

CH4 Eco-friendliness

Resources management	GRI 3-3, 301-1, 301-2, 301-3, 303-1, 303-2, 303-3, 303-4, 303-5	60
Climate change and energy management	GRI 2-23, 2-24, 3-3, 201-2, 302-1, 302-3, 302-4, 305-1, 305-2, 305-4, 305-5	65
Emissions management	GRI 3-3, 305-6, 305-7, 306	76

Performance Highlights

- ✓ Electricity consumption reduced by **1.63%** on average each year during 2015-2022, better than the regulatory requirement of 1%.
- ✓ GHG emissions were **111,975tCO₂e**, by **4.5%** less over 2017 (base year) in 2022.
- ✓ Reduced energy consumption by **977GJ** or carbon by **138tCO₂e** in 2022.

Material Topics

- Raw material management
- Water resources management
- Climate Change and Energy Management
- Air pollution control

SDGs Correspondence



Certified management system



ISO 14001 Environmental Management Systems
Validity: 13 May 2022 - 3 May 2025



ISO 50001 Energy Management Systems
Validity: 19 November 2022 - 19 November 2025



4.1 Resources management

Raw material management

Material issue: Materials management; Corresponding sustainability principle: Sustainable development GRI 3-3

Management Approach and Its Components	Impact Management	Targets and Performance of Management Approach	Evaluation of Management Approach
<p style="text-align: center;">Significance to APC</p> <p>Strengthen materials management, enhance materials efficiency, lower the production cost, and reduce waste generation.</p> <hr/> <p style="text-align: center;">Management Practice and Target</p> <p>Lower the production cost, reduce waste generation, and lower environmental impact through monitoring ethylene efficiency and controlling FIBC recovery.</p> <hr/> <p style="text-align: center;">Strategy</p> <ul style="list-style-type: none"> · Energy efficiency monitoring · Materials recycling and reuse 	<p style="text-align: center;">Positive/Negative Impacts</p> <ul style="list-style-type: none"> · Continued the management follow-up of 2021 <hr/> <p style="text-align: center;">Processes to remediate and prevent negative impacts</p> <p>NA</p>	<p style="text-align: center;">2022 Goals</p> <ul style="list-style-type: none"> · Ethylene efficiency ≤ 1.009 · Equipment operation rate $\geq 96.6\%$ · FIBC recovery rate $\geq 78\%$ <hr/> <p style="text-align: center;">2022 Performance</p> <ul style="list-style-type: none"> · Ethylene efficiency: 1.0041 (✓) · Equipment operation rate: 95.1% (✗) · FIBC recovery rate: 78.2% (✓) <hr/> <p style="text-align: center;">2023 Goals</p> <ul style="list-style-type: none"> · Ethylene efficiency ≤ 1.009 · Equipment operation rate $\geq 96.6\%$ · FIBC recovery rate $\geq 78\%$ <hr/> <p style="text-align: center;">Planning Medium- & Long-Term Goals</p> <ul style="list-style-type: none"> · Increase the dispatch flexibility of materials supply through the Kaohsiung ICT Phase II investment project to increase ethylene supply by about 19%/day. · Promote the circular economy, enhance the scrap efficiency, and recycle and reuse waste film rolls $\geq 60MT$. 	<p style="text-align: center;">Effectiveness Assessment</p> <ul style="list-style-type: none"> · Include ethylene efficiency as a quality target to control the accomplishment rate. · Include materials recycling and reduction volumes in routine management. <hr/> <p style="text-align: center;">Evaluation of the management approach</p> <ul style="list-style-type: none"> · Periodically review ethylene efficiency at the weekly plant affairs meeting. · The Finished Product Section produces statistics and follows up the FIBC recovery rate each month.

Materials use

We mainly produce low density polyethylene (LDPE) resins and ethylene vinyl acetate copolymer resin (EVA) with ethylene and VAM being the major materials and mineral spirit the secondary material.

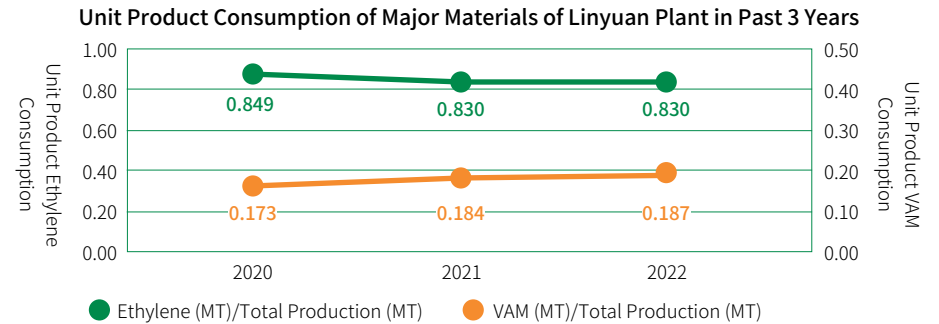
We do not use recycled materials for the major materials or recycle our products for reuse. The consumption of major materials in the past three years are tabulated below:

Major Materials Consumption of Linyuan Plant in Past 3 Years

Material	Unit	2020	2021	2022
Ethylene	MT	110,065	112,990	107,936
VAM	MT	22,460	25,105	24,270

In 2022, the overall capacity reduced by 4.4% over 2021 as a result of the increased unplanned halts. Due to the high EVA demand and development of high-value and high VA content products, the unit product VAM consumption increases annually, while the unit product ethylene consumption reduces each year.

The graph below shows the unit product consumption of major materials in the past three years:



Materials Use GRI 301-1, 301-2

Linyuan Plant packs products in bags or in containers. The former includes PE bags, FIBC, container bags, top sheet, and shrinkable films. **No recycled materials are used.**

To lower the environmental impact of product packaging materials, customers recover PE bags, container bags, top sheets, and shrinkable films for the temporary packaging of goods or debris. Linyuan Plant recovers FIBC for reuse. Transporters will bring FIBC back to Linyuan Plant in the next delivery. Each FIBC is reused for about four times on average.

Reuse Volume and Recovery Rate of Packaging Materials in Past 3 Years GRI 301-3

Packaging Material	Unit	2020		2021		2022	
		Consumption	Recovery	Consumption	Recovery	Consumption	Recovery
PE Bag	MT	389	Recovered by customers	482	Recovered by customers	474	Recovered by customers
Top Sheet and Shrinkable Films	MT	27	Recovered by customers	58	Recovered by customers	61	Recovered by customers
Container Bag	MT	0	Recovered by customers	0	Recovered by customers	0	Recovered by customers
FIBC	MT	144	78.0 %	126	78.2 %	146	78.2 %

Note: FIBC recovery rate = (Number of recovered FIBCs ÷ Number of products sold in FIBC), based on domestic sales.

The FIBC recovery rate cannot be increased because some FIBCs recovered from customers are damaged and cannot be reused. We have notified sales representatives to communicate with customers to handle FIBCs with caution to prevent damage from affecting FIBC recovery and reuse.

