

2024 Climate and Nature Report





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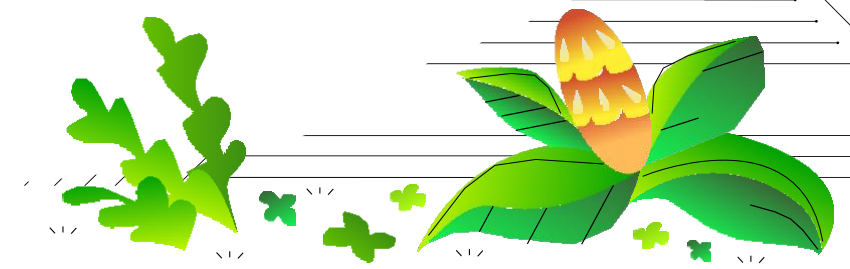
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Preface

Sustainable Practices Under the Foundation of Green Semiconductors: From Climate Risks and Opportunities to Biodiversity Commitments

In the face of rising global economic and environmental risks, climate change and the loss of natural capital have become systemic challenges for corporate management. According to the World Economic Forum's *Global Risks Report*, climate-related risks have consistently ranked among the most severe global issues for the next decade. Extreme weather, ecosystem degradation, and resource depletion are reshaping the boundaries of corporate operations and responsibility frameworks.

As a key player in the semiconductor industry, Winbond Electronics recognizes its responsibility and role in addressing climate change and natural risks. Guided by the vision of becoming an "invisible champion enriching human life through green semiconductor technology," Winbond has explicitly integrated sustainable development into its corporate governance framework and adopted international standardized guidelines to enhance the effectiveness and transparency of climate and nature-related issue management.

Since 2021, Winbond has followed the TCFD (Task Force on Climate-related Financial Disclosures) framework to establish a comprehensive mechanism for identifying risks and opportunities, performance indicators, governance processes, and strategic actions. In 2024, the company further adopted TNFD (Taskforce on Nature-related Financial Disclosures) principles to systematically assess the dependencies and impact pathways between business operations and natural capital, promoting ecological conservation and nature resilience through a science-based approach.

Additionally, Winbond officially signed the Winbond Biodiversity Commitment, reinforcing its governance responsibility and execution capacity in conservation efforts. The company has set "net positive impact" and "zero deforestation" as core goals to concretely implement sustainable biodiversity management.

In terms of climate governance, Winbond's board of directors oversees climate-related strategies, while cross-functional teams execute risk identification, indicator management, action implementation, and performance tracking. The company actively connects with supply chain partners, participates in carbon data exchange platforms and low-carbon transformation subsidy mechanisms, expanding carbon reduction benefits across the value chain and fostering co-evolution within the industrial ecosystem.

For carbon management and energy transition, Winbond steadily advances its renewable energy procurement plan and has established a carbon accounting system covering Scopes 1 to 3, improving the transparency and accuracy of carbon emissions data. Simultaneously, low-carbon strategies are incorporated into product design, promoting the launch of green products and demonstrating the company's substantive contribution to net-zero goals.

Beyond internal management, Winbond has long invested in nature-based solutions, supporting local species conservation through beach and stream cleanups, habitat maintenance, and species restoration efforts. These include protection initiatives for the purple crow butterfly, *Odorrana swinhoana* (Swinhoe's frog), and *Spiranthes sinensis* (Chinese spiranthes). The company has also conducted afforestation on state-owned forest lands in Chiayi, Tainan, and Yilan, with a cumulative conservation area of nearly 25 hectares, aligning with Taiwan's 2050 net-zero pathway and its strategic emphasis on "natural carbon sinks."

Looking ahead, Winbond Electronics will continue to optimize its sustainability governance framework, deepen integrated management of climate and nature-related risks, and accelerate the transition toward a low-carbon and ecologically symbiotic future through technological innovation and value chain collaboration—fulfilling its long-term corporate value and social responsibility.

Milestone

2010

- Established CSR policy
- Established EICC Promotion Team
- Verified through (BSI) PAS 2050 Carbon Footprint Standard
- Obtained Carbon Footprint Label from Taiwan Electrical and Electronic Manufacturers' Association



2011

- Formulated Corporate Social Responsibility Procedures



2015

- Established CSR Committee
- Completed first CSR report in 2014



2020

- Registered for EPA's TM002 Offset Project

2021

- Wafer products verified through ISO 14067 Product Carbon Footprint
- Implemented ISO 14046 Water footprint assessment
- Received four awards from TCSA



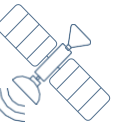
2022

- Established ESG Committee
- Implemented ISO 50001 Energy Management System
- Completed ISO 14067 Product Carbon Footprint assessment for IC products
- Joined Taiwan Climate Partnership (TCP)
- Participated in CIX Auctions, obtained voluntary carbon credits from world's largest blue carbon project
- Celebrated Zero Carbon Family Day by adopting blue carbon offsets
- Acquired 15% equity stake in CHIA-HO Green Energy Corporation
- Established Carbon Emissions Information Platform
- Received three awards from TCSA



2023

- Published the first independent TCFD report
- Implemented ISO 46001 Water efficiency management systems
- Obtained the first T-REC through procuring green energy
- Joined Taiwan Carbon Solution Exchange (TCX), obtained international voluntary carbon credit
- Participated in Tree Planting plan of Taiwan Forestry and Nature Conservation Agency
- Participated in TSIA's Net Zero Emissions and Voluntary Reduction initiatives
- Received six awards from TCSA
- Achieved B list (Management Level) in "Climate Change" and "Water Security" in Carbon Disclosure Project (CDP)
- Received Taichung City low-carbon sustainable city outstanding contribution Award
- Collaborated with 13 suppliers to apply for the Ministry of Economic Affairs' "Large Lead Small" subsidy program for low-carbon transformation and smart upgrading of manufacturing industry and obtained full funding



2024

- The Board has approved the procurement of 75 MW of solar power, 9.24 MW of onshore wind power, and 25 MW of offshore wind power
- Signing of Taiwan's first-ever deal for an offshore wind power purchase agreement between a renewable energy provider and a domestic enterprise
- All Winbond fabs certified under the ISO 46001 water efficiency management system
- Listed on the 2025 S&P Global Sustainability Yearbook for the first time
- Received eight awards from TCSA
- Achieved A- list (Management Level) in "Climate Change" and B list in "Water Security" in Carbon Disclosure Project (CDP)
- Kaohsiung fab was awarded the Southern Taiwan Science Park Outstanding Environmental Protection Unit
- Officially launched products made by renewable energy
- Established carbon accounting system
- Announced the 《Winbond Biodiversity Commitment》



▲ Collaborate with suppliers to participate in the "Carbon Data Electronic Exchange Standard"



▲ 2024 Zero Carbon Family Day

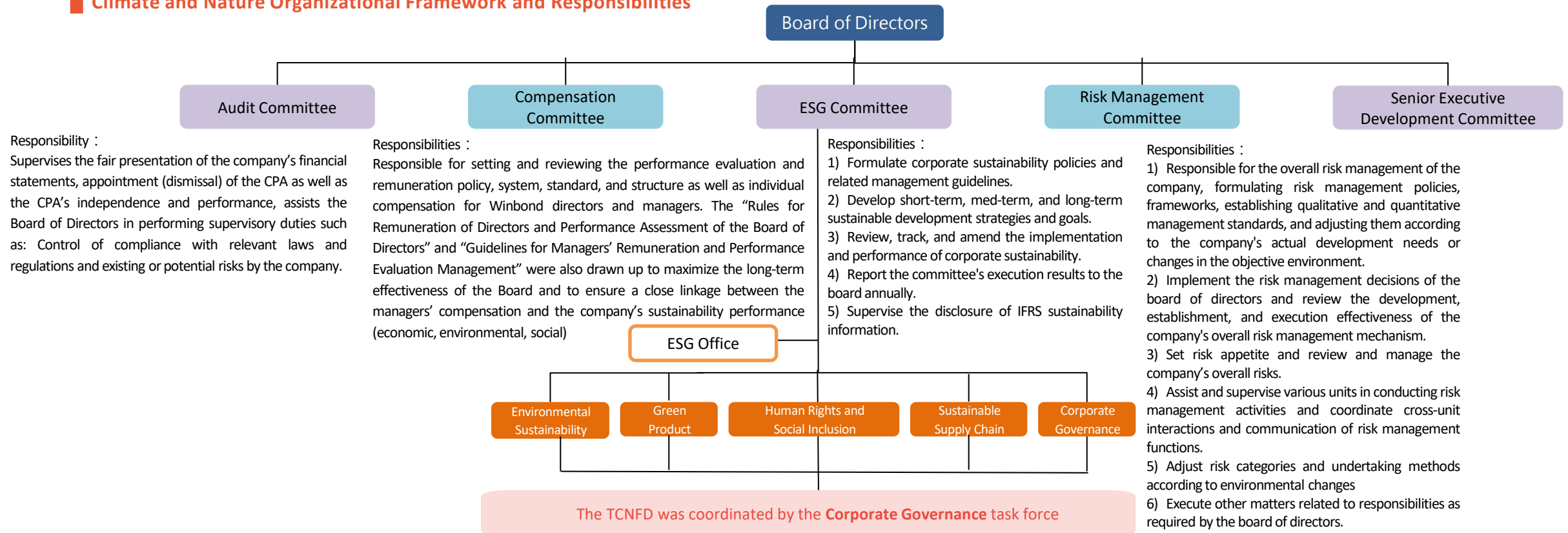
1. Climate and Nature Governance

1.1 Climate and Nature Organizational Framework

Winbond has established a well-developed governance framework. The Board of Directors is Winbond’s highest governing body, in charge of its operations and decision-making. The Board of Directors is responsible for ensuring the sustainable development of the Company and guaranteeing the rights of the Company’s shareholders and other stakeholders. Winbond’s 13th Board of Directors consists of 11 directors (including 4 independent directors and 3 female directors). More than two-thirds of the directors were not managers of Winbond or its subsidiaries. The Chairman concurrently served as the CEO to lead the management team in efficiently executing the board's decisions. The Board held 7 meetings in 2024 with a 100% attendance rate (including 92% actual attendance and 8% proxy attendance).

To ensure the effective supervision and management functions of the board of directors, Winbond's board has established several functional committees, including the Audit Committee, Compensation Committee, ESG Committee, Risk Management Committee, and Senior Executive Development Committee. Each functional committee is accountable to the board of directors and submits its proposals for board resolution. The ESG Office and its five functional teams focusing on the areas of Environmental Sustainability, Green Product, Human Rights and Social Inclusion, Sustainable Supply Chain, and Corporate Governance were formed under the ESG Committee. Members of the functional teams with the requisite expertise were tapped to form the TCNFD project team.

Climate and Nature Organizational Framework and Responsibilities



Operations of Climate and Nature Governance-Related Functional Committees

Audit Committee

- Composed of independent directors, with Mr. Allen Hsu as the convener.
- In 2024, the Audit Committee held six meetings with a 100% attendance rate (including 95% actual attendance and 5% proxy attendance).

ESG Committee

- Composed of the chairman and all independent directors, with Mr. Arthur Yu-Cheng Chiao as the convener.
- In 2024, the Sustainability Committee held two meetings, achieving a 100% attendance rate—80% of members attended in person, while 20% participated via proxy.

The ESG Committee established the ESG Office and 5 functional groups: Environmental Sustainability, Green Products, Human Rights and Social Inclusion, Sustainable Supply Chain, and Corporate Governance. The committee reported its execution results to the board annually to ensure the promotion and implementation of corporate sustainability-related work. The committee was led by the chairman, with independent directors as members. The ESG Committee held regular meetings twice a year, where each functional group reported the execution progress (results) for the current year and submitted the execution plan for the next year.

Compensation Committee

- Composed of independent directors, with Mr. Stephen T. Tso as the convener.
- In 2024, the Compensation Committee held five meetings with a 100% attendance rate (including 85% actual attendance and 15% proxy attendance).

Risk Management Committee

- Composed of the chairman and all independent directors, with the chairman, Arthur Yu-Cheng Chiao, as the convener.
- In 2024, the Risk Management Committee held 2 meetings, with an attendance rate of 100% (including 90% actual attendance and 10% proxy attendance).

Note 1 Winbond established the "Board of Directors Remuneration and Board Performance Evaluation Measures," specifying the basis for director remuneration and submitting it to the Compensation Committee for review and adjustment annually. Both the Audit Committee and the Compensation Committee were composed entirely of independent directors, ensuring independence. Winbond did not have a remuneration claw back mechanism. For information related to the remuneration of directors and managerial officers, please refer to the 2024 Annual Report.

Note 2 Winbond stakeholders could express their opinions through various channels, such as attending shareholders' meetings or employee engagement surveys. The Compensation Committee regularly considered these opinions as one of the factors in remuneration considerations. In the 2024 Annual Shareholders' Meeting, no shareholders raised questions regarding the remuneration of directors and employees, which was recorded in the minutes of the shareholders' meeting.

Senior Executive Development Committee

- The committee members are composed of board members from Winbond and Nuvoton, serving as mentors. The committee chairman is elected by the directors, and currently, the chairman is independent director Kuan Chung-Ming. The mentee members are senior executives from Winbond and Nuvoton, and the board of directors discusses and adjusts the list of mentees annually.

Objective

- 1) Enhance the knowledge of participants beyond their primary industry.
- 2) Expand the international perspective of participants.
- 3) Enable directors to gain a better understanding of the company's internal operations.

Procedures

1. Seminar Courses for All Participants

In 2024, a total of 4 seminar courses were held, with independent director Kuan Chung-Ming, the committee chairman, recommending the speakers. The course topics were diverse and adopted various formats such as in-person and online synchronous sessions, as well as digital course production, providing senior executives with flexible learning options.

- A. International economic environment
- B. Technology and business innovation
- C. Leadership and management

2. Mentor/mentee System

In 2024, mentors and mentees conducted in-depth exchanges for the first time, successfully establishing a good mutual trust relationship, enabling mentees to seek advice and interact in their daily work.

1.2 Accountability Measures

Reporting to the Board of Directors

Winbond continues to incorporate climate change-related proposals into the decision-making process of the Board of Directors to ensure corporate leadership and sustainability in addressing climate change.

Professional Excellence of Directors

All 11 directors possessed extensive industry management experience, with a wide age distribution. Their academic knowledge and professional backgrounds covered various fields, equipping them with the necessary skills to perform their duties as directors, supervise, and provide constructive opinions and strategies. Winbond regularly held seminars offering diverse training courses. In 2024, directors participated in other training courses or company-organized training, covering topics such as environmental sustainability, risk management (including climate change, sustainable finance, political risks) with 45 hours of training, business courses related to the company's industry (global economy, macro trends, semiconductor industry) with 39.5 hours of training, and legal compliance courses with 15 hours of training. The average training hours for directors were 9.05 hours.

Training of Climate and Nature-related Competencies for Management and Employees

Winbond has invested significant time and resources into successfully communicating the risks and impacts of climate change to all employees. The company uses a variety of channels to actively cultivate a basic awareness among staff, aiming to embed the concept of carbon reduction. To encourage employees to participate in sustainable development and social contribution, Winbond will pilot the inclusion of "ESG activity participation" in performance reviews starting in the second half of 2024. The company is launching the "ESG Participation & Points Credits Tracker" to consolidate various internal and external ESG-related activities, courses, and lectures. It is hoped that this platform will encourage employees to deepen their understanding of corporate sustainability and actively increase their participation.

Important Climate-Related Proposals and Reports for the 2024 Board of Directors

- Report quarterly on the planning of greenhouse gas inventory and timeline (including subsidiary companies)
- Approval of increased capital expenditure of equipment and facility for energy conservation and carbon reduction
- Approval of the Signing of Agreement with Chenhwa Power Co., Ltd.
- Approval of our company's proposal to sign a contract with Energy Helper TCC Corporation for the purchase of onshore wind power
- Adoption Schedule for IFRS Sustainability Disclosure Standards
- Proposal to sign a contract with Sino-American Silicon Products Inc.'s subsidiary Sustainable Energy Solution Co., Ltd. for the procurement of offshore wind power and solar power

2024 Board of Directors Climate and Nature--related Competency Development Topics

- Carbon Trading Mechanism and Carbon Management Applications
- Lessons Learnt from the Challenges in Growth of Renowned Multinationals/The Trend and challenges of climate change and corporate sustainability
- Opportunities and Challenges of Generative AI; Leveraging Climate Legal and Economic Tools to Address Carbon Reduction Challenges under Scope 3 – Carbon Creditization of Micromobility

ESG Sustainable operation



ESG Participation & Points Credits Tracker

永績績效平台
Credits Tracker

永績領先 x 積德無限

均衡特賞年度累積
(均衡特賞：各種類皆參與至少一項)

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Win-Smart Win-Heart Win-Earth

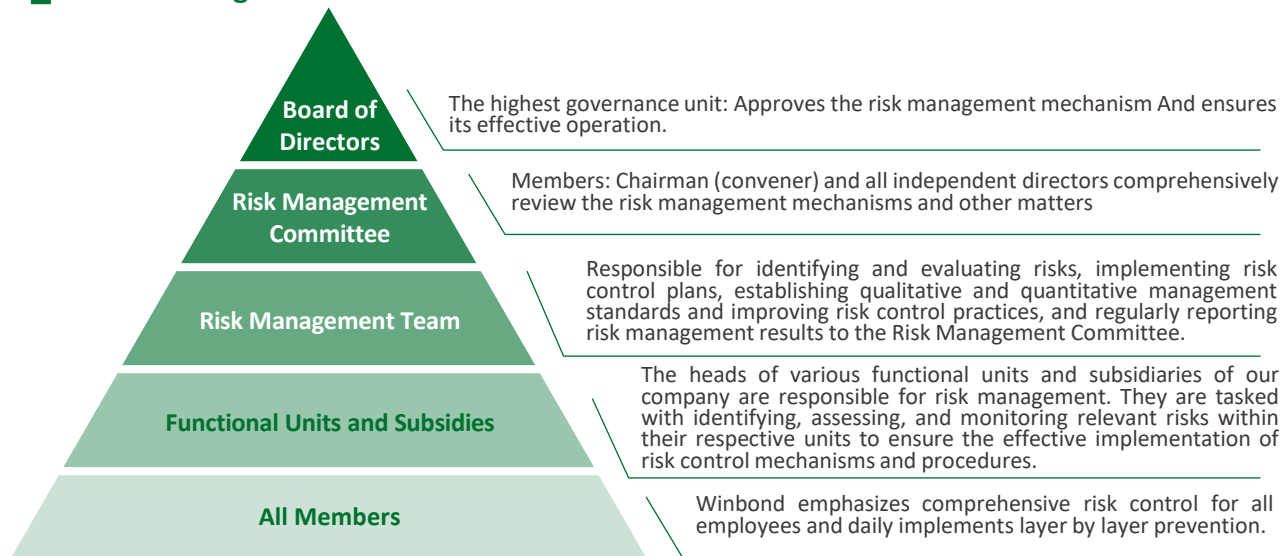
2. Climate and Nature Risk Management

2.1 Risk Management Framework and Process

Winbond belongs to the semiconductor manufacturing industry. Facing natural disasters, accidents, human-made incidents, changes in international political and economic situations, the emergence of new technologies, and changes in policies and regulations may all cause serious impacts on its operations and finances. Therefore, in 2023, Winbond established a "Risk Management Committee" under the Board of Directors. This committee is one of the functional committees and organizes existing departments or units responsible for risk to enhance the overall risk management organizational structure. It formulates sound internal management regulations and operating procedures for each unit's scope of responsibility and conducts risk management.

In 2023, Winbond revised the "Risk Management Committee Charter" and formulated the "Risk Management Policy and Procedures" after receiving approval by the Board of Directors. It actively manages the four major types of risks faced by contemporary enterprises: "strategic," "operational," "financial," and "information security." It develops comprehensive plans and processes for pre-assessment, risk avoidance, loss prevention, and crisis management for various operational activities and regularly reports to the management and governance units to ensure that all corporate risk control goals are achieved. The risk management team should pay attention to the development of international and domestic risk management systems and changes in internal and external operating environments, adjust control mechanisms, report to the Risk Management Committee and the Board of Directors for approval, and enhance the effectiveness of risk management implementation.

Risk Management Structure

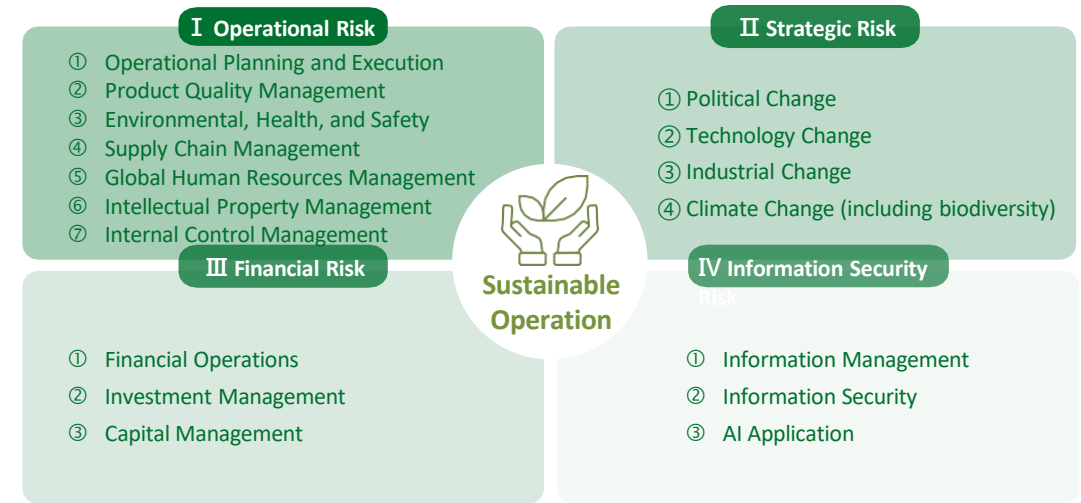


Winbond Risk Management Policies and Procedures

Including but not limited to

- 1 Risk management objectives
- 2 Risk management organizational structure and responsibilities
- 3 Risk management procedures

Four Scope of Risk Management



Winbond Risk Management Objectives

Winbond aims to manage various risks that may impact the achievement of company goals through a comprehensive risk management framework. By integrating risk management into operational activities and daily management processes, Winbond aims to achieve the following objectives:

- 1 Achieve company goals.
- 2 Enhance management efficiency.
- 3 Provide reliable information.
- 4 Allocate resources effectively.

Winbond's risk management process include at least five elements: risk identification, risk analysis, risk assessment, risk response, and supervision and review mechanism. The specific procedures and methods for each element are as follows:

Risk Identification

- Each functional unit and subsidiary should identify the risks of the short-, mid-, and long-term objectives and the business operations based on the company's risk management policies and procedures.
- Various feasible analysis tools and methods (such as process analysis, scenario analysis, questionnaire surveys, PESTLE analysis, etc.) should be used for risk identification. Risks should be analyzed from both top-down and bottom-up perspectives, considering internal and external risk factors, stakeholder concerns, etc., to comprehensively identify potential risk events that may affect the company's goals or cause losses or adverse impacts.

Risk Analysis

- Each functional unit and subsidiary should analyze the probability and impact of identified risks based on existing control measures, past experiences, industry cases, etc., and calculate the risk value accordingly.

1. Risk Analysis Measurement Standards

- The risk management team should establish appropriate quantitative or qualitative measurement standards based on the company's risk characteristics as the basis for risk analysis.
- Qualitative measurement standards refer to expressing the probability and impact of risk events through textual descriptions, while quantitative measurement standards refer to expressing the probability and impact of risk events through specific measurable numerical indicators (such as days, percentages, amounts, numbers, etc.).

2. Risk Appetite

The risk management team should develop risk appetite (risk tolerance) and report it to the Risk Management Committee and the Board of Directors for determining the company's acceptable risk threshold. Based on the risk appetite, the risk management team should discuss the corresponding risk levels for each risk value and the response methods for each risk level, serving as the basis for subsequent risk assessment and risk response.

Risk Assessment

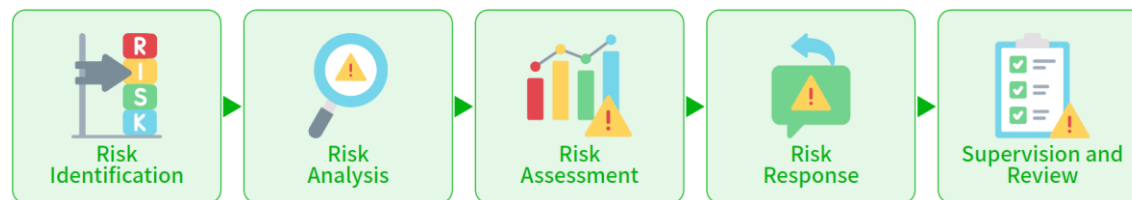
- Each functional unit and subsidiary should, based on the results of risk analysis, align with the risk appetite approved by the Risk Management Committee and the Board of Directors. They should then plan and execute subsequent risk response measures according to the risk levels.
- The relevant results of risk analysis and assessment should be accurately documented and reported to the Risk Management Committee.

Risk Response

- After assessing business risks, each unit should propose appropriate risk response measures and control operations and report them to the risk management team for review.

Supervision and Review

- The risk management team should regularly report the implementation results of risk management procedures to the Risk Management Committee as a reference and report major risk events to the Risk Management Committee and the Board of Directors, as necessary.



In addition, Winbond has incorporated climate change risks into its long-term business operations management. To understand the impact on the environment and operations, Winbond has adopted the Task Force on Climate-related Financial Disclosures (TCFD) framework since 2021. Observing international regulatory trends and market developments, Winbond annually identifies and discloses the financial impacts of climate-related risks and opportunities (including quantitative and qualitative aspects), and proposes review and management strategies. Winbond will continue to monitor the risk impacts brought by climate and strengthen the company's operational capabilities, promote various carbon reduction projects, improve energy efficiency, and steadily move towards sustainable development. In 2024, Winbond also adopted the TNFD's LEAP methodology, formed a cross-departmental working group to identify natural dependencies and impacts, and implemented the TNFD disclosure guidelines to publish the "2024 Climate and Nature Report."

2.2 Procedures for Identifying Climate Change Risks and Opportunities

In 2024, Winbond convened representatives from 19 departmental units and group enterprises, with over 30 colleagues forming the TCFD project team. The team members were grouped according to the nature of their business, and each group discussed climate change issues relevant to their business. They used Winbond’s internally developed TCFD platform to identify climate risks and opportunities, generate matrixes. The evaluation results had been reported in the ESG Committee meetings.



▲ TCFD project team meeting

01 Form a TCFD project team
 Formed by members from 19 units, including Sales, Marketing, R&D, Resources, Subcon, Procurement, IT, Fab Facility, Public Affairs, Quality Management, Environmental Safety and Health, Legal and Human Resources, Finance, and Accounting.

02 Create climate risk and opportunity lists
 Referencing the TCFD framework and CDP questionnaire items, and combining domestic and international regulatory trends and industry dynamics, a list of climate risks and opportunities was established, including 36 climate risks and 19 climate opportunities.

03 Define evaluation criteria
 Conducted evaluation based on impact degree, possibility of occurrence and time of occurrence

04 Generate risk matrix and opportunity matrix for each team
 Each team identified major short-term, medium-term, and long-term risks and opportunities based on their impacts, possibility of occurrence, while considering their own business relevance

05 Develop the consolidated risk matrix and opportunity matrix
 Aggregated the results from each team to generate the Winbond Climate Risk Matrix and Opportunity Matrix

06 Evaluate the financial and operation implications of major risks and opportunities
 Conducted qualitative and quantitative analysis to assess potential financial impacts resulting from high-impact and high-likelihood risks and opportunities

07 Discuss response measures
 Engaged relevant units to review and develop response measures for major risks and opportunities

2.3 Climate Risk and Opportunity Matrix

Impacts of Major Climate Change and Responses

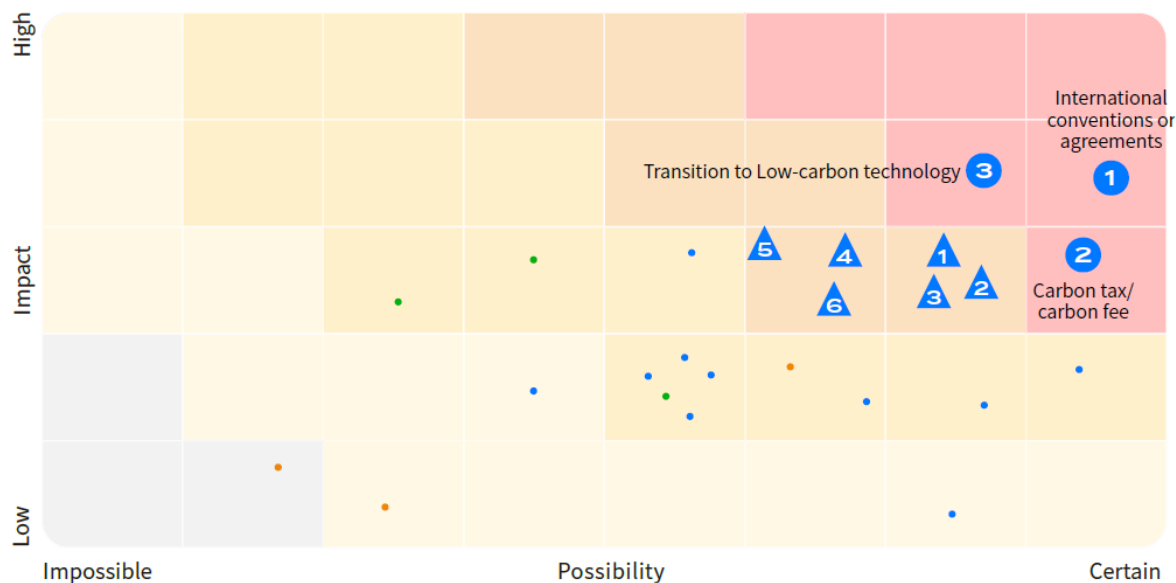
Through the course of workshops and educational training, and by utilizing Winbond's internally developed TCFD platform in 2023, Winbond identified climate risks and opportunities. From 36 climate risks (including 27 transition climate risks and 9 physical climate risks), Winbond identified 3 major climate risks and 6 minor climate risks. Additionally, from 19 climate opportunities, Winbond identified 3 major climate opportunities and 3 minor climate opportunities.

