



SUSTAINABLE PRACTICES

Sustainable Supply Chain

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Considering corporate sustainability from the perspective of the value chain, sustainability factors must be incorporated into the work design and training from inbound logistics and manufacturing to outbound logistics to effectively promote sustainable supply chain management.

In 2023, Winbond focused on a dual-axis transformation strategy, encompassing digitalization and decarbonization, complemented by an ecosystem approach in work design to implement sustainable supply chain management initiatives. This encompasses managing supplier from the source, conducting internal sustainability training, executing procurement tasks, establishing internal green logistics systems, and closely collaborating with outsourcing partners. Faced with a challenging business environment, Winbond emphasizes the importance of maintaining innovative management thinking and the ability to rapidly adjust and react. This ensures the evolution of timely and adaptive business capabilities with suppliers, ultimately achieving the goal of a sustainable supply chain.

2023 Performance Highlights



Over 16,965 Hours

- Total accumulated learning hours for the supply chain ecosystem



100% Completion Rate

- Product carbon footprint for major packaging product types (BGA, SOP, SON, WLCSP, RDL)



63,000 tCO₂e

- Accumulated Scope 3 emission reduction



Supply Chain Decarbonization

- Brought 13 suppliers and obtained a full subsidy of NT\$30 million from IDB, MOEA for the post-pandemic "Leading Small by Large Supply Chain Decarbonization Project" initiative



100% Coverage Rate

- Proportion of ESG self-assessment surveys conducted by tier-one key suppliers

4.1 Sustainable Supply Chain Management Framework and Mechanisms

4.1.1 Sustainable Supply Chain Management Strategy and Policy

Under the ESG Committee, Winbond has established a Sustainable Supply Chain Task Force responsible for devising and implementing sustainable supplier management strategies. In response to extreme climate change, global economic, trade, and geopolitical risks, Winbond integrates its existing supplier management policies across three main dimensions: sustainable procurement strategies, sustainability risk assessments, and digitalization of supply chain management. This integration encompasses RBA, Hazardous Substance Free (HSF) policy, traditional supplier management aspects (quality, price, delivery time, and process technology capabilities), and Authorized Economic Operator (AEO) certification, forming the Winbond Sustainable Supply Chain Management Framework. Detailed strategies, management policies, and measures have been developed accordingly.




Shu-Cheng Chang

Technology Executive, Prod. Control and Sub. Management Center

Supply chain is the relationship between a company and its suppliers, including aspects such as materials, equipment, and services. Winbond, continuously established partnerships and work with suppliers to achieve ESG goals and promote sustainable development. This effort further enhances business ethics, environmental protection, social care, and transparency in governance structure.

Sustainable Supply Chain Management Strategies and System

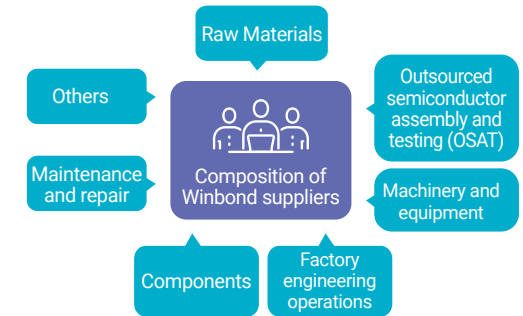
Three Strategies for Sustainable Supply Chain Management	Management Policy/Measures/Activity
 Responsible Procurement	<ul style="list-style-type: none"> Evaluation of new suppliers Winbond Supplier Code of Conduct Commitment Letter Winbond's Corporate Social Responsibility (CSR) and Integrity Policies Hazardous Substance Free (HSF) Non-use of Conflict Minerals Regular supplier evaluations
 Strengthening Supply Chain Resilience	<ul style="list-style-type: none"> Authorized Economic Operator(AEO) Sustainable risk Due Diligence in the supply chain Supplier on-site audits, coaching, improvement, and enhancement ESG co-learning workshops for key suppliers Various supplier training, negotiation, and communication activities
 Low-carbon Supply Chain	<ul style="list-style-type: none"> Sustainable Procurement Work (including local procurement, circular procurement, green procurement) Tier-one Suppliers Resource Usage Survey Carbon emissions management for Contractors (packaging and testing) Establishment of green logistics systems Government Project – Winbond decarbonization cooperation through "Large leads Small"

4.1.2 Supply Chain Composition and Structure

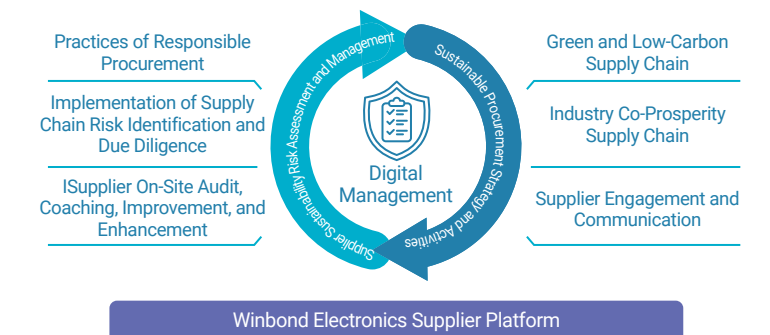
As one of the global key memory manufacturers, Winbond operates along the industry chain, catering to upstream IC/IP design demands, engaging in 12-inch wafer manufacturing, and outsourcing to packaging and testing facilities to complete memory production. In 2023, Winbond's most important operating location is Taiwan, while the other important

locations distributed across China, Japan, Korea and Israel. In 2023, Winbond engaged with a total of 1,027 suppliers for various transactions, categorized by procurement type and application area, including raw materials, outsourced semiconductor

assembly and testing vendors, machinery and equipment suppliers, factory engineering, parts, maintenance and repair, and others (transport logistics, waste disposal merchants, waste removal merchants, information equipment and software, as well as miscellaneous affairs). In order to meet the global supply demands, key (critical) suppliers are from Japan, the United States, South Korea, Belgium, and Germany. There were no significant changes in activities, value chains, or other business relationships compared to the previous reporting period. Additionally, Winbond conducted annual supply chain sustainable risk assessments for suppliers directly related to product composition to ensure stable operations and minimize risks.



Supply Chain Management Framework



- Supplier Routine Operations (Shipping and Receiving, Payment for Imports and Exports)
- Supplier ESG Interactive Network
- Packaging and Testing Product Carbon Footprint Data Exchange Module
- Green Product Logistics Management Module

4.1.3 Supplier Management Process and Mechanisms

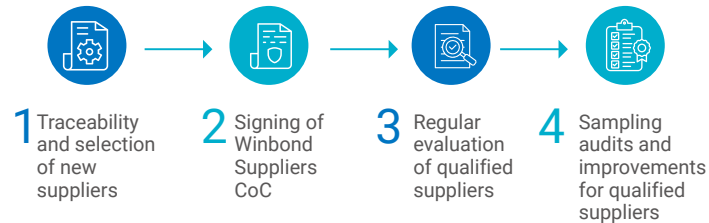


2023 Results of Key Supplier Sustainability Management

- **100%** Signing rate of Winbond Supplier Code of Conduct Commitment (CoC) Letter
- **100%** Signing rate of declarations on non-use of banned substances and conflict materials
- **100%** Compliance rate of new traceability suppliers with economic, environmental and social standards



Suppliers Management Process



With the aim of achieving sustainable supply chain development in mind, building a solid long-term relationships with Winbond suppliers is the foundation of a stable management system. Winbond has designed the sustainable supply chain management system based on systematic Plan-Do-Check-Act (PDCA) procedures. These procedures allow us to trace and select new suppliers, regularly evaluate qualified suppliers, and finally track and improve any deficiency. Winbond has proactively implemented SDG 17.16 “Enhance the Global Partnership for Sustainable Development”, applying strict internal quality standards to the raw materials provided by suppliers. Externally, Winbond has carried out regular supplier evaluations, on-site audits, deficiency identification, and improvement, discovering new ways to improve the operational and manufacturing operations with the suppliers. Through methods such as regular tracking, discussing improvements, and other methods to refine the business operations, Winbond is dedicated to collaborating with its suppliers in embodying the principles of sustainable supply chain development.

