03 Green Production

3.1 Environmental Management

GIGABYTE is committed to reducing the environmental impact of operations and manufacturing processes as well as protecting the health and safety of our employees as part of commitment and promise on environmental management. Environmental and hazardous substance management systems such as ISO 14001, ISO14064, and IECQ QC 080000 were therefore introduced to ensure that our routine operations and products all comply with environmental standards and regulations. There were no material (fines over NT$1 million) sanctions related to environmental protection in 2024.

Environmental Management Performance

In terms of environmental performance management, clear long-term goals have been drawn with an aggressive reduction timetable. Our "333 Short-term Reduction Targets" require GIGABYTE to reduce our carbon emissions, water consumption, and waste production by each 3% every year. Reduction incentive mechanisms, green contests and other activities also encourage employees to get in the habit of saving water and energy as well as invest enthusiastically in the development of green and energy-saving products

- Annual investment and output of environmental resources

Input		Output		Emissions in the Last 2 Years
Energy[1] [GJ]	Purchased Electricity: 165,579.52 Purchased Steam: 2,213.78 Gasoline: 11.87 Diesel: 22.68 Liquefied Petroleum Gas: 0.51	Greenhouse Gases [Tonnes-CO_2e]	Direct Emissions (Scope1): 824.73 Energy Indirect Emissions (Scope2): 22,687.85	▪ 2023 saw a reduction of 472.18 tonnes CO_2e (-1.69%) compared to the previous year Reduction of 43.95% compared to 2009 (base year) ▪ 2024 saw a reduction of 3,926.68 tonnes CO_2e (-14.31%) compared to the previous year Reduction of 51.97% compared to 2009 (base year)
Water Resource [Tonnes]	Tap water: 254,200	Effluent (Tonnes)	Domestic sewage: 215,300	▪ 2023 saw a reduction of 3,194 tonnes CO_2e (-1.26%) compared to the previous year Reduction of 35.99% compared to 2010 (base year) ▪ 2024 saw a increase of 4,400 tonnes CO_2e(+1.75%) compared to the previous year Reduction of 34.87% compared to the base year
Resource[2] [Tonnes]	Plastic: 2,323.45 Glass: 802.98 Metal: 10,852.64 Paper: 5,945.28 Other:1,085.91	Waste (Tonnes)	General Industrial Waste: 2,651.27 Hazardous Industrial Waste: 227.67	▪ 2023 saw an increase of 297.44 tonnes CO_2e (+13.43%) compared to the previous year Reduction of 0.18% compared to 2010 (base year) ▪ 2024 saw an increase of 472.18 tonnes CO_2e (+14.6%) compared to the previous year Increase of 14.39% compared to 2010 (base year)

Note 1: The unit used for energy conversion is based on the user plant for each energy type. Steam, LPG and gasoline are based on the values for China, while diesel and gasoline use the Heat Content of Energy Commodities table published by the Energy Administration, MOEA.

Note 2: Resources include all product packaging as well as investment in ATX, MicroATX, and Mini ITX motherboards.

Note 3: General industrial waste includes domestic waste.

Note 4: The scope of energy in this table encompassed Headquarters, Taoyuan Nanping Factory, China Dongguan and Ningbo Factory, as well as the the Taipei Silicon Valley Park Office where the subsidiaries Bestyield International, G-Style, Selita Precision, and the sub-subsidiary GIGAPIC are located(included in scope of inventory from 2021 onwards); the boundary of water resources and resources was Headquarters, Taoyuan Nanping Factory, and China Dongguan and Ningbo Factory.

Sustainability Fund and Reduction Reward Program

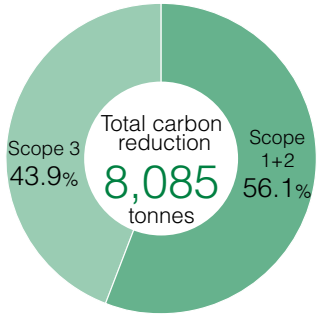
A "Sustainability Fund" for 6 years was officially launched by GIGABYTE in 2019. The new fund will be funded by annual energy saving, and used to promote proposals relating to plant energy efficiency, reduction, and low-carbon products as well as sustainable development-related projects. Providing employees with reduction motivation and incentives served to promote innovative thinking and green design that realize the Company's reduction targets.

- Results of reduction rewards and low-carbon product proposals

Applications for reduction and low-carbon product proposal rewards are accepted twice a year. 11 rounds have been held as of the end of 2024. The review of employs the "shadow pricing" concept for internal carbon pricing to quantity reduction performance. Carbon was therefore priced at USD 50 per tonne.

Most of the proposals this year focused on equipment energy-efficiency, reducing the use of parts/consumables, and recycling of resources. Proposals for reducing Scope 1 and 2 carbon emissions accounted for 56.1%. Most involved energy-saving equipment and lab optimizations; Scope 3 accounted for 43.9% and was mainly made up of savings in parts or packaging materials.

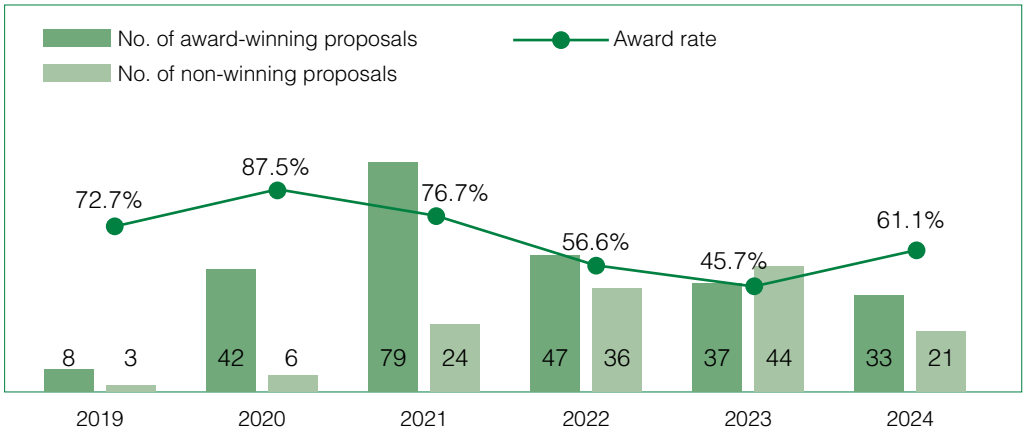
- Actual amount and proportion of carbon reductions from proposals up to the end of 2024



▪ Participation in reduction proposals

Two request for proposals were held in 2024. 147 people took part and submitted 54 proposals.

The proposals were reviewed and awards given out based on the significance and feasibility of the reductions, and proposal quality. The award rate in 2024 was 61.1%, an improvement of 14.4% over the previous year. Reduction proposals rated as excellent will be introduced in the workplace and follow-up conducted until the case is closed.



Most proposals in 2024 focused on energy-saving solutions. In the future, we will continue to provide incentives and mentoring on proposals to not only encourage proposals that combine creativity and environmental protection from employees. but also boost the number of creative proposals in areas other than energy efficiency. The reward scheme will also be optimized so that more influential carbon reduction and sustainable innovation proposals can be realized.

▪ Reduction proposals and performance

Time Proposed	Electricity Savings (kWh./year)	Water Savings (Tonnes/ year)	Waste Reduction (kg/year)	Effluent reduction (L/year)	Emission reduction (L/year)	Carbon reduction (kg- CO_2e/year)
2019-2024 Cumulative Total	8,949,755.8	32,656.8	581,896.2	59,585.5	18,842.4	8,085,575.0

3.1.1 GHG and Energy Management

Energy use

Electricity is the main form of energy used by routine operations and production processes at GIGABYTE. In 2021, GIGABYTE included the subsidiaries (Bestyield International, G-Style, Selita Precision) and sub-subsidiary (GIGAPIC) at the Taipei Silicon Valley Park Office in the scope of our energy inventor. Total electricity consumption in 2024 was 45,994.31 MWh (165,579.52 GJ), an increase of 11.1% compared to 2023 and 11.52% lower than 2009. Analysis of increase in electricity consumption found that this was due the increased server production and more energy-intensive production process. Total energy consumption in 2024 from electricity and other sources amounted to 173,368.79 GJ, a decrease of 33.2% compared to the base year of 2009. Energy intensity per thousand chips produced in 2024 was 15.15 GJ. Energy intensity per person was 27.78 GJ.

▪ Summary of Energy Consumption over the Past 4 Years

Energy Type	Unit	2009	2021	2022	2023	2024	2024 vs 2009 Difference
Electricity	GJ	187,131.89	155,550.38	147,820.19	149,077.54	165,579.52	-11.52%
Purchased Steam		63,925.40	5,453.65	5,409.32	4,025.16	6,488.60	-89.85%
Gasoline		1,684.65	254.49	232.27	334.64	377.01	-77.65%
Diesel		2,656.72	2,620.70	852.75	846.96	898.07	-65.74%
Liquefied Petroleum Gas		4,121.70	24.09	31.65	27.13	25.59	-99.38%
Total Usage	GJ	259,520.36	163,903.31	154,346.18	154,311.42	173,368.79	-33.2%
	MWH	72,089.05	45,528.73	42,873.97	42,864.32	48,158.04	

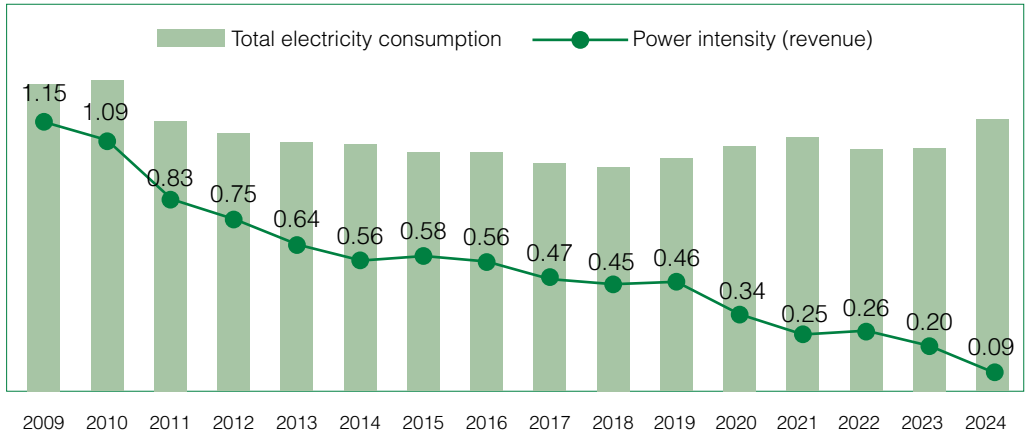
Note 1: The unit used for energy conversion is based on the user plant for each energy type. Steam, LPG and gasoline are based on the values for China. Diesel and gasoline use the Heat Content of Energy Commodities table published by the Energy Administration, MOEA, instead.

Note 2: The boundary of the above energy data is consistent with the boundary of the GHG inventory: Headquarters, Taoyuan Nanping Factory, Dongguan Factory and Ningbo Factory in China. The Taipei Silicon Valley Park Office where the subsidiaries Bestyield International, G-Style, Cloudmatrix, and Selita Precision as well as the sub-subsidiary GIGAPIC are located were added from 2021 onwards.

Note 3: The base year 2009 of the GHG reduction target was also used as the base year for calculating reduction in energy consumption.