Possible Happening Time

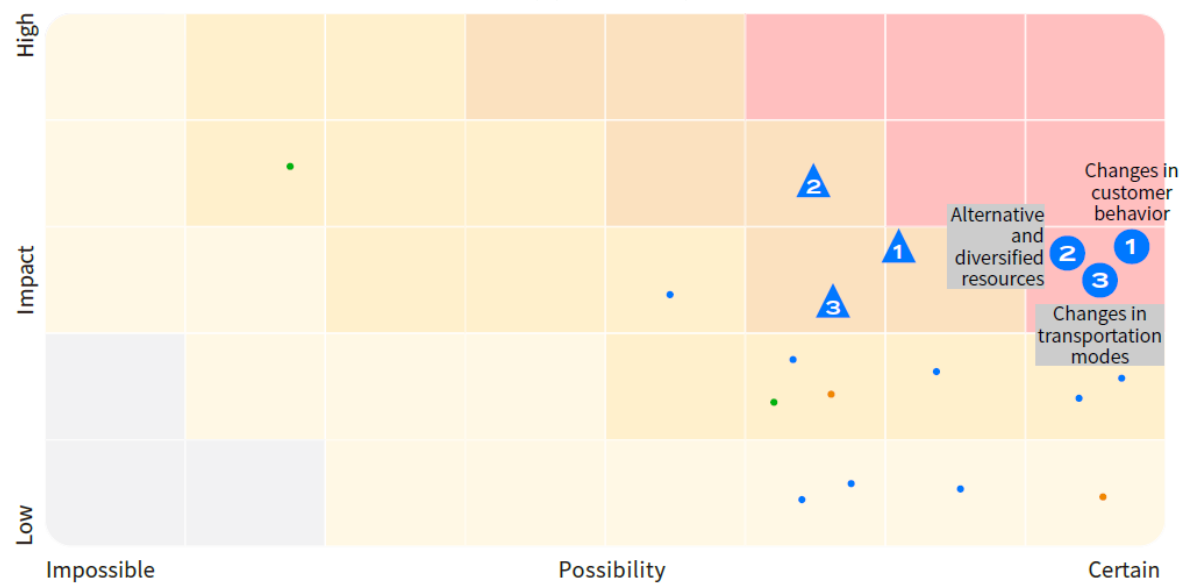
- Short-term : 1 to 3 years
- Mid-term: 3 to 5 years
- Long-term : Over 5 years

Highlight Gray : New Major Opportunity added in 2024

— Climate Risk Matrix —



—Climate Opportunity Matrix—



| Major Risk | Minor Risk | |
|---|--------------------------------|--|
| 1 International conventions or agreements | 1 Tropical cyclones | 4 Uncertainty of new regulations |
| 2 Carbon tax/carbon fee | 2 Changes in customer behavior | 5 Greenhouse gas emissions cap-and-trade |
| 3 Transition to Low-carbon technology | 3 Environmental regulations | 6 Extreme rainfall and drought |

| Major Opportunities | Minor Opportunities |
|---|--|
| 1 Changes in customer behavior | 1 Participate in renewable energy projects |
| 2 Alternative and diversified resources | 2 Process optimization and R&D innovation |
| 3 Changes in transportation modes | 3 Obtain government collaboration and incentives |

2.4 Impact and Response to Major Climate Change

Climate-related Risk Topics

| Climate Risk | Time of Occurrence | Value Chain | Potential Financial or Operational Impacts (-) represents a negative impact (+) represents a positive | Response | |
|-------------------|--------------------|---|---|---|--|
| Transitional Risk | Short-term | International conventions or agreements | <ul style="list-style-type: none"> ▪ Increase in indirect costs arising from the signing of the agreement (-) ▪ Increase in capital expenditure arising from the signing of the agreement (-) ▪ Reduce in carbon emissions leading to a decrease in carbon tax / carbon fee expenditure (+) | <ul style="list-style-type: none"> ▪ Set the 2030 RE50 green electricity target to achieve the 2050 net-zero emission target. ▪ Formulate a voluntary emission reduction plan to reduce greenhouse gas usage through process improvement, including accelerating the replacement of energy-saving components and installing exhaust gas treatment equipment at the machine end. ▪ Establish on-site solar photovoltaic systems and purchase renewable energy power to increase the utilization rate of renewable energy. | |
| | | Carbon tax/ carbon fee | <ul style="list-style-type: none"> ▪ Upstream or supply chain ▪ Company operations ▪ Downstream or end users | <ul style="list-style-type: none"> ▪ Increase in indirect costs (-) ▪ Suppliers passed on their carbon tax/carbon fee expenditures, leading to ▪ increased procurement costs (-) ▪ Limited capacity expansion (-) | <ul style="list-style-type: none"> ▪ Set the 2030 RE50 green electricity target to achieve the 2050 net-zero emission target. ▪ Formulate a voluntary emission reduction plan to reduce greenhouse gas usage through process improvement, including accelerating the replacement of energy-saving components and installing exhaust gas treatment equipment at the machine end. ▪ Establish on-site solar photovoltaic systems and purchase renewable energy power to increase the utilization rate of renewable energy. ▪ Establish a carbon accounting system to achieve transparent management of carbon inventory and carbon footprint. ▪ Establish internal voluntary carbon credit investment standards and continue to pay attention to the development of carbon credit offset systems. ▪ Develop negotiation strategies to avoid unreasonable cost shifting by suppliers. ▪ Manage suppliers with annual emissions greater than 25,000 tons, regularly collect and understand their reduction behaviors, and positively drive them to reduce carbon emissions through regular sustainability evaluations of suppliers. |
| | | Transition to Low-carbon technology | <ul style="list-style-type: none"> ▪ Upstream or supply chain ▪ Company operations | <ul style="list-style-type: none"> ▪ Capital expenditure for equipment (-) ▪ R&D costs increase (-) ▪ Reduce in carbon emissions leading to a decrease in carbon tax/carbon fee expenditure (+) | <ul style="list-style-type: none"> ▪ Implemented ISO 50001 Energy Management System, conducted energy audits, and continuously improved optimization. ▪ Executed energy-saving projects for production machinery and facilities infrastructure, including adding variable frequency drives to machine pumps, installing local scrubbers for exhaust treatment, and improving energy efficiency of the Make-up Air Handling Unit (MAU) water washing system. ▪ Utilized renewable energy sources to reduce greenhouse gas emissions. ▪ Continued engaging with outsourcing partners to develop low-carbon materials and optimize packaging processes. ▪ Actively monitored market transactions to mitigate procurement cost increases caused by information asymmetry. |
| Physical Risk | Short-term | Tropical cyclones | <ul style="list-style-type: none"> ▪ Impact on production and revenue (-) ▪ Automated production lines continued to operate, legally paid overtime, leading to increased labor costs (-) ▪ Impact on supplier deliveries and Winbond production (-) ▪ Increase in natural disaster insurance premiums (-) | <ul style="list-style-type: none"> ▪ Adopted automated production to reduce manual operation requirements. ▪ Utilized digital tools to enhance remote work efficiency. ▪ Promoted relevant countermeasures to suppliers, such as strengthening fab infrastructure and drainage facilities, and conducting daily drills. ▪ Established a 24-hour emergency response team and continuously monitored disaster situations at suppliers' locations. | |

Due to the implementation of the aforementioned measures, the estimated management costs for 2024 are as follows:

- The budget for ESG-related equipment replacement is approximately NT\$ 120,000,000.
- Maintenance cost for on-site solar photovoltaic systems is approximately NT\$ 700,000 per year.
- Other associated costs encompass personnel training expenses related to sustainability topics, human resource costs for supplier engagement, and personnel costs for digital resources and event execution, among others.
- Subsidy for low-carbon raw material suppliers is NT\$ 1,250,000 per year.
- Increased electricity cost for using green electricity compared to using gray electricity is approximately NT\$ 87,000,000 per year.
- Verification cost for low-carbon materials and processes is NT\$ 1,500,000 per year.

Note: The primary climate risks identified in 2024 were all transition risks. Considering the completeness of the climate risk assessment, the "tropical cyclones," which had the highest impact and likelihood among the physical risks in 2024, was included in the assessment.

Climate-related Opportunity Topics

| Climate Opportunity | Time of Occurrence | Value Chain | Potential Financial or Operational Impacts | Response |
|--|--------------------|--|---|--|
| Changes in customer behavior | Short-term | <ul style="list-style-type: none"> Upstream or supply chain Company operations | <ul style="list-style-type: none"> Product portfolio changes accelerated the positive development of the overall supply chain. Obtaining orders and expanding revenue. Increased order stability and reduced revenue fluctuations. Enhanced company reputation. | <ul style="list-style-type: none"> Continuously understood customer requirements and specifications for green products, developed low power consumption and low carbon emission products to meet their needs. Increased the use of renewable energy in line with customer requirements, and continued to discuss with outsourcing partners to develop low-carbon materials and processes, launching products manufactured with renewable energy. Established a carbon emission information platform that integrates and manages carbon emission data to facilitate green and low-carbon production. Participated in global sustainability-related evaluations, enhancing the transparency of sustainability practices. |
| Alternative and diversified resources | Short-term | <ul style="list-style-type: none"> Upstream or supply chain Company operations | <ul style="list-style-type: none"> Enhanced supply chain reliability. Reduced production costs. | <ul style="list-style-type: none"> Conducted comprehensive traceability for key raw materials, achieving 100% of the 14 predetermined goals. Regularly reported information on material supply, costs, and alternative materials, continuously monitoring the development of specific raw materials in their places of origin and distribution worldwide. |
| Changes in transportation modes | Short-term | <ul style="list-style-type: none"> Upstream or supply chain Company operations | <ul style="list-style-type: none"> Reduced indirect costs. Reduced carbon emissions leading to a decrease in carbon tax/expenditures. | <ul style="list-style-type: none"> Completed localized procurement of five key materials in 2024, achieving a carbon reduction of 7.2 metric tons of CO2 equivalent by reduced transportation distances. |

Due to the implementation of the aforementioned measures, the estimated management costs for 2024 are as follows:

- Maintenance cost for self-built renewable energy generation devices is approximately NT\$ 700,000 per year.
- Verification cost for low-carbon materials and processes is NT\$ 1,500,000 per year.
- Increased electricity cost for using green electricity compared to using gray electricity is approximately NT\$ 87,000,000 per year.
- New product design and process development costs.
- Subsidy amount for low-carbon raw material suppliers is NT\$ 1,250,000 per year.
- Labor costs for developing suppliers and communicating with them.

2.5 Climate Risk Scenario Analysis

Transition Risk Scenario Analysis

Considering Winbond is a group based in Taiwan with a global market perspective, three scenarios were adopted for transition risk simulation. In addition to examining the risks of current domestic regulations, the impact of international carbon reduction trends was also included in the assessment. The three transition risk scenarios include: (1) National Net-zero Pathway; (2) SSP1-1.9 Low Emission Scenario from the Intergovernmental Panel on Climate Change (IPCC): Derived from the IPCC's sixth scientific assessment report.; (3) An annual reduction rate of 4.2% as required by the Science-Based Targets Net-zero (SBT-NZ) Standard for carbon emissions. The scope of the transition risk scenario analysis covers the group's main fabs and offices.

| External Scenarios | Description | Assessed Sources of Emissions |
|---------------------------|--|-------------------------------|
| National Net-zero Pathway | Based on Taiwan's current net-zero target | Scope 1 + Scope 2 |
| SSP1-1.9 | Based on the SSP1-1.9 pathway in the IPCC Sixth Assessment Report | |
| SBT-NZ | Based on the emissions reduction pathway required to achieve the SBT's net-zero criteria by 2050 | |

The issue of climate change is expected to have financial impacts on Winbond in terms of regulations, technology, market, and reputation. Among these, the introduction of carbon tax/carbon fee and fee, compliance with regulations for intensive electricity users to use of renewable energy electricity are estimated to result in a financial impacts of approximately NT\$ 0.2~7 billion by 2030, which is about 0.3%~9% of revenue in 2024.

| Carbon Tax Imposition | | |
|---------------------------|--|------------------------------------|
| External Scenarios | Assumption | Estimated Financial Impact in 2030 |
| National Net-zero Pathway | Estimated at US\$2 to 10/tCO ₂ e from 2021 to 2050 by referring to SSP2-4.5 | <NT\$50 million |
| SSP1-1.9 | It will reach about US\$650 per ton CO ₂ e in 2050 by referring to SSP1-1.9 | >NT\$5 billion |
| SBT-NZ | | |

| Carbon Fee Imposition | | |
|---------------------------|---|------------------------------------|
| External Scenarios | Assumption | Estimated Financial Impact in 2030 |
| National Net-zero Pathway | Estimated at the general rate of NT\$300/tCO ₂ e. Single fab carbon emission exemption quota of 25,000 tCO ₂ e/year | <NT\$200 million |
| | Estimated at preferential rate A of NT\$50/tCO ₂ e. Single fab carbon emission exemption quota of 25,000 tCO ₂ e/year | <NT\$50 million |

| Regulation of Renewable Energy | | |
|--------------------------------|--|------------------------------------|
| External Scenarios | Assumption | Estimated Financial Impact in 2030 |
| National Net-zero Pathway | Procurement costs were estimated based on the average wholesale price of Taipower's renewable energy power plus the supply cost. The maintenance cost of solar photovoltaic systems was estimated based on the average maintenance cost in the IRENA report. | <NT\$50 million |
| SSP1-1.9 | | |
| SBT-NZ | | |

Note 1 The Scope 1 and Scope 2 carbon emissions after 2025 were estimated data. The estimation was calculated by comprehensively considering the actual emissions in 2024, the future medium- and long-term average emission growth trends, and the predicted values of the electricity emission factor.
 Note 2 Considering the current international trend towards carbon taxation, carbon fees is only considered under the national net-zero pathway scenario.

Physical Risk Scenario Analysis of Winbond(Taiwan)'s Major Location

Winbond followed the IPCC Sixth Assessment Report to assess the risk of flooding, debris flows, and landslides in Winbond(Taiwan) under extreme precipitation. Referencing data from the Taiwan Climate Change Projection Information and Adaptation Knowledge Platform (TCCIP), National Science and Technology Council (NSTC), and National Science and Technology Center for Disaster Reduction (NCDR), scenario simulations were conducted using four climate models: RCP2.6, RCP4.5, RCP6.0, and RCP8.5 to avoid biased results.

The results showed that by the end of the 21st century, Winbond (Taiwan) 's main fabs and offices (including the CTS Fab, Kaohsiung Fab and Zhubei Building) have a risk level of 0 (low possibility of flooding, debris flows, and landslides) under four scenarios.

Risk Value =

- Risk of flooding, debris flows, and landslides
- Categorized by risk level:

| Level | Rick Value |
|----------|------------|
| Low | 0-12 |
| Miderate | 13-25 |
| High | 26-50 |

Hazard ×

- Extreme rainfall: Possibility of cumulative rainfall reaching 650 millimeters within 24 hours
- Four scenarios: RCP 2.6, RCP 4.5, RCP 6.0, RCP 8.5
- Categorized by hazard level:

| Level | Return Period |
|-------|---------------|
| 1 | 1,000 Yrs |
| 2 | 500 Yrs |
| 3 | 100 Yrs |
| 4 | 50 Yrs |
| 5 | <50 Yrs |

Vulnerability × Exposure

- Flood potential: Defined based on the criteria set by Water Resources Agency of the Ministry of Economic Affairs and the government's flood relief qualifications:

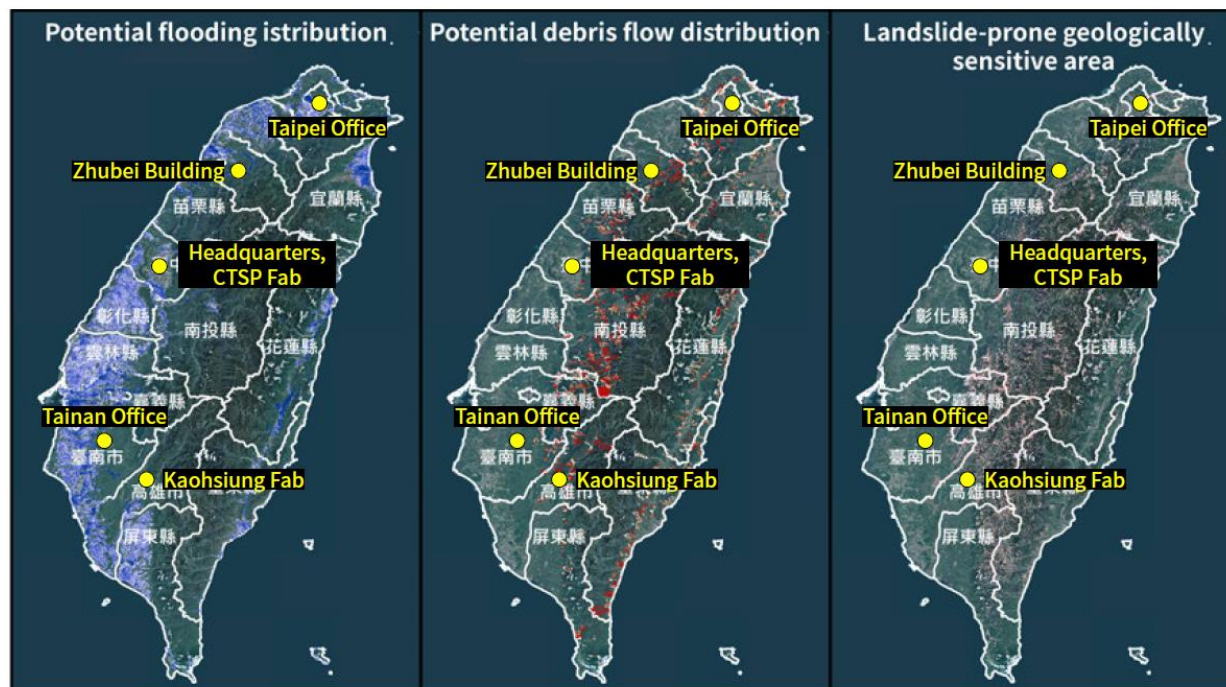
| Level | Flood Magnitude Class | Level | Flood Magnitude Class |
|-------|-----------------------|-------|-----------------------|
| 0 | No potential | 3 | 1.0-2.0m |
| 1 | 0.3-0.5m | 4 | 2.0-3.0m |
| 2 | 0.5-1.0m | 5 | >3.0m |

- Debris flow potential: Defined based on the criteria set by Soil and Water Conservation Bureau of the Council of Agriculture, Executive Yuan:

| Level | Potential Magnitude of Class | Level | Potential Magnitude of Class |
|-------|------------------------------|-------|------------------------------|
| 0 | No potential | 3 | Moderate |
| 1 | Continuous Monitoring | 4 | High |
| 2 | Low | | |

- Landslide potential: Defined based on the criteria set by Central Geological Survey of the Ministry of Economic Affairs:

| Level | Potential Magnitude of Class | Level | Potential Magnitude of Class |
|-------|------------------------------|-------|------------------------------|
| 0 | No potential | 1 | Intersected |



Potential flooding distribution
 Level 5 (>3 m)
 Level 4 (2-3 m)
 Level 3 (1-2 m)
 Level 2 (0.5-1 m)
 Level 1 (0.3-0.5 m)
 No Potential

Potential debris flow torrent
 Level 4 (High risk)
 Level 3 (Moderate risk)
 Level 2 (Low risk)
 Level 1 (Continuous monitoring)
 No Potential

Landslide-prone geologically sensitive area
 Intersected
 No Potentia



■ Physical Risk Scenario Analysis of Nuvoton (Taiwan) and Nuvoton (Japan)

Nuvoton followed the IPCC Sixth Assessment Report, adopting the worst-case global warming scenario SSP5-8.5 and high emission scenario SSP3-7.0, combined with data from the Taiwan Climate Change Projection Information and Adaptation Knowledge Platform, to assess the potential financial impact of typhoons, droughts, and other extreme weather events, as well as rising average temperatures on Nuvoton (Taiwan) and Nuvoton (Japan).

Risk analysis showed that extreme weather could lead to production interruptions, increased costs, operational impacts, and reputational damage. Under both scenarios, the potential impact on Nuvoton's revenue in 2030 was estimated at 0.1%. Rising average temperatures were projected to increase labor and operational costs, with a potential impact on Nuvoton's revenue in 2030 ranging from 0.8% to 1.2%.

For further information related to the financial disclosure of climate risks, please refer to Nuvoton's annual TCFD reports.



2.6 Nature and Biodiversity Assessment

Winbond recognizes that preserving biodiversity and natural ecosystems is fundamental to sustainable development. In response to growing stakeholder concerns over climate-related risks and biodiversity loss, the company aligns its strategy with the Global Goal for Nature and adopts the assessment framework proposed by the Taskforce on Nature-related Financial Disclosures (TNFD).

Through collaboration with the Chung-Hua Institution for Economic Research, Winbond applies the LEAP approach—Locate, Evaluate, Assess, and Prepare—to understand the interdependencies between its Taiwan manufacturing sites and surrounding ecosystems. This systematic analysis enables the identification of nature-related risks and opportunities, which are integrated into the Enterprise Risk Management (ERM) framework to enhance risk control, ensure operational stability, and safeguard stakeholder interests.

To mitigate environmental impact, Winbond commits to reducing its reliance on natural resources through green product innovation and science-based carbon reduction. The company actively promotes biodiversity conservation and reforestation initiatives, and calls on its value chain and operational sites to prevent deforestation. Winbond continues to implement strategies of avoidance, minimization, and restoration, systematically introducing Nature-based Solutions (NbS) to achieve No Net Loss by 2030 and Net Positive Impact by 2050, striving for a balance between technological advancement and ecological preservation.



LEAP Analysis

1. Winbond LEAP analysis

- Initiated the first disclosure from core operations, starting with wafer fabs.
- Planned to expand gradually to global sites and the full value chain.

2. Conduct LEAP analysis

Locate

Natural Sensitivity Analysis

Winbond integrated the geospatial cloud service platform with the National Ecological Green Network to assess the location and species sensitivity of its operational sites. Relevant conservation regulations and sensitive area data were referenced to support the evaluation. The assessment focused on protected and endangered species within a 2-kilometer radius of each site. Based on the findings, priority rankings were established for further evaluation.

Natural Sensitivity Analysis Results for Taiwan Sites

CTSP Fab

Species Sensitivity: "Leopard Cat" Location Sensitivity: Groundwater Recharge Area/National Green Network Concern Area/Dadu Mountain Conservation Axis

KaohsiungFab

Species Sensitivity: "Grass Owl" Location Sensitivity: National Green Network Attention Area

Evaluate

Analysis of Organizations' Dependence on and Impact on NatureRefer

to the ENCORE tool to filter out natural dependencies and impact factors related to operational activities, ultimately focusing on 10 dependency factors and 8 impact factors.

Results of the Analysis of Nature's Dependence and Impact

Dependency Factors:

- Water supply /Storm mitigation/Global climate
- Rainfall patterns/Local climate regulation
- Air filtration services and solid waste remediation
- Water purification/Disease control and atmospheric ecosystem services

Influencing Factors:

- Greenhouse gas emission/Freshwater ecosystems
- Marine ecosystems and non-greenhouse gases
- Generation and discharge of solid waste
- Discharge of toxic pollutants in water and soil
- Extraction of other abiotic resources/Water usage

Assess

Analyze natural-related risks and opportunities

Winbond identified potential future nature-related scenarios based on the dependencies and impacts filtered in the Evaluate phase, and assessed the risks and opportunities arising from ecosystem service dependencies and natural impacts in each scenario.

Results of Natural-Related Risk and Opportunity Analysis

Natural Risks:

- Physical Risks: Climate disasters, ecological degradation, air deterioration
- Transition Risks: Policies, markets, technology, reputation, and responsibility

Natural Opportunities:

- Enhancing resource efficiency
- Developing green products and sustainable markets
- Strengthening corporate reputation and ecological protection

The availability of "renewable energy" and "recycled water" is a major challenge at present. To reduce dependence on natural resources, the company continues to improve energy and water resource efficiency and expand the proportion of "renewable energy procurement" and "recycled water use."

Prepare

Response Strategies and Execution Actions

Winbond systematically manages the interaction between enterprises and the natural environment through the AR3T action framework, which is based on four principles: "Avoid," "Reduce," "Restore," and "Regenerate."

Response Strategies and Execution Action Items

Transformation:

- Environmental education integrated into daily work

Restoration and Regeneration:

- Nature-based solutions, afforestation, species conservation and breeding

Mitigation:

- Carbon, water, and waste management, process optimization, promotion of circular economy

Avoidance:

- Consideration of environmental symbiosis in plant construction, resilience enhancement, compliance with regulations, supply chain management

Scoping – Confirming the organizational scope of the LEAP analysis

Winbond selected CTSP Fab and Kaohsiung Fab as priority sites for the initial TNFD assessment due to their high nature dependency and environmental impact, which are closely tied to operational risks and opportunities. Future assessments would expand to office-based sites and the full value chain to capture nature-related risks and opportunities comprehensively.

This phase focused on identifying high-priority sites by scanning all departments, activities, regions, and value chain segments, and selecting those with the greatest nature impact and relevance to business risks. Winbond operated five sites in Taiwan: CTSP Fab, Kaohsiung Fab, Jhubei Office, Taipei Office, and Tainan Office. Among them, CTSP and Kaohsiung were core production sites and the main focus of this assessment.

-Scoping Principles for Organizational Boundaries-

| Principle Type | Principle Description | Winbond Taiwan Site Assessment Description |
|---|---|--|
| Level of Nature Dependency | Organizations with greater dependency on natural resources or ecosystem services (such as water, soil, pollination, and carbon storage) were prioritized. | Production activities at fab sites typically relied directly on natural resources and ecosystem services, resulting in a higher level of dependency. Administrative units, on the other hand, influenced the use of natural resources primarily through indirect impacts and policy-making, and therefore exhibited relatively lower dependency. |
| Level of Nature Impact | Organizational activities that caused greater negative impacts on the natural environment—such as land development, water pollution, and biodiversity loss—were prioritized. | Winbond conducted geospatial overlay analysis using the Ministry of the Interior’s TGOS geospatial cloud services and the National Ecological Green Network platform to determine site sensitivity. |
| Level of Locational Sensitivity | Sites located within ecologically sensitive areas—such as protected zones, wetlands, or biodiversity hotspots—were prioritized during the assessment. | Winbond conducted species sensitivity analysis within a 2-kilometer radius of each operational site using the Taiwan Biodiversity Network (TBN) and the Taiwan Biodiversity Information Access (TBIA) platform provided by the Biodiversity Research Institute of the Ministry of Agriculture. Each site was then classified and assigned a corresponding score based on its sensitivity level. |
| Degree of Sensitivity Across the Value Chain | Determine whether the greatest impact or dependency lies in the upstream (e.g., suppliers), within the organization itself, or downstream (e.g., product use). The greater the impact or dependency, the higher the priority. | Due to limited assessment resources, it was challenging to evaluate all operational assets and sites within a short timeframe. Winbond therefore initiated its first disclosure by focusing on the CTSP Fab and Kaohsiung Fab, which are dedicated to wafer manufacturing and production operations, and will gradually expand the scope to include upstream and downstream segments of the value chain. ° |
| Relative Importance of Revenue to the Organization | Prioritize based on business revenue contribution, growth potential, or strategic importance. The higher the proportion, the greater the potential, or the more strategic the importance, the higher the priority. | CTSP Fab and Kaohsiung Fab served as Winbond’s core sites for wafer manufacturing and production operations, located in the Central Taiwan Science Park and Southern Taiwan Science Park (Kaohsiung), respectively. In terms of revenue contribution, these two fabs represented the primary sources of Winbond’s operating income. |
| Availability of Assessment Data High / Low | Prioritize based on the completeness and accessibility of current databases. The more readily available the data, the higher the priority. | CTSP Fab and Kaohsiung Fab served as Winbond’s core sites for wafer manufacturing and production operations. Compared to administrative buildings and offices, these fabs had more comprehensive site-related information and publicly disclosed data available. |
| Level of Stakeholder Concern | Identify which activities or locations are under close scrutiny by investors, communities, NGOs, or government agencies. The higher the level of stakeholder attention, the greater the prioritization. | From the perspective of biodiversity conservation, Winbond continued to organize coastal adoption and beach cleanup environmental education programs. These included wetland restoration and park cleanup activities at Yuanzhonggang in Kaohsiung, as well as the adoption of the Houfeng Bikeway in Taichung, fostering positive engagement with community stakeholders. |

Locate – Identify the relationship between operational sites or assets and nature

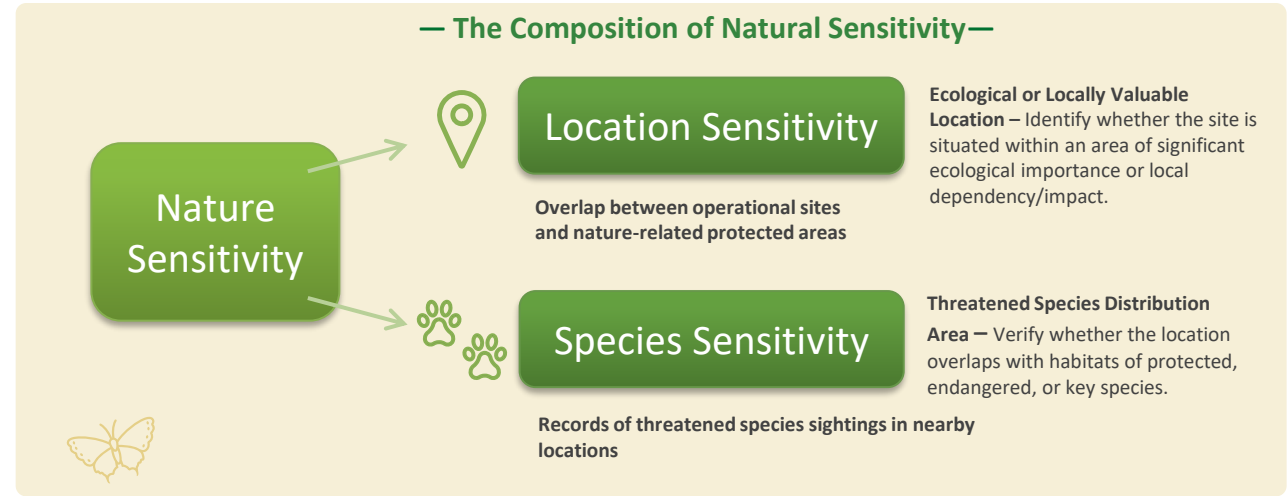
Winbond followed the TNFD (Taskforce on Nature-related Financial Disclosures) guidance and prioritized the “Locate” analysis for its operational sites in Taiwan, selecting CTSP Fab and Kaohsiung Fab as the initial assessment targets. These two sites focused on wafer manufacturing and production operations, with high dependency on natural resources and significant environmental impacts, closely linked to the Company’s risks and opportunities. As such, they became the core focus of subsequent evaluation efforts.