Regular Evaluation of Qualified Suppliers

Winbond conducts regular evaluations of its qualified suppliers annually, with a specific focus on suppliers and outsourcing partners (packaging and testing) due to the division of labor in Winbond's product manufacturing process. The evaluation criteria encompass various aspects such as quality (product/technology), delivery time, service, and pricing. Based on the evaluation results, the management mechanisms for suppliers and outsourcers are categorized into two groups. For suppliers, the management mechanisms are categorized as A, B, or C (Excellent, Good, Requires Review); while for packaging and testing outsourcers, that are categorized as superior, Class A, Class B, or Class C. These classifications serve as the basis for different management and improvement approaches.

As key technology partners in packaging and testing gradually possess energy-saving testing technology required by Winbond, sustainability performance was officially included in the regular evaluations in 2023. Sustainability evaluation criteria includes organizing sustainability-related activities, formulating green energy goals, setting energy-saving and carbon reduction targets, and considers major environmental or occupational safety incidents as deduction factors, ensuring the fairness of the evaluation process. In 2023, due to proactive advocacy and communication efforts, all qualified suppliers received an A rating in the regular evaluations, with no significant quality issues related to products or technology.

In the future, the inclusion of sustainability performance in the evaluation process will begin with packaging and testing suppliers and gradually expand to other types of suppliers. This approach not only encourages suppliers to consider sustainability performance as part of their competitiveness but also contributes to the long-term transformation and sustainable development of the entire supply chain.

Suppliers/Contractors Evaluation and Management Mechanism

Type of vendors	Rating and Management Mechanism			
Suppliers	Level A (≥ 85)	Level B(70 ≤ score <85)		Level C (<70)
	Continuous cooperation	Provide improvement measures, downgrade to Level C if rated Level B in two consecutive evaluations		Reduce quantity or discontinue
Outsourcers	Superior (≥90)	Level A (80 ≤ score <90)	Level B (75 ≤ score <80)	Level C (<75)
	Increase quantity recommended	Continue monitoring	Reduce quantity recommended	Terminate cooperation

Sourcing and Assessment of New Suppliers

Winbond's selection system for new suppliers includes evaluation items such as a quality system questionnaire (including quality, delivery time, services, technologies, and the supplier's quality management system), which based on RBA Code of Conduct. Additionally, suppliers are required to provide third-party certification of its quality management system and its management guidelines for Process/Product Change Notices (PCN) and fill out a questionnaire on its hazardous substance management questionnaire. Suppliers who are responsible for outsourced work on security products are additionally required to provide an international safety certificate and fill out the “Questionnaire on Safety Control Measures for Outsourced Work on Security Products.” In 2023, 9 new suppliers have passed the selection.

Percentage/Number of New Suppliers Selected Based on Economic, Social, and Governance Standards

Year	Number of New Suppliers	Percentage of Suppliers Selected
2019	11	100%
2020	4	100%
2021	3	100%
2022	5	100%
2023	9	100%
Total	32	100%

Outsourcers ESG Evaluation Items

Outsourcers ESG Evaluation Items
Participation in Winbond's ESG activities 40%
Results of Energy-Saving and Carbon-saving 30%
Green Energy Planning and Management 30%
Negative Factors Points deducted (1 point per case) for significant occupational safety accidents, environmental penalties, labor disputes, or other litigations that occur within the year.

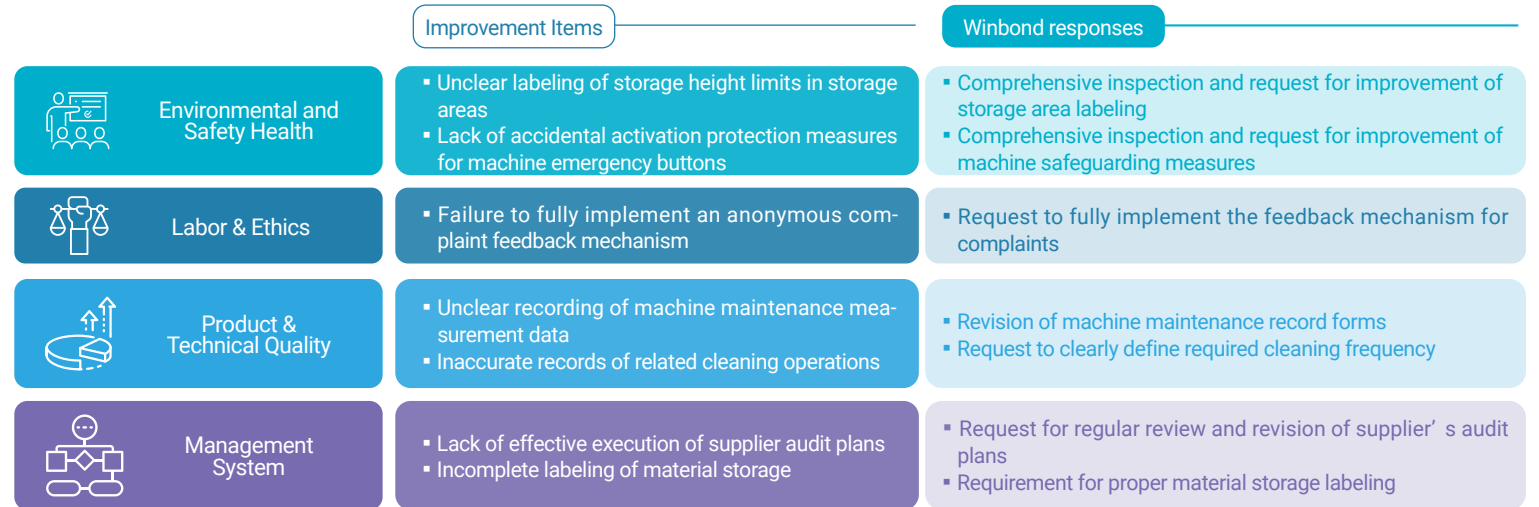
Qualified Supplier Audit and Improvement

In response to the rapid pace of digital transformation and the information convergence, Winbond will incorporate information security as a key audit criterion for suppliers, bolstering the resilience of the supply chain in this digital era. To ensure effective oversight of all qualified suppliers' operations, the Winbond supplier audit team conducts targeted sampling audits annually. The written audits cover various certification aspects such as "Quality Management" and "Green Review." On-site visits and audits focus on the core elements outlined in the RBA 7.1.2 audit manual, specifically addressing "Social Responsibility Audits." In 2023, a total of 31 audits were conducted, including 19 raw material suppliers and 12 packaging and testing outsourcers. Notably, audit outcomes across these three key areas aligned with Winbond's standards, with no disqualifications due to significant environmental, social, or governance issues among qualified suppliers. To foster sustainable collaboration with suppliers in product/technical services, management, and operations, Winbond compiled 151 improvement suggestions from 31 audits conducted in 2023. Suggestions include process control, environmental health and safety management, supplier management, quality management, and management systems. Through proactive engagement with the Winbond supplier audit team, suppliers proactively identified potential risks in their daily operations, thereby implementing preventive measures to meet audit requirements and effectively enhanced their sustainability capabilities.

