南茂科技
ChipMOS

# ChipMOS
## Climate and Environmental Report



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# Message from the Chairman

In recent years, the world has faced the profound impact of extreme weather events, leading to unusual climate patterns and frequent natural disasters in many countries. For global business leaders, climate issues have transformed from long-term risks into critical and ongoing challenges that companies must proactively address. ChipMOS, a leading company in the semiconductor packaging and testing industry, takes its environmental responsibility seriously. The Company follows the international agreement of the Paris Climate Accord and actively works to control global warming and reduce greenhouse gas emissions. ChipMOS also focuses on enhancing its ability to adapt to climate change and consistently educates its employees to strengthen their environmental awareness. Additionally, the Company extends these efforts to suppliers and stakeholders, collaborating to promote low-carbon energy conservation and create a green-friendly environment.

ChipMOS has committed to setting specific medium to long-term goals based on Science-Based Targets (SBT) with an overarching objective of achieving comprehensive net-zero emissions by the year 2050. ChipMOS has adopted a top-down approach to drive its sustainability strategy, ensuring that climate change issues are integrated into its governance framework. The Board of Directors, serving as the ultimate decision-making body, diligently reviews sustainability and environmental matters on a quarterly basis, aiming to improve overall operational efficiency. In 2021, ChipMOS adhered to the Task Force on Climate-related Financial Disclosures (TCFD) framework. The Company conducted thorough assessments of climate change risks and opportunities, as well as evaluating the financial impacts. Specific management strategies were then formulated based on these assessments. Additionally, ChipMOS proactively participated in the Carbon Disclosure Project (CDP) questionnaire for 2022, receiving commendation for its leadership and management in climate change and water security domains. In terms of Greenhouse Gas Check, ChipMOS has taken the initiative from 2020 onward to include Scope III inventory in order to gain comprehensive understanding of its carbon emission status. Furthermore, the Company planned to complete Greenhouse Gas Check and verifications for its subsidiaries in the United States and Shanghai by 2023. ChipMOS continues to promote its energy-saving initiatives in a planned manner, working collaboratively with its suppliers to drive the implementation of low-carbon sustainability practices.

ChipMOS communicates its long-term commitment and efforts in climate change, water resource management, and the preservation of the natural environment to all stakeholders through its Climate and Natural Environmental Report. The report outlines the Company's dedication to addressing climate-related challenges and opportunities during its operations. It also provides assessments of the impact of environmental risks and outline relevant response policies and plans. ChipMOS shall continue to boost its climate resilience and actively implement green energy and carbon reduction initiatives in accordance with its sustainability strategy so that the Company may achieve its net-zero emissions objective by 2050.

Chairman & President 鄭世杰

# About This Report

## Other reports relating to sustainable development

This report focuses primarily on the disclosure of climate and nature-related risks and opportunities, along with information regarding environmental, social, economic, and cultural aspects ChipMOS' corporate sustainability. For a detailed understanding, you can refer to the annual Sustainability Report published on ChipMOS website.

ChipMOS website - Corporate Sustainability section

This Report is published in June 2023 and it is ChipMOS' first report featuring climate-related financial disclosure. Through this report, we aim to demonstrate our commitment to stakeholders by providing transparent, rigorous, and comprehensive data. Our goal is to enable stakeholders to understand ChipMOS's dedication to managing climate and environmental risks and opportunities.

## Reporting boundary

This Report focuses primarily on ChipMOS and all plants and fabs mentioned in this report refer specifically to all operating locations under the management of ChipMOS in Taiwan, and Tainan fab. 2 is covered under Tainan fab. Unless otherwise specified, the policies and practices mentioned in the report are adopted within the ChipMOS Technologies Group and are applicable to all operational locations of the Company. All currency units mentioned in this Report are in New Taiwan Dollars (NTD).

