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## Environmental Sustainability

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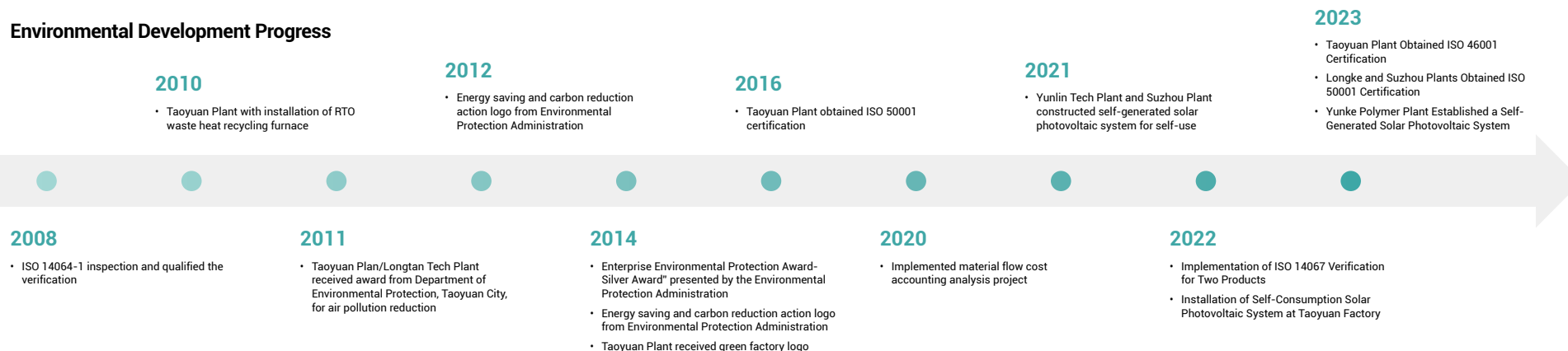
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# Environmental Management

## Environmental Development Progress



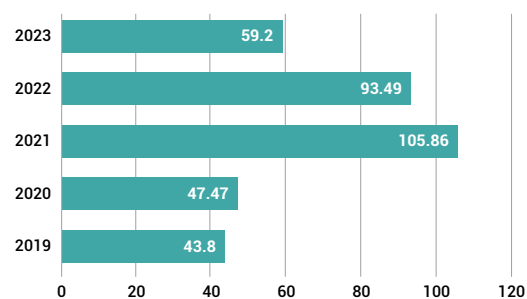
## Environmental Management Objectives

BenQ Materials has established a comprehensive environmental management mechanism, which includes management methods for energy and greenhouse gas management, water resource management, and waste management. The company actively manages the use of energy and resources in all aspects and has set environmental management goals. Additionally, BenQ Materials continuously monitors international environmental issues and trends, conducts internal audits and external third-party verifications annually to ensure the effective operation of its management systems. The company has obtained certifications at key operational sites, including ISO 46001 (Taoyuan Plant) in 2023, ISO 50001 (Longke Plant, Suzhou Plant), and ISO 14067 (polarizer products, textile products, battery products). [For details, please refer to Appendix 9-8: Overview of the Management Systems Implemented.](#)

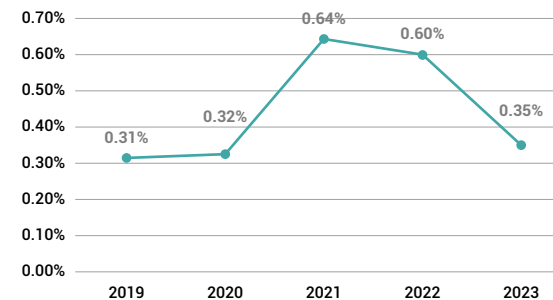
Item	Objectives
Climate Change Management	Reduce greenhouse gas emissions (Scope 1 and 2) compared to the baseline year (2020)
	Increase the share of renewable energy in the overall energy mix
Energy Management	Decrease energy intensity (non-renewable energy) compared to the baseline year (2020)
	Promote 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

Environmental Investments Over the Years (unit: NT\$ millions)



Environmental Investment to Revenue Ratio (%)



Note: Environmental investment costs include waste disposal fees, pollution control costs, and capital expenditures for equipment. In 2023, major expenses included the replacement of RTO regenerative materials, chemical dosing for the wastewater system, and maintenance of water treatment facilities, totaling 59.2 million NTD. The environmental investment to revenue ratio for the year was 0.35%.





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## Climate Change Management

In 2021, BenQ Materials' ESG Sustainability Committee set a target of achieving net-zero emissions by 2050. Combining greenhouse gas inventory information and its own development trends, the company has formulated short-, medium-, and long-term carbon reduction targets and strategies. To mitigate and adapt to climate change, the company continuously promotes the ISO 14001 environmental management system, ISO 50001 energy management system, and various energy and resource conservation activities. In recent years, the company has also invested in new AI technology applications and new equipment to enhance production efficiency and transition to low-carbon production. This includes the installation of solar power generation systems within the plant to use renewable energy, active development of low-carbon green products, and collaboration with sustainable supply chain partners, all aimed at comprehensive development towards a low-carbon, green, and sustainable enterprise.

### Climate Change Management Working Team

BenQ Materials has established the "Climate Change Management Task Force," with the CEO and General Manager serving as Chairman and Vice Chairman, respectively. The first-level supervisors from each unit serve as committee members, and the CFO/Risk Management Unit serves as the Secretary General. This task force is responsible for promoting activities related to climate change management.

Low-carbon  
production  
transformation

Renewables use

Low-emission  
green products

Sustainable  
partnership

#### Short Term Goal

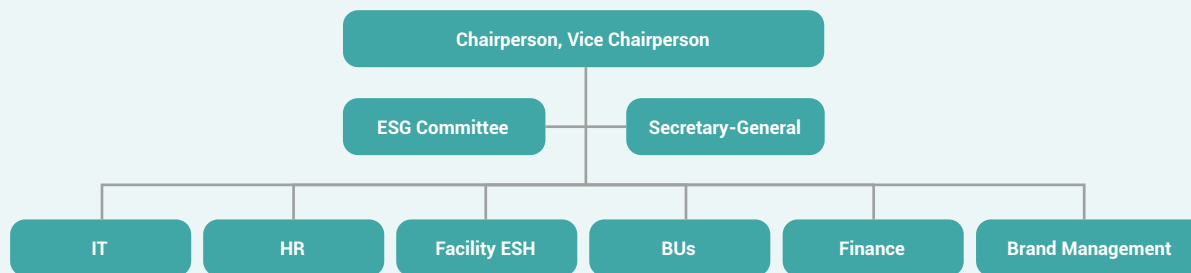
- 15% of renewables in 2023
- The 2023 GHG emissions reduced by 9% over 2020

#### Medium Term Goal

- Reduce by 30% by 2030 (base year 2020)

#### Long Term Goal

- Net-Zero by 2050
- RE100% by 2040



### Strategy and action plan for climate change management

BenQ Materials follows the Task Force on Climate-related Financial Disclosures (TCFD) framework to manage and identify the risks and opportunities associated with climate change. The company has identified five major risks and opportunities and, after comprehensive consideration of potential financial impacts, the urgency of risk plans, derived benefits, economic efficiency, and technical feasibility, it formulates and implements climate change adaptation action plans. The company holds internal management review meetings annually and integrates these activities with existing risk management systems. Each year, reports are submitted to the Audit Committee and the Board of Directors to review and guide the company's climate change strategy, targets, and action plans.







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## TCFD Operation and Management Framework

Aspect	BenQ Materials Strategy and Action Plan
Governance	<p>1. The Board of Directors regularly reviews climate change-related risks and opportunities:</p> <ul style="list-style-type: none"><li>Starting from 2022, an annual report on the operation of climate change-related issues is presented to the Board of Directors and the Audit Committee. The report for 2023 was completed on November 2.</li><li>The organization chart of the Climate Change Management Task Force is shown above. Each year, the task force identifies and evaluates climate change risks and opportunities, comprehensively considering potential financial impacts and other influences. It formulates climate change adaptation plans, with management review meetings chaired by the Chairman/Vice Chairman to ensure timely provision of resources and alignment of climate change adaptation actions with the company's strategic direction.</li></ul>
	<p>1. According to the climate change risk and opportunity assessment methodology, the internal definitions are as follows:</p> <ul style="list-style-type: none"><li>Time scales for potential impacts: short-term is defined as 0-3 years, medium-term as 3-5 years, and long-term as 5-10 years.</li><li>Risk impact considerations include the effects on assets and finances, product and service impacts, personnel impacts, and reputational impacts.</li></ul> <p>2. Through identification and assessment, five major risks and opportunities were focused on:</p> <ul style="list-style-type: none"><li>Risks: Raw material shortages or cost increases (short-term), extreme weather events (short-term), average temperature rise (medium-term), changes in rainfall patterns (medium-term), strengthened carbon emission disclosure requirements/carbon pricing mechanisms (short-term).</li></ul>
Strategy	<p><b>Transition Risks:</b></p> <ul style="list-style-type: none"><li>Strengthened carbon emission disclosure requirements/carbon pricing mechanisms</li><li>Requirements and regulations for existing products and services</li><li>Mandatory use of renewable energy</li><li>Insufficient training on new policies and regulations</li><li>Low-carbon alternative products and services</li><li>Stricter product regulations</li><li>Raw material shortages or cost increases</li></ul> <p><b>Physical Risks:</b></p> <ul style="list-style-type: none"><li>Extreme weather events</li><li>Average temperature rise</li><li>Changes in rainfall patterns</li><li>Wildfires</li><li>Food shortages</li><li>Increased likelihood of infectious diseases</li><li>Rising insurance premiums</li></ul> <p><b>Opportunities:</b></p> <ul style="list-style-type: none"><li>Adoption of more efficient production and distribution processes</li><li>Recycling and reuse</li><li>Transition to more efficient buildings</li><li>Reduction in water use and consumption</li><li>Work From Home (WFH)</li><li>Renewable energy and energy-saving initiatives</li><li>Development and innovation of new products and services</li><li>Development and/or increase of low-carbon products and services</li><li>Changes in consumer preferences</li><li>Use of new technologies</li><li>Entry into new markets</li><li>Sustainability-linked syndicated loans</li></ul> <p>1. Opportunities: Development and innovation of new products and services (short-term), related to renewable energy and energy saving (short-term), development and/or increase of low-carbon products and services (short-term), reduction in water use and consumption (long-term), use of new technologies (medium-term), and entry into new markets (medium-term).</p>

## Strategy

Risk  
ManagementMetrics and  
Targets

Strategy	<p><b>Opportunities:</b></p> <ul style="list-style-type: none"><li>Adoption of more efficient production and distribution processes</li><li>Recycling and reuse</li><li>Transition to more efficient buildings</li><li>Reduction in water use and consumption</li><li>Work From Home (WFH)</li><li>Renewable energy and energy-saving initiatives</li><li>Development and innovation of new products and services</li><li>Development and/or increase of low-carbon products and services</li><li>Changes in consumer preferences</li><li>Use of new technologies</li><li>Entry into new markets</li><li>Sustainability-linked syndicated loans</li></ul>
	<p>3. Scenario setting directions include:</p> <ul style="list-style-type: none"><li>Transition scenarios: changes in regulations/policies/product demand/green inflation transition scenarios.</li><li>Physical scenarios: referencing SSP5-8.5 (extreme high emissions scenario) from the IPCC Sixth Assessment Report (AR6); due to insufficient external literature, the IPCC Fifth Assessment Report (AR5) RCP8.5 scenario is used for mainland China facilities.</li></ul>
Risk Management	<p>1. Using the TCFD framework to establish a climate change identification process:</p> <ul style="list-style-type: none"><li>Deploy the TCFD framework to identify and assess risks, including transition risks (current regulations, emerging regulations, legal, policy regulations, technology, market, reputation) and physical risks (immediate and long-term).</li><li>Prioritize and analyze the results of the identification and assessment, and report to the Climate Change Management Task Force during the annual management review meeting to ensure the effectiveness of operations.</li></ul> <p>2. Integration of climate-related issues into corporate risk management processes:</p> <ul style="list-style-type: none"><li>Include high-risk issues in high-level meetings for management; annually review changes in transition risks and physical risks, and make rolling adjustments to adaptation action plans. <a href="#">(Refer to section 3-5 Risk Management in this report)</a></li></ul>
	<p>1. Climate Change Performance Management Targets:</p> <ul style="list-style-type: none"><li>Renewable Energy Proportion: Set a target to increase the proportion of renewable energy to 100% by 2040.</li><li>Greenhouse Gas Emissions: Reduce greenhouse gas emissions by 30% by 2030 compared to the baseline year of 2020.</li><li>Achieve net-zero emissions by 2050 and meet key climate goals related to product design.</li></ul> <p>2. Conduct an annual greenhouse gas inventory through ISO 14064-1:2018 to assess company risks and formulate feasible mitigation strategies:</p> <ul style="list-style-type: none"><li>Perform the inventory according to ISO 14064-1:2018 and obtain third-party verification statements.</li><li>Reduce greenhouse gas emissions by 30% by 2030 compared to the baseline year of 2020.</li><li>Achieve net-zero emissions by 2050 and meet key climate goals related to product design.</li><li>Detailed climate change adaptation action plans are provided in the table below.</li></ul>



