Innovation Value

2.1 New Businesses Development

2.1.1 Circular Economy

Wistron is one of the world's largest suppliers of information and communication products that focuses on product development, design, manufacturing, and services. Using the concept of sustainable product design and development that combines product lifecycle and the circular economy, we are committed to lowering the impact of products on the environment and creating sustainable value. Wistron does not only produce green electronic products, we also recycle discarded electronic products and convert recycled materials into environmentally friendly products. We use resource sustainably to create a green and circular sustainable business model.

In 2010, Wistron established green resources businesses which officially began operations in 2013 to provided cradle-to-cradle green services with closed-loop recycling solutions. The Company seeks to maximize benefits for customers in the circular economy. The total shipped volume of post-consumer-recycled (PCR) environmentally friendly materials was 26,288 tons in 2021. We have received 16 UL yellow card product certifications in total. In 2021, the reduction in the use of new plastics materials reached 11,131 tons. Using the carbon footprint estimate for recycled plastics in the TUV database, we calculate that we reduced carbon emissions by 49,116 tCO_2eq. Furthermore, for the subjects of closed-loop gold and closed-loop plastic services, apart from the information and communication industry, medical industry, and aviation industry, the services have been expanded to "safe product destruction and recycling" services requested by OEM clients. Product lines that use recycled plastics have gone from display products and televisions to desktop computers, VoIP phones, servers, set-top boxes, mice, and keyboards.

Green Resources Business Achievements (tons)

Item	2018	2019	2020	2021
Electronic waste treated	10,046	11,363	10,000	7,300
PCR plastic materials shipping volume	17,320	13,512	16,930	26,288
Reduction in usage of new plastic materials	6,062	4,730	7,620	11,131

Raw Materials and Technological Innovations

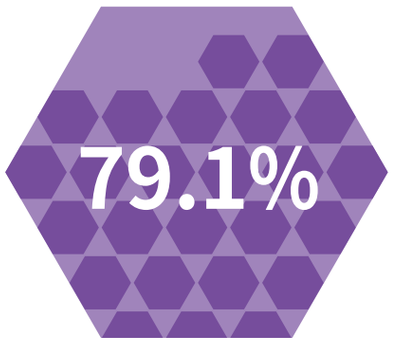
The Wistron green resources team provides recycle processing and recycled plastics services, such as ocean plastics recycling and recycled plastics, building on its 9 years of practical circular economy experience. Since the announcement by ODM customers that 100% of packaging and 50% of the product materials should use recycled or renewable materials, bio-based plastics have been integrated into smaller parts of laptop products, such as the rubber feet. At the same time, we have assisted customers to introduce 50% PIR (post industrial recycled) hydroelectric recycled aluminum in 2021 to satisfy their aluminum needs. Additionally, recycling and reuse of lithium batteries will be the focus of next phase of developments.

Item	Raw materials/ technologies	Characteristics and environmental benefits
Renewable raw materials	Bio-based Plastic	The addition of bio-based plastics does not impact the structural strength and can improve sustainable content. Currently, the main source of bio-based plastics is castor oil from renewable plants. The addition ratio is between 20% to 50% (bio based mass balancing). Besides reducing the use of petroleum, it can reduce carbon emissions without weakening the structural strength.
	Ocean-bound plastic	Ocean-bound plastic has been used in product development for products such as display products and fans. In 2021, 102 tons of products made from ocean-bound plastic were shipped.
Innovative technology	Hydroelectric recycled aluminum	Traditional aluminum is mostly made from fossil fuel power. 50% PIR recycled aluminum have been introduced through recycling and reuse because the energy consumption of recycling aluminum is much lower than producing new aluminum. Additionally, the carbon dioxide emissions of producing 1 ton of aluminum through hydropower are much less than fossil fuel power. This will also help achieve energy conservation and carbon reduction goals.
	Recycling and reuse of lithium batteries	When recycling and refining lithium batteries used in consumer products, lithium batteries used in electric vehicles can also be recycled, in order to fully implement the ideals of a circular economy.

Green Product Performance

Sustainability is the creation of a resource rich future for the next generations. For several years, Wistron has implemented concrete green products and circular economy concepts in its business model. The product design and development process complies with the "Guidelines for Green Product Design and Review Procedure" and considers waste reduction, environmental protection, and the use of non-hazardous materials. Besides meeting international regulations and standards, we are also dedicated to minimizing our impact on people and the environment. Wistron's Green Resources Business subsidiary focuses on the recycling of waste electronics and refining of renewable plastics, promoting post-consumer recycled (PCR) plastics for various customer products and expanding Wistron's influence on green products. In 2021, Wistron's shipped products using PCR plastics accounted for 79.1% of its hardware revenue, representing an increase of 58.7% compared to the previous year. This proves that Wistron's dedication to low carbon and green product concepts has received the affirmation of the international market.

Wistron's product packaging has always been based on the concepts of environmental protection and reduction of resource waste. We choose recyclable and reusable materials for cardboard boxes, cushioning materials, and ink used for printing whenever possible. We also make use of this feature to add recycled and reproduced materials at the source for production. In 2021, the products that used Wistron's packaging design with recycled materials accounted for 98.1% of hardware revenue. Among which, 98.1% of the external boxes were made from recycled pulp; 97.9% of the cushioning materials were made from recycled EPE; and 98.0% of the printed materials were printed with environmentally friendly water-based ink. They significantly reduced the impact and destruction of the environment.



Percentage of PCR plastic materials in revenue from hardware

Percentage of packaging designed with recycled materials in revenue from hardware

Products Using PCR Plastic Materials as Percentage of Hardware Revenue (%)

Item	2018	2019	2020	2021
Laptop computers	46.9%	52.2%	61.8%	**85.6%**
Desktop computers	49.6%	65.8%	58.1%	**68.4%**
LCD Display products	98.5%	97.7%	95.8%	**96.5%**
Servers	1.6%	1.3%	0.5%	**0.65%**
Total	47.6%	53.5%	58.7%	**79.1%**

Note : Hardware products refer to laptop computers/desktop computers, and all-in-one (AIO) computers/ display products / servers/Voice over Internet Protocol (VoIP)

Green Product Key Performance Indicators (%)

Item	2018	2019	2020	2021
Percentage of products compliant to WEEE regulations	100%	100%	100%	**100%**
Percentage of products with environmental labels	84.1%	87.0%	89.5%	**90.7%**
Percentage of packaging designed with recycled materials	84.0%	95.0%	98.0%	**98.1%**
Percentage of products that use recycled plastic materials	47.6%	53.5%	58.7%	**79.1%**

Note : Data and examples of packaging designs using recycled materials before 2020 in Wistron Technology

Recycled Materials Used in Product Packaging as Percentage of Hardware Revenue in 2021 (%)

Item	Recycled pulp for cardboard boxes	Cushioning materials using recycled EPE	Environmentally friendly water-based ink for printed materials
Laptop computers	99.4%	99.4%	99.4%
Desktop computers and all-in-one (AIO) computers	96.9%	96.9%	96.9%
Display products	97.3%	97.3%	97.3%
Servers/Voice over Internet Protocol (VoIP)	86.2%	85.7%	86.2%
Keyboards	100%	0%	100%
Audio	100%	0%	0%
Handheld mobile devices	100%	0%	0%
Total	98.1%	97.9%	98.0%

2.1.2 Product Design and Development

Wistron has developed strong R&D and technological innovation capabilities and powered its growth and development with a diverse product portfolio in recent years. These developments have allowed the Company to expand its product portfolio, including portable computer products, desktop computer systems, servers and network storage devices, display products, communication products, and after-sales maintenance services, and to expand its businesses to cloud, vertical integration of display products, and green resources involving scrapped electronic products and renewable resources businesses to become a leading technology service provider (TSP).

Excellent product quality is the foundation of the Company's competitiveness. It is one of the key factors for gaining customer trust and determining the Company's operations in the current intense and rapidly changing business environment. We have established a quality management system and policy to ensure product quality. We use enhanced IT system management procedures to implement top-down monitoring, assessment, analysis, and continuous improvements of quality-related indicators and incorporate the Plan-Do-Check-Act management cycle into day-to-day operations and management. The end to end comprehensive services include early stage designs and development to after-sales services after mass production. The services help customers clearly and comprehensively understand the design and manufacturing processes.

In terms of product design and development, the Wistron R&D team provides customers with comprehensive and environmentally friendly integrated design services, allowing our ICT products to continuously improve and enhance our customer satisfaction.