## TCFD recommendations

The Task Force on Climate-related Financial Disclosures (TCFD) is a working group established by the Financial Stability Board (FSB) in December 2015. The TCFD recommendations were first released in 2017 with the objective of encouraging companies to provide consistent and comparable reporting on climate-related risks and opportunities. The TCFD recommendations are structured around four pillars: (i) Governance, (ii) Strategy, (iii) Risk Management, and (iv) Metrics and Targets. Under these pillars, there are a total of 11 recommendations that support the objective of enabling effective disclosure. In this report, ChipMOS provides the requested information related to all four main pillars and 11 recommendations to effectively manage climate change risks and opportunities. This ensures that investors and managers can focus on key issues and access relevant and reliable quantitative information to benefit stakeholders.




## TNFD deployment and disclosure

Society and businesses rely on the services provided by nature, including the provision, regulation, support, and cultural services it offers. The accelerating global loss of natural resources poses an increasingly significant risk for both businesses and financial capital providers. The TNFD (Task Force on Nature-related Financial Disclosures) is a global, market-led initiative with the mission to develop and provide organizations with a risk management and disclosure framework to report and address the evolving nature-related risks and opportunities. The ultimate goal is to support the transition of global financial flows from nature-negative to nature-positive outcomes. The full set of recommendations of TNFD (Version 1.0) is scheduled to be released in September 2023 for market adoption. ChipMOS has made relevant deployments in advance by adopting the self-assessment and review processes based on the test version (V0.4) of the disclosure framework released in March 2023.

# Climate and Sustainability Achievements in 2022

CDP (carbon disclosure project)
**Leadership level (A-)**

15th TCSA Global and Taiwan Corporate Sustainability Awards
**Taiwan Corporate Sustainability Awards: Top 100 Corporations Corporate Sustainability Report - Platinum Grade**

CDP(water security project)
**Management level (B)**

Occupational Health and Safety Indicators Disclosed in the Corporate Sustainable Reports (Occupational Safety and Health Administration, Ministry of Labor)
**Placed Top 10% Outstanding Corporate in the Listing Electronic Companies**

Industrial Development Bureau,Ministry of Economic Affairs
**Green Factory Label**

Environmental Protection Administration, Executive Yuan
**Air Quality Purification Area Recognition – Special Contribution Award**

TWSE's 9th Corporate Governance Evaluation
**Ranked top 5% in among public listed companies for two consecutive years**

Environmental Protection Administration, Executive Yuan
**Outstanding Unit of Green Procurement and Promotion of Green Consumption Promotion**

# 4

# Climate Actions

## Became an official supporter of TCFD

**December 2021**

Introduced TCFD

**March 2022**

ChipMOS officially signed to join the TCFD Supporters.
We raise the level of governance management for climate change and be a TCFD supporter. By introducing TCFD, ChipMOS identifies climate-related risks and opportunities, develops effective strategies, and takes proactive actions.

## Developing green energy goals and plans

**Before 2025**

Setting up renewable energy installations or power generation equipment that comply with legal requirements

**ChipMOS' Roadmap to Net-Zero Emissions, Green Energy Plan beyond 2026**

- With SBT 1.5℃ (annual carbon reduction at 4.2%) as the basis
- In reference to customer's product carbon reduction plan

## Climate actions

### Energy conservation and carbon reduction

**2022**

- Power saving rate came to 1.17%
- Implemented energy conservation and carbon reduction by 2,871 metric tons of $CO_2e$
- As of the end of 2022, we have completed the carbon footprint inventory for 10 serial products

**2023**

- Achieved an energy-saving rate of 1.58%, with an estimated investment of NT$ 86.7 million
- Completed GHG inventory and verification for subsidiaries in 2023

## Water Resources Management

### Recycling and reuse of process water

**2022**

- Gaining a comprehensive understanding of the situation by identifying water resource risks and opportunities
- Installed process water recycling systems that have accumulated a total of 11,364.14 million liters of water recycled over 15 years, equivalent to nearly 4,546 international standard swimming pools saved

**2023-2024**

By introducing the ISO 46001 Water Resource Efficiency Management System, we were able to strengthen water efficiency and our drought-response capabilities



# 01 Climate Governance

1.1 Tiers of Management

1.2 Senior Management

ChipMOS has incorporated climate change issues into its corporate governance to ensure effective implementation of climate strategies through board oversight and leadership from top management. By doing so, ChipMOS fulfills its commitment to relevant stakeholders regarding climate action and demonstrates its dedication to addressing the challenges of climate change.

