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4.1 Eco Design and Sustainability Liability of Product

N Vision and Commitment

In respect to the global Sustainable Development Goals, Advantech is responding to SDG 9 (Industry Innovation and Infrastructure) and SDG 12 (Responsible Consumption and Production). Starting from raw materials, product design and extending into manufacturing and environmental management, we are gradually setting goals and introducing each item of the standards. We thus are willing to do our best to improve the environment, reduce environmental impact, and produce environmentally friendly products.

A Phased Achievements and Future Goals of Eco Design

Direction of Goals In 2023, More than 50% of the eco design products achieved silver medals of internal self-announced label.

The energy-saving part of the eco design products self-announced by Advantech has all been required to comply with the ErP international standard requirements starting in 2022. Starting from this aspect, it includes other aspects of internal inspection with high standards in 2023 to expand the scope of eco design products in addition to energy saving of products. The green competitiveness of enterprises is then enhanced through the research and development of green products.

Phase of Goals

From the aspect of products' energy saving, all aspects of inspection are comprehensively introduced from voluntary standardization to inclusion in norms in the new product development process in order to increase the proportion of green product revenue. The expansion of the applicable product range and the continuous introduction of new material research and development are expected to improve green product design to be 100% introduced in the research and development stage.

	Strategy	KPI	2022 Goals	Status of Achievement	2023 Goals	2025 Goals
	The scope of	In line with proportion of the International Environmental Protection Regulations (Management of Hazardous Substances)	100% of raw materials continue to achieve the compliance with environmental protection international regulations and Advantech's standards for regulated substances.	100% of raw materials continue to achieve the compliance with environmental protection international regulations and Advantech's standards for regulated substances.	100% of raw materials continue to achieve the compliance with environmental protection international regulations and Advantech's standards for regulated substances.	100% of raw materials continue to achieve the compliance with environmental protection international regulations and Advantech's standards for regulated substances.
Eco Design and Sustainability Liability of Product	eco design inspection of new products has been expanded to enhance the green competitiveness of enterprises	Number of products meeting internal eco design standards	20% (Advantech's newly developed standard products meet the requirements of four aspects of eco design standard guidelines)	The achieved quantity of newly developed standard products is 3 products (silver medal). Besides, there are 21 Mass- produced products which are the next generation existing products, reaching 20% of the target set last year. (Several models among the newly developed products are currently under design and development)	 Overall goals: More than 50% of eco design new products achieved silver medals. The mass-produced IPC system products are implemented with green eco design and contributes 10% of overall revenue. 	 Overall goals: More than 80% of eco design new products achieved silver medals. The mass-produced IPC system products are implemented with green eco design and contributes 15% of overall revenue.
	green product research and development.	The number/ratio of products that meet energy-saving product design	Expanded the introduction of low energy design to 15 new products.	A total of 41 products complying with energy-saving design have reached the target set last year.	 The newly developed standard products must meet the specifications of energy- saving design. The mass-produced IPC system products are strategically implemented power-saving gold power supply and contributes 10% of total revenue. 	 New products of specific product lines (suitable field) meet the requirements of Energy Star / obtain the internal energy- saving gold medal up to 20%. The mass-produced IPC system products are strategically implemented with power-saving gold power supply and contributes 15% of total revenue.

M Highlighted Projects or Performance Figures



In addition, Internal product energy-saving classification labels are established by Advantech in 2022. It is divided into three levels based on energy efficiency performance to assist customers in identification. Also, internal green design products and silver medals are consistent to assist customers in recognition.

4.1.1 Eco Design

A Eco-Product following the LCA life cycle

Advantech has always adhered to the concept that products shall follow a life cycle. We anticipate using life cycle assessment (LCA) and product carbon footprints to quantify the impact of Advantech's products on the environment. The assessed projects include the carbon emissions from the selection, manufacturing, distribution, use and final disposal of upstream raw materials. Also, carbon reduction targets will be further set and taken actions to implement the reduction, which will be incorporated into the Company's operational management goals.



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Figure 4.1.1 Eco Product LCA Life Cycle

Selection of raw materials	We manage from the source and formulate Advantech's green eco design standards and guidelines from four product aspects: (1) green materials (2) green packaging materials (3) product recycling (4) product energy saving, evaluating products from production, manufacturing to transportation. The impact on the environment at all stages of consumer use, recycling, and disposal, and in line with international regulations and customer needs. In particular, there are relevant regulations on "green materials and green packaging materials", such as the use of recycled fibers and recycled plastics, and the selection of energy-saving and high-efficiency power modules to improve energy efficiency, and the design of innovative green products that reduce environmental toxicity.
Product manufacturing process	We develop green products with high energy efficiency and low environmental toxicity according to Advantech Green ECO Design Guideline to achieve performance. Through Eco Design Dashboard management, we regularly convert the introduction status of the four major aspects into carbon reduction effects, check the achievement status monthly, and plan the layout of the power module replacement strategy for the next three years. We have achieved the goal of introducing 20% high-efficiency green products by 2022, and will continue reducing waste and pollution and banning hazardous chemicals during product manufacturing. In the future, we set out goal to achieve 50% high-efficiency green products by 2023 and 80% by 2025.
Product Shipping	We formulate according to the green packaging material guidelines in Advantech Green ECO Design Guideline, which requires the use of more than 90% recycled fiber materials, and the advanced goal is to reduce the packaging material weight, improve the packaging material design, and optimize the packaging size to reduce the environmental impact of transportation. We also look forward to cooperating with the product carbon footprint project in the future, formulating a product transportation planning management system, enhancing transportation and storage safety, and reducing environmental impact.
Phases of use	We formulate according to the product energy saving guidelines in Advantech Green ECO Design Guideline. Besides, we also roll- out the plan of energy saving design via internal Management Committee of Technology, and plan the layout of the power module replacement strategy for the next three years. Our target is to replace the power supply modules with selected high-efficiency ones from design-wise.
Product Disposal Management	We include the eco design concept such as recyclable, Easy to disassemble, low pollution and energy saving into consideration of product design. Based on the international regulation on recycling, we promote the reuse and recycling of electronic products, as well as adhere to the commitment and responsibility as a producer to conduct the recycling and management of electronic waste. Product Waste Disposal: In response to WEEE regulations, we started replacing product recyclers in Europe at the end of 2020, and gradually expand the product recycling scope from 8 countries to 20 countries.

Advantech has planned to obtain the first product carbon footprint certification in the second quarter of 2023. The material selection depth of the product is evaluated through the product life cycle (LCA) to identify the top 5 key carbon footprint materials. Moreover, the establishment of Advantech product carbon footprint inventory methodology will be completed in Q2. The basis for an internally developed product life cycle assessment (LCA) will be established as well. In the future, we will gradually complete the carbon footprint inventory of representative products of each business group as a material selection mechanism for the development of low-carbon products. The SPC-815 series products were selected as the first carbon footprint products.

▲ Eco-Product Target setting

In the second half of 2020, Advantech formulated an eco-product innovation design project to promote Green eco design standards and guidelines to R&D units. Since then, the Company has been committed to encourage the adoption of eco design innovation processes and invited product department proposals to participate in the internal selection.

We introduced the innovative design process of eco-products in stages while setting short-, medium- and long-term goals. In 2021, we completed our formulation of four product standpoints (material/packaging/recycling/energy saving) and established an inspection system. In 2023, our target is that 50% of newly developed standard products should comply with eco design with full implementation, and 80% of new products should meet the requirements in 2025.

A Eco Product Design Management Mechanism

From the four product standpoints of (1) green materials, (2) green package materials, (3) product recycling, and (4) product energy saving, we design innovative eco products by formulating standards to evaluate environmental impact of products from the selection of raw materials, production and manufacturing to transportation, consumer use, recycling, disposal, and so on in compliance with international regulations as well as our customers' needs.

Figure 4.1.2 Eco Product Design Management Mechanism



Product

recycling

Product

energy

saving



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Interdepartmental Committee

We set up an Eco Design Management Committee, with Advantech's Project Management Optimization (PMO) convening relevant departments to formulate standards and to oversee their implementation, management, and inspection.



∧ Setting of Standards

Based on international environmental regulations or international assessment tools (such as the US Electronic Product Environmental Assessment Tool (EPEAT)) as well as our experience in serving brand customers, we have formulated and promoted Advantech's Green ECO Design Standard Guidelines for energy efficiency, eco-design, and reduction of environmental toxic hazards. Furthermore, we provide tools for inspection standards that will offer gold medal and silver medal labels when passed.

Table 4.1.1 Examples of Eco Product Design Content Planning

Product Category Environmental design focus		Design content
		Compliance with EU RoHS Directive, China RoHS, Taiwan BSMI RoHS, and IEC62474 regulations
		Compliance with the requirements of substance restriction of EU Battery Directive
		Reduction of Bromine and Chlorine content in plastic (>25g) parts
		Compliance with EU REACH regulations for requirements of supply chain communication
		Elimination of heavy metals that are added to packaging
Selection of product:		Restriction on the use of elemental chlorine as a bleaching agent in paper-based packaging material
Panel PC (Industrial computer	Improve energy efficiency,	Enhancing the recyclability of packaging materials
equipment with screen), Server, Industrial computer	Eco design, Reduce environmental toxicity	Recycled fiber for corrugated packaging
(IPC), Board		Design for repair, reuse and recycling
		Design for plastics recycling (plastic parts weighing>100g)
		Product recyclability calculation and minimum 90% recyclability rate (IECTR62635)
		Information and reports for reuse and recycling
		Replacement components availability
		Energy efficiency

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Examination of Product Development Stages

With management from the source, system products such as IPC, Server, and Display will be fully included in the internal inspection of the four aspects of green eco design in 2023. We set up relevant departments in the design and development stage to ensure quality and adherence to eco design goals.