Investments in innovative developments	2018	2019	2020	2021
Funds invested in R&D (NT$ hundred million)	144	162	190	**208**
R&D funding as percentage of revenue (%)	1.62	1.84	2.25	**2.41**
R&D personnel (number of people)	4,354	4,556	4,896	**5,350**
Percentage of R&D personnel per total employees (%)	5.5%	6.5%	7%	**8.5%**

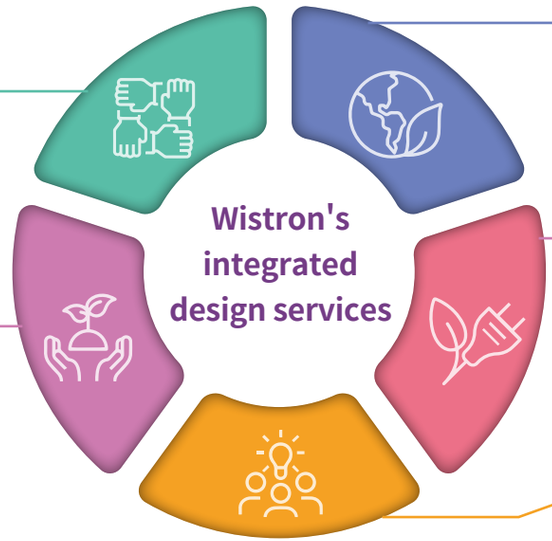
Wistron's Integrated Design Services

Integrated design services for various products

The services range from industrial design, electronic, software, mechanical and function testing, reliability testing services, and environmental considerations for packaging development.

Environmentally friendly

Wistron has stipulated green product planning procedures and imposed bans on hazardous substances and materials, reducing wasted resources, improving energy savings and recyclable designs, and allowing the products to comply with customers' environmental protection requirements and related laws and regulations.



International certification for products

According to the characteristics of the information and communication product, develop heat transfer, vibration, emission frequency, energy consumption, structure, and reliability design services to ensure that the products can pass global or specific market quality assurances.

Green design concepts

The thinking behind product development covers product concept development, exploration of the user interface, materials, ideas on appearance and style, selection of components, production of prototype, and provision of engineering samples.

Large investments in R&D and innovation

Besides large investments in R&D and actively strengthening the engineering manpower and capabilities for R&D, Wistron also encourages employees to engage in innovative research, so the number of patents obtained will continue to increase.

Wistron Invention Reward Regulation

In order to maintain the competitive edge in innovative technologies, Wistron encourages our employees to continuously improve their engineering capabilities and develop new technologies. The company has stipulated the "Wistron Invention Reward Regulation" to encourage our employees to boldly innovate. The regulation provides incentives in the invention disclosure, patent application, patent grant, and technology licensing stages. An Annual Patent Award Ceremony is held to encourage employees to continue researching and innovating. Wistron will continue to utilize our innovative energy and increase our R&D competitiveness.

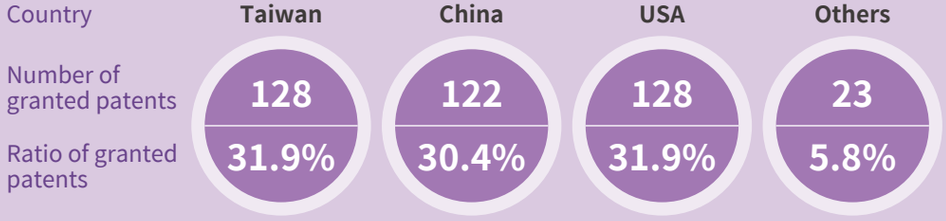
Accumulative Number of Patent Applications and Patents Awarded

Wistron continues to develop new innovations and obtain patents. In order to further enhance the quality of the patents, in 2021, Wistron's internal patent quality control measures reduced the number of patent applications that are less directly related to the Company's R&D or business development. The Company also adopted different patent filing strategies for different technologies and other intellectual property rights protection for technologies that are less suitable for patent protection. These measures have improved the quality of patent applications.

Patent commendations	2018	2019	2020	2021
Number of patent award winners	320	248	246	**237**
Number of patent applications	495	532	429	**386**
Number of granted patents	446	440	459	**401**

Note: Wistron was named one of the Top 100 Global Innovators™ by Clarivate in 2022 and one of the Global 250 by IFI CLAIMS in 2022

Number of patents granted in different countries and the ratio, in 2021



Encourage the Development of Green Product Patents

In order to implement Wistron's Green Product Policy, we also included the ideas of green innovation in the development of our products. Among the patents granted in 2021, green product patents with environmentally friendly designs accounted for 15 granted patents. Green product patents increase the added value of products, protect the environment with innovative technologies, and create a better life for the entire society.

Wistron's Green Product Patents

Wistron's green product patents	2018	2019	2020	2021
	13	13	20	15

Green Product Patent Design Achievements in 2021

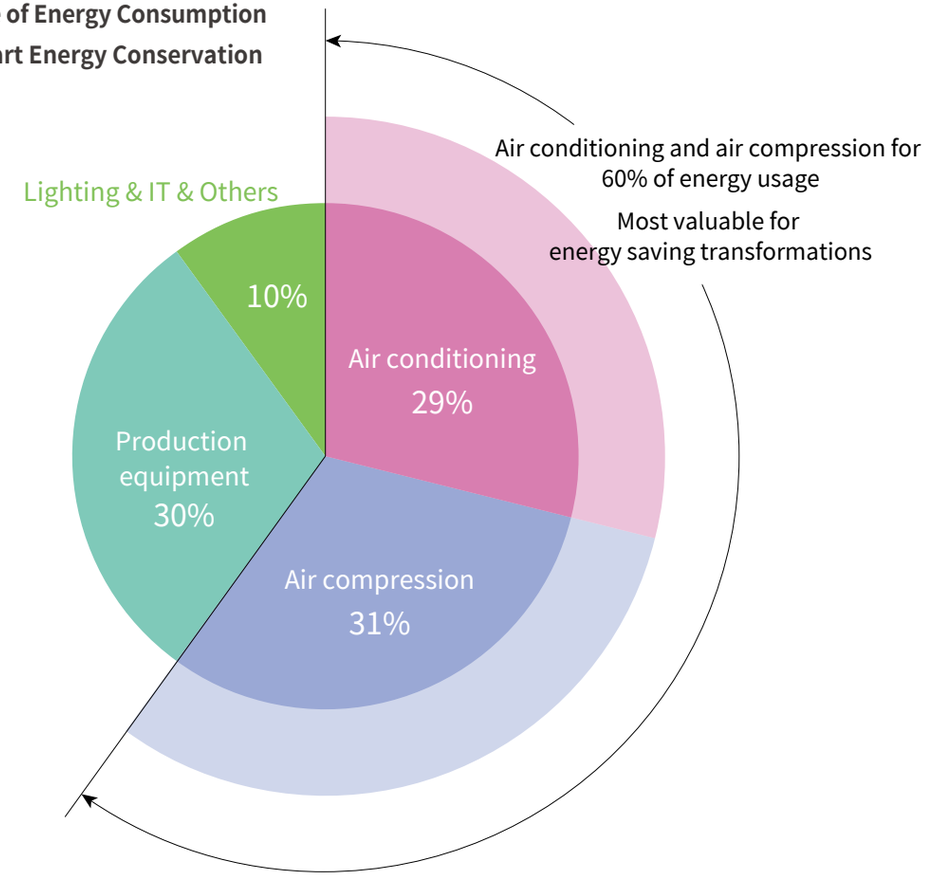
Light emitting diode package structure and manufacturing method thereof and display device	**TWI743891**	With blue light emitting diodes with longer peak wavelengths and multi-color neon powders with specific ratio ranges, in combination with hardware design, harm from blue light can be reduced and the wide color range and environmental protection guidelines can be satisfied.
Intelligent speaker for recovering vibration energy to generate electrical power	**CN111526451**	When recycling the soundwaves emitted by speakers, a power generating module can be used to turn the vibrations made by sound into induced current to charge the battery module. The high frequency soundwaves which are classified as noise can be converted into power. The recycling of vibrational energy can fulfill the purpose of energy conservation.
Fluid distribution apparatus and fluid distribution module with choke	**US11129306**	Through the mechanical design of fluid diverging modules, situations where the data center needs to increase power to the cooling devices due to insufficient flow can be reduced. The maintenance of even flow can not only improve the cooling efficiency of the device, but can also reduce energy consumption to realize energy savings.