## 1.1 Tiers of management

TCFD Governance a.

ChipMOS's Board of Directors consists of nine members, including five independent directors. These independent directors have been chosen for their extensive industry experience and academic background, ensuring a diverse range of expertise in business operations. With expertise and professional backgrounds including enterprise management, electrical engineering, financial accounting, and law, ChipMOS' directors have strong academic research background in climate and energy issues and practical experience in managing environmental and climate-related issues within the sector. Not only that, they are also familiar with climate change matters and understand the significant impact of climate change on the Company's development. Adhering to the company mission of "Providing innovative, clean production, and energy- and water-efficient solutions for a better tomorrow," the Board of Directors meeting at least on a quarterly basis to evaluate the Company's performance and discuss ESG issues.

In addition to that, ChipMOS has established its Sustainability Development Committee as the highest-level organizational body to drive environmental, social, corporate governance, and climate change initiatives. The committee is chaired by the Chairman and CEO. The committee holds regular meetings to review the progress towards sustainability goals and periodically reports to the Board of Directors on the implementation and outcomes of environmental and climate-related initiatives. At the same time, the Company has also established its Environmental Safety, Health and Energy Management Committee to oversee operations and implementations relating to environmental, energy and carbon management issues. The committee is headed by the Executive Vice President as the top executive and establishes subcommittees at each fab, with tier-1 managers at each fab serving as key committee members. The committee operates by holding regular quarterly meetings to track the progress and implementation of environmental sustainability initiatives.

## 1.2 Senior Management

TCFD Governance b.

At ChipMOS, the Executive Vice President holds the highest management position responsible for driving climate and environmental initiatives. The Executive Vice President is entrusted to analyze international trends in the environment and sustainable development with clear understanding of stakeholders' expectations in the identification of key topics and priorities. The Executive Vice President takes on the role of supervising climate-related matters within ChipMOS. This includes reviewing the progress towards achieving short-term, medium-term, and long-term sustainable development goals, assessing and managing climate-related risks and opportunities, collaborating with senior executives to plan and execute strategies, and mitigating the potential impacts of climate change. Additionally, the focus is on reducing environmental vulnerabilities, actively improving environmental performance, and effectively implementing ChipMOS's environmental sustainability policy.