Total electricity consumption and intensity in past years

Unit: kWh; kWh/NTD million



2024 Carbon reduction plan

No. of energy conservation cases	Electricity Saving (Unit: KWh)	Energy Reduction (Unit: GJ)	Carbon Reduction (Unit: Tons-CO_2e)
15pcs	1,267,329	4,758.49	697.19

Note 1: Different equipment was replaced each year so energy consumption of device before upgrade was therefore used as the baseline for the calculation of energy consumption.

Note 2: Carbon emissions in the Taiwan region were calculated using the electricity emissions factor of 0.494 (kg-CO_2e/kWh) published by the Energy Administration, MOEA.

Note 3: China factories used the 2022 electricity coefficients published on December 20, 2024, by the National Bureau of Statistics of the Ministry of Ecology and Environment, PRC.

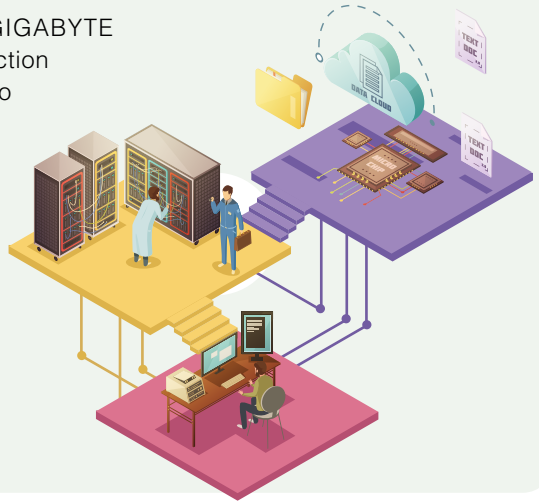
The Dongguan factory used a coefficient of 0.4403 (kg-CO_2e/kWh); the Ningbo plant factory in China used a coefficient of 0.5153 (kg-CO_2e/kWh).

Building a Smart Low-Carbon Production Environment at GIGABYTE

GIGABYTE is building a low-carbon production environment through improvements to the production environment and process equipment. In 2023, the process power management and monitoring system was introduced at Headquarter to integrate real-time power consumption information and the SCADA smart power tracking system. Power consumption during the production process was remotely monitored to improve energy efficiency and optimize time-of-use.

Energy-intensive equipment in the production process is being progressively replaced by GIGABYTE as well. Two legacy process chillers were replaced with active magnetic bearing chillers in 2024 to greatly reduce process power consumption. Water temperature monitoring was also linked to dynamic adjustment of chiller loads to boost operating efficiency.

In terms of process optimization, GIGABYTE introduced Automated Optical Inspection (AOI) on the production line to automatically scan Printed Circuit Boards (PCB) for defects such as missing components and solder problems. The assistance it provides to production line workers effectively reduced production non-conformities as well as power consumption due to back-end reworking.



Renewable energy usage

Purchased electricity accounted for around 95% of GHG emissions at GIGABYTE. The use of renewable energy will help the Group reduce indirect emissions from purchased electricity and progressively realize carbon reduction targets. The contracted capacity at GIGABYTE locations in Taiwan does not currently exceed 5,000 kWh so is not subject to the "Large Electricity Users Green Energy Clause." GIGABYTE is already investing in the construction of solar power plants in Miaoli to prepare for the domestic/overseas push towards requiring businesses to adopt renewable energy and future increases in power consumption due to revenue growth. This is expected to meet 10% of the power demand at operating locations in Taiwan from 2026 onwards. In addition to operating locations in Taiwan, North American operating locations are planning to build their own rooftop solar panels; German operating locations installed and began using renewable energy from solar panels in 2020. Cumulative power generation as of 2024 was 53.005 MWh (190.82 GJ), equivalent to a reduction of 14.84 tonnes CO_2e

Greenhouse Gas Reduction Targets and Performance

GIGABYTE GHG reduction pathway is based on a 50% reduction in 2025 compared to the base year of 2009. GHG inventory is also conducted in accordance with ISO 14064, Scope of inventory was expanded from 2021 onwards in response to new regulatory requirements. The Taipei Silicon Valley Park Office where the subsidiaries Bestyield International, G-Style, and Selita Precision as well as the sub-subsidiary GIGAPIC are located were incorporated into the original inventory boundary. Inventory and disclosure of the Group's Scope 3 emissions were also added. Air pollution control complied with local regulations in Taiwan and China with no NO_X, SO_X, and PFCs were emitted by production processes and products.

▪ Progress on GHG Reduction Targets

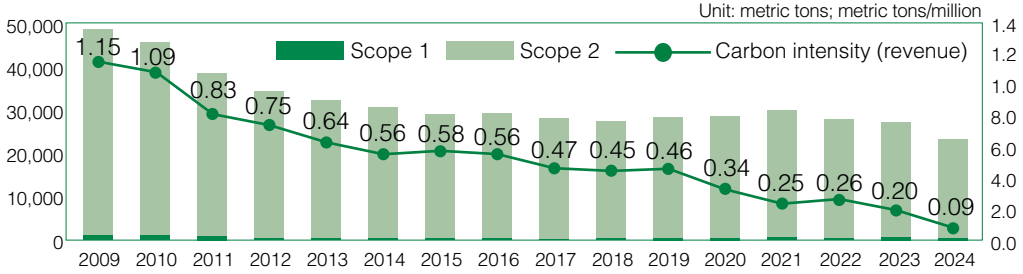
GIGABYTE has engaged in the transformation of our organizational strategy and diversification of product portfolio in recent years in response to the popularization of cloud computing, digitization, and automation. We are focusing on working with our global partners to develop innovative solutions and this has led to fluctuations in annual product output. Our GHG emissions in 2024 was 51.97% lower than the base year and 14.31% lower than the previous year; in terms of emission intensity, emissions per unit of revenue are now 92.17% lower than the base year and 55% lower than the previous year.

Scope 1+2 Targets Explained		2024 Targets Completed	
		Absolute reduction	Intensity reduction.
Short-term	Carbon reduction of 3% every year	Reduction of 14.31% compared to last year	Carbon emission per Million NTD in revenue 55% reduction compared to last year
Medium and Long-term Goals	Carbon reduction of up to 50% in 2025 compared to 2009 (base)	Reduction of 51.97% compared to 2009 (base year)	Carbon emission per Million NTD in revenue 92.17% reduction compared to 2009 (base year)

Note 1: The new 2022 electricity coefficients published by the National Bureau of Statistics, Ministry of Ecology and Environment, PRC, on December 20, 2024, was reduced, so GIGABYTE's Scope 1 and Scope 2 emissions met the target of a 50% reduction compared to the 2009 base year in 2024, ahead of schedule.

Note 2: The difference in scope of the GHG inventories in 2024 and base year was due to the inclusion of the Taipei Silicon Valley Park Office where the subsidiaries Bestyield International, Cloudmatrix and G-Style as well as the sub-subsidiary GIGAPIC are located.

▪ Total scope 1 and 2 emissions and emission intensity in past years



▪ Scope 1 and 2 Greenhouse Gas Inventory over the Past 4 Years

Unit: t-CO_2e

Item	2021	2022	2023	2024
Scope 1	1,063.52	627.81	832.86	824.73
Scope 2	28,874.43	27,283.64	26,606.40	22,687.85
A Sum of Scope 1 and Scope 2	29,937.95	27,911.44	27,439.26	23,512.58

Note: Based on the Global Warming Potential (GWP) definition in the 6th IPCC Assessment, the type of greenhouse gases that need to be calculated include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3)

▪ Scope 3 Greenhouse Gas Inventory for the Past 4 Years

Unit: t-CO_2e

Scope 3 GHG Emission Items		2021	2022	2023	2024
Transport-related	Upstream Transportation and Distribution	234.74	58.32	617.35	2,905.56
	Downstream Transportation and Distribution	40,088.61	28,051.45	44,405.99	20,416.20
	Business Travel*	24.13	128.35	548.17	752.83
	Employee Commuting*	1,201.65	1,867.53	1,028.98	1,224.31
GIGABYTE's use of products	Purchased Goods*	1,515,136.60	892,256.60	1,213,983.28	1,075,787.90
	Capital Goods	739.74	776.94	580.91	576.26
	Fuel and Energy-related Activities	1,860.45	1,217.49	3,188.28	3,908.80
	Waste Generated from Operation*	1,464.50	1,238.66	1,911.11	2,238.90
Use of GIGABYTE's products	Processing of Sold Product	1,722.91	2,312.99	1,541.80	1,603.54
	Use of Sold Products*	4,239,140.03	5,689,602.28	4,525,119.43	5,434,613.16
	End-of-Life Treatment of Sold Products*	10,931.82	8,089.73	8,757.16	9,738.99
Total Scope 3 Emissions		5,812,545.17	6,625,600.33	5,801,682.44	6,553,766.45

Note: Figures marked with * have been verified by an external party

▪ Voluntary Retirement of CERs

GIGABYTE partnered again with the Plant-for-the-Planet Foundation by committing to retiring 2,500 CERs from overseas renewable energy projects every year between 2023 and 2027. These CERs were issued from Gold Standard from2024. The voluntary retirement in carbon credits was not counted towards the Group's GHG inventory and carbon reduction target progress for 2024.

3.1.2 Water Resource Management

100% of the Group's water consumption is tap water. There are now withdrawals of underground water or supplies from other forms of water source. Water is supplied to employee locations, customers, and plant infrastructure. As GIGABYTE product lines are mainly assembly and there are no water-intensive processes, all effluent generated after use is domestic sewage that satisfies the discharge standards. The discharge is released into the sewer system without impacting on the local environment around the operating locations.

Total withdrawal in 2024 amounted to 254.2 ML, an increase of 1.75% from last year. This was mainly attributed to the expansion of inventory boundary due to Company growth. However, it's 34.87% lower than the base year and met the medium-term target for a 20% reduction ahead of schedule. An examination of water consumption revealed a decrease in water usage per million yen, indicating improvements in energy efficiency.

▪ "333 Reduction" water reduction target

Target Description		2024 Progress	
		Absolute reduction	Intensity reduction.
Short-term	Reduce water consumption by 3% per year	Up 1.75% more compared to last year	Water consumption per Million NTD in revenue 47.54% reduction compared to last year.
Medium and Long-term Goals	2030 compared to 2010 (baseline year) Water reduction of 20% compared to (Baseline year)	Reduction of 34.87% compared to last year to 2010 (baseline year)	Water consumption per Million NTD in revenue 89.63% reduction compared to 2010 (baseline year)

▪ Group water consumption over the last four year

Unit: 1000 KL

	2021	2022	2023	2024
Water Withdrawal	259.2	253.0	249.8	254.2
Water Discharge	219.7	214.0	212	215.3
Total Water Consumption	39.5	39.0	37.8	38.9

Note 1: The boundary for the scope of water resource calculations included Business Headquarters, Taoyuan Nanping Factory, China Dongguan and Ningbo Factory. 4F of Building B from Headquarters was also added in 2022. Addition of dormitory water consumption of Ningbo Factory to the 2014 inventory scope.