The primary objective of this phase was to assess and rank the nature-related impacts of Winbond’s operational sites and value chain locations, identifying areas with significant dependencies, impacts, risks, and opportunities. Winbond adopted a localized assessment approach based on two criteria: locational sensitivity and species sensitivity.

For locational sensitivity, Winbond conducted overlay analysis using the Ministry of the Interior’s TGOS geospatial cloud services and the National Ecological Green Network platform to understand the interaction between fab sites and surrounding ecosystems. Considering the global nature and biodiversity databases were still under development and the Company’s operations were concentrated in Taiwan, Winbond incorporated official geospatial data, including legally designated ecological sensitive areas, conservation policy outcomes, and species hotspot data published by research institutions, to enhance the accuracy and diversity of the assessment.

Species sensitivity analysis was conducted using the Taiwan Biodiversity Network (TBN) and the Taiwan Biodiversity Information Access (TBIA) platform provided by the Ministry of Agriculture’s Biodiversity Research Institute. Environmental analysis was performed within a 2-kilometer radius of each operational site. The assessment covered the presence of threatened species listed in Taiwan’s Red List and protected wildlife species announced under the Wildlife Conservation Act, with scoring and classification based on the higher conservation level.

Through these analyses, Winbond preliminarily identified the potential nature dependencies and impacts of each site’s operations and determined the priority order for further evaluation based on nature sensitivity results, establishing a clear foundation for the subsequent “Evaluate” phase.



| Nature Sensitivity | | Location Sensitivity | | | | |
|---------------------|---|----------------------|---|---|---|---|
| | | 5 | 4 | 3 | 2 | 1 |
| Species Sensitivity | 5 | 10 | 9 | 8 | 7 | 6 |
| | 4 | 9 | 8 | 7 | 6 | 5 |
| | 3 | 8 | 7 | 6 | 5 | 4 |
| | 2 | 7 | 6 | 5 | 4 | 3 |
| | 1 | 6 | 5 | 4 | 3 | 2 |

Natural Sensitivity Assessment and Prioritization Guidelines

•Natural sensitivity is determined by two dimensions: regional sensitivity and species sensitivity. The scores from both dimensions are summed to calculate the overall natural sensitivity score.

•Based on the total score, evaluation priority is assigned as follows:

- 9–10 points: First priority
- 7–8 points: Second priority
- 6 points: Third priority
- 2–5 points: Non-priority evaluation sites

| Assessment Priority Order | |
|---------------------------|---------------------------|
| Nature Sensitivity | Assessment Priority Order |
| Scores of 9–10 | First Priority |
| Scores of 7–8 | Second Priority |
| Score of 6 | Third Priority |
| Scores of 2–5 | Fourth Priority |

20 •According to ecological experts, if one dimension scores particularly high (e.g., a full score of 5), but the total score is below 9, the item should still receive special attention due to its high sensitivity.

Winbond’s Location Sensitivity Assessment

Winbond reviewed key geospatial layers aligned with international standards (e.g., IUCN Protected Areas Database) and Taiwan’s conservation laws (National Park Act, Wildlife Conservation Act). A locally adapted, tiered sensitivity framework was applied.

Operational sites were assessed for location sensitivity using spatial overlays and data verification. Scores were assigned based on proximity to ecologically sensitive zones to identify potential nature-related dependencies and impacts.

- CTSP Fab: Located near Fazi River, a groundwater recharge zone designated by Taichung Water Resources Bureau — Score: 5
- Kaohsiung Fab : Within a National Green Network focus area — Score: 3

Ecological Green Network Conservation Corridor



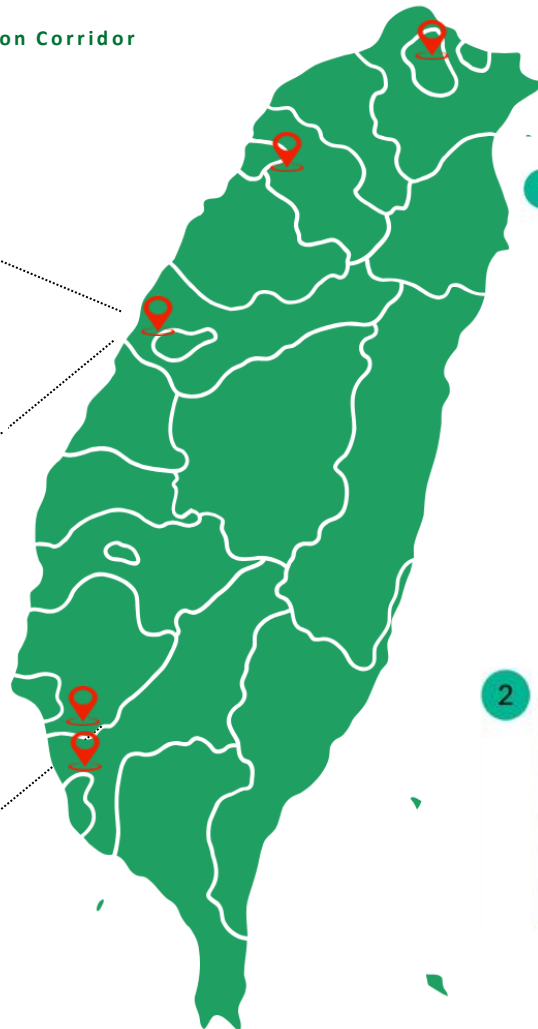
Groundwater Recharge Area Sensitive Zone



National Green Network Focus Area



Operational Sites



1



The Taichung Central Science Park factory is near Fazi River, which is designated by the Taichung City Water Resources Bureau as a sensitive area for groundwater recharge. The location score is 5 points.

2



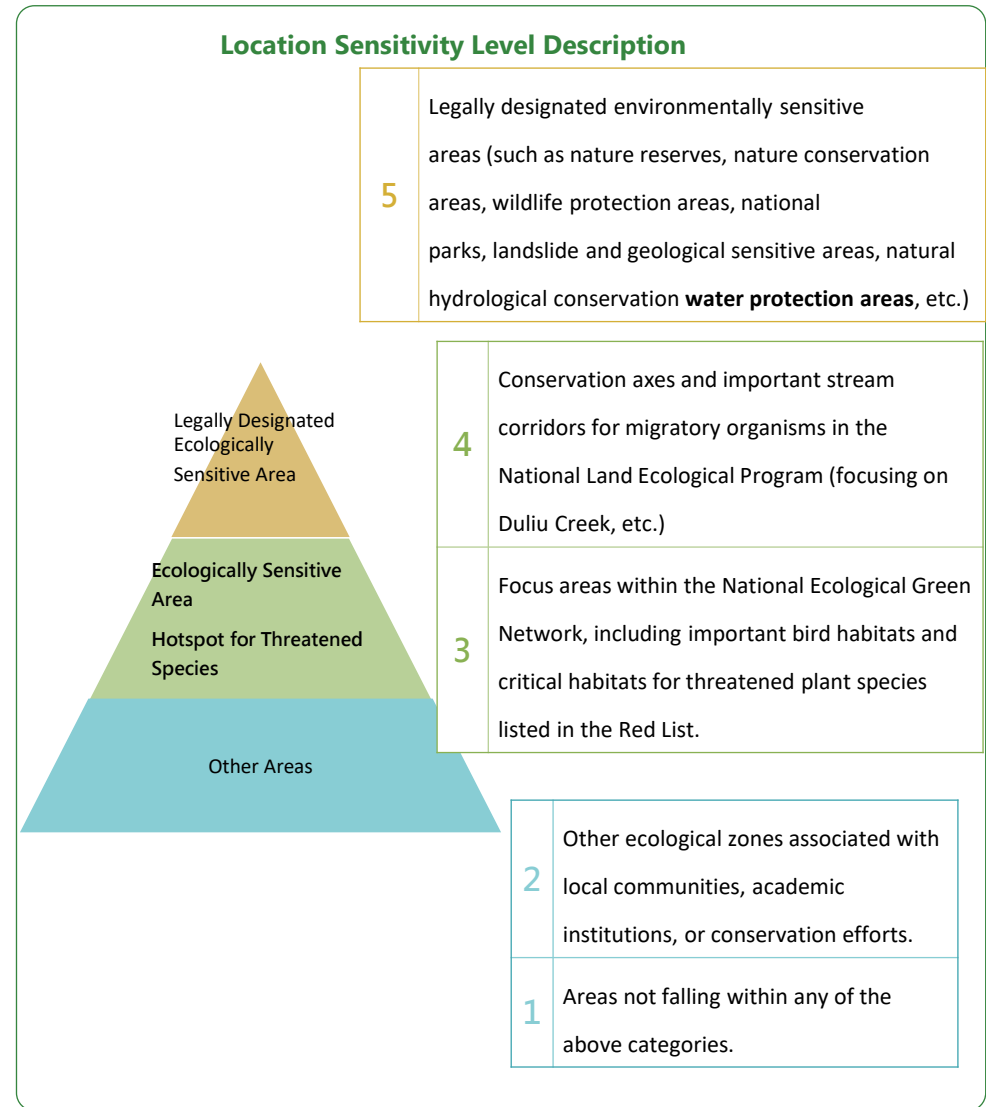
The Kaohsiung plant is located within the National Green Network attention area, with a location score of 3 points.

Location Sensitivity Level Description

| | |
|---|--|
| 5 | Legally designated environmentally sensitive areas (such as nature reserves, nature conservation areas, wildlife protection areas, national parks, landslide and geological sensitive areas, natural hydrological conservation water protection areas , etc.) |
|---|--|

| | |
|---|--|
| 4 | Conservation axes and important stream corridors for migratory organisms in the National Land Ecological Program (focusing on Duliu Creek, etc.) |
| 3 | Focus areas within the National Ecological Green Network, including important bird habitats and critical habitats for threatened plant species listed in the Red List. |

| | |
|---|---|
| 2 | Other ecological zones associated with local communities, academic institutions, or conservation efforts. |
| 1 | Areas not falling within any of the above categories. |



Species Sensitivity Hotspot Identification

–The assessment confirms whether the area contains protected, endangered, or key species, using data from the Taiwan Biodiversity Network (TBN) and the Taiwan Biodiversity Information Alliance (TBIA) systems. The analysis covers a 2-kilometer radius around each operation site, checking for species listed in the Taiwan Red List and those announced under the Wildlife Conservation Act, with the higher threat level taken when overlaps occur. Each site is then classified and scored based on its sensitivity level.

According to the results:

- CTSP Fab received a sensitivity score of 5, due to the presence of the Formosan Leopard Cat.
- Kaohsiung Fab also scored 5, associated with the Grass Owl, a critically endangered protected species.

— Biologically sensitive areas of Winbond's direct operation sites —

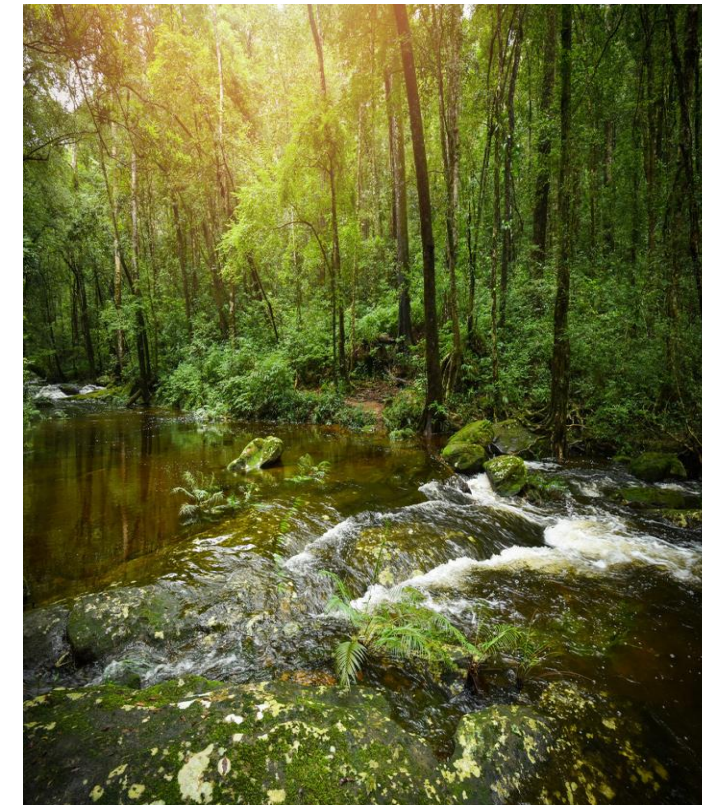
| Category | Level | Scoring | CTSP Fab | Kaohsiung Fab |
|------------------------------|--|---------|-------------|---------------|
| Taiwan Red List | (National Critically Endangered) NCR | 5 | 0 | 0 |
| | (National Endangered Mammal) NEM | 4 | 2 | 0 |
| | (National Vulnerable) NVU | 3 | 8 | 5 |
| | (National Near Threatened) NNT | 3 | 6 | 5 |
| | (National Least Concern) NLC | 2 | 200 | 165 |
| | (Data Deficient)DD | 1 | 4 | 2 |
| | (Not Evaluated) NE | 1 | 2 | 2 |
| | Not Applicable | 1 | 69 | 57 |
| | Sensitivity Score | | 4 | 3 |
| | Endangered Species | | Leopard Cat | |
| Conservation Category | Critically Endangered | 5 | 1 | 1 |
| | Precious and Rare | 4 | 15 | 14 |
| | Other Species to be Conserved | 3 | 3 | 2 |
| | Sensitivity Score | | 5 | 5 |
| | Endangered and Protected Wildlife | | Leopard Cat | Grass Owl |



Leopard Cat



Grass Owl



Natural Sensitivity Recognition –

The CTSP Fab and Kaohsiung Fab focus on wafer manufacturing and production operations as the primary evaluation sites.

Winbond examines the status of natural sensitivity through assessments of location sensitivity and species sensitivity, using the priority ranking of natural sensitivity as a reference for its TNFD evaluation. Subsequent assessments will identify dependencies and impacts on natural capital, conduct a comprehensive evaluation of risks and opportunities, and develop appropriate disclosure strategies.

Winbond operates five locations in Taiwan, including its corporate headquarters at the Central Taiwan Science Park (CTSP), the Kaohsiung Fab, the Zhubei Building, and offices in Taipei and Tainan. Among these, the Hsinchu, Taipei, and Tainan sites primarily handle office-related functions such as administration and R&D support, while the CTSP Fab and Kaohsiung Fab focus on wafer manufacturing and production operations.

For this TNFD evaluation, Winbond began with its own operational sites, gradually expanding the scope to include upstream and downstream segments of the value chain. To identify environmentally sensitive areas requiring special attention, the CTSP Fab and Kaohsiung Fab were selected as primary evaluation sites due to their manufacturing focus.

Following the assessment:

- The CTSP Fab received a natural sensitivity score of 10, indicating strong potential for biodiversity conservation. The site is adjacent to the Dadu Plateau Forests, farmlands, and Fazih River.
- The Kaohsiung Fab scored 8, and both sites were designated as priority assessment locations.

Further analysis of surrounding land use revealed that these areas do not directly or significantly impact habitats or species of concern.



CTSP Fab



Kaohsiung Fab

— **Natural Sensitivity Assessment** —

| Sensitivity Category | CTSP Fab | Kaohsiung Fab |
|--|--|---|
| Location Sensitivity | 5 | 3 |
| Location Sensitivity Items | Groundwater Recharge Area and Dadu Mountain Conservation Axis within National Land Ecological Network Focus Area | National Land Ecological Network Focus Area |
| Species Sensitivity Score | 5 | 5 |
| Endangered Protected Wildlife Species | Leopard Cat | Grass Owl |
| Natural Sensitivity Score | 10 | 8 |

Evaluate – Identify and analyze the organization's dependence on and impact on nature

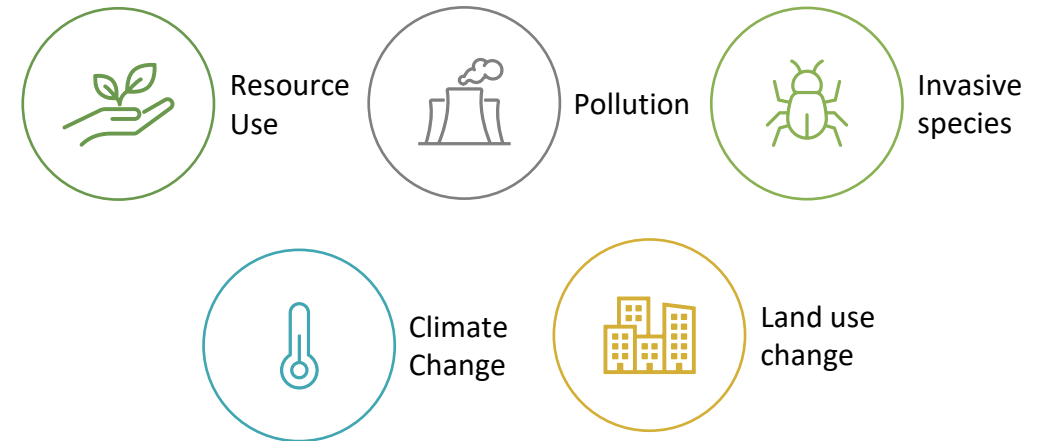
The Evaluate (E) phase focuses on identifying the organization's dependence on natural capital and ecosystem services, as well as the impacts of its operational activities on nature. To comprehensively assess the dependence and impact of various types of sites on nature, the working group adopted the LEAP methodology recommended by TNFD, while also incorporating an Evaluate analysis process tailored to current operational conditions.

The priority assessment sites identified during the Locate phase were analyzed and evaluated based on their industry, sector, business processes, or operational characteristics, in conjunction with the site's natural capital, ecosystem services, and impact drivers resulting from operational activities.

Winbond applies a broad definition of nature-related issues, including climate, and initiates its analysis using TNFD’s categories of nature dependencies and impacts. The company organized workshops to engage various internal departments in educational training, using brainstorming sessions to gather collective work experience and insights, and to explore potential nature-related dependencies and impact issues that the enterprise may face.



– Five driving factors for enterprises to respond to natural changes –



The five major driving factors for companies to respond to natural changes are usually defined as: climate change, land use change, resource use, pollution, and invasive species. These factors are interrelated and jointly affect the operations of enterprises and natural ecosystems. These driving factors help companies assess risks, formulate strategies, and move towards more sustainable business models. The focus of the evaluation stage is on identifying dependence on natural capital and ecosystem services, as well as the impact of their operations on nature.

Winbond's Dependence on Ecosystem Services and Its Impact on Changes in Natural Condition




The natural impact of a company refers to changes in the state of nature caused by its business operations, which in turn affect the environment's ability to support societal or economic activities. In assessing its environmental impact, Winbond evaluated the extent of its influence on nature. Based on the sites identified during the Locate phase, the Company further analyzed its dependence on natural capital and ecosystem services in relation to the nature of its industry, departmental functions, and operational activities.

By referencing the ENCORE tool, Winbond screened nature-related dependencies and impact drivers associated with its operations, ultimately identifying ten dependency factors and eight impact factors as the foundation for evaluating its interrelationship with nature.

Winbond primarily relied on ecosystem services such as water resources, climate regulation services, and supporting services. The assessment of environmental impact categories at its fabs revealed higher relevance in issues such as waste, greenhouse gas emissions, air pollutant emissions, and use of freshwater and marine resources, along with the associated impacts from resource use and greenhouse gas emissions. These identified issues were further addressed through strategic management and mitigation measures, which were elaborated in the chapters on targets and indicators, and climate and nature strategies.



— List of Dependency Factor —

| Category | Dependency factor | Dependency Explanation |
|--|--------------------------------------|---|
| Provisioning services  | Water Supply (Abiotic) | <ul style="list-style-type: none"> Water resources are critical to manufacturing demands and are a core element in ensuring wafer production. During drought periods, water shortages may necessitate the use of more costly alternative water sources or a reduction in production, thereby increasing operating expenses or decreasing revenue—constituting a physical risk with negative financial impact. In terms of environmental safety, water is used in large quantities only during emergency response situations, such as for cooling, firefighting, or pollutant dilution. These water sources come from independent firefighting water supplies regulated by fire safety laws and are not part of routine daily water usage. |
| | Storm Mitigation | <ul style="list-style-type: none"> Storms can lead to equipment damage, construction safety risks, and work stoppages, while storm mitigation services can reduce these impacts. |
| Regulating & Maintenance  | Global Climate Regulation | <ul style="list-style-type: none"> Winbond relied on global climate regulation services to ensure stable electricity and water resources. If climate regulation failed, the probability of extreme weather increased, which might affect the stability of power equipment, cause water shortages or deterioration in water quality, leading to production interruptions or disruptions, and increase operating costs. |
| | Rainfall pattern regulation services | <ul style="list-style-type: none"> If rainfall was unstable, reservoir storage was insufficient, or groundwater levels declined, during periods of drought and water shortages, the need to find more expensive alternative water sources or reduce production might arise. This would increase operating costs or reduce revenue, constituting a physical risk with negative financial impacts. |
| | Local climate regulation services | <ul style="list-style-type: none"> Climate change-induced high temperatures increased the company's electricity and water demands. Prolonged heat might cause droughts and wildfires, affecting employees' work efficiency and health. Abnormal temperature rises or drastic temperature changes would increase equipment failures, electrical loads, firefighting pressure, and employee health risks. |
| | Air filtration service | <ul style="list-style-type: none"> When air quality deteriorated, the frequency of replacing cleanroom consumables increased, leading to higher costs and negatively impacting employee health. The Winbond plant had an efficient filtration and HVA control system. Surrounding green spaces, trees, and wetlands provided preliminary filtration to reduce the load before air entered the plant area. |
| | Solid Waste Remediation Services | <ul style="list-style-type: none"> During the manufacturing process, various types of solid waste (such as chemical containers, electronic components, expired or damaged manufacturing materials, etc.) were generated. The residuals after treatment relied on the ecosystem to convert them into low-risk substances, thereby mitigating the impact on the environment. |
| | Water purification services | <ul style="list-style-type: none"> Water quality played an important role in the semiconductor manufacturing industry. If water quality deteriorated due to a lack of water during dry seasons, eutrophication of reservoirs, or high concentrations of particles in the water, it would increase the burden on water resource treatment. Winbond produced wastewater during the manufacturing process and therefore relied heavily on natural water purification services. |
| Regulating & Maintenance Services  | Disease Control Services | <ul style="list-style-type: none"> Employees might be absent due to factors such as epidemics or the spread of pandemics, making labor management difficult. |
| | Atmospheric and ecosystem dilution | <ul style="list-style-type: none"> Winbond produced greenhouse gases and harmful gases during the manufacturing process. After mitigation, it relied on the atmosphere and ecosystems for dilution. |



— List of Impact Factor —

| Category | Impact Factor | Description of Potential Impacts | Response Measures |
|-----------------------------|---|---|---|
| Climate change | GHG Emissions | <ul style="list-style-type: none"> Semiconductor manufacturing is highly energy-intensive. Winbond must meet power demands to support manufacturing, wastewater treatment, and water supply facilities. Greenhouse gas emissions exacerbate global warming, increasing the risk of extreme weather events. Currently, most electricity comes from non-green energy sources, resulting in higher emissions. | <ul style="list-style-type: none"> Semiconductor manufacturing is highly energy-intensive. Winbond must meet electricity demands to support manufacturing, wastewater treatment, and water supply facilities. Greenhouse gas emissions exacerbate global warming, increasing the risk of extreme weather events. Currently, most electricity comes from non-green energy sources, resulting in higher emissions. |
| Land/Water/Ocean Use | Freshwater Ecosystem Use | <ul style="list-style-type: none"> During its manufacturing process, Winbond generates pollutive wastewater containing dyes, which has a significant impact on the ecological functions of rivers. | <ul style="list-style-type: none"> Winbond's wastewater is first treated internally at the plant, then transferred to the science park's sewage treatment facility for final processing. It is discharged only after meeting emission standards, at which point its impact on freshwater and marine ecosystems is minimal. |
| | Marine Ecosystem Use | <ul style="list-style-type: none"> During its manufacturing process, Winbond generates pollutive wastewater containing dyes, which has a significant impact on the ecological functions of rivers. | |
| Pollution/Pollution Removal | Non-GHG Air Pollutants | <ul style="list-style-type: none"> Winbond emits PM2.5 and volatile organic compounds (VOCs) during energy use, vehicle operations, and semiconductor manufacturing processes. These pollutants have potential impacts on the environment, air quality, and human health, and can also affect plant growth. | <ul style="list-style-type: none"> Winbond collects emissions through sealed pipelines and treats them using a thermal oxidizer (TO). After meeting regulatory emission standards, the treated gases are released into the atmosphere. |
| | Generation and Disposal of Solid Waste | <ul style="list-style-type: none"> Winbond generates various types of solid waste during its production processes, such as chemical containers, electronic components, and disposable materials, which may impact the environment. The company's operations also produce large amounts of commercial and general waste, requiring the selection of qualified waste disposal vendors to properly manage the waste and reduce negative environmental impacts. | <ul style="list-style-type: none"> Winbond selects qualified waste disposal vendors to properly manage waste and reduce negative environmental impacts. The company also implements a waste management system that complies with legal requirements. |
| | Toxic pollutants discharged into water and soil | <ul style="list-style-type: none"> Winbond's manufacturing processes generate toxic pollutants such as heavy metals. If discharged without treatment, they would severely impact the environment. | <ul style="list-style-type: none"> Process pollutants are collected according to their characteristics and treated either in-house or by qualified external vendors to ensure they do not impact aquatic or terrestrial ecosystems. |
| Resource Usage/Supplement | Other non-living resource extraction | <ul style="list-style-type: none"> Wafer fabrication requires various mineral resources such as silicon, metals (copper, aluminum, nickel), and rare earth elements. The extraction of these resources may impact ecosystems, including deforestation, loss of biodiversity, water pollution, and soil degradation. | <ul style="list-style-type: none"> Reduce the use of raw materials. |
| | Resource Usage/Supplement | <ul style="list-style-type: none"> Winbond's manufacturing processes require substantial water resources, especially in the ultrapure water process, which involves large-scale extraction of surface or groundwater. This can significantly impact the environment. Water is an essential ecosystem service that Winbond depends on, but the semiconductor industry's extensive water use may lead to competition with nearby communities or businesses and cause ecosystem damage. | <ul style="list-style-type: none"> Use and recycle water resources to ensure water sustainability. By establishing a water recycling system, the impact on the natural environment can be reduced. |

Assess – Nature-related Risk and Opportunity Identification Process

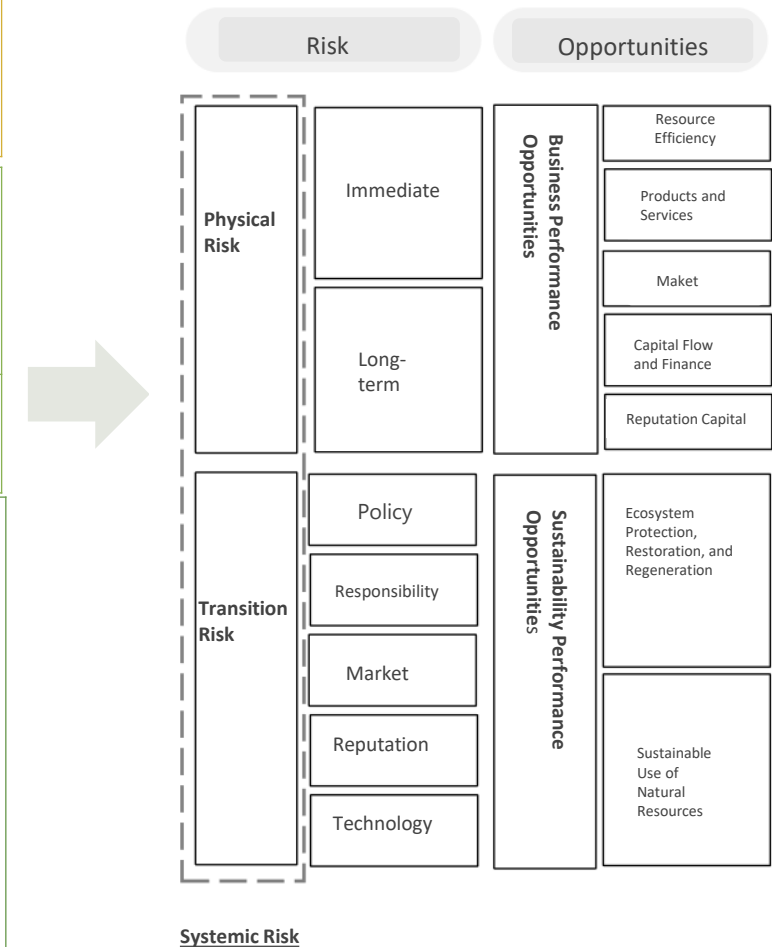
The focus of Winbond’s Assess phase was to align with the Evaluate phase by reviewing the organization’s dependencies and impacts on nature. This process identified and selected potential nature-related future development scenarios that the organization may face.

Under each scenario, Winbond evaluated the risks, opportunities, and materiality associated with ecosystem services on which the organization was highly dependent, as well as its impacts on nature. These assessments informed the prioritization of corresponding actions.

Risk considerations included degradation of ecosystem services the organization relied on, worsening impacts on nature, and challenges in operational adjustments under future scenarios. Opportunity considerations included reducing ecosystem dependency, minimizing impacts on nature, and enhancing nature-related growth potential.

