



Environmental Sustainability

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Environmental Management

» Environmental Development Progress

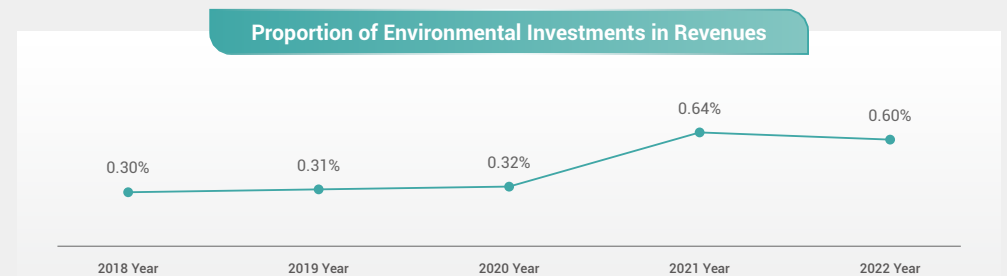
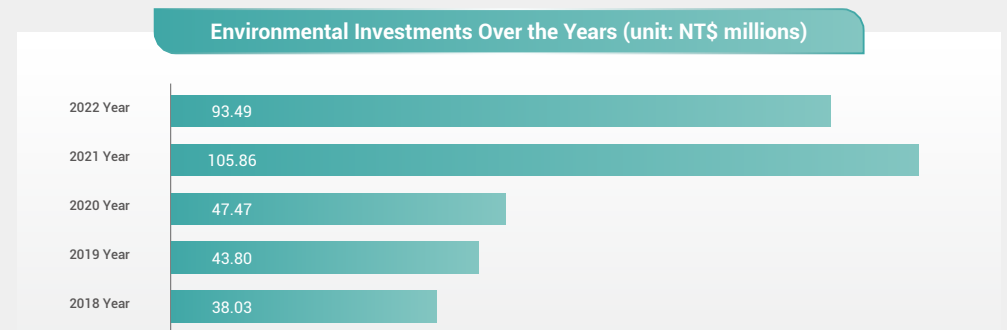


» Environmental Management Objectives

BenQ Materials has established a comprehensive environmental management mechanism, which includes relevant management measures for energy and greenhouse gas management, water resource management, and waste management. We actively manage energy and resource usage in various aspects and have set environmental management goals. In addition to monitoring international environmental issues and trends, BenQ Materials conducts internal audits and external third-party verifications annually to ensure the effective operation of the management system. Our important operational sites have obtained ISO 14001 and ISO 50001 certifications. We are also working towards obtaining ISO 46001 certification for water resource management system at our Taoyuan factory by 2023.

Item	Objectives
Climate Change Management	Reduce greenhouse gas emissions (Scope 1 and 2) compared to the baseline year (2020)
	Increase the share of renewable energy in the overall energy mix
Energy Management	Decrease energy intensity (non-renewable energy) compared to the baseline year (2020)
	Promote energy conservation among all employees (annually)
Water Management	Reduce water intake intensity (non-renewable water) compared to the baseline year (2020)
	Improve water resource reuse rate
Reduce, Reuse, and Recycle to Achieve Zero Waste Production	Increase waste recycling rate

» Environmental Investment Costs



註：包含廢棄物處理費、污染防治費用與設備投資。



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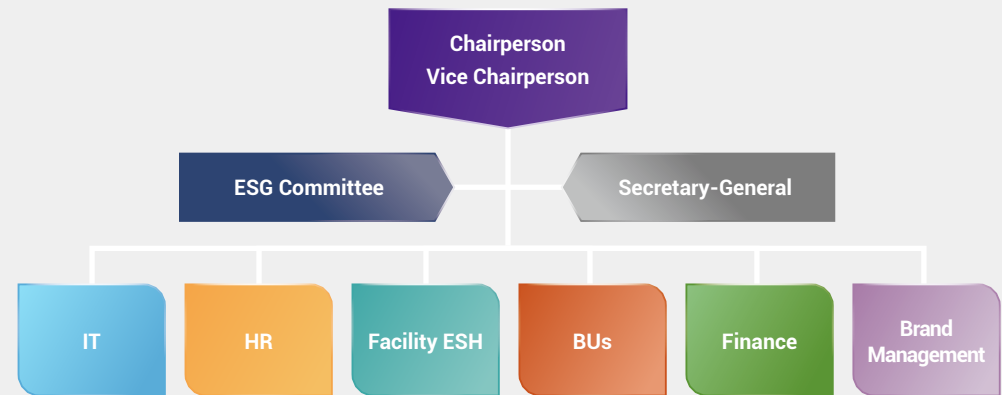
Climate Change Management

Short-, medium-, and long-term carbon reduction targets and strategies are established based on the Net-Zero 2050 carbon reduction strategy and target set by the ESG Committee in 2021, as well as the GHG inventory information and corporate development trends. In response to climate change mitigation and adaptation, strategically we implement the ISO 14001 environmental management system (EMS), the ISO 50001 energy management system (EnMS), and various resource conservation activities. In recent years, apart from engaging in AI technology use, new equipment investment, production efficiency enhancement, and low-carbon production transformation, we have also built solar PV system to use renewables, actively developed low-emission green products, and teamed up with partners of the sustainable supply chain to develop towards a low-emission, green, and sustainable business.



» Climate Change Management Working Team

We establish the "Climate Change Management Working Team" chaired by the chairperson & CEO and co-chaired by the president, with top-tier officers of each unit being members, the CFO and risk management unit being the secretary-general to unfold related activities within the TCFD-recommended framework.



» Strategy and action plan for climate change management

After identifying and assessing climate-related risks and opportunities based on the framework recommended by the Task Force on Climate-related Financial Disclosures (TCFD), we identified five major risks and opportunities. Through integrated consideration of the urgency, derivative benefits, economic benefits, and technical feasibility, we drew up 19 climate adaptation action plans. In 2022 the Climate Change Management Team began to hold the internal management review meeting each year and integrate with the existing risk management system to review and direct the Company's relevant issues, including climate change strategic goals and action plans.





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• TCFD Operation and Management Framework

Governance

- The Board periodically review climate-related risks and opportunities.
 - Periodic report the operation of climate-related issues to the Board and Audit Committee from 2022. The past report was made on November 1, 2022.
- The Board receives climate-related education and training.
 - Each month the ESG Committee shares environmental, social, governance (ESG) information to capture climate-related issues.
 - In 2022 directors and management received a total of 39 hours of climate-related training for the annual training. Please [refer to p.26 of the annual report for the name of courses](#).