Figure 4.1.5 Decision Check Points in Development Stages of Eco Product Innovation Design Projects

2023 Target Full introduction of eco design DCP process check for new products



A Eco Design Award System

We continue to offer rewards to encourage colleagues within the company to design environmentally friendly eco products and to achieve eco benchmark products of Advantech in 2022.

Figure 4.1.6 Outstanding Eco Product Awards

Eligibility for award Taking each product as a unit, products comply with the GreenDesign Guideline will be awarded according to the level.



Eco-Excellence

the EnergyStar Standard



Overall compliance with Advantech's silver-medal definition of eco design specifications.

Audit Checklist

Green packaging 🔽 Green material

definition of eco design specifications and has passed

Overall compliance with Advantech's gold-medal





Action Plan

1. Starting from IPC, Server, Display type of system products, to assist relevant product lines to meet the four aspects of green eco design products, the guidelines and requirements are enacted and announced publicly throughout the company.





2. Implementation of the design of high-efficiency and energy-saving products across different business groups: With the selection of power modules with energy saving and high conversion efficiency, Advantech plans to improve the replacement strategy for power modules in the next three years, which was simultaneously introduced into mass-produced hot-selling products. After a whole year of supplier selection, inquiry, cost analysis and verification test last year, we are currently continuing to optimize the costs. Some mass-produced products are expected to be introduced with power supplies with a power-saving function this year to gradually increase the efficiency of 250W/300W/500W.

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Figure 4.1.8 Power-Saving Gold Power Supply Introduction Plan and Schedule



3. Specific product lines selected are required to retrieve Energy Star certification by top-down decision and the installation of energy-saving management software to improve carbon reduction performance: Display / Panel PC / Portable Products are prioritized to be introduced in the scope. And software modules for energy-saving management are developed and designed to be quickly deployed on Advantech products to improve carbon reduction performance. (This refers to the Erp & Energy Star international regulations on energy efficiency optimization to accelerate the standardization of energy-saving design.)

Figure 4.1.8 Design and Continuous R&D for Product standardization of Energy-Saving Product



Energy-saving design of products (hardware aspect/software aspect)

- Build energy-efficient IP to reduce power consumption of components
 Use of energy saving mode
- Use of energy saving mode



Improved Power Efficiency

- Modules using high-efficiency power supplies

Existing directives for good use and reference





Energy-Related Products (ErPt) USA Energy Star

4. Re-optimization of eco design products: The standards of the silver medal for eco design products continue to be standardized into the mandatory requirements of Advantech's new product development. The implementation is evolved from voluntary to mandatory on specific type of products. Besides, the introduction of recycled materials is under evaluation, such as the use of recycled metal for shell of mechanical products, the conversion from EPE foam plastic material to paper, etc. The design of reduced packaging materials for the first and second generation models is currently being planned for evaluation and introduction.

A Performance Presentation

A list of Advantech's 2022 eco design product silver medal/Advantech energy saving label product is as follows. After many years of hard work, our policy is to design energy efficient, energy saving, carbon reduction, low environmental toxicity hazard, easy assembly and disassembly, and recyclable products. These policies are implemented in the eco design thinking of each phase in the product life cycle, and the performance of circular economy is concretely presented. In addition, USA Energy Star/ the revenue of Advantech's green design products with silver medal, energy-saving label products was account for 3.10 % in 2022. It has grown more than 6 times compared to 0.46% in 2021, and the target for 2023 is set at 10%. Advantech encourages our employees to design products which can improve energy efficiency, save energy and reduce carbon emissions, reduce environmental toxicity and hazards, be easy to assemble and disassemble, and easy to recycle material resources. Also, an internal bonus reward mechanism was set up, and honor certificates were awarded. Guidelines are set for incentive mechanisms for internal green design. The evaluation includes four aspects of green eco design products: green materials, green packaging materials, product recycling, and product energy saving. After the annual settlement in 2022, award-winning employees will be awarded with certificates and bonuses.

Advantech's internally announced eco design label

Green eco design internal labels

Eco design product label announced internally	Description
PRODUCT	The required and optional items of the four standpoints all conform to Advantech's Eco-Ecological Design Standard Guidelines and have passed the inspection, so they are given gold medal label.
PROJUCT	The required items of the four standpoints all conform to Advantech's Eco-Ecological Design Standard Guidelines and have passed the inspection, so they are given silver medal label.

Energy saving classification labels

Energy consumption label an- nounced internally	Description
Energy	The energy efficiency of the product can reach more than 90%, and the color is consistent with internal gold label certification.
Energy	The energy efficiency of the product can reach more than 87%~90%.
Energy	The energy efficiency of the product can reach more than 82%~87%, and the color is consistent with internal silver label certification.

The proportion of revenue of products that achieve the Silver Medal of Green Products/Advantech Energy Saving Label in 2022: 3.10%

Table 4.1.2 Revenue Contribution Rate of Advantech's Green Products in 2022

Eco Product operating revenue share (%)



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4.1.2 Product Liability

Advantech reviews the current status of hazardous substances management every year in accordance with international regulations, customer requirements, and trends in environmental protection in order to reduce environmental and ecological impact, fulfill corporate responsibility for environmental sustainability, meet the expectations of stakeholders, and continue to adhere to the requirements of international regulations. We have thus formulated Advantech's Green Policy (Hazardous Substance Reduction Program), and we regularly update Advantech's eco product rules for the management of hazardous substances. These in turn are managed through an green supply chain management platform.







supply chain

information

regulations

(expansion)

Announcement of Advantech

Update critical regulations or

Conflict minerals survey

announcements regarding client

Report conflict minerals in line with

Responsible Business Alliance

qualification reporting quickly

Update list of smelters timely
 Perform surveys and product

Figure 4.1.11 Green Supply Chain Management Platform GPMS

risk assessment

- Asses the usage of substances at Advantech
- Ensure components comply with new regulations (Ex. RoHS Exemption)

Generate product reports for clients

- Assess announcements of Advantech meeting RoHS & REACH
- Assess other regulations

Advantech established Green Supply Chain management in 2010. On this supply chain platform, suppliers must promise and guarantee that their products do not contain harmful substances listed by the Company, and supporting documents shall be provide for future reference. We optimize this platform every year, activate the database, and form an effective green supply chain. Advantech has introduced its hazardous substance management system since 2010. We uphold the spirit of strict quality management, continuously controlling every aspect of product responsibility. The products of Advantech are all in compliance with relevant regulations.

Figure 4.1.12 Green Supply Chain Management Process

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Case Focus: Sony Green Partner

Beginning in 2012, Advantech has become a Sony Green Partner. From component partners to OEM partners, we have challenged many levels of stages. In recent years, only document review is required, and certificates can be directly extended. Becoming a Sony Green Partner shows that Advantech's green management performance is highly recognized by our customers.

*Note: Sony Green Partner certification ensures that all phases of the product life cycle, such as procurement, production, and delivery are systematically controlled in the green product management system. It minimizes the risk of introducing any kind of non-environmentally friendly substance into products while enhancing our customers' products to continuously meet the requirements of environmental protection substance standards. It serves as the best partnership to maintain Advantech's environmental requirements and commitments to products, and to meet the most updated environmental concerns.

Responsibility for Product End-of-Life : Product Recycling

The design consideration of "recyclable, easy to disassemble, low pollution, and energy saving" for easy recycling is injected into the early stage of product design. Reuse and recycling of electronic products is facilitated through legally required recycle programs. We uphold the spirit of producer responsibility to commit to the recycling and management of electronic waste.

Europe

The been the r the ir

In response to the specifications of WEEE and sustainable product design and development, we re-examined our cooperative product recyclers and start to replace those located in Europe at the end of 2020. In 2022, the inspection of product shipments and recycling was expanded (recycling countries were expanded from 8 countries to 20 countries). We retroactively revised the 2019-2022 data, and calculated the tonnage of product recycling based on the annual effective recycling data of countries provided by the recyclers. According to the calculation of the following methodology, a total of electronic products with a total weight of about 1005 metric tons was recycled in Europe in 2022, as shown in the table below with retroactive revision of the 2019-2022 data. Advantech's products are equivalent to the customer's WEEE electronic products of the same category. Therefore, the client's WEEE calculation tool was used to make the estimate.

detailed data of other regions have not checked this year, and it is expected that etrospective data will be presented when aventory plan is added in the future.		The total weight of the product that can be recycled globally (tons) (2019~2021 WEEE recycling rate is 80%) (The recycling rate of Advantech eco-design products is 90% in 2022)	The total weight of the product actually recycled (tons) (The average recovery rate in European countries is 84%)	Percentage of actual (Europe- an) product recycling world- wide (%)
Recycling volumes	2019	8112	794	9.8
in Europe region	2020	7738	767	9.9
Unit: Metric tons	2021	9596	903	9.4
	2022	10041	1005	10

Taiwan

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The recycling of electronic waste in Taiwan is a public operation. Also, recycling can be done through cleaning teams and resource recovery agencies. Business operators pay the resource recycling management fund based on the annual business volume and the rate of recycling and disposal fees. The fund is managed by the Environmental Protection Administration of the Executive Yuan, R.O.C (Taiwan).