Ultimately, the organization assessed the overall implications—both positive and negative—of these impacts on its operations.

| Phase | Process | Work item | Description |
|-------|----------------|---|--|
| 1 | Collected | Compiled a list of nature-related risks and opportunities | Collected a list of relevant risks and opportunities based on the results of the Evaluate step and both internal and external information. |
| 2 | Identification | Held a TNFD workshop | Each department assessed nature-related risks and opportunities arising from the business's dependency and impact on nature, and evaluated the potential effects of these factors on the company and its operations across the upstream and downstream value chain. |
| | | Summary Identification Results | The working group consolidated nature-related risk and opportunity factors associated with each department's business operations. |
| 3 | Recognition | Nature-related risks and opportunities | Identified nature-related risks and opportunities based on industry characteristics and operational conditions. Established corresponding indicators by analyzing the convergence of dependencies and impacts across operational activities. Conducted pathway analysis of dependencies and impacts to derive relevant risk and opportunity factors. Assessed the financial implications and formulated response strategies. Implemented ongoing risk mitigation measures and actively captured opportunities. |



Natural Risk and Opportunity Analysis

Based on the TNFD guidelines for nature-related risks and opportunities, Winbond has considered industry characteristics and operational conditions to identify its own nature-related risks and opportunities through the “TNFD Workshop.” Upon evaluation, the availability of renewable energy and recycled water emerged as the current major challenges. To reduce dependence on natural resources, the company continues to improve the efficiency of energy and water usage, and expands its procurement of renewable energy and usage ratio of recycled water.

The nature-related risks assessed at this stage are mainly categorized into physical risks and transition risks. In terms of risks, the scope includes:

- Physical risks such as climate change-induced disasters, degradation of ecosystem services, and deterioration of air filtration services;
- Transition risks involving changes in policies, markets, technologies, and reputation;
- Liability risks including compensation issues caused by environmental pollution.

On the opportunity side, the focus is on enhancing business performance through:

- Improved resource efficiency,
- Expansion into new markets,
- Development of green products and services,
- Optimization of capital flows and financing,
- Strengthening reputational capital and sustainable use of natural resources.

Strategies for ecosystem protection, restoration, and regeneration are also explored.

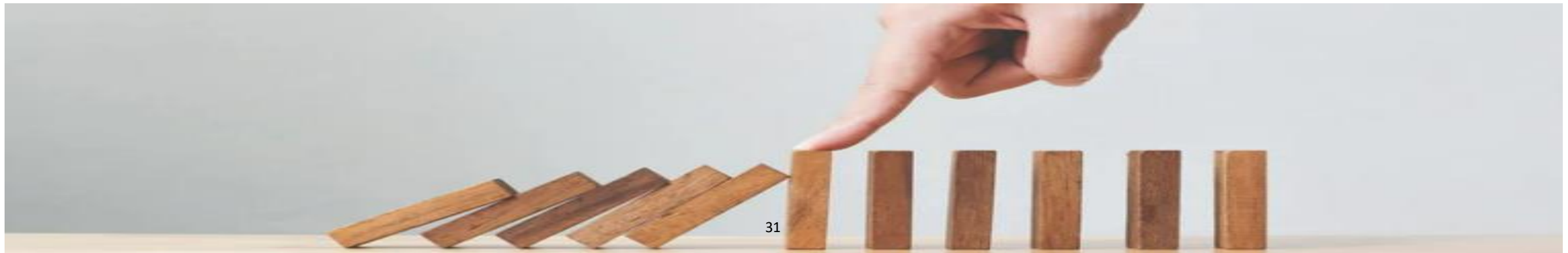
Winbond monitors the status of nature-related dependencies and impacts by setting corresponding indicators based on operational activities. Through dependency and impact pathway analysis, the company identifies related risks and opportunities, evaluates their financial implications, and formulates response strategies. It continues to implement risk mitigation measures and seize opportunities, ensuring that while pursuing operational profitability, it also addresses environmental impacts to effectively respond to nature-related risks.



—Nature-related risks—

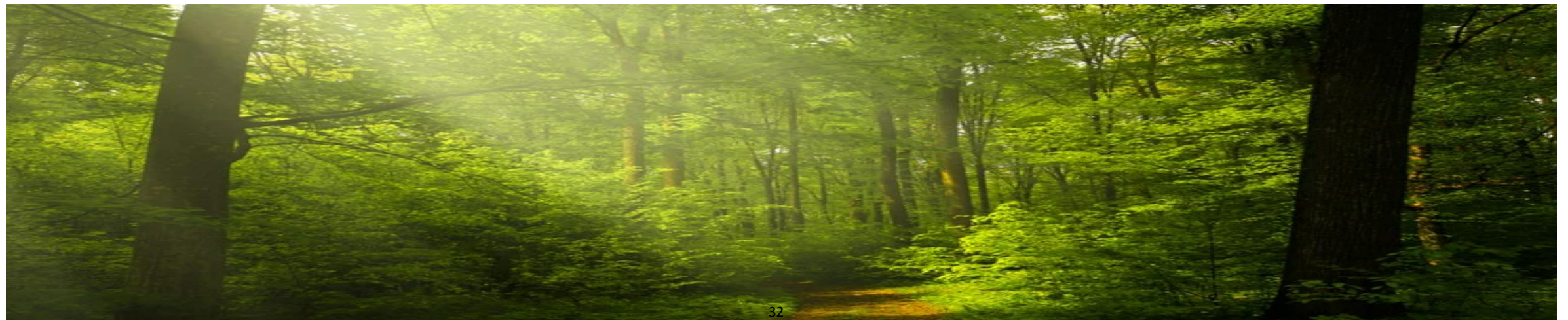
| Item | Nature-related Risks | Risk Issues and Descriptions | Impacts | Dependencies | Countermeasures |
|----------------|---|--|---|---|--|
| Physical Risks | Climate change causes extreme weather | The impact on semiconductor manufacturing operations has resulted in decreased production efficiency, compromised product quality, disrupted capacity, increased operational costs (such as rising utility expenses), and higher insurance premiums. | <ul style="list-style-type: none"> GHG emissions | <ul style="list-style-type: none"> Climate regulation | <ul style="list-style-type: none"> Installed on-site exhaust treatment systems to reduce greenhouse gas emissions. Advanced processes and packaging enable smaller product sizes. Promoted domestic afforestation and conservation efforts. Implemented drainage, flood control, and water recycling to boost climate resilience. Enhanced energy efficiency via ISO 50001 and AI-driven HVAC systems. Invested in renewable energy generation infrastructure. |
| | Water supply shortage | The industry's high dependency on water, combined with aggressive facility expansion and insufficient rainfall, may result in supply shortages or competition with agricultural and domestic water needs | <ul style="list-style-type: none"> Water use | <ul style="list-style-type: none"> Rainfall Pattern Regulation Service Water Supply Service | <ul style="list-style-type: none"> Boosted water recycling to reduce freshwater use, adopting ISO 46001 and ISO 14046 standards. Established backup water truck systems for drought resilience. Installed flood control measures to handle heavy rainfall. Integrated drainage and water-saving systems into facility design to enhance climate resilience. |
| | Impact of ambient air composition on facilities | The deterioration of air filtration services, coupled with declining air quality, has led to an increased demand for advanced cleanroom filtration systems and raised concerns regarding employee health and workplace safety. | <ul style="list-style-type: none"> GHG emissions non-greenhouse gas emissions | <ul style="list-style-type: none"> Air Filtration Services | <ul style="list-style-type: none"> Installed on-site exhaust treatment systems for hazardous gases to meet environmental standards. Subsidized regular employee health checkups. Controlled carbon emissions and improved process technologies. |
| | Environmental impacts of renewable energy supply | The development and operation of renewable energy facilities may impact native species habitats or cause ecological disruption | <ul style="list-style-type: none"> Marine Ecosystem Terrestrial Ecosystem Non-Greenhouse Gas Emissions | <ul style="list-style-type: none"> Local Climate Regulation Services | <ul style="list-style-type: none"> Planned internal net-zero roadmap for 2050, with a commitment to 50% renewable electricity (RE50) at Winbond Taiwan sites by 2030. Invested in renewable energy projects. Purchased voluntary carbon credits. |

| Item | Nature-related Risks | Risk Issues and Descriptions | Impacts | Dependencies | Countermeasures |
|----------------|---|---|---|--|--|
| Physical Risks | Increasing Customer/Investor Awareness of Nature-Related Issues | Deepening Public Perception of High Pollution in the High-Tech Industry | <ul style="list-style-type: none"> Greenhouse Gas Emissions Generation and Disposal of Solid Waste Water Usage | <ul style="list-style-type: none"> Local Climate Regulation Services Water Supply Water Quality | <ul style="list-style-type: none"> Actively participate in climate initiatives (SBTi) and domestic and international evaluations (such as DJBIC, CDP, MSCI, TCSA, and sustainability award selections) to strengthen external credibility. Invest in ecosystem protection and restoration actions, promote domestic afforestation and conservation programs such as the 30-year tree planting carbon reduction plan, and assist in the conservation of Taiwan’s ecosystems. Protect endangered wild plants and native Taiwanese plant species to maintain biodiversity and ecological health. Implement 100% responsible sourcing, using conflict-free minerals. |
| | Shift towards low natural impact technology/operations direction. | Domestic and international markets prefer environmentally friendly products and services. | <ul style="list-style-type: none"> Greenhouse gas emissions Non-greenhouse gas emissions | <ul style="list-style-type: none"> Local climate regulation services. | <ul style="list-style-type: none"> Develop products with the core goal of reducing environmental impact (such as low-carbon materials, energy-saving and low-power consumption, small packaging, and low pin count), and strive to work with customers to achieve energy-saving and low-carbon end products. Continue to invest in renewable energy development and continue to ally and communicate with green industry suppliers. |
| | In response to relevant regulatory amendments and potential fees. | If the factory park does not properly handle pollutants, it will be at risk of being sued by regulations. | <ul style="list-style-type: none"> Greenhouse gas emissions Generation and disposal of solid waste | <ul style="list-style-type: none"> Solid waste remediation services. | Winbond successfully verified its water footprint through ISO 14046 certification and implemented the ISO 46001 water efficiency management system. The company established systems for the recycling of wastewater from scrubbers, cooling towers, process waste liquids, and process water. Additionally, Winbond adopted measures for waste reduction, classification, and recycling |

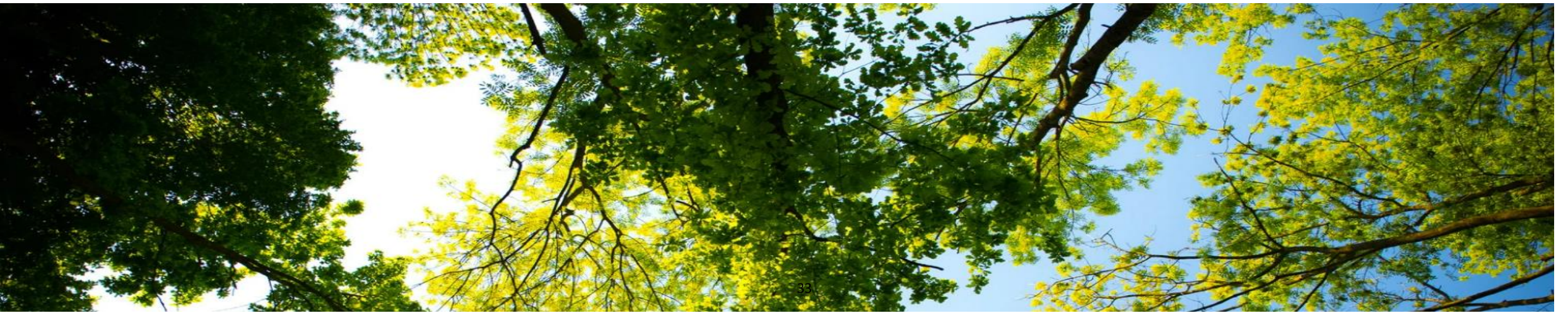


— Nature-related Opportunities —

| Item | Natural opportunity | Opportunity Issues and Descriptions | Impacts | Dependencies | Countermeasures |
|-----------------------------|---|---|--|---|--|
| | Business Performance - Resource Efficiency Improve Production Operation Efficiency | By optimizing resource utilization efficiency, we reduced costs and improved efficiency | <ul style="list-style-type: none"> Greenhouse Gas Emissions | <ul style="list-style-type: none"> Local climate regulation services | <ul style="list-style-type: none"> Implement the SEMI-E18 standard to enhance information security and operational stability in production operations. Promote intelligent manufacturing applications through industrial AI technology to establish a smart factory with high-efficiency production and quality control. |
| Business Performance | Business Performance - Products and Services Develop products and services that have a positive impact on nature, in line with the preferences of environmentally friendly consumers | Consumers are gradually willing to increase their consumption of green products and services. Organizations can attract these consumers' preferences by establishing environmentally friendly brand awareness | <ul style="list-style-type: none"> Greenhouse Gas Emissions Non-Greenhouse Gas Emissions Generation and Emission of Solid Waste | <ul style="list-style-type: none"> Generation and discharge of solid waste | <ul style="list-style-type: none"> Research and development of flash memory, secure flash memory, niche memory, and mobile memory as green products. Develop using key technologies focused on high efficiency, small size, low power consumption, high quality, and safety. Continuously enhance design precision and miniaturize manufacturing processes. Promote product carbon footprint audits and carbon reduction strategies to optimize both processes and the product life cycle. |



| Item | Natural opportunity | Opportunity Issues and Descriptions | Impacts | Dependencies | Countermeasures |
|----------------------------|---|---|--|---|--|
| Sustainability Performance | <p>Sustainable Performance - Sustainable Use of Natural Resources</p> <ul style="list-style-type: none"> Renewable Energy Transition | <p>Install Renewable Energy Generation Devices to Reduce Carbon Emissions and Their Impact on Nature</p> | <ul style="list-style-type: none"> Marine Ecosystem Terrestrial Ecosystem Non-Greenhouse Gas Emissions | <ul style="list-style-type: none"> Local Climate Regulation Services | <ul style="list-style-type: none"> Planned an internal action plan for achieving net-zero emissions by 2050. Committed to using 50% renewable energy (RE50) in Winbond's Taiwan production fabs by 2030. Invested in renewable energy projects. Purchased voluntary carbon credits. |
| | <p>Sustainable Performance - Ecosystem Protection, Restoration, and Regeneration</p> <ul style="list-style-type: none"> Supporting Nature-Based Solutions | <p>Support Nature-Based Solutions, Generating Multiple Benefits Such as Improved Soil Health and Carbon Sequestration</p> | <ul style="list-style-type: none"> Atmospheric and Ecosystem Dilution Air Filtration Services | <ul style="list-style-type: none"> Other Non-Biological Resource Extraction | <ul style="list-style-type: none"> Invest in ecosystem protection and restoration actions, promote domestic afforestation and conservation programs such as the 30-year tree planting carbon reduction plan, and assist in the conservation of our country's ecosystems. Protect endangered wild plants and Taiwan's native plants, maintain biodiversity and ecological health |
| | <p>Sustainable Performance - Sustainable Use of Natural Resources</p> <ul style="list-style-type: none"> Improve Water Resource Use Efficiency, Reduce Operating Costs | <p>Improve Water Resource Use Efficiency, Reduce Operating Costs</p> | <ul style="list-style-type: none"> Water Usage | <ul style="list-style-type: none"> Rainfall Pattern Regulation Services Water Supply Services | <ul style="list-style-type: none"> Improve water recovery efficiency, reduce the demand for water extraction, and introduce ISO 46001 Water Efficiency Management System and ISO 14046 Water Footprint Verification. Establish a backup mechanism for water trucks to increase resilience to droughts. Implement flood prevention measures to increase resilience to floods. Incorporate drainage, flood prevention, and water-saving recovery facilities into plant design to enhance climate resilience. |

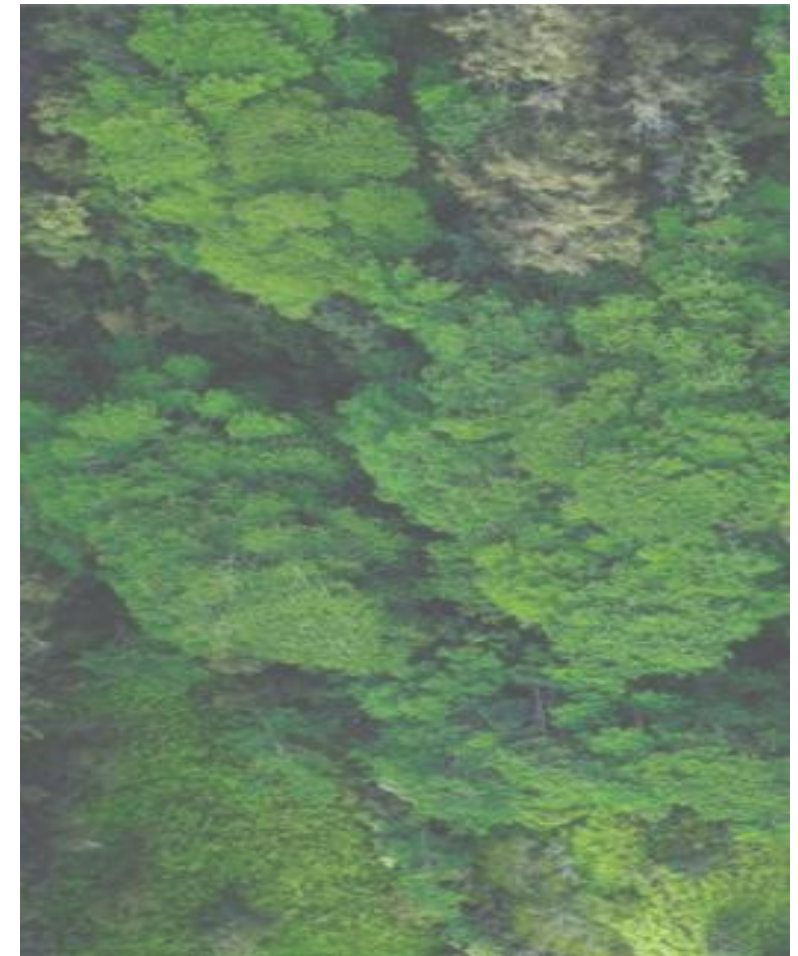
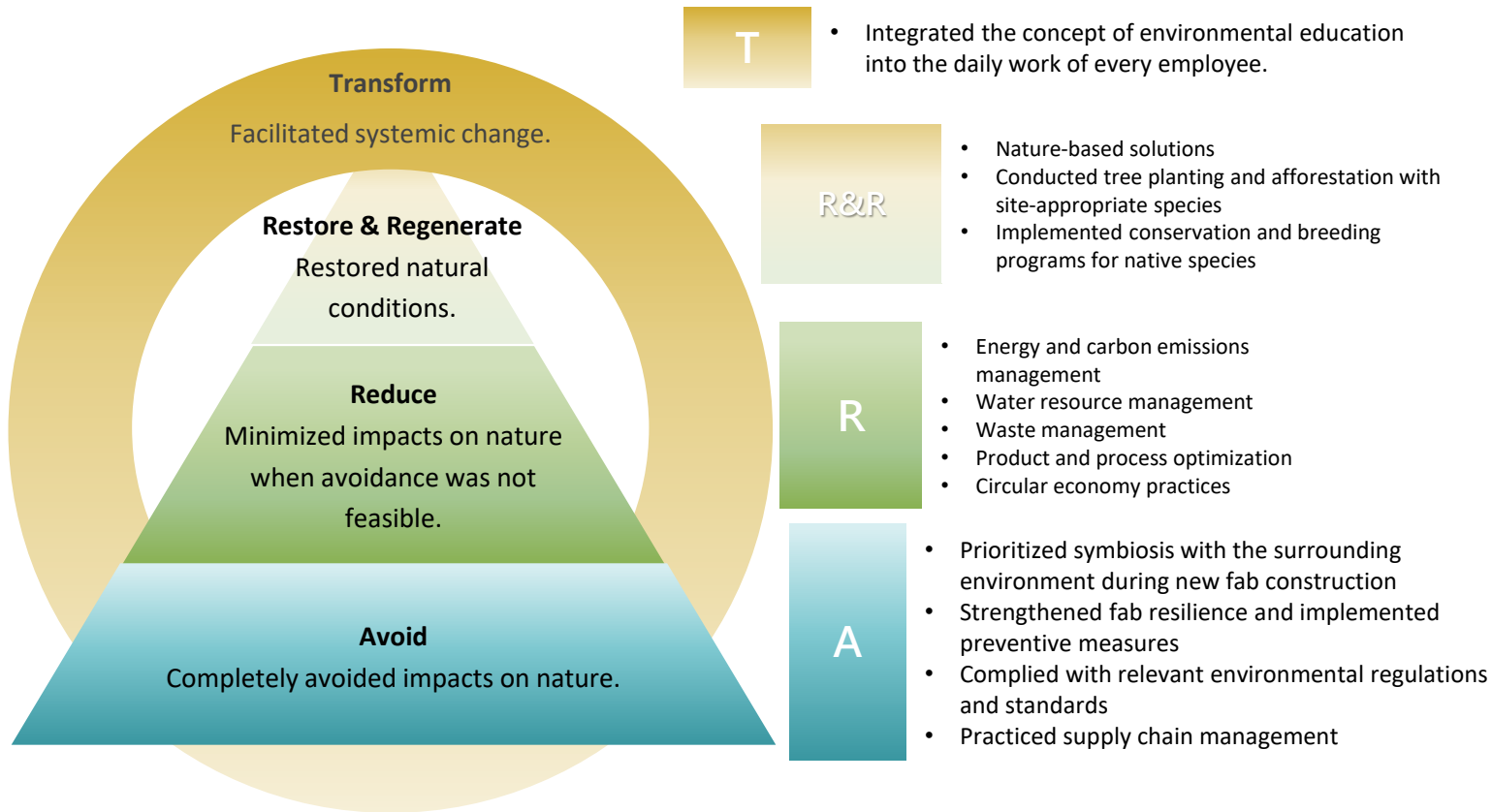


Responded to nature conservation with practical actions

Mitigated the company’s impact on biodiversity through the AR3T Action Framework.

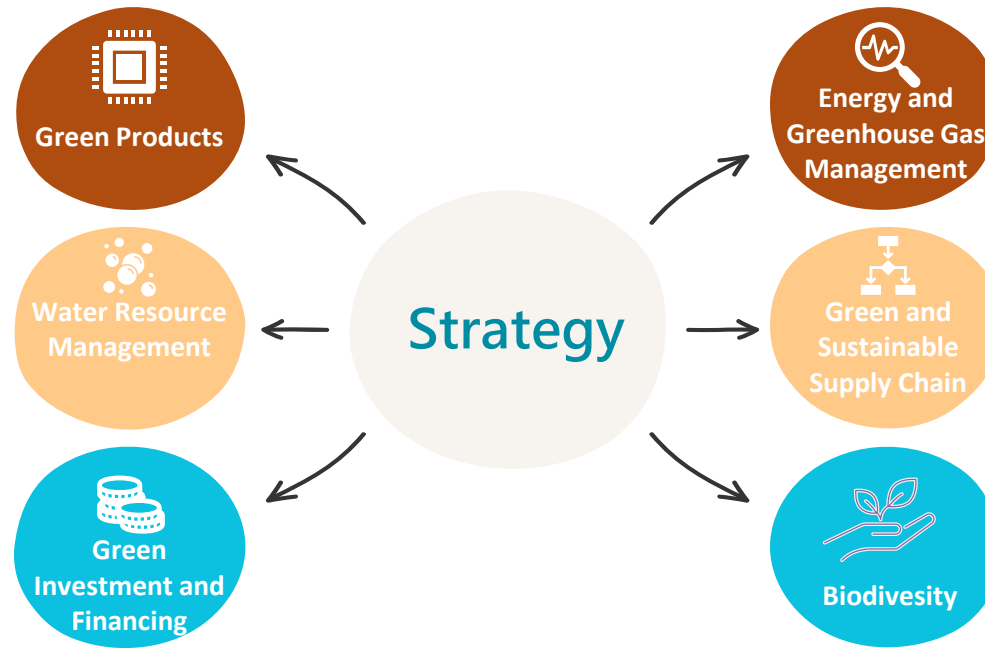
Winbond adopted the AR3T Action Framework to mitigate its impact on biodiversity and incorporated the TNFD (Taskforce on Nature-related Financial Disclosures) framework into its sustainability strategy. Through the four principles of “Avoid,” “Reduce,” “Restore,” and “Regenerate,” the Company systematically managed interactions between business operations and the natural environment, aiming to comprehensively assess financial impacts and promote sustainable operations.

Relevant strategies and measures were elaborated in the chapters “Climate and Nature Strategy” and “Targets and Indicators,” highlighting corresponding strategic management and actions.



3. Climate and Nature Strategy

- LPDDR4/4X achieves a 90% reduction in standby power consumption over standard DDR4 due to its reduced operating voltages of 1.1V/0.6V.
- The world's first NOR Flash to support a working voltage of 1.2V was developed, which saves 50% in power consumption compared to 1.8V NOR Flash.
- Products manufactured with renewable energy have begun shipping, resulting in approximately 60% fewer carbon emissions compared to those made with conventional energy sources.
- A smaller size was achieved by advancing manufacturing processes and evolving packaging technology.
- 81.9% Water Recycling Rate in 2024
- Received a B rating in the CDP water security evaluation in 2024
- Both the Taichung Fab and Kaohsiung Fab have successfully implemented and obtained certification for ISO 46001
- Investment of NT\$955 million in renewable energy investment plan
- Cumulatively obtained 13,500tCO2e of international voluntary carbon credits
- Signed a NT\$20 billion Sustainability-Linked Loan
- Established Internal Voluntary Carbon Credit Investment Standards in 2024



- The Kaohsiung Fab was certified with ISO 50001 Energy Management System in 2024
- Generated 27 MW from offshore floating solar power plants and 9.24 MW from onshore wind power plants in 2024
- Winbond (Taiwan) consumed 43.96 million kWh of renewable energy in 2024, representing 5.9% of its total energy consumption.
- Cumulative electricity savings of 482.3 MWh from 2019 to 2024
- Received an A- rating in the Climate Change evaluation in 2024
- Suppliers directly related to Scope 3 emissions achieved a 100% response rate to energy resource usage surveys
- 100% of OSAT suppliers have established production capacity for renewable energy-based products
- Digital management of supply chain communication Supply chain ecosystem co-learning activities totaled 38,646 hours
- 100% response rate achieved from OSAT suppliers to the electronic carbon data exchange
- The afforestation plan covered an accumulated area of nearly 25 hectares
- ✓ The plan aimed to plant over 40,000 trees.
- ✓ The "Winbond Biodiversity Commitment" was declared.
- Ecological restoration of the Purple Crow Butterfly.
- ✓ Habitat protection of Swinhoe's frog.
- ✓ Collection and cultivation of Camellia species plants.
- ✓ Protection of the endangered wild plant *Spiranthes sinensis*.

3.1 Green Products

Winbond provides global customers with comprehensive specialty Memory solutions. Core products include Code Storage Flash Memory, TrustME® Secure Flash Memory, Specialty DRAM, and Mobile DRAM, making Winbond the only Taiwanese manufacturer with proprietary technologies in both Flash and DRAM. Winbond leverages the synergies generated by its product portfolio and adopts a green product design philosophy to meet diverse customer needs. This enables customers to combine their expertise with Winbond's innovative green products for applications in hand-held devices, consumer electronics, computer peripherals, artificial intelligence, automotive, and industrial electronics markets. To achieve environmental friendliness and sustainable growth while providing customers with high quality and innovative products and services, Winbond continuously invests in research and development, technology, and talent. Winbond is committed to developing innovative products and technologies and remains focused on the following issues:

1. Development of green products in Flash memory, Secure Flash memory, Specialty DRAM, and Mobile DRAM
2. Development and production processes of green products, along with achievements in carbon reduction and energy saving
3. Key technology development focusing on high performance, small size, low energy consumption, high quality, and security
4. Refinement in design and process miniaturization
5. Innovation and intellectual property management

| Key Technology | Products | Application |
|------------------------------------|---|---|
| Low-Power NOR Flash Memory | <p>1.2V Flash Memory</p> <ul style="list-style-type: none"> Winbond launched the market's first 1.2V 64Mb QspiNOR Flash Memory: W25Q64NE. 128Mb was launched in 2024, and other capacities ranging from 8Mb to 256Mb are expected to be available in 2025. | <ul style="list-style-type: none"> Wearable devices and other low-power application products. Meeting the low operating voltage requirements of advanced processes can eliminate the need for power management IC (PMIC), further reducing costs and area. |
| High Performance NAND Flash Memory | <p>8-channel NAND Flash Memory (Octal NAND)</p> <ul style="list-style-type: none"> Winbond's 46nm serial NAND Flash memory technology launched the market's first high-speed NAND Flash memory supporting 8-channel input/output. It can support products requiring higher capacity and high transmission speed applications. | <ul style="list-style-type: none"> Automotive electronics (such as dashboards, driver assistance applications), meeting the needs for quick startup and rapid firmware updates. Smart visual doorbells, meeting the needs for quick startup detection applications. |
| Secure Flash Memory | <p>Anti-Quantum Computing Attack, Integration of PQC (Post-Quantum Cryptography) Secure Flash Memory with Leighton-Micali Signature (LMS) Algorithm</p> <ul style="list-style-type: none"> Supported asymmetric key encryption algorithm (Leighton-Micali Signature, LMS), enabling devices to achieve secure OTA requirements through LMS-OTS (One-Time Signature) as specified by NIST800-208. The component supported a high-performance 166MHz Quad-SPI interface and expanded Replay-Protected Monotonic Counter (RPMC) support, increasing to 8 counters, suitable for security enhancement and data protection in personal computers (UEFI and BIOS). | <ul style="list-style-type: none"> The first memory supplier to integrate the LMS algorithm, meeting emerging security regulatory requirements and setting new standards in the industry. Optimized for industrial IoT, network, server, and critical infrastructure applications. |
| Low-Power Mobile Memory | <p>LPDDR4/4X 100 BGA Mobile Memory</p> <ul style="list-style-type: none"> Data transfer rate reached 4267 Mbps, voltage reduced to 1.1V/0.6V to lower power consumption, featuring low power consumption and high performance. 100BGA package, compared to the standard 200BGA package, size reduced by 50%. The reduction in package size also means that carbon emissions related to the package can be reduced by 50%. | <ul style="list-style-type: none"> Automotive electronics, 5G mobile devices, wearable devices, IoT devices, and edge AI computing applications. |



Code Storage Flash Memory

Winbond is a leading manufacturer of flash memory, continuously striving to reduce the carbon footprint and power consumption of its products. For example, with the evolution of the process to the new generation of 45nm products, the area of a single die has been significantly reduced. In addition, the new generation of products also supports smaller packaging types, greatly reducing the carbon footprint of Flash products during wafer manufacturing and packaging stages. Taking the 128Mb NOR Flash in the new generation 45nm PW series as an example, its single die area is reduced to 50% of the 58nm product of the same capacity, and it can support smaller USON packaging. Ultimately, the carbon footprint is reduced by 18% compared to the 58nm FW series. Based on the sales volume of the new generation Serial NOR Flash in 2024, it saved 5.6 tCO₂e compared to the 58nm products.