Strategy

- Based on the methodology for assessment of climate-related risks and opportunities, the internal definitions include:
 - The time frame for potential impact occurrence: short term 0-3 years, medium term 3-5 years, and long term 5-10 years.
 - Considerations of the significance of risk impact include asset and financial impact, product and service impact, personnel impact, and reputational impact.
- Through identification and assessment, we focus on five major risks and opportunities:
 - Physical Risk: including weather events
 - Transition Risk - Policy and Legal: including the carbon pricing mechanism and compulsory renewables use.
 - Market: Increased cost or shortage of materials.
 - Technology: Unsuccessful investments/R&D of low-emission substitution products.
 - Reputation: Increased stakeholder concern or negative stakeholder feedback.
- Directions of scenario settings include:
 - Transition scenario: National carbon reduction target
 - Physical scenario: RCP 8.5

Risk Management

- Establishing the process for identifying climate-related risks based on the TCFD-recommended framework:
 - Based on the TCFD-recommended framework, identify and assess climate-related risks, including the current laws and regulations, emerging laws and regulations, legal, policy and legal, technology, market, reputation, and physical risks (acute and chronic).
 - Prioritize and analyze risks based on the identification and assessment results and report to the annual management review meeting of the Climate Change Management Working Group to ensure the effectiveness of operation.
- Including climate-related issues in the corporate risk management process
 - Include high-risk issues in the management meeting for management; review the changes in transition and physical risks every year; and make rolling adjustment to the adaptation action plans. ([Please refer to 3-5 Risk Management of this report](#).)

Metrics and Targets

- Metrics for climate change performance management have been set:
 - Ratio of renewables: 30% of renewables use by 2030.
 - Development of low-emission and low-carbon products and technologies
- Perform GHG inventory in accordance with ISO 14064-1:2018, review potential risks, and establish feasible mitigation strategies every year:
 - Conduct ISO 14064-1:2018 GHG inventory and pass third-party assurance (with certificate).
 - Reduce GHG emissions by 30% by 2030 over 2020 (base year).
 - Achieve net-zero emissions by 2050 and key climate-related targets, such as product design.



• Management Approach for Physical and Transition Risks

Risk Category	Aspect	Challenge and Opportunity	Management Approach	Number of Action Plans
Physical	<ul style="list-style-type: none"> Extreme weather events. 	<ul style="list-style-type: none"> Challenge: Increase the cost of risk management; business disruption due to poor response. Opportunity: Reduce carbon emissions and environmental impacts, reduce risks and costs, and enhance competitiveness and sustainability. 	<ul style="list-style-type: none"> Enhance the resilience of the in-house power system. Enhance the resilience of the in-house water system. Consider extreme weather events at the design phase of new plant construction. 	
Transition	<ul style="list-style-type: none"> Policy and legal: including carbon pricing and compulsory renewables use. 	<ul style="list-style-type: none"> Challenge: Increase operating cost; various operational uncertainties due to policy and legal changes. Opportunity: Accelerate promotion of the internal low-carbon operating model to enhance internal concern about the reduction and control of carbon emissions to enhance market competitiveness. 	<ul style="list-style-type: none"> Build solar PV installations. Promote energy conservation and carbon reduction activities and enhance energy efficiency. Participate in the domestic green power market to introduce green energy. 	
	<ul style="list-style-type: none"> Market: Increased cost or shortage of materials. 	<ul style="list-style-type: none"> Challenge: Increased operating costs or disrupted materials supply. Opportunity: Exploring new markets and closer supply chain partnership 	<ul style="list-style-type: none"> Alternative materials deployment and initiation. Energy conservation and carbon reduction guidance for suppliers. 	
	<ul style="list-style-type: none"> Technology: Unsuccessful investments/R&D of low-emission substitution products. 	<ul style="list-style-type: none"> Challenge: Shifts in consumer choices to other suppliers for failure to meet customers' demand for low-emission products or technologies; increased internal R&D costs. Opportunity: Reduced internal operating costs and cultivation of new markets for low-emission products. 	<ul style="list-style-type: none"> Design and development of low-emission products. Waste reduction in production and recycling for reuse. Reduction of packaging materials. 	
	<ul style="list-style-type: none"> Reputation: Increased stakeholder concern or negative stakeholder feedback. 	<ul style="list-style-type: none"> Challenge: Failure to meet stakeholder expectation and impact on corporate reputation and operations. Opportunity: Improve corporate green image through information disclosures to increase positive stakeholder concern. 	<ul style="list-style-type: none"> ESG performance disclosures and stakeholder communication. Establish and implement publicity campaigns to improve corporate in consumers. 	



» Greenhouse Gas Management

• GHG inventory

With reference to the ISO 14064-1:2018 GHG inventory standard and the Greenhouse Gas Protocol published by the World Resources Institute, we have established the GHG inventory mechanism, began to progressively establish the GHG emissions list of various manufacturing locations in 2008, and inventory GHG each year. Subsidiaries including Cenefom and Genejet Biotech will introduce and implement the GHG inventory mechanism in 2023.

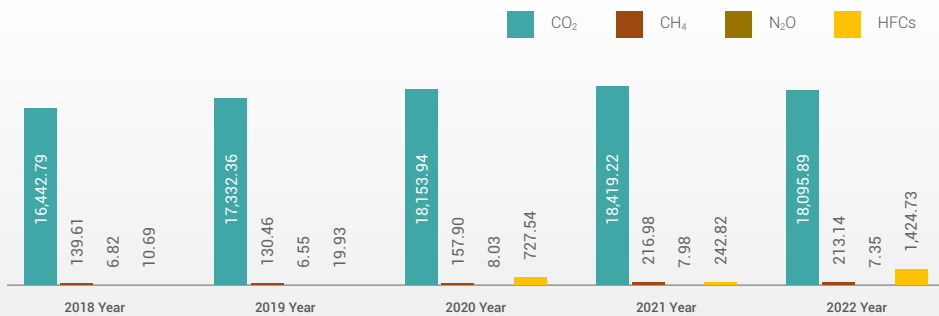
We have two major sources of GHG emissions, including the CO₂ produced from the purchased electricity used in the manufacturing process and the gas and petroleum used in internal operations.

In 2022 we re-identified the categories of indirect (Scope 3) GHG emissions through assessment through activity data collection and based on the ease of access to supply chain GHG emission factors to identify select the categories of indirect (Scope 3) GHG emissions for this year, including the following six categories: upstream transportation and distribution, business travel and employee commuting, purchased goods and services, capital goods, and waste generated in operations.

The 2022 GHG (Scopes 1 and 2) emissions reduced by 11.17% over 2021 and 8.02% over 2020 to 52,923.32 tCO₂e. GHG (Scopes 1 and 2) emissions intensity began to progressively reduce in 2017. The 2022 unit intensity reduced by 5.79% over 2021 and 10.92% over 2020 to 3.41 tCO₂e/NT\$ million.