Pass rate of Key Suppliers/Outsourcers for the Audit's Economic, Environmental, and Social Items (Unit: %)

ESG aspect	Audit Items	Pass rate
Economic	ISO 9001 Quality Management Systems	100%
	IATF 16949	100%
Environmental	ISO 14001 Environmental Management Systems	100%
	REACH	100%
	RoHS	100%
	HSPM Hazardous Substance Process Management	100%
Social	RBA Social Responsibilities	100%

Improvement Items in Economic, Environmental, and Social for Qualified Suppliers and Winbond Responses



4.2 Sustainable Supply Chain Risk Management

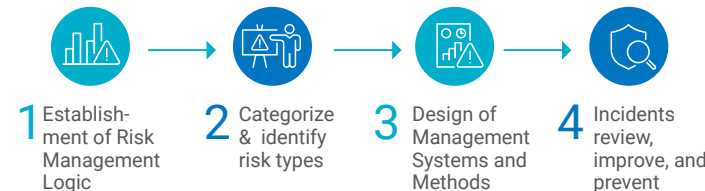


2023 Results of Supply Chain Risk Management

- 100% Signing rate of suppliers committing to compliance with Winbond's Corporate Social Responsibility (CSR) and Integrity Policies
- 100% of tier-one key suppliers implementing sustainable risk assessments



Risk Management Process



Based on Winbond's purchasing activities, composition of our supply chain consists of suppliers from different types and companies from different production bases. In light of this, in supply chain risk management, first, Winbond monitors and assesses impacts using the systematic thinking of ISO 31000 risk management. Secondly, it identifies the types and sources of risks, categorized into internal risks, intra-partnership risks, and external risks. Thirdly, in response to the differences in risk sources and types, appropriate management approaches are established. Finally, each management event is reviewed, and improvements are made based on the deficiencies identified in the event, to mitigate future risks' impact on supply chain management. The following details the content of various risks and the corresponding management systems.

4.2.1 Supply Chain Risk Management Mechanism

To address the varying impacts and stages of different risks, Winbond designed different management systems, ensuring the overall stability of the supply chain operations.

Categories Identification	Material Risk	Intra-partnership Risk	External Risk
Definition	Risk that directly related to the production and Manufacturing	Integrity risks that arising from conflict of interest	External risks are divided into three categories: climate change, natural disaster, and non-natural risks (political, economic and social risks, etc.).
Management System/ Measure	<ul style="list-style-type: none"> Winbond regards the Responsible Business Alliance (RBA) requirements for conflict-free minerals as a core management principle. Annually, Winbond conducts due diligence investigations on critical suppliers using the Conflict Minerals Reporting Template (CMRT) provided by the Responsible Minerals Initiative (RMI) and publishes an annual Conflict Minerals Due Diligence Report. To uphold product quality, Winbond has established the Process/Product Change Notice (PCN) management principle for suppliers. This management mechanism is activated whenever there is any change in raw materials or in suppliers' raw material, process, or packaging materials. 	<ul style="list-style-type: none"> Require newly qualified suppliers to sign Winbond's Supplier Code of Conduct Commitment Letter. Conduct biannual ethics and integrity policy advocacy for all suppliers. State Winbond's information security management policy in the order, require suppliers of qualified transactions to strictly abide by it, and outline the response and compensation responsibilities of both parties when information security risks occur. 	<ul style="list-style-type: none"> In the event of natural disasters such as earthquakes, Winbond utilizes its Emergency Response System to promptly reflect seismic intensity worldwide, allowing procurement colleagues to assess the impact on suppliers. In controlling the impact of climate change, Winbond has analyzed the disaster potential of more than 1,400 domestic suppliers at their operating sites according to various warming scenarios (refer to the 2023 Task Force on Climate-related Financial Disclosures Report). Regarding political-economic risks (e.g., Russia-Ukraine and Israel wars) and social risks (e.g., supplier factory safety accidents, strikes) that may cause supply disruptions, Winbond promptly establishes an emergency response team to manage situation reporting, compilation, notification, analysis, and assessment. Winbond strictly adheres to the regulations of the Customs Administration, Ministry of Finance, regarding "Authorized Economic Operator" (AEO) status, and requires contractors to comply with and improve trade security management.

4.2.2 Supply Chain Sustainable Risk Assessment

Winbond employs RBA 7.0 and ISO 20400:2017 Sustainable Procurement as the core frameworks to establish the content of supplier ESG sustainable risk assessment. In 2023, Winbond conducted surveys targeting tier 1 critical suppliers, including raw materials, packaging and testing, critical spare parts (such as quartz, photomasks, PAD), with significant procurement amounts and direct relevance to production and manufacturing. The response rate exceeded 90%.

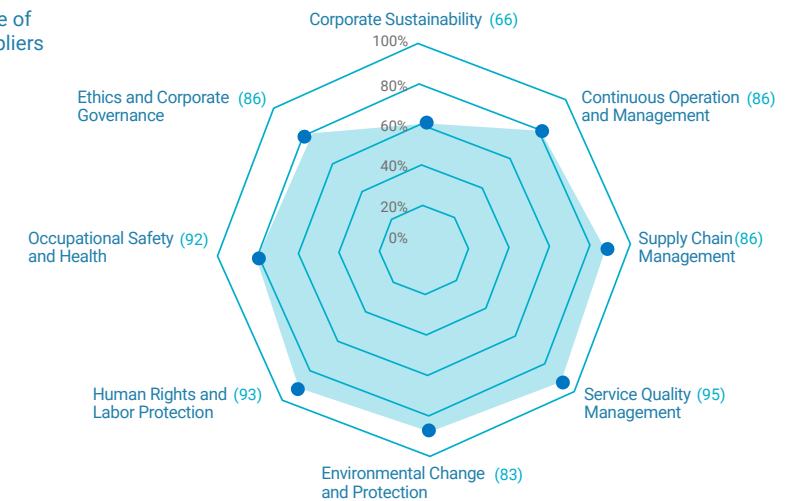
Firstly, among the surveyed suppliers, the overall average ESG score was 84.2 points, with higher scores observed for raw material suppliers and outsourcing assembly and testing partners. Secondly, by observing the implementation items of each sub-assessment category for tier 1 critical suppliers, it was found that most suppliers performed well in areas such as service quality management, occupational health and safety, human rights, and labor protection, with average scores ranging from 92 to 95 points.

However, regarding the enhancement of the overall resilience of the supply chain, surveyed suppliers still need to strengthen the implementation of formal corporate sustainability measures (such as formal organization, management systems, etc.) and enhance execution in response to and protection against environmental changes. In the future, to effectively and continuously manage the overall risk impact and sustainability of the supply chain, Winbond will implement three major measures regarding the enhanced resilience of the supply chain mentioned above. First, through the Sustainable Supply Chain Upgrade Forum, suppliers will regularly be provided with the correct management mindset, enhancing their knowledge of governance structures to improve their capabilities in environmental and social aspects. Second, resources from our country's government, industry, academia, and research sectors will be introduced to provide the necessary improvement resources for suppliers, thereby reducing their financial burden. Third, using the Winbond Supplier ESG Interaction Network as a platform, we will proactively provide various corporate sustainability and training information.

Looking ahead, to gradually enhance proactive risk management, Winbond plans to expand the scope of surveys to cover all suppliers, broadening the range of risk control. Additionally, existing supplier performance evaluations and on-site audits will incorporate ESG assessment criteria. Winbond will exert its utmost efforts to collaborate with suppliers to discuss improvement methods, jointly striving to enhance the resilience of the overall supply chain.