2.1.3 Low-Carbon Manufacturing and Energy Saving Innovations

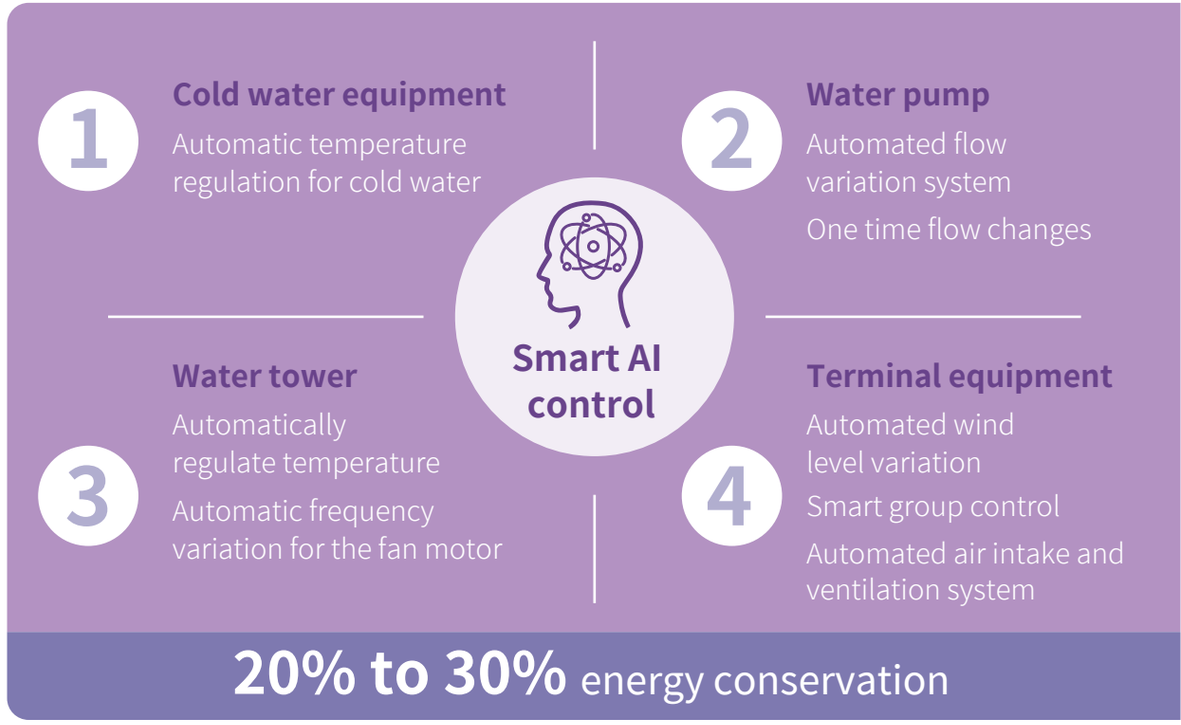
Wistron complies with the carbon peak in 2030, carbon neutral by 2060 policy of China. Smart energy management systems have been introduced in the Chinese plants. IIoT information models are utilized to create digital and instant water, power, and gas data during manufacturing. The systems are capable of automated analysis and equipped with alarm functions. The data will facilitate the stipulation of goals and strategies by the managers in order to achieve high-efficiency management and control.

Air conditioning and air compression are the major energy consuming facilities in the plants. They account for 60% of total energy consumption. After introducing smart, energy-saving technologies, automated connected control can be realized for the machinery, cooling pumps, cooling towers, freezing pumps, and terminals. With the additional integration of advanced AI and IoT technologies, energy savings can reach 20% to 30%. The air compressor system can automatically recommend the most energy-saving combinations according to the AI model, automatically detect the pressure data and system status, and issue a warning notification in case of abnormalities, so as to achieve the goals of energy conservation, carbon reduction and real time and effective management. The energy savings of the smart air compressor system is 18% to 25%. Smart dormitory unit energy management platforms and smart streetlight control systems will be introduced in the future, in order to improve the energy efficiencies of lighting and other systems.

Percentage of Energy Consumption Before Smart Energy Conservation



Four Stages of Energy Conservation for Smart Air Conditioning Systems



2.2 Pursuing the Highest Quality

2.2.1 Green Products

Wistron has adopted the Green Design Guide for product design and incorporated green product management in compliance with the ISO 9001 Quality Management System to obtain the IECQ QC 080000 Management System certification. We also incorporated product lifecycle assessment ideas into the QC 080000 Hazardous Substance Process Management System.

By 2020, all product lines have attained 100% compliance with Waste Electrical and Electronic Equipment Directive (WEEE) regulations. Wistron complies with customer requirements, local energy regulations, energy label, and safety label requirements to design products that meet requirements. In 2021, the Company helped customers obtain various environmental protection labels. The sales from products with environmental protection labels account for 90.7% of hardware revenue. All product lines are 100% compliant with customer requirements, local energy regulations, and energy label requirements. There was no violation of product information labeling regulations and voluntary compliance.

Ensures the ban on environmentally hazardous materials; adopts environmentally friendly materials; and achieves reduce and reuse through recyclable designs for products and increasing the use of recycled materials, in order to reduce raw material usage.

Cleaner production is achieved through greenhouse gas emissions management, energy management, resource management, and waste management.

Implement a circular economy through recyclable designs for products and suitable waste management and recycling.

Improve transportation efficiency through lightweight product designs and reduced packaging.

Achieve better product usage and energy usage and extend product lifecycles through energy conservation and easy to repair designs in products.

Wistron Strictly Complies with the Import Laws, Regulations and Directives of Various Countries, Achieving a Passing Rate of 100% in Previous Years

Laws, regulations and directives	Wistron's products
EU RoHS directive: Control of substances hazardous to the environment	100% compliant
REACH	100% compliant
Recycling of electronics/appliances wastes: WEEE	100% compliant
CA65	Products exported to California are 100% compliant
POPs (Persistent organic pollutants)	Products exported to EU are 100% compliant
VOCs	Products exported to China are 100% compliant

Passing Rate for Other Industrial Certification Standards

Certification standards	2018	2019	2020	2021
Products certified by Energy Star	80.75%	82.87%	86.69%	**89.54%**
Products meet EPEAT certification or equivalent standards	47.33%	56.56%	62.35%	**74.55%**

100%
Complies with the product import laws, regulations and directives of different countries

90.7%
Percentage of products with environmental labels in revenue from hardware

Number of Important Product Environmental Labels Acquired in 2021

Label name	Product type and quantity
Taiwan Green Mark	62 personal computer products (including 34 laptop computers, 25 desktop computers, and 3 all-in-one computers) and 4 monitor products obtained the Taiwan Green Mark.
China Environmental Labelling	167 personal computer products (including 94 laptop computers, 61 desktop computers, and 12 all-in-one computers), 92 monitor products, and 4 corporate products obtained the China Environmental Labelling.
U.S.A EPEAT	217 personal computer products (including 156 laptop computers, 53 desktop computers, and 8 all-in-one computers) and 90 monitor products obtained US EPEAT certification.
TCO Certification	97 personal computer products (including 63 laptop computers, 31 desktop computers, and 3 all-in-one computers) and 96 monitor products obtained TCO certification.
US Energy Star	513 personal computer products (including 367 laptop computers, 127 desktop computers, and 19 all-in-one computers), 134 monitor products, and 9 corporate products obtained US Energy Star label.

Sales of Products with Important Environmental Protection Labels as Percentage of Hardware Revenue In 2021 (%)

Item	Energy Star	EPEAT/TCO/Taiwan Green Mark/ China Environmental Labelling
Notebook computers	98.27%	78.91%
Desktop computers and all-in-one (AIO) computers	89.42%	69.84%
Display products	88.61%	95.57%
Servers/Voice over Internet Protocol (VoIP)	9.76%	4.70%
Total	**89.54%**	**74.55%**

Product Safety Management and Guidelines

In order to ensure that the raw materials of products do not contain hazardous materials in order to protect the health and safety of consumers, Wistron has implemented design for environment. Wistron established the "Wistron Technical Standards for Environmental Monitoring of Hazardous Substances" and "Control Procedures for Products Not Containing Hazardous Materials" in accordance with IECQ QC 080000 standards, customers' special requirements, and the latest international regulations and trends, The Standards are used to verify that every component and packaging material meets customer requirements regarding hazardous materials and international environmental regulations. Effective management and monitoring mechanisms have been established and product lifecycle management (PLM) and green product management (GPM) systems have been created for material reviews. There are currently 10 banned substance and 154 regulated substances. The Company reviews regulations and customer standards every six months for the amendment of Wistron regulations. Wistron strictly requires suppliers to not use hazardous materials and disclose materials mentioned in related laws and regulations, in order to comply with customer guidelines as well as laws and regulations regarding raw materials. Wistron's packaging materials mainly use renewable materials. We compile statistics every year based on the import/export customs declaration system for the weight of product materials and packaging materials.

Use of Product Materials and Packaging Materials

Item	2018	2019	2020	2021
Product material usage volume (tons)	254,459	230,657	196,097	**238,388**
Packaging material usage volume (tons)	51,789	68,229	63,101	**78,979**
Percentage of renewable materials (%)	20.4%	29.6%	32.2%	**28.6%**

Note1 : The weight of all materials and packaging materials is denominated in "gross weight", which is defined as the total weight that includes the weight of packaging materials.
Note2 : Product material usage volume (ton) = product weight + packaging material weight
Note3 : Packaging material usage volume (ton) = packaging material weight
Note4 : Percentage of renewable materials = (total renewable materials/total materials) x 100%

Wistron's Hazardous Material Regulations

The Company has established the five major guidelines set forth below for managing products (including subsidiary materials) in accordance with regulatory trends and customers' environmental protection requirements. The guidelines are implemented in the procedures stipulated by the internal "Wistron Hazardous Substance Management Regulations" Defining the restriction standards for hazardous materials by the uniform material concentration and establishing the lists of complete controls and monitoring items. Wistron is committed to working together with our partners to not use materials hazardous to the environment, reducing the impact on the environment and ensuring the health of everyone.

1. Hazardous substances restricted by the EU RoHS Directive
2. Wistron restricted items: Established based on the IEC62474 Material Declaration Standards and requirements of individual customers.
3. Wistron monitoring items: Include substances of concern that have yet been banned. We collect information on the usage status as the basis of evaluation for future reduction schedule or new bans.
4. Halogen-free or low-halogen product regulated items: Wistron has introduced halogen-free or low-halogen regulations for specific products in response to customer demands.
5. Substances of Very High Concern (SVHC) under REACH

Battery regulations	As batteries contain a vast number of chemical substances, all types of batteries must be labeled with recycling symbols based on the requirements of customers and different countries. They must be recycled and processed separately before discarding.
Packaging material regulations	The main regulations are subject to the packaging materials used for shipping finished products. For example: Corrugated cartons, packaging bags, cushioning materials, fixing devices, sheets, tapes, labels, plastic pads, coatings, and ink.