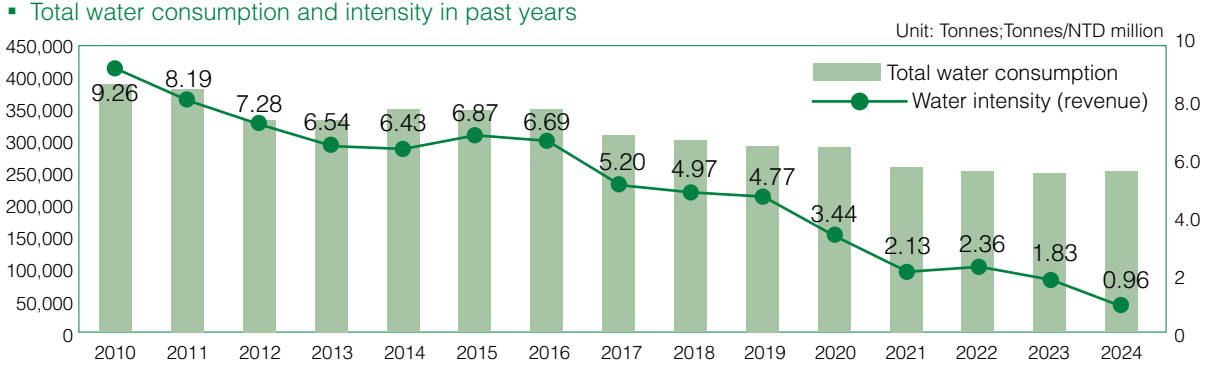
Note 2: Headquarters, Nanping Factory and Ningbo Factory were estimated as water withdrawal * 0.8. Drainage of Dongguan Factory was estimated as water withdrawal * 0.9.

▪ Water resource reduction

Water recovery equipment including central air-condition cooling water recirculation systems and production line wastewater treatment and recirculation systems was installed by GIGABYTE at the Dongguan and Ningbo factories. Up to 21,873 KL of water was recovered in 2024. The Company conducts periodic maintenance on water-efficiency equipment at our plants every year. Timely repair of leaks reduced water consumption by 2,087 KL. Inspections were also stepped up to reduce the loss of water resources even further. In addition, the G-HOME GIGABYTE sustainable rooftop rainwater reclamation system supplies about 50% of all irrigation water each year. Irrigation systems are also used to reduce water loss in order to support the campus' ecological operations and improve water efficiency.

GIGABYTE encourages employees to actively participate in water conservation proposals. Even though there were no related proposals in 2024 but we will continue to encourage employees to participate in innovative water conservation plans in the future in order to achieve our annual and long-term reduction goals.

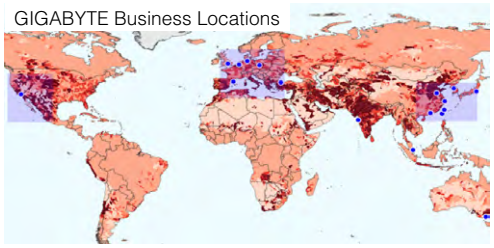
▪ Total water consumption and intensity in past years



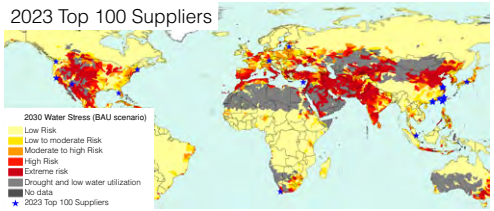
Water Resource Risk Assessment

In response to the increased severity of drought and flood risks due to climate change, GIGABYTE employed GIS tools and the water risk assessment tool developed by the World Resource Institute (WRI) for the first time in 2019 to analyze the water stress and risk exposure at our global operating locations and top 100 key suppliers. Most GIGABYTE operating locations are classified as moderate risk in terms of water stress. Scope of supplier analysis was based on the top 100 suppliers by purchasing amount in 2023 and encompassed 75.2% of total purchasing amount. Analysis found that most upstream suppliers were located in regions with moderate to high risk for water stress. In response, GIGABYTE used the findings as a reference for supply chain risk management. We also shared water-related risks that supply chains in reach region may encounter and indirectly impact on supply stability such as flooding, water shortage, and regional water usage regulations so that management measures could be developed. For water risk management measures, please refer to 3.2.2 Climate Management Strategy.

GIGABYTE Business Locations



2023 Top 100 Suppliers



3.1.3 Waste Management

Waste Reduction

GIGABYTE operations generate domestic waste, recyclable waste, and hazardous industrial waste. Qualified contractors are engaged at each plant to remove the waste for disposal in accordance with local clearance regulations. The waste is weighed then a receipt issued for their proper disposal to facilitate declaration and management. Waste contractors are regularly audited as well to verify proper disposal. In 2024, 2,878.94 tonnes of waste were generated so we failed to meet our short-, medium- and long-term reduction targets. The main reason for this was changes in market demand that led to an increase in server orders, resulting in greater production and more waste. GIGABYTE is nevertheless continuing to enforce waste recycling and reduction initiatives, so actual waste generated per million NTD in revenue has continued to decrease relative to the previous and baseline year. GIGABYTE will continue to examine our reduction targets and promote internal waste reduction programs that optimize our resource utilization and recovery mechanism to ensure that reduction targets stay on track .

▪ "333 Reduction" water reduction target

Target Description		2024 Progress	
		Absolute reduction	Intensity reduction.
Short-term	Reduce waste by 3% per year	Up 14.6% more compared to last year	Waste generated per NTD million in revenue reduced by 40.88% compared to last year
Medium and Long-term Goals	2030 compared to 2010 (baseline year) 50% reduction in waste	Compared to 2010 (baseline year) Increase of 14.39%	Waste generated per NTD million in revenue reduced by 81.82% compared to 2010 (baseline year)

▪ Waste reduction measures

The reduction incentive system was used to promote waste reduction throughout the Group. The waste reduction of proposals in 2024 included reducing solid waste by 14.84 tonnes, reducing waste liquids by 408 L, and reducing waste emissions by 1.88 tonnes; amount of waste recycled at Xindian Headquarters also increased by 1% though contributions to overall reductions can still be improved. In the future, GIGABYTE will continue to promote reduction incentives and other programs in order to progressively realize the waste reduction targets.

▪ Waste disposal in the last 4 years

Unit: Tonnes

Category	Disposal Method		2021	2022	2023	2024
Non-hazardous waste	Recycling/Reuse		1,401.01	1,152.01	1,398.49	1,757.47
	Landfill		498.57	431.21	453.99	362.2
	Incineration	Energy recovery	337.64	315.88	323.15	531.59
		No energy recovery	-	-	-	-
	Other (incl. composting)		7.37	174.15	8.72	0.01
	Total		2,244.59	2,073.25	2,184.35	2,651.27
Hazardous	Disposal through qualified outside contractors	Incineration (energy recovery)	51.51	32.42	37.06	49.3
		Recycle	141.37	76.80	242.17	135.79
		Physical disposal	40.52	32.35	48.68	42.58
	total		2,478.00	2,214.82	2,512.25	2,878.94

Note 1: Disposal of non-hazardous waste: Landfill is the main disposal method for waste produced by China plants; incineration (co-generation) refers to the recovery and use of heat energy produced during waste incineration

Note 2: None of the hazardous industrial waste recovered in 2024 was reused or recycled

Note 3: All waste disposal took place off-site

▪ Total waste volume and intensity in past years

Unit: Tonnes; Tonnes/NTD million

Note: The boundary for the scope of waste calculations included Headquarters, Taoyuan Nanping Factory, China Dongguan and Ningbo Factories. Taipei Silicon Valley Park Office is located in a leased office building shared with other tenants. The centralized waste disposal means separate waste data is not available so it is not included in the boundary.

3.2 Climate Strategy and Risk Management

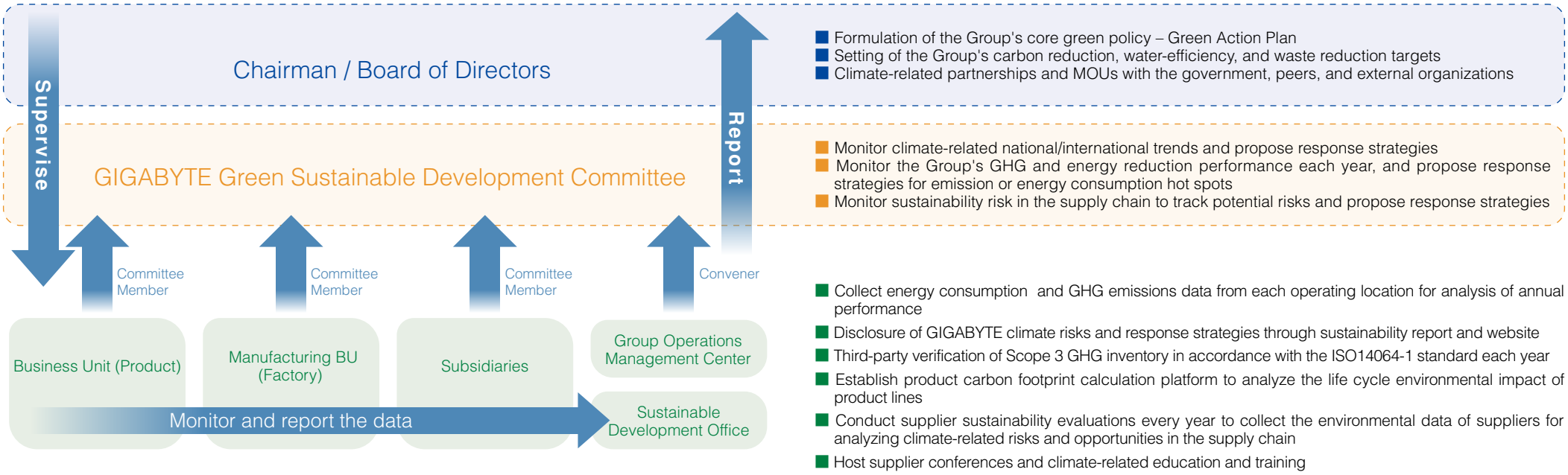
GIGABYTE is committed to mitigating the business impact of climate change. Visionary management policies and effective response plans were adopted for the effective promotion of climate-rated management and adaptation measures. These not only improve our operational efficiency, boost the green competitiveness of our products, but also fulfill our environmental responsibility on climate change mitigation and adaptation. Climate-related information was disclosed by GIGABYTE in the Sustainability Report using the recommended framework of TCFD for the first time in 2020. The first TCFD Independent Report was then published in 2023. The three core components of governance, strategy, and risk management in the TCFD disclosure recommendations will be outlined in this section. Please refer to 3.1 Environmental Management for the relevant metrics and targets. For more details, please refer to the GIGABYTE Taskforce on Climate-related Financial Disclosures Report.

3.2.1 Climate Governance Structure

GIGABYTE senior management is authorized by the Board of Directors to manage all economic, environmental, and social topics generated by the Company's business activities, and that the management should periodically report its promotion of such topics to the Board of Directors. The GIGABYTE Green Sustainable Development Committee was formally established by GIGABYTE in 2009 to serve as the highest supervisory and governance body for climate-related management topics. The Committee is chaired by the company chairperson.

The Sustainable Development Office is the convener of the Committee and reports to the Group Operations Management Center. The Office also briefs the CEO on the progress and outcomes of sustainability and climate-related tasks every week. Inter-BU, inter-plant and inter-subsidiary meetings are convened by the Committee every 1 to 2 months during which organizational representatives report on regulations and trends in sustainability, environmental and product regulations. Corporate response strategies are also proposed at the same time to ensure timely adjustment of internal policies in response to international developments. Resolutions are submitted to the chairperson every two weeks. Annual outcomes are reported to the Board of Directors so they can evaluate the overall performance of the company at the end of the year.