# 02 Climate Strategies

2.1 Major Risks and Opportunities

2.2 Pertaining to Operations and Financials

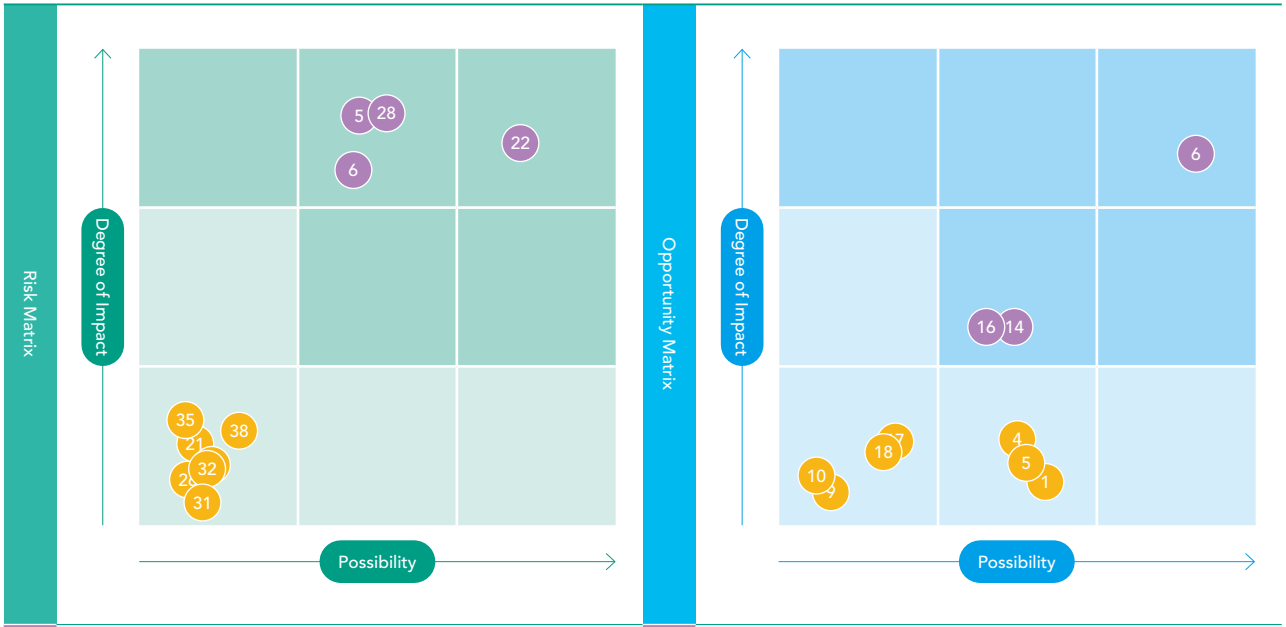
2.3 Demonstration of Resilience

## 2.1 Major Risks and Opportunities

Starting from 2021, members of ChipMOS' ESG Committee have conducted 4 meetings with sub-group discussions, which discussed in transition (Legal, Technology, Market, and Reputation)and physical (Acute and Chronic) risks and opportunities associated with climate change. Guided by the principles of TCFD, ChipMOS integrates the process of identifying and assessing climate change risks into its Enterprise Risk Management (ERM) framework. Each year, ChipMOS undertakes a thorough assessment of all risk factors that have an impact on both the Company's internal operations and its extended value chain. This includes evaluating the significant financial, operational, and personnel implications associated with climate change. Each department identifies key trends and risks and proposes corresponding measures to address them. We rank the risks and opportunities according to the possible time of risk impact: short-term (0-1 year), medium-term (1-5 years) and long-term (5-10 years), impact degree factors (finance, operation / manpower, legal and reputation), and identify 4 major carbon risks and 3 major carbon opportunities, and then assess the potential financial impact, and develop relevant countermeasures, so as to mitigate the impacts of climate risks and grasp future business opportunities.



### Climate Change Risks and Opportunities




| | | | |
|---|---|---|---|
| Major Carbon Risks | 5 Customer Behavior Change<br>6 Demand for Low-carbon Products and Services<br>22 Renewable Energy Regulations<br>28 Carbon Tax | Major Carbon Opportunities | 6 Energy Efficiency Improvement<br>14 Customer Behavior Change<br>16 Low Carbon Energy |
| Non-major Carbon Risks | 21 Fuel Tax / Energy Tax<br>23 General Environmental Regulations<br>26 Voluntary Agreement<br>31 Lack of Regulation or Legality<br>32 Total Volume Control / Emission Trading<br>35 Extreme Rainfall and Drought<br>38 Average Temperature Change | Non-major Carbon Opportunities | 1 Alternative or Diversified Resources<br>4 Recycled Materials<br>5 Production process<br>9 Low Carbon Products or Services<br>10 Commissioning and Solutions<br>17 Participation in Renewable Energy Projects<br>18 Policy Incentives |

## 2.2 Pertaining to Operations and Financials TCFD Strategy a.

ChipMOS defines significant financial impact as: a substantial change in annual revenue, costs, capital, assets, and liabilities exceeding 5% of pre-tax net income. The Company evaluates the impact of these changes on its strategy through four operational and financial-related dimensions.