Information System and Management Procedures

- **Invention and Innovation Reward Scheme**
- **Project Tracking System, PTS**
- **Quality Management System (ISO 9001)**
- **Hazardous Substance Process Management System (IECQ QC 080000)**
- **Green-Design Guide**
- **Product Lifecycle Management (PLM) System**
- **Green Product Management (GPM) System**
- **SAP System**
- **RoHS Directive**
- **Registration, Evaluation, Authorization and Restriction of Chemical substances, REACH**
- **International Safety Regulations (BSMI, CB, CCC, CUL, UL, TUV, and certifications from different countries)**

2.2.2 Product Life Cycle Assessment

The product life cycle assessment (LCA) refers to the assessment of potential environmental impacts caused by the investments in and outputs of raw material acquisition, manufacturing, delivery and sales, use, and waste processing and recycling stages of products and services. Corporations can use LCA to assess all the impacts on the environment created by products "from cradle to grave", such as contributions to global warming and damage to the ozone. The assessment results can be applied to products, manufacturing and services to achieve the purpose of continuously providing environmentally friendly products and reducing energy and resource usage during product manufacturing. Wistron complies with ISO 14040 and 14044 life cycle assessment standards in the life cycle assessments of handheld devices and laptop computers. The scope of the system boundaries has been defined according to the product category rules (PCR) for IT equipment by the EU Environmental Footprint Category. The boundaries have been defined as cradle to grave, which includes raw material, raw material transportation, manufacturing, distribution, use, and end of life stages. The Simapro software is used to conduct the computational analysis to obtain the environmental impact assessment results and carbon footprint of the product. In the future, Wistron will continue to expand LCA coverage for products, establish an operating procedure for LCA, train our employees through e-learning classes, and design low-carbon products based on improvements proposed by LCA analysis for carbon hot spots.

Analysis of Carbon Footprints at Every Stage of the Lifecycle

Product scope	Raw materials	Transportation of raw materials	Manufacturing	Distribution	Product use	End of life	Total carbon emissions
Handheld devices (Malaysia Plant)	37.6	0.267	3.75	0.0168	5.62	0.311	47.60
Handheld devices (Kunshan Plant)	37.6	0.142	3.64	0.00616	5.63	0.311	47.30
Laptop computers (Chengdu Plant)	101	0.328	1.90	0.423	29.5	2.75	136

Unit : kg CO_2 eq

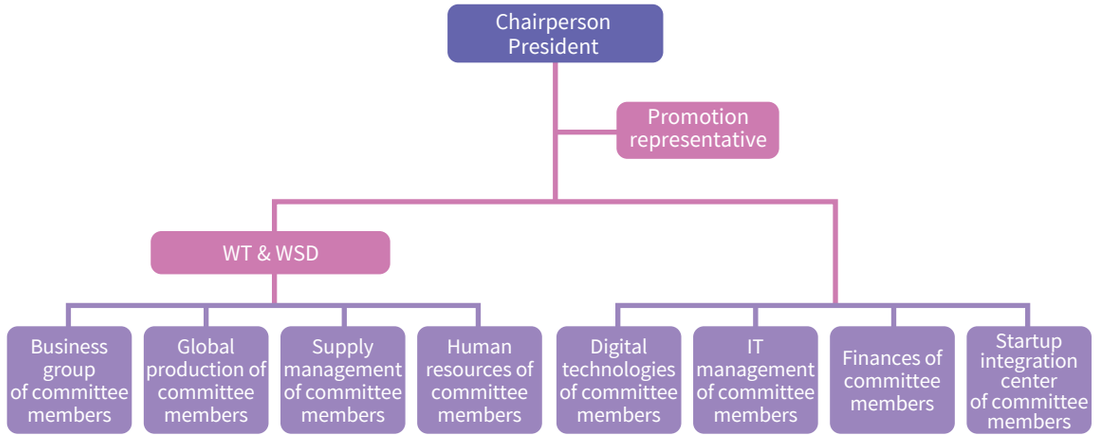
Environmental Impact Assessment Results

Impact category	Unit	Environmental impact results		
		Handheld devices (Malaysia Plant)	Handheld devices (Kunshan Plant)	Laptop computers (Chengdu Plant)
Climate change	kg CO_2 eq	48.4	48.2	138
Stratospheric ozone depletion	kg CFC-11 eq	$2.53E^{-05}$	$2.5E^{-05}$	$7.59E^{-05}$
Ionizing radiation	kBq Co-60 eq	5.44	5.49	21.4
Ozone formation, Human health	kgNO_x eq	0.138	0.142	0.363
Fine Particulate matter formation	kg $PM_{2.5}$ eq	0.114	0.11	0.303
Ozone formation, Terrestrial ecosystem	kgNO_x eq	0.14	0.144	0.371
Terrestrial acidification	kg SO_2 eq	0.198	0.198	0.573
Freshwater eutrophication	kg P eq	0.0614	0.0605	0.142
Marine eutrophication	kg N eq	0.00545	0.00539	0.0302
Terrestrial ecotoxicity	kg 1,4-DB eq	146	146	1230
Freshwater ecotoxicity	kg 1,4-DB eq	26.2	26.2	54.7
Marine ecotoxicity	kg 1,4-DB eq	34.5	34.5	71.5
Human carcinogenic toxicity	kg 1,4-DB eq	4.22	4.19	14.5
Human non-carcinogenic toxicity	kg 1,4-DB eq	410	409	810
land use	m^2 a crop eq	3.15	3.06	14.2
Water consumption	m^3	0.899	0.866	2.73
Mineral resource scarcity	kg Cu eq	1.39	1.39	3.57
Fossil resource scarcity	kg oil eq	12.3	12	35.3

2.3 Maintaining Customer Relations

2.3.1 Product Quality

Wistron has adopted "zero-defect" as a long-term quality management target for design quality, production quality, and service quality. We aim to meet and exceed customer expectations and become a reliable partner for all customers. In order to completely implement the quality policy of "delivering competitive products and services with zero faults to our customers on time", we introduced the ISO quality management system, followed quality management processes and policies, and adopted a comprehensive IT systems and management procedures to promote the monitoring, assessment, analysis, and continuous improvements of quality related indicators. We comprehensively implement circular PDCA to prevent deficient quality. We have established the "Quality and Hazardous Substance Management Systems Committee", which is chaired by the President of the Company. The various business units appointed committee members to implement the quality and hazardous substance management requirements to the various units under it. In 2021, Wistron did not recall any products.



In order to comply with the customer quality requirements, we formulated different development checklists and quality goals for the design and manufacturing stages based on the quality management system. We conduct management to maintain product quality during development, design, and manufacturing and satisfy the quality requirements of all customers.

Product Design/Production Management Procedures

1 Development stage
- Perform Failure Mode and Effects Analysis (FMEA) for the various aspects of cost, scheduling, product quality, and performance.
- Consider high risk factors first according to the Lessons Learned database.

2 Design stage
- Factory team joins the design team to provide manufacturing related experience, so that the product design can comply with DFX (Design For Manufacture / Assembly / Testing / Service).

3 Manufacturing stage
- Conduct separate analyses of defective products according to the personnel, machinery (production equipment), materials (materials and components), and methods (testing methods and operational procedures).
- Implement improvement measures and preventative policies for defective products.

4 Verification stage
- During the product quality verification process, simultaneously confirm and ensure product function verification, compatibility verification, reliability verification, and other international standards and environmental protection standards.

2.3.2 Customer Satisfaction

Wistron provides products/services that customers are satisfied with and exceeds customer expectations. Our value is based on developing dependable partnerships with all customers. During the provision of products/services, we use different communication methods and frequency to understand the needs of customers, such as internal assessments and customer satisfaction surveys. Wistron implements continual improvements related to the results and actively responds to customer needs, in order to improve customer satisfaction. During the process of providing products/services to customers, we expect to create more benefits and provide better services for our customers.

Customer Satisfaction Results

Item	2018	2019	2020	**2021**	Goal of 2022
Satisfaction score	77.2%	78.6%	79.7%	**79.7%**	80%
Customer coverage (%)	79.0%	77.8%	75.5%	**76.3%**	80%

Note : The updated data for 2020 supplements the questionnaires that have not been collected and included in the statistics in the current year.

Helping customers improve their competitiveness

- Sharing product designs or new technological trends with customers.
- Implement quantitative and qualitative improvements in partnership projects with customers.

Developing long-standing partnerships with customers

- Management strategies based on customer value.
- Establish partnerships and not business relationships.
- Understand what customers truly want to eliminate actions or procedures that decrease value.