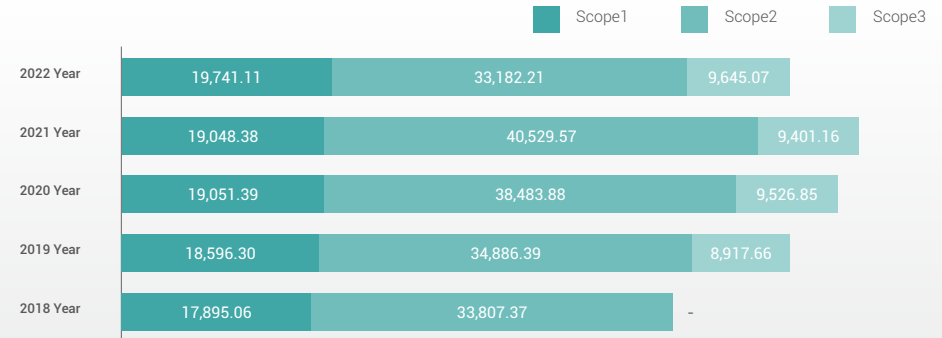
The 2022 GHG (Scope 3) emissions reduced by 2.59% over 2021 and 1.24% over 2020 to 9,645.07 tCO₂e.

GHG Emissions (by emission by) (unit: t)

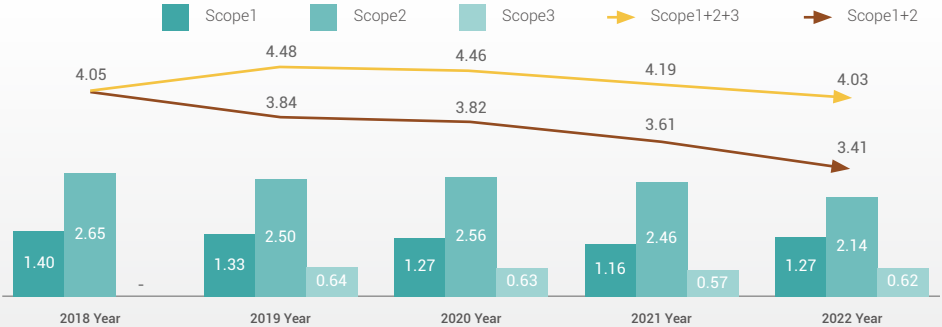


Note: We did not have PFCs and SF₆ emissions.

GHG Emissions (by scope) (unit: tCO₂e)



GHG Emissions Intensity Over the Years (unit: tCO₂e/NT\$1 million revenue)



¹Boundaries of GHG inventory: BenQ Materials HQ, Taoyuan Plant, Longtan Tech Plant, Yunlin Tech Plant, Suzhou Plant, Wuhu Plant, and SIGMA Medical Supplies, Haihu Plant, BMC (No. 28), BMM, and DTB; Scope 3 inventory of HQ and all plants in Taiwan and overseas plants started in 2019 and 2022 respectively.

²We inventoried GHG in accordance with ISO 14064-1:2018 and implemented third-party verification by external certification bodies. Plants in both Taiwan and mainland China passed the verification in 2022.

³Emissions from electricity consumption in Taiwan were calculated based on the 2022 electricity carbon emission factor at 0.509kg tCO₂e/kWh announced by the Bureau of Energy.

⁴The power emission coefficient of business locations in China refers to the "2019 China Regional Grid Baseline Emission Factor" announced by the Ministry of Ecology and Environment Bureau, PRC, and the Eastern China regional grid conversion coefficient is 0.7921 tCO₂e/MWh.

⁵For the fuel and coolant emission coefficient, the research and summary information of the greenhouse gas emission provided by the Environmental Protection Administration, Executive Yuan – Emission Coefficient Table Version 6.0.4 is used

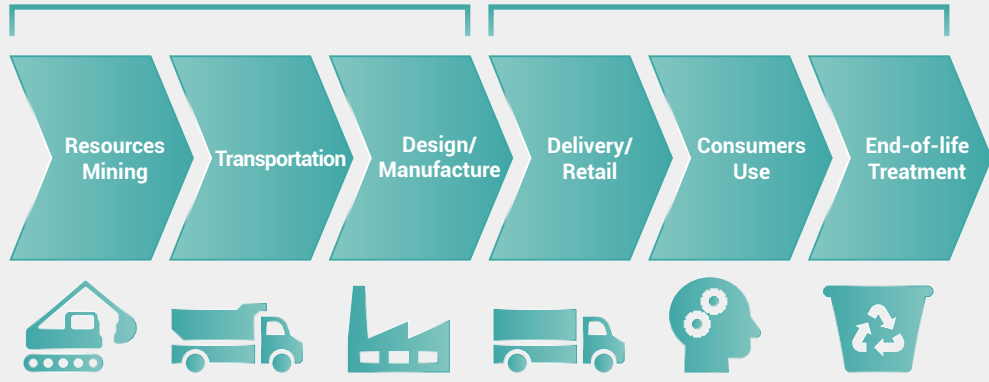


• **Product carbon footprint verification**

In addition to capturing organizational GHG emissions, we also continuously reduce product GHG emissions by and assess product GHG emissions based on the product's life cycle. In 2022 we started carbon footprint verification (CFV) on the textiles (product functional fabrics) and polarizer (product polarizer materials) business units. We obtain the Verification Opinion Statement of Greenhouse Gases (Cradle-to-Gate) in October 2023. Apart from providing a reference for establishing appropriate carbon reduction measures, voluntary CFV also enables customers to understand and calculate the carbon footprint (CFP) of their products and provides customers with added value.



The current scope of fact-checking is until now



• **Establishment of carbon management platform**

In 2022 we started "Carbon Management Platform Construction." At stage 1, we performed digital transformation of daily activities. The IT department developed the e-form system to collect data of GHG emissions in daily activities to build the carbon emissions database. Currently, data collection has been completed for direct (Scope 1) emissions from fuels, indirect (Scope 2) emissions from purchased electricity, and indirect (Scope 3) emissions from employee commuting and waste generated in operations. In the future, we will progressively expand the scope of data collection.

After the statistical analysis of the data collected through the Carbon Management Platform, we locate the hotspots and trends of emissions and discuss the reduction targets and performance through periodic review meetings, making the platform an important tool for setting reduction targets at different stages.