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## Management Approach for Physical and Transition Risks

Category	Aspect	Management Policy / Plan Content
Physical	Extreme weather events.	<ul style="list-style-type: none"> <li>Enhance the resilience of the in-house power system.</li> <li>Enhance the resilience of the in-house water system.</li> <li>Consider extreme weather events at the design phase of new plant construction.</li> </ul>
	Policy and legal: including carbon pricing and compulsory renewables use.	<ul style="list-style-type: none"> <li>Build solar PV installations.</li> <li>Promote energy conservation and carbon reduction activities and enhance energy efficiency.</li> <li>Participate in the domestic green power market to introduce green energy.</li> </ul>
Transition	Market: Increased cost or shortage of materials.	<ul style="list-style-type: none"> <li>Alternative materials deployment and initiation.</li> <li>Energy conservation and carbon reduction guidance for suppliers.</li> </ul>
	Technology: Unsuccessful investments/R&D of low-emission substitution products.	<ul style="list-style-type: none"> <li>Design and development of low-emission products.</li> <li>Waste reduction in production and recycling for reuse.</li> <li>Reduction of packaging materials.</li> </ul>
	Changes in Consumer Habits	<ul style="list-style-type: none"> <li>Product adjustments to expand other application areas.</li> </ul>
	Develop or increase low-carbon products and services.	<ul style="list-style-type: none"> <li>Introduction of low-carbon materials.</li> <li>Green production.</li> <li>Reduction of raw materials.</li> <li>Equipment optimization.</li> </ul>
Chance	Research and innovate the development of new products and services.	<ul style="list-style-type: none"> <li>Application of innovative technologies to develop substitute materials.</li> </ul>
	Use more efficient production and distribution processes.	<ul style="list-style-type: none"> <li>Process optimization.</li> </ul>
	Recycling and reuse.	<ul style="list-style-type: none"> <li>Packaging recycling.</li> <li>Reuse of reworked consumables.</li> <li>Recycling and remanufacturing.</li> </ul>



## Greenhouse Gas Management

### GHG inventory

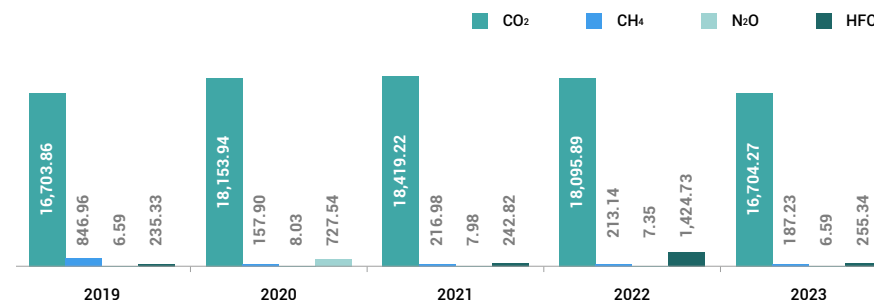
BenQ Materials, following the ISO 14064-1:2018 greenhouse gas inventory standards and the Greenhouse Gas Protocol published by the World Resources Institute (WRI), has established a greenhouse gas inventory mechanism. Since 2008, the company has gradually developed a comprehensive greenhouse gas emissions inventory for each manufacturing site, conducting annual greenhouse gas inventories. Starting in 2023, subsidiaries such as Shuochen and Jingjie have also introduced and implemented self-inventory operations.

BenQ Materials' greenhouse gas emissions originate from two major sources: primarily, the purchased electricity required for operations, which generates carbon dioxide during the power generation process, and secondarily, greenhouse gases produced by the use of gas and gasoline in internal operations.

In 2023, the company re-identified Scope 3 indirect emission items, evaluating the ease of collecting activity data and referencing coefficient sources. Selected Scope 3 indirect emission inventory items include upstream transportation and distribution, business travel, employee commuting, purchased goods and services, capital goods, and operational waste. New inventory items in 2023 included employee commuting and downstream transportation and distribution. Scope 3 items are expected to be fully inventoried by 2024.

In 2023, greenhouse gas emissions (Scope 1 + Scope 2) amounted to 41,744.00 tons of CO<sub>2</sub>e, a decrease of 21.12% compared to 2022 and a decrease of 27.45% compared to 2020. Analyzing the greenhouse gas emission intensity (Scope 1 + Scope 2), it has decreased annually since 2017. In 2023, the intensity was 2.44 (tons of CO<sub>2</sub>e per million NTD), a decrease of 28.43% compared to 2022 and a decrease of 36.25% compared to 2020. This reduction was mainly due to the introduction of renewable energy and energy-saving carbon reduction investment projects. In 2023, Scope 3 greenhouse gas emissions were 31,090.88 tons of CO<sub>2</sub>e, an increase of 222.35% compared to 2022 and an increase of 226.35% compared to 2020. The increase in Scope 3 emissions in 2023 was due to the additional inventory and quantification of employee commuting and downstream transportation and distribution items.

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





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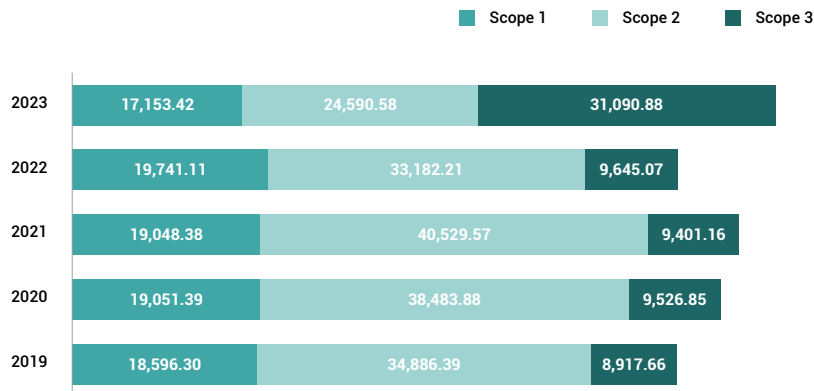
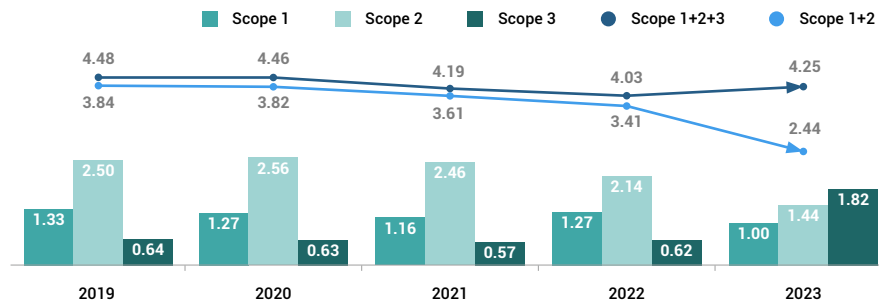
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GHG Emissions (by scope) (unit: tCO<sub>2</sub>e)GHG Emissions Intensity Over the Years (unit: tCO<sub>2</sub>e/NT\$1 million revenue)

Note 1: Operational sites verified by third-party units include: BenQ Materials headquarters, Taoyuan Plant, Longke Plant, Yunke Plant, Suzhou Plant, Wuhu Plant, Lianhe Medical Materials, Hailu Plant, BMC (Dormitory), BMM, and DTB. Scope 3 inventories for headquarters and Taiwan plants began in 2019, while overseas plants began in 2022. Subsidiaries (Web-pro, Cenefom, and Genejet Biotech) have only completed self-inventories, and their data has not yet been included in the disclosure scope.

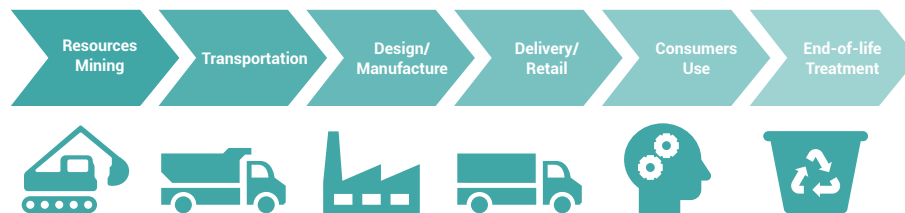
Note 2: The greenhouse gas inventory adopts the ISO 14064-1:2018 version. In 2023, all plants in Taiwan and China passed third-party verification by external verification bodies.

Note 3: The power emission coefficient for Taiwan sites is based on the 2022 power carbon emission coefficient of 0.495 tons CO<sub>2</sub>e per megawatt-hour (MWh) published by the Bureau of Energy in 2023.

Note 4: The power emission coefficient for China sites is based on the national grid average emission factor for 2022 of 0.5703 tons CO<sub>2</sub>e per megawatt-hour (MWh) published by the Ministry of Ecology and Environment of China.

### Product carbon footprint verification

In 2022, BenQ Materials began conducting product carbon footprint inventories, completing the carbon footprint inventories for three products by 2023: waterproof and breathable functional fabric, display materials (polarizers), and advanced battery separator membranes. Carbon footprint inventory statements (scope: cradle to gate) were obtained for these products. In 2024, another B to C product will be selected for a full life cycle assessment. By conducting full life cycle carbon footprint inventories, the company aims to better understand the carbon emissions during the consumer use and end-of-life disposal stages. This data will serve as a reference for the design and development of low-carbon products and the formulation of appropriate carbon reduction measures.



- Completed carbon footprint inventory and the proportion of carbon emissions at each stage for each product

Product Type	Raw Material Stage	Transportation Stage	Manufacturing Stage
Waterproof and Breathable Functional Fabric	92.68%	1.87%	5.45%
Display Material (Polarizer) Products	55.49%	0.48%	44.03%
Advanced Battery Separator Membrane Products	26.92%	0.17%	72.91%

### Internal Carbon Pricing and Carbon Fees

BenQ Materials has long supported national greenhouse gas reduction policies and actively participated in energy-saving and emission reduction actions. Since 2021, the company has introduced an internal carbon pricing mechanism to manage the future risks associated with carbon emissions and to raise internal awareness of carbon management. Each year, reduction targets are set and the execution of reduction efforts is reviewed through the ESG Committee's governance platform.

To accelerate the company's overall net-zero transition, promote internal carbon reduction actions, and optimize daily operational processes, BenQ Materials actively implements carbon reduction measures. In 2023, the company launched an internal carbon fee system, setting a unified rate for the carbon emissions of each business unit. Each month, carbon fees are collected based on the actual energy consumption and carbon emissions of each business unit. The collected carbon fees are pooled into a common carbon reduction fund, which is primarily used for investing in energy-saving and emission-reduction equipment within the plants, investing in renewable energy equipment, and purchasing renewable energy externally.



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# Energy Management

## Energy consumption data

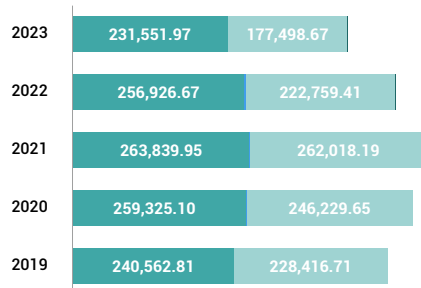
In 2023, the primary energy sources used were natural gas and non-renewable electricity purchased from external power companies, followed by diesel. The total energy consumption in 2023 was 6.1462 million cubic meters of natural gas, 63.3785 million kilowatt-hours of electricity (including both non-renewable and renewable electricity), 13,400 liters of gasoline, and 1,800 liters of diesel. Converted to energy units, this totaled 470,280.43 GJ (gigajoules), a decrease of 45,179.30 GJ (8.76%) compared to 2022.

When calculated per revenue, the total energy consumption in 2023 had an energy consumption intensity (energy consumption per million NTD revenue) of 27.46 GJ per million NTD, a reduction of 5.71 GJ per million NTD (17.22%) compared to 2022.

Energy Consumption Over the Years (non-renewables)

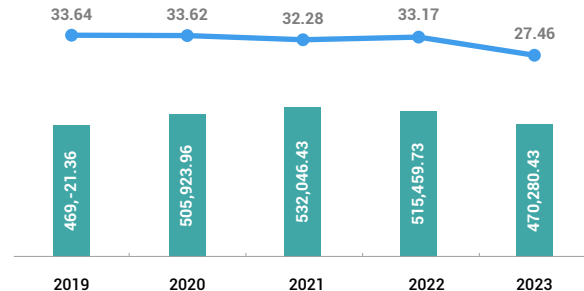
Unit: Gigajoules (GJ)

■ LNG ■ Diesel ■ Non-renewables ■ Petroleum



Energy Consumption Intensity Over the Years

■ Total Energy Consumption (GJ)  
● Unit Energy Consumption (GJ/NT\$1 million)



Note 1: The scope of energy management disclosure in 2023 includes the following operational sites: BenQ Materials headquarters, Taoyuan Plant, Longke Plant, Yunke Plant, Suzhou Plant, Wuhu Plant, Sigma Medical Materials, Hailu Plant, BMC (Dormitory), BMM, and DTB.