Introduce value creating organizational structures and management systems

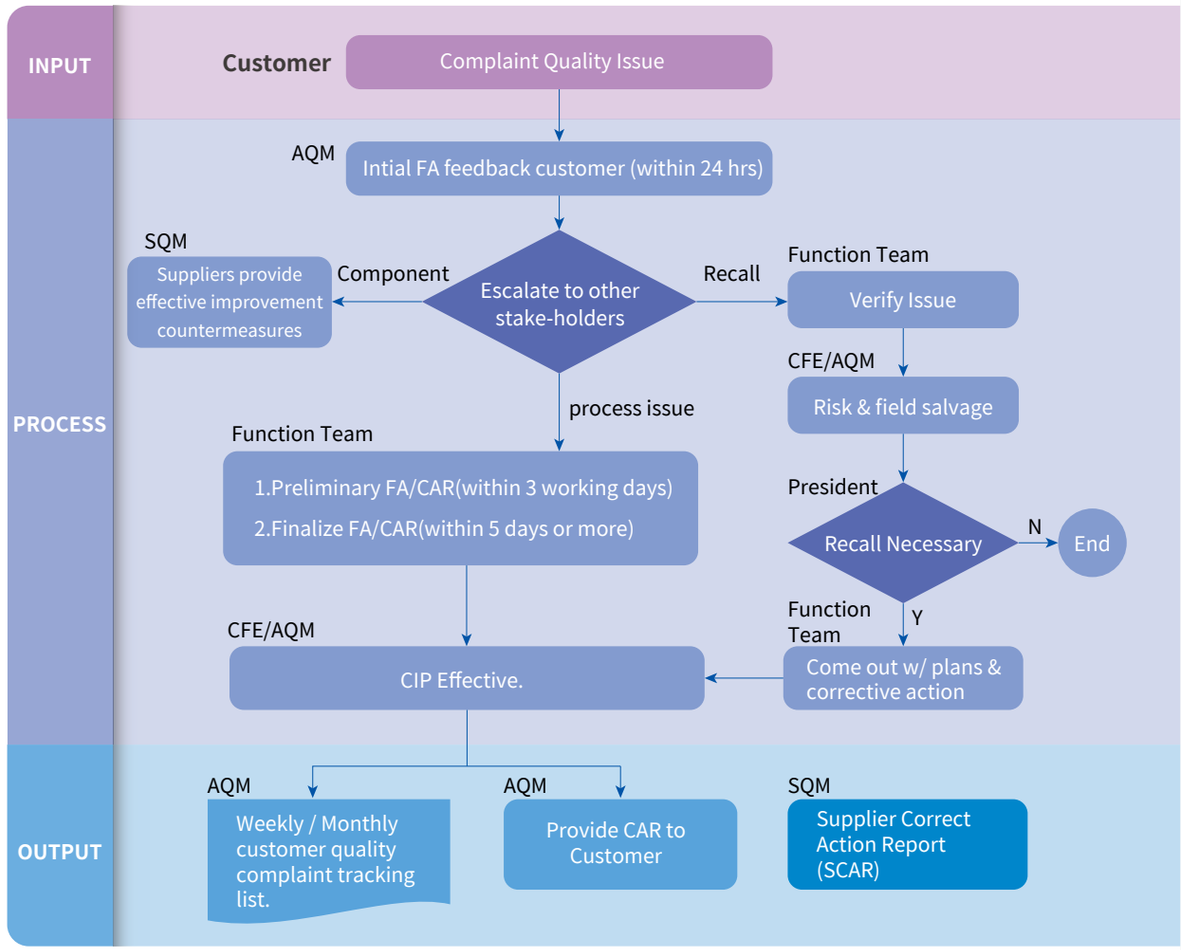
- Research optimized organizational structures based on CRM to increase customer value.
- Fully review management systems to improve our own value through innovation and performance principles.

Comprehensively increase customer satisfaction

- Implement daily management of customer relations.
- Increase the ranking of client QBR year over year.

Customer Complaint Handling Procedure

According to industry characteristics and practical requirements, the service procedure will be adjusted according to customer demands in order to provide more flexible and efficient services. The procedures are mainly based on the RFQ (Request for Quotation) or SOW (Statement of Work) provided by individual customers. Customized mission teams are organized to respond to the customers in a timely fashion and provide the best service quality.



2.3.3 Privacy Protection

Wistron is committed to "ensuring the confidentiality of customer information and upholding the principle of good faith" to protect customer privacy rights. In order to implement personal data protection and management, Wistron refers to the local regulations of the operational locations and relevant requirements of the EU General Data Protection Regulation (GDPR) to establish privacy policies. The policies are the highest governing principles for privacy protection and covers all employees, suppliers, contractors, and external consultants of Wistron and its subsidiaries and joint venture companies which Wistron has significant influence power on them. The policies contain clear regulations and requirements for personal data usage and protection. We require all members and partners to comply with the policies, in order to effectively protect personal data and rights and interests.

We have established privacy reporting channels. If incidents that may damage privacy or violate privacy policies occur, the incidents may be reported through the privacy protection hotline, (02)6616-9999 ext. 25740 or the email address, web_master@wistron.com. In order to implement privacy protection, we periodically conduct privacy protection training for all employees and review the effectiveness of the training. Wistron adopts a zero tolerance policy for privacy protection. If any personnel violates the policies, the punishment will be determined according to the Company's code of conduct.

Wistron absolutely complies with the privacy policies for customer information and will not use customer information for secondary purposes. Therefore, the percentage of using customer information for secondary purposes is 0%. From 2018 to 2021, no complaints related to privacy from external or supervisory organizations were received.

2.4 Moving Towards a Sustainable Supply Chain

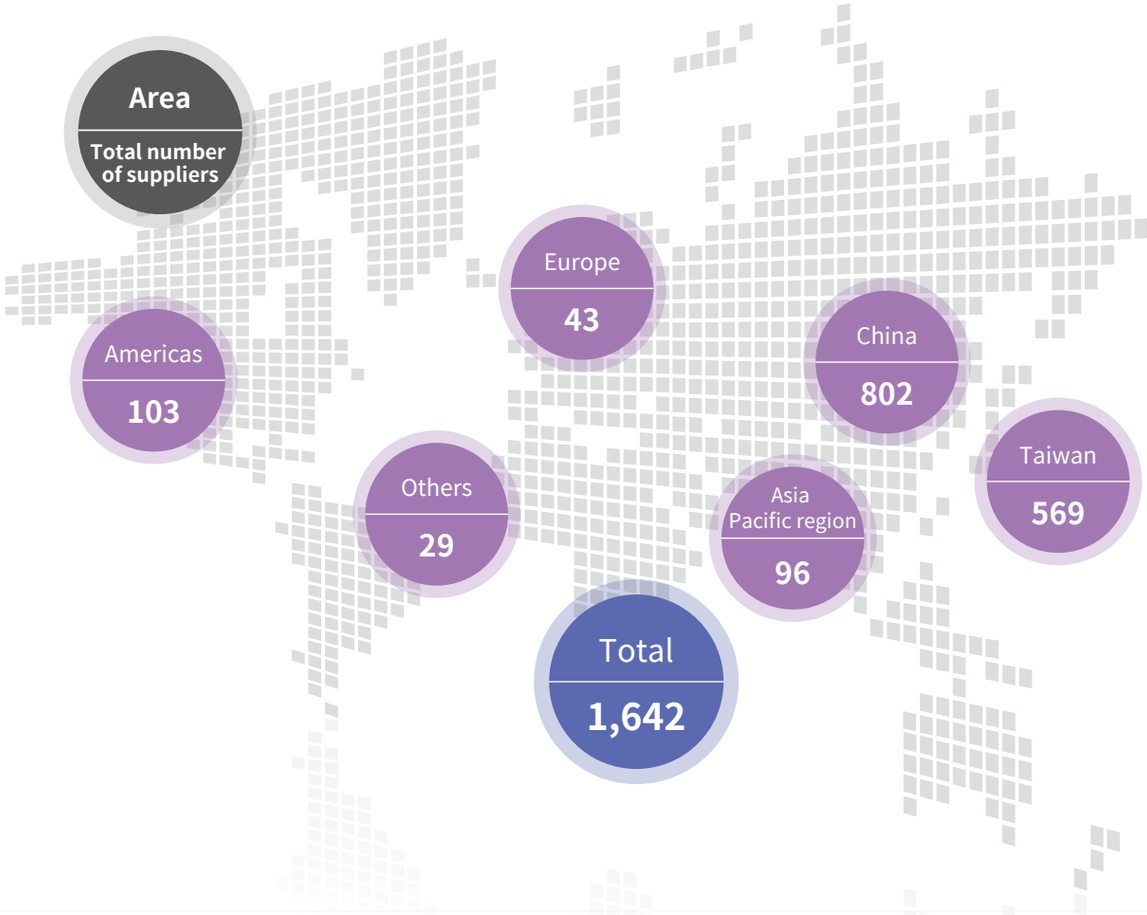
In order to improve the sustainable resilience of the supply chain, we work closely with suppliers to create sustainable and mutually beneficial industry chains. On the basis of principle, suppliers are very important partners of Wistron. We will also work with suppliers to continue strengthening the sustainable supply chains and create more resilient and influential supply chains. Wistron is dedicated to the promotion of sustainable supply chains. In 2010, we became a member of the Responsible Business Alliance (RBA)to substantial support the vision and goals of RBA. We aim to ensure that the work environment for labor in the supply chain are safe and secure, and the employees must be worthy of being respected. Wistron also ensures that our operations and activities comply with environmental protection regulations and ethical business practices.