Additionally, in terms of power consumption and extending battery life, Winbond developed new processes and circuit architectures. It introduced the world's first NOR Flash supporting an operating voltage of 1.2V. When paired with SoCs designed with advanced processes for low voltage, it achieved high-performance reading while significantly reducing power consumption, thus meeting the goals of high efficiency and energy savings.

| 1.2V NOR Flash | |
|----------------|--|
| | <p>Compared to the current 1.8V NOR Flash, the power consumption was reduced by 50%.</p> <p>Under the usage scenario of 8 hours of operation per day, with 80% reading, 10% standby, and 10% sleep mode, after 3 years of use, based on the total sales of 1.2V NOR Flash in 2024, it saved 537,948 kWh of power consumption (equivalent to 1,936,612 million joules) compared to 1.8V NOR Flash, approximately reducing 255 tCO₂e, which is equivalent to the carbon sequestration of 0.66 Daan Park for a whole year</p> |
| | <p>Performance</p> <p>Maintains similar transition level as 1.8V/3V Flash</p> |
| | <p>Product applications</p> <p>Wireless headphones, smart watches, smart wristbands, smart glasses, and other wearable devices with high power-saving requirements</p> |

Note Based on the emission factor of 0.474 kg CO₂e/kWh announced by the Ministry of Economic Affairs in 2024, and the data published by the Forestry and Nature Conservation Agency, Ministry of Agriculture and the Taipei City Government Land Administration Bureau: 25.93 hectares, carbon sequestration factor of 14.9 metric tons of CO₂e/hectare/year, Daan Park's annual absorption of 386 metric tons of CO₂e was calculated

Customized Memory Solution (CMS)

Winbond launched the 100 BGA LPDDR4/4x solution with high performance and low power consumption advantages. Its data transfer rate reached 4,267 Mbps, significantly improving data transfer speed compared to DDR4 3200 Mbps, resulting in superior performance. In terms of power consumption, LPDDR4/4x voltage was 1.1/0.6V, greatly reducing power usage. To meet the low power consumption needs of emerging mobile and smart devices, this series' low power consumption characteristics effectively extended battery life.

The solution adopted a smaller 100BGA package, reducing its size by 50% compared to the standard 200BGA package. The reduction in package size also meant that carbon emissions related to packaging could be reduced by 50%. The 100BGA package was fully downward compatible with existing 200BGA single die package (SDP). By adjusting the PCBA layout, customers could directly adopt this advanced memory packaging solution without large-scale rework, thereby reducing resource consumption. Additionally, to meet the low power consumption needs of emerging consumer trends such as wearable and smart devices, Winbond launched the 1.2V HYPERRAM, which saved 33% power consumption compared to the original 1.8V HYPERRAM. Combined with high transfer rates, it provided customers with competitive and long-lasting battery life design solutions for smart wearables.

In 2024, Winbond focused on the development of DDR4 niche memory and launched the first 20nm DDR4 product. Compared to DDR3, DDR4 offered higher bandwidth and lower power consumption, providing better performance and efficiency. It was widely used in high-end industrial computers and industrial control devices, high-specification television and audio-visual equipment, and enterprise-grade network equipment. Additionally, through the evolution of process technology nodes, the product's carbon emissions were reduced. The next-generation 16nm DDR4 product is expected to be launched in 2025.

LPDDR4/4X

Winbond's LPDDR4/4X DRAM, the fourth generation of low-power memory, achieved a data transfer rate of 4,267 Mbps. In terms of energy consumption, with the VDDQ voltage reduced to 1.1/0.6V, it significantly lowered power usage, effectively extending battery life and achieving high performance and energy-saving goals.

100BGA Form Factor

Winbond's latest packaging, 100BGA LPDDR4/4X, has a size of only 7.5x10 mm², which is 50% smaller compared to the 200BGA 14.5x10 mm², and reduces packaging-related carbon emissions by 50%. The 100BGA packaging is fully downward compatible with the existing 200BGA single-chip packaging, allowing for adjustments to the PCBA layout without requiring extensive rework, thereby reducing resource consumption.

DDR4

In 2024, Winbond launched the 20nm DDR4 product, which offers higher bandwidth and lower power consumption compared to DDR3, providing better performance and efficiency. With the advancement of process technology nodes, its process carbon emissions can continue to decrease, and the 16nm DDR4 product is expected to be launched in 2025.

Winbond foresees the market trends of new generation products and continuously invests resources in pursuing green semiconductor design, energy-saving and carbon-reducing production technologies, green energy production, and sustainable innovation of products, aiming to enhance the competitive advantage of green products while providing customers with high-quality products and service support.

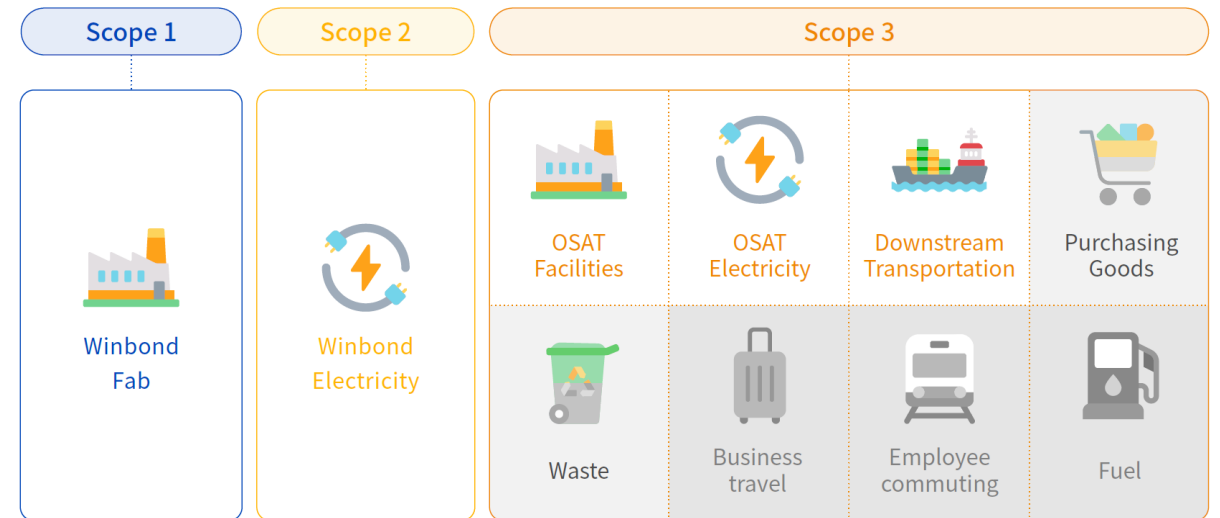
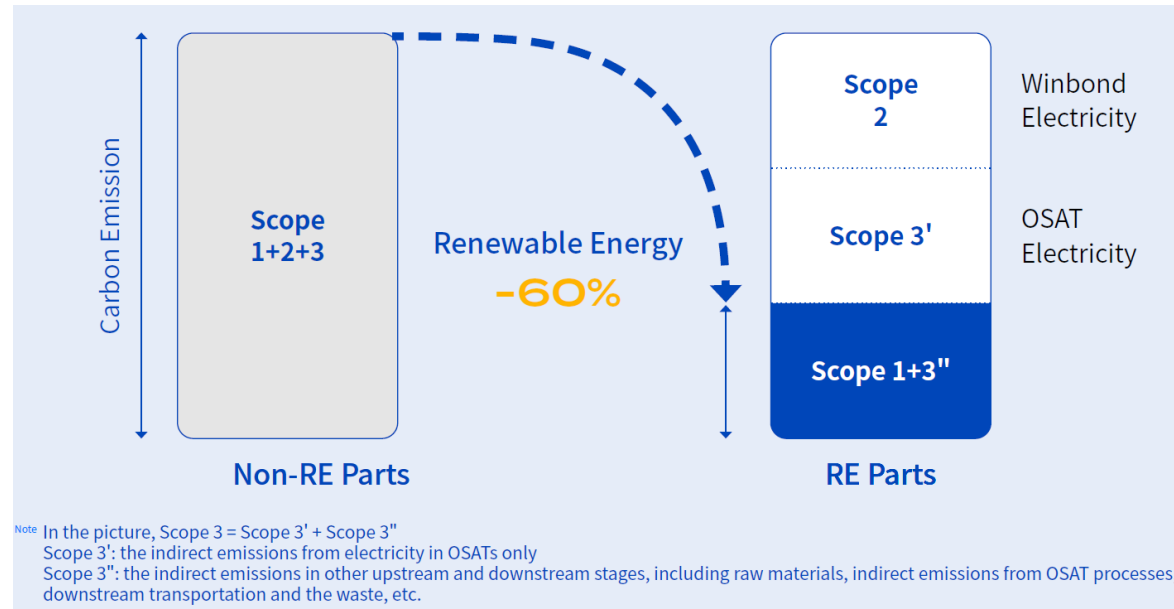
Winbond Green Product Manufacturing: Utilizing Renewable Energy for Product Manufacturing Demonstrates Commitment to Sustainable Development

Winbond actively promoted product innovation by reducing hazardous substances and carbon emissions in the manufacturing process, shortening production cycles, and lowering manufacturing costs. This approach helped develop smaller, more energy-efficient, and environmentally friendly products with low carbon emissions, while reducing the materials, electricity, carbon emissions, and power consumption of end devices during use, further reducing the carbon emissions of production electricity.

To further reduce the environmental impact of production and manufacturing, Winbond began using renewable energy for product manufacturing in 2024 and extended it to downstream packaging and testing plants. Green products manufactured with renewable energy represented the production and manufacturing at Winbond fabs, outsourced packaging plants, testing, and other processes, all powered by renewable energy, indicated by the 13th digit "G" in the product part number. Additionally, to effectively monitor carbon emission activities and achieve efficient real-time management, Winbond developed an advanced carbon accounting system. This system aggregated Scope 1 direct "indirect" greenhouse gas (GHG) emissions, integrating carbon emission information from manufacturing production and outsourced packaging and testing.

Winbond's products manufactured with renewable energy began mass shipments to key ESG-focused customers in December 2024, marking a significant milestone in aligning with ESG market trends and meeting the growing demand for green energy-saving products. These products manufactured with renewable energy had approximately 60% lower carbon emissions compared to those produced with conventional energy. As a leading supplier of green semiconductor memory, this move further demonstrated our commitment to sustainable development, aiming to achieve net-zero emissions by 2050.

We believe that the future of the planet is closely related to the sustainable development of enterprises. Therefore, ensuring innovation and environmental responsibility is crucial for driving corporate development. With the launch of products manufactured with renewable energy, Winbond has established an important milestone in its sustainability journey.



Establishing a Carbon Accounting System to Create a Green Future and Achieve Net Zero Emissions

Facing the increasingly severe challenges of climate change, countries around the world actively promoted carbon reduction policies, and enterprises faced multiple pressures from international regulations and internal and external demands. Achieving “Net Zero Carbon Emissions by 2050” had become a global consensus, and accurate carbon emission data management was the foundation for formulating effective emission reduction strategies.

To accurately grasp product carbon emission data, Winbond extended the concept of accounting systems to carbon data tracking with industry-leading innovation, developing a standardized and automated carbon accounting system for big data collection. This system realized the automation and standardization of carbon emission data collection, implemented product carbon inventory and carbon footprint systems, and provided in-depth analysis to assist in formulating product carbon emission reduction strategies. Through this well-constructed carbon accounting system, Winbond gradually moved towards the goal of net zero carbon emissions.

Investing in Carbon Data Management: The Cornerstone of Achieving Net Zero Carbon Emissions

The calculation and management of carbon emissions were the first steps in corporate carbon reduction actions. However, carbon data collection faced many challenges, including:

- **Large data volume:** Corporate operational activities involved many aspects, generating a large amount of carbon emission data, and collecting and organizing this data was a tedious task.
- **Complex calculation methods:** Calculating carbon emissions required different calculation methods based on various emission sources and activity data, posing high demands on corporate expertise and technical capabilities.
- **Lack of real-time information:** Traditional carbon data collection methods often relied on manual collection and organization, making it difficult to achieve real-time data updates and tracking, affecting corporate decision-making efficiency.

To overcome these challenges, Winbond extended the concept of accounting systems to carbon data tracking, developing an automated and standardized carbon accounting system that realized the automation and standardization of carbon emission data collection and provided in-depth analysis.

Establishing Winbond's Carbon Accounting System: Leading Green Transformation

Winbond's carbon accounting system aimed to comprehensively track and manage corporate carbon emissions, covering Scope 1, Scope 2, and Scope 3 emission sources, and provided data analysis and emission reduction strategy recommendations. The system had the following features:

- **Integration with existing systems to create a unified data platform:** The system integrated the company's existing accounting systems, combining carbon emission data with financial data, facilitating comprehensive analysis for the company.
- **Automated data collection to improve efficiency:** The automated data collection function could reduce manual input workload, improving data accuracy and efficiency.

The carbon accounting system was divided into three major sections:

Carbon Inventory System

Following ISO 14064 standards, it calculated the company's total carbon emissions, ensuring data reliability and comparability. It established a carbon emission database, developed calculation formulas, designed monitoring systems, and built analytical models. The system provided comprehensive carbon emission management tools, facilitating enterprises to track, analyze, and manage carbon emissions. It also offered strategies and recommendations for reducing carbon emissions, providing personalized reduction plans based on the actual situation of the enterprise.

Carbon Footprint System

Following ISO 14067 standards, it calculated the carbon emissions of products from cradle (raw materials) to gate (transportation), helping enterprises assess the environmental impact of products. The system evaluated the carbon footprint of products, understanding the environmental impact of products. Carbon footprint analysis helped enterprises identify the stages with the highest carbon emissions in the product life cycle and formulate corresponding reduction measures. It calculated the carbon emissions of each product based on direct attribution/allocation rules, enabling enterprises to more effectively formulate product carbon footprint management strategies.

Net Zero Emission Path and Management System (Under Construction)

Based on the aforementioned big data database, it helped formulate product carbon emission reduction strategies, moving towards the goal of net zero carbon emissions. The system's development came from the full investment of various departments of Winbond, leading the industry from scratch to establish Winbond's carbon accounting system. The entire company worked together for energy conservation and carbon reduction, creating Winbond's green culture.

Investing in Carbon Data Management: The Cornerstone of Achieving Net Zero Carbon Emissions

Scope 3 carbon emissions accounted for the largest proportion and were also the biggest challenge in carbon accounting. Scope 3 carbon emissions mainly came from the supply chain, so the carbon footprint data of supply chain partners was the cornerstone of carbon reduction. However, the carbon accounting system also faced some challenges in supply chain management:

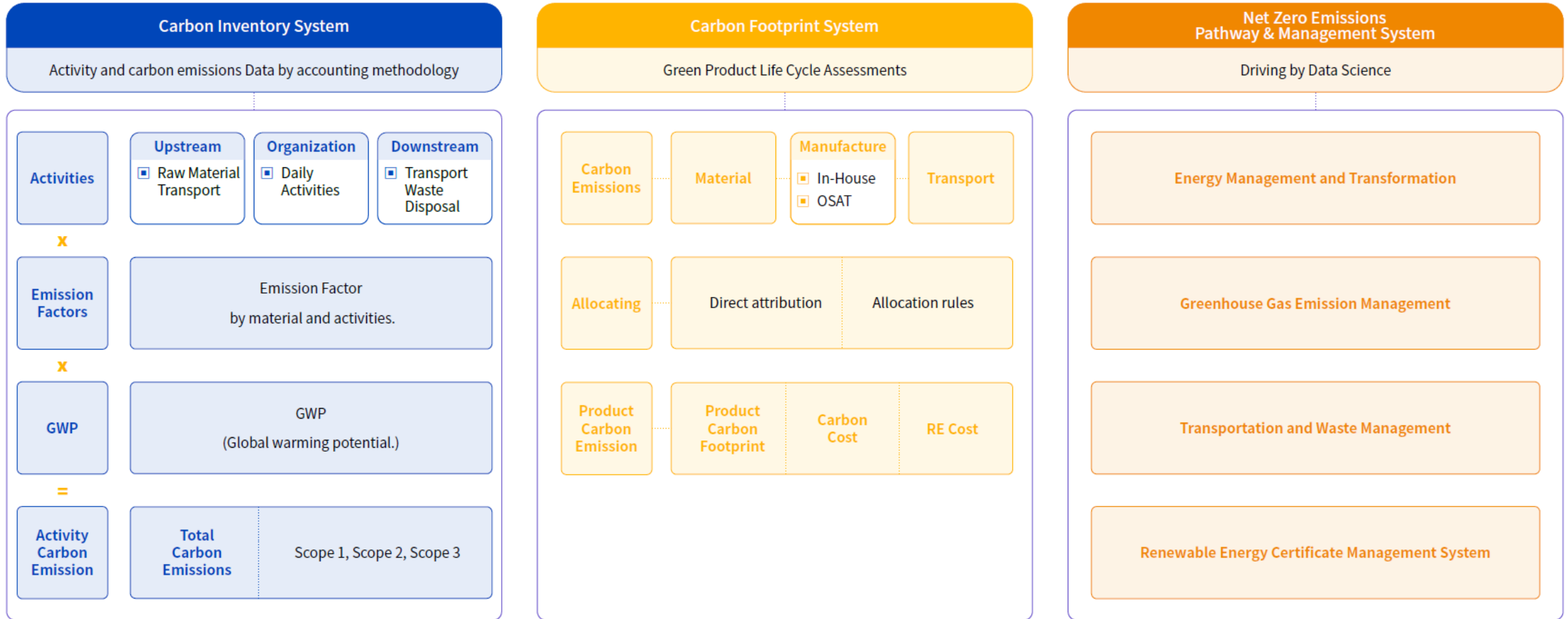
- **Data completeness:** Different suppliers might provide incomplete data, affecting the accuracy of overall carbon emission data.
- **Data accuracy:** Suppliers' carbon inventory capabilities varied, and data might have errors and inconsistencies.
- **Supplier participation:** Some suppliers might lack the motivation or resources to participate in carbon inventory, affecting the comprehensiveness of data collection.
- **Technical and methodological differences:** Different suppliers might use different technologies and methods to calculate carbon emissions, leading to data comparability issues.
- **Reporting frequency:** The frequency of suppliers reporting carbon emission data might be inconsistent, affecting the timeliness of data.

To address these challenges, Winbond actively cooperated with supply chain partners to promote the construction of a green supply chain, jointly moving towards the goal of net zero carbon emissions.

Future Outlook

The carbon accounting system is an important tool for enterprises to achieve the goal of net zero carbon emissions. To fully utilize its functions, enterprises need to continuously improve system functions and overcome challenges in data collection and management. At the same time, enterprises need to closely cooperate with supply chain partners to jointly promote the construction of a green supply chain to ultimately achieve the goal of sustainable development. In the future, Winbond will continue to improve the carbon accounting system and actively promote it to supply chain partners, jointly creating a green value chain and contributing to the goal of sustainable development.

Carbon Accounting System Architecture: Winbond's Carbon Accounting System aims to comprehensively track and manage the company's carbon emissions, covering Scope 1, Scope 2, and Scope 3 emission sources. It provides data analysis and emission reduction strategy recommendations. The system is divided into three main blocks: (1) Carbon Inventory, (2) Carbon Footprint, and (3) Net Zero Carbon Management System



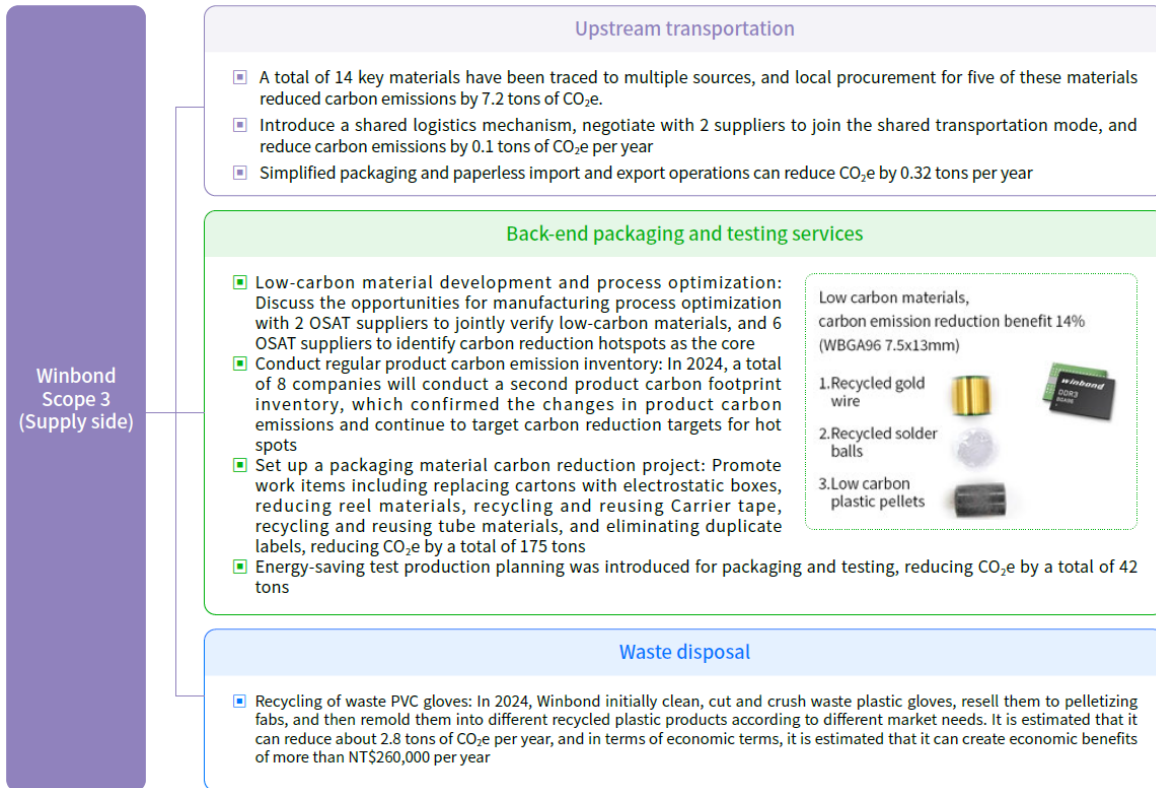
3.2 Green and Low-carbon Supply Chain

In order to effectively move towards the 2050 net-zero goal, in 2024, in addition to continuing to organize supplier ESG negotiation activities related to energy conservation and carbon reduction, Winbond expanded the scope of supply chain carbon reduction, and lead by example, starting from Scope 3 reduction, including upstream transportation, back-end packaging and measurement services, waste treatment, etc. The spirit of target setting and substantial carbon reduction drives the design of carbon reduction work of all units, hoping to achieve the target of 30% reduction by 2030. In view of this, in 2024, Winbond focuses on the promotion of green and low carbon supply chains, namely "Leading the Way - 2024 Internal Scope 3 Carbon Reduction " and "Diffusion and Impact - Low-carbon Supply Chain Governance".

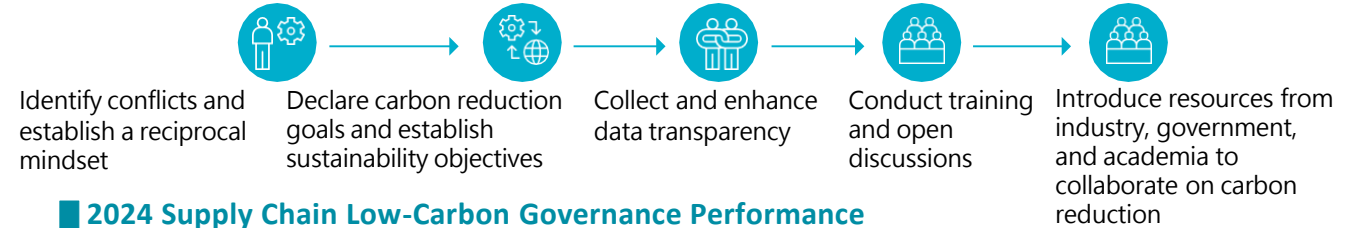
2024 Achievement Highlights

- The proportion of Tier-1 significant suppliers disclosing energy resource usage in sustainable supply chain surveys is > 95%.
- Assisting all OSAT suppliers in establishing renewable energy product production planning and manufacturing capabilities 100%.
- Achieved a Scope 3 carbon reduction of 228 tons of CO₂e.

Leading the Way - 2024 Internal Scope 3 Carbon Reduction Initiative



Low-Carbon Supply Chain Management Process



2024 Supply Chain Low-Carbon Governance Performance

| Low-carbon Management Promote Measures | 2024 Measures and Actions |
|---|--|
| Carbon Reduction and Resource Efficiency Commitments | By 2030, the supply chain must achieve a 10% carbon reduction <ul style="list-style-type: none"> Annual electricity consumption saving target of 1% 5% annual water saving target Annual waste reduction target of 1% |
| Supply chain energy resource usage disclosure | Winbond surveyed a total of 358 suppliers directly related to Winbond's Scope 3 emissions to review the achievement of annual electricity savings, water consumption, waste production, and progress in greenhouse-gas reduction. |
| Conduct Training and Open Discussions | Winbond held a total of 8 supplier ESG workshops and 2 sustainable supply chain upgrade + forums. From the perspective of thematic learning and benefiting suppliers, the scope of learning includes plant energy conservation, low-carbon footprint of raw materials, hydrogen energy application, data center carbon reduction, and supply chain SBTi reduction target setting and promotion. |
| Introduce Industry-Government-Academia Collaboration to Advance Carbon Reduction | <ul style="list-style-type: none"> In 2024, Winbond, in collaboration with its suppliers, increased the carbon reduction amount of the "Large Leads Small" project from 5,866 tons CO₂e to 9,500 tons CO₂e, expanding the impact of the industry demonstration project. Winbond hold Winbond Electronics Supply Chain Transformation Diagnosis Subsidy Briefing, and specially invite suppliers with small procurement amounts and insufficient transformation resources to participate. A total of 80 companies participated, with 92 participants contributing 184 person-hours of work. Strengthen the promotion of iPAS Net-Zero Carbon Emission Planning Administrator resources jointly organized by the Ministry of Economic Affairs and the Ministry of Education to help small and medium-sized suppliers alleviate the problem of sustainable talent shortage |

Note 1 The baseline year for energy resource conservation and carbon reduction in Winbond's supply chain is 2021, and only those who provide relevant supporting documents, statutory declaration materials, and those who have disclosed them for three consecutive years will be deemed to be valid

Note 2 Percentage of households achieving the savings target = Number of households achieving the savings target / Number of surveyed homes in the current year.

Note 3 Tier-1 significant Suppliers are those directly related to Winbond's Scope 3 Emission Category 4 (ISO 14064:2018)

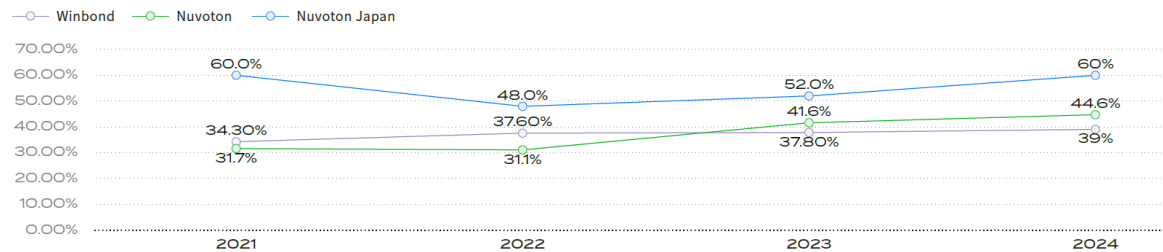
Local Procurement

we actively leverage the economic benefits generated by procurement activities to collaborate with existing and potential suppliers as long-term partners. In 2024, Winbond fully promoted economically beneficial sustainable procurement practices, including local procurement to reduce greenhouse gas emissions from international transportation, circular procurement to create material recycling and reuse, and green procurement to encourage domestic suppliers to provide Green Products/services.

To ensure the sustainability of Winbond's CTSP Fab, Kaohsiung Fab, Nuvoton, and Nuvoton (Japan) manufacturing, raw materials closely related to wafer manufacturing, including chemicals, gases, targets, and wafers, were the main focus of Winbond Group's promotion of local procurement. In 2024, Winbond Group faced external challenges such as climate change, reforms to international climate agreements, inflationary pressures, and geopolitical conflicts including the Russia-Ukraine and Israel wars; internally, to meet the needs of Winbond Group's green products and process improvements, in addition to setting management goals annually, we actively adjusted the procurement ratio of local raw material suppliers. Overall, Winbond Group made good progress in local procurement performance, including the proportion of local procurement of raw materials for Winbond increasing from 37.8% in 2023 to 39% in 2024, an annual increase of 1.2%; the proportion of local procurement of raw materials for Nuvoton increased from 41.6% in 2023 to 44.6% in 2024, an annual increase of 3%; the proportion of local procurement of raw materials for Nuvoton (Japan) increased from 52% in 2023 to 60% in 2024, an annual increase of 8%.

Examining Winbond's local procurement strategy for raw materials in 2024, it not only improved the economic benefits of local semiconductor suppliers but also significantly reduced international transportation, resulting in a reduction of over 7.2 tCO2e emissions. This clearly shows the sustainability benefits of the local procurement strategy for the overall industry. Looking ahead, Winbond Group will continue to explore the possibilities of localizing various raw materials and, through various sustainability agreements, encourage local semiconductor suppliers to develop green products/services, leveraging the scale of supply chain organizations to achieve the synergy of corporate sustainability.