Note 2: The energy disclosure data for 2021-2022 has been updated (excluding subsidiaries). The disclosed data does not include subsidiaries (Web-pro, Cenefom, Genejet Biotech), which are expected to complete third-party verification and be included in the disclosure scope in 2024.

## Action and Performance of Reduction

To mitigate global warming and reduce the operational risks brought by climate change while enhancing green production effectiveness, we continue to take actions in energy saving, emission reduction, green manufacturing, and circular utilization. Through various means, we aim to reduce the use and consumption of energy resources.

In 2023, we implemented a total of 23 electricity-saving projects, with an annual electricity savings of 1.4136 million kilowatt-hours, reducing carbon emissions by 732.75 tons of CO<sub>2</sub>e. Additionally, we executed 5 natural gas-saving projects, with an annual natural gas savings of 87,800 cubic meters, reducing carbon emissions by 178.40 tons of CO<sub>2</sub>e.

In 2024, we will focus on introducing large equipment for steam boilers, waste heat recovery systems for air compressors, high-efficiency motors, replacing lighting fixtures with energy-saving LED types, and upgrading fan filter units to DC energy-saving motors. We will continue to promote energy-saving and carbon-reduction measures to reduce energy consumption.

## Main Energy-Saving Measures Implemented in 2023

- 1 AI intelligent control operation of chillers
- 2 Optimization of air conditioning unit startup and shutdown in clean rooms
- 3 Conversion of process hot water heating from electric to steam heating
- 4 Replacement of FFU AC with DC, optimization of air compressor system, recovery of waste heat from air compressors
- 5 Reuse of waste heat from steam
- 6 Flameless operation of RTO (Regenerative Thermal Oxidizer)

Year	Electricity conservation effectiveness (kWh)	Emissions reduction effectiveness (tCO <sub>2</sub> e)
2020	707,809	355.32
2021	779,358	391.24
2022	2,405,830	1,264.99
2023	1,413,562	732.75

Note: Scope 2 for all.

Year	Natural gas conservation effectiveness (m <sup>3</sup> )	Emissions reduction effectiveness (tCO <sub>2</sub> e)
2020	341,808	646.02
2021	505,615	950.05
2022	293,972	552.37
2023	87,777	178.40

Note: Scope 1 for all.





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### Renewables use

In 2023, BenQ Materials followed the renewable energy strategic goals of Qisda Group, advancing the target timeline for achieving RE100 from 2050 to 2040. The company has also developed a strategic pathway to achieve RE100, which includes investing in self-built solar power generation systems for internal use and collaborating with renewable energy electricity sellers to gradually obtain a larger amount of renewable energy electricity.

In 2023, BenQ Materials' total renewable energy usage reached 14.072 million kWh, with self-built solar power generation accounting for 2.796 million kWh, externally purchased renewable energy accounting for 3.656 million kWh, and the purchase of 7.62 million kWh of I-REC renewable energy certificates issued in China for the China plants. This was declared as the voluntary reduction of carbon emissions from the externally purchased electricity used in the operation of various plants during 2023.

Looking ahead to 2024, the company plans to continue increasing investments in self-built solar power generation systems and expanding the purchase and use of renewable energy externally, gradually achieving the RE100 targets set by the Group and the ESG Committee.

### Self-developed renewables

Since 2021, various plants have been constructing solar power generation equipment to supply electricity internally, thereby reducing external electricity purchases and carbon emissions. In 2023, new solar power generation equipment projects were completed and put into use at the Yunke Plant and the Taoyuan Plant. The total annual power generation for all plants reached 2.796 million kWh in 2023. In 2024, the company plans to continue expanding the solar power generation equipment at the Yunke Manufacturing Plant 1. It is estimated that the total power generation for all plants will reach 3.6 million kWh in 2024.

Year	Generation capacity (kWh)
2021	1,379,200
2022	2,530,591
2023	2,796,485

### Obtaining Carbon Offset Credits from the Environmental Protection Administration

As a participant in the 2050 net-zero emissions initiative, BenQ Materials not only continuously reduces carbon emissions through energy management and process improvements but also obtained carbon offset credits in 2023 through the "RTO Waste Heat Recovery Equipment Offset Project," continuing to make positive contributions to the environment.

The "RTO Waste Heat Recovery Equipment Offset Project" involves recovering waste heat generated by the regenerative thermal oxidizer (RTO) and converting it into steam to be used by the production line. This process reduces the need for natural gas in the incinerator, and the saved carbon emissions can be applied for carbon credits from the Environmental Protection Administration. This project represents the first successful case in Taiwan of obtaining carbon credits through non-electric energy conversion. The project allows the company to obtain 1,529 tons of carbon dioxide equivalent per year from the Environmental Protection Administration, surpassing the carbon offset achieved by 30 years of reforestation by the Water Resources Agency. For more details, please refer to [the BenQ Materials ESG website](#).





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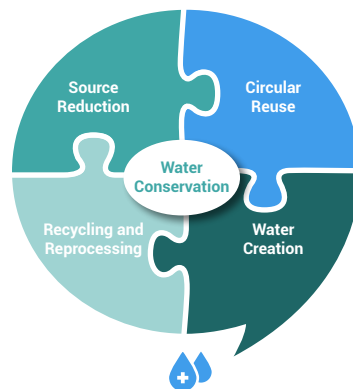
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# Water Resource Management

Starting from the sustainable use of water resources, BenQ Materials follows three main principles: water inventory, water-saving measures, and recycling and reuse. These principles extend to four strategic stages: wastewater reduction, wastewater recycling, development of new water sources, and zero wastewater discharge. Wastewater reduction and recycling are approached from four main water usage areas: domestic, process, air conditioning systems, and boiler water. The company aims to gradually improve water use efficiency and strategies. In 2023, the Taoyuan Plant introduced the ISO 46001 Water Efficiency Management System and passed the verification.

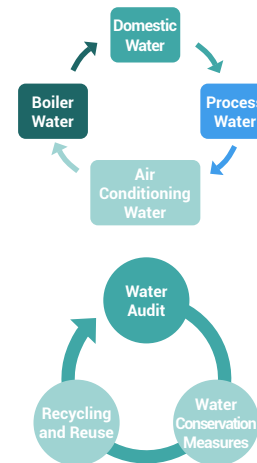
## Starting from Sustainable Water Resource Utilization, Implementing Four Major Water Usage Directions to Enhance Water Reuse Rate

- Using water-saving facilities, such as water-saving toilets and faucet aerators
- Improving the water production rate of the pure water system
- Utilizing rinsing in the production line to replace high water-consuming membranes to reduce water usage
- Classifying and recycling wastewater from production processes
- Recycling and reusing pure water system wastewater
- Recycling and reusing domestic wastewater



- Recycling steam condensate
- Filtering and circulating water in production line tanks
- Circulating water usage in cooling towers
- Recycling and using air conditioning condensate
- Storing and using rainwater/reclaimed water for toilet flushing and irrigation

## Water Principles and Directions



## Water Consumption Overview

BenQ Materials' main water uses at each plant can be divided into process water, fire-fighting water, and domestic water. The water sources and supply units are specified according to their respective locations.

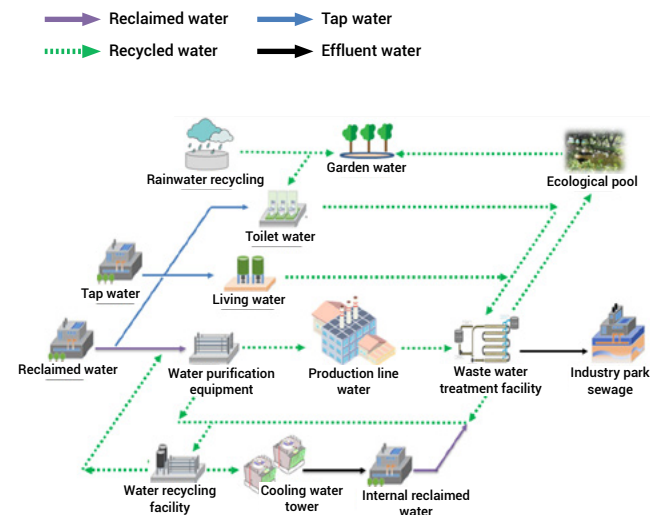
Currently, all Taiwan plants are equipped with wastewater recycling and treatment facilities. The discharged wastewater is 100% directed to the sewage treatment plants in the industrial zones where the plants are located for subsequent treatment. Each industrial zone's sewage treatment plant has established standards for the limits

of wastewater entering the plant, and discharge must comply with these standards. At the Suzhou Plant, domestic wastewater is discharged into the municipal sewage network and is uniformly treated by the municipal sewage center. At the Wuhu Plant, process wastewater, such as that from coating roller cleaning, is treated through flocculation, sedimentation, and filtration. Along with domestic sewage, it is processed through a septic tank before being discharged into the sewage network. In 2023, no water quality abnormalities were reported at any of the plants.

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.

Note: The scope of water resource disclosure for 2023 includes BenQ Materials headquarters, Taoyuan Plant, Longke Plant, Yunke Plant, Suzhou Plant, Wuhu Plant, Lianhe Medical Materials, Hailu Plant, BMC (Dormitory), BMM, and DTB.

## Plant Water Consumption Process





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## 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

In 2023, BenQ Materials (excluding subsidiaries) had a total water intake of 342.45 million liters (ML) across all plants, a decrease of 83.47 ML compared to 2022. The total discharge of wastewater was 269.24 ML, which was directed to the sewage treatment plants in various industrial zones, a reduction of 91.38 ML compared to 2022. The water consumption was 73.21 ML, primarily used for the evaporation of cooling tower water in the chilled water system.

In 2023, the discharge rate (discharge volume/total water intake) for BenQ Materials (excluding subsidiaries) was 78.62%. If the recycled water from internal process recycling, scrubbing tower recycling, process water treatment recycling, ROR cycle recycling, wastewater treatment recycling, and air conditioning water recycling is included, the R2 (reuse rate) was 87.62%. If the recycled water from cooling towers is also included, the R1 (overall plant recycling rate) could reach 97.82%.

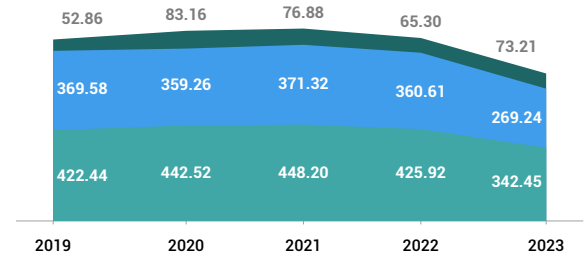
## Statistics of Water Withdrawal Over the Years Unit: Megaliters (ML)

Withdrawal Source	Type	2019	2020	2021	2022	2023
Groundwater	Freshwater	0.26	0.16	9.17	0.07	0.10
Water from third party	Freshwater	422.18	442.36	439.02	425.85	342.35

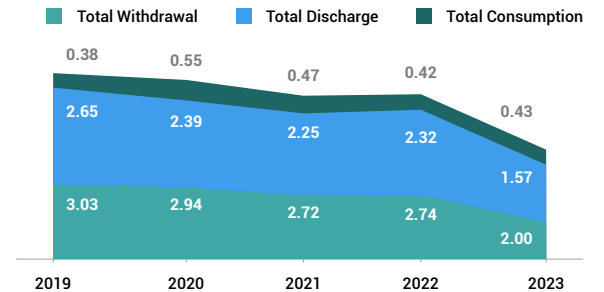
## Statistics of Historical Water Discharge Amount Unit: Megaliters (ML)

Withdrawal Source	Type	2019	2020	2021	2022	2023
Discharge amount according to destination	Water from third party	369.58	359.36	371.32	360.61	269.24
Discharge amount according to water quality	Freshwater	369.58	359.36	371.32	360.61	269.24
Discharge by level of water quality treatment	Primary treatment	73.96	68.39	77.54	75.96	61.85
	Secondary treatment	188.16	204.66	203.75	207.89	136.69
	Tertiary treatment	107.47	86.32	90.02	76.76	70.70

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



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



Note 1: BenQ Materials uses the WRI Aqueduct water risk scenario simulation tool to analyze the geographical locations of its operational sites. In the short term, only the Suzhou Plant in China is in a high water stress risk area, accounting for approximately 16.32% of the total water intake.

Note 2: The scope of water resource disclosure for 2023 includes BenQ Materials headquarters, Taoyuan Plant, Longke Plant, Yunke Plant, Suzhou Plant, Wuhu Plant, Sigma Medical Materials, Hailu Plant, BMC (Dormitory), BMM, and DTB.