Average ESG Score of Tier 1 Critical Suppliers

Average Score **84.2**



Content of supplier ESG risk assessments

Management	Environment	Society	Governance
Definitions	Starting with product life cycle traceability and supply, Winbond has committed to requiring our partnered suppliers to operate in an environmentally-friendly and economic manner	Suppliers are required to sign the Winbond Supplier Code of Conduct Commitment Letter, ensuring that our suppliers provide a safe and healthy workplace compliant with international labor rights standards.	Suppliers are required to conduct business operations ethically and with integrity, the highest standard for business ethics, and ensure that this standard is applied to all internal business operations.
Assessment items	<ul style="list-style-type: none"> Environmental Management Systems Air Pollution Prevention Water Management Waste Management Greenhouse Gas Management Biodiversity Management Hazardous and Shared Substance Management 	<ul style="list-style-type: none"> Human Rights Protection Employment and Labor Rights Protection Occupational Health and Safety, and General Health Management Chemical Safety Fire Safety Equipment Safety 	<ul style="list-style-type: none"> Degree to Which Corporate Sustainability has been Formally Incorporated Sustainability Impact and Degree of Disclosure Business Continuity and Management Supply Chain Management Service Quality Management Business Ethics and Philanthropy Corporate Governance

- Note**
1. Definition of key supplier refers to: directly related to production and manufacturing, single source of supply, critical and affecting production of spare parts (photomasks, PAD, quartz, packaging for shipment).
 2. Definition of local supplier: mainly refers to suppliers in Taiwan.

Supplier Sustainability Risk Assessment Results and Future Management Promotion Activities

The main strategy for improving sustainability risks among suppliers



Environment

- Promote the use of renewable energy as the primary source of electricity.
- Facilitate and execute assessments of products' carbon footprint.
- Drive biodiversity initiatives and establish relevant management policies and systems, encouraging suppliers to publicly declare their policy content.
- Utilize the influence of responsible procurement to implement biodiversity management in internal procurement activities.
- Dedicate efforts to improving production, manufacturing, and processes that affect environmental ecology, while enhancing circular technologies in various engineering fields.



Social

- Promote human rights due diligence assessments.
- Encourage suppliers to consider epidemiological trends and assist in arranging appropriate preventive treatments for on-site employees (such as influenza or COVID-19 vaccinations).
- Require suppliers to design facilities according to the total number of company employees.
- Mandate suppliers to precisely comply with regulatory requirements for machinery-related permits, licenses, and testing reports.
- Ensure that suppliers establish machine risk assessments and safety protection plans to ensure the safety of their employees while operating machinery.



Government

- Encourage suppliers to regularly maintain and manage the intellectual property or patent portfolio related to their products/services.
- Encourage suppliers to provide regular training courses to strengthen governance functions at the highest levels of the company.
- Provide the latest domestic and international governance standards, guiding suppliers to implement due governance from the perspective of market institutional investment.
- Encourage suppliers to promote sustainability initiatives based on international standards such as GRI, SASB, and IFRS.

Sustainable Learning
Forum Training

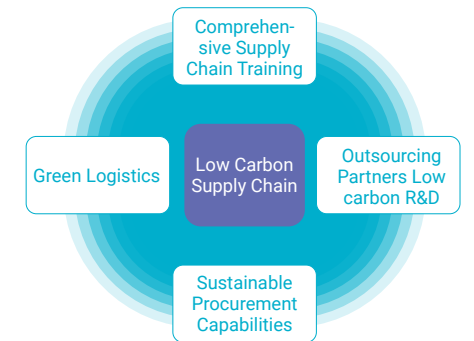
Introduce industry-government-academia collaboration
Resource Subsidy Project

Sustainable learning resources
Digital and real-time

4.3 Sustainable Supply Chain Impact

4.3.1 Green and Low-carbon Supply Chain

Since 2022, Winbond has established the Co-Sustainability Project to communicate its carbon reduction goals and priorities to the supply chain through activities and sustainability supply chain resource usage surveys. In 2023, Winbond further segmented its efforts in supply chain decarbonization into four areas. First, it promotes the transformation of the supply chain towards low-carbon to achieve a 10% carbon reduction by 2030, This including comprehensive training, surveys, and the introduction of resources from industry, government, and academia. Second, it enhances sustainable procurement capabilities (including local procurement, circular procurement, and green procurement). Third, it strengthens the management of low-carbon work by outsourcing partners. Finally, it actively develops internal green logistics systems.



2023 Results of Supply Chain Influence

- Tier one main suppliers ^(Note) sustainability supply chain resource usage surveys response rate: **>90%**
- Completion Percentage of carbon footprint inventory for major packaging types of products: **100%**
- The first semiconductor manufacturer received full subsidies of **NT\$30 million** from the IDA of MOEA for "Large Leads Small Initiative."


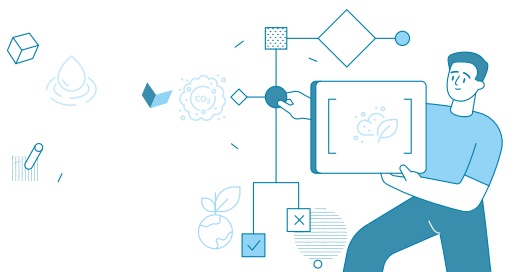


Note The primary suppliers in the first stage refer to those who supplied to Winbond in 2023 and were directly or indirectly related to the products, technologies, or services comprising Winbond's offerings.

Low Carbon Supply Chain Management Process



Low Carbon Supply Chain Initiatives

Management Process	Item	Description
Identify conflicts and establish a reciprocal mindset	<ul style="list-style-type: none"> ESG co-learning workshop for suppliers Internal ESG Training 	<ul style="list-style-type: none"> Utilizing the Supplier ESG Learning Forum as a platform, starting in 2022, invite critical suppliers who have been engaged in carbon reduction for many years with outstanding performance to exchange views on carbon reduction work. In 2023, we plan to expand the scope of internal staff ESG education and training to enhance the empathy of internal staff towards supplier carbon reduction work. Encourage, assist, and reciprocate instead of demanding to reduce resistance from various suppliers towards carbon reduction work, facilitating the subsequent disclosure of information in category three and gradually improving the transparency of carbon information in the supply chain.
Declare carbon reduction goals and establish sustainability objectives	<ul style="list-style-type: none"> Sustainable Supply Chain Upgrade + Forum 	<ul style="list-style-type: none"> Publicly disclose the supply chain 2030 reduction target as 10%, achieving net-zero in 2050.
Collect and enhance supply chain carbon emission data transparency	<ul style="list-style-type: none"> Sustainable Supply Chain Resource Usage Survey Outsourced Product Carbon Footprint Inspection and Calculation 	<ul style="list-style-type: none"> In 2023, an assessment was conducted on Tier 1 primary suppliers, evaluating their performance in electricity consumption, water usage, waste generation, greenhouse gas emissions, international climate governance efforts, and the energy consumption and carbon footprint of various resources used in their production processes ^(Note 1). Number of survey participants: 152 2030 supply chain carbon reduction target: 10% Annual electricity savings: 39 million kWh Annual water conservation: 2.828 million metric tons Annual waste reduction: 77,500 metric tons Number of ISO 14064-1:2018 Certified Companies: 35 Number of greenhouse gas reduction companies: 91 Number of ISO 14067:2018 Certified Companies: 14 Number of ISO 50001 Certified Companies: 19 Number of Companies Participating in CDP Survey: 58 Types of Packaging with Product Carbon Footprint: BGA, SOP, SON, WLCSP, RDL ^(Note 2) 
Conduct training and open discussions	<ul style="list-style-type: none"> Sustainable Supply Chain Upgrade + Forum Advanced Packaging Technology Forum 	<ul style="list-style-type: none"> Since 2023, Winbond holds three Sustainable Supply Chain Upgrade+ Forums to enhance suppliers' knowledge of sustainability. The topics of the forums include international standards, management benchmarks, and disclosure. Professionals are invited to serve as speakers and outstanding suppliers are also invited to share their experiences. Each forum concludes with a Q&A session and further discussion. Through this platform, Winbond and suppliers unify their efforts towards sustainable learning.
Introduce resources from industry, government, and academia to collaborate on carbon reduction	<ul style="list-style-type: none"> Winbond Leads and Supports Small Suppliers Institute for Information Industry (III) and College Teams Provide Carbon Reduction Guidance 	<ul style="list-style-type: none"> Led by Winbond, a total of 13 suppliers including raw materials, packaging and testing, machinery and equipment, and plant engineering were invited to form an ESG sustainable supply chain team. Winbond applied to the Industrial Development Administration (IDA) of the Ministry of Economic Affairs for the "Large Leads Small Initiative: Advancing Low-Carbon and Smart Transformation in the Manufacturing Industry" and successfully secured full subsidies amounting to NTS30 million. Incorporating carbon reduction consulting resources from the Institute for Information Industry and university teams (including Ming Chi University of Technology, Southern Taiwan University of Science and Technology, and National Cheng Kung University Sustainability Center) for the tier one suppliers in the first stage.