Proportion of local procurement amount of raw materials



Green Procurement

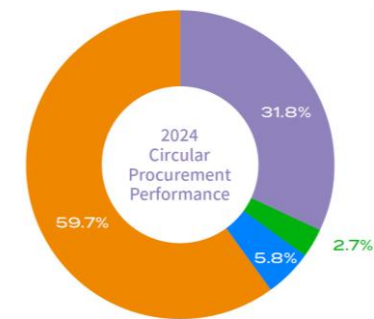
"Sustainable Living" is an eco-friendly lifestyle. In 2024, Winbond Group utilized its procurement power to effectively influence the supply side. In the production and manufacturing sector, the group gradually promoted the adoption of energy-saving, low-pollution, recyclable, reusable, and green building materials and equipment. On the employee lifestyle side, the group actively advocated the benefits of green living for individuals and the environment. In 2024, Winbond Group officially reported a green procurement amount exceeding NT\$265 million on the Green Procurement Declaration Platform of the Environmental Protection Administration of the Executive Yuan. In the future, to continue exerting the sustainable influence of green procurement on the environment, society, and economy, Winbond Group will not only continue to promote the benefits of green living but also seek suitable Green Products/services for administrative and manufacturing use.



Local Procurement

According to the EU's explanation of circular procurement, Winbond utilizes the concept of maximizing resource utilization efficiency emphasized by the circular economy's "Closing the Loop" to identify products or services that can generate circular economic benefits during the operations of the CTSP Fab and Kaohsiung Fab. By fully leveraging procurement bargaining power and negotiating with relevant suppliers, Winbond has achieved significant results. In 2024, through the recycling and sale of recyclable waste, including waste targets, quartz, waste wafers, O-rings, FOSBs, Mixed Metals/ Laptops/ Screens/ Iron/Circuit Boards, Winbond generated over NT\$6.52 million in revenue from recyclable waste sales, a 64% increase compared to 2023. Looking ahead, Winbond will continue to seek products that can be repaired, reused, or recycled during the procurement process, emphasizing resource utilization efficiency through circular procurement to promote the achievement of sustainable development goals.

2024 Circular Procurement Performance



- Target
- FOSB
- Idle waste material resale
- Mixed Metals/ Laptops/Screens/ Iron/Circuit Boards

OSAT suppliers Green Product Capability Building Project

With its corporate vision of "Being the hidden champion of sustainable semiconductors enriching human life", Winbond is prioritizing green products as the challenges of climate change and the urgent need for carbon reduction. In view of this, we have made full use of the advantages of supply chain collaboration and cooperation. Since 2022, we have actively negotiated with OSAT suppliers for back-end packaging and testing to jointly complete the manufacturing capacity of renewable energy products, and finally at the end of 2024, Winbond became the first memory manufacturer with the capability to produce products using renewable energy.

| | | | | | |
|--|---|---|--|---|---|
| <p>Step 1</p> <p>2021 2022</p> <p>Assist the OSAT supplier to have the ability to organize and conduct product carbon footprint inventory</p> | <p>Since 2021, Winbond has taken three major measures to build the overall carbon capability of the supply chain: first, it has actively negotiated with OSAT suppliers to set a 60% carbon reduction target and the concept of renewable energy product manufacturing; secondly, to conduct product carbon footprint inventory and verification for its own 12-inch wafer manufacturing and outsourcing packaging and testing services; Third, we need to hold regular meetings to keep track of the OSAT supplier's carbon reduction progress. In 2024, all of Winbond's OSAT suppliers in Taiwan have completed the product carbon footprint inventory of BGA, SOP, SON, WLCSP, and RDL, and will continue to identify opportunities for the reduction of carbon footprint coefficients for packaging and testing services. It is evident that Winbond and its OSAT supplier partners are working together to reduce the carbon emissions of their products.</p> | <p>Step 2</p> <p>2023 2024</p> <p>Call on OSAT suppliers to join the ranks of carbon data electronic data exchange empirical ranks</p> | <p>Based on the Pathfinder Framework proposed by the Partnership for Carbon Transparency (PACT) of the World Business Council for Sustainable Development, Winbond has partnered with the Institute for Digital Transformation of the Information Industry to act as an industry think tank. Winbond and its OSAT supplier partners play the role of industry demonstrators in the demonstration of carbon emission data exchange between heterogeneous platforms. In 2024, 100% of OSAT suppliers responded, which served as a significant industry demonstration in terms of carbon data streaming for manufacturing and outsourcing services.</p> | <p>Step 3</p> <p>2024</p> <p>Improve the ability of OSAT suppliers to produce and plan renewable energy products</p> | <p>Winbond leads the industry by using the manufacturing characteristics of its own self-made 12-inch wafers and outsourced packaging and testing services, and on the basis of supply chain collaborative planning and cooperation, it proposes to use a sustainable production operation management mechanism to create sustainable and comprehensive effects with supply chain characteristics in two major measures. In the future, on the one hand, carbon emission reduction within the supply chain can be achieved, and on the other hand, the green electric products required by customers can be delivered within the time limit.</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="1883 751 2135 927"> <p>Integration of Supplier Technical Capabilities Collaborated with engineering teams and packaging testing teams to develop new testing platforms and introduced energy-saving testing equipment.</p> </div> <div data-bbox="2148 751 2400 927"> <p>Establishment of Green Power Production Planning Broke the "quantity" mindset and established production planning that combines "quantity" and "green power".</p> </div> </div> |
|--|---|---|--|---|---|



2021-2022
ESG Requirements for OSATs Agreed Upon



2023-2024
OSAT suppliers join the ranks of carbon data electronic data exchange empirical activities



2023-2024
Share experience in supply chain carbon data management across industries (including ASUS, Taichung Precision Machinery, Institute for Information Technology, BCSD)



2024
The first batch of renewable energy products are ready to go



Supply Chain Sustainable Logistics and Low-Carbon Transportation

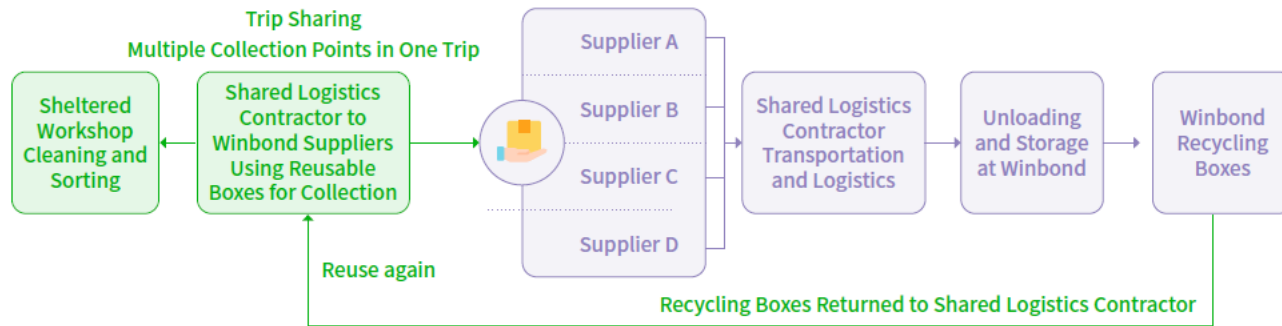
Logistics and transportation encompass both the "first mile" of inbound shipments from our suppliers to Winbond and the "last mile" of outbound deliveries to our customers. Winbond actively identifies all potential carbon reduction opportunities within our Scope 3 emissions, using supplier collaboration as a foundation to drive the planning and design of reduction initiatives. In 2024, Winbond officially launched a shared logistics system for inbound transportation from our suppliers. Looking ahead, we will leverage the strategic locations of our warehouses to plan efficient, low-carbon transportation for outbound shipments to customers.

Winbond's material supply side

resource recycling, sustainable logistics

In 2024, Winbond took the materials used in the factory (such as cleanroom gloves and masks) as the primary assessment, and negotiate with relevant suppliers to abandon carton packaging and use reusable recycling boxes to supply to Winbond's operating sites based on Winbond's annual consumption. In the shared logistics management model, the scale economy and low-carbon nature of transportation will be met by using trip sharing, and a total of 0.1 tons of CO₂e will be reduced by 2024. It is worth mentioning that the reusable recycling boxes will be handed over to the sheltered factories for cleaning and sorting after recycling, creating income and disadvantaged employment opportunities for sheltered factories, which is a logistics operation mode that can create comprehensive sustainable benefits. In the future, Winbond will actively negotiate with more suppliers to join the ranks of this shared logistics and apply the scale of the supply chain to improve its sustainable and comprehensive efficiency.

Shared logistics operation mode

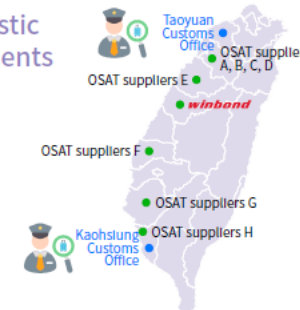


Winbond's product shipment

minus per trip, carbon emission reduction plus

Winbond adopts 12-inch wafer self-production and packaging and testing outsourcing in manufacturing, and adopts the direct delivery mode, and the semi-finished products and finished products are stored at the packaging and testing company, and the OSAT suppliers will carry out domestic and international shipments after the customer orders. In 2024, Winbond will explore opportunities for carbon reduction from digital management and entrepot operation. We have integrated the transportation route records, the addresses of each temporary storage point, the distance, the order weight, and the emissions per tonne-kilometer delayed for the whole year, optimized the transportation routes and shifts, reduced unnecessary trips, and ensured that the transportation vehicles can fully carry the cargo. In the future, we will continue to seek the sustainable development of low-carbon transportation in this model, in order to significantly reduce fuel consumption and carbon emissions.

Domestic shipments



International shipments



3.3 Energy and Greenhouse Gas Management

Winbond manages greenhouse gases and energy resources digitally through data governance. In 2020, Winbond began data sorting and inventory work to establish systematic management, and in 2023, expanded it to subsidiaries, gradually improving data management capability. Based on the inventory results, Winbond took various reduction actions and regularly tracked various data.

Energy Management

Winbond adhered to the vision of "Being a hidden champion in providing sustainable semiconductors to enrich human life." fulfilling its green manufacturing responsibilities and reducing the environmental impact of operations, enhancing product value while conserving energy and improving efficiency, and investing resources to support equipment energy optimization, aiming to fulfill social responsibility and achieve sustainable operations.

CTSP Fab obtained the ISO 50001 Energy Management System certification in 2022, effectively institutionalizing engineering management, while the newly built Kaohsiung Fab also introduced ISO 50001 in 2023, expanding the scope and benefits of energy management, and obtained certification in 2024.

Energy Management Programs

- 1 Energy Audits:** Conduct comprehensive energy reviews to identify opportunities for improving energy performance, including inspecting equipment operation, analyzing energy consumption data, and identifying potential energy-saving measures.
- 2 Energy-saving Targets:** Establish specific energy-saving reduction targets to help systematically advance various energy-saving action plans and ensure measurable and trackable results.
- 3 Energy-saving Actions:** Implement a series of actions, such as replacing high-efficiency equipment, optimizing production processes, and improving facility energy efficiency.
- 4 Regular Evaluation and Continuous Improvement:** Regularly evaluate the progress of energy-saving actions to ensure each action can be advanced as planned and achieve the expected results. Evaluation results provide feedback for timely adjustment and continuous improvement.
- 5 Use of Green Energy:** Prioritize the use of clean green energy, such as solar and wind energy, to further reduce our carbon footprint and environmental impact.
- 6 Innovative Research and Development:** Increase investment in innovative technology and research projects to seek new solutions to reduce energy consumption, improve energy efficiency, and promote sustainable development.
- 7 Sustainable Culture:** Foster a culture of environmental responsibility among all employees, provide energy efficiency training to management, employees, suppliers/contractors, and expand value chain cooperation to foster a sustainable environment.

Energy Usage

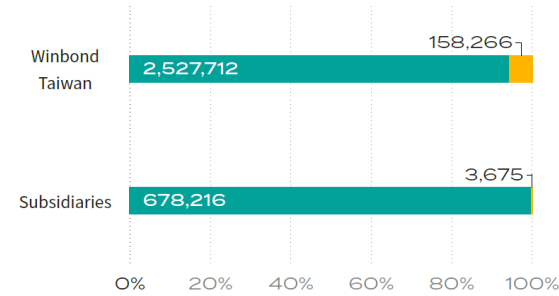
In recent years, due to the expansion of the Kaohsiung Fab and the addition of new equipment, the consumption of various raw materials and fuels has shown an upward trend. In 2024, Winbond(Taiwan)'s total energy consumption was approximately 3,085,408 gigajoules, while the subsidiaries' total energy consumption was approximately 963,369 gigajoules.

The energy consumption indicator for unit products in 2024: The average power consumption per layer of mask for producing 12-inch wafers was 85.8 megajoules, compared to 100.7 megajoules in 2023, the unit product power consumption decreased by approximately 14.8% YoY (megajoules/layer-mask). The power saving rate in 2024 was 3.5%, and the energy power reduction target for 2025 is to reduce the average power consumption per layer of mask for producing 12-inch wafers to below 89.7 megajoules. In the future, Winbond will continue to promote energy-saving projects such as equipment replacement, consumption reduction, process optimization, smart energy saving, and efficiency improvement to increase environmental sustainability benefits.

Energy Usage

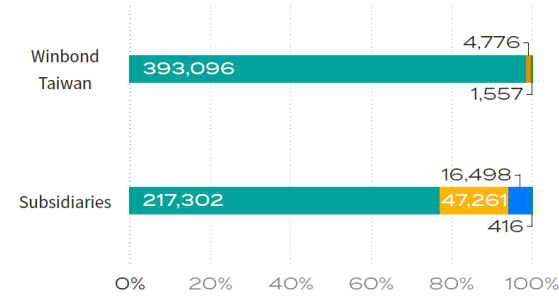
Electricity Usage (GJ)

- Purchased Electricity (excluding renewable energy)
- Renewable Energy (electricity)



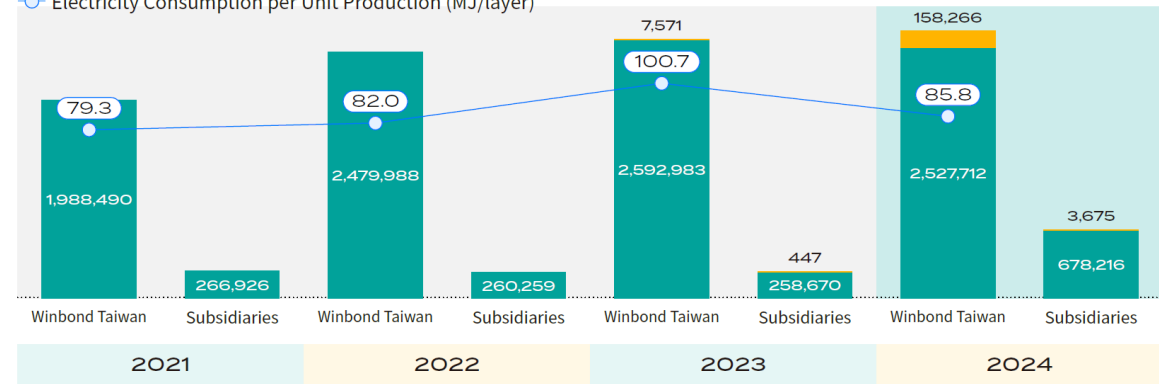
Fuel Usage (GJ)

- Natural Gas
- Liquefied Petroleum Gas
- Diesel
- Fuel Oil (Heavy Oil)
- Vehicle Gasoline/Diesel



Electricity Usage (GJ)

- Purchased Electricity (GJ) excluding renewable energy
- Renewable Energy (GJ) electricity
- Electricity Consumption per Unit Production (MJ/layer)



Note 1 Energy consumption has been converted to joules. Except for natural gas, which is calculated based on the calorific value provided by the supplier, all other energy sources are calculated using the greenhouse gas emission coefficients announced by the Ministry of Environment and Climate Change. Electricity 1 kWh = 3,600 kJ, natural gas 1 cubic meter = 8,853 kcal, liquefied petroleum gas 1 liter = 6,635 kcal, fuel oil 1 liter = 9,600 kcal, diesel 1 liter = 8,642 kcal, gasoline 1 liter = 7,609 kcal, 1 calorie = 4.184 joules.

Note 2 Energy consumption is derived from measured values on billing receipts, monthly natural gas consumption settlement tables, and material inventory change verification tables by material number, with no estimated values.

Note 3 From 2021 to 2023, the scope was Winbond (Taiwan) and Nuvoton (Taiwan); in 2024, the scope was Winbond Group.

Renewable Energy Promotion

In 2023, Winbond completed its first renewable energy procurement.

Winbond expanded its renewable energy portfolio and made its first renewable energy procurement in 2023, acquiring onshore wind power, which is expected to provide Winbond with nearly ten million kWh of renewable energy annually, exceeding the annual electricity consumption of Winbond (Taiwan)'s non-manufacturing sites.

In 2024, Winbond continued to purchase diverse power sources.

In February 2024, Winbond signed a corporate power purchase agreement with Chenya Energy Co., Ltd., obtaining 27 MW of solar power from offshore floating solar farms starting in April. The total power supply during the five-year contract period is expected to reach approximately 175 million kWh, with carbon reduction benefits equivalent to the annual carbon absorption of 490 Da'an Forest Parks, and can supply the annual electricity consumption of 43,000 households.

In August 2024, Winbond signed a corporate power purchase agreement with Energy Helper TCC Corporation, to obtain a total of 9.24 MW of onshore wind power in September and October of the same year.

In November 2024, Winbond's board of directors approved the signing of a long-term renewable energy power purchase agreement with Sustainable Energy Solution Co., Ltd.(SES), renewable energy provider under Sino-American Silicon Products Group(SAS). Starting with the completion of the first phase of third-stage development project, SES will supply Winbond with offshore wind and solar power. This 30-year collaboration is expected to deliver approximately 4.8 billion kWh of renewable energy. This cooperation represents the first transaction in Taiwan in which offshore wind power is sold renewable energy provider to a domestic enterprise, demonstrating Winbond's determination to advance on the path to net zero. This cooperation not only covers offshore wind power but also extends to the supply of solar photovoltaic power, helping meet the company's green power needs at year round through the complementary characteristics of both sources. This move is anticipated to help Winbond reduce approximately 80,000 metric tons of carbon dioxide emissions annually, with a cumulative reduction of 2.4 metric million tons over 30 years, marking a significant step toward sustainable development and net zero carbon emissions.



Establishment of Self-Generated Renewable Energy Power Devices

In response to the government's active promotion of green energy policies, Winbond Group has continuously invested in the development and utilization of renewable energy. In 2019, Winbond took the lead in installing a 499 KW rooftop solar power generation device at its fab, and in 2024, the generated power was converted for self-use, supporting green manufacturing. Nuvoton also followed suit, completing the installation of an 819 KW self-use solar power generation device in 2023.

In the future, Winbond Group will continue to evaluate the expansion of renewable energy device capacity, gradually increasing renewable energy use and progressing toward the goal of becoming a green enterprise.

In 2024, Winbond’s renewable energy usage reached 43.96 million kWh, and obtained 43,961 renewable energy certificates.



Energy Conservation Plan

In 2024, Winbond employees implemented 129 energy-saving measures through benchmarking, precise control, and technical cooperation. These measures were categorized into six major types: equipment replacement, machine modification, efficiency improvement, usage reduction, process optimization, and smart energy saving. Among them were process improvements, optimization of the MAU (Make-up Air Unit) washing system, enhancement of air compressor operation efficiency, and replacement of energy-saving motors. Compared to 2023, this resulted in an increase of approximately 94,650 gigajoules, equivalent to approximately 26.3 million kWh—roughly the annual electricity consumption of 7,503 households.

Note The calculation basis is Taiwan Power Company - the average annual household electricity consumption in 2018 was 3,504 kWh, approximately 12.6 billion joules.

| Type | Action (Example) | Measures | Electricity Savings (10,000 kWh) | Gigajoules | Emission Reduction (tCO ₂ e) |
|------------------------|--|----------|----------------------------------|------------|---|
| Equipment Replacement | <ul style="list-style-type: none"> Replacement of energy-efficient motors; Replacement of energy-efficiency heating/cooling equipment | 17 | 1,513 | 54,464 | 7,474 |
| Usage Reduction | <ul style="list-style-type: none"> Machine heating/cooling equipment settings; Optimized machine exhaust reduction | 20 | 223 | 3,830 | 526 |
| Machine Improvement | <ul style="list-style-type: none"> Enhanced insulation of machine heating/cooling systems; Replacement of energy-saving components in machines | 13 | 106 | 16,715 | 2,294 |
| Process Optimization | <ul style="list-style-type: none"> Switching machine cooling to PCW cooling water circulation; Optimization of vacuum pumps and ovens usage time | 62 | 9 | 8,039 | 1,103 |
| Efficiency Enhancement | <ul style="list-style-type: none"> Enhanced MAU System Performance; Enhance the plate heat exchanger efficiency of PCW | 12 | 464 | 338 | 46 |
| Smart Energy Manageme | <ul style="list-style-type: none"> AI smart air-conditioning | 5 | 313 | 11,264 | 1,546 |

Note 1 The base year is 2021.

Note 2 The electricity carbon emission factor is 0.494 kg CO₂ equivalent/kWh.

• Case Study: Energy Conservation

The MAU Water Washing System

The MAU (Make-up Air Unit) water washing system introduced new nozzles, low-power energy-saving motors, wet plates, and guide plates, which reduced circulating water flow, pump power, and fan pressure loss, thereby decreasing pump and fan motor energy consumption which reduced circulating water flow, pump power, and fan pressure loss, thereby decreasing pump and fan motor energy consumption by 56%, saving approximately 3.06 million kWh annually.



New Type of Nozzle

High-Efficiency Nozzle

- Improved Washing Efficiency
- Reduced Number of Nozzles

Low-Power Energy-Saving Motor

Replaced Large Pump with Small Pump

- Installed Low-Power Pump
- Reduced Energy Consumption

Wetting Plate

High-Efficiency Low-Pressure Loss Wetting Plate

- Introduced New Wetting Plate
- Reduced Airflow Pressure Loss

Deflector

Replaced Baffle with Deflector

- Introduced New Deflector to Improve Airflow Distribution
- Reduced Airflow Pressure Loss

Improving Air Compressor Operational Efficiency

As the ambient temperature rises, air density decreases, causing the air compressor to compress more air to achieve the same compression ratio, increasing energy consumption. Winbond maintained appropriate ambient temperature and intake temperatures to preserve the compression ratio and operational efficiency of air compressors, reducing energy consumption by 7%, equivalent to saving approximately 840,000 kWh annually.

Strengthening the ventilation of the computer room environment

- Improving overall air exchange in the computer room to reduce ambient temperature

Independent exhaust for air compressors

- Adding independent fans and exhaust ducts to lower the temperature

Insulation for dryers

- Adding insulation cotton and aluminum skin insulation to prevent heat source dispersion

Greenhouse Gas Management

Winbond actively cooperates with the government's corporate greenhouse gas inventory registration efforts, implemented greenhouse gas management mechanisms within the fab, and conducted ISO 14064-1 greenhouse gas inventory using the operational control method. Winbond and its subsidiaries have comprehensively promoted the inventory and verification of greenhouse gas emissions, set reduction targets, identified reduction opportunities, and proposed improvement plans.

Winbond has set greenhouse gas emission reduction targets, aiming to reduce Scope 1 and Scope 2 emissions by 42% by 2030 (base year 2023). In 2024, Scope 1 and Scope 2 emissions were reduced by 1.1%. The greenhouse gas emission intensity indicator for 2024 was 12.7 kg CO₂ equivalent, compared to 15.5 kg CO₂ equivalent in 2023, representing a year-on-year reduction of approximately 18.1%. In the future, Winbond will continue to promote the reduction of process gases such as FCs (e.g., process improvements and installation of exhaust treatment equipment), energy-saving measures (process optimization, efficiency improvement, and smart energysaving), and the use of renewable energy to continuously reduce carbon emissions.

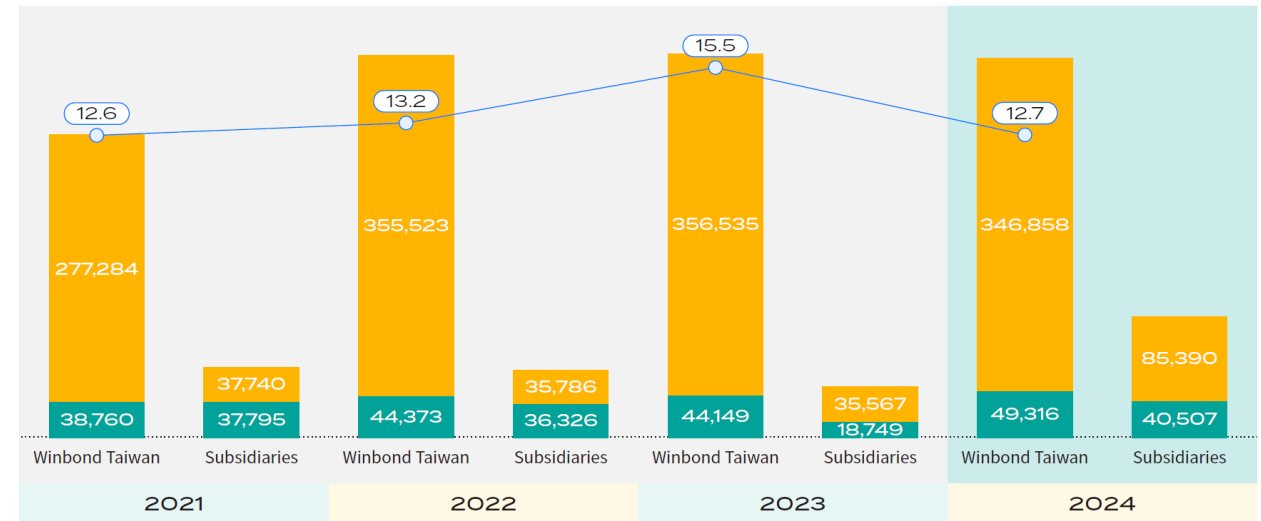
Greenhouse Gas Inventory

Winbond continued to expand the scope of greenhouse gas management, fully implementing ISO 14064-1 greenhouse gas emissions inventory and verification at its Taiwan locations. Each year, Winbond conducts regular inventories of greenhouse gas emissions at each fab to monitor carbon emissions and verify the effectiveness of reduction actions. Starting in 2024, Winbond began including data from subsidiaries in its consolidated financial statements.

| 2024 Greenhouse Gas Emissions | | Scope 1 | Scope 2 | Scope 3 |
|-------------------------------|-------------------------------|---------|---------|---------|
| Winbond (Taiwan) | Emission (tCO ₂ e) | 49,316 | 346,858 | 405,474 |
| | Percentage | 6% | 43% | 51% |
| Subsidiaries | Emission (tCO ₂ e) | 40,507 | 85,390 | 571,768 |
| | Percentage | 6% | 12% | 82% |

Scope 1 and Scope 2 Emissions

● Scope 1 (tCO₂e) ● Scope 2 (tCO₂e) ○ Emission Intensity (kgCO₂e/layer)



Note 1 Winbond increased the reporting boundary in 2023 to include consolidated financial statement subsidiaries (Nuvoton (Taiwan)) to obtain more comprehensive emission information. Therefore, the base year for greenhouse gas inventory was tentatively set as 2023.

Note 2 The global warming potential (GWP) sources for 2021 and 2022 were from the IPCC Fourth Assessment Report (2007), while those for 2023 and 2024 were from the IPCC Fifth Assessment Report (2019). The subsidiary's 2024 sources were from the IPCC Sixth Assessment Report (2021).

Note 3 The types of greenhouse gases included nitrous oxide (N₂O), methane (CH₄), carbon dioxide (CO₂), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆), and nitrogen trifluoride (NF₃).

Note 4 All energy consumption data were derived from measured values on billing receipts, monthly natural gas consumption settlement tables, material requisition forms, and AS400/ inventory change verification tables by material number, with no estimated values.

Note 5 Coefficient sources: Uncertainty data for emission factors were referenced from the latest version of the Climate Change Office's greenhouse gas emission factors, and the uncertainty assessment of activity data was referenced from the calibration and inspection technical specifications of metrology instruments.

Note 6 The 2024 values were estimates, as the 2024 electricity coefficients had not yet been announced.

Note 7 From 2021 to 2023, the scope was Winbond (Taiwan) and Nuvoton (Taiwan); in 2024, the scope expanded to include the entire Winbond Group.

• **Scope 3 Emissions Sources**

| Type of Emissions | 2024 Scope 3 Emissions (tCO ₂ e) | |
|--|---|--------------|
| | Winbond(Taiwan) | Subsidiaries |
| Purchased goods and services | 323,883 | 382,937 |
| Fuel and energy-related activities | 74,237 | 184,930 |
| Upstream transportation and distribution | 1,433 | 1,253 |
| Waste generated in operations | 2,570 | 135 |
| Business travel | 372 | 1,185 |
| Employee commuting | 2,980 | 1,328 |

Greenhouse Gas Reduction

Greenhouse Gas Reduction Strategy

Winbond's primary greenhouse gas emissions come from fluorinated gases (Fluorocarbons, FCs) used in processes and purchased electricity, accounting for over 90% of Scope 1 and Scope 2 greenhouse gas emissions. Therefore, reducing direct emissions of FCs (process improvements and installation of exhaust treatment equipment), indirect emissions through energy-saving measures, and using renewable energy are crucial strategies for reducing greenhouse gas emissions. Winbond plans to promote various carbon reduction projects and improve energy efficiency, establish a carbon emission information platform to integrate and manage carbon emission information, and achieve "Green low-carbon" is redundant and vague low-carbon production. Additionally, Winbond will respond to the Science Based Targets initiative (SBTi) by planning to use 50% renewable energy in Winbond (Taiwan) by 2030 and reduce Scope 1 and Scope 2 greenhouse gas emissions by 42% (based on 2023 levels), aiming for net-zero emissions at all fabs by 2050.

Action Plan

Winbond is committed to green semiconductor manufacturing, implementing process improvements to reduce greenhouse gas usage. Specific action plans include accelerating the replacement of energy-saving components and installing exhaust treatment equipment at the equipment end, implementing energy-saving projects for production machines and facilities, using renewable energy, and reducing the consumption of gas and chemical raw materials. The scope of new projects in 2024 covers Scope 1, 2, and 3, which can further reduce 26,860 metric tons of CO₂ equivalent emissions annually (Scope 1: 2,537 metric tons of CO₂ equivalent emissions; Scope 2: 12,989 metric tons of CO₂ equivalent emissions; Scope 3: 11,334 metric tons of CO₂ equivalent emissions), equivalent to the annual carbon sequestration of approximately 70 Daan Forest Parks.