- GIGABYTE Climate Governance Supervision, Reporting and Functional Structure



- GIGABYTE performance in CDP assessment

GIGABYTE began participating in the CDP climate change survey in 2010 in response to customer requirements. We went beyond responding to customer and international expectations by reviewing our own implementation of carbon management. We adjust our carbon management approach base on the assessment results and feedback in order to refine our management regime. In 2024, GIGABYTE's CDP climate change survey score was given a rating of B (Management), the supplier engagement rating (SER) was A-, and water security rating was B. The growing domestic and overseas importance of carbon management means that we will continue to strengthen our carbon reduction initiatives in order to realize the goal of low-carbon technology.

Leadership / Management	2020	2021	2022	2023	2024
Climate Change	B	A-	A-	A-	B
Supplier Engagement Evaluation Rating	A	A-	A-	A	A-
Water Security	/	/	B	B	B

Note: Climate change score was reduced to B due to the non-purchase of green electricity. GIGABYTE is continuing to plan and evaluate renewable energy investments. Our solar power plant investment is expected to be commissioned in 2025. Its output will be matched to the power requirements of our operating locations to increase the proportion of renewable energy usage.

3.2.2 Climate Management Strategy

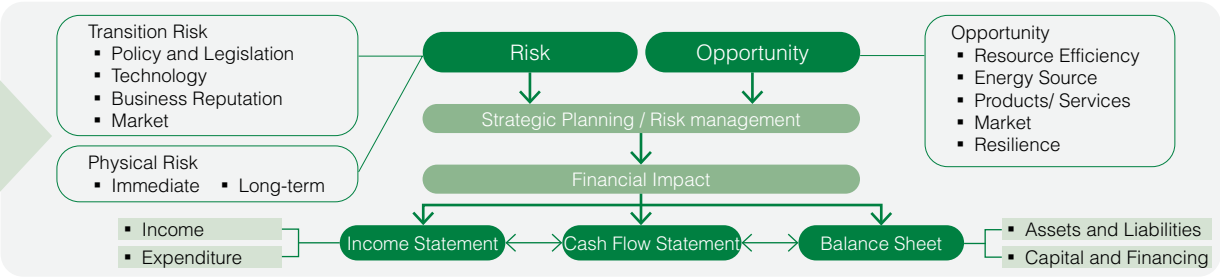
Climate-related issues not only have a direct impact on GIGABYTE operations but also indirectly affect our upstream and downstream value chains to different degrees. GIGABYTE adopted the framework recommended by the Task Force on Climate-related Financial Disclosures (TCFD) to obtain a full picture on how climate risks may affect company operations or the opportunities that it may create. We will continue to use the TCFD framework to identify climate-related risks and opportunities. For issues that significantly affect finances, change business strategies or models, or impact on the value chain, the risky opportunity matrix is used to prioritize the planning of corresponding response strategies and management measures. Climate scenario analysis is employed every year for re-reviews and assessments aimed at improving GIGABYTE's ability to respond to climate-related risks and opportunities.

- Identification process for GIGABYTE's climate-related risks and opportunities

Potential international, regional and local climate-related issues as well as issues specific to the electronics and technology industries were compiled then sorted into climate-related risks and opportunities using the TCFD framework as the reference.

Stage 1 Information gathering and sorting

- Material consequences of global warming or extreme climate events
- Existing or new climate-related mitigation and adaptation laws and regulations
- Any other changes to policies, commercial activities, or markets due to climate-related factors



Stage 2 Financial Impact Assessment

The risk and opportunity issues identified in stage 1 were used to evaluate the direct or indirect impact to GIGABYTE's scope of operations or finances in the short, medium or long-term:

Scope of operational impact to consider		Financial Impact Aspects to Consider		Definition of Risk Timing	
Upstream Supply Chain	Issues that have a significant impact on key parts and Tier-1 suppliers including raw materials, production capacity, transportation, and personnel safety	Revenue	▪ Changes in demand for products and services ▪ Changes in market competitiveness	Short -term	Immediate action must be taken as the issue is very likely to have a material impact on the Company's operations or business strategy within 1 ~ 3 years
Business Operation	Issue has a significant impact on the routine operations of GIGABYTE including office work, energy, production capacity, commuting, distribution and sales, and employee safety	Cost	▪ Increase in direct costs ▪ Increase in indirect costs ▪ R&D investment in low-carbon transformation technologies	Medium -term	Planning of preventive measures required as the issue is very likely to have a material impact on the Company's operations or business strategy within 3 ~ 5 years
Downstream Value Chain	Issue has a significant impact on GIGABYTE customers, particularly in terms of preferences, user experience, use cost, and waste disposal	Asset Expenditure	▪ Replacement and upgrade of energy-saving equipment ▪ Investment in low-carbon production processes	Long -term	Variables such as regulation and climate change must continue to be monitored as the issue is likely to have a material impact on the Company's operations or business strategy within 5 ~ 10 years.

Stage 3 Drawing of the Risk and Opportunity Matrix

For climate-related issues identified in stage 2, weighted analysis is employed to derive the likelihood and scale of impact for each risk and opportunity. These are used to draw the risk and opportunity matrix to identify the relative priorities of each issue. GIGABYTE identified 11 climate-related risks and 4 climate-related opportunities in 2024.

Stage 4 Management and tracking of climate risks and opportunities

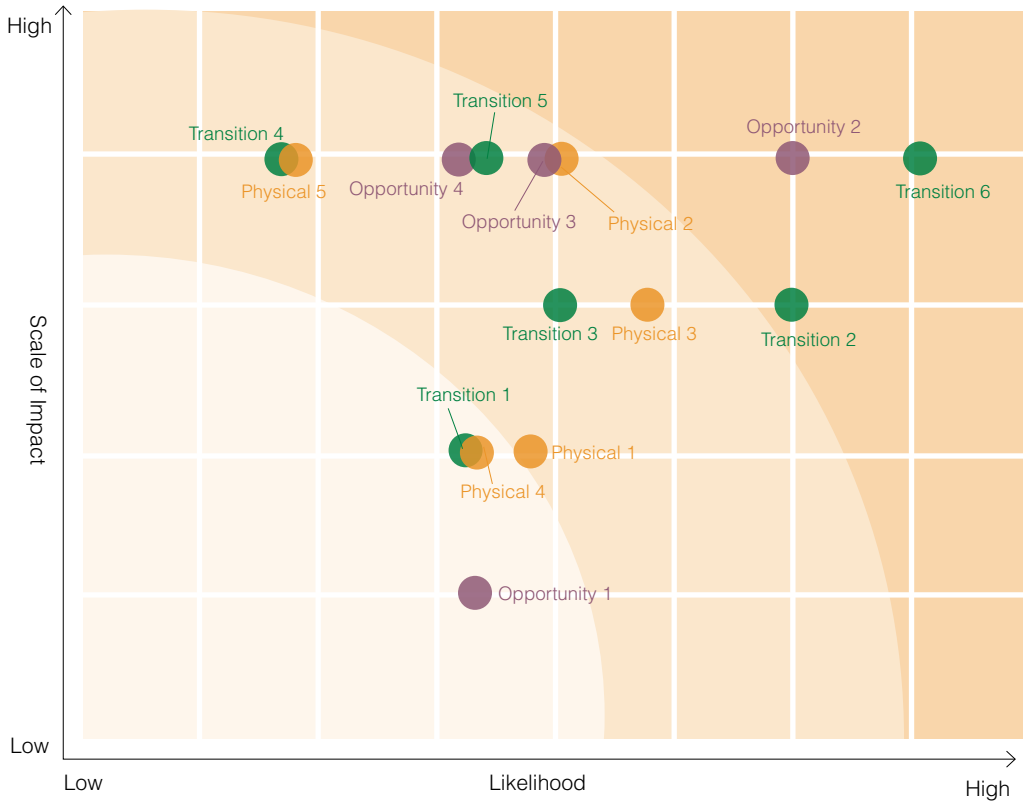
The GIGABYTE Green Sustainable Development Committee periodically convenes a trans-BU, trans-plant, and trans-subsidiary meeting once every 1 ~ 2 months. A report is presented by each organizational representative on how identified climate-related risks and opportunities are affecting current operations. The implementation outcomes of each policy are also reported and reviewed so that rolling adjustments to strategy can be made as necessary and to provide a reference for decision-making. The Sustainable Development Office continuously monitors potential climate-related risks and opportunities to ensure that the Company has sufficient climate resilience to take on emerging climate risks and opportunities.

- Table of climate-related risks and opportunities

Transition Risk	
Transition 1	Taiwan carbon fee collection mechanism
Transition 2	Group GHG inventory Requirements
Transition 3	Renewable Energy Usage Requirements
Transition 4	International Carbon Border Adjustment Mechanism and Carbon Tariffs
Transition 5	Sustainable consumption awareness
Transition 6	Customer-required disclosures

Physical Risk	
Physical 1	Increased extreme weather events
Physical 2	Supplier exposure to flood risk
Physical 3	Increase in average temperature
Physical 4	Water shortage risk at operating location
Physical 5	Supply of critical components impacted by water shortage

Opportunity	
Opportunity 1	Improved resource productivity through improvements to process energy efficiency
Opportunity 2	Development and expansion of low-carbon products market
Opportunity 3	Diversification of products and business model
Opportunity 4	Strengthen supplier resilience to co-create value



▪ Summary of Climate-related Risks

Risk	Risk Type		Risk Description	Impact Schedule		Impact and scope			Degree of Financial Impact		Response Measure
						Upstream supply Chain	Business	Downstream Value Chain			
Transition 1	Transition Risk	Existing Laws and Regulations	Taiwan carbon fee collection mechanism	Medium-term	Expected to become subject to carbon fees in 3 ~ 5 years	Higher production costs	Higher purchasing costs	Impact on product sale price or profits	Moderate	GIGABYTE carbon emissions are relatively low so the levying of carbon fees is expected to have little impact	GIGABYTE is continuing to monitor climate-related legislation in Taiwan. Measures such as the Sustainability Fund, internal carbon pricing, and carbon source management have been introduced already. We will continue to study low-carbon business models to counter the operational impact of rising carbon costs.
Transition 2			Group GHG inventory Requirements	Immediate Future	GHG inventory must be completed for subsidiaries in consolidated financial statements by 2026	-	Higher GHG management costs	-	Moderate-to-High	Fines for non-compliance with inventory a disclosure regulation	The existing scope will be gradually expanded until all overseas branches of locations are covered. GHG inventory data quality and verification will be continuously expanded as well.
Transition 3			Renewable Energy Usage Requirements	Medium-term	Expected to become subject to "Green Electricity Clause" in 3 ~ 5 years	-	Higher energy expenditure and energy-efficiency management costs	-	Moderate-to-High	Payment of energy fees, purchase of certificates, or payment of charges for statutory compliance	We are currently installing photovoltaic equipment in Taiwan already. In the future, we will assess purchased electricity as well as the feasibility of building our own solar power plants at overseas plants to continue improving the green electricity usage of the Group.
Transition 4		Emerging Laws and Regulations	International Carbon Border Adjustment Mechanism and Carbon Tariffs	Long-term	Western markets are expected to impose carbon-related taxes and fees on importers of electronic products, components and parts in 5 ~ 10 years	-	Higher product tax costs	Impact on product sale price or profits	High	Payment of carbon tariffs when importing products or participation in the local emissions control and carbon credit trading mechanism in accordance with the regulations of the target market	GIGABYTE is continuing to monitor international climate-related legislation. A carbon footprint calculation and management system has already been introduced and supply chain carbon management will be further strengthened going forward.
Transition 5		Business Reputation	Sustainable consumption awareness	Medium-term	Sustainable consumption trends in developed markets are expected to have a more substantive impact on GIGABYTE products in 3 ~ 5 years.	-	Failure to meet consumer expectations will affect product sales	Impact on product sales and revenue	High	Increase in marketing costs to strengthen image as a green brand when EU/US markets where there is greater awareness on sustainable consumption are important export markets for GIGABYTE.	Continued promotion of ESG and sustainability-related activities as well as regular publication of the Sustainability Report and TCFD Report to enhance consumer perception on the Company's sustainability developments. We will also actively participate in international sustainability ratings and achieve good results to strengthen the Company's sustainability image.
Transition 6		Market	Customer-required disclosures	Immediate Future	Increasingly required by customers along with demand for more detailed disclosures	-	Failure to meet customer requirements will result in lost customers and orders	Impact on product shipments and revenue	High	Stricter customer requirements on sustainable supply chain management when B2B products account for a growing proportion of GIGABYTE sales each year	GIGABYTE will continue to publish sustainability-related information on open platforms to give stakeholders a better idea of our sustainability strategy. We also communicate regularly with stakeholders to ensure that the information conforms to customer requirements and expectations on disclosure.