Note 3: The energy disclosure data for 2021-2022 has been updated (reason for update: exclusion of subsidiaries). The disclosed data does not include subsidiaries (Weipu, Shuocheng, and Jingjie), which are expected to complete third-party verification and be included in the disclosure scope in 2024.





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## Water risk management

According to the World Economic Forum's (WEF) Global Risks Report 2023, natural resource crises, including water resource crises, rank as the sixth most severe risk among the top ten global risks for the next decade. Referring to the AQUEDUCT Water Risk Atlas data from the World Resources Institute, BenQ Materials has identified water-related risks at its operational sites. The identification results show that in the short term, only the Suzhou Plant in China is in a high water stress risk area, while other plants are at a low water risk level. However, considering long-term climate change factors, the water stress and water use risk at the Yunke Plant in Taiwan are expected to rise to a moderate risk level. It is necessary to formulate response strategies to enhance water resource risk resilience.

### Analysis of Significance of Water Impact

Business Location	Supplier	Supply Volume <sup>1</sup> (MI/day)	Consumption Volume <sup>2</sup> (MI/day)	Significance of Impact <sup>3</sup>
Taoyuan Plant	Danna Purification Plant	38.25	0.03	0.09%
Longtan Tech Plant	Longtan Purification Plant	13.76	0.04	0.28%
Yunlin Tech Plant	Yunlin Tech Purification Plant	1.6	0.002	0.14%
Suzhou Plant	Suzhou Qingyuan Water Resource Ltd.	45	0.008	0.02%
Wuhu Plant	Wuhu Huayen Water Resource Ltd.	87	0.002	0.002%

Note 1: Water supply data source: Official data published by the local government.

Note 2: Water consumption data source: Average water volume statistics from the plant.






Note 3: Usage impact = (Water consumption ÷ Regional water supply) × 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
 <b>Condition Blue</b> Normal Water Conditions	NA	Water supply stabilization	Normal withdrawal for production use
 <b>Condition Green</b> Slightly Tight Water Conditions	NA	Recommendation for following	Trial operation of the well water system every two weeks Notification of water tank contractors
 <b>Condition Yellow</b> First Stage Water Restrictions Nighttime Reduced Pressure Supply	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
 <b>Condition Orange</b> Second Stage Water Restrictions Reduced Supply of Non-Essential Water	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
 <b>Condition Red</b> Third or Fourth Stage Water Restrictions Rotational Water Supply	Stage 3 rationing	Supply by region or time-based water suspension	Initiation of the well system at Taoyuan Plant Activation of water tank supply





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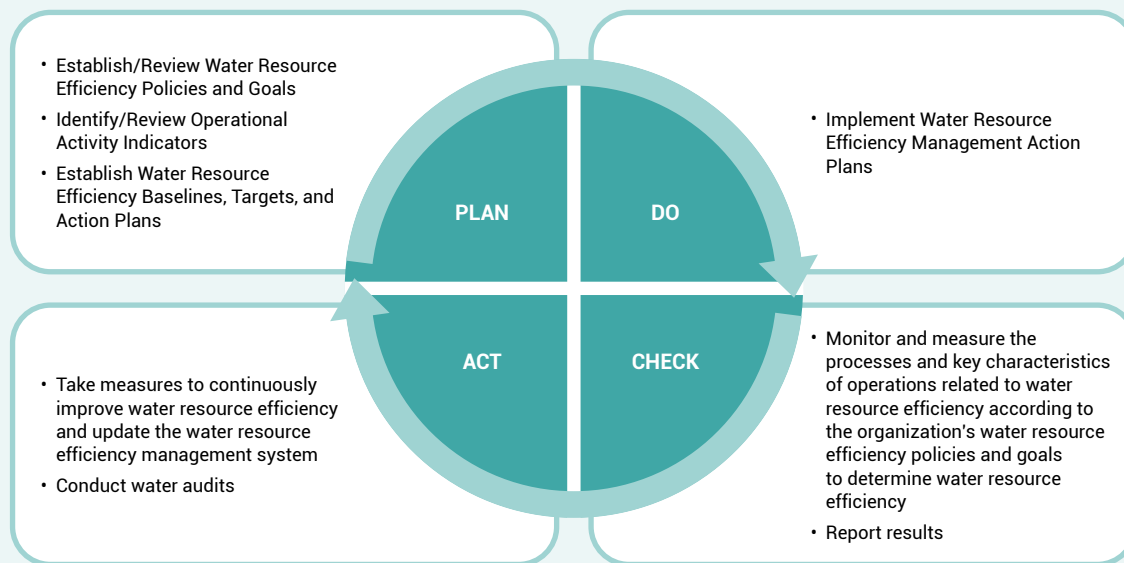
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### Establishment of the water efficiency management system

In 2023, the Taoyuan Plant began establishing the operational system for the ISO 46001 Water Efficiency Management System. By the end of 2023, the plant completed the verification and introduced a water use baseline. Daily audits of water use rationality were conducted to enhance the company's water resource management level and achieve environmental sustainability goals.



### Water Conservation Solutions

In 2023, we continued to promote water-saving initiatives, executing a total of eight water-saving projects. The main water-saving directions included the recycling of regenerated pure water discharge, improving the efficiency of wastewater recycling systems, enhancing process wastewater recycling, and recovering condensate water. These efforts resulted in an annual water savings of approximately 12.879 million liters, continuously reducing the water resources consumed in the processes.

Year	Effectiveness (m <sup>3</sup> )
2020	14,290
2021	49,439
2022	12,562
2023	12,879

### Major Water Conservation Measures in 2023

1	Added resin tower washing wastewater recycling in the pure water system
2	Improved MBR wastewater recycling equipment efficiency (parameter optimization)
3	Added E-LINE etching line wastewater recycling
4	Added RO concentrated water recycling and reuse at the Yunke Plant
5	Added process discharge water recycling and reuse at the Yunke Plant



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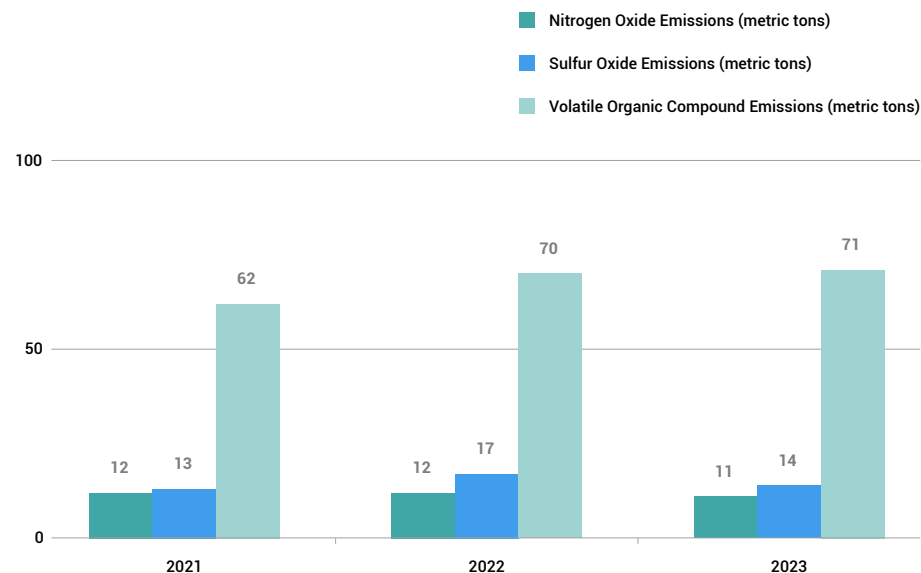
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## Air Population Control

BenQ Materials strictly adheres to environmental regulations by installing air pollution control equipment such as regenerative thermal oxidizers (RTO), scrubbers, and baghouse dust collectors to specifically handle process exhaust gases. This ensures that air pollutant emissions are minimized, reducing the environmental burden. All pollution control equipment is operated and maintained by dedicated personnel, and their operational status is jointly monitored by the central control system and inspection personnel to ensure the proper functioning of air pollution control equipment and to prevent any air pollution incidents. Additionally, through the ISO 14001 Environmental Management System, BenQ Materials manages and continuously improves environmental performance to reduce the risk of environmental pollution. In recent years, there have been no air pollution penalties.

2023 Air Pollutant Emissions



Note 1: The data source is the total from the Taoyuan Plant, Longke Plant, and Yunke Plant; the Suzhou Plant, Wuhu Plant, and subsidiaries Web-Pro, Cenefom, Genejet Biotech have no air pollution emissions.

Note 2: The average VOC treatment efficiency is maintained at over 98%, exceeding the environmental authorities' requirement of 92%.



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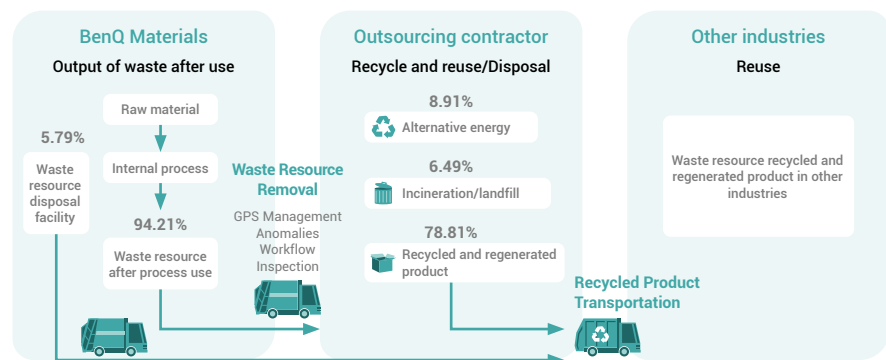
# Circular Economy

## Waste Management

Waste generated during business operations must be properly disposed of. Improper disposal can cause severe environmental pollution problems and indirectly affect local residents. BenQ Materials is committed to reducing the environmental impact of products throughout their life cycle—from raw materials, manufacturing, storage, transportation, and use to disposal—by fully implementing responsible production and achieving zero waste management through reduction and recycling.

BenQ Materials adopts a source management strategy, continuously assessing resource minimization (Reduce) at the production source, adjusting raw material usage parameters, and improving process technologies. By collaborating with the supply chain, the company aims to optimize and minimize raw material usage to avoid waste generation as much as possible.

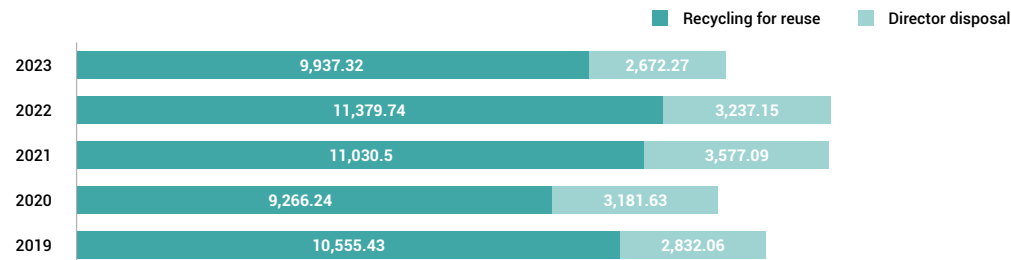
In addition to managing waste reduction of discarded resources, BenQ Materials implements the circular economy concept by recycling and classifying resources to achieve waste reduction targets. The company prioritizes "material recycling" and "energy recovery" for waste resources that cannot be reused within the plant, delivering them to qualified waste disposal companies. Incineration and landfill are considered the last resort.



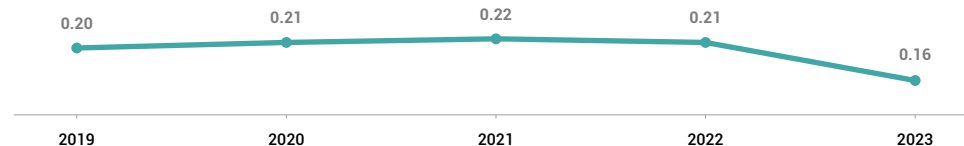
## Waste Production Volume

The types of waste at BenQ Materials' various plants can be categorized into seven main types: general industrial waste, potassium iodide, membrane waste, waste liquids and adhesives, recyclable waste liquids, solid waste, and recyclable materials. In 2023, the total waste generated was 12,609.83 tons, a decrease of 2,007 tons compared to the previous year. The recycling and reuse rate in 2023 was 78.81%, an increase of 0.95% from the previous year. The waste disposal and treatment costs in 2023 were approximately 39.75 million NTD, accounting for 0.23% of revenue. The waste disposal intensity (weight of directly disposed waste/revenue in millions of NTD) in 2023 was 0.16.

