Advantech Co., Ltd.

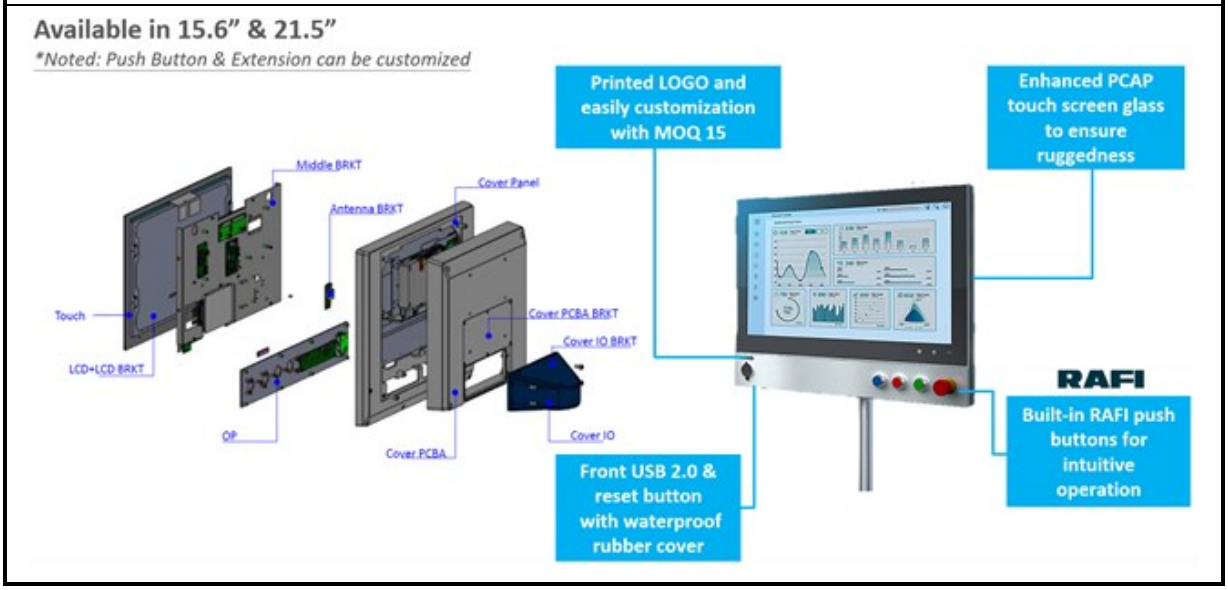
Life Cycle Analysis - Environmental Impacts

Product name：Integrated Computer (SPC-815-633A)