Wistron is a leading company in the global ICT (Information and Communications Technology) industry. The upstream and midstream of the entire industry chain consists of component suppliers, while the downstream consists of various customer groups. We vertically integrate the industry chain through customer needs and are dedicated to providing competitive products.

Upstream	Midstream	Downstream
Component Suppliers	Assembly Plants	Customer Groups
CPUs, displays, solid/liquid state drives, memory, chipsets, batteries, passive components, power supplies, keyboards, chassis, and circuit boards	Desktop computers, all-in-one computers, laptop computers, tablets, mobile smart devices, smart accessories and optical components, smartphones, servers, data centers, and industrial computers	Brands, wholesalers, consumer electronics retailers, and end customers

2.4.1 Supply Chain Management

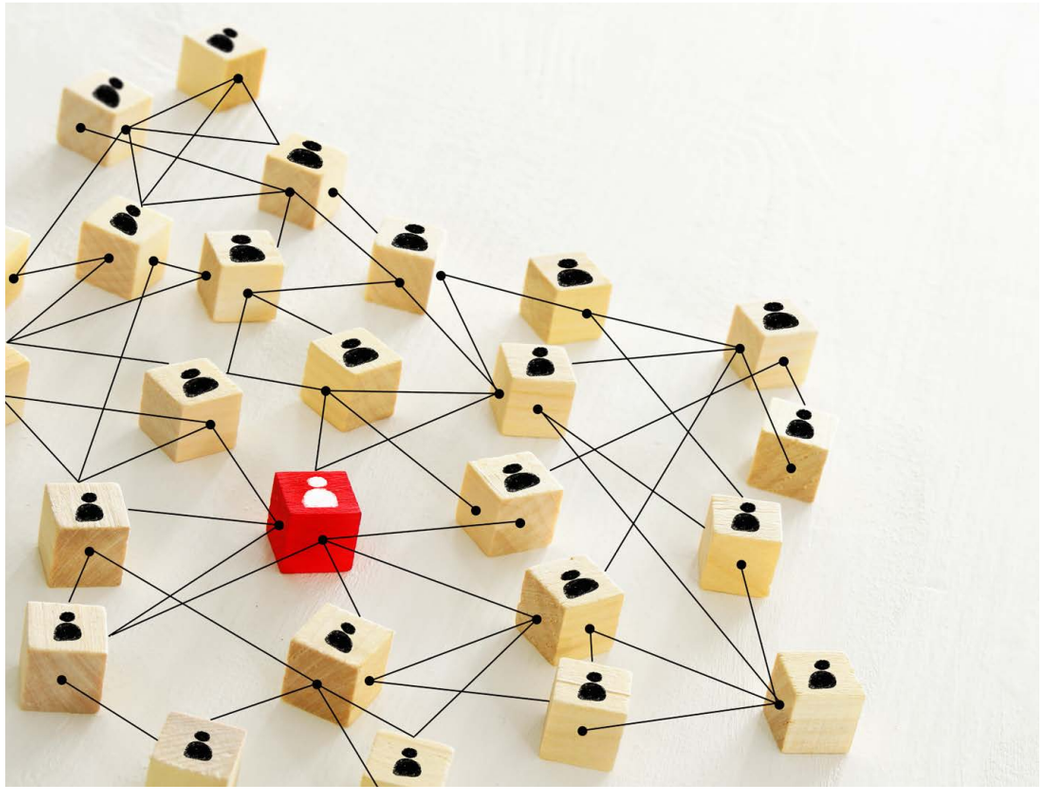
Taiwan is an important global supplier of IT products, in which, Wistron holds a place of importance. In order to provide more convenient services to customers, we deployed a comprehensive global manufacturing and service network to support customers in different regions. As of the end of 2021, Wistron has partnered with 1,642 suppliers around the world. To effectively manage our suppliers, we have classified and divided suppliers for management, in order to grasp the status of the entire supply chain.



Critical suppliers

Wistron's suppliers are distributed around the world. Considering differences in procurement amounts, we have defined tier 1 suppliers as those who have had 6 transactions with Wistron in a year and the total amount of the transactions is over NT$1 million. In 2021, there were 1,084 tier 1 suppliers. The main suppliers of Wistron are electronic parts and mechanical parts suppliers. We have identified the critical suppliers through procurement amounts and related conditions . In 2021, 394 suppliers were listed as critical tier 1 suppliers[1]. Regarding critical non-tier 1 suppliers, these suppliers are defined as suppliers who trade through agents or the upstream suppliers of direct suppliers. In 2021, there were 256 critical non-tier 1 suppliers.

[1] Note: Proportion of high turnover (more than 80% of the annual transaction value); Technical pioneering ability; The only source of supply is irreplaceable.



Supplier Types		2019	2020	2021
Electronic parts	Number of tier 1 suppliers	982	549	**426**
	Number of critical tier 1 suppliers	191	216	**193**
	Share of total procurement spent on critical suppliers	65.17%	85.99%	**96.91%**
Mechanical parts	Number of tier 1 suppliers	796	627	**658**
	Number of critical tier 1 suppliers	152	134	**201**
	Ratio of critical supplier purchase amount	85.92%	89.00%	**90.89%**
Total	Number of tier 1 suppliers	1,778	1,176	**1,084**
	Number of critical tier 1 suppliers	343	350	**394**
	Share of total procurement spent on critical suppliers	72.99%	88.06%	**94.66%**

2021	Number of electronic parts suppliers	Number of mechanical parts suppliers
Taiwan	207	154
China	146	412
Asia Pacific region	28	34
Europe	6	16
Americas	31	27
Others	8	15
Total	426	658

Critical Non-tier 1 Suppliers

Supplier types	2019	2020	2021
Number of non-tier 1 suppliers	575	520	**279**
Number of upstream suppliers for direct suppliers	156	423	**256**

2.4.2 Supply Chain Sustainability Management

Supplier Code of Conduct

Wistron is fully aware that in the pursuit of the company's continuous growth, our operating strategy must take into account the impacts of society and the environment. Therefore, Wistron invites all our suppliers to work together towards sustainability and has established the supplier code of conduct, as a basis for supplier compliance. The content covers the 5 major aspects of labor, health and safety, the environment, code of ethics, and management systems. At the same time, we will include the suppliers' compliance with the code as one of the assessment items during procurement. In order to improve the sustainability of supply chains, we have amended the Supplier Code of Conduct in 2021 and required suppliers to re-sign the Code of Conduct and undergo related education and training. The Code of Conduct signing rate and training rate were 87.20% and 81.91%, respectively.

Signing of the Supplier Code of Conduct

Year		2021	2022 Targets
Existing suppliers	Number of suppliers that should sign	1,055	-
	Percentage of signed suppliers (%)	87.20%	100%
New suppliers	Number of suppliers that should sign	117	-
	Percentage of signed suppliers (%)	53.85%	100%
New critical suppliers	Number of suppliers that should sign	16	-
	Percentage of signed suppliers (%)	93.75%	100%

87.20%
Existing signed Code of Conduct

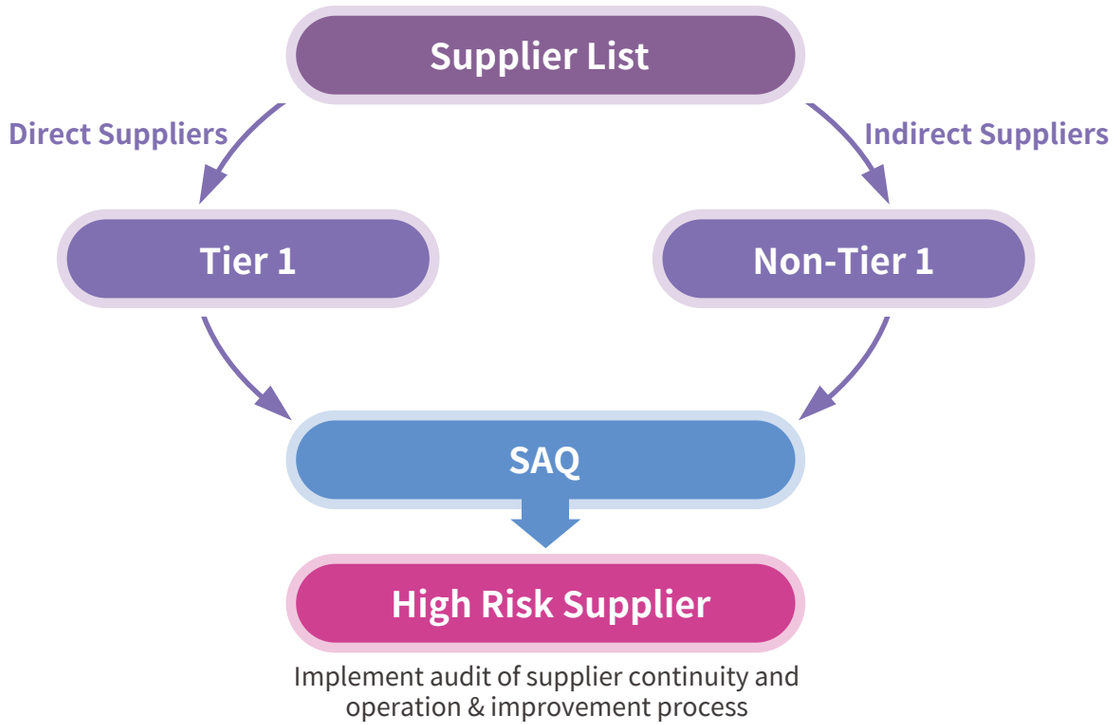
81.91%
Training rate for the Supplier Code of Conduct