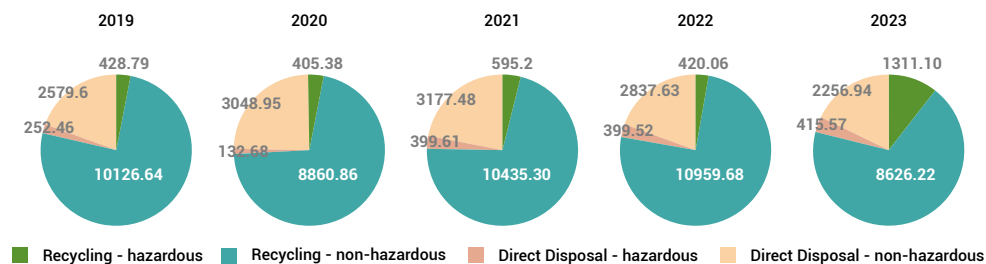
### Waste Production Statistics (t)



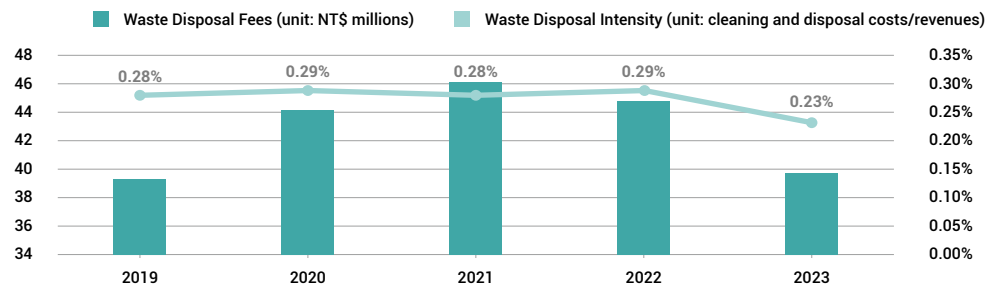
### Waste Production Intensity (t/revenue NT\$1 million)



### Waste Production Statistics-By waste type (unit: t)



### Waste Disposal Fees and Intensity Over the Years







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## Waste Resource Recycling and Reuse

BenQ Materials conducts monthly inspections of the goals set for waste recycling to ensure that action plans are properly implemented. To increase the proportion of recyclable waste, BenQ Materials has established waste management procedures and recycling targets, reviewing action plans and goals quarterly in the ESG Sustainability Committee to achieve long-term monitoring effects.

Various types of waste are continually examined for reuse methods, developed into products, or recycled for reuse. Currently, the main focus is on reusing distilled ethyl acetate (EAC) within the plant to reduce raw material usage and waste generation, as well as collaborating with other industries to use distilled EAC as their raw material. Additionally, BenQ Materials seeks partners to use waste

white film (excluding iodine) as raw material for other industries and continues to explore alternative disposal methods for waste films besides using them as auxiliary fuel.

The highest revenue-generating product for BenQ Materials is polarizers, whose main material is the original film. Due to the current technical limitations, it is not feasible to reuse materials from recycled polarizers or other electronic products to remanufacture original films for polarizer production. Therefore, there is no related product recycling or recovery of other electronic waste, and recycling is managed internally or by outsourcing to other suppliers. In 2023, three recycling and reuse projects were completed.

### Distilled EAC Internal Recycling

#### Management Method

- 1 Distill the waste material.
- 2 Confirm the quality of the distilled EAC.
- 3 Introduce the distilled EAC into the process for recycling.

#### Reduction Performance:

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

### Waste White Film Used as Raw Material for Other Industries

#### Management Method

- 1 Collect, classify, and gather the waste film at the production line.
- 2 Ensure the recovered material meets customer requirements.
- 3 Confirm that the breakpoints and winding conditions of the recovered waste meet customer needs before shipping.

#### Reduction Performance:

- Reuse waste as raw materials for other industries.
- Reduce waste by 21 tons per month and lower waste disposal costs simultaneously.

### 100% Recycling of Potassium Iodide

#### Management Method

- 1 Modify the pipeline to collect and reuse the discharged potassium iodide solution.
- 2 Purify the solution using low-temperature circulation filtration.
- 3 Concentrate and reuse the low-concentration solution after replacement.

#### Reduction Performance:

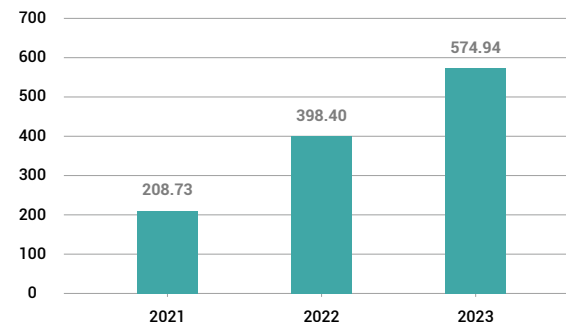
- Reduce potassium iodide usage by 3,100 kilograms annually.
- Reduce the discharge of waste solution by 1,014 tons.

## Waste to resource data

In 2023, the recycling and reuse rate was 78.81%, an increase of 1.23% compared to 2022. Efforts have been made to continuously optimize the distillation machinery, improving the distillation efficiency of PSA adhesives, enhancing their characteristics and quality, and integrating them into internal recycling processes. This has led to a 100% replacement of raw materials, reducing raw material purchase volumes and creating economic value. Since 2021, a total of 574.94 tons have been recycled within the plant, and efforts are ongoing to find more recyclable vendors to use waste as raw materials in other industries or reprocess it into products for reuse within the plant. For detailed historical waste data, [please refer to Appendix 9-1](#).

To advance towards a circular economy and achieve this through innovative production techniques, alternative materials, waste reduction, green supply chains, resource reuse, or "zero emissions" technology, it is planned to introduce SRF (Solid Recovered Fuel) manufacturing equipment in 2024. This equipment will convert plant waste into SRF, which can then be reused in the boiler processes of other industries. This not only promotes waste reuse but also reduces the use of coal in boilers. In addition to the SRF manufacturing equipment, we are exploring ways to create products from waste materials. Currently in the testing phase, this includes processing waste films into bricks, giving waste a "second life" and advancing the goals of the circular economy.

Accumulated Amount of Waste Recycled and Reused (tons)





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## Responsible Product

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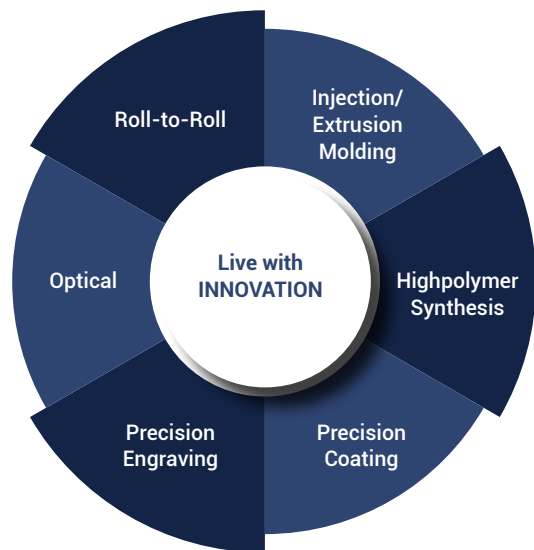
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# Core Technology and Intellectual Property Management

## Six Main Core Technologies

BenQ Materials has developed from optical design and material R&D to process optimization. Through years of development and experience accumulation, the company currently possesses two major material technologies: optical multilayer film design and polymer synthesis, as well as four major process technologies: roll-to-roll processing, precision engraving, precision coating, injection molding, and extrusion.



## Product Manufacturing Process

BenQ Materials products are divided into display materials, battery materials, medical and care products, and fabric series. After being produced in the five major operating sites, display materials and battery materials are shipped to B to B customers, while medical and care products and functional fabrics are shipped to B to B customers, distributors, medical institutions, or e-commerce platforms depending on the nature of the product. The corresponding operating sites and production processes of each product line can be found on the [BenQ Materials ESG website](#).

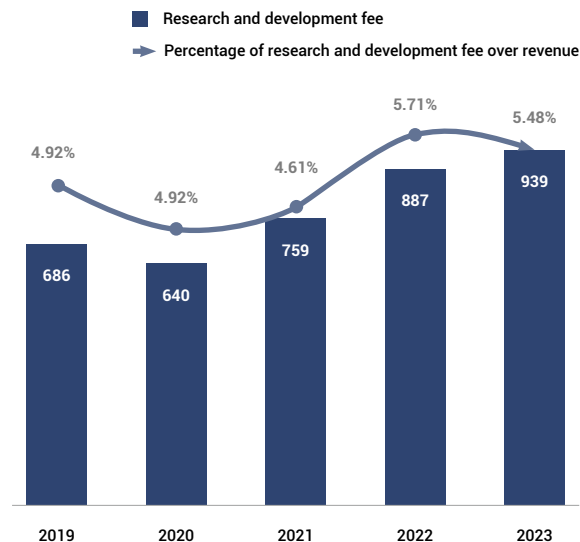
## Intellectual Property Management

Intellectual property is a key capability for sustainable profitability. To protect research and development results and technological competitiveness, BenQ Materials actively encourages innovation and independent R&D. The intellectual property strategy focuses on core technologies, combining the company's technological and product development layout as the primary goal. The company continuously promotes patent deployment, providing timely patent protection and effective management for high-potential technologies and innovations produced during production and operations.

In 2023, BenQ Materials passed the Taiwan Intellectual Property Management System (TIPS) A-level certification re-inspection, systematically protecting R&D achievements and maintaining professional technical competitiveness.



Historical Research and Development Investment Amount and Percentage







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## Intellectual Property Management Goals

- 1 Develop intellectual property management plans linked to operational goals and continuously promote the TIPS intellectual property management system, regularly reporting the implementation status of intellectual property management plans to the Board of Directors and disclosing them on the official website.
- 2 Implement intellectual property management, integrating various intellectual property management regulations, and clearly establishing the relevance of various intellectual property-related operating procedure documents.
- 3 Strengthen the R&D document management system, fully digitizing R&D records.
- 4 Establish a patent information monitoring system.
- 5 Regularly conduct internal audits and hold management review meetings, as well as organize education and training courses for working groups.
- 6 To enhance employees' intellectual property awareness, organize educational training courses, including:
  - Intellectual property courses for new employees.
  - Advanced intellectual property courses for R&D personnel.
  - Advanced training courses for intellectual property specialists.

## Intellectual Property Management Achievements

Since 2000, BenQ Materials has filed over 1,200 global patent applications and obtained over 800 patents as of December 2023, with coverage in major markets and countries including Taiwan, the United States, the European Union, Japan, mainland China, and India. The execution results of BenQ Materials' intellectual property management were reported to the fourth Board meeting on November 2, 2023.

Patent Outcome	2019	2020	2021	2022	2023
Number of Applications	46	63	44	39	78
Number of Certificates Granted	30	30	37	38	33

## Collaborative Innovation with Academia and Industry

To continuously enhance innovation and R&D capabilities and product competitiveness, BenQ Materials has actively engaged in cooperation and exchanges with domestic academic research institutions in recent years. Collaboration partners include the Industrial Technology Research Institute, National Tsing Hua University, National Cheng Kung University, National Taiwan University of Science and Technology, Chang Gung University, National Yunlin University of Science and Technology, Far East University, and other academic institutions with abundant research capabilities. Collaborative projects cover areas such as smart medical care, solid-state battery material R&D, new material development, and biomedical technologies. In 2023, 12 industry-academia cooperation projects were implemented, with an R&D investment of over NT\$14 million. The project outcomes include 3 Taiwan invention patents (1 granted: TWI759106), 2 Chinese patents, and 2 US patents. For more details on intellectual property management, please visit [the BenQ Materials website](#).





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# Sustainable Design and Innovation of Products

In 2023, BenQ Materials incorporated the requirement that new product development must be 100% compliant with sustainability definitions into the product development procedure. Using a life cycle perspective, from design, manufacturing, logistics, to end use, maintenance, and disposal stages, and integrating the concept of a circular economy, the main principles for product design and innovation include "structure optimization," "environmentally friendly raw materials," "recyclable materials," "low impact components," "reduction of product packaging," and "product safety." The goal is to reduce the overall environmental impact of products and create sustainable value.