Certification Standard：ISO 14067：2018

Life Cycle Analysis - Environmental Impacts

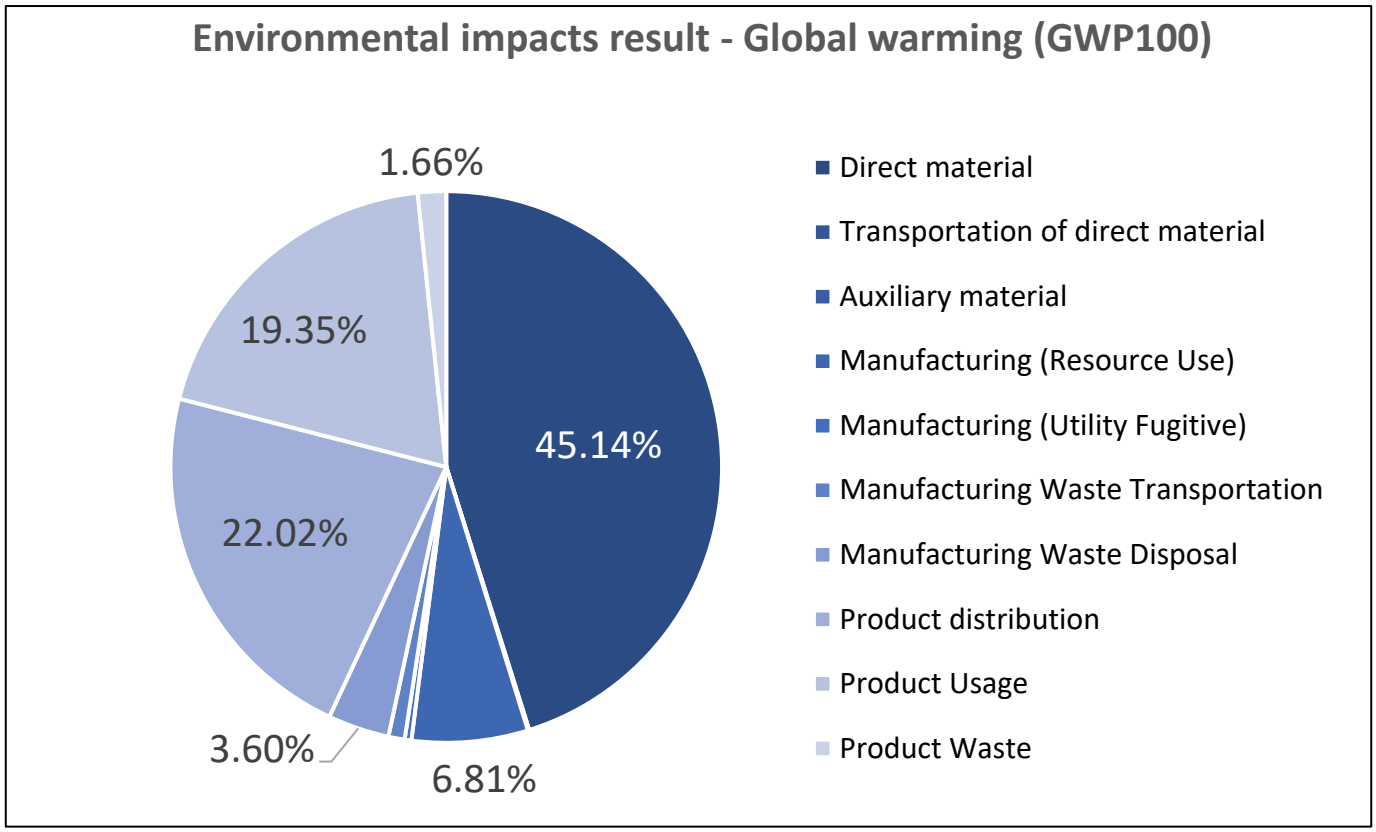
- **Product information**

Item		Product information(SPC-815-633A)
Technical specifications	Base Unit	IP65-rated standalone panel PC with 15.6" HD, P-CAP touch, front USB, Intel i3-6100U CPU, 8 GB RAM
	Length*Width*Height	402.19mm*333.19mm*67mm
	Power Consumption	35W Typical, Max 60W Typical
	Power input	24v
	Weight(Net /Gross)	8.2 kg / 9.123 kg
Product exploded View		
		

- **Impact category：Global warming (GWP100)（Unit：kg CO2 eq）**

Summary of the environmental impacts results

Product Lifecycle Stages	GHG Emissions by Stage ($kgCO_2$ e/product)	Proportion of emissions (%)
Direct material	127.9510	45.138%
Transportation of direct material	0.2244	0.079%
Auxiliary material	0.0008	0.0003%
Manufacturing (Resource Use)	19.2902	6.805%
Manufacturing (Utility Fugitive)	1.1094	0.391%
Manufacturing Waste Transportation	2.7016	0.953%
Manufacturing Waste Disposal	10.2162	3.604%
Product distribution	62.4072	22.016%
Product Usage	54.8621	19.354%
Product Waste	4.7025	1.659%
Total	283.4655	100.000%



Impacts from direct material& auxiliary material stage

Impact category	Global warming (GWP100), kg CO2 eq
BATTERY	0.0020
cable	0.0643
Connector	7.5500
Cover-Cage(METAL)	30.3219
Heat sink(METAL)	5.9645
Module	65.6004
Packaging	7.3056
PCBA	10.4043
Plastic/Gasket Tape	0.0007
Plastic/LED light post	0.0188
Plastic/mylar	0.0239
Plastic/Rubber	0.2300
Plastic/Thermal pad (gel)	0.0286
Plastic/Wire Mount	0.0139
Post/Screw	0.3717
Alcohol	0.0008
Total	**127.9518**

Impacts from Manufacturing stage

Impact category	Global warming (GWP100), kg CO2 eq
Nature Gas	0.0863
Water	0.0374

Purchased electricity	19.2000
Diesel	0.0059
Air conditioning and refrigeration equipment	1.1095
Fire extinguishers	0.0000
Total	**20.3997**