• **Internal Carbon Pricing**

BenQ Materials has implemented an internal carbon pricing of NT\$1,650 per metric ton (approximately \$55 USD). In evaluating new investment projects in the future, the company will utilize the shadow pricing method to estimate potential carbon costs and incorporate both the carbon costs and emission reduction benefits into the final investment decision-making process. This approach ensures that the impacts of carbon emissions are reflected in the decision-making of new project investments, allowing for effective anticipation and management of potential carbon costs.

• **Piloting internal carbon tax mechanism**

In response to the global net-zero target, businesses are accelerating their net-zero transformation. In 2023 we piloted the internal carbon tax system by pricing GHG rates of different business units and charging them the carbon tax based on their carbon emissions from energy consumption to internalize the external cost of GHG emissions in advance so as to urge the internal carbon reduction action and business process optimization for carbon reduction.





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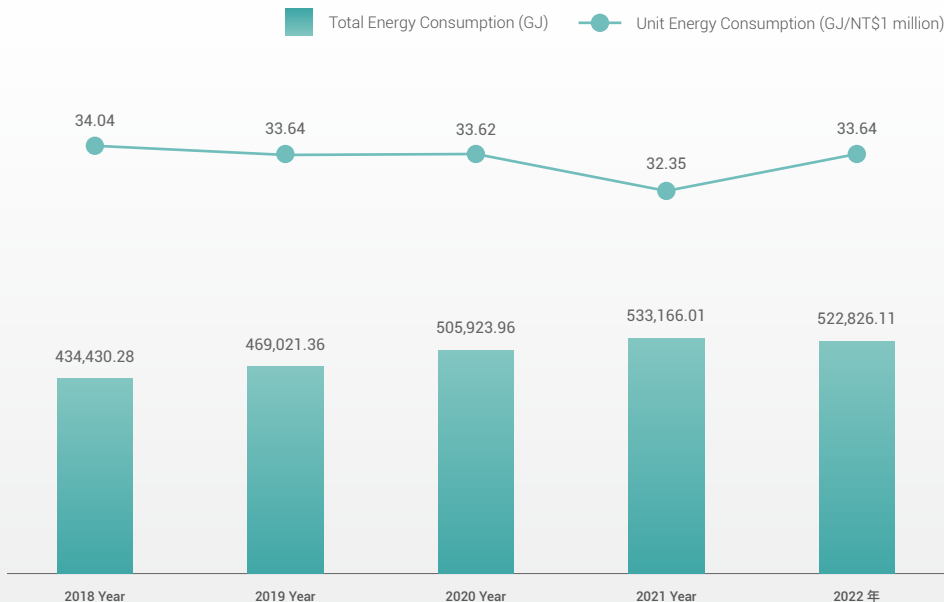
Energy Management

» Energy consumption data

In 2022 non-renewables including natural gas and purchased electricity were the major types of energy we consumed, while diesel was the second highest. The total 2022 energy consumption included 6.8197m3 of natural gas, 73.5551 GWh (including non-renewables and renewables) of electricity, 1.234Ml of petroleum, and 1.994Ml of diesel. In terms of heat value, it was 522,826.11 GJ (109 joule), reducing by 1.94% over 10,339.90 GJ in 2021.

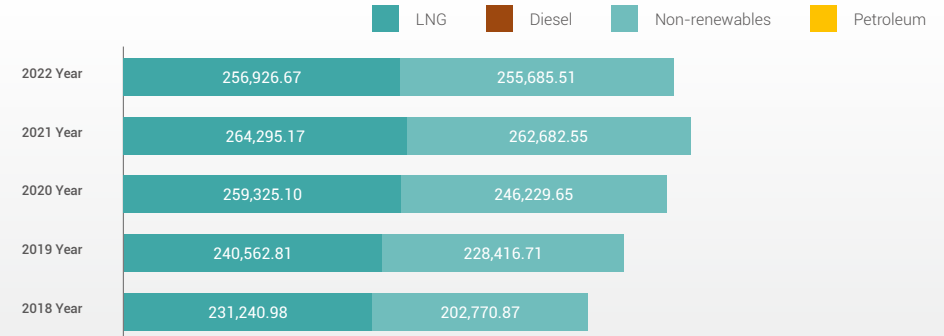
When calculating total energy consumption using revenues as the denominator, the 2022 energy intensity ratio (energy consumption/NT\$1 million revenues) was 33.64 (GJ/NT\$1 million), increasing by 1.29 (4.0%) over 2021.

Energy Consumption Intensity Over the Years



*The boundary of energy management disclosure in 2022 included subsidiaries Cenefom and Genejet Biotech.

Energy Consumption Over the Years (non-renewables) Unit: Gigajoules (GJ)



» Action and Performance of Reduction

To mitigate global warming and to lower the operational risk from climate change and enhance the effectiveness of green production, we continue to take actions in energy conservation, emissions reduction, green manufacturing, and recycling to reduce energy and resources use and consumption.

In 2022 we implemented 25 electricity conservation projects, reducing carbon emissions by 1,207.7 tCO₂e in terms of the annual total energy consumption at 2.406 GWh. In 2022 we implemented 4 natural gas projects, reducing carbon emissions by 555.6 tCO₂e in terms of the annual total energy consumption at 294,000m³.

Item

Major Energy Conservation Measures in 2022

- 1 Introduction of the super-high performance active magnetic bearing compressor for the compression dryer air (CDA) system.
- 2 Reduction of chiller system energy consumption: Introduced super high-efficiency fan propellers to the cooling tower; replaced aged cooling materials; installed the AI smart load prediction/chiller energy conservation operation model.
- 3 Installation of the air-bearing blower in the biological tank in the wastewater treatment plant.
- 4 Introduction of smart high-performance energy-efficient lifts.
- 5 Installation of the waste heat recovery boiler to the regenerative thermal oxidizer (RTO).



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Year	Electricity conservation effectiveness (kWh)	Emissions reduction effectiveness (tCO ₂ e)
2020	707,809	355.32
2021	779,358	391.24
2022	2,405,830	1,264.99

*Scope 2 for all.

Year	Natural gas conservation effectiveness (m ³)	Emissions reduction effectiveness (tCO ₂ e)
2020	341,808	646.02
2021	505,615	950.05
2022	293,972	552.37

*Scope 1 for all.

In 2023 we will replace old large equipment including aircon chillers and steam boilers; assess the benefits of implementing high-efficiency smart control and the use of waste heat recovery process technology; replacing lighting fixtures with energy-efficient LED models and FFU with DC motors to continuously implement energy conservation and carbon reduction to reduce energy consumption.

IT Data Center Energy Efficiency and Public Cloud Status

- Currently, approximately 90% of the existing information data centers have been transformed into centralized private cloud virtual environments, resulting in a 60% decrease in power consumption.
- External services, including employee mobile app self-service and brand official website, will be transitioned to external cloud hosting management, reducing the growing electricity consumption of the information data centers.