100%
SAQ response rate among tier 1 suppliers

Sustainability Risk Assessment for Suppliers

In order to understand the risk related to sustainability in the supply chain, Wistron distributed the Self-Assessment Questionnaire (SAQ) to all our tier 1 suppliers and non-tier 1 suppliers. The suppliers must describe their implementation of the 5 major sustainability issues (sustainability and operational risk management, supply chain and operation continuation, environmental protection, human rights and labor security, and occupational safety and health) in the questionnaire, and provide related evidence, such as management system certification or related documents. The supplier self-assessment result will be used as reference for future sustainability risk management. The response rate for the SAQ among tier 1 suppliers was 100% in 2021. The response rate among critical non-tier 1 suppliers was also 100%.

Supplier Sustainability Risk Assessment Flowchart



2021 Self-Assessment Questionnaire

Year		2021	2022 Targets
Tier 1 suppliers	Number of surveyed suppliers	**1,084 suppliers**	-
	Response rate (%)	**100%**	100%
Critical tier 1 suppliers	Number of surveyed suppliers	**394 suppliers**	-
	Response rate (%)	**100%**	100%
Critical non-tier 1 suppliers	Number of surveyed suppliers	**256 suppliers**	-
	Response rate (%)	**100%**	100%

Through the analysis of the SAQ results, we defined suppliers which scored less than 80 points as high risk suppliers, and identified the potential risks within the supply chain. In 2021, we identified 50 high risk suppliers (including 14 critical suppliers). We later conducted onsite audits of the high risk suppliers, in order to confirm and understand the risks of the suppliers.

2021 High Sustainability Risk Factors for Suppliers

Dimension	Risk
Environmental protection	Energy conservation and carbon reduction mechanisms for energy management have not been implemented.
	Scope 3 greenhouse gas emissions management has not been implemented.
Sustainability and operational risk management	Response plan management for continued operations has not been implemented.

2021 Self-Assessment Questionnaire Results

Tier 1 suppliers	Number of high risk suppliers	50
	Percentage of high risk (%)	4.61%
Critical tier 1 suppliers	Number of high risk suppliers	14
	Percentage of high risk (%)	3.55%
Critical non-tier 1 suppliers	Number of high risk suppliers	0
	Percentage of high risk (%)	0%

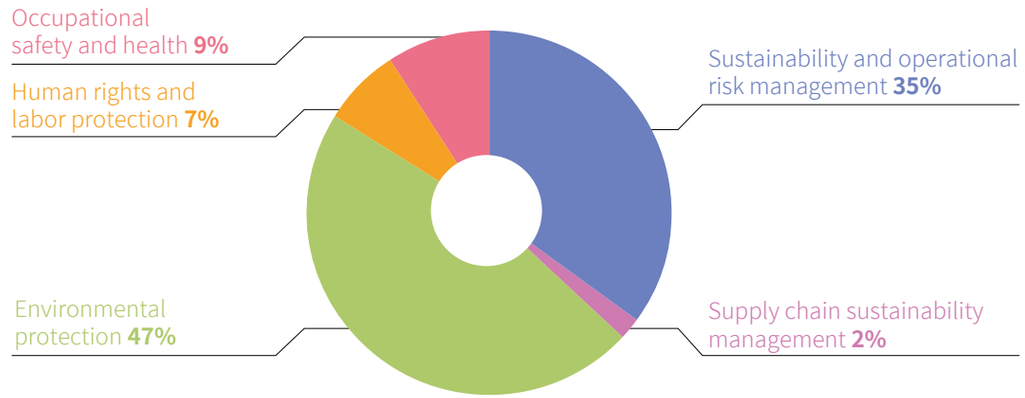
Supplier Audit

In order to implement supplier sustainability risk management, Wistron has stipulated audit procedures for supplier CSR and onsite audits will be conducted for critical suppliers and high risk suppliers. If the supplier has a score of lower than 80 points in the audit results, the Company will ask the supplier to propose improvement measures for discrepancies found in the audit. The supplier is required to complete the improvements for the discrepancies, report back, and file a re-audit application within two months. If the supplier still can't pass the re-audit, it may not file another application within six months. Where the issues discovered affect the quality of materials supplied, the materials/supplier will be replaced with an alternative.

Item	2021	2022 Targets
Number of audited critical suppliers	**650 suppliers**	-
Number of audited high risk suppliers	**50 suppliers**	-
Percentage of audited high risk suppliers (%)	**100%**	100%
Number of audited high risk critical suppliers	**14 suppliers**	-
Percentage of audited high risk critical suppliers (%)	**100%**	100%
Deficiency improvement rate (%)	**100%**	100%

Deficiencies in the Audit and the Percentage of Related ESG Items

Critical suppliers (331 suppliers) and high risk suppliers (50 suppliers) were audited according to the audit procedures above. 45 non-compliant reports were found, including 16 cases of sustainability and operational risk management, 1 case of supply chain sustainability management, 21 cases of environmental protection, 3 cases of human rights and labor security, and 4 cases of occupational health and safety. The discrepancies found in the audit shall be improved with the stipulated improvement measures and continuous follow up, in order to ensure effective improvement actions and reduction of risk.



Supplier Audit Deficiency Improvement Actions

Aspects	Topics	Improvement Actions
Sustainability and Operational Risk Management	Anti-bribery and anti-corruption control procedures Information Security	▪ Periodic education, training and advocacy are organized for employees and related stakeholders. ▪ To understand the possible outcomes and risks of violations. ▪ For the identification of information security risks, education and training related to information technology management policies are implemented to improve overall IT security capabilities and strengthen the organization's resilience against IT security incidents and threats.
Supply Chain Sustainability Management	Supply chain disruption	▪ Establish a comprehensive supply chain risk management plan. ▪ Identify all risks at every point of the supply chain. ▪ Improve the accuracy of demand prediction and establish a secure inventory.
Environmental Protection	Environmental permits	▪ Formulate energy saving and carbon reduction policies and reduction targets. Promote the implementation of practical actions to regulate impact.
Human Rights and Labor Protection	Anti-discrimination communication channel	▪ Direct complaint channels through a suggestion box, public WeChat account, or QR code. ▪ Conduct anti-discrimination training for employees according to the training plan and implement record retention and management.
Occupational Safety and Health	Handling of work-related injuries/occupational illness Personal protection	▪ Advocacy and announcement of the handling of work-related injuries/occupational illness. The added announcement areas include: Break area/employee cafeteria. ▪ Conduct inspection of chemical safety information. ▪ The designated personnel for first aid kits shall conduct the inspection to ensure that the protective equipment match the ones listed.

Sustainable Supply Chain Strategy

Wistron places great value on our partnerships and growth with our suppliers. We hope to use our partnerships to support each other and grow together. Our strategy is based on sustainable procurement. We have responded to customer demands and established the Sustainable Supply Chain Strategy, which includes, quality performance and implementation, technical manufacturing capabilities, cost/operation management, local supply chain prioritization, and sustainability. We hope to strengthen our partnerships to create new opportunities.

Sustainable Supply Chain Strategy

Optimize Core Competitiveness of Suppliers	Deepen Regional Strategic Cooperation	Strengthen Supply Chain Sustainable Resilience
Quality Performance and Implementation Technology and Process Capability Cost/Operation Management	Local Supply Chain Priority	Sustainability

Wistron has established a global procurement unit and supplier quality management unit to conduct supplier management. The units manage the standards and procedures for supplier selection based on partnerships with suppliers. They conduct risk/performance evaluations, audit guidance, education and training, and organize supplier conferences, in order to implement the sustainability requirements in the daily management of supply chains.

Supplier Sustainability Evaluation

Wistron has stipulated ESG standards for suppliers (including new and existing suppliers). In order to become a Wistron supplier, suppliers must sign the Code of Conduct and are required to pass ISO 90001, ISO 14001, IECQ QC 080000, and ISO 45001 certification.
Furthermore, we have included the supplier's ESG performance in the selection criteria. Regarding the evaluation of new suppliers, the product quality assurance evaluation form of partner suppliers will be used for evaluation. The ESG factors account for 13.33% of the score, and include:

- Established appropriate and effective documents and procedures related to the RBA Code of Conduct (2.22%)
- Complies with labor standards (2.22%)
- Complies with health and safety standards (2.22%)
- Complies with environmental standards (2.22%)
- Complies with ethical business standards (2.22%)
- Complies with management systems (2.22%)

The ESG performance of existing suppliers is regulated by the supplier performance evaluation. The regulated items include quality, reliability, compliance, supply capabilities, price, and sustainability. Among these factors, sustainability accounts for 10% and includes:

- Have operational risk management and disaster prevention plans (e.g. for human rights issues and management risks, etc.) (5%)
- Complies with the hazardous material regulations (5%)

Supplier Selection Mechanism

In order to implement sustainability and performance management for suppliers, Wistron has implemented the supplier performance evaluation system. The scores, from high to low, go from A to E (A is over 85 points and E is lower than 46 points). The evaluation is the basis for supplier selection and the selection mechanisms are as follows. In 2021, one supplier was rated as E in the supplier performance evaluation and no suppliers were eliminated.