Note According to data from the Forestry and Nature Conservation Agency and the Taipei City Government's Department of Land Administration, Daan Forest Park covers 25,894 hectares and has a carbon fixation rate of 1.7 CO₂e per hectare per year. As a result, the park contributes to the area via absorption of approximately 363 CO₂e

Reduction of Fluorinated Greenhouse Gases

Winbond has participated in the Perfluorocarbons (PFCs) greenhouse gas emission reduction program of the Taiwan Semiconductor Industry Association (TSIA) and the World Semiconductor Council (WSC) since 2000. Through process adjustments, the use of alternative gases, and the installation of fluorinated greenhouse gas (FCs) reduction equipment, Winbond reduced greenhouse gas emissions by approximately 242,000 metric tons of carbon dioxide equivalent in 2024. This effort has lowered climate risk impacts, enhanced Winbond's ability to adapt to climate change, and increased industry competitiveness, creating value.



3.4 Water Management

Winbond adheres to the vision of "Being a hidden champion in providing sustainable semiconductors to enrich human life." fulfilling the responsibility of green manufacturing, reducing the impact and influence of corporate operations on the environment, aiming to fulfill social responsibility and sustainable management.

Water Resource Efficiency Policy

- ✓ All employees participate in water conservation, promoting awareness of water resource management.
- ✓ Prioritize water-saving designs and continuously improve water resource efficiency.
- ✓ Recycle and reuse water resources to ensure the achievement of water resource goals.
- ✓ Strictly comply with government regulations and conduct regular reviews of water resource management.

Water Resource Risk Assessment

To understand the water resource risk situation, Winbond uses the World Resources Institute (WRI) water risk assessment tool, adopting the "Aqueduct Water Risk Atlas" through the AQUEDUCT website to analyze the distribution of water resources in Taiwan, understanding that all Taiwan operation sites are located in low-risk areas for water resource pressure.

Water Resource Efficiency Management Guidelines

- **Identify water-saving hotspots:** Identify high water consumption points in the production process and continuously identify opportunities for water conservation and recycling within the company.
- **Water-saving action plan:** Implement a series of action plans, such as adopting water-saving designs, optimizing production processes, and improving the water efficiency of facilities.
- **Water pollution prevention:** Minimize harmful substance use and reduce sources of process waste water, and properly treat wastewater to reduce or remove pollutant emissions, complying with regulatory standards.
- **Water resource management targets:** Ensure the safety of drinking water in the communities where operations are located; set specific water-saving targets to help systematically advance various water-saving action plans and ensure measurable and traceable results.
- **Water recycling measures:** Continuously improve the reuse rate of recycled water, develop diverse alternative water sources, and take actions to reduce water intake and consumption.
- **Sustainable culture:** Foster a culture of environmental responsibility among all employees, provide environmental education and awareness training to management, employees, suppliers/contractors, expand value chain cooperation and sharing, raise awareness and accountability of internal and external stakeholders for environmental sustainability, exert social influence, and jointly protect the integrity of terrestrial, freshwater, and marine ecosystems, creating a beautiful sustainable environment.

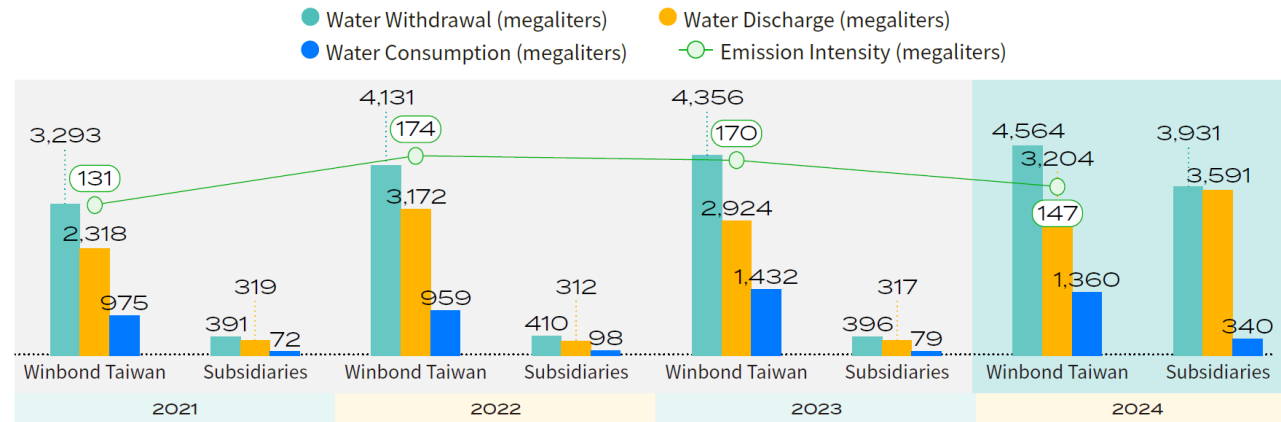


Water Withdrawal, Discharge, and Consumption

Winbond's water sources mainly come from tap water supplied by Taiwan Water Corporation, sourced from Liyutan Reservoir, Deji Reservoir, and Agongdian Reservoir, with a small portion coming from rainwater and air conditioning condensate. After the water shortage issue in 2021, Winbond has found stable natural water sources, and the fab has an underground reservoir with a capacity of 75,000 cubic meters, sufficient to support fab operations during water shortage and restriction crises. In 2024, Winbond received a B rating in the CDP water security evaluation.

In 2024, Winbond's total water consumption was approximately 4,564,136 cubic meters, with the unit product water consumption indicator – the average water consumption per layer of photomask for producing 12-inch wafers being 147 liters, compared to 170 liters per layer of photomask in 2023, the unit product water consumption YoY decreased by about 13.5%, and will continue to optimize the efficiency of the recycled water system and improve water efficiency.

• **Water Withdrawal, Discharge, and Consumption**



Note 1 The third-party water source comes from surface water (freshwater ≤ 1,000 mg/L total dissolved solids); the total water withdrawal calculation method is the sum of surface water (total), groundwater (total), seawater (total), produced water (total), and third-party water (total).

Note 2 From 2021 to 2023, the scope was Winbond (Taiwan) and Nuvoton (Taiwan); in 2024, the scope was Winbond Group.

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Rainwater and Condensate - Diverse Alternative Water Sources

Rainwater and condensate are also alternative water resources that can be utilized, and proper collection and use can reduce the impact on environmental water resources. Winbond's rainwater and condensate are mainly used for irrigation and secondary water use, with a usage of 0.26 megaliters in 2024.

Water Conservation and Recycling

The long-term goal of water resource management is to achieve an average annual water recycling rate of over 80% across the entire fab by 2030. In 2024, the water recycling volume reached 13.68 million cubic meters, with a fab-wide water recycling rate of 81.9% and a process water recycling rate of 89.3%, meeting the commitments of the Science Park environmental impact assessment (fab-wide water recycling rate greater than 77%, process water recycling rate greater than 85%).

Water-saving measures

Winbond continued to increase the reuse rate of recycled water, implementing 10 new water-saving measures in 2024, resulting in an increase of approximately 155,000 cubic meters of water saved. From 2019 to 2024, the cumulative water savings reached approximately 4,880 megaliters, equivalent to about 0.97 times the effective capacity of Baoshan Reservoir.

Introduction of ISO 46001 Water Resource Efficiency Management System

Winbond implemented ISO 46001 in 2023, with the Taichung Fab obtaining certification in January 2024 and the Kaohsiung Fab obtaining certification in October 2024. Through the ISO 46001 Water Resource Efficiency Management System, Winbond effectively managed the related risks of water resource supply, measured and monitored water resource usage, improved overall performance, and reduced water resource consumption to minimize environmental impact.

ISO 14046 Water Footprint Verification

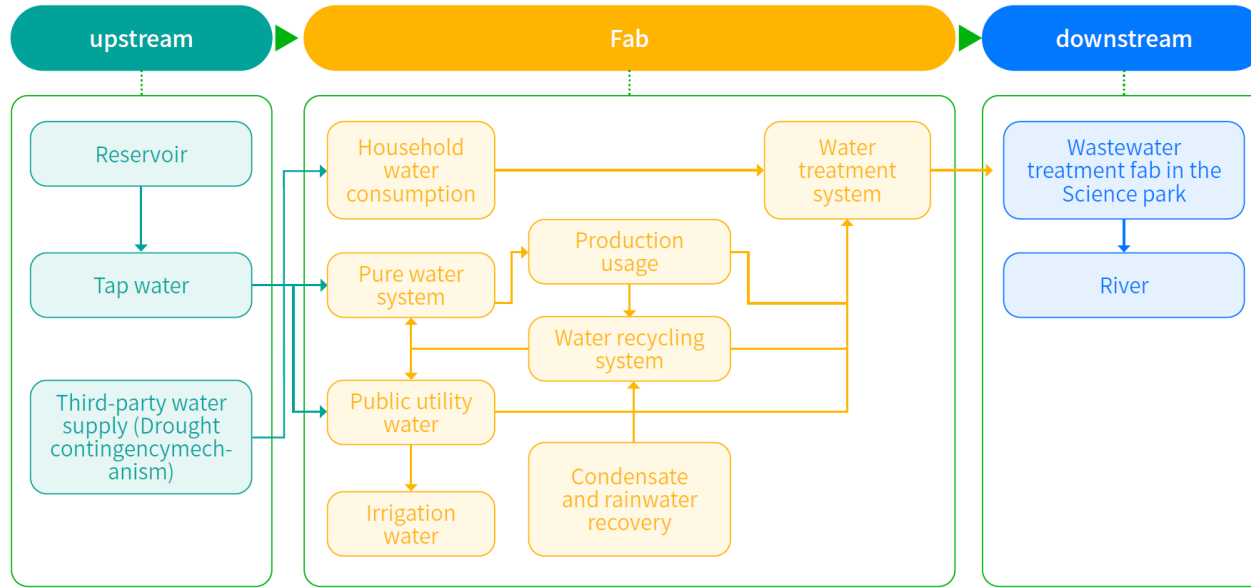
Winbond conducts ISO 14046 water footprint verification every three years. In February 2025, Flash and DRAM Wafer products passed the verification, further enhancing Winbond's product water management.

• 2024 Water Conservation Measures (Unit: megaliters/Year)

| Item | Conservation Project | Description | Water Savings |
|------|--|---|---------------|
| 1 | Water Conservation and Drought Resistance Measures | Reduced tap water usage by using recycled water in cooling towers | 59.3 |
| 2 | Water-saving in process equipment | Adjusted parameters of process equipment to achieve water reduction | 41.0 |
| 3 | Water-saving in exhaust gas treatment equipment | Adjusted parameters of exhaust gas treatment equipment to achieve water reduction | 22.8 |
| 4 | Water-saving through optimization of fab system procedures | Extended the operating hours of pure water system units to achieve water reduction | 11.0 |
| 5 | Automation of RO membrane chemical cleaning in wastewater ROR recycling system | Precisely controlled the amount of tap water used for automatic backwashing | 6.1 |
| 6 | Improvement of RO water production rate in UPW system | Adjusted parameters to increase RO water production and reduce tap water usage | 5.5 |
| 7 | Water-saving in CMP Brush idle rinse | Reduced UPW water usage in Brush idle rinse | 5.2 |
| 8 | Reduction of drainage in cooling tower sand filter system | Reduced the frequency of backwashing in sand filter systems to reduce tap water usage | 1.4 |
| 9 | Reduction of soft water usage in WET Local Scrubber | Reduced soft water usage in Local Scrubber washing | 1.4 |
| 10 | Reduction of water usage in WET FOUP cleaner | Reduced UPW water usage in Tool idle | 0.8 |

Note: The scope of water conservation measures statistics is the Winbond (Taiwan) fab.

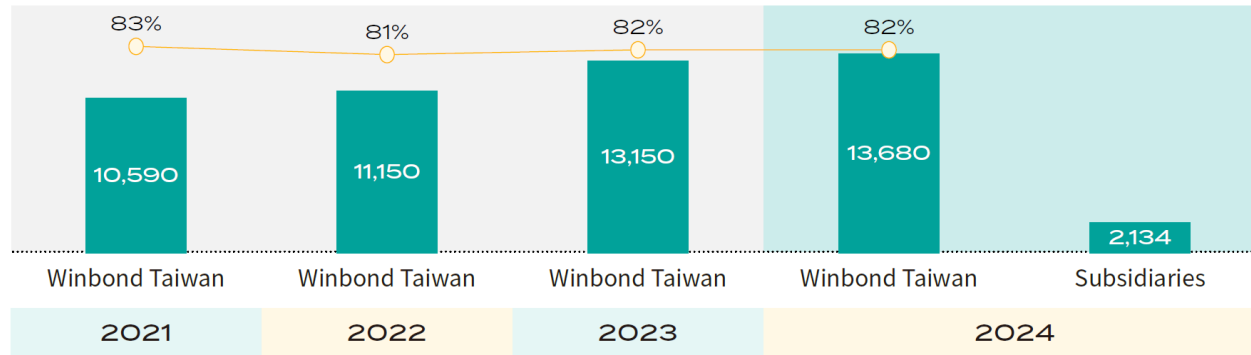
• Site Water Usage Process



Note Public utility water includes the following: cooling tower circulating water and central/local scrubber circulating water.

• Water Recovery

● Water Recovery Volume (megaliters) ○ Winbond Taiwan Recovery Rate (%)



Note Fab water recovery rate= (Recycled Condensate + Recycled Process Water + Recycled Reclaimed Wastewater) / (Tap Water + Recycled Condensate + Recycled Process Water + Recycled Reclaimed Wastewater -Evaporation).

• Case Study: Water Conservation

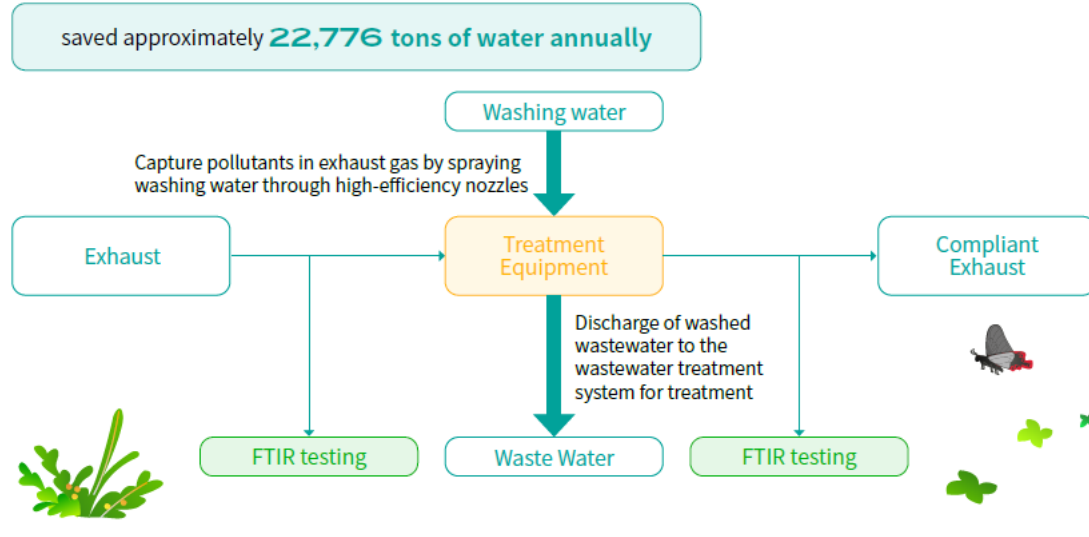


Water-saving in exhaust gas treatment equipment

In response to the advancement of semiconductor process technology, the consumption of water resources in the manufacturing process has gradually increased, making the reasonable management of water resources an urgent issue. Winbond is committed to achieving water conservation through various measures. Collaborating with exhaust gas treatment equipment manufacturers, Winbond gradually reduced the washing water flow for exhaust gas treatment equipment with lower loads, while simultaneously conducted emission concentration tests to ensure that the test results meet the requirements. This can save approximately 22,776 tons of water annually. While meeting emission requirements, this effectively reduced water usage and wastewater discharge.



Schematic diagram of exhaust treatment equipment

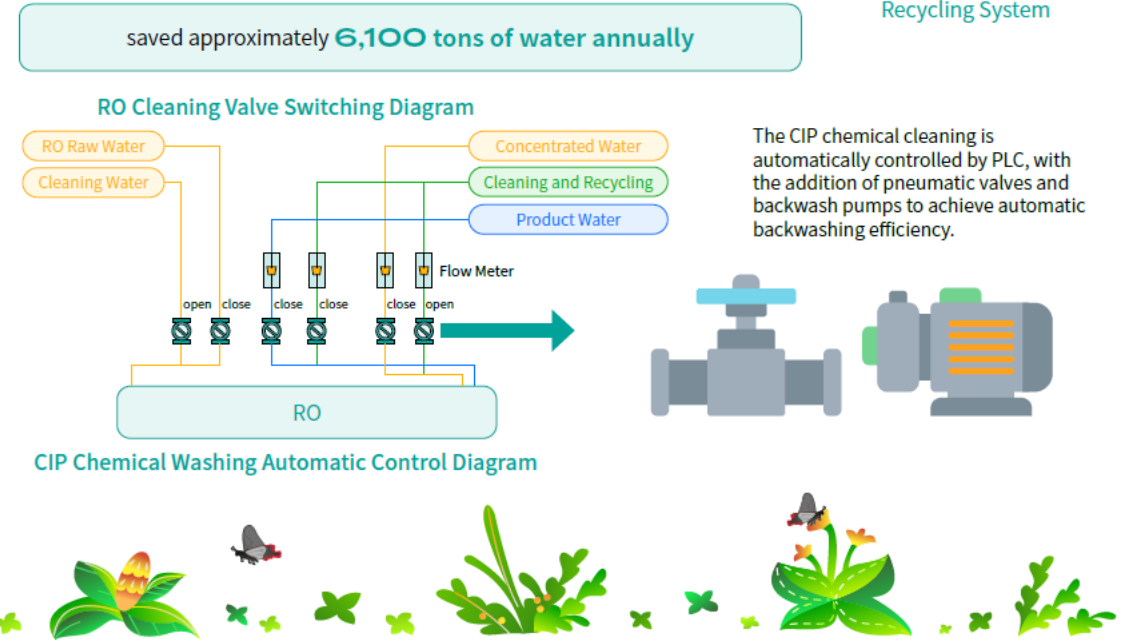


Automated of RO membrane chemical cleaning in wastewater ROR recycling system

The wastewater recycling system properly treated process wastewater to produce secondary water, which was then used in the fab system, reducing tap water usage. The RO unit backwashing operation in the wastewater recycling system was improved to an automatic backwashing mechanism, which allowed precise control of cleaning water and increased the recovery rate by more than 2%. This resulted in an increase of over 100 tons of recycled water per day, saved approximately 6,100 tons of water annually, and reduced the use of water resources.



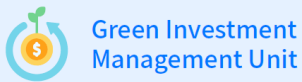
Diagram of the Wastewater Recycling System



3.5 Green Investment & Financing

Green Investment & Sustainability-Linked Loan

The whole world is facing the impact of climate change. As one of Taiwan's intensive electronics industry, we set up a green investment management unit to achieve the goal of green investment and create long-term value for investors and shareholders. °



Green Investment Management Unit

As the basic operating unit, the Finance Department further submits relevant proposals to the board of directors for resolution, and the board of directors to participate in relevant decision-making together.



Responsibility

Assess the environmental, social and governance risks of investment projects, ensure that projects meet sustainable development goals, and make sustainable investment decisions.

Renewable Energy Investment



NT\$ 955 million renewable energy investment plan

Cumulative investments in renewable energy development from 2022 to 2024, aiming to diversify power supply sources and increase investment returns.

In May 2022, Winbond acquired 15% equity in CHIA-HO Green Energy Corporation for NT\$555 million, whose main business is to develop solar energy fields. Considering that its parent company, TCC Group Holdings, has valuable practical experience in the renewable energy industry. It will bring positive benefits to Winbond in fulfilling its corporate sustainable development goals, and help Winbond obtain part of the renewable energy electricity needed to move towards net-zero emissions goals.

In May 2024, Winbond participated in the joint establishment of Kai-Hong Energy Co., Ltd., with an expected investment of NT\$ 400 million. Kai-Hong Energy's primary business involves investing in solar power generation and wind power generation infrastructure projects in Taiwan. Winbond's involvement in this joint venture not only aligns with the global and Taiwan 2050 net-zero goals, but also demonstrates its proactive engagement in green energy development. Apart from contributing to the company's net-zero emissions target through renewable energy, Winbond is progressively fulfilling its commitment to sustainable development.

As of April 2025, Winbond's board of directors has cumulatively approved NT\$ 955 million in renewable energy investment plans. Going forward, Winbond will continue to seek suitable targets for green energy investment, laying the foundation for achieving net-zero emissions goal.



International Voluntary Carbon Credits



A total of **13,500** tCO₂e carbon credits

have been obtained since 2022 from voluntary carbon credit projects in 9 countries across Asia and Africa, creating diverse sustainable benefits.

In response to the global carbon neutrality trend and the 2050 net-zero goal, Winbond not only joined Singapore’s global carbon exchange Climate Impact X (CIX) in 2022 and continued to participate in international carbon trading, but also became one of the first international carbon credits purchasers on Taiwan Carbon Solution Exchange (TCX) in 2023. By the end of 2024, Winbond had cumulatively obtained 13,500 metric tons of voluntary carbon credits from 9 countries in Asia and Africa.

The carbon credits obtained by Winbond are issued by international independent organizations such as Verra or Gold Standard. These credits cover various areas, including nature conservation, high-efficiency stoves, clean water sources, solar power generation, and wind power generation. The goal is not only to offset the company's own carbon emissions through carbon trading but also to achieve diverse sustainable benefits, such as protecting terrestrial and marine ecosystems, restoring water-related ecosystems, promoting investment in energy infrastructure and clean energy technology, and respecting the rights of local residents. Winbond's carbon credit projects align with 16 out of the 17 United Nations Sustainable Development Goals (SDGs).

While focusing on the semiconductor industry, Winbond also dedicates continuous and stable resources to participating in global carbon reduction initiatives, contributing to the sustainable survival and development of our planet.



The carbon credit projects include international voluntary carbon credit initiatives related to nature conservation, high-efficiency stoves, clean water sources, solar power generation, and wind power generation.

Sustainability-linked Loan



2 Years of Success: Achieving ESG Targets

In April 2023, Winbond signed a NT\$20 billion sustainability-linked syndicated loan agreement, incorporating specific indicators for carbon reduction, energy saving, and corporate governance into the evaluation criteria. The actual performance of these sustainability indicators was regularly audited, and the results were rewarded to interest rate deduction. In June 2024, the bank confirmed that Winbond had achieved its annual sustainability targets for two consecutive years, resulting in a reduction of NT\$1.89 million in interest expenses for 2024. The reduced interest rate conditions will apply to subsequent loan drawdown until the next audit period. Internally, the company also regularly tracked the achievement of various indicators to ensure the implementation of sustainable actions, working together with the syndicated loan group towards the goal of sustainable finance.

Sustainable Fixed Deposits

In 2024, Winbond continued to engage in sustainable development time deposits with banks for a period of at least three months. The funds were lent by the banks to other enterprises, utilized in various compliant green financing projects, or used to support green industries such as renewable energy or solar power plant investments and financing. Through diverse channels, Winbond participated in sustainable finance, further demonstrating its commitment to sustainable development.



Establishing Internal Voluntary Carbon Credit Investment Standards in 2024

Rationale

Since 2022, Winbond has established internal carbon credit trading procedures, detailing various aspects such as responsibility division, quota authorization, and internal control systems. Starting in 2023, in response to international high-quality carbon credit investment strategy trends, Winbond further strengthened and established internal carbon credit investment standards.

Objective

- ✓ Optimized internal operating procedures to avoid purchasing controversial carbon credits.
- ✓ Developed an internal carbon credit checklist as a basis for subsequent carbon credit procurement.



Photo courtesy of Delta Blue Carbon Project

| Evaluation Criteria | Note |
|--|-----------|
| <p>Evaluation Criteria: Issuing Institutions that meet any of the following conditions:</p> <ul style="list-style-type: none"> • International: <ol style="list-style-type: none"> 1. The Verified Carbon Standards (VCS) 2. The Gold Standard (GS) 3. The American Carbon Registry (ACR) 4. The Climate Action Reserve (CAR) • Domestic: Qualified inspection and certification institutions announced by the Ministry of Environment of the Executive Yuan | Necessary |
| <p>Vintage The issuance year of the carbon credits should not exceed five years from the year of acquisition by the company</p> | Necessary |
| <p>UN SDGs Achieving three or more United Nations Sustainable Development Goals</p> | Necessary |
| <p>Risk Management</p> <ol style="list-style-type: none"> 1. Transactions on compliant trading platforms domestically and internationally 2. Complete disclosure of project details and verification reports 3. Geopolitical stability of the country where the carbon credits are located 4. No major negative reports in the country where the carbon credits are located in the past three years | Necessary |
| <p>International High-Quality Carbon Standards that meet any of the following conditions:</p> <ol style="list-style-type: none"> 1. Compliance with Climate, Community & Biodiversity (CCB) 2. Compliance with The Core Carbon Principles (CCPs) | Prior |
| <p>International Carbon Ratings that meet any of the following conditions:</p> <ol style="list-style-type: none"> 1. BeZero: Carbon Rating A or above 2. Sylvera: Carbon Rating A or above 3. Calyx Global: GHG Rating B or above 4. Calyx Global: SDG Rating ★★★ or above | Prior |

3.6 Biodiversity

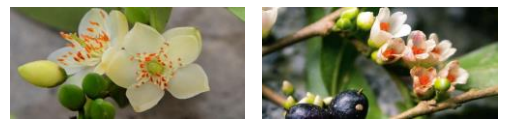
Winbond Group's Nature Positive goal, in collaboration with affiliated enterprises and academic institutions, initiated several long-term projects such as conservation breeding, afforestation, and preservation to promote environmental biodiversity and species restoration, aiming to care for and protect Taiwan's local ecology. In 2024, the Chairman signed the "Winbond Biodiversity Commitment," where the company pledged to reduce the impact of operations and value chain on the environment and support sustainable technologies. The goal is to achieve net positive impact and zero deforestation, ensuring the integrity of ecosystems.

| | |
|---|--|
|  <p>Conservation Plan Focus on protecting endangered species</p> |  <p>Systematic Afforestation Conduct afforestation based on expert recommendations</p> |
|  <p>Native Tree Planting Plant local tree species to promote ecological balance</p> |  <p>Ecosystem Services Provide benefits of natural ecosystems</p> |
|  <p>Community Collaboration Collaborate with academic institutions</p> |  <p>Carbon Storage Goals Plan to reduce carbon dioxide emissions</p> |

Biodiversity

In 2024, Nuvoton participated in the Purple Crow Butterfly Ecological Restoration Project in Wufeng Township, Hsinchu. This project, in collaboration with the Forestry Bureau, Taiwan Butterfly Conservation Society, and National Yunlin University of Science and Technology, aims to restore the Purple Crow Butterfly population by providing a stable food source for larvae through habitat surveys and forest monitoring. The project combines technological conservation, community participation, and environmental education to enhance the population of the Purple Crow Butterfly. Whilst also strengthening ecosystem resilience, and deepening communication and connections with community stakeholders. Additionally, Nuvoton assisted amphibian conservation volunteers in habitat conservation actions for the endangered Sauter's frog in the Dashanbei area of Hengshan Township, Hsinchu County, achieving the goal of biodiversity environmental education.

Winbond is committed to the conservation of Taiwan's native plants. Since 2021, Winbond has initiated a species conservation and breeding program, focusing on the collection and cultivation of Theaceae plants. Currently, 33 species of Theaceae plants have been collected and cultivated. Furthermore, Winbond protects endangered wild plants, focusing on the conservation of the Habenaria plant by delaying mowing times to ensure seed propagation opportunities, thereby protecting its population. Winbond aims to maintain biodiversity and ecological health through the conservation of endangered wild plants and Taiwan's native plants.



Conservation and Breeding Operations for Theaceae Plants



Protecting the Beautiful Habitat of Sasakia charonda



Endangered Wild Plant - Spiranthes sinensis

Afforestation

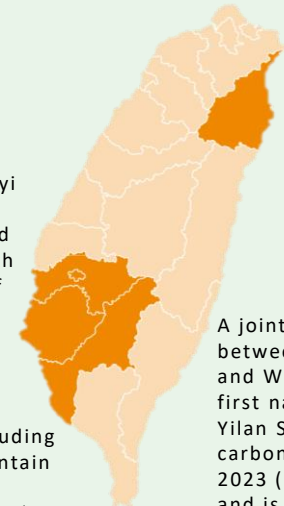
Winbond Group plans to implement natural carbon sequestration pathways in the field of forest carbon sinks. By leveraging its carbon-negative capabilities and collaborating with government, industry, academia, and the public, the primary goals are to enhance biodiversity, restore ecosystems, promote forestry economy, and improve people's quality of life and health. Carbon sequestration is a secondary goal, contributing significantly to the national net-zero emissions target and responding to Taiwan's 2050 net-zero emissions pathway's "natural carbon sequestration" key strategy.

Since 2021, we have actively promoted domestic afforestation and conservation projects. In collaboration with the Forestry Bureau of the Ministry of Agriculture and the National Property Administration of the Ministry of Finance, we have carried out afforestation and conservation on state-owned forest lands in Chiayi, Tainan, and Yilan, covering a cumulative area of over 25 hectares and planning to plant more than 40,000 trees.

For more information on biodiversity and afforestation, please refer to section 3.6 Biodiversity.