» Renewables use

• Self-developed renewables

In 2021 we began to build solar PV systems in each plant for self-generation of electricity for self-consumption to reduce purchased electricity and carbon emissions. The solar PV projects at Yunlin Tech Plant and Taoyuan Plant were completed in 2022. Operation will start in 2023Q1 to supply electricity for self-consumption. The annual general capacity of all plants will reach 2.53GWh. In 2023 we will continue the PV system expansion of Yunlin Tech Plant.

Year	Generation capacity (kWh)	Energy consumption (GJ)	Carbon reduction (tCO ₂ e)
2021	1,379,200	4,965.06	1,014.04
2022	2,530,591	2,530,591.42	1,886.56

*Figures were calculated using the electricity carbon emission factor announced by the Bureau of Energy of Taiwan and the Regional Grid Baseline Emission Factor of East China.

• Purchased renewables

We team up with renewables retailers to progressively obtain more renewables. In 2022 Suzhou Plant in mainland China purchased the renewable energy certificates issued by IREC to announce voluntary reduction of carbon emissions from purchased electricity of Suzhou Plant and Wuhu Plant in 2022.

In 2023 we will increase purchasing the Taiwan renewable energy certificate (T-REC) for solar PV wheeling to Taoyuan HQ. In the future, we will assess the increase in renewable purchase of all plants to reduce the carbon emissions from electricity.





Water Resource Management

Setting out from sustainable water use, we plan the four strategic stages: wastewater reduction, wastewater recycling, new water source cultivation, zero wastewater discharge by extending the three water principles: consumption inventory, conservation measures, and recycling. Reduction and recycling begin with domestic water use, process water use, aircon water use, and boiler water use to progressively enhance water efficiency and improve water use strategies. In 2023 we will implement the ISO 46001 water efficiency management systems and pass the certification.

» Water Consumption Overview

Water consumption in each plant can be divided into process water use, firefighting water use, and domestic water use. The withdrawal sources and suppliers of each plant are disclosed by location.

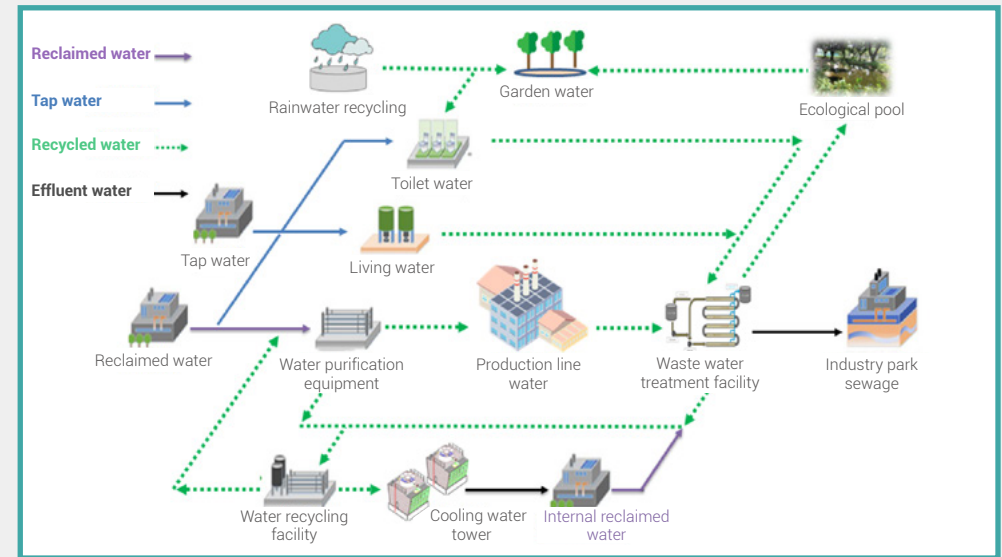
Water Sources and Uses :

Business Location	Withdrawal Source	Usage			Supply Unit
		Process	Firefighting	Living	
Taoyuan Plant	Shihmen Reservoir, and some from groundwater	●	●	●	Taiwan Water Company
Longtan Tech Plant	Shihmen Reservoir	●	●	●	Taiwan Water Company
Yunlin Tech Plant	Hushan Reservoir and Jiji Weir	●	●	●	Taiwan Water Company
Suzhou Plant	Yangcheng Lake Area (Yangtze River water consumption scope)	▲	●	●	Suzhou Qingyuan Water Resource Ltd.
Wuhu Plant	Yangtze River	●	●	●	Wuhu Huayen Water Resource Ltd.
Cenefom	Feicui Reservoir	●	●	●	Taiwan Water Company
Genejet Biotech	Yonghe Reservoir	●	●	●	Taiwan Water Company

▲ : Suzhou Plant is mainly for the posterior manufacturing process, and the factory water use demand is for air conditioning use only.

Currently, all plants in Taiwan have installed wastewater recovery and treatment facilities, and discharged wastewater is all transported to the sewage treatment plant in the industrial park where each plant is located for further treatment. The sewage treatment plant of each industrial park has set the water quality standard for incoming sewage and only qualified sewage will be discharged. The domestic sewage of Suzhou Plant is discharged into the urban sewerage network for centralized treatment by the urban treatment plant. Wastewater from cleaning coating fabric rollers is the major process wastewater of Wuhu Plant. After flocculation and sedimentation, it is discharged to the sewerage network via the septic tank together with domestic sewage. The 2022 effluents of all plants met the relevant requirements.

Plant Water Consumption Process :



Wastewater discharge standard and inspection items :

Business Location	Wastewater Discharge Standard	Inspection Item
Taoyuan Plant	Sewage Water Quality Standard of Guishan Industrial Zone Service Center Sewage Treatment Plant	Water temperature, pH, BOD, COD, SS, boron, fluoride salts, copper, zinc, nickel
Longtan Tech Plant	Longtan Park Sewage Usage Fee Calculation Standard of Hsinchu Science Park Bureau, Ministry of Science and Technology	Water temperature, hydrogen ion concentration index (pH), biochemical oxygen demand (BOD), chemical oxygen demand (COD), SS, boron, fluoride salt, copper, zinc, nickel, anionic surfactant, ammonia nitrogen, nitrate nitrogen, cyanide, cadmium, total chromium, hexavalent chromium, total mercury, arsenic, lead, indium, gallium, molybdenum, true color
Yunlin Tech Plant	Sewage Water Quality Standard of Yunlin Technology Park	Water temperature, pH, COD, SS, ammonia nitrogen
Suzhou Plant	"Sewage Comprehensive Discharge Standard" GB8978-1996, "Sewage Water Quality Standard for Discharging Sewage into Cities and Towns" GB/T31962-2015	Animal and vegetable oils, pH, COD, SS, ammonia nitrogen, total phosphorus (TP)
Wuhu Plant	"Sewage Comprehensive Discharge Standard" GB8978-1996 Level 3 standard	Animal and vegetable oils, pH, BOD, COD, SS, ammonia nitrogen
Cenefom	No wastewater	No wastewater

*Subsidiary Genejet Biotech does not involve wastewater discharge.