**Probability**

- Absolutely impossible <5%
- Highly unlikely <10%
- Unlikely <33%
- Possibly <33-50%
- Moderately likely >50%
- Likely >66%
- Very likely >90%

**Impact Intensity**

Categorized into 5 levels based on impact type

Low — Low-Moderate — Moderate — Moderate-High — High

**Types of Impact**

- **Financial Categories** (Annual revenue, costs, assets, and liabilities change as a percentage of "pre-tax net income" - (<0.5%, 0.5%~2%, 2%~3.5%, 3.5%~5%, >=5%) - to determine the five levels of impact intensity (pre-tax net income * 5%)
- **Operational Categories** (Loss < NT$ 1 million, NT$1 million - 3 million, NT$ 3 million - 5 million, NT$ 5 million - 15 million, over NT$ 15 million or Customer Order Stoppage)
- **Company Image** (Negative news coverage lasting <1 day, 1-3 days, 3-7 days, 7-14 days, >14 days)
- **Employee Injury** (No apparent harm, Minor medical treatment required, Temporary disability, Permanent disability, Fatality)

**Scope of Impact**

Direct operations, Upstream or supply chain, Downstream or customers

We calculate the average score for each dimension, and when the score for a particular dimension exceeds 12, it is defined as a major operational risk.



| Major Carbon Risks | Risk Description | Location of Occurrence | Time of Occurrence | Potential Impact | Financial Connection | Management Practices |
|---|---|---|---|---|---|---|
| Renewable Energy Regulations | International or domestic regulations on renewable energy may affect the current and future energy sources, composition, price, etc. | Within the Organization | Middle Term | Increase in Capital Expenditure | • Loss of revenue if products fail to meet regulations or standards<br>• According to the renewable energy obligations as specified in domestic laws and regulations, the large power users paid NT$56Million, NT$668Million and NT$1.33 Billion in 2025, 2030 and 2050 respectively. | Solar energy installations are expected to reach 6,990.45 kW in 2024, with a capital expenditure of approximately NT$389.963 million:<br>• **Lease and Buyback**<br>In 2021, the roofs were leased to install 990.45 kW, and were bought back in 2022.<br>• **Leas land and Build on Its Own**<br>The contract will be completed in 2022, and it is expected to obtain fields with 6,000 kW in 2023. |
| Carbon Tax | Tax system formulated by international or domestic governments, related to GHG emissions or climate change. | Within the Organization | Middle Term | Increase in Indirect Costs | Total emissions (regression forecast in the past five years)<br>• Carbon tax price (word bank or IPCC AR6):<br>It is estimated that the additional cost will be NT$9.22 Million in 2030 and NT$148 Million in 2050. | • Strive to reduce GHG emissions at the Company's organizational boundary to cope with the cost of carbon tax at home and abroad in the future.<br>• At present, 98-99% of greenhouse gas emissions in the fab. come from electricity. At present, efforts are made to invest in energy-saving schemes and renewable energy equipment to improve the use of renewable energy and reduce carbon emissions.<br>• Develop low-carbon products and reduce GHG emissions. |
| Customer Behavior Change | Because of the rising global or regional awareness of sustainability, customers have different considerations when choosing products or services than before. | Within the Organization Customers | Middle Term | Decrease in Operating Income | • Revenue decreased by NT$1.75 Billion in 2035 and NT$3.5 Billion in 2050.<br>• The labor cost of communicating with customers was NT$5 Million in 2021, and is estimated to be NT$10 Million in 2035 and NT$15 Million in 2050. | The customer requests to draw up a green power use and carbon neutralization assessment plan.<br>• First, conduct the carbon footprint verification and establish the verification scope<br>• Formulate carbon reduction targets<br>• Set up carbon neutrality targets |
| Demand for low-carbon products and services | Due to the climate change factors, the products and services currently provided are high energy consumption or high carbon emission, which do not meet the market demand and may be eliminated. | Within the Organization Customers | Middle Term | Decrease in Operating Income | Regarding issues related to the introduction of low-carbon materials, the labor cost of communicating with customers will be >NT$15 million in 2035 and >NT$20 million in 2050. | • Strive to reduce GHG emissions on the organizational boundary of the Company.<br>• At present, 98-99% of greenhouse gas emissions in the fab. come from electricity. At present, efforts are made to invest in energy-saving schemes and renewable energy equipment to improve the use of renewable energy and reduce carbon emissions.<br>• Develop low-carbon products (together with relevant material evaluation units) to reduce GHG emissions. |