In the future, the planned inventory and interrogation will be expanded to cover other countries, and the main sales markets include China, Japan, and the United States.

4.2 Climate Change Strategy and Management

As the world's largest provider of industrial computer and Internet of Things technologies and services, Advantech understands its responsibility to the global environment. The Company's policy statement on climate change is aligned with the Paris Agreement's goal of keeping warming below 1.5°C. The Science Based Target (SBT) was adopted and committed in 2021. Since then, we have further committed to join the RE100 initiative and set a net zero carbon emission target in 2023. Renewable energy is regarded as an important strategy towards net zero emissions, and it is planned to achieve 50% renewable energy use in Taiwan and Kunshan, China by 2030. Also, we will achieve 100% global renewable energy use by 2040 to achieve the goal of RE100, and achieve the goal of net zero carbon emissions by 2050.

Advantech has included climate change as one of the material risk projects of corporate sustainable management, and has managed it according to the two standpoints of "mitigation" and "adaptation." Meanwhile, we are also actively identifying risks, building adaptation capabilities, further researching and analyzing opportunities for climate change, and accumulating and deepening R&D momentum. We continue to invest in eco energy and in energy-saving products and solutions, and we are integrating them with the core business of energy management to promote energy saving and sustainability.

Advantech's Net Zero Vision

Achievement of net zero emissions	2050 Achievement of net zero carbon e	2050 Achievement of net zero carbon emissions			
Expansion of use of renewable energy	2030 Taiwan and Kunshan use 50% renewable energy	2040 The global use of renewable energy reaches 100%, reaching the RE100 goal			
Improvement of energy efficiency	2030 Scope 1 and 2 carbon intensity de carbon intensity decreased by 49	creased by 60% ; Scope 3 product use			

A Advantech's Climate Change Development History

	 2020 Establishment of ESG Corporate Sustainability Committee and ESG Office Introduction of green product plan to produce low-carbon products CDP Climate Change Ranking Receives 'B' 		 2022 Establishment of the Sus (SDC) at the board level Completion of Task Fo Disclosures (TCFD) risks Initiation of the invent categories of ISO 14064 Obtained green factory co CDP Climate Change Ram 	tainability Development Committee rce on Climate-Related Financial and opportunities assessment tory and verification plan for all Greenhouse Gas Scope 3 (Scope 3) ertification of Kunshan factory king Receives 'B'	 2024 Completion and analysis of g iEMS collection and monitori electricity consumption at n global operating locations Calculation of carbon footpri representative products of business group 	lobal ng of najor nt of each	 2030 Achieved Scope 1 and 2 cc intensity decreased by Scope 3 product use ca intensity decreased by 49 SBT target Taiwan and Kunshan use 5 renewable energy 	arbon 60%; rbon 1% of 0% of	2050 • Achievement of net zero carbon emissions
•	 2019 Launch of ISO 14064 Greenhouse Gas Inventory and Verification Program in Taiwan and Kunshan 	2021 • The Scinadopte	ence-Based Target (SBT) d to comply with the onal below 2°C	2023 Commitment to join RE100 targel investment Link between the ESG KPI and th	ts and process active low-carbon e performance also approved by	202 • Cor 140	26 mpletion of the global ISO 064 greenhouse gas inventory I verification plan	2040 • The glob reaches goal	pal use of renewable energy 100%, reaching the RE100
	Program in Taiwan and Kunshan Base year for Advantech's Science- Based Target (SBT) CDP Climate Change Ranking Receives 'B' Disclo CDP Receives 'B'		nent and support for Task (Climate-Related Financial res (TCFD) flow-carbon investment solar ants to supply Taiwan factory imate Change Ranking 'B'	 the Board Initiation of the subsidiary's g verification plan Initiation of the electricity cons bases collected by iEMS in Taiwa Obtained green factory certification Obtained ISO 50001 certification operating bases Obtained the first product carbon 	reenhouse gas inventory and sumption of the main business n and Kunshan on of Taiwan factory tion of Taiwan and Kunshan footprint ISO 14067 certification			goui	106

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Advantech set a Science-Based Target (SBT) for carbon reduction in 2021. Using 2019 as the base year, we proposed targets of reducing the carbon intensity of Scope 1 and Scope 2 products by 60% by 2030, and reducing that of Scope 3 products by 49%. Furthermore, we passed a compliance review organized by the Science-Based Targets Initiative (SBTi). This makes us the third technology industry company in Taiwan to pass such a review, and we continue to move forward in pursuit of these goals.

Figure 4.2.1 Advantech's SBT Targets



SBT Scope 1 and 2 Carbon Intensity (tCO,e/M NTD) Targets

SBT Scope 3 Product Use Carbon Intensity (tCO₂e/M NTD) Targets



*Note:

- 1. Having set 2019 as the base year, Advantech applied for SBT targets in 2021. The period in which the relevant carbon reduction plans were drawn up. Therefore, relevant results was only available from 2022. For the relevant product carbon reduction plan, please refer to **4.1.1 Action Plan**.
- 2. In 2021, products in Scope 3 were updated with carbon intensity figures, the original figure is -34.77%, and the corrected figure is -7.82%.





4.2.1 TCFD Governance Structure and Climate Management Strategy

Businesses face potential operational impact from the extreme climate events; from the low-carbon transition pressure brought about by the aggressive carbon reduction targets among a range of countries; and from the carbon reduction requirements imposed upon the upstream and downstream of the value chain. Under the impetus of our ESG Corporate Sustainability Committee ("the ESG Committee"), Advantech responded to this trend by having the ESG Office integrate cross-departmental resources and introduce the Task Force on Climate-related Financial Disclosures ("the TCFD") in responding to the increasing global need to identify the linkage between climate risk and financial impact. According to the TCFD guidelines, we have taken a systematic approach in measuring the climate risks and opportunities faced by the company. We have also thoroughly evaluated the climate change risks that the existing risk management procedures on which the Pan-Operational Risk Map focuses. Evaluation results and response plans have also been reported to the senior management of the SDC Corporate Sustainable Development Committee. Furthermore, the SDC Committee regularly reports the progress of climate management to the Board of Directors, so as to enhance the resilience in dealing with climate risks.

		Advantech's Climate Governance Framework	
Gover- nance	Board of Directors	 The highest supervisory unit for risk management (including climate risk) Review major goals and implement of budgets related to climate issues 	 Oversee climate risk management and strategies to drive results
	Chairman	 Chair the SDC Committee and leading the management mechanism for climate issues 	 Confirm climate-related KPI targets and action plans
	SDC Corporate Sustainability Development Committee	 The main authority and decision-making unit of climate risk management Regular reporting to the Board on climate management progress Review climate-related risk, opportunity, result, and response strategies 	 Approve TCFD report Monitor the implementation of climate issues and review KPIs
	ESG Office	 Coordinate the execution of climate-related risk and opportunity analyses and integrated disclosure report Promote climate-related action plans and report progress to SDC Committee quarterly 	 Research and analyze climate policy and scientific research development trends; regularly monitor climate risk events
	Board Oversight	 The SDC Committee regularly reports climate-related management plans and results to the Board of Directors while the Board of Directors reviews relevant major goals and budgets In 2021, the Board of Directors decided to approve Advantech Taiwan's renewable power target and renewable energy PPA procurement budget, and a solar power plant project 	 In 2022, consulting companies and external experts were assigned to attend the training for the Board of Directors. The topics included: how the ICT industry can help to fight climate change, international sustainable trends, new trends in risk management and response
	High-Level Management Mechanism	 Led by the Chairperson, the SDC Committee holds meetings each quarter. Th strategic planning, and implementation progress. Meanwhile, the SDC Comm climate-related risks and opportunities assessment results and response stratements. 	e ESG Office reports on trends in climate-related issues, ittee monitors the performance of its goals and reviews ategies

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Disclosed Aspects		Advantech's Implementation Status			
िर्मु Strategy	Short-, medium-, and long- term risks and opportunities	 Advantech has identified six risks and five opportunities that are of materiality to the Company in view of their impact levels. We have made these identifications with reference to the TCFD guidelines on risk and opportunity issues and their financial impacts, combined with operational bases and industry analysis. "Short-," "medium-," and "long-term" are respectively defined as three years, three to five years, and more than five years, respectively, in assessing when each issue is likely to occur. 			
	Potential impacts and financial planning	• We qualitatively assess the possible financial impact of each significant risk and opportunity. Based on this, we develop preventive and improvement measures and formulate KPI.			
	Scenario Analysis	• We analyze carbon reduction amounts and the financial impact on the Company based on Beyond 2°C Scenario (B2DS) and the 1.5°C Scenario (1.5DS) of the International Energy Agency (IEA). In addition, we also use the RCP4.5 BAU scenario and the RCP8.5 high-warming scenario to analyze physical impacts on operations so that we might include them in the assessment of the resilience of the adaptation strategy.			
	Disclosed Aspects	Advantech's Implementation Status			
Risk Manage- ment	Evaluation and Management Process	• Every year, the ESG Office convenes its members across departments to collect and review the Company's climate risk and opportunity factors. Through their levels of impact and likelihood, it assesses major climate issues, monitors changes in risk levels, reviews and develops response strategies, and reports them to the ESG Committee for resolution. As well as reviewir relevant disclosures, the ESG Committee makes regular reports allowing the Board of Directors to monitor the progress of climate risk management and review major relevant decisions.			
	Overall Risk System Integration	 At the beginning of each year, the Risk Management Task Force evaluates the Company's overall operational risks according to risk management procedures, and it draws a pan-operational risk map in reporting the risk management process and planning to the Board of Directors. Climate change risk has been included in the assessment process since 2021. We identify its risk level in line with the main investigation of the Audit Office and cooperate with the ESG Office to evaluate and identify its risk level In 2022, the complete evaluation process of TCFD was introduced. The assessment practices and results was applied to the climate change risk analysis in the above risk map, integrating it into the overall risk management process 			
	Disclosed Aspects	Advantech's Implementation Status			
Metrics and Targets	Greenhouse Gas Scope 1, 2 and 3 Emissions and Targets	 Passed SBT Science-Based Target Carbon Reduction Review Each year, Advantech Taiwan and Advantech Kunshan both complete ISO 14064-1 greenhouse gas inventory, verification, and target tracking other climate-related management indicators and targets. 			
	Other climate-related management indicators and targets	 We committed to join the RE100 initiative and the 2050 net zero carbon emission target was set. We have set targets for power saving, use of renewable energy, water saving, and eco products as percentages of revenue as well as energy efficiency improvement of product power supplies. We are planning to introduce the ISO 50001 energy management system and LCA life cycle carbon footprint assessment of main products. In the future, management indicators and goals will be set for related strategies. 			