The 2022 total withdrawal reduced by 18.96MI (4.20%) over 2021 to 432.74 MI. The 2022 total discharge (wastewater discharge) to the local wastewater treatment plant reduced by 9.40 MI to 365.42MI over 2021. The 2022 water consumption was 67.32 MI, mainly from evaporation by the cooling water tower.

No wastewater was recycled for the following plants: Wuhu Plant (discharged together with domestic water), Suzhou Plant and subsidiaries Cenefom and Genejet Biotech (mainly domestic wastewater). The 2022 discharge rate (discharge/total withdrawal) of each plant in Taiwan was 82.13%. By including the amount of process recycling, scrubber recycling, process water treatment and recycling, ROR circulation and recycling, wastewater treatment recycling and aircon water recycling, the recycling rate was 84.16%. By further including the water recycled water from the cooling water, the recycling rate could be up to 97.36%.

Unit: Megaliters (MI)

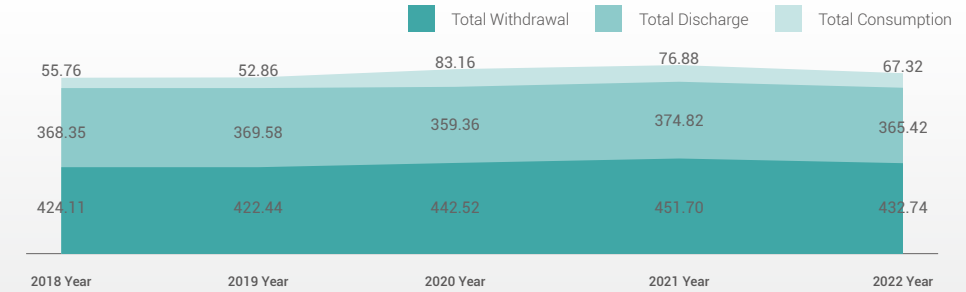
Statistics of Water Withdrawal Over the Years						
Withdrawal Source	Type	2018	2019	2020	2021	2022
Groundwater	Freshwater	0.43	0.26	0.16	9.17	0.06
Water from third party	Freshwater	423.68	422.18	442.36	442.52	432.68

Unit: Megaliters (MI)

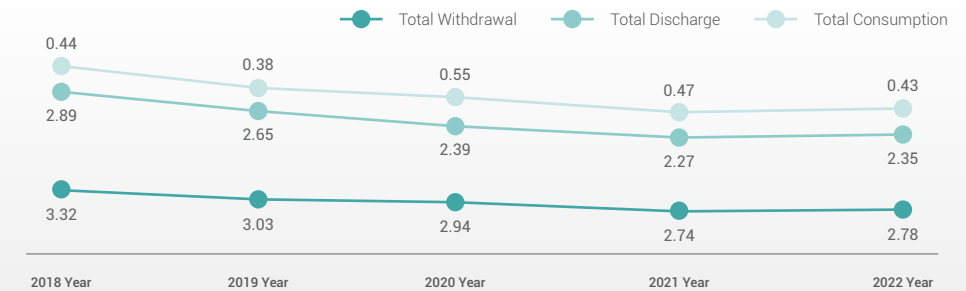
Statistics of Historical Water Discharge Amount						
Withdrawal Source	Type	2018	2019	2020	2021	2022
Discharge amount according to destination	Water from third party	368.35	369.58	359.36	374.82	365.42
	Freshwater	368.35	369.58	359.36	374.82	365.42
Discharge by level of water quality treatment	Primary treatment	101.84	73.96	68.39	81.05	76.17
	Secondary treatment	169.84	188.16	204.66	203.75	212.49
	Tertiary treatment	96.67	107.47	86.32	90.02	76.76

*Analysis of the geographical location of business locations with WRI's Aqeduct tool shows that only Suzhou Plant in mainland China is located in a high water stress region (accounted for 11% of total withdrawal).

Annual water resource utilization intensity (Unit: million cubic meters per hundred million dollars)



Annual water resource utilization overview (Unit: hundred cubic meters)



*Subsidiaries Cenefom and Genejet Biotech were added to the water use disclosures in 2022.

» Water risk management

In accordance with the Global Risks Report 2022 published by the World Economic Forum (WEF), "natural resource crises," including water crisis, is amongst the most severe risks on a global scale over the next 10 years. Identification of the relevant water risks in the locations of all BenQ Materials plants in accordance with the AQUEDUCT Water Risk Atlas of the World Resources Institute shows, only Suzhou Plant in mainland China is located in a high water stress area in the short term, while the water risk of locations of other plants is low. In consideration of the long-term effect of climate change, the water stress and water risk of Yunlin Tech Plant in Taiwan will increase to moderate, and we will need to plan responsive strategies to enhance its water risk resilience.



• Analysis of Significance of Water Impact

Business Location	Supplier	Supply Volume ¹ (MI/day)	Consumption Volume ² (MI/day)	Significance of Impact ³
Taoyuan Plant	Danna Purification Plant	38.25	0.04	0.10%
Longtan Tech Plant	Longtan Purification Plant	13.76	0.06	0.44%
Yunlin Tech Plant	Yunlin Tech Purification Plant	1.6	0.01	0.63%
Suzhou Plant	Suzhou Qingyuan Water Resource Ltd.	45	0.02	0.04%
Wuhu Plant	Wuhu Huayen Water Resource Ltd.	87	0.005	0.01%

¹Source of supply volume: Data announced by local governments.

²Source of consumption volume: Average consumption calculated by each plant.






³Significance of impact = Consumption ÷ Regional Supply x 100%

Water is one of the key global resources. Additionally, the risk and importance of water availability and use matter our operational activities and supply for the supply chain. In response to business disruption resulting from the potential risk of water suspensions and droughts due to climate change, we have established three major risk response strategies: external water information reporting system, internal water management system, and emergency response mechanism to enhance overall water risk resilience.

• Water risk management approaches

- Establish a plant-wide water conservation management program and implementation plan and set up a task force.
- Analyze, inventory, and calculate plant water consumption, establish feasible solutions, and implement water conservation plans.
- Take the water conservation awareness education courses and training organized by the government and professional organizations.
- Enhance awareness and enrich professional knowledge of water conservation through awareness education and internal training.
- Each department sends seed personnel to implement water conservation work.
- Establish the water incoming and suspension information management report system to enhance the warning and response capabilities of water risks.
- Establish the drought response mechanism according to the government's water condition indicator.