Tree Adoption Plan in Chiayi: planting approximately 7,700 trees

Winbond actively participated in the tree adoption plan of the Forestry Bureau and the Nature Conservation Agency of the Ministry of Agriculture, adopting national forest land located in Tainan City and Chiayi County, planting 4 native tree species including Taiwan cherry, maple, acacia, and neem on 29,400 square meters of land, with an estimated total carbon sequestration of 990 metric tons of CO2 equivalent



Afforestation Plan in Kaohsiung: planting approximately 1,300 trees

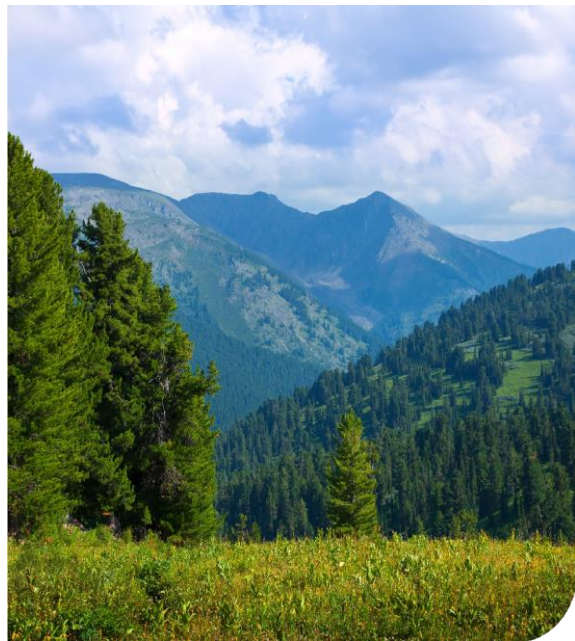
Winbond planted 5 native tree species including Cinnamomum camphora, large-leaved mountain olive, neem, and Ligustrum lucidum at the Kaohsiung Fab, in collaboration with National Chung Hsing University, conducting a 30-year continuous afforestation plan, with an estimated carbon sequestration of 390 metric tons of CO2 equivalent.

A joint venture between Walsin Lihwa and Winbond, won the first national land Yilan Sanxing natural carbon sink project in 2023 (21.66 hectares), and is expected to plant 33,000 trees to generate carbon sink from new afforestation.

Winbond Electronics Biodiversity Commitment

Winbond is committed to protecting biodiversity, considering it a key aspect of sustainable development. The "Winbond Electronics Biodiversity Commitment" was signed by the Chairman, and the company promises to reduce the environmental impact of its operations and value chain, while supporting sustainable natural technologies.

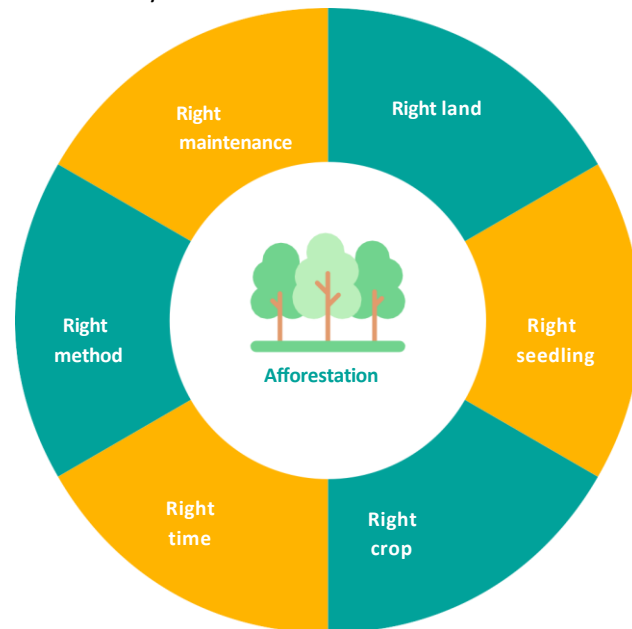
Through green manufacturing, afforestation, sustainable supply chain collaboration, and natural carbon sink research, Winbond actively mitigates biodiversity loss. The company also emphasizes environmental education to raise public awareness of ecological protection. The goal is to achieve net positive impact and zero deforestation, ensuring the integrity of ecosystems.



Nature-based Solutions (NBS)

Winbond is committed to carbon removal while preserving biodiversity

To achieve net-zero targets, Winbond has begun researching strategies to remove carbon dioxide from the atmosphere. Scientists have discovered that capturing and storing carbon dioxide from the atmosphere is essential for reaching net-zero emissions. It can be stored through means such as in soils, the ocean, and rocks. Winbond has been researching nature-based solutions and, through industry-university collaboration and tripartite collaboration between industry, government, and academia, has implemented tree planting and adoption, invested in blue carbon projects, and engaged in conservation and breeding of tree species. These approaches contribute to the removal of carbon dioxide from the atmosphere while protecting biodiversity.



Nature-based solution – Afforestation

The afforestation carbon reduction project is conservatively estimated to remove at least 10,000 metric tons of carbon dioxide equivalent.

- Based on recommendations from academia and experts, Winbond systematically planned new afforestation operations, following steps such as suitable land, suitable species, suitable seedlings, suitable timing, suitable methods, and suitable maintenance. From afforestation design, seedling cultivation and selection, land preparation, new afforestation, nurturing, and sustainable harvesting, Winbond invested significant time and effort in systematically planning the sustainable forest management project, aiming to increase Taiwan's forest carbon sinks.
- At the Kaohsiung Fab, Winbond planted five native tree species: Bischofia javanica, Elaeocarpus sylvestris, Acacia confusa, Melia azedarach, and Cinnamomum camphora. In collaboration with National Chung Hsing University, Winbond carried out a 30-year afforestation project, with an estimated total carbon sequestration of 390 metric tons of carbon dioxide equivalent. Following the principle of suitable land and suitable trees in forest management, Winbond removed invasive species and planted native Taiwanese tree species, creating green spaces with native plants within the fab to achieve carbon sequestration, environmental beautification, and air purification, stabilizing the natural ecological environment.
- Additionally, Winbond actively participated in the tree adoption program of the Forestry and Nature Conservation Agency of the Ministry of Agriculture, adopting state-owned forest land in Tainan City and Chiayi County. On 29,400 square meters of land, Winbond planted four native tree species: Zelkova serrata, Liquidambar formosana, Acacia confusa, and Melia azedarach, with an estimated total carbon sequestration of 990 metric tons of carbon dioxide equivalent. Currently, over 7,700 trees have been planted on the land. Through afforestation efforts, Winbond aims to restore vegetation cover on the slopes and continue assisting in cultivation efforts to maintain local plant diversity, increase local biodiversity and species habitats, maintain ecological stability, and provide ecosystem services such as soil and water conservation, disaster reduction, soil fertility maintenance, and water flow regulation.
- In 2024, Winbond, through its affiliated company Theaceae Conservation Corporation won the bid for the Ministry of Finance's National Property Administration's natural carbon sink state-owned land investment project. In the future, a large-scale Carbon Sink Afforestation Program will be launched in Sanxing, Yilan. The total carbon sequestration of this afforestation project is estimated to be 10,477 metric tons of carbon dioxide equivalent. The Corporation collaborated with National Ilan University to improve the environment of the abandoned gravel plant, which is overgrown with weeds and Leucaena, and restore the natural ecology of the Lanyang River basin through tree planting and afforestation. This project integrated drone technology to manage sustainable smart forestry and develop green technology. It aims to promote land use and enhance carbon sink capacity while closely aligning with environmental ecological benefits and added value, ensuring that a healthy forest ecosystem is maintained during land development.



Conservation and Breeding of Native Taiwanese Plants.

Since 2021, Winbond has integrated group resources to launch the Baoshan Park conservation and breeding project, targeting Taiwan native tree species. The project focuses on the Theaceae family, collecting and cultivating Taiwan native plant germplasm.

There are total 42 species of Theaceae plants in Taiwan, and currently, 33 species have been collected and cultivated. Among these, one species is assessed as critically endangered in the Red Book, one species is endangered, seven species are vulnerable, and three species are near threatened.



Camellia species conservation and breeding operations

Endangered Wild Plant 'Ribbon Grass' Appears! Taiwan's Smallest Native Terrestrial Orchid

Spiranthes sinensis, originally a robust plant species widely distributed across Taiwan's plains and green spaces, has seen a significant reduction in its habitat in recent years. Consequently, it has been listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). At Winbond's CTSP Fab and Tainan Building, wild populations of *Spiranthes sinensis* have been discovered due to the absence of herbicide application. To conserve *Spiranthes sinensis*, Winbond has adjusted its vegetation management schedule to coincide with the plant's flowering and fruiting periods, ensuring opportunities for root sprout and seed propagation. Wild plants are crucial components of biodiversity, and Winbond aims to conserve endangered native plants to maintain Taiwan's biodiversity and ecological health, contributing to the well-being of this land.



Endangered Wild Plant- *Spiranthes sinensis*

The Reborn of Butterfly

The *Sasakia charonda formosana*, classified as an endangered wild animal under wildlife conservation regulations, is assessed as vulnerable in the IUCN Red List. It is only found in the mountainous areas of Jianshi Township, Hsinchu County, and Fuxing Township, Taoyuan County. During its life cycle, the butterfly lays eggs on the branches or leaves of *Quercus glauca*. After hatching, the larvae move to the leaf litter under the trees to overwinter. Currently, its habitat has shrunk, and the number of mature *Quercus glauca* trees has decreased, directly affecting the population of *Sasakia charonda formosana*.

Nuvoton, a subsidiary, and the Forestry and Nature Conservation Agency, Ministry of Agriculture (FANCA) have planned this project in collaboration with the Bailan Tribe of Wufeng Township. Using remote sensing technology, they record the distribution and phenology of *Quercus glauca*, with regular maintenance by the community patrol team. This establishes a long-term monitoring database for use in ecological tours and appropriately develops ecotourism routes. Nuvoton combines technological innovation to conserve precious species, uniting local tribes to protect their homeland, and hopes to raise awareness through environmental education, promoting the ideal blueprint for sustainable urban and rural development.



This aligns with Goal 15 of the SDGs, which focuses on the conservation of terrestrial ecosystems, and achieves both conservation and educational significance through the protection of endangered species.

Bringing Ecology Back to Life: Creating Ecological Landscapes with Native Plants

Winbond's Zhubei Building selected 20 native Taiwanese plants to create a native wildflower garden, including one species assessed as critically endangered in the Red Book, three species as endangered, and three species as vulnerable. Winbond adopted the concept of Wild Gardening, using 20 native Taiwanese species to create an ecological landscape in approximately 1.6 square meters of green space, creating a small patch of native plant ecology in the city. The garden's aesthetic combines greening, environmental protection, and energy-saving design, with distinct seasonal landscapes that provide ecological benefits such as environmental beautification, microclimate regulation, and dust absorption. Winbond set up explanatory signs to help community residents understand the ecological significance of native plants.

Winbond's CTSP Fab planned and implemented greening with species suitable for the central Taiwan low mountain forest, planting 149 plants. This includes three species assessed as critically endangered in the Red Book, three species as vulnerable, five species as near-threatened, and 14 other endemic plants. Winbond remains committed to sustainable ecology, integrating ex situ conservation of endangered native plants into the fab's green landscape, preserving the genetic resources of native Taiwanese plants within the fab, and creating ecological stepping stones in the Central Taiwan Science Park with small green patches. In 2025, Winbond plans to plant 33 native species and 130 seedlings. Through advocacy and education, Winbond helps employees understand how to coexist with nature, from understanding and caring to action, rediscovering the value of ecology.

As urban development progresses, people often overlook the need for ecological services in daily life, such as regulating temperature and humidity, absorbing carbon dioxide, producing fresh oxygen, and adsorbing air pollution and suspended particles. Winbond provides nature-based solutions by bringing forests back to office buildings and fabs, emulating nature to create a more resilient and sustainable urban life for employees.



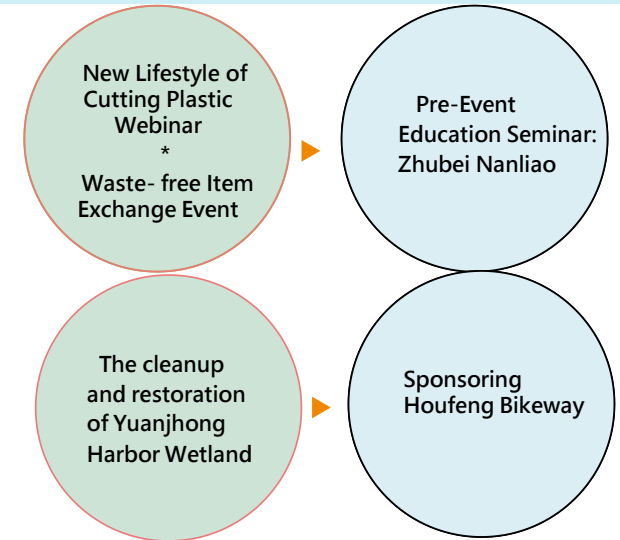
Using native plants to create ecological landscapes and design natural-style plantings

Environmental Education Philosophy

Integrate nature conservation into organizational culture and promote environmentally friendly measures.

Winbond integrates nature conservation into corporate culture, not only reflecting the company's social responsibility but also creating a long-term competitive advantage. We incorporate environmental friendliness as part of daily decision-making, embedding nature conservation into corporate culture. This not only responds to social and policy pressures but is also a key turning point for the company towards a sustainable economic system. From the perspective of biodiversity, we continuously organize coastal adoption and beach cleaning environmental education experiences to raise awareness of protecting wildlife and the environment.

From the perspective of net-zero carbon reduction goals, we plan environmental education courses focusing on carbon reduction, biodiversity, and other topics to exert corporate influence and help participants understand the importance of climate change and environmental sustainability.



A New Lifestyle of Plastic Reduction: Webinar & Waste-Free Exchange Event



In 2024, Winbond explored the practical details of a minimalist lifestyle from aspects such as food, clothing, housing, transportation, education, and entertainment to mindset adjustment. By analyzing common blind spots people had, they delved into the seemingly simple yet easily overlooked daily issue of reducing plastic use. After the lecture, interested colleagues were invited to bring an idle item from home to participate in a "waste-free" exchange activity to jointly practice recycling and embody the core spirit of a subtractive lifestyle.



Wetland Cleanup at Kaohsiung Yuanjzhong Harbor Wetland

Winbond collaborated with the Society of Wilderness for the first time to organize a cleanup action at the Yuan Zhonggang Wetland in Kaohsiung. The Yuan Zhonggang Wetland boasts rich biodiversity, playing a crucial role in maintaining local biodiversity, climate regulation, and water quality regulation. Additionally, this initiative aims to enhance public awareness of wetland restoration and waste source reduction.



Zhubei Nanliao: Beach Cleanup Action



Before organizing the "Beach Cleanup Action: Nanliao, Zhubei " event, Winbond held a pre-event briefing to help participants understand the significance of waste source reduction, the usage of the ICC classification table, and discuss ways to reduce plastic usage to achieve the goal of waste reduction. The event emphasized that since tides continuously bring new waste, the ultimate goal of a beach cleanup is not just removal, but prevention by reducing waste at its source. This action not only demonstrates the company's commitment to sustainable development but also encourages employees and their families to actively participate in environmental protection and promote more effective plastic reduction actions.



Sponsoring Houfeng Bikeway



In 2024, Winbond continued to participate in the adoption of public recreational facilities, collaborating with the Taichung City Tourism Bureau for the corporate adoption of the Houfeng Bikeway. Winbond is responsible for regular road cleaning and tree pruning to maintain the beauty and safety of the Houfeng Bikeway. This partnership aims to safeguard the cleanliness of Taichung City's public recreational facilities and enhance the quality of the recreational environment.

4. Metrics and Targets

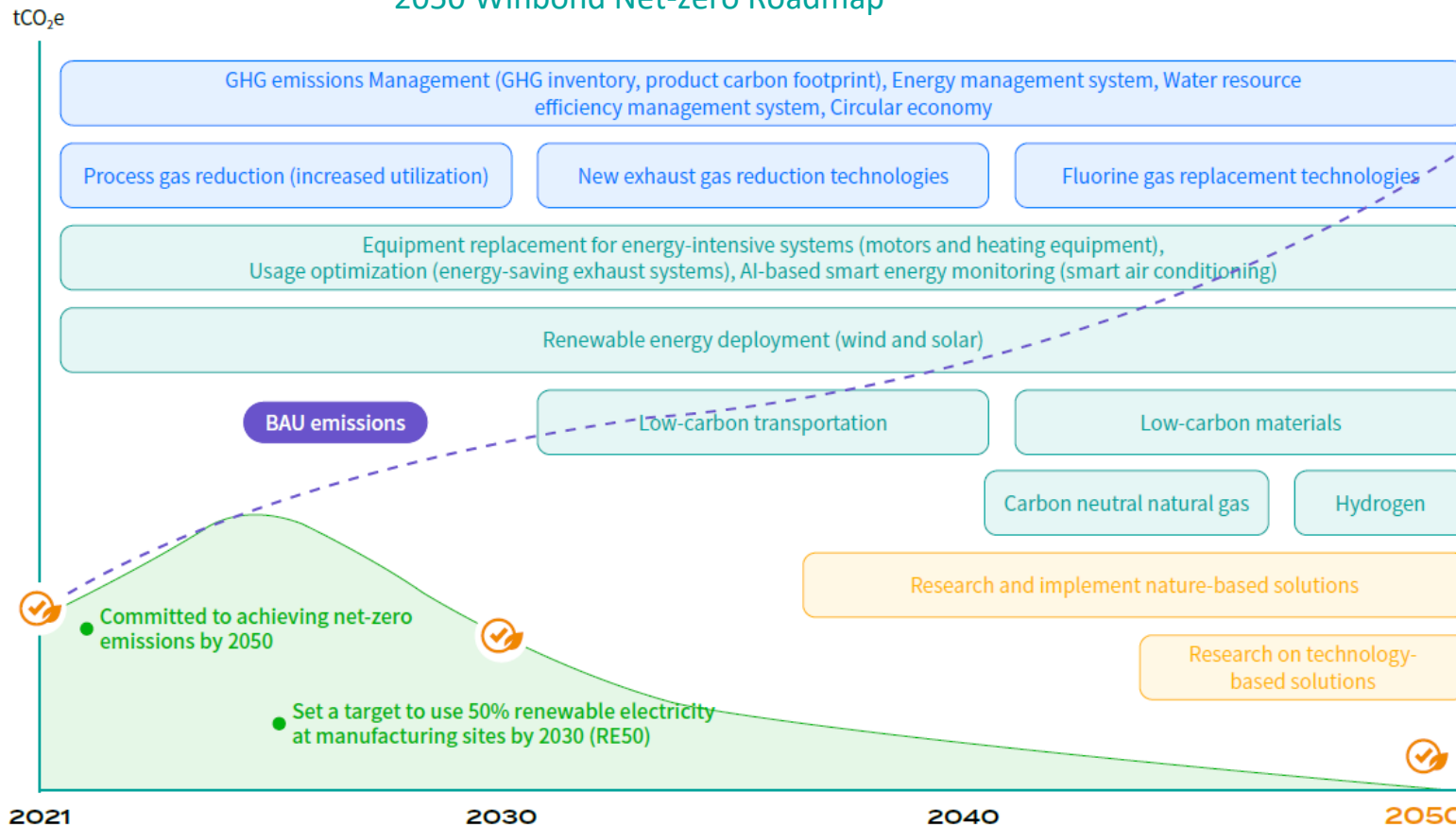
4.1 Towards Net Zero Emissions



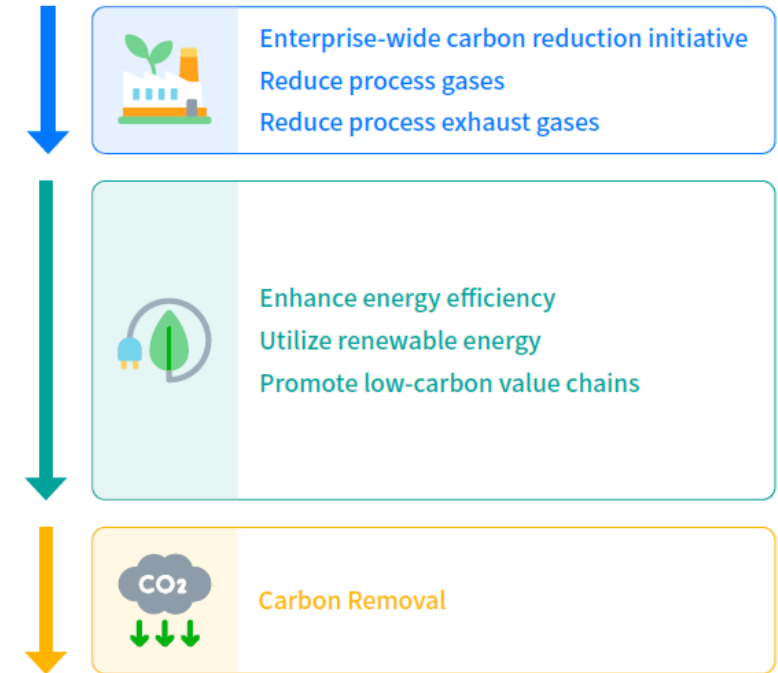
Net-Zero Strategy and Action Plan

To steadily advance towards sustainability, Winbond aligned its corporate sustainability strategy and ethos to establish short-term (by 2030), medium-term (by 2040), and long-term (by 2050) net-zero goals. Additionally, Winbond developed a roadmap to achieve net-zero emissions by 2050 and has been undertaking comprehensive actions to drive ongoing progress toward this commitment.

2050 Winbond Net-zero Roadmap



Net-Zero Action Plan



4.2 Climate and Nature-Related Management Metrics

Winbond has introduced the TCDF and TNFD management frameworks and published a Climate and Nature report to assess out operational resilience. In the future, we will continue to track and monitor our management metrics. This will allow us to pursue corporate growth while also supporting and protecting the environment and society, realizing our corporate vision of “Be a hidden champion in providing sustainable semiconductors to enrich human life”.

| Category | Metric | 2024 Progress | 2025 Short-term Goal | 2030 Mid-term Goal |
|----------------------------|--|--|--|--|
| Green Products | Customer application energy-saving and carbon reduction > 33% | Customer application energy-saving and carbon reduction 33% ¹ | Customer application energy-saving and carbon reduction 33% ¹ | Product lifecycle carbon emission reduction 20% ² |
| | Flash memory series relative to F58s mass production | 56,000 tCO ₂ e carbon reduction ³ | 35,000 tCO ₂ e carbon reduction ³ | 110,000 tCO ₂ e carbon reduction ³ |
| Sustainable Supply Chain | Tier-1 significant suppliers ⁴ underwent sustainable due diligence SAQ | 100% | 100% | 100% |
| | High-risk suppliers ⁵ underwent on-site sustainable audits and guidance (cumulative number) | 4 | 9 | 34 |
| | Major suppliers ⁶ disclosed the proportion of resource usage and savings ≥ 95% | 95% | 95% | 100% |
| | Increased the localization ratio of key raw material procurement ≥ 38% | 39% | 39.5% | 42% |
| Environment Sustainability | Emission reduction of Greenhouse Gas (with 2023 as the baseline year) | Winbond (Taiwan) Scope 1 and 2 GHG emissions reduction 1.1% | Winbond (Taiwan) Scope 1 and 2 GHG emissions reduction 2.5% | Winbond (Taiwan) Scope 1 and 2 GHG emissions reduction 42% |
| | Total electricity saving | The annual electricity savings were 3.5% | 2~3% Annual electricity savings | Cumulative electricity savings over 15% |
| | Fab-wide water recycling rate | 81.9% | ≥ 80% | ≥ 80% |
| | Renewable energy usage rate | 5.9% | - | Achieve 50% renewable energy in Winbond (Taiwan) |
| Climate Change Risk | Production disruptions caused by climate disasters (day) | 0 day | 0 day | 0 day |

Note 1 This calculation is based on the 25nm 1.2V/128Mb HyperRAM product.

Note 2 This calculation is based on the entire series of dynamic random-access memory (DRAM) products, including process evolution.

Note 3 This calculation is based on the entire series of flash memory products, including process evolution.

Note 4 Tier-1 significant suppliers refer to those who directly trade with Winbond, providing products/services/technologies directly related to production and manufacturing, with an annual procurement amount exceeding NT\$10 million.

Note 5 High-risk suppliers refer to those comprehensively determined through sustainable due diligence and sustainable written audits to require on-site audits and guidance to reduce sustainability risks.

Note 6 Major suppliers refer to those directly related to Winbond's Scope 3 emission category 4 (inventory standards based on ISO 14064:2018).

Appendix

About this Report

For the third year, Winbond has utilized the Task Force on Climate-related Financial Disclosures (TCFD) framework to evaluate climate-related risks and opportunities. This analysis forms the basis for our mitigation and adaptation strategies, strengthening the company's operational resilience. In 2024, we expanded our efforts by integrating the TNFD framework to systematically map the dependencies and impacts of our business on natural capital. In our commitment to paperless practices, this report is disclosed electronically on the Winbond official website. The reporting period for this report is from January 1, 2024, to December 31, 2024. The scope of information disclosure in this report aligns with the boundaries of the consolidated financial statements. If the scope of disclosure differs from above, it will be noted in the respective section.



Appendix 1 TCFD Indicator Reference Table

| Core Element | TCFD Recommended Disclosure | Corresponding Chapter <i>in this Report</i> | Page |
|---------------------|---|--|----------------|
| Governance | Board of Directors' oversight of climate-related issues | 1. Climate and Nature Governance | 5~7 |
| | Role of management in assessing and managing climate-related issues | 1. Climate and Nature Governance | 5~7 |
| Strategy | Identification of short, medium, and long-term climate-related risks and opportunities | 2.3 Climate Risk and Opportunity Matrix | 11 |
| | Impact of climate-related risks and opportunities on business, strategy, and financial planning | 2.4 Impacts of Major Climate Change and Responses | 12~13 |
| | Scenario analysis, including a 2°C or more extreme scenario | 2.5 Climate Risk Scenario Analysis | 14~16 |
| Risk Management | Process for identifying and assessing climate-related risks | 2.1 Risk Management Framework and Process 2.2 Procedures for Identifying Climate Change Risks and Opportunities | 8~9 10 |
| | Process for managing climate-related risks | 2.1 Risk Management Framework and Process 2.2 Procedures for Identifying Climate Change Risks and Opportunities | 8~9 10 |
| | Integration of identification, assessment, and management processes into overall risk management system | 2.1 Risk Management Framework and Process 2.2 Procedures for Identifying Climate Change Risks and Opportunities | 8~9 10 |
| Metrics and Targets | Metrics used to assess climate-related risks and opportunities within the framework of strategy and risk management processes | 4. Metrics and Targets | 65~66 |
| | Disclosure of Scope 1, Scope 2, and Scope 3 (if applicable) greenhouse gas emissions and related risks | 2.3 Climate Risk and Opportunity Matrix 3.3 Energy and Greenhouse Gas Management | 11 46~51 |
| | Management targets and associated performance metrics | 3. Climate and Nature Strategy 4. Metrics and Targets | 35~64 65~66 |

IFRS S2 Climate-related Disclosures

In June 2023, the International Financial Reporting Standards (IFRS) officially launched the IFRS S1 and S2 to sets out the standards of sustainability-related financial information disclosures and climate-related disclosures, respectively. The Financial Supervisory Commission announced to adopt the standards directly in the same year and required the companies with capital of more than NT\$10 billion should disclose the information in the 2026 annual shareholder meeting published in 2027. To be in line with international standards in advance, Winbond quoted the relevant standards in the 2023 TCFD report and disclosed seven cross-industry, climate-related Metric Categories.



Appendix 2 IFRS S2 Index on Cross-industry, Climate-related Metric Categories

| Metric Category | Metrics | Page |
|-------------------------------|---|---------|
| Green House Gas Emissions | Total Greenhouse gas emissions and reduction (tCO ₂ e) | 50~51 |
| | Unit Greenhouse gas emissions (average greenhouse gas emissions per layer of photomask for 12-inch wafer production) | 50 |
| Transition Risks | Percent of renewable energy electricity (%) | 47 ~ 51 |
| | Reduction of electricity usage per unit product (%) | 46~47 |
| Physical Risks | Number of production days interrupted by climate disasters | 66 |
| | Water usage per product (average water usage per layer of photomask for 12-inch wafer production) | 53 |
| Climate-related Opportunities | Refer to the Chapter 2.4 : Impacts of Major Climate Change and Responses | 13 |
| Capital Deployment | The investments related to Mitigation and Adaptation Measures , including but not limited to: | |
| | • Development of high-performance, compact, low-power, high quality and security green products | 36~41 |
| | • Green and Low-carbon supply chain management | 42~45 |
| Remuneration | • Continued to implement energy conservation measures, including equipment replacement, improving product efficiency and reducing product energy, usage reduction, process optimization, smart energy saving and new machine design | 48~49 |
| | • Renewable energy investment and obtained international voluntary carbon credit | 57~59 |
| Remuneration | Refer to the Chapter 1.1 : Climate and Nature Organizational Framework | 5 |

Appendix 3 TNFD LEAP Methodology Index Table

| Core Element | TNFD recommended disclosure items | Corresponding Report Sections | Page |
|--------------|--|--|-------|
| L | Identify and determine affected scopes | Locate – Impacts on marine or wetland ecosystems | 20~23 |
| | Identify external dependency risks | Locate – Analysis of impacts on marine or wetland ecosystems | 20~23 |
| | Connectivity with nature and trend forecasting analysis | Locate – Analysis of impacts on marine or wetland ecosystems | 20~23 |
| | Links to sensitive areas | Locate – Analysis of impacts on marine or wetland ecosystems | 20~23 |
| E | Environmental assets, ecosystem services and impact drivers identification | Evaluate – Analysis of the dependence and impact of identified organizations on nature | 24~27 |
| | Dependence identification | Evaluate – Analysis of the dependence and impact of identified organizations on nature | 24~27 |
| | Dependence and impact assessment | Evaluate – Analysis of the dependence and impact of identified organizations on nature | 24~27 |
| | Major Impact Assessment | N/A | |
| A | Risk and Opportunity Identification | Assess – Identification of risks and opportunities in nature process | 28~33 |
| | Existing Risk and Opportunity Mitigation and Management | Assess – Identification of risks and opportunities in nature process | 28~33 |
| | Risk and Opportunity Assessment | Assess – Identification of risks and opportunities in nature process | 28~33 |
| | Major Risk and Opportunity Assessment | Assess – Identification of risks and opportunities in nature process | 28~33 |
| P | Strategic and Resource Allocation Plan | Indicators and Goals Climate and Nature Strategy | 35~66 |
| | Goal Setting and Performance Management | Indicators and Goals Climate and Nature Strategy | 35~66 |
| | Describe the organization's goals and objectives for managing nature-related dependencies, impacts, risks, and opportunities, as well as its performance against these goals | N/A | |
| | Report | About This Report | 67 |



winbond
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