Risk	Risk Type		Risk Description	Impact Schedule		Impact and scope			Degree of Financial Impact		Response Measure
						Upstream supply Chain	Business	Downstream Value Chain			
Physical 1	Physical Risk	Immediate	Increased extreme weather events	Immediate Future	The regions where we operate are now facing an increasing number of extreme weather events including heavy rainfall and unpredictable hurricane tracks	Interruption to supply from suppliers of key parts due to extreme weather events	Interruption to factory production due to extreme weather events	Shipping schedule is affected by extreme weather events resulting in increased transportation costs and late-delivery penalties	Moderate	Loss of production from production interruption due to extreme weather events and cost of post-disaster recovery	Establish the "Risk and Emergency Management Guidelines" in accordance with ISO 14001 to formulate the management and response measures for typhoons and floods. Diversification and distribution of product sources in the supply chain to improve the stability of material supply and strengthen the risk resilience of the supply chain
Physical 2			Supplier exposure to flood risk	Medium-term	Most tier-1 suppliers are located in coastal or riverside cities with higher flooding potential risk.	Interruption to supply from suppliers of key parts due to extreme weather or flood events	Unstable parts supply impacts on production scheduling, delivery times and customer trust	-	High	Identify suppliers in coastal or riverside cities, particularly critical suppliers for key products. Flooding of the supply chain will impact on procurement costs, production output, and revenue.	Sustainable supplier evaluations are conducted every year to evaluate how well suppliers are responding to climate change in order to reduce climate-related potential risks for supply chain management.
Physical 3		Long-term	Increase in average temperature	Medium-term	The number of high-temperature days during summer is expected to increase in the next 3 to -5 years along with an extension in summer	Increase in overall energy consumption leads to higher production costs	Increase in electricity consumption from cooling of production equipment and office air-conditioning	High temperatures may interfere with the shipping of downstream products	Moderate-to-High	Higher energy costs from increase in operating time and cooling intensity of air-conditioning equipment due to high temperatures	Continue to introduce temperature and power supply management systems for offices and plants. Gradually retire and replace aging equipment, and optimize the energy utilization efficiency of the equipment.
Physical 4			Water shortage risk at operating location	Medium-term	Incidents of drought have already occurred at operating locations and may become the norm in 3 to 5 years	-	Operations may come under pressure or be disrupted completely due to water shortages.	-	Moderate	Loss of production from operation interruption due to drought and cost of post-disaster recovery	Water shortage drills are regularly conducted at plants to prepare for strict water restrictions caused by extended droughts. Water reclamation systems and water storage equipment are installed in plants. Employees are constantly reminded of the importance of saving water
Physical 5			Supply of critical components impacted by water shortage	Immediate Future	Some critical suppliers are already facing drought issues.	Production of key parts is affected by drought resulting in higher purchasing costs or supply chain disruption	Unstable parts supply impacts on production scheduling, delivery times and customer trust	River or sea freight routes are affected by drought resulting in higher transportation costs	High	Interruption of critical parts supply due to drought may impact on the shipping volume of high-end products. This increases purchasing costs or may lead to missed orders.	Climate risk research is conducted on the supplier's location to assess their ability to respond to climate change. Diversification and distribution of product sources in the supply chain improve the stability of material supply and strengthen the risk resilience of the supply chain

▪ Summary of Climate-related Opportunities

Opportunity	Opportunity Type	Opportunity Description	Impact Schedule		Impact and scope			Degree of Financial Impact		Response Measure
					Upstream supply Chain	Business	Downstream Value Chain			
Opportunity 1	Resource Efficiency	Improved resource productivity through improvements to process energy efficiency	Medium-term	Greater penetration and acceptance of low-carbon products in developed markets are expected in 3 to 5 years	-	Production costs will increase in the short-term but this will help improve energy efficiency and process stability in the long-term, reducing operating costs.	Lower in product carbon cost reduces the expenses borne by consumers or passed onto them by importers	Moderate	Annual savings in energy costs and avoidance of non-cost-effective investments required for achieving compliance with laws or customer requirements in the short-term	The process power management and monitoring system has now been introduced at the Headquarters to improve energy efficiency and optimize time-of-use. At the same time, automated production processes are being progressively introduced at our three main production factories. These not only improve output and reduce non-conformities but also decrease wastage.
Opportunity 2	Products and Services	Development and expansion of low-carbon products market	Immediate Future	Global developments in AI technology mean that IT products that deliver high performance and low power consumption now hold an overwhelming advantage	-	Increase in short-term R&D costs but also boosts competitiveness and revenue in the long-term	Improvement in product energy efficiency reduces energy costs during use	High	Revenue created by high-value and low-carbon products as well as the energy-efficiency benefits for customers	Allocate part of annual revenue to research and development to innovate environmentally friendly products with high performance and low carbon footprint The Green Sustainable Development Committee sets up and supervises the implementation of sustainability strategy. Meetings are periodically convened to monitor and supervise implementation progress.
Opportunity 3		Diversification of products and business model	Medium and Long-term	Demand for high-performance computing servers and advances in robotics will make the development of the circular economy in the electronics industry a necessity in the next 3 ~ 5 years and beyond	Custom materials and technical support are provided by supplier partners in support of solutions	Increase revenue by creating products and services with higher unit prices through product diversification	Reduction in energy costs during product use and waste disposal costs	High	Revenue created by green, low-carbon products and services that have high value and recycling ratio	GIGABYTE will continue to develop high-performance computing servers, reverse logistics services for electronic products, calculate all product carbon footprints, publish product environmental reports, provide public disclosures on the CSR website, and fulfill due diligence on product management.
Opportunity 4	Resilience	Strengthen supplier resilience Co-create value	Medium-term	The increasing severity of climate problems will further highlight the importance of climate risk management for the supply chain in the next 3 to 5 years	Rigorous supplier selection system and adjustment of order distribution	Risk diversification system ensures that the damage can be contained when a climate disaster occurs at key suppliers	Reduce customer losses through punctual delivery	High	Reduction or diversification of purchasing costs away from vendors located in regions with high climate-related risks to reduce potential climate-related losses in the supply chain	The "Sustainable Supplier Evaluation Questionnaire" is conducted for key suppliers every year; climate-related risk assessment and research are also conducted on related suppliers. The supplier conference is held every year with local industry leaders, sustainability experts and instructors sharing climate risk strategies and practices.

3.2.3 Climate Scenario Analysis

GIGABYTE used the TCFD "Guidance on Scenario Analysis for Non-Financial Companies" to analyze the transition or physical effects of different future scenarios on GIGABYTE operations or the supply chain. The results are taken into consideration for strategic resilience. The choice of climate scenarios is based mainly on the latest scientific assessments conducted by the International Energy Agency (IEA) and UN Intergovernmental Panel on Climate Change (IPCC). GIGABYTE's own business developments, socio-economic changes in operating regions, as well as existing or planned carbon reduction plans are all taken into account as well to provide a more comprehensive analysis of the financial impacts and changes in timetable due to climate-related risks and opportunities.

We analyzed the additional financial impact to GIGABYTE from all types of transition and physical risks in three different climate pathways at different points in time based on baseline factors, variables, assumptions, and cited parameters. The climate scenario description and assessed risks this year are tabled below

- Select climate scenario and scenario description

Climate pathway	Climate scenario setup	Scenario Analysis Description
A = Middle-of-the-Road Reduction Pathway	IEA APS +SSP1-2.6	Maintain steady progress on carbon reduction targets by implementing solar self-consumption and purchasing of green electricity/certificates in parallel
B = Business as Usual Pathway	IEA STEPS +SSP5-8.5	Business as usual, pay carbon-related fees as required by law but take no proactive carbon reduction measures
C = Paris Agreement Pathway	IEA NZE +SSP1-1.9	Maintain steady progress on carbon reduction targets by implementing solar self-consumption and purchasing of green electricity/certificates in parallel, actively engage in carbon reduction and set reduction targets aligned with the Paris Agreement pathway

- Scenario Risk Analysis Items

Scenario Risk Analysis Items	Transition Risk							Physical Risk	
	Existing Laws and Regulations	Emerging Legislation		Technology				Long-term	Immediate
Risk Item	Taiwan carbon fee collection mechanism	International Carbon Border Adjustment Mechanism and Carbon Tariffs		Low-carbon transition of production processes				Increase in average temperature	Increased extreme weather events
Risk Scenario Description	Implementation of carbon fees under the Climate Change Response Act in Taiwan	Implementation of the EU Carbon Border Adjustment Mechanism (CBAM)	Implementation of carbon tariffs by North American markets	Building of renewable energy equipment by operating locations	Corporate Power Purchase Agreement (CPPA)	Purchase of renewable energy certificates	Investment in low-carbon production processes	Additional power consumption due to higher temperatures	Losses caused by stoppages due to extreme weather events
Climate pathway									
A = Middle-of-the-Road Reduction Pathway	●	●	●	●	●	●	●	●	●
B = Business as Usual Pathway	●	●	●	●	X	X	●	●	●
C = Paris Agreement Pathway	●	●	●	●	●	●	●	●	●