| Major Carbon Opportunities | Opportunity Description | Location of Occurrence | Time of Occurrence | Potential Impact | Financial Connection | Management Practices |
|---|---|---|---|---|---|---|
| Energy Efficiency Improvement | Avoid the impact caused by energy shortage or price fluctuation, and help to launch new products or services. | Within the Organization | Middle Term | Decrease of Operating Costs | The electricity cost of NT$220 Million will be saved in 2035, and NT$962 Million saved in 2050. | By replacing old models with high energy consumption and updating new models year by year, we can improve energy efficiency and avoid the impact caused by energy shortage. In addition, the production capacity of new models will also help to meet the process requirements of new products. |
| Customer Behavior Change | When customer behavior changes, different considerations will be given to the selection of products or the provision of services. | Customers | Long Term | Emerging Market Development | The gross profit rate of low-carbon products will increase by 0.5-1% in 2035 and 1-2% in 2050. | The customer requests to draw up a green power use and carbon neutralization assessment plan.<br>• First, conduct carbon footprint verification and establish the scope of verification<br>• Formulate carbon reduction targets<br>• Set up carbon neutrality targets |
| Low Carbon Energy | Reduce dependence on fossil fuels and gradually replace them with renewable or low-carbon or green energy. | Within the Organization | Middle Term | Carbon Assets Management | In 2024, a 6,990.45 kW solar power generation system will be obtained, which can reduce the purchased power volume from Taipower. In 2025, the power cost will be saved by NT$8.42 million, in 2030, by NT$8 million, and by NT$6.31 million in 2050. | The solar power generation system has been built, with an additional budget of NT$348 million in 2022, with NT$41.96 million of budget planned for 2023, and the total power consumption of renewable energy will reach 1.7% in 2025. |

# 2.3 Demonstration of Resilience

Failure to control global warming within the 1.5℃ limit will result in significant impacts on businesses, including disruptions to production capacity expansion and increased production costs, due to various climate-related disasters. The implied risks and opportunities involved are challenges that businesses today must acknowledge and proactively prepare for. Recognizing climate strategy as a critical competitive advantage, ChipMOS has developed a well-defined and comprehensive low-carbon strategy. By taking a responsible approach that takes the impact of its operations across the entire value chain into account, the Company shall strive to improve its operational models while working with its value chain partners to create green values.

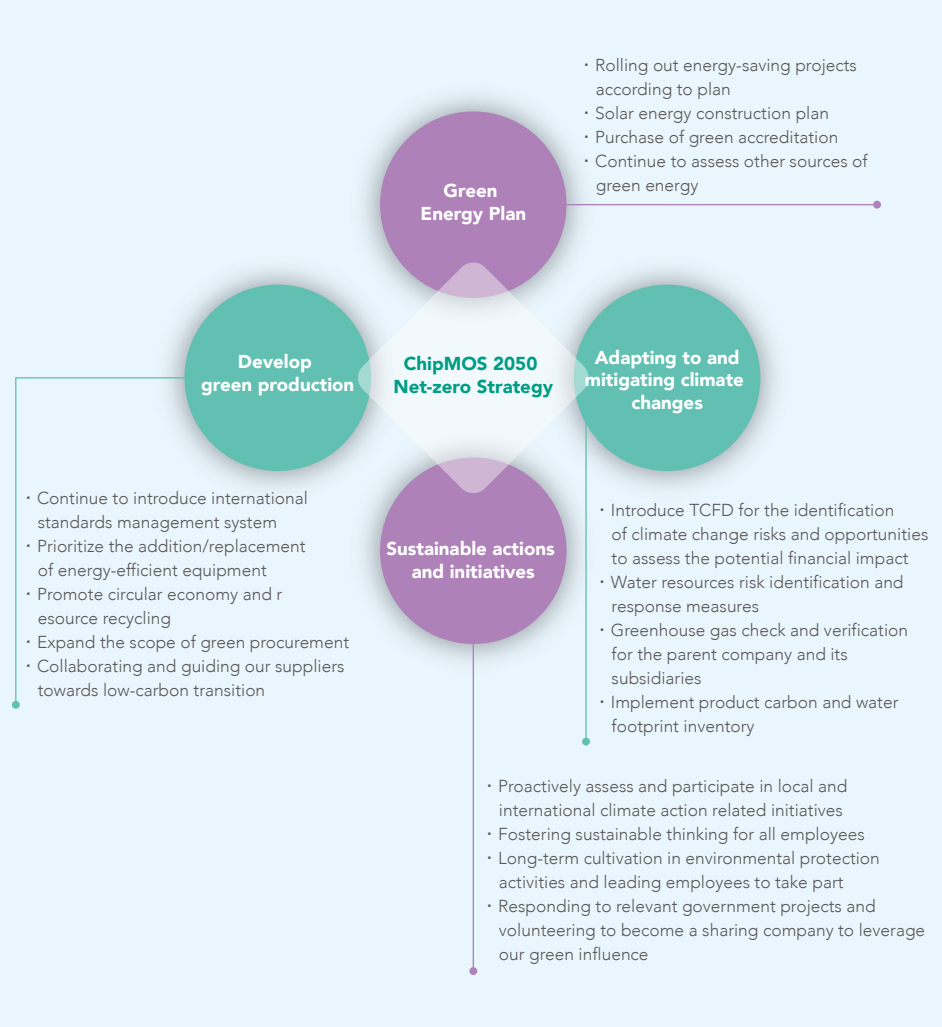
ChipMOS's net-zero emissions strategy is aligned with 5 le Development Goals (SDGs), driving the development of relevant projects, setting sustainable targets, and implementing actions with regular monitoring and follow-up. By implementing efficient management systems and operating models, ChipMOS shall drive its supply chain to jointly create a low-carbon and eco-friendly environment.