## Display Materials

Aspect	Design Principle	Current Status
Design	Structure optimization	In terms of structure, the goal is to achieve the same functional specifications by reducing the material thickness. The actual product thickness will be determined based on customer requirements.
		<p><b>Polarizer :</b></p> <ul style="list-style-type: none"><li>The total thickness of each layer of the finished product is reduced by 30%, which can reduce material usage.</li><li>The thickness of OLED products is reduced from 130um to 98um, effectively reducing the total thickness by 25%.</li></ul> <p><b>PDLC Smart Optical Film :</b></p> <ul style="list-style-type: none"><li>The adhesive layer thickness is the thinnest in the industry, only 8-10 um (industry average is 15-20 um).</li><li>The conductive layer thickness is the thinnest in the industry, only 125 um (industry average is 188 um).</li></ul> <p><b>Optical Films :</b></p> <ul style="list-style-type: none"><li>A single-layer structure is planned to be introduced in 2024, which can reduce the overall thickness by at least 80um.</li></ul>

Aspect	Design Principle	Current Status
Design	Better Materials	<p><b>Polarizers :</b></p> <ul style="list-style-type: none"><li>Solvent-free Pressure-sensitive Adhesive: Significant design adjustments have been made to the formulation and process from the source, expected to reduce overall carbon emissions by 18%.</li><li>Pressure-sensitive Adhesive Compliant with PFAS-free Requirements: New product development is underway, expected to be completed by the end of 2025.</li></ul> <p><b>PDLC Smart Optical Film :</b></p> <ul style="list-style-type: none"><li>The currently used transparent conductive film has the best appearance quality and optical coefficients in the industry. The 97/95 series is the highest transparency product in the industry, and its haze when electrically transparent is also the lowest in the industry.</li></ul>
		<p><b>Polarizer :</b></p> <ul style="list-style-type: none"><li>Recycle process chemicals and packaging materials for reuse, reducing the total amount of waste. (<a href="#">For details, refer to section 5-6 Circular Economy</a>)</li></ul> <p><b>Optical Adhesives :</b></p> <ul style="list-style-type: none"><li>Plan to conduct raw material PET (Polyethylene Terephthalate) recycling tests in 2024.</li></ul> <p><b>Optical Film :</b></p> <ul style="list-style-type: none"><li>Utilizing solvent-free pressure-sensitive adhesives can reduce oven time during the process and lower the emission of volatile organic compounds into the atmosphere.</li><li>Plan to simplify the production process in 2024, reducing the scrapping of release films.</li></ul> <p><b>Optical Adhesive :</b></p> <ul style="list-style-type: none"><li>Adopting a solvent-free process, which eliminates the need for ovens during manufacturing, thereby reducing electricity usage and carbon emissions. The absence of added acids enhances user safety and reduces the release of harmful substances into the environment during the process.</li><li>Initiated the evaluation of the feasibility of self-manufacturing chemical raw materials used in pressure-sensitive adhesives.</li></ul>
	Recyclable Materials	<p><b>Polarizer :</b></p> <ul style="list-style-type: none"><li>All raw materials used comply with the EU RoHS regulations.</li></ul> <p><b>Optical Adhesive :</b></p> <ul style="list-style-type: none"><li>The Yunke plant has passed ISO 9001, ISO 14001, and automotive certification IATF 16949.</li></ul> <p><b>PDLC Smart Optical Film :</b></p> <ul style="list-style-type: none"><li>Compliant with REACH/RoHS regulations and GP standards.</li></ul>
	Low-impact elements	<p><b>Process Switching Time Reduction Project:</b> Increased production capacity by 3% compared to 2022.</p> <p><b>Coating Line Glue Machine Speed Increase:</b> Increased machine speed from 35 meters to 38 meters, resulting in a 3% increase in monthly production capacity. (Taoyuan Plant)</p> <p><b>Introduction of Robotic Process Automation (RPA):</b> Reduced working hours by 675 hours per quarter compared to 2022.</p>
Manufacture	Product safety	<p><b>Polarizer :</b></p> <ul style="list-style-type: none"><li>Low-carbon packaging reduced CO<sub>2</sub>e emissions by approximately 172 tons.</li><li>The average recycling rate for low-carbon recycling cycles is 93%, achieving the set target. (<a href="#">For detailed information, please refer to section 4-3 Green Logistics</a>)</li></ul>
	High-Performance Manufacture	<p><b>Polarizer :</b></p> <ul style="list-style-type: none"><li>Low-carbon transportation cumulatively reduced CO<sub>2</sub>e emissions by 3,205 tons. (<a href="#">For detailed information, please refer to section 4-3 Green Logistics</a>)</li></ul>
Logistics	Green Packaging	
	High-Performance Delivery	



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Aspect	Design Principle	Current Status
Use Maintenance and Repair Scrap	High- Performance Products	<p><b>Polarizer:</b></p> <ul style="list-style-type: none"><li>Continuously enhancing the transmittance of polarizers by 2% through low-reflection surface treatments, which reduces the number of backlight LEDs required for the same product brightness, thereby lowering energy consumption.</li><li>By adjusting iodine concentration, stretching ratio, and optimizing the alignment of iodine complexes, the amount of non-aligned iodine compounds is reduced, improving transmittance by 2% while maintaining polarization capability.</li></ul> <p><b>Optical Adhesive:</b></p> <ul style="list-style-type: none"><li>Increased panel transmittance reduces light loss, roughly estimated to improve by about 20%, resulting in energy savings.</li></ul> <p><b>PDLC Smart Optical Film:</b></p> <ul style="list-style-type: none"><li>The product has obtained the Green Building Material Label (the first in the industry in Taiwan): it features high heat insulation efficiency with UV blockage rate &gt;99% and IR blockage rate &gt;87%. In applications such as floor-to-ceiling windows and curtain walls, it can reduce the harm of outdoor UV light to humans and furniture and minimize heat entering indoors. Verified by Cheng Kung University Laboratory, it can effectively reduce power consumption by 19% compared to regular glass, equivalent to reducing 96.38 kg of CO<sub>2</sub>e, making it a green building material.</li><li>Compared to insulation films, it is transparent when powered: saving 10~13% energy; and in a shaded state when unpowered: saving 13~18% energy.</li></ul>
	Product Life	<p><b>Polarizer:</b></p> <ul style="list-style-type: none"><li>Developing high-durability polarizers to enhance specifications (resistance to high temperatures from 500 hours to 1,000 hours). By adjusting process chemicals and parameters, the long-wavelength optical changes after durability (RA) are minimized. This project is being continuously adjusted to meet customer specifications and product requirements, with development expected to be completed by the end of 2024.</li></ul> <p><b>PDLC Smart Film:</b></p> <ul style="list-style-type: none"><li>Passed self-verification tests for 2,500 to 3,000 hours of durability (RA) reliability testing, and confirmed by Cheng Kung University testing laboratory for QUV 1,500 hours, all exceeding industry demands and standards. Consequently, a 5-year warranty, the longest in the industry, is offered, with an estimated lifespan of over 10 years (the industry standard is only one year).</li></ul>
	Environmental Impact	<p><b>Polarizer:</b></p> <ul style="list-style-type: none"><li>High-transmittance polarizers can reduce energy consumption by 2%. By increasing the transmittance of polarizers and conducting practical tests with customer panels, high-transmittance polarizers, compared to current mass-produced products, can increase panel transmittance by more than 2% in actual tests.</li></ul> <p><b>PDLC Smart Film:</b></p> <ul style="list-style-type: none"><li>These films have indoor insulation functions that can reduce indoor electricity consumption and decrease carbon emissions.</li></ul>
Social Contribution	Social Impact	<p><b>Polarizer:</b></p> <ul style="list-style-type: none"><li>The reflectance of low-reflection polarizers has been reduced from 5% to below 2%, thereby minimizing the impact of ambient light on the human eye. This effectively reduces eye fatigue during prolonged use of displays.</li></ul> <p><b>Optical Adhesives:</b></p> <ul style="list-style-type: none"><li>Enhances panel light output efficiency with almost no emission of harmful substances during the process, thereby minimizing the display's potential harm to the body.</li></ul> <p><b>PDLC Smart Film:</b></p> <ul style="list-style-type: none"><li>These films have the function of blocking indoor infrared and ultraviolet rays, reducing the harm of outdoor UV light to humans and furniture.</li></ul>

## Advanced Battery Materials

Aspect	Design Principle	Current Status
Design	Structure optimization	<ul style="list-style-type: none"><li>2023 product thickness: 12 um; 2024 target: 10 um</li><li>2023 coating thickness: 1.5 um; 2024 target: 1 um</li><li>Uses polyolefin materials, which are relatively environmentally friendly.</li></ul>
	Low-impact elements	<ul style="list-style-type: none"><li>The production of separator films is environmentally friendly, using a solvent-free process (dry process).</li><li>The next generation of high-power separator films (Armarator) aims for ceramic coating, water-based processes, and environmentally friendly development.</li></ul>
	Product safety	<ul style="list-style-type: none"><li>Independent Quality Control Mechanism: Strictly adhere to customer requirements and ISO, IQC, IPQC, FQC, OQC, IATF 16949 certification standards to ensure products are in optimal condition, providing customers with confidence in integrating them into battery and cell manufacturing processes.</li><li>Battery Test Line Self-Verification: Establish a cell verification model to compare and verify with competitors' products and different models during the separator film development stage. This ensures comprehensive understanding of the separator film's performance in batteries and simulates its performance at the customer's end, thereby accelerating development success rates.</li><li>Added ergonomic arm equipment to enhance loading/unloading efficiency, increasing operating rate by 5%.</li></ul>
Manufacture	High- Performance Manufacture	<ul style="list-style-type: none"><li>Speed Enhancement Engineering Changes: Speed increased by 14%, production capacity increased by 12%.</li><li>Adopted automated operations to improve material supply and inspection, resulting in a 40% increase in operational efficiency compared to 2022.</li><li>Increased roll length by 87.5%, yield improved by 0.1%, and slitting operating rate increased by 16%.</li></ul>
	Green Packaging	<ul style="list-style-type: none"><li>Reduced packaging materials consumption, increased container utilization rate, and lowered transportation costs. Continued to reduce waste by recycling and reusing cores, resulting in a 59.2-ton reduction in waste; recycled 53,267 cores with a reuse rate of approximately 98%.</li><li>Introduced new support core and pallet recycling, expected to reduce packaging material expenses by 22%.</li><li>In 2024, plan to increase the shipping length of products, expected to reduce packaging material consumption by 12%, increase container transport volume by 58%, and lower overall transportation costs.</li></ul>
Logistics	Product Life	<ul style="list-style-type: none"><li>Low internal resistance process can enhance battery cycle life; special pore size control technology can improve battery degradation after cycling.</li><li>Developed a new generation of high-power separator film (Armarator) with increased durability: melting point above 300° C and high-temperature brittle fracture at 250° C, surpassing industry standards.</li></ul>
	Environmental	<ul style="list-style-type: none"><li>Through improvements in process efficiency and yield, waste reduction, and related enhancements, the carbon emissions of separator films have decreased by 46% compared to the baseline year 2020.</li><li>Obtained ISO 14067:2018 certification.</li></ul>
Use Maintenance and Repair Scrap	Social Contribution	<ul style="list-style-type: none"><li>Driven by the boom in the electric vehicle industry, the lithium battery production index is increasing, which will eventually lead to the generation of related waste. BenQ Materials is continually advancing towards extending material lifespan and recycling materials, which will help reduce the demand for raw materials needed for lithium battery production and minimize waste generation.</li></ul>







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## Healthcare and Nursing Products

Aspect	Design Principle	Current Status
Design	Structure optimization	<b>Skin Care:</b> <ul style="list-style-type: none"><li>The number of acne patches produced per unit length increased from 333 patches per meter to 500 patches per meter, with mass production expected in 2024.</li><li>Mass production of shaped patches, which compared to acne patches, can improve film material utilization by approximately 20% and release paper utilization by 10.6%.</li></ul> <b>Vision Care:</b> <ul style="list-style-type: none"><li>The process uses low-polypropylene caps, reducing polypropylene usage by 60%.</li></ul> <b>Medical packaging:</b> <ul style="list-style-type: none"><li>In 2023, membrane material formulations were adjusted and improved; in 2024, efforts to reduce membrane materials will continue.</li></ul> <b>Wound Care:</b> <ul style="list-style-type: none"><li>The new hemostatic device product, by switching the contact layer material, achieves a direct and process material carbon reduction benefit of up to 50%.</li></ul>
	Better Materials	<b>Medical packaging:</b> <ul style="list-style-type: none"><li>Self-manufactured membranes combined with solvent-free lamination technology reduce the impact of the process on human health and the environment. Lamination: More than 40% of bag-making medical membranes have been introduced; Printing: Expected to be introduced in 2024; Estimated to reduce carbon emissions during the process by 9.12%.</li></ul> <b>Skin Care:</b> <ul style="list-style-type: none"><li>Skincare products are formulated to be "alcohol-free," "fragrance-free," and "colorant-free."</li><li>Sunscreen products use ocean-friendly formulations, avoiding ingredients banned in Palau.</li></ul> <b>Vision Care:</b> <ul style="list-style-type: none"><li>The next generation of green lens materials has completed mass production development and is expected to obtain certification in Taiwan by 2024.</li></ul>
	Recyclable Materials	<b>Skin Care:</b> <ul style="list-style-type: none"><li>PET release paper is now made from recycled materials, reducing carbon emissions by 47.8% compared to the original product. Stability verification has been completed, and it is expected to be introduced into products in Q4 2024.</li></ul> <b>Vision Care:</b> <ul style="list-style-type: none"><li>100% recycled polypropylene is used at the production end; consumer-end cup recycling in China. In Taiwan, the concept is being promoted through health education, with plans to advocate through activities in 2024.</li></ul>
	Low-impact elements	<b>Skin Care:</b> <ul style="list-style-type: none"><li>Utilizes solvent-free raw materials and processes, effectively reducing the harm and impact of organic solvents on human health and the environment.</li></ul> <b>Vision Care:</b> <ul style="list-style-type: none"><li>The globally unique "EautraSil®Plus Hydrophilic Silicone Technology®" avoids solvent residues by not requiring solvent use, thereby reducing the risk of solvent-related harm to the human body, making it non-irritating and non-allergenic to the eyes.</li></ul> <b>Wound Care:</b> <ul style="list-style-type: none"><li>When planning advanced antibacterial versions of existing products, even though the raw materials previously used are still within the allowable limits on the REACH list of substances of concern, alternative substances will be sought to achieve antibacterial effects and enhance product properties from an environmental sustainability perspective.</li></ul>