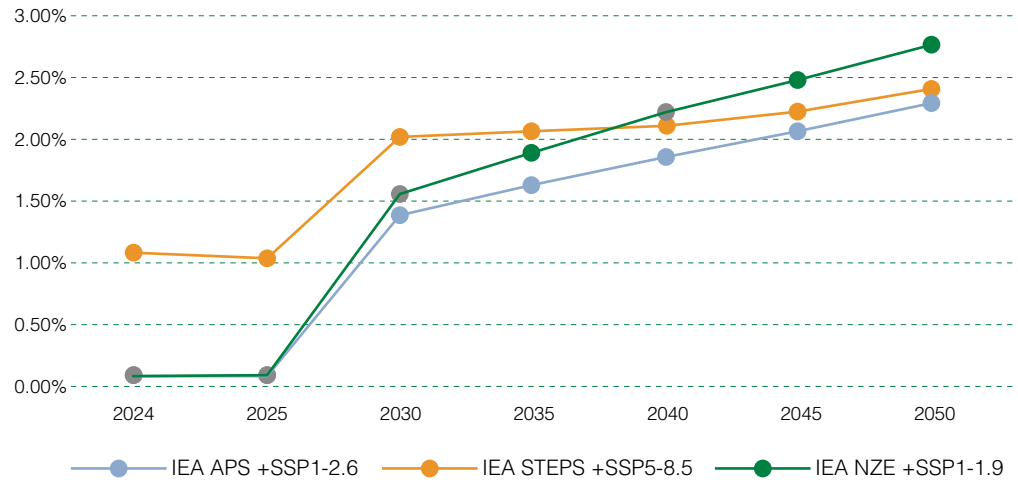
Note: ● indicates that this item is incorporated into the pathway for analysis; X indicates that this time was not incorporated into the pathway for analysis

Analytical outcomes

The analysis outcomes showed that regardless of the climate pathway, the additional anticipated costs brought about by each transition and physical risk all trended upwards over time. In 2024, the additional costs generated by the Middle-of-the-Road and Paris Agreement pathways amounted to 0.09% of the annual revenues for that year. The Business-as-Usual pathway had the greater financial impact as the additional costs amounted to 1.08% of annual revenues. By 2025, the pathway with the greatest financial impact on GIGABYTE will be the Paris Agreement pathway. Additional costs generated under this scenario amounted to 2.76% of annual revenues, surpassing the Business-as-Usual pathway at 2.40% and the Middle-of-the-Road pathway at 2.29%.

The main source of additional costs was transition risk during business operations. GIGABYTE expects that additional transition risks caused by the EU CBAM, implementation of carbon tariffs in the North American markets, increased Group demand for green electricity and energy certificates and expected increases in carbon prices are all expected to increase significantly from 2025 for each scenario pathway. With physical risk, we observed that under the Business-as-Usual pathway (SSP5-8.5 scenario) the higher frequency of extreme weather events meant that its additional physical costs and losses were significantly higher than the other two climate pathways.

▪ Additional costs from total financial risks and their proportion of revenues under each pathway



Climate pathway	Climate scenario setup
A = Middle-of-the-Road Reduction Pathway	IEA APS +SSP1-2.6
B = Business as Usual Pathway	IEA STEPS +SSP5-8.5
C = Paris Agreement Pathway	IEA NZE +SSP1-1.9

Response Strategy

The outcomes of the scenario analyses showed that in all climate pathways, climate risk always had a certain amount of financial effect and impact on GIGABYTE. We therefore propose the following climate risk response and management measures based on the results of the assessments:

(1) Periodic sustainability meetings between units and subsidiaries will be used to continue promoting various reduction management measures as well as risk adaptation assessment and tracking. This will ensure that the Company has a better grasp of climate risk's impacts. Related readiness and response processes can also be formulated in advance.

(2) For production processes, we use the Group's internal carbon emissions information platform to evaluate product carbon footprints and track carbon emission hot spots so that product carbon reduction pathways and optimization plans can be devised. Complementary measures such as the upgrading of testing machines with energy-saving components and updating of production line equipment will also be employed to optimize production processes and reduce their GHG emissions. The goal is to reduce the financial impact from the implementation of carbon-related taxes in the future.

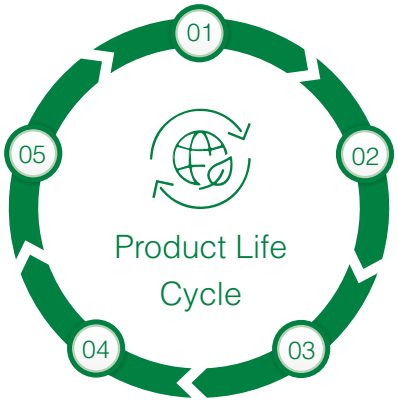
(3) GIGABYTE will continue to conduct feasibility studies on constructing our own solar power equipment and energy storage facilities in order to gradually reduce our dependence on fossil fuels or gray power.

(4) The "Risk and Emergency Management Guidelines" and "Emergency Response Measures" have now been established on the plant-side in accordance with ISO 14001. Disaster drills are regularly conducted to improve the disaster response ability of plant personnel and cultivate their disaster prevention awareness. This is to minimize any damage to business during disasters.

These strategies integrate GIGABYTE's core pillars of climate governance, strategic planning, and risk management. They are aligned with the Group's "Green Action Plan" and "333 Reduction Plan." We will continue to track trends in climate change risks, thoroughly examine the Company's resilience to climate risks and continue to push for a more sustainable business model.

3.3 Product Stewardship Responsibilities

The product life cycle mindset has been adopted by GIGABYTE during product R&D and production. The recycling and environmental friendliness of materials are already considered during the design phase. Hazardous substance controls are strictly enforced in the selection of raw materials. A longer warranty period and repair services are provided once a product is sold. We also pioneered a circular business model with reverse logistic services aimed at realizing circular resources and reducing the overall environmental impact of products.



01	Raw Material Management	Hazardous substance and quality management Improve product/packaging recycling/recovery ratio
02	Green Manufacturing	Improve manufacturing efficiency Reduce consumption of environmental resources
03	Green Transportation	Reduce carbon emissions from transportation
04	Usage Phase	Reduce energy consumption Extend product service life through servicing/ refurbishment
05	Scrapping	Recycle and reuse

3.3.1 Friendly Design

Design of High-Performance, High-Efficiency Products

GIGABYTE has introduced a range of innovative materials, technologies and rigorous management mechanisms at each stage in the product life cycle. These not only lead to exceptional product performance, stability and reliability but are also part of our ongoing push to realize the goal of zero waste through circular economy-based design.

GIGABYTE improved the heat dissipation and energy efficiency for many products in 2024. In response to the proliferation of high-speed AI computing applications, cooling solutions for data centers were also upgraded to optimize their processor density and cooling efficiency within a limited footprint, improve their power use efficiency (PUE), and meet their diverse workloads. We also helped customers reduce costs and realize sustainability targets.

- 2024 Product design highlights

Ultra Durable Mainboard

- 8-layer PCB and 2X Copper Technology
  56% reduction in dielectric loss
- Stainless Steel Memory Socket Cover
  5000-plus Plug-Unplug Cycles
- 1.5X Lateral Tensile Strength
  UD Nano Carbon Backplate
- 3X Thermal Conductivity for 10% Temperature Reduction
  Pioneered extension of 4-year warranty to 5-years
  Life extension helps to reduce waste by 5,236.18 tonnes
  (based on 2024 shipments)

Creator Notebooks

- ECO OLED Panel
  1/8 the plastic content of conventional OLED
  Process has received UL Zero Waste to Landfill certification
- Passed the TÜV Rheinland Low-Blue Light and Eyesafe ®2.0 standardsr

AI Comprehensive Computing Server

- Low power consumption, low data latency
  Rack-level solution with Direct Liquid Cooling (DLC) running the NVIDIA GB200 NVL72 system reduces energy consumption by 25-fold while delivering 130 TB/s of low-latency GPU communications
- Assist users with reducing energy expenditure and deployment costs
  Accelerate the popularization of AI by improving energy efficiency and processing speed

Immersion Liquid-Cooled Server

- Power Usage Effectiveness (PUE) 1.02
  Improves data server energy efficiency by up to 90%
- Extend the service life of system hardware
  Extend general service life by 30%
  Reduce fault replacement rate by 60%
- Introduction of Direct Liquid Cooling (DLC) in 2024
  AI servers equipped featuring the latest AMD, Intel and NVIDIA chips can all use DLC to overcome the limits of conventional air-cooling

Friendly Packaging

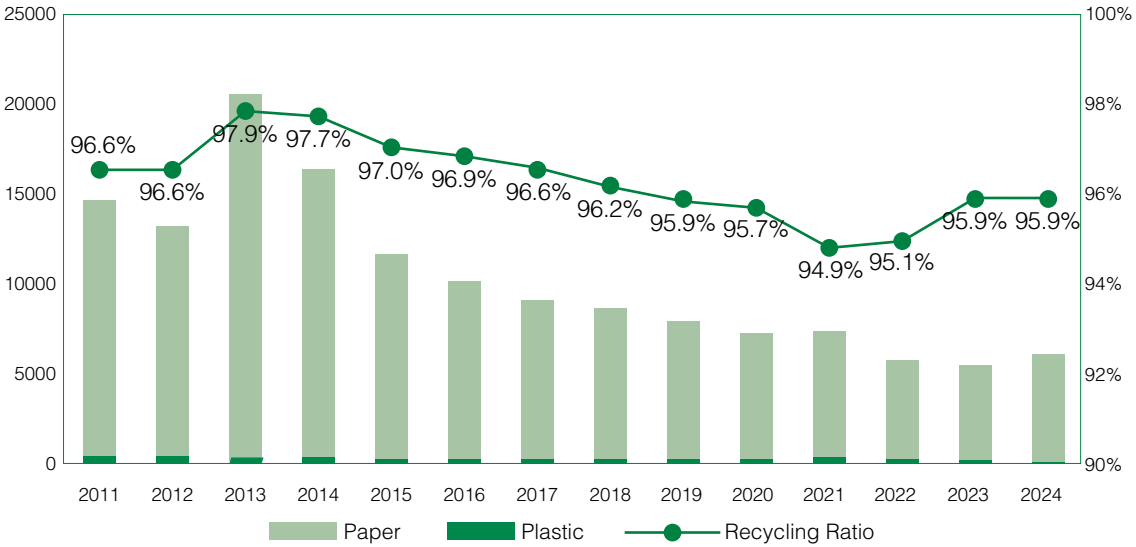
GIGABYTE product packaging complies with the EU Packaging and Packaging Waste Directive (PPWD). Emphasis is on source reduction supplemented by increasing the ratio of recyclable packaging to progressively reduce environmental impact from packaging materials. For packaging material management, various strategies including use of EPS-free buffer materials, marking packaging with recycling marks, and restrictions on hazardous substances are employed. We analyze packaging material recycling rates every year to gauge the reduction performance and promote packaging reduction projects with the goal of eliminating all disposable packaging by 2030.

▪ Status of Product Packaging in 2024

Transportation carton	Product box
▪ Recycled pulp content averaged over 80% ▪ Use of 100% recycled wood pulp for e-sports graphics cards, peripherals, parts and components ▪ Introduction of FSC virgin pulp for mainboards, display monitors, and notebook products ▪ Use of FSC-certified virgin pulp for all autotronics	▪ Recycled pulp content averaged over 85% for key products
Padding	**Accessories box**
▪ Introduction of recycled pulp and plastics for mainboards and notebook products	▪ Recycled pulp content increased from 76% to 80%
Packaging bag (film)	**User manual/card**
▪ Introduction of recycled plastic for mainboard and monitor products	▪ Increased the ratio of recycled pulp for MB products ▪ Introduction of recycled pulp for Notebook products

▪ Packaging recycling ratio

GIGABYTE makes every effort to avoid excessive packaging without compromising on protection. Total weight of product packaging has trended downwards in recent years. In 2024, GIGABYTE used 5,945.3 tonnes of paper and 165.3 tonnes of plastic in packaging materials, a reduction of 57.6 % compared to 2011. The recycling ratio for packaging was 95.9%. In the future, we will continue to fulfill our targets through reduction projects and continue to increase the recycling ratio of packaging materials.