Note 1. The electricity conservation volume was the difference between the electricity consumption calculated from the Scope 2 emissions in 2022 and the baseline year (2021). The emissions for both years were verified by a verification body. The water conservation volume and waste reduction volume were management data provided by suppliers based on the principle of good faith.

Note 2. Ball-grid arrays (BGA), Small Outline Package (SOP), Small Outline No-lead Package (SON), Wafer Level Chip Scale Package (WLCSP), Redistribution Layer (RDL).

Advancing Low-Carbon and Smart Transformation in the Manufacturing Industry

Large Leads Small Initiative

Advancing Low-Carbon and Smart Transformation in the Manufacturing Industry
Winbond Sustainability Supply Chain Low-Carbon Transformation Project



In 2023, Winbond collaborated with 13 companies including Powertech Technology Inc., Greatek Electronics Inc., Probe Test System Corp., Lingsen Precision Industries, Walton Advanced Engineering, Inc., DuPont Taiwan, Resonac Semiconductor Materials (Taiwan), Wonik Quartz Taiwan Co., LTD., United Industrial Gases Co., LTD., Hsing Mien Industry CO., LTD., Edwards Vacuum, Taiwan Puritic Corp., and Mega Union Technology Inc. to execute three major projects: "Reduction of Factory Process Gas Emissions," "Implementation of Lean Electricity and Water Conservation Measures in Factories," and "Promotion of Greenhouse Gas Inventory and Hotspot Analysis in the Supply Chain." During the collaborative period of this project, a total investment of over 200 million New Taiwan Dollars was made. Within two years, these initiatives aimed at promoting low-carbon transformation gradually increased their carbon reduction capacity. It is anticipated that when the projects completed in 2025, an annual reduction of approximately 5,866 tCO₂e will be achieved, equivalent to 14 times the annual carbon sequestration by the Daan Forest Park annually. This achievement not only serve as a model promoting the low-carbon transformation of the semiconductor industry supply chain but also showcases the multifaceted qualitative and quantitative operational methods with benefits, which make Winbond the first semiconductor to receive a full subsidy of NT\$30 million. Therefore, the Ministry of Economic Affairs' Industrial Development Administration invited Winbond to the "2023 Supply Chain Transformation and Innovation Forum" as a representative of the semiconductor industry to share its experiences in sustainable operations and low-carbon transformation.



Winbond Project Content

Management and Ideological Values
On-site work requires energy-saving thinking

7S on-site work management model 5S+Safety+Energy Saving

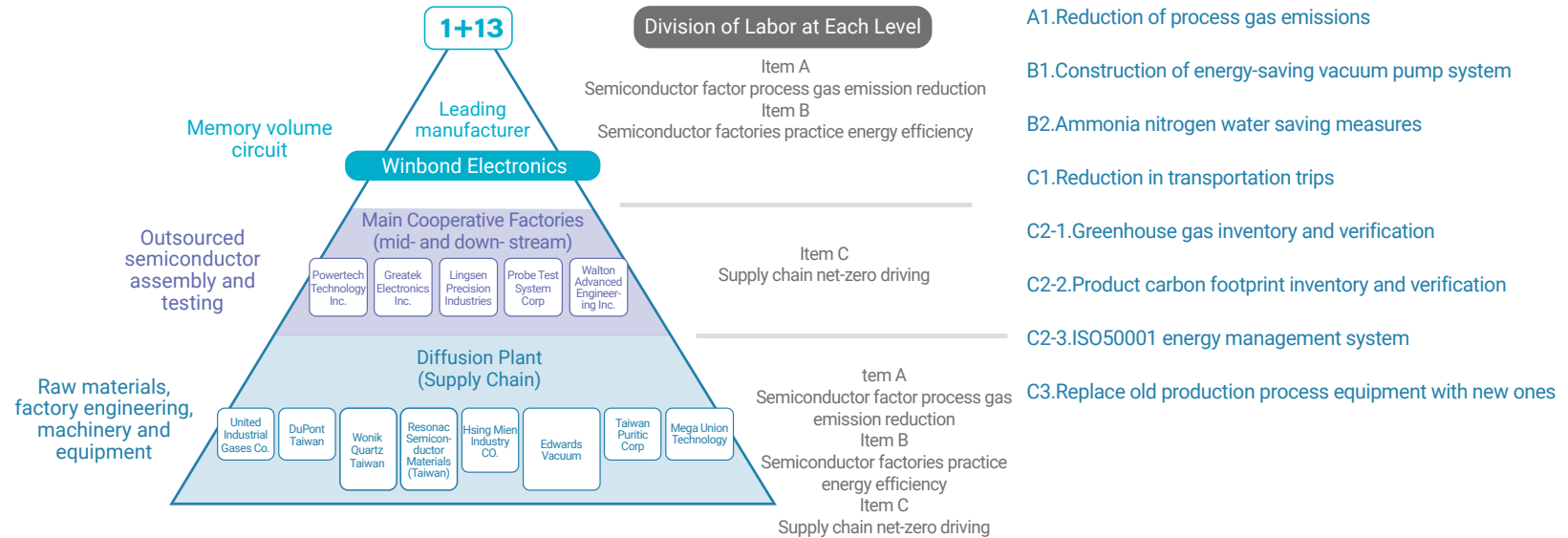
Industrial aspect
Brainstorm carbon reduction measures

Economic aspect
Encourage the purchase of domestic equipment



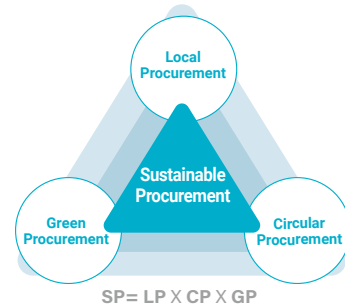
Gathering semiconductor low-carbon teams

Diversified carbon reduction items



Sustainable Procurement

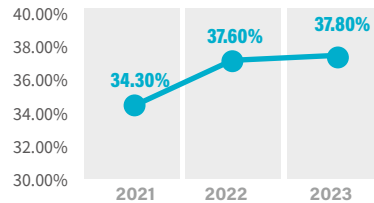
Since 2023, Winbond has redefined the proactive significance of procurement work in sustainability and has planned corresponding procurement strategies. These strategies include local procurement, which effectively reduces GHG emissions generated by international transportation distances, circular procurement to promote material recycling and reuse, and green procurement to encourage domestic suppliers to provide green products/services. These initiatives are integrated into Winbond's sustainable procurement promotion efforts. In the future, the green procurement is highlighted by leveraging the economic value generated by procurement activities and collaborating with suppliers to implement our sustainable development.