*Note: The scope names of greenhouse gas under the ISO14064-1:2006 in responding to ISO14064-1 are divided into: Scope 1, corresponding to Category 1; Scope 2, corresponding to Category 2; and Scope 3, corresponding to Categories 3 to 6.

4.2.2 Identification of Climate-Related Risks and Opportunities, and Financial Implications

ESG Office convenes members across departments to define risks and opportunities in accordance with the TCFD guidelines. In addition, it undertakes multi-faceted topic collection, crossdepartmental discussions, and external consultation to specifically identify Advantech's major risks and opportunities and the corresponding potential scenarios of occurrence and impact levels, and to analyze the possible financial impacts. Furthermore, we focus on industry characteristics and international contexts in three major aspects: operations (reductions and natural disasters), product and supply chains, and markets. We do so in order to facilitate the inventory of climate risks and opportunities at the Company's overall level, and to accurately propose relevant strategic countermeasures. Therefore, the Company's climate risk management covers the entire value chain (upstream, downstream, and our own operations).



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Results of a scenario analysis of Climate Change risks (For TCFD financial quantification status report, please refer to **Appendix**)

Results of a scenario analysis of transformation risks

Scenario	Impact Assessment	Financial impact
WB2DS (Scenario of SBT Voluntary Emission Reduction)	In 2030, the voluntary emission reduction of the overall operation is evaluated to the financial impact of offsetting carbon reduction through the full purchase of renewable energy, regardless of the cost of purchasing carbon rights.	Increase in cost of renewable Power Purchase Agreement (PPA) or I-REC procurement amounted to NT\$57,706,595
1.5DS (Scenario of Net Zero)	In 2030, the voluntary emission reduction of the overall operation is evaluated to the financial impact of offsetting carbon reduction through the full purchase of renewable energy, regardless of the cost of purchasing carbon rights.	Increase in cost of renewable Power Purchase Agreement (PPA) or I-REC procurement amounted to NT\$58,764,963
Implementation of Controls Scenarios (Refer to Historical Scenarios)	The evaluation of China's energy transition and policy on power limits caused interruption of water supply and power supply, resulting in increases in equipment damage and uninterruptible power system maintenance cost and reduction in revenue due to operational production interruption.	Increase in cost due to operational production interruption amounted to NT\$315,557,546
STEPS Implementation of Stated Policies Scenario	The evaluation of impact on Advantech by government regulations in Taiwan in the future during 2025–2030, including the tightening of regulations for large power consumers requiring a certain proportion of renewable energy and the revision of the Climate Change Response Act. The Company's operating costs will increase due to payment of monetary substitution or carbon fees if it fails to meet the regulations.	Increase in operation cost due to renewable energy monetary substitution paid and carbon fee imposed amounted to NT\$8,868,638

Results of a scenario analysis of physical risks

Scenario	Impact Assessment	Financial impact
RCP8.5 (Worst-Case Scenario for Warming)	The financial impact from operational production caused by extreme weather events (flooding due to heavy rainfall) incurred in overall Taiwan until mid-century (2050) / every 5 or 10 years are evaluated, regardless of the impact of other physical risks (such as temperature rise and drought)	Increase in operation cost due to equipment damage in the factory area and personnel could not go or delayed start to work amounted to NT\$379,400
RCP4.5 (BAU Scenario)	The financial impact from operational production caused by extreme weather events (flooding due to heavy rainfall) incurred in overall Taiwan until mid-century (2050) / every 5 or 10 years are evaluated, regardless of the impact of other physical risks (such as temperature rise and drought)	Increase in operation cost due to equipment damage in the factory area and personnel could not go or delayed start to work amounted to NT\$379,400

∧ Climate-related risk and opportunity assessment results and response strategies

■ Climate risk ■ Climate opportunity

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Category		Risk or opportunity issues	Advantech encounters risk or opportunity.	Level of Impact	Affected schedule	Financial impact	Advantech's response strategy
	Tr	Cap and carbon trading, carbon tax, and carbon fee system	When regulations related to greenhouse gases are implemented, emission credits may be purchased or carbon-related fees may be imposed.	Medium	Mid-term	 Increase operating cost 	 High energy-consuming equipment was replaced and building energy management system (iEMS) was established
Operation	ansition Risk	Regulations related to energy curtailment	Splitting of power usage and policy on power limits caused interruption of water supply and power supply, resulting in increases in equipment damage and uninterruptible power system maintenance cost.	Medium	Short- term	 Increase operating cost Increase capital expenditures Operational disruptions are caused to decrease operating revenue 	 Investment in green energy equipment in factories and offices The maintenance and testing of the uninterruptible power system are strengthened, and contingency measures for power cuts are established.
	Opportunity	Emission reduction measures to improve production efficiency	Emission reduction measures such as the replacement of old machines and the adjustment of the operating mode of reflow ovens are used to improve the efficiency of energy and resource use and the resilience of operations	Medium	Short- term	• Short-term	 Carbon reduction KPI were set up for each department Plan to introduce the ISO 50001 energy management system
	Physical risk	Heavy rainfall / flooding of strong typhoon	The situation of interruption in operation includes heavy rainfall exceeding the maximum capacity of the drainage system and flooding causing power failure in the computer room.	Medium	Short- term	 Increase capital expenditures decrease in asset value Operational disruptions are caused to decrease operating revenue 	 Business Continuity Plan (BCP) and exception handling procedures are established and regularly exercised. The maintenance and testing of drainage facilities and anti-flooding operations are strengthened to evaluate the configuration of power generation facilities and the addition of energy storage equipment. The risk assessment of the operating sites is planned to formulate warning levels and response measures based on external data and scenarios for climate flooding potential.
Product/ Supply Chain	Transi	Low-carbon technology introduction cost of products	Additional costs include increased demand for low- carbon products, design and development introduced by derivative low-carbon technologies, replacement of environmentally friendly materials, safety certification fees, etc.	High	Short- term	Increase operating cost	The Green Design Management Committee was established to target four product standpoints: green materials, green packaging materials, product recycling, product energy saving, and refer to the standard guidelines for green design formulated by international standards.
	ition Risk	Customers' requirements for suppliers to save energy and reduce carbon emissions	Requests from customers to investigate Advantech's greenhouse gas emissions, carbon reduction goals and measures have increased, thus deriving the pressure of carbon reduction and related costs.	High	Short- term	 Increase operating cost Impact on orders to decrease operating revenue 	 New product or material designs are incorporated into energy efficiency standards, and existing product designs are changed to achieve energy efficiency goals. Environmentally-friendly materials and product designs with extended service life are enhanced.

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Cate	gory	Risk or opportunity issues	Advantech encounters risk or opportunity	Level of Impact	Affected schedule	Financial impact	Advantech's response strategy
Product/ Supply Chain	Transition Risk	Low carbon products or product energy efficiency requirements	The EU ErP Energy Efficiency Directive has expanded its regulatory scope. Those that don't meet energy efficiency requirements could face a drop in sales. In response to demands for low-carbon products, the US Energy Star standard was voluntarily introduced to expand competitive advantages.	Medium	Short- term	 Increase operating cost Impact on shipment to decrease operating revenue 	 The weight and size of the packaging materials are adjusted to reduce the use of materials and the carbon emissions of transportation. The communication between suppliers and customers has been strengthened to facilitate the promotion of green material procurement and compliant products. Investigate, assess, and coach improvement on ESG risks of suppliers. It is planned to require key/high energy-consuming suppliers to be subject to carbon inventory. The introduction of the assessment of the carbon footprint of the product life cycle of the main product LCA is planned.
Market		Participate in investment in the renewable energy supply market	We invest in the green energy industry, such as cooperating with Micropower Energy to set up solar power plants to comply with the increasingly stringent renewable energy regulations and the trend of RE100, in order to develop related market opportunities.	Medium	Short- term	 Increase operating revenue 	 We invest in renewable energy companies or cooperate with them in technology to ensure the future supply of renewable electricity and improve
	Oppor	Expand climate mitigation market demand	The world is accelerating the expansion of the goal of net zero emissions and the policy-derived demand for carbon control. Advantech's IoT hardware and software products just cut into the application market that can mitigate climate change, including energy information management systems and so on.	Medium	Short- term	 Increase operating revenue 	 the cloud management platform technology related to new energy cases. The products, solutions and technical services that integrate the Internet of Things are expanded to be used in client-side energy management, renewable energy and energy storage equipment,
	rtunity	Participate in the construction of relevant renewable energy infrastructure	In response to the needs of renewable energy development, intelligent maintenance and monitoring solutions related to the development of energy and energy storage equipment can increase the market share of new energy industries, such as communication gateways for renewable energy.	High	Short- term	 Increase operating revenue 	 and environmental monitoring. Regional Business Units and Emerging Business Opportunities Department shall keep abreast of new business opportunities in climate-related markets to formulate business development plans.
		Expanding demand for climate adaptation solutions	The intensification of climate change brings about the need for adaptation. Advantech integrates IoT technologies to provide solutions such as monitoring of landslides and flood control, sponge cities, and smart agriculture to tap into emerging and adaptive business opportunities.	Low	Mid-term	 Increase operating revenue 	Green operating revenue brought by the planning of quantified low-carbon/climate-related solutions

*Note:

1. The degree of impact: Internal assessment is conducted and classified into "high, medium, and low" according to the possibility of occurrence and the degree of impact.