Impacts from product distribution stage

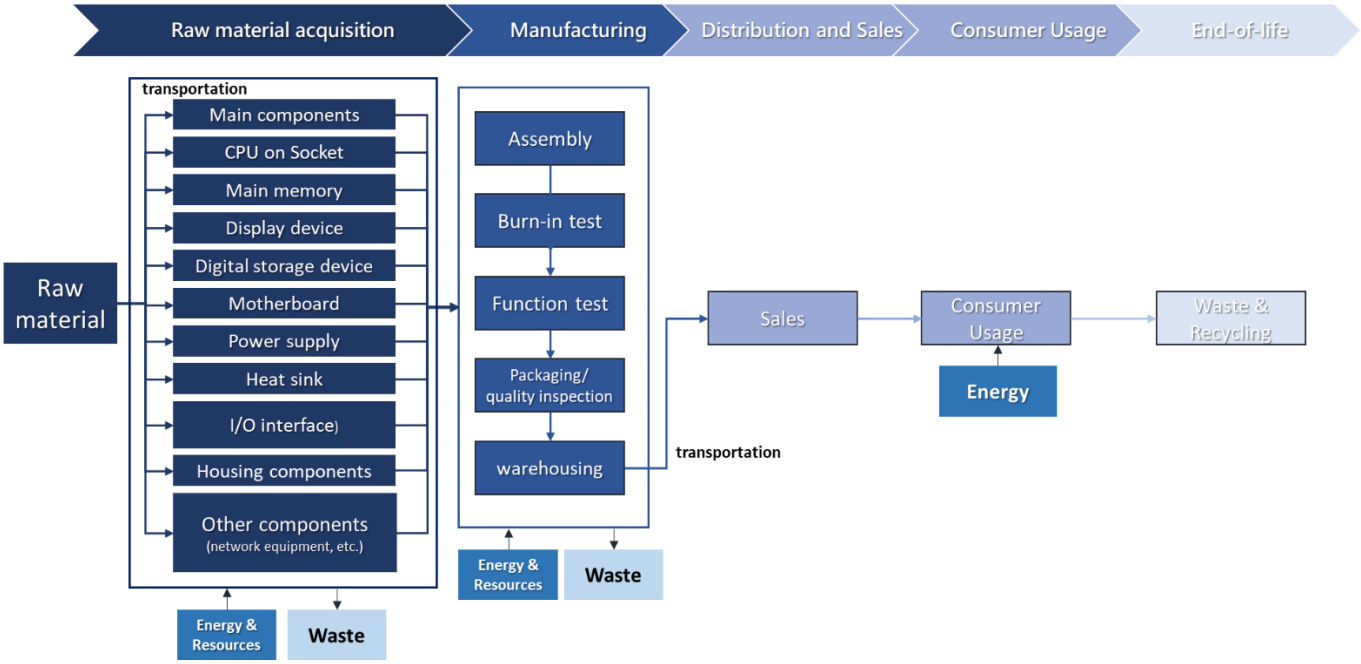
Impact category	Global warming (GWP100), kg CO2 eq
International land transport - trucks	0.1468
Domestic land transport - truck	0.0339
Air freight	62.0200
Ocean freight	0.2503
Total	**62.4072**

Impacts from product usage stage

Impact category	Global warming (GWP100), kg CO2 eq
product usage	54.8621
Total	**54.8621**

SPC-815-633A EcoProfile

1. Evaluate boundary



2. SPC-815-633A Raw material usage

Category	Ingredient composition	Weight ratio (%)
PCBA	Capacitor SMD/DIP、Capacitor MLCC NPO 0402/0603/1808、Capacitor MLCC X5R 0201/0402/0603/0805/1210、Capacitor MLCC X7R 0402/0603/0805/1206/1808、BUZZER、Coil/Inductor、Crystal、Diode、Ferrite Bead Core、FUSE、IC、LED、Oscillator、PCB、Protective Device/ Polyswitch、Resistor 0201/0402/0603/0805/ 2010/2512、Switch、Thyristor、Transistor	<5
BATTERY	BATTERY	<1
cable	cable	<5
Cover-Cage(METAL)	Metal COVER-SGCC Steel、Metal COVER-ADC 12	>30
	Coating-NPS810、Coating-MBK880	<0.5
Connector	Connector	<1
Heat sink(METAL)	Heat sink(METAL)	<10
Plastic/Gasket Tape	Plastic/Gasket Tape	<0.5
Plastic/LED light post	Plastic/LED light post	<0.5