- Suppliers who scored lower than an E in the quarterly evaluation are required to propose improvement measures. Wistron will discuss adjustments to the supplier's strategy and the cancellation of the supplier's current projects and qualifications for new projects according to the improvements implemented by the supplier.
- If a supplier is given an E rating for 3 consecutive quarters, the suspension of the supplier's qualifications to join new projects will be discussed in the quarterly meetings.

Supplier Partnership Projects

Through communication and cooperation with the suppliers, Wistron continues to identify their needs while they improve on sustainability. We maximize the impacts of the investments and improve the sustainability awareness and capabilities of suppliers, in order to face the ever-changing sustainability standards and trends

Supplier partnership projects	Cooperation description	Qualitative benefits	Quantitative benefits
PCR(Post-consumer Recycled) Use of PCR (post-consumer recycled) plastics	Monitor products use recycled plastics.	The use of recycled plastics in products fully implements the ideas of a circular economy	PCR renewable plastics are used in over 91.03% of monitors.
Hosting of the Supplier Conference	Cooperated with SGS/Cozeta/National Taipei University of Science and Technology to promote GHG related activities	Information related to supplier GHG inventory and Wistron's requirements	GHG inventory reports were provided by 350 suppliers (52 provided verification statements, 89 provided social responsibility reports, and 16 provided carbon disclosure project reports)
Introduced Xienbi (CNP) automated testing	Automated testing of mechanism dimensions	Parts coverage: Optimized measuring points and improve mass production efficiency	Measuring points are reduced for the Cyborg series (4 points per side), increasing from 30% to 60%
Introducing water-based environmentally friendly paint	The introduction of water-based paints complies with VOC requirements	In response to the government's call to action, Wistron complies with policy transformations and adjustments, adapts to environmental requirements, and completes our corporate vision according to customer needs, in order to gain customer recognition and improve competitiveness	The action is equal to reducing VOC emissions by 2.028 tons/year, decreasing emissions by 66.29%

91.03%
PCR renewable plastics are used in monitors

66.29%
Introduced water-based environmentally friendly paint reduces carbon emissions

Supplier Conference

Every year, the Wistron team invites with suppliers to achieve friendly, mutually beneficial, and common growth for sustainability. In the 2022 Supplier Conference, the main focus will remain on global climate change. The Wistron Group Partner Conference is hosted to honor the suppliers with outstanding performance in sustainability, social responsibility, and greenhouse gas inventory reports. During the 2021 CSR/GHG Supplier Conference, consultant companies were invited to provide education and training to suppliers. In addition, we also explained Wistron's management policies for sustainability and social responsibility to suppliers, with the aim of promoting Scope 3 of the GHG inventory and the importance of water resource management.

Critical Performance Indicators for Sustainable Supply Chains

Year	2019		2020		**2021**		2022	2025	2030
Item	Achievement rate	Target	Achievement rate	Target	Achievement rate	Target	Target	Target	Target
Signing rate of the code of conduct for tier 1 suppliers	80.00%	80%	90.50%	82%	**86.50%**	**90%**	100%	100%	100%
Risk assessment completed for tier 1 suppliers	89.60%	90%	90.00%	100%	**100%**	**100%**	100%	100%	100%
Audit rate for high risk suppliers	67.10%	70%	100%	100%	**100%**	**100%**	100%	100%	100%
Suppliers signed the "Declaration of Non-use of Conflict Minerals"	90.00%	85%	89.80%	92%	**86.26%**	**90%**	100%	100%	100%
Number of attendees at the Supplier Conference - groups/departments	-	-	176 people/ 290 people	-	**354 people/ 366 people**	**-**	300 suppliers / 210 suppliers	350 suppliers / 250 suppliers	400 suppliers / 300 suppliers
Suppliers with high energy consumption obtained external GHG inventory certification (ISO 14064-1)	-	-	-	-	**-**	**-**	35%	50%	100%

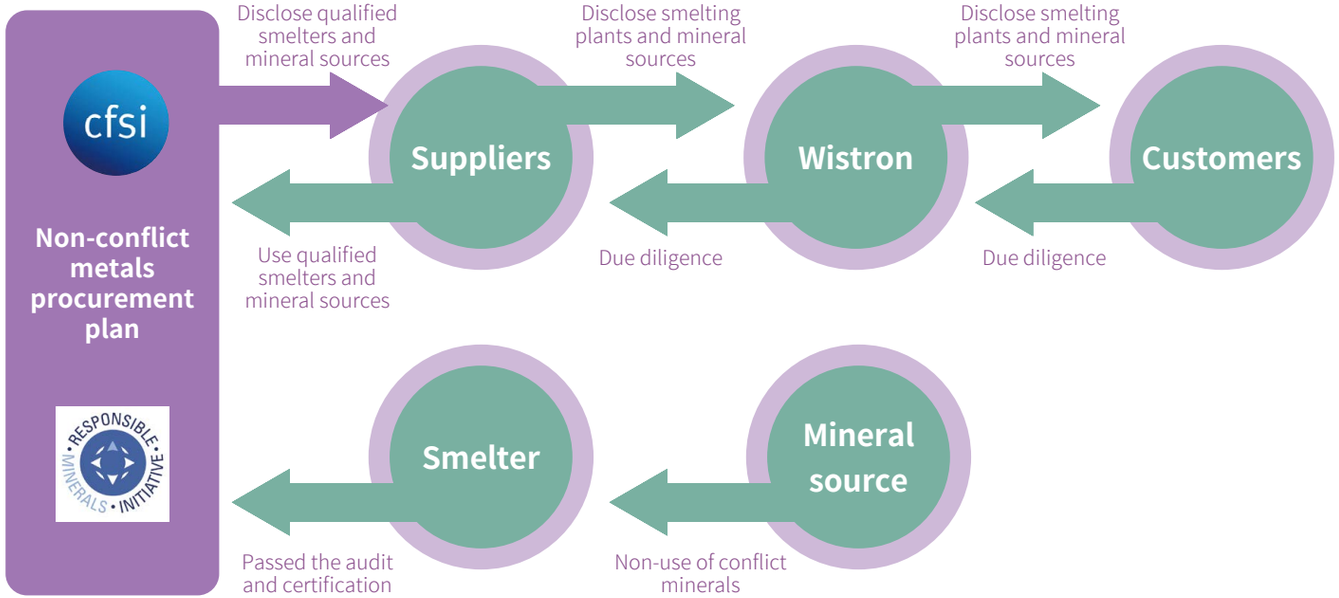
2.4.3 Conflict Minerals

In order to achieve responsible and sustainable procurement, Wistron stipulated the conflict minerals policy and promises to comply with the standards stipulated in the Organization for Economic Co-operation and Development (OECD) regulations related to the responsible supply chain investigation guide for minerals from conflict zones and high risk regions for due diligence. Wistron purchases resources from smelters and refineries that have passed 100% of third party reviews, in order to avoid purchasing conflict minerals from The Democratic Republic of Congo or neighboring countries.

Wistron complies with the results of the Responsible Minerals Initiative (RMI) and in 2020, stipulated regulations for supplier social responsibility management, "Management Procedures for Conflict Minerals". In order to avoid the procurement of metals from conflict areas, Wistron has asked required ourselves and our suppliers to be committed to not using minerals such as tantalum, tin, tungsten, gold, and cobalt associated with armed conflict, forced labor, or child labor abuse, or mining under other illegal and harsh working conditions. We reevaluate the list of smelters using Wistron products every year according to updates to the conformant smelters list announced on the RBA website. Wistron also uses the Wistron supplier questionnaire platform to conduct conflict mineral investigations using surveys and onsite audits. Furthermore, Wistron is fully committed to conducting due diligence investigations to understand the source of supplier minerals. We use the conflict mineral investigation template of the RMI to conduct the investigations. We require suppliers to disclose the source of the minerals and to sign the Declaration of Non-use of Conflict Minerals, in order to comply with the non-use of conflict minerals policies. At the same time, Wistron adopts further management to ensure that the procurement sources of the suppliers are non-conflict areas and comply with customer and legal requirements.

Through the supplier assessment procedure, we require our suppliers to sign the "Declaration of Non-use of Conflict Minerals". The signing rate in 2021 reached 86.26%, with a total of 910 suppliers signing the declaration. Wistron hopes to use our combined strength with our suppliers to fulfill our corporate responsibilities together. We aim to build a sustainable corporation based on the principles of never engaging in non-humanitarian and human rights violating matters.

Management Procedure for Conflict Minerals



Signing of the “Declaration of Non-use of Conflict Minerals”