• Drought Response Mechanism

	Rationing Stage	Government Policy	BenQ Materials' Response Plan
	NA	Water supply stabilization	Normal withdrawal for production use
	NA	Recommendation for following	Trial operation of the well water system every two weeks Notification of water tank contractors
	Stage 1 rationing	Supply with reduced pressure at off-peak hours and specific periods	Trial operation of the well water system every week Notification of water tank contractors
	Stage 2 rationing	1,000MT/month for industrial users Supply reduction by 5-20%	Initiation of the well system at Taoyuan Plant Notification of water tank contractors
	Stage 3 rationing	Supply by region or time-based water suspension	Initiation of the well system at Taoyuan Plant Activation of water tank supply

• Establishment of the water efficiency management system

Taoyuan Plant started establishing the ISO 46001 water efficiency management systems in 2023, and certification will be completed by the end of 2023 to raise the Company's water management standard to achieve environmental sustainability.

» Water Conservation Solutions

In 2022, the company continued to implement water saving solutions, such as condensate improvement, water consumption improvement and water recycling rate, which can be converted into the water saving amount of approximately 16.22 MI of whole-year water consumption. In addition, the company will continue to reduce the water resource consumed during the manufacturing process.

Year	Effectiveness (m ³)	Item	Major Water Conservation Measures in 2022
2020	14,290	1	Replace pure water RO membranes with biological anti-scaling membranes to increase water production
2021	49,439	2	Reduce process consumption
2022	12,562	3	Reclaim RO concentrate to the cooling water tower pump
		4	MBRReplace membrane pipelines



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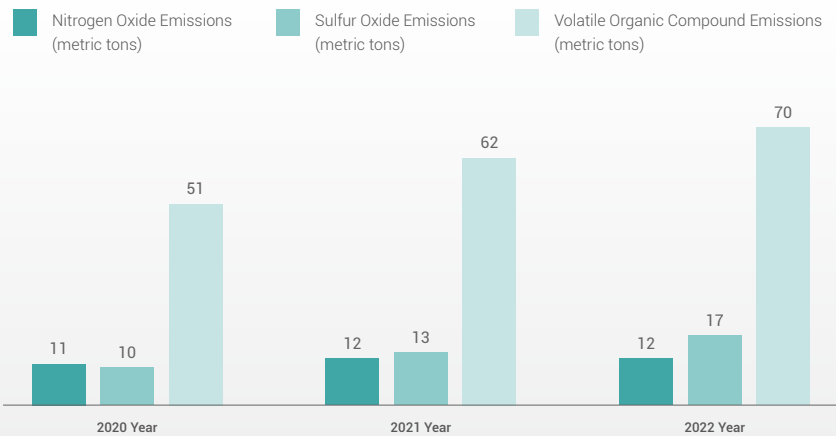
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Air Population Control

We abide by the environmental protection regulations and have installed the air pollution control equipment such as the regenerative thermal oxidizer (RTO), scrubber, and bag dust collector for process waste gas treatment to minimize air pollutant emissions and to reduce environmental burden. Each pollution control equipment is operated and maintained by responsible personnel. The operating status of the equipment is also monitored by the central control system or inspectors to ensure that the air pollution control equipment operates normally and to prevent air pollution incidents. Additionally, based on the ISO 14001 environmental management system, we manage and continually improve environmental performance and reduce the risk of environmental pollution. In recent years no sanction for air pollution has been reported.

2022 Air Pollutant Emissions :

Unit: MT



Note: Suzhou Plant and Wuhu Plant have no emission of air pollution

*The average efficiency of VOC treatment is maintained at over 98%, superior to the 92% standard of the Environmental Protection Administration.





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Circular Economy

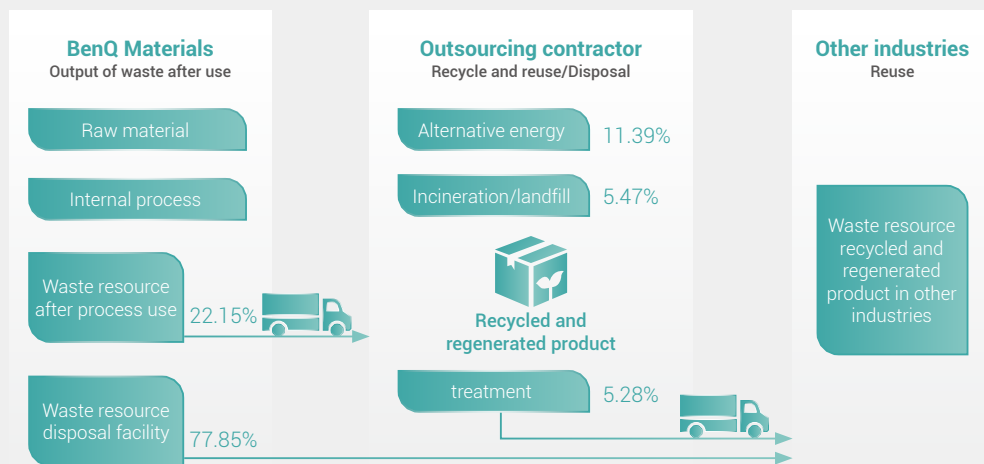
» Waste Management

Waste generated from business operations should be properly handled and disposed of. Inappropriate disposal may cause severe environmental pollution and indirectly affect residents in local communities. Committed to reducing the environmental impact of products at different stages of the life cycle from raw materials, manufacturing, storage, transportation, use to scrap to implement responsible production and achieve zero waste management through reduction and recycling.

BenQ Materials adopts the strategy of source management, and continues to perform the resource consumption minimization evaluation (reduce) at the production source, along with the adjustment of the raw material use parameters and process technology improvement solutions, thereby achieving the raw material optimization and minimization with the joint effort of the supply chain, in order to reduce the generation of wastes as much as possible.

In order to waste reduction management for the waste resource, the company also implements the circular economy principle along with the method of resource recycling and classification, in order to achieve the goal of waste reduction. For the waste resource that cannot be used in the plant, the methods of "Material Recycling" and "Energy Recovery" are adopted in priority for delivery to qualified waste treatment suppliers, following which incineration and landfill methods are performed at the end.