Local Procurement

To ensure the sustainability of CTSP and Kaohsiung Fabs, the focus of local procurement was on materials directly related to wafer manufacturing, including chemicals, gases, targets, wafers, and key consumables. In 2023, Winbond actively adjusted the procurement ratios of various raw material suppliers, due to the external impacts such as climate change, inflation control, and conflicts in Ukraine, Israel, etc., and internal demands for green products and process improvements. The proportion of local procurement increased from 37.6% in 2022 to 37.8%, marking a 0.2% annual increase. Looking ahead, Winbond will continue to explore the potential for localizing various raw materials to minimize carbon emissions and supply chain risks while optimizing management costs.

Proportion of local procurement amount of raw materials

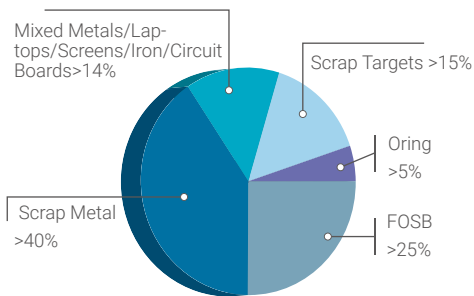


● Proportion of local purchase amount

Circular Procurement

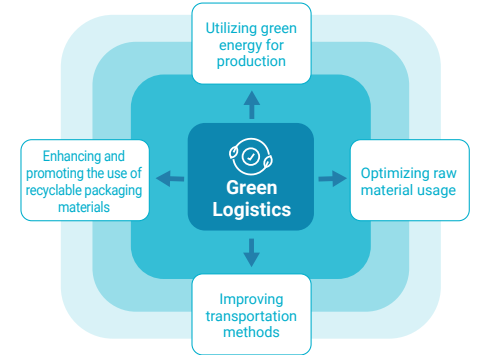
Following the EU's definition of circular procurement, Winbond applies the concept of closing the loop in the circular economy to identify products or services that can generate economic benefits through circularity in the operations of CTSP and Kaohsiung fabs. By leveraging its bargaining power and negotiating with suppliers, Winbond achieved over NT\$2.3 million in sales performance from the recycling and sale of various waste products in 2023, including Scrap Targets, O-rings, FOSBs, mixed metals, laptops, screens, iron, and tray pallets. Looking ahead, Winbond will continue to seek products that can be repaired, reused, or recycled in the procurement process, emphasizing resource efficiency through circular procurement to achieve sustainable development goals.

2023 Circular Procurement Performance



Internal Green Logistics

In recent years, the demand for carbon-neutral products from international customers has been growing. In 2023, Winbond actively responded to this demand by incorporating plans for low-carbon production into its internal logistics system, based on considerations within the company's value chain. This includes continuously improving production forecasting capabilities during the input stage of production to optimize the usage of raw materials and avoid unnecessary waste. At the stage of completing the manufacturing of DRAM and NOR Flash finished products, efforts were made to reduce greenhouse gas emissions by improving transportation management. In 2023, these logistics and transportation operations saved 110.9 tCO₂e emissions. Suppliers were requested to prioritize the use of recycled materials for packaging while maintaining quality standards. In 2023, over 70% of waste pulp was used in packaging cardboard, and 100% of plastic pallets were manufactured from recycled materials.



Outsourcer' Low-carbon Technology Development Capability



In 2023, Winbond leveraged government subsidies and carbon reduction guidance resources from the Institute for Information Industry to motivate outsourcer to eliminate high-energy-consuming or inefficient machinery and equipment. They were also encouraged to identify carbon emission hotspots and significant energy uses through GHG emission verification and by implementing the ISO 50001 energy management system. From the analysis of product carbon footprints, outsourcers were encouraged to rethink process improvements from the source. In summary, the low-carbon technology development among outsourcers in 2023 focused on three aspects: Firstly, monitoring the input of energy and resources in each stage of testing and packaging processes, and actively communicating with outsourcers to reduce energy usage; secondly, evaluating the development of green materials and prioritizing the use of raw materials that meet environmental and regulatory standards; collaborating with outsourcers to brainstorm ideas for low-carbon processes. Third, by optimizing upstream material inputs, waste generation during the outsourcing phase is minimized, effectively lowering overall waste disposal across Winbond's supply chain.

4.3.2 Supply Chain Inclusion



2023 Results of Sustainable Supply Chain Learning Ecosystem

- TSupplier ESG workshop training hours accumulated: **9,438 hours**
- Large forums training hours accumulated: **5,000 hours** · Satisfaction rate: **4.55**
- Employee's ESG training hours accumulated: **1,800 hours**



Communication Process



1 Advocacy of sustainable issues for new suppliers



2 Deep engagement by co-learning workshop



3 Survey on Sustainable training needs of suppliers



4 Conducting public forums and consolidating conference meeting

To effectively advance supply chain management towards sustainability, Winbond integrates technical and quality-oriented approaches with innovative thinking and management models in its existing supplier collaboration efforts. In addition to regular environmental, safety, and health (ESH) training for suppliers/contractors and outsourcers conferences, new initiatives have been added to the agenda. For example, Supplier ESG Learning Hub, Internal ESG Education Training for Colleagues, Sustainable Supply Chain Upgrade+ Forum, and Advanced Packaging Technology Forum. In 2023, Winbond conducted a total of 5,977 hours of regular ESH training for suppliers/contractors, accumulated 9,438 hours of learning in the Supplier ESG Learning Hub, and exceeded 1,800 hours in Internal ESG Education Training for Colleagues. A total of five forums, accumulating over 5,000 hours, were organized. In the future, Winbond will continue to match appropriate training resources for various suppliers, working together to implement corporate sustainability.

Regular ESH Training for Suppliers/Contractors

To effectively maintain safety in the workplace at Winbond and enhance suppliers' awareness of occupational safety during work, Winbond annually provides relevant training for supplier employees engaged in on-site work or stationed at the facilities. This training covers workplace equality and epidemic prevention. Given the specific environment of semiconductor work, Winbond conducts comprehensive hazard notification and special operation education training for incoming supplier employees each year to ensure occupational safety and health. In 2023, a total of 5,977 hours of training were conducted, including sessions at the Zhubei Building, the CTSP and the Kaohsiung fabs.

Suppliers / Contractors' Regular Environmental, Safety, and Health training

Topic	Content	Number of people	Total training hours (people * hours)	Factory
Equality in workplace	Training and advocacy on workplace bullying, abuse, harassment, etc.	26	13	CTSP fab
		22	11	Kaohsiung
		10	5	Zhubei
Epidemic prevention advocacy	Temperature monitoring and mask-wearing for employees/visitors/contractor personnel upon entry	26	26	CTSP fab
		22	22	Kaohsiung
		10	10	Zhubei
Occupational safety and health	Hazard notification and special operation education training for suppliers/contractors entering the premises	1,705	2,264.5	CTSP fab
		2,436	3,156	Kaohsiung
		318	556.5	Zhubei

Deep Engagement – Suppliers ESG Co-learning workshop

Since 2023, Winbond has expanded the scope of its mutual learning workshop to include in-depth discussions on environmental resource reduction, climate change adaptation measures, greenhouse gas and carbon management, human rights and labor protection, as well as corporate governance and ethics. With the participation of 24 companies and a total of 286 attendees, the workshop accumulated a total of 9,438 hours of training. In addition to staying updated on the latest trends and developments in the semiconductor industry's ESG practices, Winbond gains diversified ESG insights through the selfless sharing of benchmark suppliers. This enables Winbond to acquire diverse ESG practices and obtain relevant new knowledge, such as low-carbon gas substitution and human rights due diligence. Internally, the workshop provides the latest industry information to various departments, facilitating Winbond's planning and execution of sustainability initiatives throughout its supply chain. Externally, the workshop gradually becomes a platform for members to showcase their sustainability beliefs and practices.