Aspect	Design Principle	Current Status
Design	Product safety	<b>Medical packaging:</b> <ul style="list-style-type: none"><li>Passed the certification of the EU Medical Device Regulation (MDR) and also completed the FDA recertification in the United States.</li></ul> <b>Skin Care:</b> <ul style="list-style-type: none"><li>Acne patch products have all passed biological cytotoxicity tests, sensitivity tests, and aging safety tests. Skincare products have also passed high-standard stability, skin-friendliness, and functionality tests.</li></ul> <b>Vision Care:</b> <ul style="list-style-type: none"><li>All contact lens products comply with Green Product (GP) regulations.</li></ul> <b>Wound Care:</b> <ul style="list-style-type: none"><li>All products comply with ISO 13485 (Medical Devices Quality Management) and ISO 10993 (Medical Devices Biocompatibility).</li></ul>
		<b>Wound Care:</b> <ul style="list-style-type: none"><li>Manufacturing Improvement: Gauze yield increased by 0.6%, per capita revenue contribution increased by 50%.</li><li>Introduction of Gauze Alcohol Recovery Machine: Scheduled for mass production in 2024, expected to reduce alcohol usage by 15 tons.</li></ul> <b>Skin Care:</b> <ul style="list-style-type: none"><li>Introduction of Automatic Feedback System: Estimated to reduce misaligned acne patches by 3,700 patches, with efficiency simultaneously improving by nearly 2%.</li><li>Collaboration with Automatic Recognition System: Improved image recognition capabilities, reducing manual inspection workload, with manual inspection share decreasing by 28.1%.</li><li>Introduction of Automated Folding Machine: Reduced manual folding operations, improving production efficiency by 80%.</li><li>Introduction of Automated Packaging Machine: Reduced manual packaging operations, improving production efficiency by 50%.</li></ul>
Manufacture	High-Performance Manufacture	<b>Vision Care:</b> <ul style="list-style-type: none"><li>100% Surface Automatic Optical Inspection: Introduced in Q3 2022 with an operating rate of 51%; in 2023, the operating rate increased to 78%.</li><li>100% recovery of contact lens printing plates (achieved 100% recycling from Q2 to Q4 2023).</li><li>100% recycling of PP materials used in pre-process molds, for reuse by downstream manufacturers.</li><li>Increased lifespan of process alcohol, reducing usage by 1.4 tons compared to 2021.</li><li>Reduced load on high-energy-consuming equipment: Reduced CO<sub>2</sub>e emissions by 135 tons compared to 2021, a 22% reduction in carbon emissions.</li><li>No production scheduling on holidays, reduced load on equipment (nitrogen machines, sterilizers, clean rooms), reducing electricity consumption.</li></ul> <b>Medical packaging:</b> <ul style="list-style-type: none"><li>Optimization of machine speed and automation introduction: Automation introduction was unsuccessful due to the inability of product structure to maintain the current operation mode stably; in 2024, plans to continue machine speed optimization, expected to increase production capacity by 10%, and average operating rate by 7%.</li><li>Long paper rolls have been introduced, reducing the number of joints by about 25%.</li><li>Through improvements in membrane manufacturing processes, waste rate reduced by 10%; electricity consumption reduced by 15%.</li></ul>



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Aspect	Design Principle	Current Status
Logistics	Green Packaging	<b>Wound Care:</b> <ul style="list-style-type: none"><li>100% FSC-certified product packaging: Achieved 43% in 2022 and 52% in 2023. The remaining portion is due to inventory and EU certification factors for hemostatic products that prevent immediate implementation. Medical product transportation packaging requires transportation tests, and certification changes currently hinder initiation.</li></ul>
		<b>Skin Care:</b> <ul style="list-style-type: none"><li>Product packaging has achieved 100% FSC certification.</li></ul>
		<ul style="list-style-type: none"><li>Introduced recycled paper cards to replace aluminum foil packaging (implementation rate 4%), reducing aluminum foil usage and lowering carbon emissions (62% reduction in material carbon emissions, 16% reduction in production costs).</li><li>QR codes replaced product instruction manuals, reducing carbon emissions by 43% compared to the previous year; sales point stickers were replaced by direct printing on packaging, reducing carbon emissions by 70% compared to the previous year.</li><li>Introduced the removal of inner box packaging for Taiwanese e-commerce, reducing inner box usage by 8%.</li></ul>
		<b>Vision Care:</b> <ul style="list-style-type: none"><li>Introduced FSC-certified packaging for 4 items, accounting for 20% of annual new products; in 2024, all self-produced new products will use FSC-certified packaging, covering 39% of the current total product range.</li></ul>
Logistics	High-Performance Delivery	<b>Medical packaging:</b> <ul style="list-style-type: none"><li>Reduced the use of outer box strapping, decreasing annual waste by over 400 kilograms.</li><li>Introduced recycled paper for shipping cartons, with a 60% implementation rate.</li><li>No customer logos printed on outer cartons for domestic orders.</li><li>Adjusted the shipping method for large rolls of film by removing the carton and using kraft paper bags for shipping.</li></ul>
		<b>Wound Care:</b> <ul style="list-style-type: none"><li>Conducted centralized sterilization treatment by third-party units, reducing the number of transport trips within the production and sales plan period, effectively centralizing control of sterilization time and trips. Compared to 2022, integrated sterilization reduced transportation by 4,800 kilometers and fuel consumption by 600 liters.</li><li>In 2024, plan to maximize packaging box configuration and shipping quantities for foreign customers based on product size to reduce shipping costs.</li></ul>
		<b>Skin Care:</b> <ul style="list-style-type: none"><li>Domestic channels switched to pallet shipping, which can increase the number of boxes shipped by approximately 310% compared to single-box shipping.</li><li>For container shipments to Indonesia, implemented pallet stacking, reducing the original 3 large containers to 2 large containers, saving NT\$15,000 in costs.</li></ul>
		<b>Medical packaging:</b> <ul style="list-style-type: none"><li>Adopted a domestic multi-point delivery model in a single trip, reducing shipping costs by 25%.</li></ul>
Use Maintenance and Repair Scrap	High-Performance Products	<b>Wound Care:</b> <ul style="list-style-type: none"><li>Quick Ning gauze product has an average liquid absorption rate of more than 14 times its weight, demonstrating excellent exudate absorption capacity. In clinical trials for bleeding management, the bleeding management score is twice that of regular gauze.</li></ul>
		<b>Skin Care:</b> <ul style="list-style-type: none"><li>Angel Care acne patches absorb 3 to 5 times better than the market-leading brand.</li><li>The material surface uses a special matte process treatment to reduce the reflectivity of the acne patch, increasing its concealment.</li></ul>

Aspect	Design Principle	Current Status
Use Maintenance and Repair Scrap	High-Performance Products	<b>Vision Care:</b> <ul style="list-style-type: none"><li>The product has an oxygen permeability of Dk/t 193, which is 6 times that of traditional hydrogel, the highest in the market, allowing eyes to breathe smoothly.</li><li>The full-color technology's three-layer coating technique locks the color material in the middle layer, ensuring it does not fade.</li><li>The solvent-free formula significantly enhances the hydrophilicity of the lens, providing a highly smooth and watery feel to the eyes.</li><li>The non-indentation optical design effectively replaces tear fluid and metabolizes eye secretions, preventing lipid and protein deposits.</li><li>Enhanced moisturizing function of the material increases wearing time and comfort:<ul style="list-style-type: none"><li>1. Lens moisture evaporation rate decreased by 10%; moisturizing time increased by 71%.</li><li>2. Clinical dryness satisfaction increased by 8%; overall satisfaction increased by 9%.</li></ul></li><li>Adjusted product shape through optical design to improve product comfort.</li><li>Optical design correction based on the physiological structure of the eye, using a multi-arc design for the lens to fit closely to the eye, controlling lens displacement, and improving wearing comfort while reducing the sensation of foreign objects. Clinical overall satisfaction with wearing increased by 9%.</li></ul>
		<b>Product Life</b>
		<b>Wound Care:</b> <ul style="list-style-type: none"><li>Through special process technology, ChitoClot Gauze has a storage period of up to 5 years, higher than the 3-year life of ordinary gauze.</li></ul>
		<b>Vision Care:</b> <ul style="list-style-type: none"><li>In response to the waste of disposable cups generated by contact lens use, since March 2022, Miacare has launched the Green Movement initiative in China, and as of December 2023, over 130,000 cups have been recycled.</li></ul>
Social Contribution	Circular Economy	<b>Medical packaging:</b> <ul style="list-style-type: none"><li>Actively trialing the introduction of self-made membranes using reusable cores, with expected benefits in 2024.</li><li>The reuse rate of wastewater from the printing process is maintained at 90%.</li></ul>
		<b>Skin Care:</b> <ul style="list-style-type: none"><li>Acne patches are manufactured using a solvent-free process, while also striving to reduce packaging material usage and adopt environmentally friendly packaging materials. Without compromising the quality of raw materials and warehouse operations, individual product packaging is improved to expand the types of packaging material reductions.</li><li>Working on "lightweight" packaging, evaluating materials and specifications with suppliers, and refining packaging methods not only reduce the weight and volume of products but also reduce carbon emissions generated during transportation, contributing to environmental protection.</li></ul>
		<b>Environmental Impact</b>
		<b>Vision Care:</b> <ul style="list-style-type: none"><li>Conducting recycling of cup materials to not only reuse but also reduce the environmental impact of waste.</li><li>Emphasizing the importance of eye care from a young age, Miacare has collaborated with the Taiwan Fund for Children and Families and Kobayashi Optical since 2014 on the "Optical Hope Project," providing free glasses to economically disadvantaged children in need of vision correction. For details, refer to section 8-2 Public Welfare Care.</li></ul>
Social Contribution	Social Impact	<ul style="list-style-type: none"><li><b>Wound Care:</b> Reducing the medical burden, providing health care services at home, and helping elderly or disabled individuals improve their quality of life.</li><li><b>Medical packaging:</b> Sterile barrier systems protect healthcare workers and patients from hospital-acquired infections resulting from medical procedures.</li></ul>



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## Waterproof and breathable textiles

Aspect	Design Principle	Current Status
Design	Structure optimization	<ul style="list-style-type: none"><li>Optimization of film microstructure design and composite adhesive application to enhance product strength and reliability.</li><li>Mon-material (single material) development focuses on combining polyester fiber fabrics with polyester breathable membranes to develop composite materials for waterproof and breathable fabrics that facilitate recycling processes. Polyester composite fabric is expected to be mass-produced and introduced in Q3 2024.</li></ul>
	Recyclable Materials	<ul style="list-style-type: none"><li>To reduce the use of petrochemical raw materials and support the removal and purification of marine waste, the company has introduced pioneering domestic technology for recycling nylon marine waste yarn. This technology is combined with BenQ Materials' eco-friendly micro-porous breathable membrane, producing functional fabrics in a plant planned to use fully renewable energy, providing products with a stronger environmental concept. In 2023, the waterproof and breathable functional fabric made from recycled marine waste yarn won the highest honor, the Gold Award, at the 32nd Taiwan Excellence Awards.</li><li>Developed recycled polyester fabric from discarded polarizer release films. Based on the goals of the circular economy and sustainable development, this project exemplifies the cross-industry collaboration of recycling electronic waste into textile applications, setting a precedent for converting electronic factory waste into textile uses.</li></ul>
	Low-impact elements	<ul style="list-style-type: none"><li>Solvent-free film production technology: Ensures that the process does not produce volatile organic compounds (VOCs).</li></ul>
	Product safety	<ul style="list-style-type: none"><li>Materials certified by Intertex are free of perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), aligning with the future trends of sustainable applications in various countries.</li><li>Micro-nano level pore design, which passes the wet bacterial penetration test (TTRIENISO 22610), meets the functional needs for bacterial blockage in the post-pandemic era.</li></ul>
Manufacture	High-Performance Manufacture	<ul style="list-style-type: none"><li>Online fabric handling machine, increasing fabric joining production capacity by 50%.</li><li>Introduction of automatic packaging machines, increasing packaging production capacity by 50%.</li><li>Introduction of conveyor belts to replace manual handling, reducing daily round-trip handling by 120 trips, with a benefit of approximately 1.5 hours.</li></ul>
Logistics	Green Packaging	<ul style="list-style-type: none"><li>Reduced the core paper thickness of some product shipments from 3 inches to 2 inches, increasing the fabric winding length and improving container volume utilization, thereby reducing the number of transportation trips.</li></ul>
	High-Performance Delivery	<ul style="list-style-type: none"><li>To meet shipment deadlines, we communicated and coordinated with customers to consolidate shipments. We requested customers to retain or return shipments, allowing the pallet recycling system to remain operational. In 2023, the recycling usage rate was approximately 60%.</li></ul>
Use Maintenance and Repair Scrap	High-Performance Products	<ul style="list-style-type: none"><li>Through BenQ Materials' core composite technology, a longer and more reliable product lifecycle is established.</li></ul>
	Product Life	<ul style="list-style-type: none"><li>It is a hydrophobic and breathable material, unlike common polyurethane materials that easily hydrolyze and age, providing better assurance for waterproof characteristics.</li></ul>
Social Contribution	Environmental Impact	<ul style="list-style-type: none"><li>Xpore products are 100% fluorine-free, solvent-free, non-toxic, and safe, protecting consumer safety.</li></ul>
		<ul style="list-style-type: none"><li>All Xpore manufacturing processes strictly adhere to environmental regulations, causing no air or water pollution.</li></ul>





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# Green Logistics

## Green logistics policy

Net-zero is a global concern for enterprises. In addition to continuous process optimization and improved water efficiency, BenQ Materials is implementing low-carbon circular management to reduce carbon emissions from transportation as a primary logistics policy. Through product carbon footprint inventory and verification, BenQ Materials is gradually establishing a database for product carbon emissions to support the development of low-carbon, low-energy products. The goal is to achieve low-carbon product production through circular management.