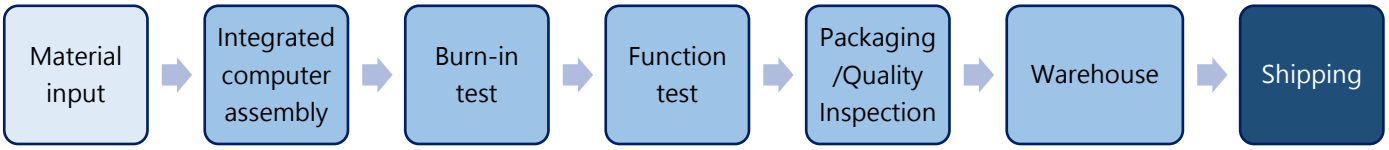
Category	Ingredient composition	Weight ratio (%)
Plastic/mylar	Plastic/mylar	<1
Plastic/Rubber	Plastic/Rubber	<1
Plastic/Thermal pad (gel)	Plastic/Thermal pad (gel)-PC 1225L、Plastic/Thermal pad (gel)-Sarcon PB25A、Plastic/Thermal pad (gel)-XR-HL	<0.5
Plastic/Wire Mount	Plastic/Wire Mount	<0.5
Post/Screw	Clinching Fastener、Post、Screw	<1
Module	Add-on Card/TRANSFERRING/EXTENSION BOARD、Display Module/LED Board、MEMORY MODULE、Touch Panel Module、Touch Panel Module/Controller Board-PCB CCL / Cover Glass-Glass ITO Film(PET)	<15
Packaging	Packaging/Bubble Bag、Packaging/Carton、Packaging/label、Packaging/Sponge、Packaging/User Manual、Packaging/Others Manual、Packaging/WARRANTY CARD、Packaging/Zipper bag	>40

3. Energy/resource consumption in manufacturing process

3.1 Manufacturing site：

Advantech AIoT Co-Creation Campus（No.27 & 27-3, Wende Rd., Guishan Dist., Taoyuan City 333005, Taiwan）。

3.2 Manufacturing process：



3.3 Energy/resource consumption：

From material input to product assembly, the total electricity consumption per 1Pcs. functional unit is 32.4756 kWh; total water consumption: 0.1607 m3; total natural gas consumption: 0.0360 m3; total diesel consumption: 0.0018L.

4. Transportation information (statistical period: 2022.01.01-2022.12.31)

- Taiwan (Land transport) -> USA (Ocean freight, OAKLAND Port) -> USA (Land transport), the total distance is 10,985 km for 4 products' transportation.
- Taiwan (Land transport) -> USA (Air freight, San Francisco Airport) -> USA (Land transport), the total distance is 10,472 km for 18 products' transportation.

- Taiwan (Land transport) -> Europe (Air freight, Maastricht airport) -> Europe (Land transport), the total distance is 9,589 km for 11 products' transportation.
- Taiwan (Land transport) -> China (Ocean freight, SHANGHAI Port) -> China (Land transport), the total distance is 804 kilometers for 2 products' transportation.

5. Energy consumption during product usage stage

The estimated service life of the product is 5 years. This calculation divides the product into three operating modes: idle mode, on mode, and standby mode. The hourly power consumption is 0.0132, 0 .0398 and 0.0023 kWh, respectively, and the annual power consumption of the product is estimated by operating for 8 hours/day, so the power consumption of the product during use is 161.3592 kWh.

6. Product recycling information

6.1 Purpose：

The document provides the basic instructions for the disassembly of products to remove components and materials requiring selective treatment, as defined by EU directive 2002/96/EC and 2012/19/EU, Waste Electrical and Electronic Equipment (WEEE).

6.2 Items Requiring Selective Treatment：

Item	Item Description	Quantity of items included in product
Printed Circuit Boards (PCB) or Printed Circuit Assemblies (PCA)	With a surface greater than 10 sq. cm Mother board, Card Reader board, USB Daughter board, LID Daughter board	1
Batteries	All types including standard alkaline and lithium coin or button style batteries 6cell battery or 9 cell battery, and RTC battery	1
External electrical cables and Power cord		0
Liquid Crystal Displays (LCD) with a surface greater than 100 sq cm	Includes background illuminated displays with gas discharge lamps	1
Cathode Ray Tubes (CRT)		0
Gas Discharge Lamps		0
Electrolytic Capacitors / Condensers measuring greater than 2.5 cm in diameter or height		0
Mercury-containing components	For example, mercury in lamps, display backlights, scanner lamps, switches, batteries	0
Capacitors / condensers (Containing PCB)		0
Plastics containing Brominated Flame Retardants weighing > 25 grams	(Not including PCBs or PCAs already listed as a separate item above)	0
Components and parts containing toner and ink, including liquids, semi-liquids (gel/paste) and toner	Include the cartridges, print heads, tubes, vent chambers, and service stations.	0