Note 1: The recycling ratio for packaging materials was calculated using the percentage of paper in all packaging materials.

Note 2: There was an error in the table data for 3.3 Friendly Products on p. 42 of the 2023 GIGABYTE Sustainability Report. The bar chart showing the product recycling ratio for 2023 has been corrected to 95.9%

3.3.2 Hazardous Substance Management

GIGABYTE became the first original-brand system manufacturer in the world to pass IECQ QC 080000 certification in 2005. To GIGABYTE, ensuring our products are safe for consumers and friendly to the environment is the basic principle as a manufacturer. The trends and changes in international hazardous substances management standards are reported quarterly at the Green Sustainability Committee meetings. A cross-department response plan will be started when it is necessary. The plan will set a response time target to ensure that GIGABYTE's products comply with the latest laws and regulations in time.

To ensure all products and services purchased by the Company reduce their content of environmentally hazardous substances, GIGABYTE defines the "Harmful Chemical Substances Requirements (HCSR)", which classifies the substances into three levels: Level A prohibited substances, Level B prohibited substances with time limits, and Level C potentially prohibited substances in the future. We can quickly eliminate prohibited substances through systematically managing the list of high-risk substances and forming respective response plans according to the hazardous levels.

2024 Management Performance

Achieved a 100% record of no hazardous substance violations.

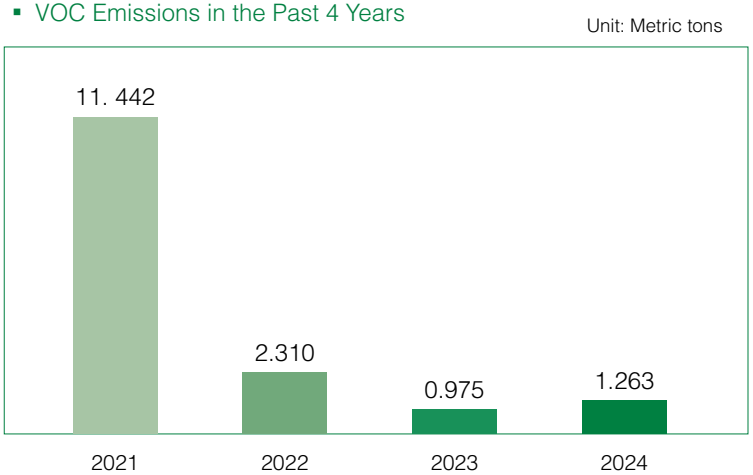
Green and Sustainable Development Committee reported 4 updates on international environmental regulatory trends.

- Harmful Substance Management Process

Volatile Organic Compounds (VOCs)

Volatile Organic Compounds (VOCs) can easily react with other pollutants in the lower atmosphere, such as photochemical reactions with nitrogen oxides (NOx) to form ozone or smog, one of the main causes of poor air quality. GIGABYTE's air pollution control complies with Taiwan and mainland China regulations and standards. Taoyuan Nanping Factory is not subject to Taiwan's "Air Pollution Control Act" at present. Dongguan and Ningbo Factories have been inspecting VOCs every year since 2020 in order to properly solve the problem of xylene and non-methane total hydrocarbon emissions. In 2024, the Dongguan factory has no emissions, while the Ningbo factory recorded 1.263 metric tons.The emissions comply with local regulations and standards.

- VOC Emissions in the Past 4 Years



Note: Since 2023, the Dongguan factory has no longer operated any VOC-related processes and has deregistered its emissions permit with the competent authority.

3.3.3 Product Transportation

Product transportation management is one of GIGABYTE's key metrics for maintaining competitiveness. To improve the efficiency of product transport and reduce carbon emissions generated during transportation, GIGABYTE has continued to introduce green logistics into our supply chain. This included the optimization of the Company's internal product transportation policies and the use of sustainable fuels during the transportation process. Through the execution of strategies in different dimensions, we will continue to strengthen the sustainability management of our global logistics. In addition to greater control over transportation costs, carbon emissions generated during transportation can be reduced as well, resulting in a solution that delivers improved operating costs and environmental sustainability.

- The 4 Key Aspects of Green Logistics at GIGABYTE

Company Management

- Application for related certifications:Such as the ISO 14000 series, and Net Zero Emissions graded mark. GIGABYTE has introduced ISO 14001 and ISO 14064-1 certifications so far
- Membership of organizations promoting green logistics
- Volunteering of related data reports:Including the environmental performance data report, GHG emissions performance evaluation, and carbon emissions tracking.
- Communication to each department:Communicate to each department the importance of green logistics and carbon footprints

Partner (logistics) vendors

- Give preference to vendors participating in green logistics organizations
- Encourage vendors to provide related data reports:Use transport contracts to encourage the provision of related reports such as carbon emissions data
- Consolidate goods for shipment:Arrange for combined transportation to avoid generating excess carbon emissions from dispersed transportation
- Include carbon fees in transportation costs

Product Manufacturing

- Green Packaging:Select appropriate packaging materials
- Carbon Footprint Label
- Electronic waste recycling

Warehouse planning

- Automated warehousing:Precision management of warehouse power consumption and storage performance through AI and big data
- Energy-efficient Equipment
- Reduce the use of printed documents
- Green Building:Select warehouse vendors that are Green Building compliant

Green Logistics

GIGABYTE is reducing Scope 3 GHG emissions through green logistics. In addition to continuing to invest in sustainable fuels through the DHL Go Green Plus service, we also partnered with logistics companies to introduce new energy vehicles and barcode-based management to continue reducing logistics-related emissions. We also introduced automated warehousing at our US location and this reduced our error rate in 2024 to 0%, effectively boosting our logistics efficiency. We are continuing to conduct internal communications to raise awareness on green logistics.

▪ 2024 Green Logistics Management Performance

Adoption of sustainable fuels during transportation	Joined the DHL Go Green Plus service program and received emissions reduction certification
Internal Communication	Continue to communicate green logistics information to all Company departments
Green logistics management	1. Partnered with E-Road Logistics in China to introduce sustainable operations Added 10 new energy vehicles, barcode-based management, and provided carbon emissions data for the entire process Increase vehicle turnover, wireless terminal operation mechanism, reduced paper usage 2. Business Headquarters partnered with shipping agent and DHL (courier)/DGF (air cargo) on use of bio-fuel transportation
Green Warehousing	Automated warehousing adopted at US location with robotic pickers and loaders. Automated warehousing zone achieved an error rate of 0% for the year.

▪ Results of the Green Logistics investigation

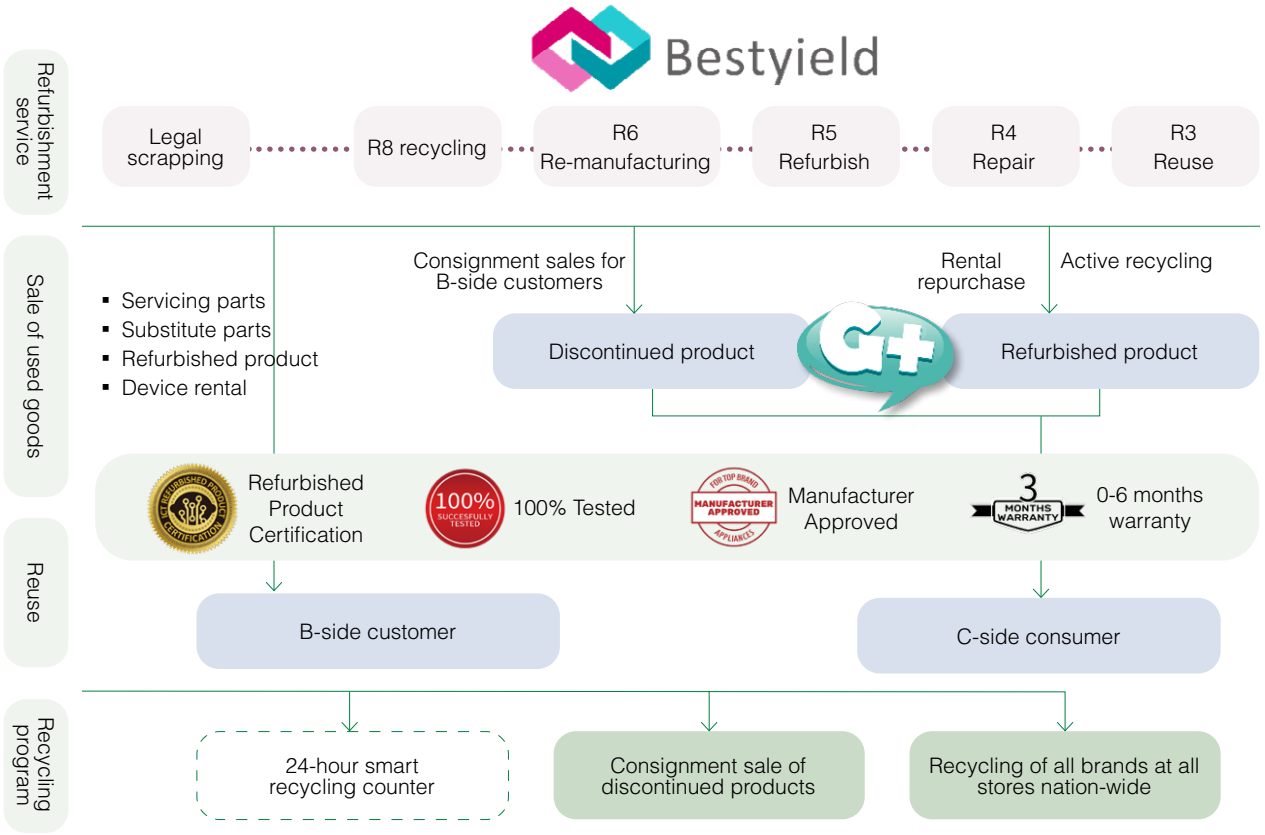
Aspect	Indicators	The proportion of partner agents that have implemented this measure (n=26)
Business strategy	Implement the ESG sustainability policy	84.62%
	Green transportation plan	76.92%
	GHG emissions reduction targets	76.92%
	ISO specification	73.08%
	Green specialists	69.23%
	Join the green logistic organization	46.15%
Carbon Transparency	Carbon offsetting plan	61.54%
	Carbon emission estimation	76.92%
	Online carbon emissions calculator	42.31%
	Carbon reports	57.69%
	Route optimization	96.15%
	Multimodal transport	88.46%
	Biofuel solution	57.69%
	Electric vehicles	73.08%
	Using recyclable plastic pallets	53.85%
	Environment reverse logistics	73.08%
	Reducing paper processes	92.31%
Warehouse	Green warehousing	69.23%

3.4 Circular Economy

GIGABYTE is uncovering value-adding business opportunities through after-sales service for products. Bestyield International became an independent subsidiary in 2018 specializing in IT/3C reverse logistics and eco-friendly re-manufacturing/reuse solutions. The "4-stage Leasing Cycle" ensures 100% closed recovery and repair of products to improve resource utilization. In 2020, Bestyield International was certified to have achieved the highest level of "Optimized" on the maturity of its business model under the BS8001 circular economy standard. It also actively participates in the circular economy industry associations such as the Taiwan Circular Economy 100 (TEC100) and 8+N Resource Circulation Alliance to continue expanding the reach and influence of circular economy.