Water resources management

Material issue: Water management; Corresponding sustainability principle: Sustainable development GRI 3-3

Management Approach and Its Components	Impact Management	Targets and Performance of Management Approach	Evaluation of Management Approach
<p style="text-align: center; color: #0070C0;">Significance to APC</p> <hr/> <p>In response to global climate change, valuable water resources are reclaimed for reuse through water conservation and process improvement programs.</p> <p style="text-align: center; color: #0070C0;">Management Practice and Target</p> <hr/> <ul style="list-style-type: none"> · Reduce pollution and emission through process and source improvement and then end-of-the-pipe treatment promote water resource recycling and reuse. · Continuously implement water conservation measures and emissions reduction, and water resource reclamation management. <p style="text-align: center; color: #0070C0;">Strategy</p> <hr/> <ul style="list-style-type: none"> · Management and follow-up of water reclamation rate · Continuous follow-up and management of unit product water consumption · Continuous follow-up and management of process improvement projects related to water conservation. · The data boundary of water management covers Linyuan Plant, and data coverage is 100%. <p style="text-align: center; color: #0070C0;">Goals</p> <hr/> <ul style="list-style-type: none"> · Accomplish the annual target for water reclamation. · Accomplish the annual target for unit product water consumption. · Keep up with the annual schedule planning for process improvement projects related to water conservation. 	<p style="text-align: center; color: #00A68F;">Positive/Negative Impacts</p> <hr/> <ul style="list-style-type: none"> · Negative Actual Impact- Insufficient reservoir water <p style="text-align: center; color: #00A68F;">Processes to remediate and prevent negative impacts</p> <hr/> <ul style="list-style-type: none"> · Implement three-stage water conservation measures in coordination with the government's stage water conservation program to save water by about 10%. · Continuous follow-up and management of water reclamation rate, unit product water consumption, and process improvement projects for water conservation. 	<p style="text-align: center; color: #4B3A8D;">2022 Goals</p> <hr/> <ul style="list-style-type: none"> · Water reclamation rate >95% · Water consumption per unit product: <4.1 m³/MT <p style="text-align: center; color: #4B3A8D;">2022 Performance</p> <hr/> <ul style="list-style-type: none"> · Water reclamation rate: 99.2% (✔) · Unit product water consumption: 3.8 M³/MT (✔) <p style="text-align: center; color: #4B3A8D;">2023 Goals</p> <hr/> <ul style="list-style-type: none"> · Water reclamation rate >95% · Unit product water consumption <4.0 m³/MT <p style="text-align: center; color: #4B3A8D;">Planning Medium- & Long-Term Goals</p> <hr/> <ul style="list-style-type: none"> · Water reclamation rate >95% · Unit product water consumption <4.0 m³/MT · Process improvement projects related to water conservation: At least one project each year 	<p style="text-align: center; color: #E67E22;">Effectiveness Assessment</p> <hr/> <ul style="list-style-type: none"> · Water conservation statistics · Water bills · Periodic calibration of flowmeters · Follow-up and management of unit product water consumption based on ISO 9001 <p style="text-align: center; color: #E67E22;">Grievance Mechanism</p> <hr/> <ul style="list-style-type: none"> · "ESG" section on APC website · Environmental impact grievance channels <p style="text-align: center; color: #E67E22;">Evaluation of the management approach</p> <hr/> <ul style="list-style-type: none"> · Report the status and rate of self-imposed water conservation at the periodic plant affairs meeting and make rolling review. · Discuss the progress and construction methods of improvement projects related to water conservation at the periodic technological exchange meeting.

Water source of APC Linyuan Plant

Water risk level: Low

Water source: Tap water

Water is supplied by the Gaoping River Weir via the Fengshan Reservoir.

1. Use of the water risk assessment tool of the World Resources Institute (WRI)
2. The data boundary of water management covers Linyuan Plant, and data coverage is 100%.

Water consumption of Linyuan Plant in 2022 494,813 M³

Water discharge of Linyuan Plant 177,084 M³

Water consumption of Linyuan Plant 317,729 M³

Water reclamation rate (reuse rate, R1) 99.2 %

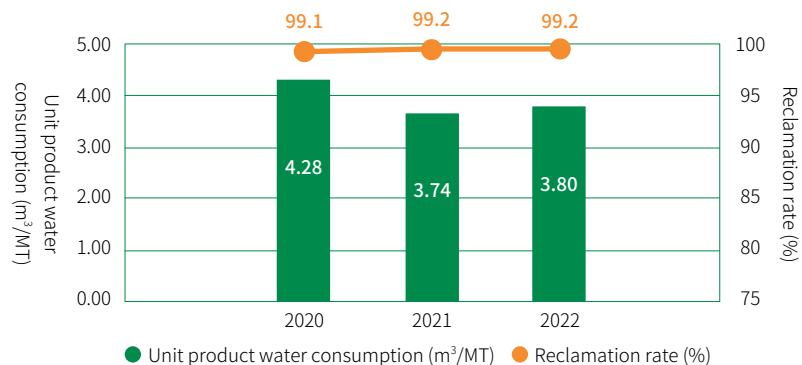
$R1 = \frac{\text{Total volume of recycled water} + \text{Total volume of reclaimed water}}{\text{Tap water consumption} + \text{Total volume of recycled water} + \text{Total volume of reclaimed water}} \times 100\%$

GRI 303-1, 303-3, 303-4, 303-5 SASB RT-CH-140a.1

In 2022 the unit water consumption slightly increased by 1.6% over the previous year to 3.80 m³/MT, which was still below the standard at 4.10 m³/MT.

In Linyuan Plant, we reclaim condensate and recycle water of the cooling water tower for reuse. In accordance with the Directions for Review of Water Consumption Plans promulgated by the Ministry of Economic Affairs, the water reclamation rate in 2022 was 99.2%, which is the same as that of 2021. The graph below shows the unit product water consumption and unit product water reclamation rate of Linyuan Plant in the past three years. Additionally, **the impact of global warming and climate change concerns us. Due to the water crisis in Kaohsiung region in recent years, we will propose the water solution policy to management in 2023.**

Unit Product Water Consumption and Water Reclamation Rate of Linyuan Plant in Past 3 Years

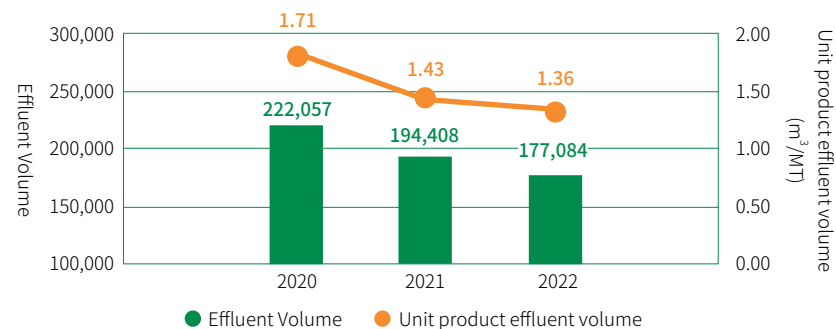


Effluent management

In Linyuan Plant, solid polyethylene products are produced by means of gas compression. After equipment cooling, dicing and cooling, and rinsing product storage tanks, tap water is collected in the equalization basin. Hence, effluents can be discharged free from contamination with a quality better than the legal requirements. It is transported to the dedicated sewerage system via underground pipelines and discharged to the wastewater treatment plant of Linyuan Industrial Park for treatment.

The 2022 effluent volume reduced by 8.9% over 2021 to 177,084m³; the volume of unit product effluent was 1.36 m³/MT. Due to the proper water quality control of the cooling water tank, the required water replacement volume reduced, reducing the volume of unit water effluent over 2021.

Unit Product Water Consumption and Water Reclamation Rate of Linyuan Plant in Past 3 Years



In Linyuan Plant, the major effluent testing items include suspended solids (SS), chemical oxygen demand (COD), and pH. The periodic report data is lower than the sewerage water quality limits.

The table below shows the results of major water quality test items of Linyuan Plant in the past three years: [GRI 303-2](#)

Unit: mg/L

Test Item	2020	2021	2022	Standard
S.S.	10.26	9.51	9.18	≤ 25
COD	38.23	32.72	40.72	≤ 90
pH	7.39	7.58	7.52	6~9

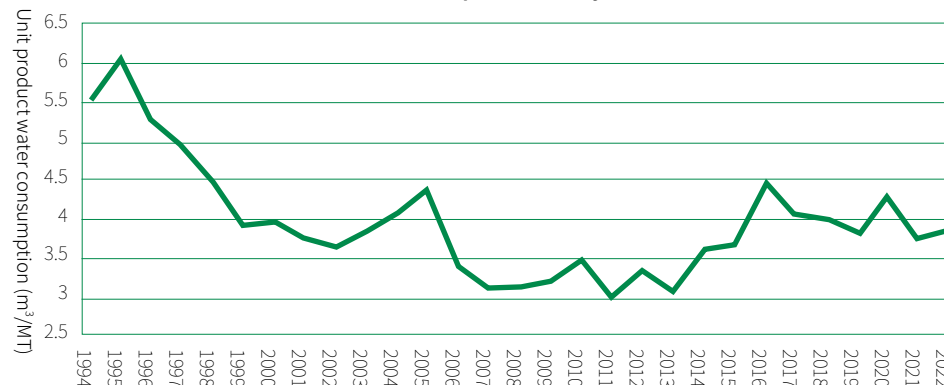
✓ In 2022 the results of all water quality test items fell within the limit, and there was no illegal discharge. [SASB RT-CH-140a.2](#)

Water conservation measures

At APC, the enthalpy of vaporization of heat removal equipment and cooling water towers is the main source of water consumption. Over the years we have implemented various water conservation programs, such as replacing the absorption chiller with the electric chiller, waste heat recovery, dicing soft water management, and increasing the concentration factor of cooling water. By maintaining the efficiency of heat exchangers, the 2022 unit product water consumption increased slightly.