Asbestos waste and components which contain asbestos		0
Components containing refractory ceramic fibers		0
Chlorofluorocarbons (CFC), hydrochlorofluorocarbons (HCFC) or hydrofluorocarbons(HFC), hydrocarbons (HC)		0
Components, parts and materials containing radioactive substances		0

6.3 WEEE Recyclability Assessment

Product Recyclability Assessment	Weight(g)	Percent (%)
Recyclable(Reuse + Recycle)	6460	97.2%
Waste to Energy(Energy Recovery)	61	0.9%
Landfill	127	1.9%

6.4 Reference

The above information is based on the internal Product Disassembly Instructions - Multi-Touch Panel Computer SPC-815 (SPC-815-633A) from Advantech.

7. Environmental impact information

- Assessment scope: Raw materials, manufacturing, transportation, use, disposal/recycling stages of the product.
- Functional unit: 1 integrated computer (SPC-815-633A)
- Evaluation software: SimaPro 9.3.0.3
- Assessment results

Environmental impact items	Equivalent unit	Equivalent value
Greenhouse Gases in GWP100	Kg CO2 eq.	283.4655

Advantech’s Green Design Product Management

1. Advantech’s Green Design Product Management

Advantech adheres to the concept of environmental protection and actively promotes a green product design management mechanism. It uses life cycle assessment (LCA) and product carbon footprint to quantify the environmental impact analysis of Advantech products to ensure that products comply with international regulations and customer needs.

Advantech's green product design mainly follows the following four aspects: (1) eco materials, (2) eco packaging materials, (3) product recall, (4) product energy saving, as shown in Figure 1. These aspects cover all stages of a product, from raw material selection, manufacturing, transportation, and use stages until the final disposal. Advantech has developed a series of standards based on international environmental regulations and assessment tools (such as Table 1), such as the US Electronic Product Environmental Assessment Tool (EPEAT), to improve energy efficiency, reduce environmental toxicity, and provide verification standards. Products that pass the verification can obtain the gold or silver medal mark declared by Advantech internally. Among new products in 2024, the proportion of products with green design system that meet the internal self-declaration standard for silver medals reach 60%. The goal for 2025 is 80%, and for 2026, it will increase to 90%. In addition, Advantech also introduce the internal silver medal standard into the internal specifications of the development process in 2024, and actively design and develop models that meet the gold medal standard for green design products.