| SDGs | Pillars of the Strategy | Actions | |
|---|---|---|---|
| SDG6 SGD6 Clean water and sanitation | • Adapting to and mitigating climate changes<br>• Develop green production<br>• Sustainable actions and initiatives<br>• Green Energy Plan | Water Resources Management | • Construction of process water recycling system<br>• Introduction of ISO 46001 Water Efficiency Management Systems in 2023-2024 |
| SDG7 Affordable and clean energy | | Improvement of Energy Efficiency | • Improved energy conservation and efficiency and achieved an energy-saving rate of 1.58% in 2023<br>• Continued to promote company-wide energy conservation and carbon reduction incentive programs |
| SDG11 Sustainable cities and communities | | Creating a green environment | • Green Factory<br>• Adoption and maintenance of green spaces and air quality purification zones |
| SDG12 Responsible consumption and production | | Recycling/ Resource sustainability | • Management of raw material from the source to reduce raw material consumption<br>• Recycling of Packaging Materials<br>• Promoting circular economy and turning wastes into resources<br>• Continued to promote waste reduction |
| SDG13 Climate action | | Development of green energy | • Enhance resilience and adaptation to climate-related disasters and natural hazards<br>• Elevating the level of governance for climate change |

## 2.3.1 Sustainable Strategies TCFD Strategy c.

ChipMOS Technology developed climate-related strategies and set net-zero emissions targets through strategic pillars, including the Green Energy Plan, Climate Change Adaptation and Mitigation, Green Production Development, and Sustainable Actions and Initiatives. The Company actively monitors domestic and international trends, adjusting relevant strategies and plans to effectively respond to climate challenges and capitalize on opportunities.

### Pillars of ChipMOS' Net-zero Emissions Strategy



## 2.3.2 Situation Analysis and Financial Impact TCFD Strategy b.

### ▷ Transition Risk Scenario Analysis

ChipMOS has constructed three climate scenario models to simulate potential impacts. Each facility is required to establish its climate change scenario analysis framework to simulate various parameter changes and assess potential impact areas. By implementing preventive mechanisms, early warning systems, and emergency response frameworks, we have confidence in our ability to effectively address climate change risks. We have taken current climate change policies and strategies and the implemented and determined operation conditions as the basic scenarios. The basic assumption is that the emission growth rate of category I: estimated based on the assumption of average value from 2019 to 2021; power consumption growth rate: 2%; from 2020 to 2050, according to the non-nuclear home policy and the gradual change of power coefficient under waste coal, the current government's forecast target (30% coal, 50% gas and 20% renewable energy) will be achieved in 2030, and will continue to grow to 50% renewable energy and replace coal-fired power generation until 2050.