Due to global warming and climate change, the situation of industrial water supply in Taiwan has been worsening in recent years. Apart from adopting progressive water rationing, the government also actively combined the wastewater discharged from various processing zones and industrial parks and further planned and built wastewater recycling plants in response to water shortages. In the future, the consumption of the recycled water generated will become a key factor. After assessing the construction and operating costs of an in-house wastewater recycling system, we temporarily hold the construction of the small wastewater recycling system and consider using the recycled water from the government's wastewater recycling plants for in-house consumption to support the government's wastewater recycling policy so as to achieve the win-win advantage for the public and private sectors. [SASB RT-CH-140a.3](#)

Trend of Unit Water Consumption of Linyuan Plant Over the Years



Our stage response to the government's stage water rationing measures:

1 Phase I

- Urge employees to save water.
- Reclaim office rinsing water for plant irrigation.
- Reclaim dicing water and cooling water for low-level water use.

2 Phase II

- Increase the concentration factor of cooling water tower water (from 5.5 times to 7.5 times)
- Reduce dicing water replenishment of production lines.
- Temporarily stop unnecessary washing of product storage tanks and floor

3 Phase III

- Lower the frequency of fire hydrant water tests and postpone fire drills.
- Activate distillation and purification only when the liquid in the reclamation tank is at the high liquid level.
- Temporarily shut down bathroom use for employees.

Through the above measures, we can save water by about 10%. However, we will need to buy groundwater with water tankers in severe droughts.

4.2 Climate change and energy management GRI 2-23, 2-24

Material issue: Climate change and energy management; Corresponding sustainability principle: Sustainable development GRI 3-3

Management Approach and Its Components	Impact Management	Targets and Performance of Management Approach	Evaluation of Management Approach
<p style="text-align: center;">Significance to APC</p> <hr/> <p>Extreme weather events impact human lives and property. As climate change is an inevitable global issue, it is necessary for businesses to take immediate action to enhance energy efficiency and reduce GHG emissions as the immediate action.</p> <p style="text-align: center;">Management Practice and Target</p> <hr/> <p>Establish the ISO 50001 Energy Management Systems to enhance energy efficiency through improving energy conservation measures and monitoring energy KPIs. Implement voluntary GHG inventory and emission control to realize our voluntary reduction commitment and ensure legal compliance. Analyze the risks and opportunities due to climate change to reduce the financial loss on production and operations as a result of extreme weather events.</p> <p style="text-align: center;">Strategy</p> <hr/> <ul style="list-style-type: none"> · Establish the energy conservation and carbon reduction commitment · Enhance energy efficiency · Legal compliance · Climate change risk response 	<p style="text-align: center;">Positive/Negative Impacts</p> <hr/> <ul style="list-style-type: none"> · Negative Actual Impact: Increased energy prices · Negative Actual Impact: Insufficient power supply · Negative Potential Impact: Carbon tax collection <p style="text-align: center;">Processes to remediate and prevent negative impacts</p> <hr/> <ul style="list-style-type: none"> · Review in-house energy conservation and carbon reduction programs each year in coordination with the Group Energy Management Department. · Plan and build generation sets to ensure electricity redundancy during power supply disruption. · Plan and implement green power strategies within the group: APC will use green power (solar PV) of about 2.5GWh in 2025 by law. 	<p style="text-align: center;">2022 Goals</p> <hr/> <ul style="list-style-type: none"> · The 2022 emissions reduced by 3.8% over 2017 · Unit product electricity consumption: 1.49 MWh/MT · Feasibility assessment of the installed and contractual capacity of 10% green power · Operational interruption due to extreme weather events: 0 day <p style="text-align: center;">2022 Performance</p> <hr/> <ul style="list-style-type: none"> · The 2022 emissions reduced by 4.5% over 2017 (✓) · Unit product electricity consumption: 1.477 MWh/MT (✓) · USI Green Energy Corporation (USIGE), a USIG business, continues to purchase solar PV project sites and will discuss the green power purchase contract with all USIG businesses in 2024. · Operational interruption due to extreme weather events: 0 day <p style="text-align: center;">2023 Goals</p> <hr/> <ul style="list-style-type: none"> · GHG emissions were 111,100tCO₂e · Reduce emissions by about 1,738 tCO₂e with the energy conservation and carbon reduction program. · Unit product electricity consumption: 1.48 MWh/MT · The verification of Linyuan Plant's 2022 GHG emissions will be completed in 2023Q4. · Operational interruption due to extreme weather events: 0 day <p style="text-align: center;">Planning Medium- & Long-Term Goals</p> <hr/> <ul style="list-style-type: none"> · 27% less than 2017 by 2030 · USIG plan and implement the green power strategy. Linyuan Plant will use 2.5GWh of green power (solar PV) by law in 2025 	<p style="text-align: center;">Effectiveness Assessment</p> <hr/> <ul style="list-style-type: none"> · Include energy conservation and carbon reduction programs in the energy management system for progress control. · Monitor, measure, and control energy KPI and review differences monthly. · Energy Conservation Audit System Report of Energy Users of the Bureau of Energy. · Regulations for Management of GHG Inventory and Registration of the EPA, voluntary GHG inventory. <p style="text-align: center;">Grievance Mechanism</p> <hr/> <ul style="list-style-type: none"> · "Contact us" on the corporate website · Survey on issues that concern stakeholders <p style="text-align: center;">Evaluation of the management approach</p> <hr/> <ul style="list-style-type: none"> · USIG Technology exchange Meeting · Energy Management System Management Review Meeting

Description: Values have been converted into the annual value after a change in the method of energy conservation and carbon emissions calculation; and the actual reduction was used as the 2022 target in response to USIG's carbon reduction target: 27% less than 2017 by 2030.

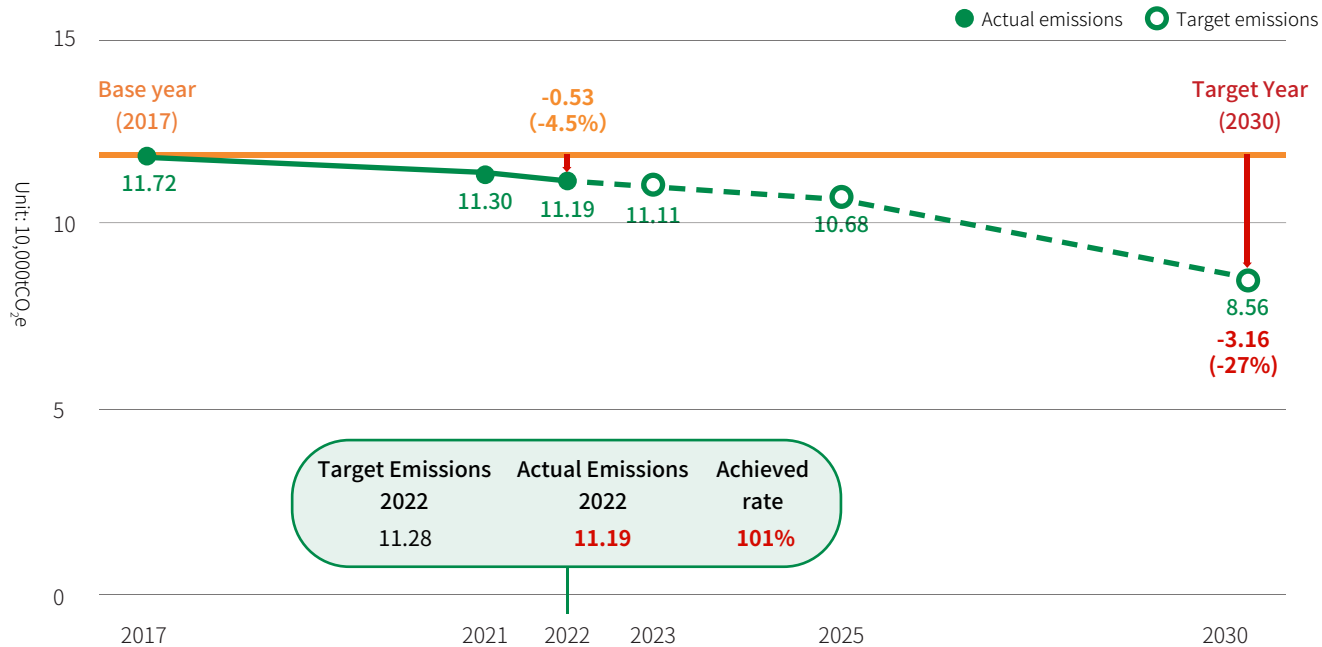
Climate change and risk management GRI 2-23, 2-24

Climate change is a common challenge around the world. To keep up with the world and match the demand for sustainable development, Taiwan’s legislature passed the Climate Change Response Act in October 1, 2023.