2. The duration of the impact: The consideration of the possible timing of occurrence is divided into "short-term (<3 years), medium-term (3-5 years), and long-term (>5 years)".

4.3 Greenhouse Gas Inventory and Energy Resource Management

M Highlighted Projects

-12.2%

In 2022, the greenhouse gas emissions per unit of revenue of Taiwan and Kunshan factories was reduced by 12.2% compared with 2021

-13.1%

In 2022, the Company's overall * greenhouse gas emissions per unit of revenue was reduced by 13.1% compared with 2021

B List

2022 CDP Climate Change Questionnaire was ranked B List

*Note: Main operating bases and manufacturing factories.

Advantech adheres to the original devotion to the idea of being a global citizen, and to the corporate purpose of living a happy life. We are thus willing to contribute to environmental improvement and labor safety maintenance. Advantech has gone beyond introducing the ISO 14001 environmental management system in 1996 and the OHSAS 18001 occupational safety and health management system in 2005 (revised in 2020 to ISO 45001). In addition to complying with the relevant government environmental protection and regulations of the Occupational Safety and Health Act , we are also committed to reducing the impact on overall environmental safety and health in the greenhouse gas management, product design, product use, and disposal stages. And through the participation and commitment of all employees, we can achieve the goal of environmental protection and sustainable development of the business. This chapter's writing scope covers Advantech's main global operations and production factories, together accounting for 92.3% of total consolidated revenue.

A Phased Achievements and Future Goals of Greenhouse Gas Management

Item	2022 Results	2023 Goals	2025 Goals	
Energy Management	 In 2022, the greenhouse gas emissions per unit of revenue of the Company's Taiwan and Kunshan factories was reduced by 12.2% compared with 2021 iEMS (Intelligent Energy Management System) introduced into Linkou and Kunshan and greatly evolved 	 Initiation of the electricity consumption of the main business bases collected by iEMS (Intelligence energy management system) in Taiwan and Kunshan Initiation of the subsidiary's greenhouse gas inventory and verification plan Obtained ISO 50001 certification of Taiwan and Kunshan operating bases 	Advantech's overall greenhouse gas emission intensity per unit of revenue has decreased by 36% compared to 2019	
Development of renewable energy	Completion of the construction of power generation facilities in the renewable energy field of investment	 Initiation of use of renewable energy Commitment to join RE100 targets and process active low-carbon investment 	Advantech Taiwan's use of renewable energy accounts for 25% of total electricity consumption	

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4.3.1 Greenhouse Gas Inventory and Management

Advantech is creating a low-carbon business environment. Based on Taiwan's Climate Change Response Act, and on the quantification, monitoring, reporting and verification procedures for greenhouse gas inventory provided by the ISO 14064-1 standard, we established a Greenhouse Gas Inventory Promotion Committee in order to promote various tasks connected to greenhouse gas inventory and reduction. We have done so with a view of reducing direct and indirect greenhouse gas emissions year by year. In 2011, we also joined the Carbon Disclosure Project (CDP) and have disclosed the Company's carbon reduction plans and performance annually.

▲ Greenhouse Gas Inventory

In recent years, Advantech has carried out greenhouse gas inventory, and the main operating bases and production factories that have been verified are Taiwan and Kunshan, China. In the future, major overseas operating bases and manufacturing areas will be gradually included.

Advantech's Taiwan factories make reference to ISO 14064-1 and to the GHG Protocol Evaluator Tool in addition to requiring self-inspections. Furthermore, third party on-site inspections have been carried out by Taiwan SGS Limited starting from 2019. Organizational boundaries are drawn in reference to the requirements given by the ISO 14064-1:2018 standard. Organizational boundaries are set with operational control rights; furthermore, we establish the Company's greenhouse gas inventory management procedures and inventory reports, and we redefine the emission source inventories. Organizational boundaries include Rueiguang

Headquarters, Taipei Sunny Building, the Donghu Factory, and the Linkou Campus. In addition to the qualitative and quantitative inspections of Scope 1 (Category 1 direct GHG emissions) and Scope 2 (Category 2 indirect GHG emissions associated with energy production), the scope of inventory inspections also involves conducting inventory of emission source in Scope 3 (Categories 3, 4 and 5 indirect greenhouse gas emissions). In Scope 1, Advantech's Taiwan factories emitted a total of 643.8407 metric tons of CO_2e .

Advantech's Kunshan factories conducted their first 2014 annual ISO14064-1 greenhouse gas emission inventory in 2015, and a third-party on-site inspection was conducted by the China Quality Certification Center (CQC). As a result of the 2022 inventory, it was found that Advantech's Kunshan region produced a total of 2,826.57 metric tons of CO_2e in Scope 1. Emissions by region are shown in Table 4.3.1.

Greenhouse gases Region	Carbon dioxide (CO ₂)	Methane (CH ₄)	Nitrous oxide (N ₂ O)	Hydrofluorocarbons (HFCs)	Perfluorocarbons (PFCs)	Sulfur hexafluoride (SF ₆)	Nitrogen trifluoride (NF ₃)	Total (metric tons CO ₂ e)
Taiwan ACL	31.3875	0.0168	0	612.4364	0	0	0	643.8407
China AKMC	1757.0678	25.3093	3.5908	1040.6047	0	0	0	2826.5725
Japan AJP	No statistics	No statistics	No statistics	No statistics	No statistics	No statistics	No statistics	No statistics
Korea AKR	No statistics	No statistics	No statistics	No statistics	No statistics	No statistics	No statistics	No statistics
USA ANA	No statistics	No statistics	No statistics	No statistics	No statistics	No statistics	No statistics	No statistics
European AEU	No statistics	No statistics	No statistics	No statistics	No statistics	No statistics	No statistics	No statistics
Total	1788.4553	25.3261	3.5908	1653.0411	-	-	-	3470.4132

Table 4.3.1 Greenhouse Gas Scope 1 Emissions of Advantech's Main Global Operations and Production Factories in 2022

115 *Note: Scope 1 greenhouse gas inventories of factories in Japan, South Korea, the United States and Europe have not yet been counted.

Among Advantech's Taiwan factories, Scope 2 only involve the use of purchased electricity. Carbon emissions are calculated based on the 2021 electricity factor of 0.509 kg CO₂e announced by the Bureau of Energy of the Ministry of Economic Affairs, for a total of 9,872.1888 metric tons of CO₂e. For Advantech's Kunshan factories, Scope 2 included the use of purchased electricity and purchased steam for a total of 20,035.73 metric tons of CO₂e. Carbon emission calculation of electricity refers to the grid emission factor in "the average carbon dioxide emission factor of China's regional power grid in 2011 and 2012." The emission factor of East China regional power grid in 2012 is 0.7035 kgCO₂e. Carbon emissions calculations for steam refer to an emission factor of 110 kg CO₂/GJ for steam given in "Guidelines for Accounting Methods and Reporting of Greenhouse Gas Emissions of Enterprises in Other Industries." Among Advantech's Japan factories, Scope 2 emissions only involved the use of purchased electricity. Carbon emissions are calculated based on the electricity factor of 0.365 kg CO₂e announced by Japan, for a total of 1,056.9904 metric tons of CO₂e. Among Advantech's factories in Korea, America and Europe, Scope 2 emissions only also involved the use of purchased electricity. Carbon emissions are calculated based on the electricity factor of 0.365 kg CO₂e by searching on the public website (Low Carbon Power), respectively.

The greenhouse gas scope 1 and scope 2 emissions of Advantech's main global operations and production factories are shown in Table 4.3.2. The total emissions of Scope 1 and Scope 2 in 2022 was 34,951.3741 metric tons of CO₂e. The greenhouse gas scope 1 and scope 2 emissions of Advantech's main global operations and production factories in recent years are shown in Figure 4.3.1.