Internal ESG Training

Since 2022, Winbond has been implementing 'ESG Intelligence Enhancement Education and Training,' initially aimed at its materials staff. Starting in 2023, staff involved in supply chain management, such as those from the materials department and outsourcing engineering department, have also been included in the ESG education and training programs. The training covers a wide range of topics, including sustainable cultural literacy, current climate change events, ESG fundamentals, carbon issues, and green energy development. In total, the training has provided 28 hours per person, amounting to 1,870 hours in total. Looking ahead, Winbond plans to introduce concepts of mandatory and elective courses and incorporate resources from academia and research institutions to assist staff in innovating within their existing roles and to continue advancing on the sustainability journey.

Course Categories	Times of hold
Supplier on-site training	3
ESG understanding and overview	3
Policies and regulations analysis	1
Carbon issues	2
Green energy overview	2
Sustainable discussions	1



Suppliers on-site visit Monthly ESG training



Large -scale External Training – Upgrade + Forums/Advanced Packaging Technology Forum

Sustainable Supply Chain Upgrade + Forums

The purpose of organizing the "Sustainable Supply Chain Upgrade +" forum is to enhance the acquisition of sustainable professional knowledge among suppliers and motivate them to implement this knowledge through professional courses and an open discussion format. The forum also encourages suppliers to invite other colleagues to leverage the learning and information diffusion effect, and to implement sustainable DNA in the operation of each supplier. In 2023, Winbond held a total of 3 forums. The topics include popular carbon issues, water resource management, supply chain resilience, and human rights due diligence management. The invited supplier categories include raw materials outsourced assembly and testing, machinery equipment, plant engineering, maintenance and spare parts, and waste management, etc. Besides providing professional courses, it is also a place to communicate key management policies. The total learning hours exceeding 5,000 hours.

Structure of Upgrade + Forums



Advanced Packaging Technology Forum

Innovation is also a critical success factor for sustainable supply chains. Enhancing the R&D capabilities of outsourcing partners is tantamount to boosting the competitiveness of Winbond's products. This forum aims to facilitate direct communication between various units within Winbond and the outsourced assembly and testing sectors through bilateral communication, thereby inspiring products R&D that better serve future lifestyles. In 2023, the "Advanced Packaging Technology Forum" covered topics such as advanced packaging process introduction, Flash burning application, and appearance inspection solutions. Participants included engineers from various units of Winbond and outsourced assembly and testing factories, with a total learning hours exceeding 400 hours.



Feedback From Ecosystem Members

To firmly advance alongside with suppliers on the sustainable journey, in 2023, Winbond expanded its sustainable operations in the supply chain from an ecosystem perspective (Note). In terms of the environment, cooperation focuses on low-carbon initiatives and joint beach cleanups; in terms of governance, Winbond invited suppliers to conduct procurement education and training together, thereby strengthening the sense of partnership between suppliers and Winbond. In terms of social inclusion, Winbond actively responds to the expectations of various stakeholders for sustainable supply chain management. Winbond firmly believes that in the face of a changing and challenging business environment, it is necessary to break away from linear thinking based on the supply chain, value chain, and industry chain, and to systematically reorganize and manage sustainability-related work with suppliers using a systemic approach in order to establish a sustainable growth mindset that embraces cooperation and mutual benefit in the long term.



Note The definition of a Supply Chain Ecosystem refers to the planning and organization of various types of business activities, including flows of people, information, goods, money, and facilities, from the inside out in a value-co-creation and integrated manner

ESG perspective



Environmental



Governance



Social

Feedback from Ecosystem Members



▲ Winbond's Large Leads Small initiative

Greatek Electronics Inc.

Through the "Large Corporations Lead Smaller Ones On Energy Conservation and Carbon Reduction" project, we can feel that Winbond actively promotes energy conservation and carbon reduction. Its vision and dedication are worth learning from. During the process, both parties shared a common commitment to sustainability and created green value. This not only achieves mutual benefits in business but also serves as a concrete practice of responsibility to society and the environment.

Walton Advanced Engineering, Inc.

Thanks to Winbond's invitation to participate in the "Large leads Small" project and government subsidy, we can accelerate the replacement of high-energy-consuming equipment to achieve energy-saving and carbon-reduction goals. By using the ISO 14067 carbon footprint standard, we aim to identify carbon emissions hotspots in our products. We look forward to establishing a mutually beneficial partnership with Winbond and taking steady steps towards the 2050 net-zero target!



▲ Winbond X DHL beach cleanup

DHL Group

As a leading international logistics brand, DHL actively promotes sustainable development and provides innovative solutions to help customers implement green supply chains. We are honored to participate in the "ESG Learning Forum" hosted by Winbond this year, where we shared DHL's experience in promoting sustainable logistics. Furthermore, over 40 Winbond colleagues were invited to participate in a beach cleaning activity organized by DHL in Changhua, contributing to marine conservation efforts. We appreciate Winbond's invitation, which not only facilitates ESG exchanges but also helps convey our mutual commitment to sustainability and environmental goals. We look forward to expanding the scope of cooperation and embarking on the journey towards sustainable carbon reduction together.



▲ Sustainable procurement training

Topco Quartz Products Co., Ltd

It was an honor for us that Winbond led colleagues to our company for a visit and ESG exchange in 2023. Through mutual exchanges, we were able to convey our commitment and goals for sustainable development. We look forward to partnering with Winbond to achieve net-zero emissions and establish a win-win partnership.



▲ Sustainable seminar

Department of Transportation and Logistics of Feng Chia University Department of Supply chain Management of Singapore University of Social Sciences

The semiconductor industry is one of Taiwan's highly competitive strategic industries and a key focus of global talent development. We appreciate Winbond's invitation to the Supply Chain Management Departments of Feng Chia University and Singapore University of Social Sciences to participate in a sustainability seminar on carbon emission monetization. We shared practical experiences in sustainable supply chain management in Taiwan's semiconductor industry and exchanged academic perspectives on carbon emission monetization. Winbond's dedication to corporate sustainability and proactive response to the expectations of various stakeholders is evident.



▲ Kaohsiung fab visit

The Allied Association for Science Park Industries – Procurement Committee and Water, Electricity, Gas, and ESH protection Committee

We deeply understand Winbond's pervasive culture of promoting carbon reduction and sustainable thinking during the visit to the green and low-carbon production advanced base in the Kaohsiung Fab. Winbond is not only a trusted partner for suppliers but also an exemplary company in Taiwan's electronics industry.

2023 Outsourcer Conference: Inspiring Sustainable Performance through Innovative Thinking

The success of Winbond Memory in the highly competitive market is attributed not only to the collective quality control efforts of all Winbond employees but also to the advanced and stable quality technologies proposed by various packaging and testing outsourcing suppliers. In 2023, outsourcers including PowerTech Technology Inc., Winstek Semiconductor Co., Ltd., KING YUAN ELECTRONICS CO., LTD., IMOS-ChipMOS TECHNOLOGIES INC., Greatek Electronics Inc., Formosa Advanced Technologies Co., Ltd., Lingsen Precision Industries, Probe Test System Corp., and Walton Advanced Engineering, Inc.. Senior executives from these companies participated in the Outsourcer Conference with a 100% attendance rate.