Facing the impact of climate change, carbon reduction has become a global goal. To enhance carbon reduction, we set the 2030 carbon reduction target at “**27% less than 2017 by 2030**” in early 2022 to actively implement countermeasures and management mechanisms. Nine core businesses of the group will continue to implement ISO 14064-1 GHG inventory and verification and plan and implement carbon reduction programs. The group will also actively develop external renewables sites. By the end of 2022, the accumulative on-grid capacity of solar PV sites has reached 5.9MW.

We plan the carbon reduction pathway based on the 2030 carbon reduction target. **Greenhouse gas emissions in 2022 will be 111,975tCO₂e, a decrease of 4.5% compared with the base year.** In the future, we will implement the energy conservation and carbon reduction programs more actively, enhance energy efficiency, use low-carbon fuels, accomplish carbon reduction targets, and promote sustainable development.

- Description: 1. Base year: We set 2017 as the base year of total GHG emissions because it was the first year after the commercial operation of our fourth production line.
2. Based on the results of ISO 14064-1 external verification in 2022, we revised the emissions in 2017 to 117,228tCO₂e (formerly 110,863tCO₂e).



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. GRI 201-2

Climate change management framework



Governance

ESG Committee	As the highest governance body of climate change management chaired by independent directors, the ESG Committee reports the plans implemented for addressing climate change and their performance to the Board every year.
Group Management Review 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.
Group Environmental Quarterly Review Meeting	It is the top management of the group's energy management and reports the planning, progress, and decisions of energy management to the chairman.
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.



Strategy

Identification of Risks and Opportunities	Identify material risks and opportunities based on their likelihood and impact.
Assessment of Potential Financial Impact	Assess the 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 framework, communicate with all responsible units, and confirm by senior management.
Submission 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.



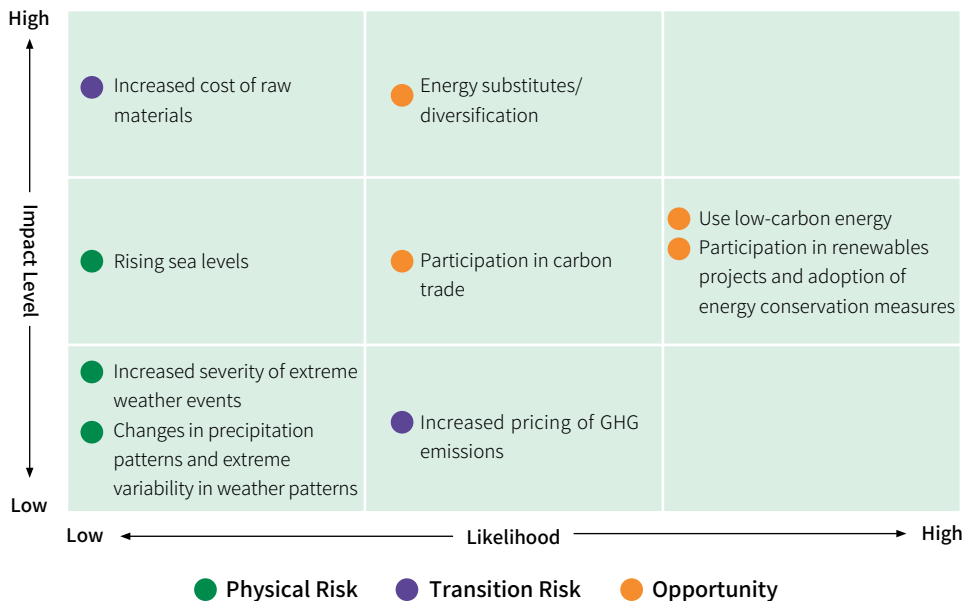
Indicators and Targets

Group Energy Management Targets	We set 2017 as the base year and reduction by 27% by 2030 as the carbon reduction target. We also review the target every three years.
Climate-Related Response Strategy	Equipment renewal, construction of renewable energy equipment, optimization of production scheduling, planning building aircon, energy management system, extreme weather emergency response plan
GHG Emissions Disclosure	Disclose the data of scopes 1, 2, emissions in the ESG report every year and review the causes of changes periodically.

Identification of Risks and Opportunities GRI 201-2

The impact of climate change on APC's operations has been increasing. To carefully tackle potential risks and capture potential new business opportunities, we have spared no efforts in implementing programs to enhance energy conservation and carbon reduction, improving production efficiency, and replacing old equipment with high-efficiency equipment. During operations, we have identified 5 major risks and 4 major opportunities with the TCFD-recommended methods and assessed and differentiated the duration of impacts. In the future, we will review the counteractions every year and develop a resilient climate change culture.

Map of Climate-Related Risks and Opportunities



The climate change risks and opportunities by the identified duration are tabulated below:

Type	Short-term (<3 years)	Medium-term (3-5 years)	Long-term (>5 years)
Physical Risk	---	<ul style="list-style-type: none"> Increased severity of extreme weather events Changes in precipitation patterns and extreme variability in weather patterns 	<ul style="list-style-type: none"> Sea level rises
Transition Risk	---	<ul style="list-style-type: none"> Enhance GHG Emission Pricing 	<ul style="list-style-type: none"> Raw material cost rises
Opportunity	<ul style="list-style-type: none"> Participation in renewables projects and adoption of energy conservation measures 	<ul style="list-style-type: none"> Alternative energy and energy diversification Participation in carbon trade 	<ul style="list-style-type: none"> Use low-carbon energy



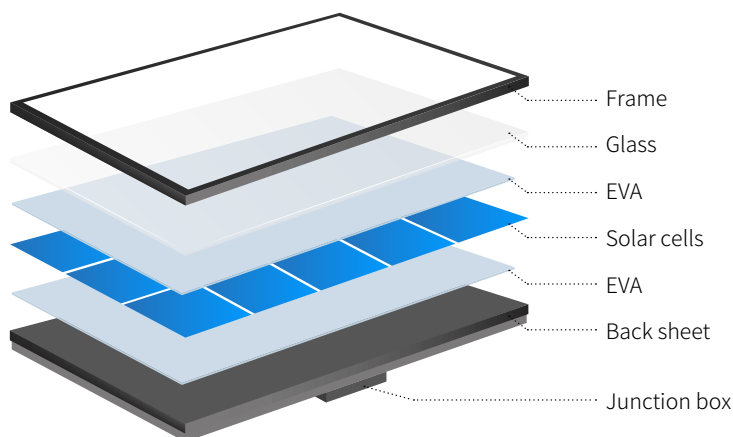
Financial implications and other risks and opportunities due to climate change and countermeasures GRI 201-2