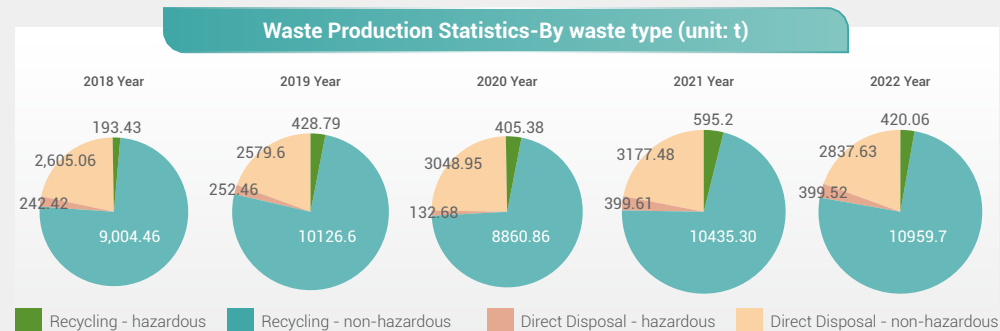
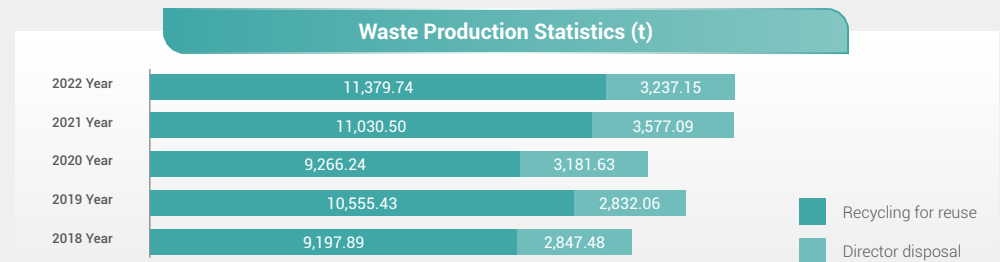
BenQ Materials Waste Impact Management



» Waste Production Volume

Waste produce at our plants can be classified into seven categories: general industrial waste, potassium iodine, film waste (waste films account for the majority of the waste), waste liquid and waste adhesive, recyclable waste liquid, solid waste, recyclable waste. The total weight of waste in 2022 was 14,616.88MT, including 11,379.74MT of recyclable waste (77.85%). Since 2018 the total weight of recyclable waste has reached 51,429.79MT accumulatively.

The 2022 total waste cleaning and disposal fee was about NT\$44.84 million, accounting for 0.29% of the revenue. The 2022 waste direct disposal (excluding recycling) intensity (weight of direct disposal/revenue of NT\$ million) was 0.21.





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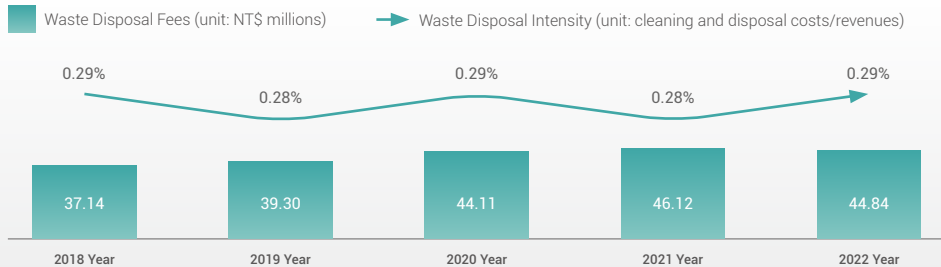
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Waste Production Intensity (t/revenue NT\$1 million)



Waste Disposal Fees and Intensity Over the Years



» Waste to resource

Each month we set targets for waste recycling to verify if the action plan is implemented unflinching. To increase the proportion of waste to resource, we have established a waste management procedure and recycling targets. Additionally, the action plan and targets are reviewed at the quarterly corporate sustainable development meeting to ensure long-term monitoring.

For each type of waste, We continuously find the reuse methods, such as development into products or for recycling and reuse. Currently, we focus on the in-house reuse of distilled ethyl acetate (EAC) to reduce the proportion of raw material consumption and waste production. We also sell distilled EAC to other businesses. We also seek contractors to recycle waste white films (iodine-free) into materials (guide films) for other businesses and continue to explore other treatments in addition to the combustion aid for waste films.

In addition, the product that accounts for the largest percentage of the revenue of BenQ Materials is polarizer, and its main material used is raw film. According to the currently existing technical capability, polarizer or other electronic recycled and reused materials cannot be used for re-fabrication into raw films in order to be used for the manufacturing of polarizer. Consequently, there have been no relevant product recycling or recovery of other electronic wastes. The wastes are self-recycled for treatment or are entrusted to other suppliers to perform reuse procedure. In 2022 two recycling projects are be implemented, including distilled EAC in-house recycling for reuse and waste films as materials for other businesses.

2022 Waste to Resource Management: In-house recycling and reuse of distilled EAC

Management Method:

1. Waste distillation.
2. Quality verification of distilled VAC.
3. Reuse of distilled EAC in the manufacturing process.

Reduction Performance:

- Replace ingredients by about 10,300 kg each month.
- Recycle waste for reuse.

2022 Waste to Resource Management: Waste white films as materials of other businesses.

Management Method:

1. Recovery, sorting, and gathering of waste films from the production process.
2. Quality verification against customer requirements.
3. Breakpoint and reeling verification of recycled waste against customer requirements before shipping.

Reduction Performance:

- Reused waste as materials of other businesses.
- Reduced 21MT of waste each month, as well as the corresponding waste disposal expenses.

» Waste to resource data

The weight of recycled waste in 2022 increased by 3.17% over 2021 to 11,379.74MT. After distillation machine optimization in 2022, the distillation efficiency of PSA adhesive enhanced to increase the recycled volume. We also continuously sought buyers to use waste white films as materials and buyers of release paper for reuse. [Please refer to Appendix 9-1 for the waste data over the years.](#)

According to the hazard type and location, wastes can be further classified into three types of waste recycled and reused directly by the plant, hazardous wastes transported to the external for recycling, and non-hazardous wastes transported to the external for recycling. In addition, according to the nature of recycling, wastes can be classified into two types of wastes for reuse, and wastes for other recycling operation.

Waste Clean-up Data

The 2022 total weight of waste for disposal (direct) by contractors reduced by 9.50% over 2021 to 3,237.15MT. Physical disposal and recycling were the major methods of disposal. In director waste disposal, the weight of hazardous and non-hazardous waste reduced by 0.02% and 10.70% over 2021 respectively. This is mainly because the increased reuse of waste white films of Taoyuan Plant by other businesses and the reuse of release paper of Yunlin Plant by other businesses, reducing the weight direct disposal by 9.50% over 2021. [Please refer to Appendix 9-1 for the waste data over the years.](#)