Table 4.3.2 Greenhouse Gas Scope 1 and Scope 2 Emissions of Advantech's Main GlobalOperations and Production Factories in 2022

Region	Scope 1 Direct Greenhouse Gas Emissions	Scope 2 Energy Indirect Greenhouse Gas Emissions	Total (metric tons CO ₂ e)
Taiwan ACL	643.8407	9,872.1888	10,516.0295
China AKMC	2,826.5725	20,035.7314	22,862.3040
Japan AJP	No statistics	1,056.9904	1,056.9904
Korea AKR	No statistics	102.6239	102.6239
USA ANA	No statistics	327.7951	327.7951
European AEU	No statistics	85.6313	85.6313
	34,951.3741		





*Note: No statistics on GHG emissions from electricity consumption in 2019 and 2020 for Korea; No statistics on GHG emissions from electricity and other energy sources in 2019 and 2020 for the United States.

*Note: Greenhouse gas inventories of factories in Japan, South Korea, the United States and Europe have not yet been verified by third party.

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The average GHG emission per unit of turnover of Advantech's main operating bases and manufacturing factories in 2022 (Scope 1 and Scope 2) was 0.508 tons of CO₂e per NT\$1 million, which is 13.1% lower than the average GHG emission per unit of turnover in 2021 of 0.585 tons of CO₂e per NT\$1 million. The main reason is that Advantech achieved overall reduction in electricity consumption by integrating manufacturing systems in Linkou and Donghu factories, improving manufacturing efficiency and making good use of Linkou's energy-saving systems. Meanwhile, the Advantech Kunshan Manufacturing Center has launched various energy-saving projects since 2019, including the establishment of an energysaving efficiency evaluation mechanism for each unit, energy-saving evaluation and verification of electrical machinery and equipment, and reduction of domestic electricity costs. In the future, we will continue to set an annual goal of reducing greenhouse gases per unit of turnover. In addition to achieving the goals set by the SBT announcement, this will also deeply embed the concept of energy saving in the hearts of colleagues and help it become an important part of the Company's culture.

In order to discover the key factors for climate change mitigation, Advantech Taiwan has also initiated inventories of other sources of GHG emissions in addition to emissions from its own operations. In 2019, the ISO14064-1 greenhouse gas emissions inventory was adopted to identify other types of GHGs along with relevant inventory methodologies being established. This was done with a view to identifying emission hotspots, setting reduction targets, and gradually implementing reduction measures. Please refer to Table 4.3.3 for identification and emissions in Scope 3 for Advantech Taiwan and China-Kunshan in 2022. Table 4.3.3 Scope 3 identification and emissions of greenhouse gases from Advantech Taiwan and Kunshan factories

Category Item	Description of the scope of verification	Emissions of the Taiwan plant (tons CO ₂ e)	Emissions of China Kunshan plant (tons CO ₂ e)
C1/ Category 4	Procurement of goods and services	192486.5544	26025.0725
C2/ Category 4	Capital goods	4849.4574	3998.1958
C3/ Category 4	Fuels and energy of upstream	1719.3008	8540.1316
C4/ Category 3	Transportation of raw materials	39.7529	328.3105
C5/ Category 4	Operational waste	1.9453	38.0556
C6/ Category 3	Business travel	53.0899	7.9636
C7/ Category 3	Commuting of employees	476.0058	266.5393
C8/ Category 4	Leased assets of upstream	75.9764	105.2401
C9/ Category 3	Shipping of products	1.9270	433.4036
C10/ Category 5	Product processing	0	0
C11/ Category 5	Use of product	890322.6918	Included in the Taiwan headquarter office
C12/ Category 5	Product end handling	18.9547	Included in the Taiwan headquarter office
C13/ Category 5	Leased assets of downstream	0	470.8849
C14/ Category 5	Franchise	0	0
C15/ Category 5	Investment	8508.0214	Included in the Taiwan headquarter office

*Note:

1. ISO14064-1 -1:2006 Scope 3 C1~C15 corresponds to ISO14064-1:2018 Category 3~6.

2. The use of products and the disposal of products are the scope of the global inspection of Advantech..

Highlighted Projects: Participation in the international Carbon Disclosure Project (CDP) evaluation

Since 2015, Advantech has cooperated with customers to participate in the evaluations of the international Carbon Disclosure Project (CDP). The CDP currently maintains the world's largest database related to climate change, and questionnaires are sent out every year to investigate companies' responses to climate change and greenhouse gas emissions and reductions. This is done so as to assess risks and opportunities for these companies arising from climate change. Through the annual regular CDP information disclosure, Advantech reviews areas including climate regulations, climate disasters, and other climate-related issues one by one to uncover hidden risks in our operations and management. In this way, we



undertake effective reduction and elimination measures to meet the requirements of international customers for greenhouse gas management. In
 2022, Advantech was selected as Level B.

A Energy Data Management

The main source of greenhouse gas emissions from Advantech's factories was carbon dioxide generated during the power generation process of the externally purchased electricity required for the Company's operations. This emission source accounted for more than 80% of the Company's overall emissions in 2022. In 2022, the total energy consumption (electricity, steam, gasoline, diesel, natural gas) in Advantech's main operating bases and manufacturing factories came to 223,340.35 GJ.



Figure 4.3.2 Electricity Consumption among Advantech's Main Operations and Production Factories in Recent Years

*Note: No statistics on consumption in 2019 and 2020 for Korea and the United States.

Figure 4.3.3 Non-renewable Fuels Consumption among Advantech's Main Operations and Production Factories in Recent Years



Energy consumption of non-renewable fuels in the Advantech plant (gasoline, diesel, natural gas, LPG)

*Note: No statistics on consumption in 2019 and 2020 for the United States.



Figure 4.3.4 Non-renewable Fuels Consumption among Advantech's Main Operations and Production Factories in Recent Years

Steam (Non-renewable) Energy Consumption of Advantech



*Note: The scope covers Advantech's main global operations and production factories, but only the Kunshan (China) factory uses steam..

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4.3.2 Energy Management Action

M Taiwan Linkou Manufacturing Park

The smart energy saving strategy of the Linkou Campus can be explained in terms of the two major systems of manufacturing and office facilities. The energy-saving facilities in the Linkou office area mainly achieve daily energy saving through intelligent parking, human-like energy-saving offices, and intelligent meeting rooms.

Intelligence is mainly implemented in the manufacturing system by means of an Intelligent Factory Situation Room: Advantech's manufacturing centers have been actively undergoing digital transformation in recent years. Through sensors deployed on the job site, information can be collected in real time and uploaded to the cloud for analysis. All plant information is displayed in realtime in the Situation Room, and management members can keep track of the latest production line statuses anytime and anywhere. Advantech's Intelligent Factory Situation Room monitors manufacturing, equipment yield and preventive maintenance, ambient temperature and humidity, and air quality. It also incorporates an energy management system.

٨ Neihu Headquarters, Taiwan

Advantech's Neihu Headquarters replaced its water chiller and LED lamps in 2020. Among them, the replacement of LED lamps reduced lighting energy usage by 65%. Together. We continued to replace office LED lamps for electricity savings. In the future, old and inefficient equipment will continue to be replaced to improve energy efficiency.

٨ Kunshan Manufacturing Park, China

AKMC's energy-saving facilities mainly save energy by promoting the optimization of energy management systems, automatic control renovation of air-conditioning systems, air compressor upgrades, replacement of energy-saving lamps, process improvement (such as line speed increase to reduce energy consumption, baking paint and liquid baking instead of roasted) and human-sensing systems.

▲ Overseas Operation Bases (Japan, South Korea, the United States, Europe)

The energy-saving facilities of Advantech's overseas main operating bases and manufacturing factories are energysaving mainly by promoting the replacement of energy-saving lamps, self-control transformation of air-conditioning systems, and changes in office usage behaviors.

AOverall Energy Management Strategies and Actions

In addition to the energy-saving facilities in each area described above, Advantech's overall energy management strategy includes: daily energy savings, development of an iEMS smart energy management system, and a clean energy strategy.



1. Daily Energy Savings

- Try to replace in-person meetings with video conferencing
- Prioritize the procurement of office equipment and information electronic products with energy-saving labels
- Control indoor air temperatures
- Encourage employees to turn off the lights

2. Development of iEMS Building Energy Management System

Advantech is committed to developing an Intelligent Energy Management System (iEMS). We carry out energy-saving management in the two dimensions of management and operations, doing so through energy consumption information capture, data uploads to the cloud, AI analysis, information presentation, and realtime alarms; and via cooperation with scheduling adjustments, equipment cleaning, and maintenance, and the replacement of high-energy-consuming equipment. Advantech's iEMS was upgraded in mid-2020, and the platform was migrated to Advantech's WISE-Stack private cloud by the end of 2020. Officially launched in Linkou in the first quarter of 2021, the first wave of functions included an overview of energy saving performance used by top decision makers, real-time energy consumption monitoring, and abnormal energy consumption analysis for the use of managers, and so on. Furthermore, it was launched in the Kunshan Campus in the second half of 2021. In 2023, Xi'an, AESC (Eindhoven), ACL (Linkou, Ruiguang, Taipei Sunny) will be launched; in 2024, the second phase of iEMS Global Roll Out will be deployed in areas of AKR, ACN (ABJ), ACN (ASH), ACN (AKDC), ANA (Milpitas, Irvine, Ottwa), and AJP (Tokyo, Nogata) to expect the system layout to be used to check the carbon reduction. In addition, we make energy consumption information transparent and compare the use of energy consumption. Therefore, the energy saving management function is generated from top to bottom through Advantech's monthly energy consumption information in Linkou, Neihu, Kunshan, Shanghai, Xi'an, and Beijing through the eManager management system.