Type	Climate Related Risk/ Opportunity	Likelihood	Impact	Potential Financial Risk	Description	Countermeasures
Physical Risk	Sea level rises	Low	Medium	Increase in capital expenditure	Our production plant is located in the Linyuan Industrial Park. It is an area subject to low to medium risk of rising sea levels. Hence, seawater intrusion or floods may cause operational interruption.	<ol style="list-style-type: none"> 1. Raise the foundation of key equipment. 2. Build flood control and drainage facilities. 3. Assess the inundation potential of new equipment sites
	Increased severity of extreme weather events	Low	Low	Increased capital expenditure, reduced value of assets	Prolonged droughts will lead to low water storage in reservoirs, resulting in water rationing and water shortages. Typhoons and unexpected torrential rain will lead to floods, resulting in operational interruption.	<ol style="list-style-type: none"> 1. Build flood control and drainage facilities. 2. Monitor the water regime and emergency response procedures. 3. Plan backup water sources
	Changes in precipitation patterns and extreme variability in weather patterns	Low	Low	Increased capital expenditure and increased costs of operations	Changes in precipitation patterns, such as typhoons and floods, will increase the probability of damage to the factory buildings and equipment, resulting in operational interruption.	<ol style="list-style-type: none"> 1. Build flood control and drainage facilities. 2. Raise the foundation of key equipment 3. Plan natural disaster insurance
Transition Risk	Raw material cost rises	Low	High	Increase in operating costs	<ol style="list-style-type: none"> 1. Extreme weather events will increase materials transportation cost and delivery uncertainty. 2. Use of low-emission materials will increase the purchasing cost. 	<ol style="list-style-type: none"> 1. Diversify materials suppliers. 2. Implement low-carbon transition to win the market demand for carbon neutrality in the supply chain.
	Enhance GHG Emission Pricing	Medium	Low	Increase in operating costs	Due to the impact of the Climate Change Response Act, carbon tax collection will begin in Taiwan.	<ol style="list-style-type: none"> 1. Set carbon reduction target to 27% by 2030. 2. Form the Green Power Team in USIG to actively build green power installations and discuss green power purchase. 3. Replace old equipment and enhance energy efficiency.
Opportunity	Alternative energy and energy diversification	Medium	High	Increased overheads, annually reduced operating costs.	Assess power source diversification and substitute high-emission power sources.	<ol style="list-style-type: none"> 1. Contract renewables retailers 2. Develop self-constructed solar PV sites 3. Keep track on and engage in the power market
	Use low-carbon energy	High	Medium	Increased overheads, annually reduced operating costs.	Instead of coal, we use natural gas as the fuel. We have already installed PV systems with a capacity up to 499 kW and will also consider the use of renewables.	<ol style="list-style-type: none"> 1. USIG will take charge of the green power procurement design in compliance with the regulatory obligatory capacity by 2025. 2. Develop self-constructed solar PV sites
	Participation in renewables projects and adoption of energy conservation measures	High	Medium	Increased overheads, reduced later emissions and operating costs.	Increase production, enhance unit product energy efficiency, and reduce GHG emissions through proper equipment and operation optimization.	Implement the energy conservation program of 1% less each year and enhance energy efficiency through process and equipment improvement.
	Participation in carbon trade	Medium	Medium	Increased overheads, annually reduced operating costs.	Carbon tax collection is prioritized under the Climate Change Response Act. We will continue to actively reduce the unit product emissions to respond to the market impact from the future cap control.	<ol style="list-style-type: none"> 1. Trace the development of climate-related laws and regulations periodically. 2. Understand the condition of the global carbon market.

In response to the extreme weather events due to climate change, we continuously develop innovative materials and products to reduce the impacts of climate change by integrating related our R&D experience and USIG’s technical and R&D capacity.

PV-grade EVA

The composition of solar panels



In response to the extreme weather events due to climate change, the market demand for green power products continue to rise. We thus actively develop PV applied products with high added value, such as the EVA films for PV module packaging, to fulfill the eager demand for PV module packaging materials and cultivate new markets for high-value products.

Due to COVID-19, the demand burst in 2021H2 continued in 2022, the product price remained high, and the PV-grade EVA sales increased by 6.5% over 2021.

Participation in Asia Pacific Forum & Exposition for Sustainability



The 2022 Asia Pacific Forum & Exposition for Sustainability organized by the Taiwan Institute for Sustainable Energy (TAISE) was held at Exhibition Hall 1, Taipei World Trade Center during 12-14 August 2022.

Based on the topic of “**Low-Emission Green Power, High-Performance EVA Films**”, we exhibited the EVA materials (PV-grade EVA) for the PV module packaging films. We also displayed the PV packaging films and PV modules supplied by downstream suppliers to present samples of the complete ranges covering raw materials, packaging film processing, and PV module packaging, demonstrating our contribution to the green power industry.

Energy management

In 2016 USIG voluntarily set energy management targets and began to make dynamic target reviews in accordance with the country’s energy development policies and by keeping track on the international trends and domestic laws and regulations. After measuring the internal and external factors, USIG set the 2030 carbon reduction target to “carbon reduction by 27% over 2017 by 2030” in early 2022. The nine USIG core businesses 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.

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 2022 the “plant technology exchange meeting” was held in October. Case presentation 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 winners. Through ratings and encouragement, sharing, and mutual learning, we aim to advance technology in the group.



The table below shows the energy conservation rate of APC Linyuan Plant in the past three years:

Electricity Conservation Rate of Linyuan Plant in Past 3 Years

Electricity Conservation Rate (%)	2020	2021	2022
	1.27	0.75	0.68

Description:

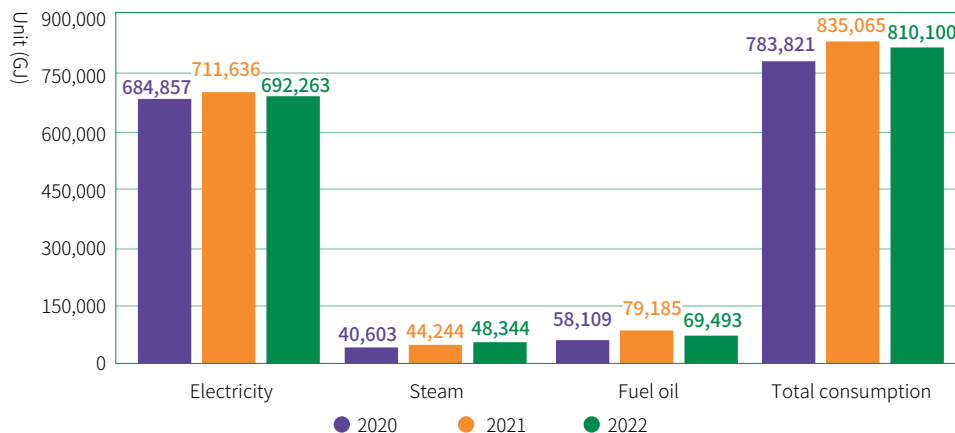
1. Due to the delay of some energy construction projects, the target reduction rate (1%) of 2022 was unachieved.
2. The rate of energy conservation in 2022 was 0.68%, and the average rate of energy conservation during 2015-2022 was 1.63%, meeting the “average energy conservation by 1%” regulatory requirement of the Bureau of Energy.
3. Energy conservation rate (including the demand bidding of Taiwan Power Company (TPC), the demand bidding capacity of electricity conservation was 328,668kWh)



Energy use GRI 302-1, 302-3

The data boundary of energy management in 2022 covers Linyuan Plant, and data coverage is 100%. The graph below shows the internal energy consumption of Linyuan Plant by electricity, by fuel oil, and by steam in the past three years and the unit product energy consumption

Statistics of Energy Consumption of Linyuan Plant in Past 3 Years



Note: 1. Unit product heating value factors: electricity = 860 Kcal/kWh and fuel oil = 9,600 Kcal/L as announced by the Bureau of Energy, MOEA; and steam = 679 Kcal/kg as announced by the steam supplier.