### Low-carbon Transportation

Planning for transportation optimization, implementation of combined type of transportation route, in order to reduce air freight weight, thereby achieving the goal of sustainable logistics and reduction of carbon emission.

### Product packaging material reduction

Change the disposable cartons to recyclable packaging boxes for the shipping method, and increase the times of use of use of packaging material, in order to reduce generation of waste.

### Packaging Material/Pallet Recycle

Use recyclable and reusable pallets for shipping, in order to prevent the use of disposable pallets, that may cause unnecessary wastes.



## Low-carbon Transportation

BenQ Materials has adopted a hybrid transportation strategy and adjusted production plans, gradually returning to regular sea transport and reducing air transport since 2023. From 2017 to 2023, the cumulative carbon reduction was 19,349 tons CO<sub>2</sub>e. In 2024, the low-carbon transportation policy will continue to be implemented, further reducing carbon emissions through circular management.

Note: Carbon reduction formula: Number of transports × [Carbon emissions per trip before implementation - Carbon emissions per trip after implementation]

### Low-carbon packaging

BenQ Materials continues to promote policies such as "recycled packaging box certification," "reducing the number of finished product shipments and air transport usage," and "recyclable packaging boxes" to encourage and guide customers to adopt these practices.

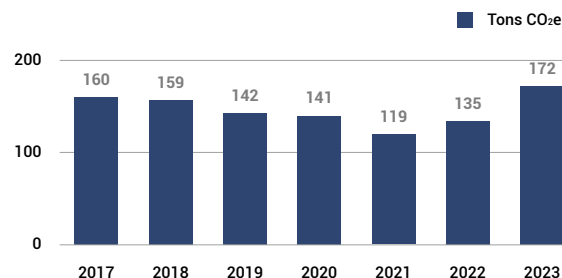
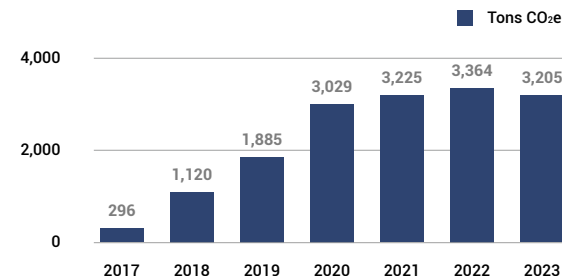
BenQ Materials' product packaging has transitioned from single-use cardboard boxes to "low-carbon packaging," reducing packaging materials through design guidelines. By using single materials and reusing them, the environmental impact is minimized. In 2023, the polarizer plant's shipment volume statistics showed that the use of recyclable packaging boxes reduced single-use packaging materials, resulting in approximately 172 tons CO<sub>2</sub>e carbon reduction.

### Low-carbon recycling and circularity

The display materials business uses recyclable packaging materials and pallets, along with low-carbon circular management to track packaging material recovery volume, recovery rates, and achievement rates. Through the packaging material recovery management mechanism, recovery quality is ensured, the usage cycle of packaging materials is extended, usage amounts and costs are reduced, and waste generation is minimized.

In 2023, the recovery items included a 94% recovery rate for recyclable packaging boxes, a 93% recovery rate for pallets, and a 94% recovery rate for product placement trays. The overall recovery rate increased by about 1% compared to 2022, achieving the 93% target.

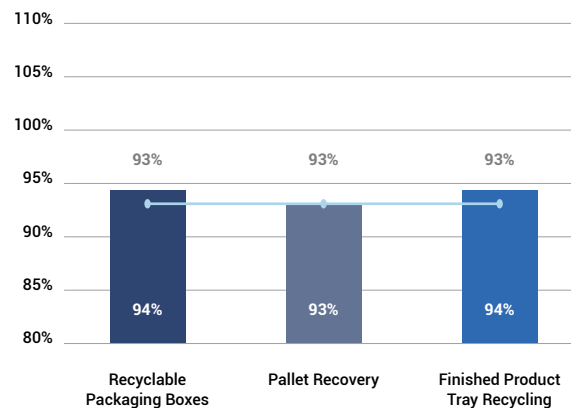
BenQ Materials continues to monitor customers' recovery status and promptly return recovered items for reuse to reduce the use of single-use packaging. The recovery rate target for 2024 is 94%.



Note : 1. Packaging material recycling rate: Calculation method refers to Each packaging material recycling volume per month of the polarizer plant site ÷ Each packaging material shipping volume per month.

2. The packaging box carbon reduction coefficient data source refers to the statistics of Longchen Paper & Packaging that for 1kg of recycled carton during the recycled waste paper process, the carbon emission is approximately 0.8 kg CO<sub>2</sub>e

### Polarizer Packaging Recovery Rate







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Appendix

# Chemical Management

## Hazardous Substance Management

BenQ Materials established the GP Core Team in 2010 to promote hazardous substance-free (HSF) management. Each year, based on international regulations, customer requirements, and environmental trends, they review the current status of hazardous substance management and update the "Environmental Quality Assurance Management System Operating Standards." All products must comply with the EU RoHS, EU REACH, Packaging Directive, and WEEE, as well as customer requirements. A material hazardous substance-free management system has been established to ensure that the produced functional films and battery materials comply with international regulations and customer requirements related to hazardous substances. In 2023, there were 1,614 non-use hazardous substance applications, with a compliance rate of 100%.

Number of HSF Product Applications

Product	Number of Applications	Compliance Rate
Display Materials	838	100%
Advanced Battery Material	11	100%
Waterproof and breathable textiles	2	100%
Vision Care	102	100%
Skincare Products	547	100%
Professional Healthcare	114	100%
Total	1,614	100%

### Hazardous

Identify international regulations and customer demands

BenQ Materials hazardous substance management guidelines

Request suppliers to provide compliance documents

Respond to provide green supporting documents complying with customer's requirement

## Product Chemical Substance Management Achievements

- 1 Fully compliant with EU RoHS: BenQ Materials' products comply with EU RoHS concentration requirements for lead, cadmium, mercury, hexavalent chromium, PBB, and PBDE. Since 2016, BenQ Materials has responded to RoHS 2.0 regulations by including phthalates (DEHP, BBP, DBP, DIBP) in their testing, with results consistently showing "not detected."
- 2 Halogen-Free Requirements for Electronic Products: General customer requirements for halogen-free products are <900 ppm for bromine and chlorine individually, and <1500 ppm in total. BenQ Materials imposes stricter requirements, with bromine and chlorine individually <800 ppm, and their products meet these stricter requirements.
- 3 Disclosure of Hazardous Substance Lists in Products: EU REACH regulation lists hazardous substances and periodically announces substances of very high concern (SVHC). After EU REACH announces SVHCs, BenQ Materials conducts investigations with suppliers and honestly discloses the results to customers.

In 2023, EU REACH announced the 28th and 29th batches of SVHCs, totaling 11 substances. BenQ Materials completed investigations for 53 display materials customers, 14 specialty products customers, and 4 battery materials customers, with 2,256 customer demand surveys conducted and results honestly disclosed.

To comply with EU regulations (e.g., RoHS and REACH) or customer specifications (e.g., green products, processes, and procurement) related to hazardous substance characteristics, BenQ Materials effectively ensures compliance through process management and system perspectives based on ISO 9001. This enhances the quality assurance of hazardous substance management and increases customer confidence in BenQ Materials' hazardous substance management. On October 11, 2023, BenQ Materials obtained the QC080000 certification for BMC & BML.



22/12~23/02

- Plan
- Internal Auditor Training



23/03~05

- QC080000 Standard (Clause) Education and Training
- System Integration and Implementation



23/05~07

- Internal Audit
- Management Review



23/07~08

- Stage 1 Document Review
- Stage 2 Formal Audit



2023/10

- Certification Acquisition



## Supply Chain Chemical Management

Connecting raw material suppliers, process material suppliers, downstream cutting plants, and packaging material suppliers, BenQ Materials forms an effective green product industry chain with upstream suppliers. This ensures effective control from the source to meet green product standards and reduce environmental impacts during the product manufacturing process.

Supplier management process: BenQ Materials manages reporting information through the 'Supplier Portal' → internal approval → documents can be queried in the system, and supplier test reports need to be updated and uploaded annually.



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Appendix

# Product Safety and Marketing Labels

## Medical Device Product Regulations and Certifications

All medical device products sold by BenQ Materials must obtain national regulations and certifications in each sales region before being exported and sold. Currently, the certifications obtained include Taiwan TFDA, EU CE, US FDA, and China CFDA. For detailed product certifications, please refer to [BenQ Materials ESG website](#).

During clinical trials, products must also comply with EN ISO 14971:2012 medical device risk management standards and ISO 14155:2011 guidelines for clinical evaluation of medical devices. These standards ensure that risk management, design, conduct, recording, and reporting of clinical trials are in compliance to guarantee scientifically conducted and reliable results. Sterilization packaging series products must pass ISO 10993:2018 biocompatibility testing before shipment.

## Medical Device Product Manufacturing and Sales Permits

BenQ Materials is a medical device manufacturer, and after obtaining approval and registration, it has received the necessary permits to manufacture related medical device products. These products must meet the safety regulations and manufacturing licenses of each country. Product sales also require obtaining a pharmaceutical sales permit and product registration before selling. Additionally, contact lenses, as medical devices, must be sold through channels with pharmaceutical permits to reach end consumers.



## Medical Device Labeling and Marketing Regulations

### Medical Device Packaging Labeling Regulations

1. Transport packaging should be clearly and permanently marked with the product catalog number, quantity, manufacturer or supplier name/trademark, production date in ISO 8601 format, batch number, standard weight per square meter (in grams), roll width (in cm) and length (in meters), and recommended storage conditions.
2. Inner packaging or roll labels should be clearly and firmly marked with the quantity, manufacturer or supplier name/trademark, batch number, and standard weight per square meter (in grams).

## Medical Device Labeling Regulations

All medical device product labels must comply with relevant regulations of the sales region and conform to EN 1041:2008 standards for information provided by medical device manufacturers, as well as ISO 15223-1:2016 standards for symbols used in medical device labels and information. Product information is disclosed according to the symbols in the standards.

Skin care products regulated by the Medical Device Management Act must include necessary information on labels, instructions, or packaging, such as product name, permit or registration number, efficacy/purpose or indications, manufacturing date/expiry date or shelf life, model/specifications or main ingredients, warnings/precautions/usage restrictions or foreseeable side effects, name and address of the permit holder or registrant, manufacturer's name and address, batch number or serial number, and other items announced by the central competent authority.



## Medical Device Product Marketing Regulations

Medical device-related products must comply with advertising and marketing laws in each country. For example, in Taiwan, before advertising and marketing medical devices, all text, pictures, or verbal information in the advertisement must be submitted to the competent authority for approval. The promotion methods are also subject to restrictions and must not use other people's names, books/documents, interviews, or other improper methods for promotion.

For example, contact lenses, as regulated by the Medical Device Management Act, must follow the advertising review regulations of the Ministry of Health and Welfare for both print and media advertisements. The Taiwan Food and Drug Administration will notify relevant departments about medical device advertising laws and review principles, ensuring immediate communication and implementation. Brand collaborations with influencers for product trial articles must be reviewed by the legal department to ensure compliance with advertising laws.