Energy-saving facilities in the office area

compressors, water chillers, and other

LED lamp replacement

equipment

• Upgrades or replacement of air

3. Renewable Energy Strategy

- Solar power generation: The Linkou Campus is equipped with solar power panels, which have been in use since June 2019. In 2021, they generated about 48,489 kWh of electricity per month on average for use in parallel with Taipower. In addition, the new building in Linkou Phase 3 is also expected to be fully equipped with solar panels, with an estimated power generation capacity of 8,000 kWh per month. The Newcastle (Gaming Team) office in the UK has installed solar photovoltaic panels on the roof, which can generate up to 27,021 kWh/year, which is expected to start recording data in 2023. The New HQ phase-I facility (AASC-II) in the United States is also expected to set up solar power generation, which is estimated to generate 912,000 kWh/year.
- Electricity purchases: The Company announced we would invest in renewable energy plants in 2021. First of all, 10 MW of our low-carbon investment solar power plant in southern Taiwan was supplied to the Taiwan factory, and it is expected to gradually start supplying power in 2024. The goal is that Taiwan and Kunshan, China will reach the goal of using 50% renewable energy by 2030, and Advantech's global renewable energy use will reach 100% by 2040. From 2023 onwards, the Kunshan Manufacturing Park in China will gradually achieve the RE100 goal through the procurement of green electricity.

▲ Future Plans

Looking to the future, Advantech integrated the Taiwan factory and concentrated production in the Linkou Phase 2 Intelligent Factory. Furthermore, through the energy management system and production line optimization management mechanism, we will achieve energy consumption reduction targets and reduce electricity consumption to realize energy saving benefits. The Intelligent Energy Management System (iEMS) is also expected to complete the Global Roll Out project by 2024. Important overseas operating bases such as the United States, Europe, and Japan are also gradually planning solar power generation installations or suitable local renewable energy solutions.



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4.4 Environmental Management

Highlighted Performance



In 2022, there was no fine imposed for violating environmental laws and regulations. **NEW** Expanded the collection of environmental data (adding Japan, Korea, the US and Europe factories information)

NEW

The Linkou factory in Taiwan obtained the Green Factory Label certification from the Industrial Development Bureau, Ministry of Economic Affairs. (No. GF0091)

4.4.1 Environmental Responsibility

In terms of environmental management, Advantech not only implements environmental protection work related to sewage and waste in accordance with relevant laws and regulations, but has also formulated an Environmental Safety and Health Management System Manual as a guiding principle for the operation of the management system, and regularly inspects and implements management. All sewage meets discharge standards and is reported as required. Business waste is also entrusted to be disposed of and processed by qualified removal companies.

The Company's environmental declaration and environmental policy are as follows:

- 1. In our design and production of products and services to our customers, we are committed to the concept of green to reduce and prevent the generation of waste and pollution through the 3R (Reuse, Recycle, Reduce) as far as possible. Also, we are committed to energy conservation, waste reduction, emission reduction, and circular economy to reduce the impact of products and production activities on the environment.
- 2. Evaluate the risk and opportunity to establish management program to promote energy conservation and reduce waste of resources in accordance with global climate change, environmental issues and international regulations and standards related to environmental protection, energy and resource efficiency.
- 3. Establish a sustainable supply chain from design, production, delivery and service through the cooperation with customers, suppliers and outsourcing parties.
- 4. Ensure that all our activities comply with requirements of environmental, health, safety & HSF regulations and customers' designation. Promote relevant environmental, health, safety & HSF protection knowledge and activities through education and training, so that all personnel may participate in achieving the objective of continuous improvement and zero disasters, occupational diseases and pollution.
- 5. Continuously promote improvement through the management system, deeply construct the corporate risk management culture for environment, safety, and health, strengthen the important responsibility and awareness of sustainable development with all employees, joint ventures and stakeholders. Also, follow this policy due diligence when merging and acquiring related businesses. This policy is followed to conduct due diligence.

A Environmental Promotion Procedures and Actions

Promotional Procedures	Management Action
Environmental protection related management operational rules, Environmental Management System (ISO 14001), Greenhouse Gas Inventory (ISO 14064), Energy Management System (ISO 50001)	 Pollution precautions and prevention Environmental education training Environmental management system maintenance Greenhouse gas management Energy performance is monitored for improvement.

In order to achieve the promise of eco operation and sustainable development, the Company has established an environmental management system since 1996. We have done so in order to better implement the planning of environmental protection issues and to achieve the effectiveness of resource use. Meanwhile, through our Environmental Safety and Health Committee, we have established Advantech's environmental safety and health conceptual framework, advocated energy conservation, improved energy efficiency, and listed energy cost reduction as an annual key audit item. Furthermore, we regularly review performance through our environmental management system and GHG inventory. Table 4.4.1 shows the environmental management system and greenhouse gas inspection and certification of each factory region of Advantech. This chapter's writing scope covers Advantech's main global operations and production factories, together accounting for 92.3% of total consolidated revenue.

There was no environmental violations in 2022. The environmental violations at Advantech's main global operations and production factories in the past four years are summarized in Table 4.4.2. Table 4.4.1 Environment-related certification of Advantech's main global operations and production factories

Factory Environmental Certification Items	Taiwan ACL	Kunshan, China AKMC	Japan AJP	Korea AKR	USA ANA	Europe AEU
ISO 14001:2015	\checkmark	0	\bigcirc	-	\bigcirc	-
ISO 14064-1:2018		>	-	-	-	-
ISO 50001:2018	\checkmark	\bigcirc	-	-	-	-

Table 4.4.2 Statistics on Environmental Violations at Advantech's main global operations and production factories

Factory Annual	Taiwan ACL	Kunshan, China AKMC	Japan AJP	Korea AKR	USA ANA	Europe AEU
2022	0	0	0	0	0	0
2021	0	0	0	0	0	0
2020	0	0	0	0	0	0
2019	0	0	0	0	0	0

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A Advantech's Environmental Energy Resources Inputs and Outputs (Scopes for Factories in Taiwan, Kunshan (China), Japan, Korea, USA, and Europe)



4.4.2 Energy Resource Use and Waste Management

M Water Use and Management

Advantech's factories use water-saving faucets and toilets and promote water-saving measures in order to find ways to reduce water consumption per person. All factories are located in developed industrial areas or campuses in metropolitan areas. In terms of tap water supply, there is no extraction of groundwater or well water. The total water consumption of Advantech's global main operating locations and production factories in the past four years is shown in Figure 4.4.1. To further analyze of the increase in total water consumption of revenue in 2021 and 2022, it is because of the expansion of the scope of disclosure to include information on overseas factories in addition to the expansion and operation of the Kunshan Factory (Phase 5).

Advantech has successively implemented water-saving improvement plans in recent years. In Taiwan, water-saving solutions such as rainwater recycling and reuse are mainly used for domestic water, intelligent irrigation water saving, and intelligent air-conditioning cooling water and chilled water system monitoring and control. In 2022, the water consumption was saved for about 9,800 tons of water compared with 2021. The Kunshan factory area has installed water meters in the production workshops of



Figure 4.4.1 Water Consumption among Advantech's Main Global Operations and Production Factories in Recent Years

*Note: No statistics on water consumption in 2019, 2020, and 2021 for Korea; No statistics on water consumption in 2019 and 2020 for the United States.

each factory and conducted water metering management. This distinguishes water used for Phase 1, Phase 2, Phase 3, 4, and 5, dormitories, kitchens, and equipment, analyzing reasonable water consumption. In addition, water quality has been improved in the manufacturing process, and a total of 6,900 tons of water was saved in 2022. The main water-saving measures in the US factory are the installation of low-flow toilets and faucets, and leak detection and maintenance programs are carried out on a regular basis.

In the future, more improvement plans will be planned to save water resources.

Except for Kunshan, China, which contains industrial wastewater discharge, Advantech's other factories do not discharge industrial wastewater. The amount of water discharged by the Kunshan factory in the past four years is shown in Figure 4.4.2. The Kunshan factory has been introduced reclaimed water reuse and overflow water reuse plans since 2022. The waste water in the process is recycled and reused to reduce the discharge of waste water. As a result, waste water consumption was reduced by 31% compared to 2021.

Figure 4.4.2 Advantech's global industrial wastewater discharge volume in major operating locations and production plants in recent years



*Note: Only the factory in Kunshan, China, contains industrial wastewater discharged among Advantech's main operations and production factories.

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M Waste Management and Resource Recovery Management

Zero waste is the ultimate goal of Advantech's waste management. We take total waste reduction and waste recycling as a strategy in addition to reducing waste output and achieving waste reduction through source management measures such as reduction of raw materials. Advantech also actively promotes the recycling of waste, such as reusing packaging materials to replace the existing end-of-pipe treatment model, and turning waste into useful resources. This not only truly achieves resource recycling, but also reduces energy consumption and waste disposal costs. Advantech devotes attention to its waste contractors every year. If a contractor breaches the contract or violates government regulations, it will undertake corresponding disposal or guidance or replacement. In 2022, Advantech did not have any major breach of contract or violation of laws by waste contractors. The Company's waste management model is shown in Table 4.4.3.