2. 1 Kcal= 4.187 KJ

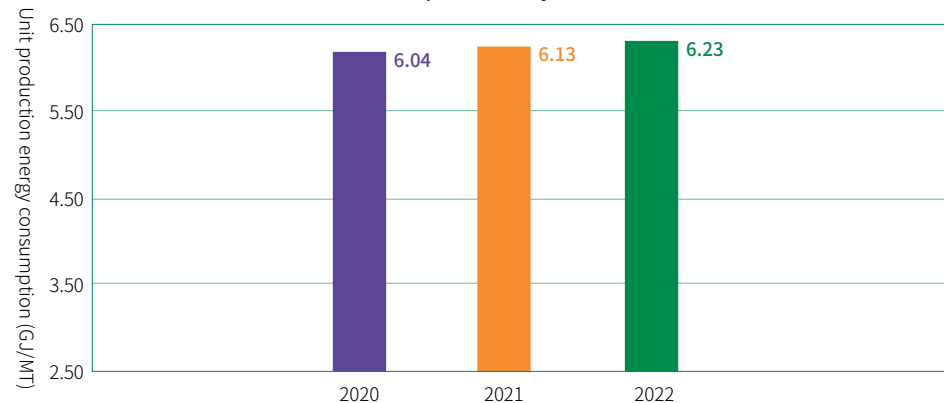
3. (Electricity/Steam/Fuel Oil) energy consumption = (Electricity/Steam/Fuel Oil) consumption x Unit product heating value factors x 4.187×10^{-6} (GJ/KJ)

4. Sources of electricity, steam, and fuel oil consumption and production data: Monthly production statistics.

5. Only non-renewables is used.

6. Fuel oil here means oil discharged from the manufacturing process.

Unit Product Consumption of Linyuan Plant in Past 3 Years



Note: 1. Unit product consumption = Total consumption (GJ) ÷ Total production (MT)

2. Source: Report on the Energy Saving Audit System of Energy Users of the Bureau of Energy.

The 2022 unit product energy consumption increased was 6.23 GJ/MT, up by about 1.63% over the 6.13 GJ/MT of 2021. This is mainly because of the increased unit product energy consumption due to the reduced total capacity and the increased proportion of EVA products with a higher unit product energy consumption after the product portfolio adjustment to meet the market changes.



Total 2022 Energy Consumption

810,100 GJ, Less: 2.99%

Energy consumption reduced over 2021 because of the reduced total production in 2022 by 4.4% over 2021.



Electricity Consumption

692,263 GJ,

accounting for 85.5%



Percentage renewables

0%



Self-Generation Energy (Solar) **2,150** GJ

Total capacity of self-generation and self-consumption (solar) 0 GJ

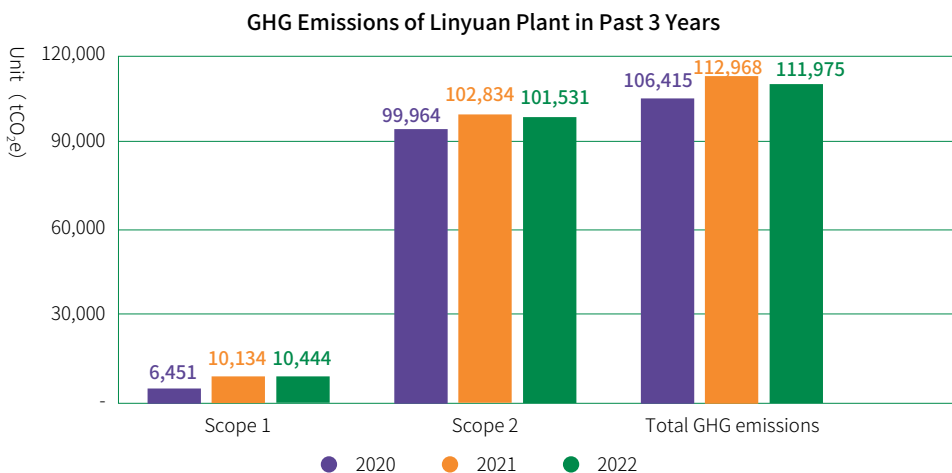
In 2022, all electricity generated by PV

systems was sold to TPC SASB RT-CH-130a.1

GHG management

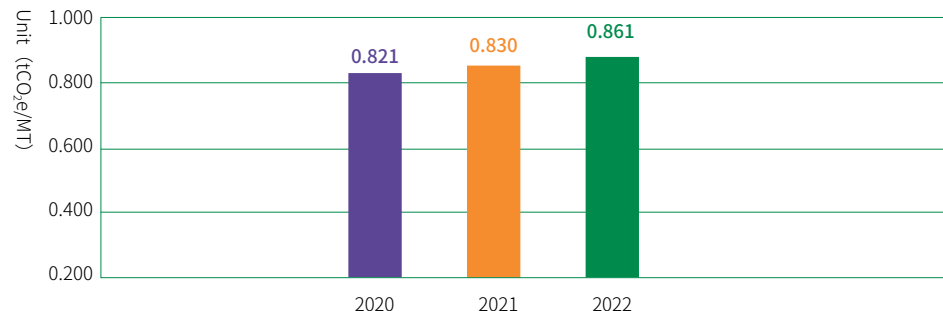
In accordance with the amended Industrial Emission Sources Required for GHG Emissions Inventory and Registration promulgated by EPA on 8 August 2022, Linyuan falls in the second group of industries required for GHG emissions inventory and registration and should complete the inventory of GHG emissions in the previous years and have the results verified by a third-party certification body and registered to the EPA-designated website by 31 August 2023. Linyuan Plant has received guidance on GHG emissions inventory from the Kaohsiung Environmental Protection Bureau and has been conducting self-imposed inventory for years. In 2022Q3, it completed the verification in accordance with ISO 14064-1 through a third-party certification body.

In accordance with the “Sustainable Development Roadmap” promulgated by the Financial Supervisory Commission (FSC), we will include the GHG emissions data of Taipei HQ and complete the GHG inventory and verification of individual companies (Linyuan Plant and Taipei HQ) in 2023. The graphs below show the GHG emissions of Linyuan Plant by scope and the intensity of unit product emissions in the past three years: [GRI 305-1, 305-2, 305-4](#)



Description: As Linyuan Plant implemented the ISO 14064-1 GHG inventory third-party verification system in 2021, we replace the original 2021 GHG emissions inventory data with the data verified by the third party.

Intensity of Unit Product GHG Emissions of Linyuan Plant in Past 3 Years



Note 1: Emissions of electricity were calculated based on the 2021 electricity emission factor at 0.509kg/CO₂e, and the emissions of steam were calculated based on the 2021 purchased steam emission factor at 0.230kg/CO₂e.

Note 2: GHG emissions:

Scope 1 refers to the direct emissions from the manufacturing process or facilities.

Scope 2 refers to the indirect emissions, such as purchased electricity (all supplied by TPC) and purchased steam (all supplied by Formosa Linyuan Plant).

Note 3: GHG emissions = (Energy/fuel consumption) × (EPA-announced emission factor) × (EPA-requested IPCC GWP value)

Note 4: Intensity of unit product emissions = Total GHG emissions (tCO₂e) ÷ Total production (MT)

Note 5: Conversion into equivalent carbon dioxide (CO₂e) based on the GHG Emission Factor V. 6.0.4 announced by EPA and the GWP value announced by the IPCC AR5 (2013).

Direct (Scope 1) GHG emissions

10,444 tCO₂e

Accounting for **9.33%**

Data boundary: Linyuan Plant + Taipei HQ

[GRI 305-1](#) [SASB RT-CH-110a.1](#)

Energy indirect greenhouse gas (GHG) emissions (Scope 2)

101,531 tCO₂e

Accounting for **90.67%**

Data boundary: Linyuan Plant + Taipei HQ

[GRI 305-2](#)

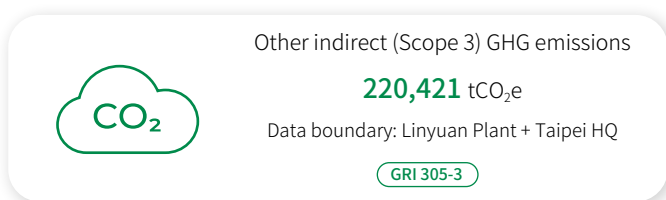
The total GHG emissions of Linyuan Plant in 2022 reduced by 0.88% over 2021 to 111,975tCO₂e because of the reduced total production by 4.4%.

(Note: GHG inventory data is the data after third-party verification)

The intensity of unit product emissions was 0.861tCO₂e/MT, about 3.7% more than the 0.83tCO₂e/MT in 2021. This is mainly because of the increased intensity of unit product emissions due to the increased EVA unit product energy consumption and the increased proportion of EVA products with a higher unit product energy consumption after the product portfolio adjustment to meet the market changes.