Circular model for electronic waste

Bestyield International analyzed and used the 9R circular economy values defined by the PBL Netherlands Environmental Assessment Agency to develop an action strategy in response to "SDG 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse." The handling of electronic waste has already resulted in measurable environmental benefits.



- 2024 Waste reduction outcomes

Repair

479,517 products were sent for repairs and 475,223 pcs were picked up after being repaired; pickup rate for repaired products reached 99.1% and facilitated the circular reuse of 825.17 tonnes in electronic waste.

Refurbishment

A total of 17,918 products were refurbished and 968 sold after refurbishment. Unsold products were returned to the distributor's refurbished goods warehouse for reuse, facilitating the circulation of 22.23 tonnes in electronic waste.

Recycling and Reuse

Consumers actively scrapped 42,520 pcs with 61 scrapped products purchased by Bestyield International. These refurbished or re-manufactured for reuse to facilitate the circulation of approximately 39.3 tonnes in electronic waste。

- Total amount electronic waste circulation facilitated during the year:
  886.7 tonnes
- Carbon reduction benefit for the year:
  110.16 tonnes CO_2e

Note: According to the product carbon footprint website of the Ministry of Environment, stabilization and solidification treatment for hazardous Industrial Waste is calculated at 130 kg CO_2e/tonne

- 2024 Outcomes of circular economy promotion

16 cross-industry collaborations

Visits or refurbishment events introduced students and the general public to the concept of the circular economy and how "cherish and reuse" is implemented

9 invitations

Sustainability actions such as developments and innovations in resource circulation technology were shared with peers in various settings such as forums, networking events and launch conferences.

2 awards

Awarded the "Social Innovation Category - SME Award" at the Global Views ESG Corporate Sustainability Awards
Outstanding Green Procurement Enterprise by New Taipei City

2030 Circular-Cross Circular Innovation Exhibition

Taipei Net Zero 101 Circular Recycling Program launch ceremony

Service center transformation and value promotion

Bestyield International is building on more than 20 years of professional repair expertise and customer service experience to make the transition to its next phase. The existing high-quality repair services are being experimented even as the company experiments with different ways of promoting the spirit of the circular economy to an even broader consumer segment. Bestyield International broke away from the traditional service center stereotype by converting six service centers into G+3C Outlets. Some of the fast repair centers were also converted into hybrid sales and service centers in 2021. In addition to customer and repair services, the G+3C Outlet also sells GIGABYTE refurbished products, discontinued products, and products on consignment to consumers with related requirements. The bright, airy and minimalist interior design provides consumers with a pleasant and stress-free shopping experience. At the same time, the store also features a repair display area to explain the repair process and reusing of products to the public. The educational display hopes to promote the concept of "cherish and reuse" to even more people. This not only showcases innovative applications of matter but also how products can be granted a second life of even greater value.

G+ 3C Outlet

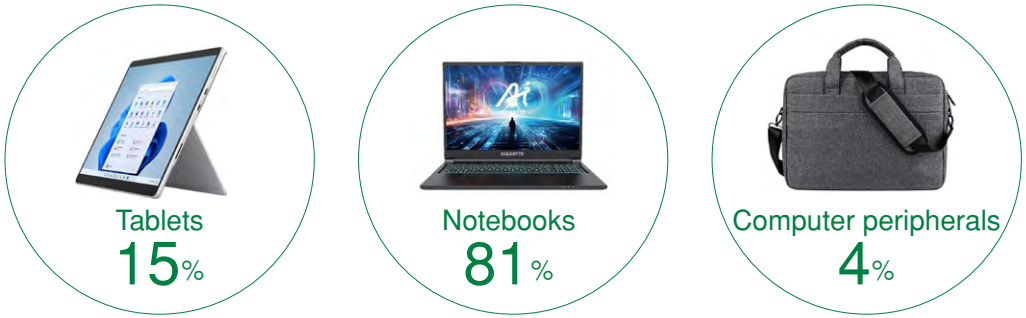
Repair Display

Refurbished parts display

Subscription-based Device as a Service

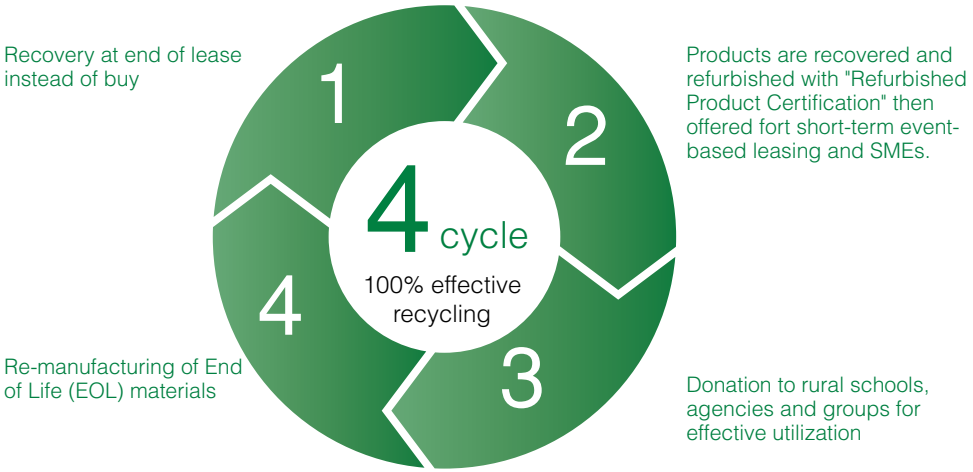
Bestyield International actively promoted enterprise rental services by providing "Device as a Service (DaaS)" subscriptions for notebooks, servers, and smart OA. Government agencies and business owners can reduce their IT infrastructure costs by leasing instead of purchasing. The 4-stage circulation plan based on product life cycles also maximizes the value of electronic products and reduces the generation of electronic waste. Reverse logistics implement the closed circulation ideal by ensuring 100% recovery and repair of products. DaaS has now been expanded to government agencies, schools, and non-government organizations. The "Lease instead of own" circular economy model is continuing to be promoted.

- Popular leasing categories and leasing ratio



- 4 key cycles for product leasing

Bestyield International has designed a 4-stage circulation plan for IT devices that are routinely used by agencies, groups and enterprises to ensure effective reuse and to reduce the generation of electronic waste.



Building Trust in the Used Market

The "Refurbished Product Certification" (RPC) was introduced by Bestyield International to improve consumer trust in used products. RPC not only ensures that products are repaired and tested to quality standards but also has a resume that allows the consumer to trace the product's entire history . The arrangement offers an alternative to the "used market" where defective products proliferate due to the information disparity between buyers and sellers. "Manufacturer Approved" and "100% Tested" marks have also been introduced, with "0 ~ 6 months warranty" offered depending on product type to increase consumer trust and willingness to buy.

- Certification mechanism for used product

Refurbished Product Certification

Products that have been repaired and tested against quality standards by Bestyield International are issued the RPC. A RPC resume is also provided to give consumers a full service record for the product.

Manufacturer Approved

In addition to receiving products from the GIGABYTE parent company, Bestyield International also accepts products on consignment from other manufacturers, or purchases discontinued products from third parties for full servicing with original manufacturer's quality approval.
*Manufacturer approval has been obtained from GIGABYTE. Other manufacturer approvals are still being arranged

100% Tested

The notebook refurbishment process for example tests I/O ports, display, external appearance, battery health, and memory after refurbishment. The product is then rated and priced accordingly for resale.

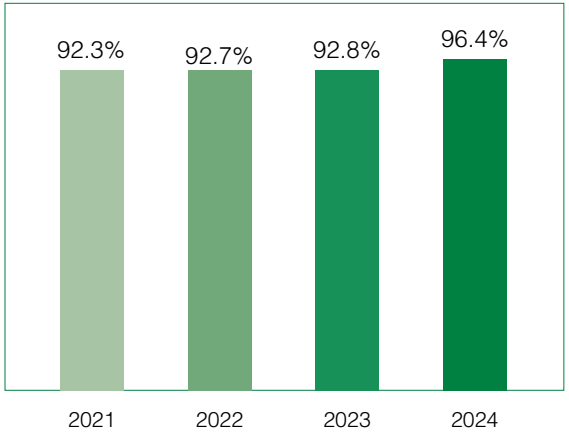
After-sales warranty

Different warranty periods are provided depending on the product category so that consumers do not end up as IT orphans.

- Product Recycling Rate

In addition to promoting the circular economy business model and reinforcing terminal recovery, GIGABYTE is working on increasing the proportion of reusable materials in our products to reduce the environmental burden at their disposal stage. Motherboards manufactured by GIGABYTE are mostly made of metal and plastics. In 2024, 10,852.64 tonnes of metal, 2,158.19 tonnes of plastic, 802.98 tonnes of glass, and 523.23 tonnes of other raw materials were used to produce motherboards. The average recyclability rate of raw materials was above 96.4%.

- Recyclability Rate of Raw Materials Used by Motherboards



Note: The motherboard form factors and model analyzed in 2024 included ATX (Z890 A ELITE X ICE), Micro ATX (B890M AORUS WIFI7), and Mini ITX (B890I AORUS ULTRA).

3.5 Disclosure of Product Environmental Impact

Environmental impact data is calculated based on the CNS 14040 Life Cycle Assessment (LCA) principles, with system boundaries defined in reference to Taiwan's Product Category Rules (PCR). The Screening LCA method is applied for the assessment. The Product Environmental Report highlights the emission proportions of CO_2 and PM2.5 across various life cycle stages. For details on the remaining 14 environmental impact indicators, please refer to the "Product Responsibility" section on our CSR website.

- Product Environmental Report

Version	Year Adopted	Number of Released Reports	Disclosed Environmental Impact (based on EU Product Environmental Footprint (PEF))	Other Information
Version 1	2018	21	3 impacts: greenhouse gases; suspended particles; terrestrial/aquatic acidification	
Version 2	2019	37	12 impacts: climate change; ionizing radiation; particulate matter; ozone depletion; photocatalytic ozone formation; mineral, fossil, and raw resource depletion; acidification; freshwater eutrophication; terrestrial eutrophication; freshwater ecotoxicity; human toxicity (cancer effects); human toxicity (non-cancer effects).	
Version 3	2020	97	16 impacts: climate change; particulate matter; ozone depletion; water use; freshwater eutrophication, marine eutrophication; resource use (energy carriers); resource use (minerals and metals); land use; terrestrial eutrophication; photochemical ozone formation; acidification; freshwater ecotoxicity; human toxicity (cancer effect), human toxicity (non-cancer effect); ionizing radiation.	Composition and recycling ratios of the materials used in the product and packaging.

- Product Environmental Report Example - AOURS 16

Environmental impact data is calculated based on the CNS 14040 Life Cycle Assessment (LCA) principles, with system boundaries defined in reference to Taiwan's Product Category Rules (PCR). The Screening LCA method is applied for the assessment. The Product Environmental Report highlights the emission proportions of CO_2 and PM2.5 across various life cycle stages. For details on the remaining 14 environmental impact indicators, please refer to the "Product Responsibility" section on our CSR website.

- Climate Change