Type of waste		Content description	Action taken	Ultimate disposal method
	Bottles	PET bottles/steel or aluminum cans, etc.	Dedicated recycling	Reuse
	Paper	Newspapers/magazines/photocopying paper/ printing paper/cartons/boxes, etc.	Dedicated recycling	Reuse
	General-use glass	Beverage bottles, etc.	Dedicated recycling	Cyclical use
General household waste	General-use plastic	Beverage bottles/waste containers, etc.	Dedicated recycling	Cyclical use
	Other recyclable resources	Batteries/toner clips/lights, etc.	Headquarters/photocopier manufacturers	Cyclical use
	Food waste recycling	Compost food waste/pig food waste, etc.	Management Committee	Fertilizer use
	Domestic waste	Office household waste, etc.	Management Committee	Incineration (Taiwan) / Sanitary burial (Kunshan)
	General business waste	PCB scrap/waste electronic parts/waste sponges/waste tape, etc.	Dedicated recycling	Incineration/Landfill/Reuse
Business waste	Hzardous business waste	Waste tin slag/chemical waste liquid, etc.	Outsource the processing to a qualified removal processing company	Solidification and landfill/incineration/ reuse

Table 4.4.3 Advantech Waste Management Model

Regarding the final disposal weights of waste at Advantech's main global operations and production factories, because the weight of domestic waste is an approximate estimate of the contracted clearance, weight information for further disposal classifications is not yet available. Therefore, only information waste is disclosed. Please see this as shown in Table 4.4.3 and Figure 4.4.3.



Figure 4.4.3 Disposal Volume of Business Waste among Advantech's Main Global Operations and Production Factories in Recent Years

*Note:

- 1. The source of statistics on the weight of waste in the Taiwan and Kunshan factories is the data reported by each factory to the competent authorities. The source of waste statistics in Japan, the United States, and European factories is the data of outsourced processing.
- 2. No statistics on the production volume from 2019 to 2022 for Korea.
- 3. The production volume for the United States and Europe in 2019 and 2020 was not counted.



Introduction to the project of waste tin recycling and reuse



In recent years, Advantech's Taiwan factory has begun to introduce the thinking of circular economy. Principles are valued and introduced into the project of tin slag reuse, such as resource reuse, waste reduction, waste reduction, etc. Therefore, harmful waste tin slag is successfully recycled and reused by using a solder spatter separator. The amount of tin dross waste was reduced by 68%, resulting in a reduction in the output of hazardous waste.



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According to the statistics, the total waste disposal volume of Advantech's main operating bases and production regions in 2022 was 1,242.53 metric tons. Out of this, there was 1,000.48 metric tons (80.5%) of non-hazardous waste and 242.05 metric tons (19.5%) of hazardous waste. Please refer to see Table 4.4.4 and Figure 4.4.5 for waste disposal.

Table 4.4.4 Waste Disposal Methods of Advantech's Main Global Operations and Production Factories in 2022

	Incineration	Landfill	Recycle/Reuse
Hzardous business waste (metric tons)	211.17	3.60	27.28
Non-hzardous business waste (metric tons)	20.09	0	980.39

*Note:

 The source of statistics on the weight of waste in the Taiwan and Kunshan factories is the data reported by each factory to the competent authorities. The source of waste statistics in Japan, the United States, and European factories is the data of outsourced processing.

2. The production volume of Korea in 2022 was not counted.

Figure 4.4.5 Business Waste Disposal Status among Advantech's Main Global Operations and Production Factories in Recent Years



*Note:

1. The source of statistics on the weight of waste in the Taiwan and Kunshan factories is the data reported by each factory to the competent authorities. The source of waste statistics in Japan, the United States, and European factories is the data of outsourced processing.

2. No statistics on the production volume from 2019 to 2022 for Korea.

3. The production volume for the United States and Europe in 2019 and 2020 was not counted.

Air Pollutant Management

Air pollutants have become one of the important environmental issues of global concern. In 2017, the International Agency for Research on Cancer (IARC) listed air pollutants as known primary human carcinogens. Volatile organic compounds (VOCs) are one of the most important portions of air pollutants that are harmful to ecology and health. Advantech also cares about the effectiveness of air pollution controls and about atmospheric air quality. Volatile organic compounds is one of the important sources of contribution to the formation of PM2.5 and so fine that it penetrates into the lungs very easily; thus, the impact of VOCs on human health cannot be ignored. Regarding air pollution data and information disclosures, Advantech has put together three key points:

- Advantech's production process does not generate ozone-depleting substances (ODS) and hence there are no ODS emissions.
- Advantech Taiwan and Advantech Japan mainly utilize assembly processes with low air pollution load, so there is no emission of nitrogen oxides, sulfur oxides, or volatile organic compounds (VOCs).
- Advantech's Kunshan (China) Campus utilizes liquid coating and powder coating processes, and the volatile organic compounds (VOCs) emitted are all in compliance with local regulations

Please refer to Table 4.4.5 for volatile organic compounds (VOCs) emitted by Advantech's manufacturing factories in recent years. The substantial increase in VOCs in 2021 was due to increased production capacity.

Table 4.4.5 Volatile Organic Compounds (VOCs) Emitted by Advantech's Main Global Operations and Production Factories in Recent Years (Unit: mt)

Factory Annual	Taiwan ACL	Kunshan, China AKMC	Japan AJP	Korea AKR	USA ANA	Europe AEU
2022	-	27.57	-	-	-	-
2021	-	31.42	-	-	-	-
2020	-	8.94	-	-	-	-
2019	-	5.52	-	-	-	-



*Note: The scope covers Advantech's main global operations and production factories, but only the Kunshan (China) factory produces VOCs.

In order to implement environmental reduction targets, Advantech Kunshan (China) has adopted effective control of volatile organic compounds (VOCs). This has been accomplished through online real-time continuous monitoring and outsourced monitoring and management of emissions, and improvements in equipment processing efficiency to reduce environmental emissions. Improvement projects have been implemented successively in recent years, for example, the transformation of process technology, changing the liquid baking varnish to powder baking varnish waste gas and improving the equipment treatment efficiency of the production line, effectively reducing the generation of energy, waste gas and VOCs. In 2022, the production of VOCs was reduced by 12% compared with 2021.

4.4.3 Biodiversity and Conservation of Forests

Advantech started to focus on the topics of biodiversity and conservation of forests in 2022. Moreover, we joined the Taiwan Nature Positive Initiative (TNPI) initiated by the Taiwan Business Council for Sustainable Development (BCSD-Taiwan). We take more active actions on this issue to increase Advantech's corporate resilience. Moreover, Advantech's IoT expertise is being applied to empower nature conservation.

A Progress in 2022

In 2022, Advantech handled the following activities related to biodiversity and conservation of forests

Activity name	Activity theme	Achievement of participation		
"International Coastal Cleanup Day" beach cleanups activities at Jinshan beach	14 _{我想} 海洋 與保育	A total of 55 employees participated, and more than 70 kilograms of marine waste were removed.		
Ecological Conservation Action of the Guandu Wetlands	15 ^{陸坡生態}	A total of 43 employees participated to learn wetland ecology, recycling knowledge and field operations, and lotus root pond conservation work was also carried out.		

Advantech's headquarter and major overseas business units have jointly promoted and implemented the green office plan. It emphasizes and encourages the paperless work, the use of double-sided printing of office paper, the paper recycling and reuse, and the promotion of office paper and household paper to choose FSC (Forest Stewardship Council) certified sustainable forest paper or other papers made through recycling.

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A Plans for 2023

AloT for Biodiversity

For 2023, Advantech has drawn up plans related to biodiversity and conservation of forests as follows: In 2023, it is estimated that NT\$3 million will be invested in co-creating AloT for Biodiversity innovative solutions in the form of industry-university cooperation. One of the main axes of the project will be real-time monitoring of biodiversity and identification of species assisted by artificial intelligence. The AloT platform is used to integrate technologies such as image and audio recognition. Databases of herbivores and birds of the forest are created for specific fields. There are also observation of the impact of human activities (newly planted forest roads and tourist activities) on it. Under the long-term large-scale introduction, this AloT platform and data will help the Forestry Administration to grasp the ecosystem and changes of forest land. AloT observation data is applied to plan and make decisions that minimize ecological impact. We apply our own core competence - the energy of the AloT platform, and jointly develop innovative solutions with external experts and partners to establish a demonstration field. The biodiversity benefits of this plan have been verified in the field in the short term, and it is expected to be replicated and promoted in the industry in the future.



(Powered by Advantech AloT Platform)

Collaboration with the AloT for Biodiversity project

- Integration of Advantech AloT Platform
- Outcomes of biodiversity benefits
- Armed potential for industrialization promotion
- Combined with actual field or specific project

Coastal Forest Restoration

In cooperation with Tse-Xin Organic Agriculture Foundation, we adopted 102 trees in the afforestation site in Shalun, Taoyuan, and maintained them for three consecutive years. The damage caused by the strong northeast monsoon, flying sand, sea tide, and salinity to the vegetation in this area has been slowed down through the afforestation of the first-line coastal forests. In this way, the coastline can be protected and intact habitats for native organisms are provided.

Wetland Conservation

In cooperation with Guandu Natural Park, 5 hectares of paddy fields and wetlands in the Guandu Plain were adopted. The environment and biodiversity are maintained through the cleaning and dredging of irrigation and drainage ditches, the waterways are guaranteed to be unobstructed, siltation is reduced, flood water storage space is provided, and the pressure of wetland terrestrialization is reduced.

Please refer to the full text of the official announcement for Commitment related to Advantech Biodiversity and No Deforestation.

Biodiversity Commitment

No Deforestation Commitment