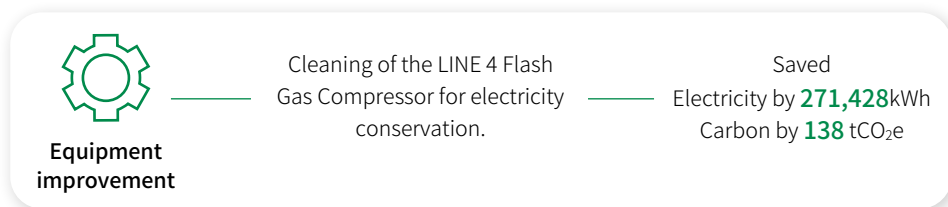
Other indirect (Scope 3) GHG emissions

We inventoried the other indirect GHG emissions of Linyuan Plant in accordance with ISO 14064-1. To assess and identify the plant’s sources of indirect GHG emissions so as to inventory specific emission sources, the implementation team has established the “Significant Sources of Indirect GHG Emissions Identification Score Sheet”. Categories 3-6 indirect GHG emissions were identified and scored in accordance with the indicators in Annex H of ISO 14064-1:2018. The identification and scoring were implemented by personnel of the relevant activities. Based on the methods of activity data quantification, factor availability, the influence of data providers, and the item’s final effect (range) on total emissions, five major sources of indirect emissions were identified, including one in Category 3 (emissions from upstream transport and distribution for goods) and four in Category 4 (emissions from purchased goods) falling in other indirect (Scope 3) GHG emissions of 220,421tCO₂e. (Note: GHG inventory data is the data after third-party verification)



Measures and performance of energy conservation

The diagram below shows the one energy conservation and carbon reduction management program implemented in 2022:



The program saves electricity by 271,428kWh and reduced carbon by 138 tCO₂e. The table below shows the energy saved and carbon reduced by process improvement and by equipment improvement.

Type		Process Improvement	Equipment improvement	Total
Energy Saved	Electricity (GJ)	---	977	977
	Steam (GJ)	---	---	---
Carbon reduced (tCO ₂ e)		---	138	138

Note: Instead of the actual energy conservation over 12 months, calculations of the 2022 energy conservation and carbon reduction program have been expressed by year.

All reduced GHG emissions were indirect (Scope 2) GHG emissions. GRI 302-4, 305-5

We establish energy conservation and carbon reduction programs and targets in response to the government’s energy conservation policy and in accordance with USIG’s energy management targets. Every month we produce statistics on the results of implementation of the energy conservation and carbon reduction programs for the reference of progress control. We also share resources and exchange experience with other USIG businesses through the group’s “Resource Integration Meeting” and “Technology Exchange Meeting” to learn from one another so as to implement practical and effective energy conservation and carbon reduction programs.

2023 Energy conservation and carbon reduction programs

Five energy conservation and carbon reduction measures will be implemented to save electricity by 2,179,826kWh and steam by 2,736MT and reduce emissions by 1,739tCO₂e.

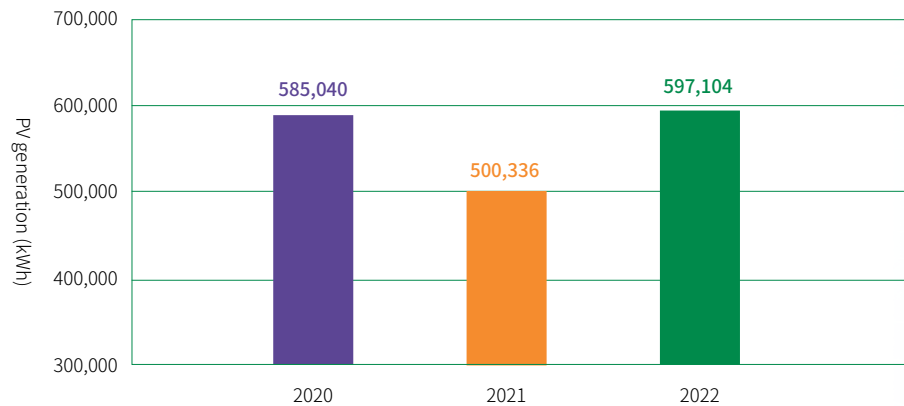
Type	Energy conservation management program	Program target value	Total program energy saved	2023 emission reduction target
Process Improvement	1. Increase steam output of V-1227 2. Reduce production pressure to save electricity	Electricity 985,600kWh Steam 2,736MT	Electricity by 2,179,826kWh Steam 2,736MT	1,739 tCO ₂ e
Equipment improvement	3. Enhance energy conservation of the Line 4 chip feeding zone 4. Replace the old P-7103A/B cooling water circulation pump 5. Replace the old reactor motor	Electricity 1,194,226kWh		

Renewables

In June 2011 we completed PV installations with an installed capacity of 496.08kW. Thanks to the proper maintenance of the in-house PV installations, the 2022 output increased significantly by 19% over the previous year. **Our 2022 PV generation was up to 597,104kWh**, and all was sold to TPC. The accumulative generation by the end of 2022 was 6.83GWh, reducing emissions by about 3,578tCO₂e.

In recent years the government has been vigorously advocating renewables development and encouraging renewables installations. On 31 December 2020 the government further promulgated the Regulations for the Management of Setting up Renewable Energy Power Generation Equipment of Power Users above a Certain Contract Capacity. Currently, USIG is planning to lead all USIG businesses to fulfill the green power demands within five years through the central construction of PV installations by the group. If the output is insufficient, the group would purchase green power and renewable energy certificates (RECs) and sign the green power wheeling and green power and REC resales contracts with USIG businesses to meet the regulatory requirements. We will follow the regulations of the new law and coordinate with the group's overall assessment and planning to fulfill the spirit of social contribution and legal compliance.

PV Generation Volume of Linyuan Plant in Past 3 Years



4.3 Emissions management

Material issue: Air pollution control; Corresponding sustainability principle: Sustainable development GRI 3-3

Management Approach and Its Components	Impact Management	Targets and Performance of Management Approach	Evaluation of Management Approach
<p style="text-align: center; color: #0072bc;">Significance to APC</p> <p>In addition to violating environmental protection laws and regulations, air pollutant emissions also affect air quality in our living environment.</p> <hr/> <p style="text-align: center; color: #0072bc;">Management Practice and Target</p> <p>At Linyuan Plant, we monitor and improve the quality of air pollutant emissions through equipment and component VOCs leakage checks and equipment air pollutant emissions reduction to meet the control standards of the Air Pollution Control Act and improve the air quality around the plant.</p> <hr/> <p style="text-align: center; color: #0072bc;">Strategy</p> <ul style="list-style-type: none"> · Equipment and component leakage tour inspection · Reduction of air pollutant emissions · Legal compliance 	<p style="text-align: center; color: #00c09d;">Positive/Negative Impacts</p> <ul style="list-style-type: none"> · Negative Actual Impact-Improper air pollution control <hr/> <p style="text-align: center; color: #00c09d;">Processes to remediate and prevent negative impacts</p> <ul style="list-style-type: none"> · Increase the frequency of periodic tour inspection of equipment and components from 140 spots/month to 280 spots/month. · Install online detectors to monitor the emission status of air pollutants (NOx, SOx, VOCs) to make immediately adjustments in process or equipment anomalies. · Reduce equipment failure rate through monthly periodic maintenance. 	<p style="text-align: center; color: #4b2981;">2022 Goals</p> <ul style="list-style-type: none"> · Periodic tour inspection of equipment and components for 140 spots each month · Process air pollutant emissions improvement programs · Complying with the recognized target emissions for air pollutants of Gaoping Phase I. (NOx 8,982kg, SOx 1,352kg, VOCs 39,771kg) <hr/> <p style="text-align: center; color: #4b2981;">2022 Performance</p> <ul style="list-style-type: none"> · Periodic tour inspection of equipment and components for 280 spots/month (✓) · Air pollutant emissions: NOx 6,025kg (✓) SOx 1,813kg (✗) VOCs 32,400 kg (✓) <hr/> <p style="text-align: center; color: #4b2981;">2023 Goals</p> <ul style="list-style-type: none"> · Periodic tour inspection of equipment and components: 280 spots/month · Process air pollutant emissions improvement programs · Complying with the recognized target emissions for air pollutants of Gaoping Phase I. (NOx 8,982kg, SOx 1,352kg, VOCs 39,771kg) <hr/> <p style="text-align: center; color: #4b2981;">Planning Medium- & Long-Term Goals</p> <ul style="list-style-type: none"> · Monthly tour inspection of VOCs equipment and components by the Industrial Safety Office: 300 pcs/month. · Reduce boiler NOx emissions to below 30ppm and TSP emissions to below 10mg/Nm3 with new air pollution control equipment. · Air pollutant emissions: Reduce NOx by 1% and SOx by 1% 	<p style="text-align: center; color: #f4912f;">Effectiveness Assessment</p> <ul style="list-style-type: none"> · Commission EPA-accredited testing laboratories to test air pollutant emissions each year. <hr/> <p style="text-align: center; color: #f4912f;">Grievance Mechanism</p> <ul style="list-style-type: none"> · Environmental impact grievance channels <hr/> <p style="text-align: center; color: #f4912f;">Evaluation of the management approach</p> <ul style="list-style-type: none"> · Exchange of environmental pollution prevention technology and experience at the group technology exchange meeting.

