource recovery of sludge. This is carried out by qualified processing plants using a thermal treatment method, after which it is used as a supplementary material for cement (not a product of TTC).

Plant	Hazardous/Non-hazardous	Type of Disposal	Method of Disposal	2022	2023	2024
Toufen Plant	Toufen Plant	Direct Treatment of Hazardous Industrial Waste	Other disposal methods	2.1	0	0
		Total weight of hazardous waste		2.1	0	0

Note: After washing and processing by qualified contractors, the hazardous industrial wastes from the Toufen Plant are crushed and sliced for recycling.

Flowchart of Waste Generation for TTC in 2024

Waste Management Operations

1 Linyuan Plant

Since 2018, wastewater sludge has been dehydrated using a plate-and-frame type dehydrator, with the addition of a dryer to further reduce moisture, achieving sludge reduction. Some secondary materials (coagulants) from the process are sold to manufacturers as raw materials, reducing waste coagulant production. ABS powder in the process wastewater is also recycled for reuse, reducing sludge waste. In 2024, residual materials from the production process were effectively utilized for use in other product grades. The recycled materials obtained ISO 14021 certification, increasing the volume of material reuse.

2 Qianzhen Plant

Since 2018, optimized the addition ratio of coagulants for wastewater sludge to further improve the efficiency of the belt filter press; planned onsite reuse of waste materials to reduce overall waste generation.

3 Toufen Plant

In 2015, they successfully developed a method to reuse waste glass wool, significantly reducing the need for waste landfilling. From 2016, through process waste reduction and repackaging of defective products, quality-inspected cotton that can be reused is sent back to the production line for pack aging, reducing the handling of waste cotton. This has led to a continuous decrease in waste disposal. In 2022, the curved printing process was dis continued, reducing waste output.

4 Zhongshan Plant

Waste wood generated is sold for incineration by a management unit. Regular household waste is collectively recycled and incinerated by government sanitation units. Sludge is landfilled by a third-party company, while hazardous waste, with the consent of the Zhongshan City Environmental Protec tion Bureau, is processed by qualified companies.

Improvement Plans for Waste Management in 2024 and 2025

Plant	2024 Improvement Initiatives	2025 Planned Initiatives
Linyuan Plant	Recycled and remanufactured process residues, effectively utilizing leftover waste materials as other product grades; the recycled materials have obtained ISO 14021 certification.	Continuously implement process residue recycling and reuse programs to increase the volume of recycled materials.
Qianzhen Plant	Recycling for reuse in-plant raw materials of flexible intermediate bulk container, repurposed for packaging products 751C and 331X.	Implement pallet recycling and reuse programs with raw material suppliers.
Toufen Plant	· Add new vendors for recycling and reuse processing. · Reduce process waste, repackage defective products, and after quality control inspection, the usable cotton is returned to the production line, reducing waste cotton handling and continuously decreasing waste disposal.	· Add new vendors for recycling and reuse processing. · Plan to establish a centralized waste storage site for organized sorting and management. · Reduce process waste, repackage defective products, and after quality control inspection, the usable cotton is returned to the production line, reducing waste cotton handling and continuously decreasing waste disposal.
Zhongshan Plant	· Strengthen process management to reduce end-of-pipe treatment. · Reuse EPS with non-standard particle sizes and periodically sell scrap to downstream manufacturers.	· Strengthen process management to reduce end-of-pipe treatment. · Reuse EPS with non-standard particle sizes and periodically sell scrap to downstream manufacturers.