At the conference, the Winbond CEO provided an in-depth analysis of the semiconductor industry market conditions to strengthen the collaborative efforts among outsourcers. Emphasizing the core competence of quality in memory products, heads of Winbond's manufacturing departments shared their experiences and insights on digital transformation, renewable energy, and carbon reduction management measures implemented in recent years. The goal was to promote sustainability within the supply chain.

With the incorporation of ESG criteria into the regular evaluation of outsourcers in 2023, Winbond conducted a comprehensive assessment based on factors such as packaging technology research and development, quality, delivery schedule, cost, service, and sustainability performance. Outstanding outsourcer awards were given in recognition of the outsourcers' continuous support and as an incentive for them to further enhance their green and low-carbon technologies.



▪ 2023 Outsourcer Conference



PowerTech Technology Inc.



KING YUAN ELECTRONICS CO.



IMOS-ChipMOS TECHNOLOGIES INC.



Lingsen Precision Industries, Ltd.

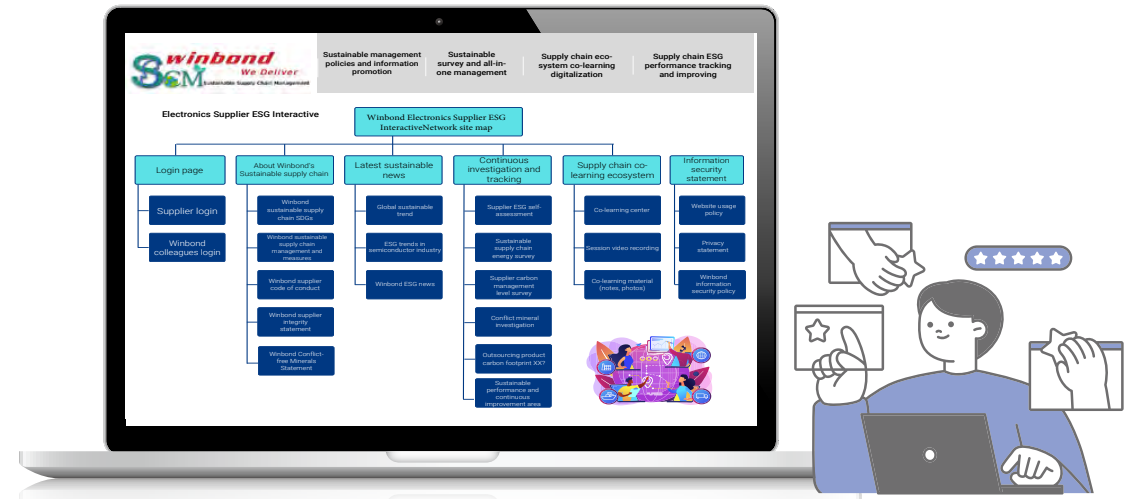


Winbond Supplier ESG Interactive Network

In 2023, Winbond established the Supplier ESG Interactive Network, which integrates four major functions: sustainable management policy and information dissemination and promotion, one-stop management of sustainable surveys, digitization of supply chain ecosystem learning activities, and continuous tracking and improvement of supplier sustainability performance. Suppliers of Winbond can firstly access the latest trends in sustainable development in the semiconductor industry on the platform. Secondly, by reviewing their own records in resource management and ESG performance, they can directly obtain learning materials for sustainability training on this platform. Notably, Winbond is a pioneer in the semiconductor industry in the collection of information on outsourced product scope 3 emissions. Following the Pathfinder Framework 2.0 guidelines (note1), the platform has established a carbon emission standard data exchange module. These initiatives not only help reduce the burden on suppliers in providing data but also enhance the disclosure of carbon emission information in the supply chain.

Note The Pathfinder Framework 2.0 guidelines, established by the World Business Council for Sustainable Development (WBCSD), are a standard data specification created to enhance the transparency of greenhouse gas emissions in supply chains

▪ Digital Management : ESG Interactive Network Map



4.4 Responsible Sourcing of Minerals

Winbond actively promotes the requirements of the Responsible Business Alliance (RBA) within supply chain, considering them to be fundamental elements of supply chain management. Following the management recommendations of the Organization for Economic Co-operation and Development (OECD) on due diligence, Winbond firstly issued a conflict-free minerals statement; and secondly, based on the composition of its products, conducts material analysis to identify suppliers that require focused investigation for further due diligence implementation. Suppliers are strictly required to select qualified smelters and update information within the validity period. Finally, each year, Winbond produces and publicly declares a conflict minerals due diligence report based on the investigation results. In 2023, a total of 17 suppliers directly related to Winbond's products and involving 3TG metals, cobalt, mica, and other minerals were investigated, with a 100% qualification rate.

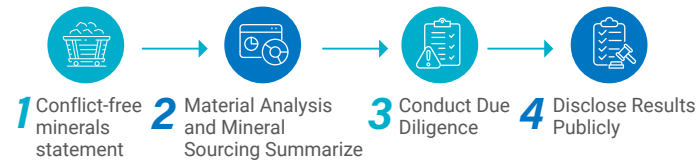


2023 Results of Responsible Sourcing Management

- **100%** Coverage rate of suppliers receiving the conflict-free mineral policy advocacy
- **100%** New suppliers signed the Winbond CoC (including the conflict-free minerals)
- **100%** Qualification rate of surveyed suppliers



Responsible Sourcing Management Process



4.4.1 Winbond Conflict-free Minerals Statement

Winbond follows the Responsible Minerals Initiative (RMI) to conduct due diligence on the sources and governance of tantalum, tin, tungsten, gold, cobalt, and mica in its manufactured products to ensure that its procurement practices comply with the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas or an equivalent and recognized due diligence framework. At the same time, Winbond also requires all suppliers to adhere to and sign relevant codes of conduct and ethical standards related to sustainability, employee ethics, the Universal Declaration of Human Rights, and the Tripartite Declaration of Principles concerning multinational enterprises and social policy by the International Labour Organization. They are also required to adopt green products, adhere to environmental protection policies, and comply with the Responsible Business Alliance (RBA) standards. In 2023, all qualified suppliers signed Winbond's Code of Ethics and Integrity and Winbond's Supplier Code of Conduct Commitment (including clauses related to RBA and conflict minerals statements), ensuring the absence of "conflict minerals from non-conforming smelters" and products from the Democratic Republic of Congo or adjacent countries and regions and compliance with applicable regional and international laws regarding responsible minerals.

4.4.2 Identification and Results of 3TG Metal Sources

Winbond initially determines the composition of each source product based on the Safety Data Sheets provided by suppliers, identifying whether they contain specific metals. Subsequently, Winbond uses the Conflict Minerals Reporting Template (CMRT) and Extended Minerals Reporting Template (EMRT) to investigate the sources of gold (Au), tantalum (Ta), tin (Sn), tungsten (W), cobalt (Co), mica, and other responsible minerals published by the Responsible Minerals Initiative (RMI) within suppliers' product components. In 2023, a total of 17 surveyed suppliers were investigated, with smelters of various metals located in 26 countries across North America, South America, Europe, Asia, and Central Asia.

A total of 114 qualified smelters met the requirements and did not engage in the sale of prohibited products to Winbond. In the future, Winbond will continue to adhere to the policy of conflict-free minerals and will regularly issue due diligence investigations and annual responsible sourcing due diligence reports. Winbond will also further plan on-site audits of each supplier and their associated smelters to ensure the integrity and transparency of the disclosed information.

Number of Qualified Smelters for Various Source of Metal