Air pollution control GRI 305-6

Nitrogen oxides (NOx), sulfur oxides (SOx), volatile organic compounds (VOCs), and total suspended particulates(TSP) are the major pollutants of Linyuan Plant. NOx and SOx are mainly produced by the plant's combustion facilities (e.g., regenerative thermal oxidizer (RTO), steam boiler, thermal oil boiler). Linyuan Plant does not generate ozone depleting substances (ODS). VOCs mainly come from the emissions and leakage of the RTO, flare, storage tanks, equipment and components. PMs mainly come from product storage tanks.

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



Reduce VOCs emissions

We commission EPA-accredited institutions to check all equipment and components in the plant each quarter, enhance the self-imposed tour inspection of equipment and component (about 15,000 spots/month), and replace one old catalyst pump.

The Industrial Safety Office has purchased two FID detectors (TVA-2020) to perform up to 280 spot checks each month, doubling that of the past.



Process ethylene recovery

We have implemented ethylene recovery among production lines when a production line halts.



Offsite underground ethylene pipelines ethylene emptying and recovery

When it is necessary to empty the offsite underground ethylene pipelines for maintenance, we recover ethylene to each production line through the in-house ethylene recovery pipelines to reduce air pollution.



Process waste reduction and improvement SASB RT-CH-110a.2

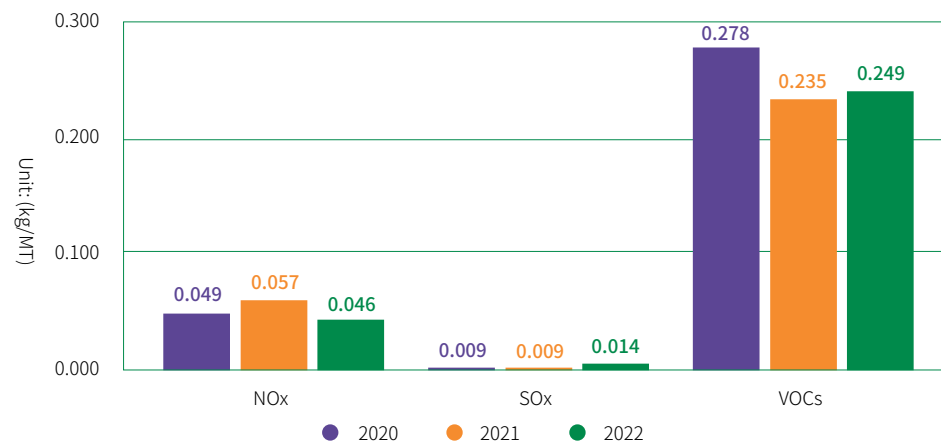
- In 2019 we changed the discharge pipeline of the outlet separator at section 1 of the flash compressor on line 4 to flow back to the inlet separator of the compressor.
- In 2021 we changed the discharge pipeline of the outlet separator at section 1 of the flash compressor on line 3 to flow back to the inlet separator of the compressor.
- In 2022 we planned the old steam boiler replacement.
- In 2023 we plan to purchase the dual fuel steam boiler to handle the process discharge oil and process exhaust to reduce the emission of total suspended particulates (TSP) and NOx.

2022 Air Pollutant Emissions of Linyuan Plant GRI 305-7 SASB RT-CH-120a.1

Type	Unit	NOx	SOx	VOCs	HAPs
Total Emissions	MT	6.0	1.8	32.4	0.653

The 2022 SOx emissions increased over 2021 mainly because the Kaohsiung Environmental Protection Bureau changed the SOx calculation method for RTOs, increasing the SOx emissions. No control limit has been set for VAM, the hazardous air pollutants (HAPs) of Linyuan Plant. The 2022 VAM emissions were 0.653MT.

Unit Product Air Pollutant Emissions of Linyuan Plant in Past 3 Years



Over the years, emission test results of the Linyuan Plant have been consistently well below the EPA emission standards. The table below shows the results of our pipeline emission test in 2022:

Pollutant	Unit	Thermal Oil Boiler	Steam Boiler	Standard	Regenerative Thermal Oxidizer	
					Standard	Standard
NOx	ppm	74	80	100	3	150
SOx	ppm	2	5	50	4	100
TSP	mg/Nm ³	1	3	30	0.6	100

Note: Total Suspended Particulate (TSP).

Waste GRI 306

Industrial waste generated by Linyuan Plant includes general industrial waste and hazardous industrial waste. We sign contracts with EPA-accredited domestic contractors to remove and dispose of waste in accordance with the Waste Disposal Act.

General industrial waste is disposed by type through intermediate waste treatment including incineration, pyrolysis, and physical disposal operations. Contractors will direct waste to landfills as final treatment according to the approved methods in their licenses.

The table below shows the methods and weight of waste disposal reported by Linyuan Plant in the past three years.

VA waste was reduced after the completion of the MRT modification for VA purification in 2022, and the generation of waste oil mixture also reduced over 2021. Waste lubricants increased due to the increased lubricant replacements after the implementation of the PSM system in recent years to optimize equipment preventive maintenance.

- ✓ There was no hazardous waste in 2022. SASB RT-CH-150a.1
- ✓ Additionally, there was no spill of oils, fuels, waste, or chemical substances 2022.

Method and Weight of Waste Disposal of Linyuan Plant in Past 3 Years Unit: t

Treatment	Type of waste	2020	2021	2022
Incineration	Household waste Waste plastics Waste wood, mixed	44.37	43.64	43.7
Physical	Waste oil, mixed	112.26	268.49	145.5
Pyrolysis, Physical	Waste lubricants	27.35	66.95	68.81
Physical	General waste chemical substances mixture	16.85	16.48	16.43
Offshore disposal	including cadmium battery	3.54	---	---
Total weight of waste		204.37	395.56	274.44

Environmental impact grievance channels

APC Linyuan Plant has established the “Procedures for Implementation of Communication and Consultation” to establish, implement and maintain channels and procedures for the communication, engagement, and consultation of environment-related topics for internal stakeholders (employees, industry associations, occupational safety and health committee meetings) and external stakeholders (customers, competent authorities, community residents, and environmental groups).

The procedure for addressing internal grievances is: Employees propose EHS-related grievances through the “Union Board Meeting”, “OSHC Meeting”, or other meetings. If publicity or response is required, the responsible departments will review the responses, which will be communicated within the company through meetings, education and training, or announcements after the approval of the OHS management representative.

The procedure for addressing external grievance is: After any units of Linyuan Plant receives an ESH-related grievance from outside of the company over the phone, orally, or in writing, the responsible units will verify the grievance contents and register them in the “EHS Information Registration Form” and make appropriate response and take appropriate action if this grievance becomes a case study.

Item	2020	2021	2022
Grievance (pieces)	0	2	3
Valid case (pieces)	0	2	3

Environmental Grievance Flowchart of Linyuan Plant