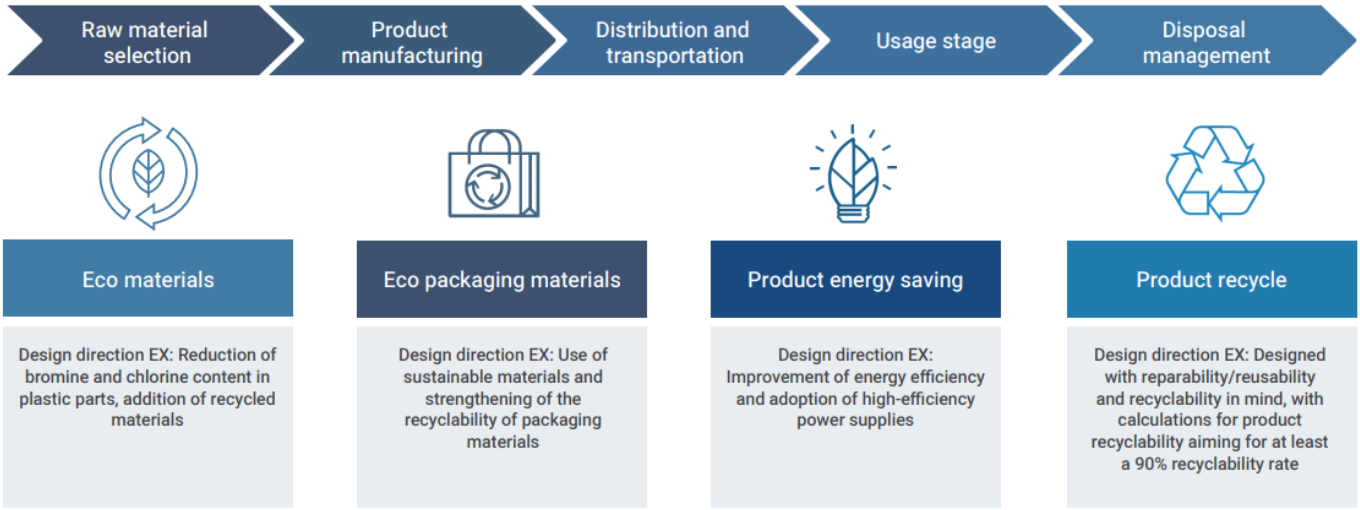


Figure1 Product life cycle and Advantech's eco product design aspects

Table1 Examples of eco product design content planning

Environmental design focus	Design content	
Enhance energy efficiency Ecological design Reduce environmental toxicity and hazards	Conformance with provisions of European Union RoHS Directive, China RoHS, Taiwan BSMI RoHS, IEC62474	Comply with regulations such as EU RoHS, China RoHS, Taiwan BSMI RoHS, IEC62474
	Conformance with substance restriction requirements of the European Union Battery Directive	Comply with the substance restriction requirements of the EU batteries regulation
	Reduction of Bromine and Chlorine content of plastic parts >25 grams	Reduction of bromine and chlorine levels (> 25g) in plastic parts
	Conformance with supply chain communication provisions of European Union REACH Regulation	Comply with EU REACH regulations on supply chain communication
	Elimination of added heavy metals in packaging	Eliminate heavy metals from packaging
	Restriction on the use of elemental chlorine as a bleaching agent in paper-based packaging material	Restrict the use of elemental chlorine as a bleaching agent in paper packaging materials
	Enhancing recyclability of packaging materials	Enhanced the recyclability of packaging materials
	Recycled fiber in corrugated packaging	Recycled fiber for corrugated cardboard packaging
	Design for repair, reuse and recycling	Design for repair, reuse, and recycling
	Design for plastics recycling	Design for plastic recycling (plastic parts weighing > 100 g)
	Product recyclability calculation and minimum 90% recyclability rate	Product recyclability calculation and at least 90 % recyclability (IEC TR62635)
	Information and reporting in preparation for reuse and recycling	Information and reports for reuse and recycling purposes
	Replacement components availability	Availability of spare components
	Energy efficiency	Energy efficiency

2. Advantech's Product Liability Management

Advantech has established a complete management and control process for product responsibility to reduce the impact on the environment and ecology and meet the expectations of stakeholders.

The recyclable design of "recyclability, easy disassembly, low pollution, and energy saving" is injected into the early stage of product design. Advantech's eco design products have a recycling rate of up to 90%; additionally, through recycling schemes required by regulations, the company promotes the reuse and recycling of electronic products. Advantech's product recycling management complies with the waste recycling and regulations in various countries, including regulations in Europe, the United States, Japan, South Korea, Taiwan, and China.

In energy-saving design, Advantech has not only introduced the internal self-declared silver label into EU ErP, but also established internal standards and introduced standardization. Each business group nominates products with Energy Star as the design goal and develops energy-saving management software to improve carbon reduction benefits. For example, Advantech uses energy-saving software to assist hardware to improve the carbon reduction performance of products, and plans to introduce new products that meet Energy Star requirements in specific product lines.

In terms of environmental responsibility, in order to reduce our impact on the environment and ecology, to fulfill our corporate responsibility for environmental sustainability, to meet the expectations of stakeholders, and to continuously comply with international regulatory requirements, Advantech annually complies with international regulations, the electronics industry standard IEC 62474, customer requirements, and environmental trends. After reviewing the management status of hazardous substances, we have established Advantech's green policy (hazardous substances reduction plan), surpassing the international mandatory regulations. By 2023, there were more than 500 controlled chemical substances, and achieved 100% compliance with international environmental regulations, 100% compliance with IEC 62474, and 100% compliance with Advantech GPM regulated substance standards. In terms of management and control, we regularly update Advantech's hazardous substance management regulations for eco products (as shown in Figure2) and manage them with the green supplier relationship management system (GPMS) (as shown in Figure3). Advantech's main plants have

introduced the IECQ QC 080000 system.

Figure2 Advantech green policy - hazardous substances reduction plan

Figure3 Green supplier relationship management system (GPMS)

In terms of supply chain management, Advantech has implemented a Green supplier relationship management system since 2010. Within this platform, suppliers must commit to and ensure that their products do not contain the Company's regulated harmful substances, as well as provide supporting documentation for reference. The platform is optimized annually to rejuvenate the database, resulting in an efficient green supply chain. Advantech has introduced the hazardous substance management system since 2010. We uphold the spirit of rigorous quality management and continue to control every aspect of product liability. Advantech's products comply with relevant regulatory requirements

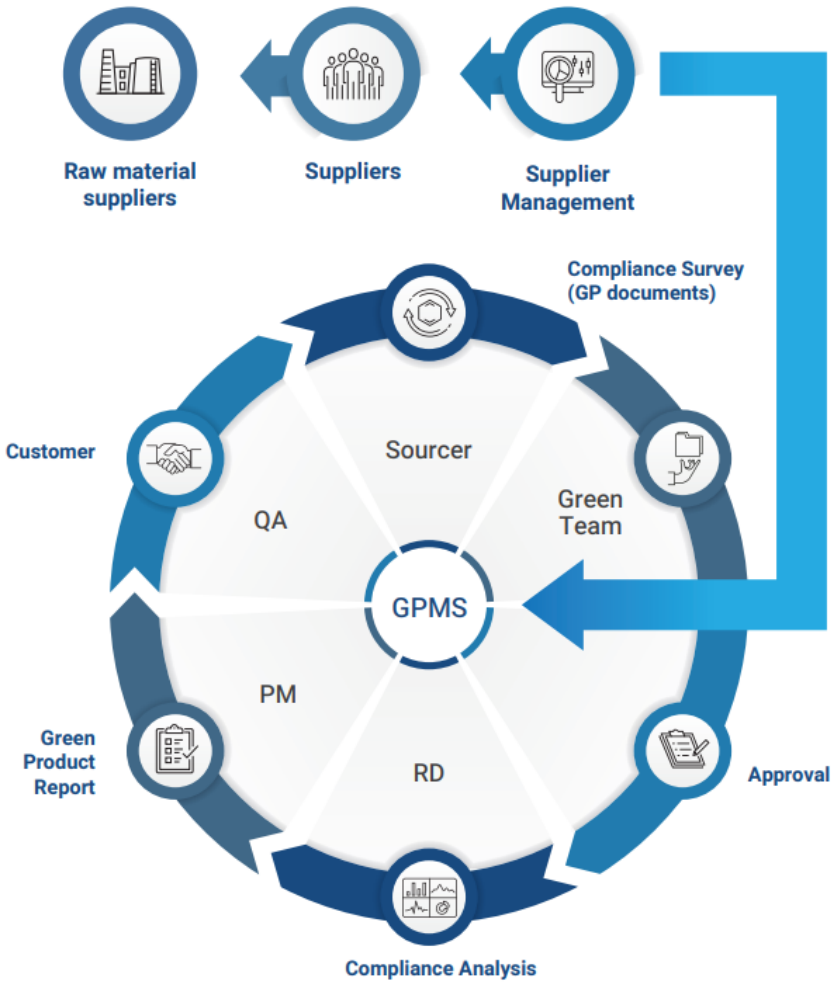


Figure4 Green supply chain management process

Finally, in terms of product recycling and reuse, Advantech's product recycling strategy emphasizes producer responsibility and is committed to the recycling and management of electronic waste. Advantech's product recycling management not only complies with national regulations, but also actively promotes the reuse and recycling of electronic waste, and has improved the recycling rate of its products through its own efforts.

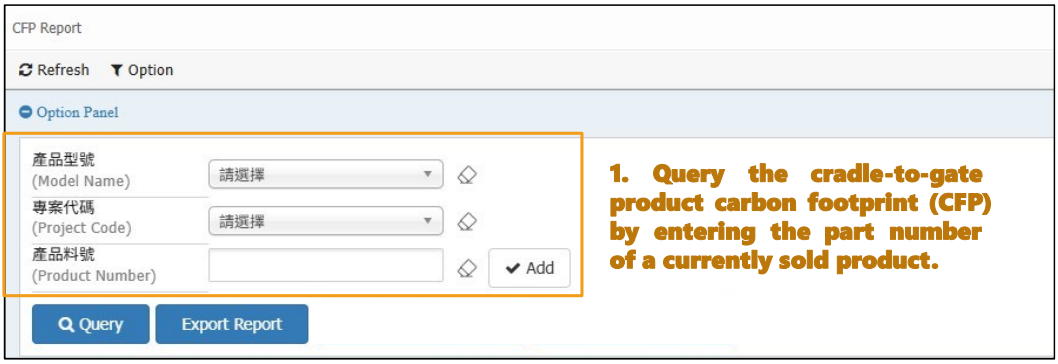
3. Advantech's Intelligent Solution for Product Carbon Footprint Calculation

Advantech is proactively responding to the global net-zero transition, recognizing carbon management as a critical factor in maintaining corporate competitiveness. As the industrial computing and IoT industry faces growing international carbon regulations—such as the Carbon Border Adjustment Mechanism (CBAM) and carbon pricing, etc.—companies are expected not only to deliver high-performance, energy-efficient products, but also to accelerate their low-carbon transformation. Enhancing transparency in product carbon footprint disclosure has become central to strengthening global market positioning.

In 2024, we began developing an internal intelligent carbon footprint accounting system to support our low-carbon product design initiatives and enable standardized emissions calculations across our product lines. Our system is based on the Life Cycle Assessment (LCA) methodology and complies with internationally recognized standards, including ISO 14040, ISO 14067, and the GHG Protocol. It integrates internal data sources—such as raw material records, supplier databases, and production

management systems—and connects with external APIs. By leveraging AI-driven emission factor mapping, the system enables rapid, automated cradle-to-gate carbon footprint calculations and generates comprehensive reports to support decision-making across product life stages.

As of June 2025, our system is fully operational and capable of calculating the carbon emissions of all products sold in 2024, covering 100% of our revenue-contributing portfolio. This significantly streamlines what was once a manual, time-consuming process and empowers us to quickly identify emission hotspots and plan effective reduction strategies. Through this system, we can proactively identify high-carbon-risk products, adjust our design and production strategies, and provide accurate carbon footprint data to meet the needs of our global customers—further strengthening our leadership in sustainable innovation.



1. Query the cradle-to-gate product carbon footprint (CFP) by entering the part number of a currently sold product.

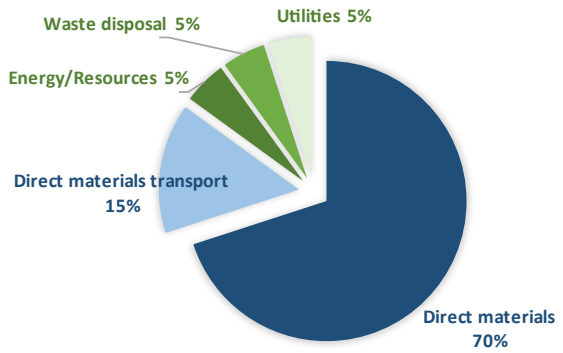
REPORT SAMPLE

Product Carbon Footprint Report

ADVANTECH

Product Model/ Number (Ver)
EKI-5526I-MB / EKI-5526I-EI-AE (A0-60)

Product Name
16 port Entry-Level Managed Switch



Life Cycle Boundary

B2B (cradle to gate)

Total Carbon Emission

1,000
(kg CO_2/Unit)
Based on 2023 manufacturing data

Life cycle stage	Carbon emission stage	Carbon emission (kg CO_2/Unit)
Material	Direct materials	700
	Direct materials transport	150
Manufacturing	Energy / Resources	50
	Waste disposal	50
	Utilities	50

NOTE 1: The system is independently developed by Advantech with Open AI Embedding Model.
NOTE 2: The calculation and methodology of this system is based on ISO 14040, ISO 14044, ISO 14064, and ISO 14067.

2. System can automatically calculate the CFP for Raw material , manufacturing , and upstream transportation stage, along with the total emissions.

Statement of Carbon Footprint

The assessment of carbon footprint refer to following instructions

- ISO 14067:2018
- TÜV NORD GHG Management Procedure（C-P-EN001）

Applicant:

Advantech Co., Ltd.

Location:

No. 27 & 27-3 Wende Rd., Guishan District,
Taoyuan City, Taiwan

Product Type:

Integrated Computer (SPC-815-633A)

Based on the information we have received and assessed, it was verified by TÜV NORD that

- **The product boundary: [Cradle to Grave]**
- **Reported product carbon footprint period in 2022-01-01 to 2022-12-31**
- **The total product carbon footprint is 283.4655 kgCO_2e/Kg with materiality of 5%**
- **Level of assurance: Reasonable assurance**

Intended User of CFP Statement: Organizations use for their own reference.

Statement No.: 233328004

The statement is valid from 2023-07-10

The statement will be expired on 2025-07-09

Sign by Jack Yeh

Statement from: TÜV NORD Taiwan Co., Ltd. Place: Taipei, Taiwan Date: 2023-07-10

Room A1, 9F, No.333, Sec 2, Tun Hua S. Rd., Taipei 10669 Taiwan, R.O.C.

This statement is in line with the project management procedure of TÜV NORD Taiwan Co. Ltd.