The estimation of carbon emissions quotas in different scenarios include the following factors:

| | |
|---|---|
| NDC (Net-Zero) Target | The baseline year emissions are set to decrease by 1.46% annually until 2030, and from 2031 to 2050, a gradual transition towards zero emissions |
| SBT-WB2DC | The baseline year emissions are targeted to decrease by 2.5% annually in a linear manner |
| SBT-1.5DC | The baseline year emissions are targeted to decrease by 4.2% annually in a linear manner |

The benchmark scenario is that if ChipMOS maintains its current status without any change, its main climate change financial impact risks will occur in carbon tax, total amount control and carbon fines, and carbon reduction without initiatives, resulting in the gradual replacement of market substitutes. The assessment results show that ChipMOS will face financial impacts in 2025, 2030 and 2050 (NDC, SBT-WB2DC and SBT-1.5DC) under the condition of inaction. In 2025, the main financial risk will come from the 3,818 kW capacity to be borne by the compulsory capacity. On the whole, the financial impact caused by the carbon tax is the most significant when the world is about to move towards 1.5°C. This carbon tax must reach more than US $300 per ton of carbon, which is extremely difficult to achieve under the current political environment. In terms of the possible carbon tax price currently regulated by the state, which is only NT$100, its financial risk cost is less than NT$100 Million.

ChipMOS uses renewable energy strategy to achieve the 2025 financial impact risk assessment under SBT-WB2DC, SBT-1.5DC and NDC. Then the most important financial risk comes from the cost of renewable energy transfer supply and the cost of device capacity. However, it can also avoid part of the carbon tax and the benefit of not having to purchase power from Taipower. The net cost is about NT $500-600 Million. By 2030, the cost risk also comes from renewable energy transfer and carbon tax. Especially in the 1.5DC scenario, when the global carbon tax reaches hundreds of dollars per ton, the carbon tax will become a very important risk. In this case, the financial risk of the three scenarios is NT$700 Million - NT$1.8 Billion. By 2050, in order to achieve the goal, the renewable energy needs to be purchased in most scenarios, so the financial cost mainly comes from the procurement of renewable energy.

| Risks and Parameters | | Notes |
|---|---|---|
| Legal | Carbon Tax | According to different situations, the unit carbon emissions of enterprises will be taxed. In this part, due to the great difference in tax system, the uncertainty is very high. This assessment mainly considers three levels of carbon taxes:<br>• NDC: estimated as SSP2-4.5<br>• SBT-WB2DC: estimated as SSP1-2.6<br>• SBT-1.5DC: estimated as SSP1-1.9* |
| | Total Amount Control and Carbon Fines | Carbon fines (NTD/t$CO_2$e) are applied to the excess part, which are analyzed by different total amount controls. Total amount control is designed in three scenarios:<br>• NDC: 100 NTD/t$CO_2$e<br>• SBT-WB2DC: 750 NTD/t$CO_2$e<br>• SBT-1.5DC: 1500 NTD/t$CO_2$e |
| | Compulsory Capacity | According to the draft measures for the management of renewable energy power generation equipment to be set up by power users with a certain contractual capacity or more announced by the Energy Administration on December 31, 2020, ChipMOS assumes that 10% of the compulsory capacity will be set up in 2025 and 20% discounted. The construction cost will not be amortized. |
| Technology | Power Saving Benefit | Power saving cost, mainly based on Taipower's announced price, 2.44NTD/ kWh |
| Market | Green Products | Alternative products and services are gradually impaired because they do not meet the environment friendly requirements.<br>• NDC: 0<br>• SBT-WB2DC: 1% decrease in market share<br>• SBT-1.5DC: 2% decrease in market share |

*Based on the five core scenarios presented in the AR6 (Sixth Assessment Report) released by the IPCC (Intergovernmental Panel on Climate Change) in 2021:
- SSP2-4.5 corresponds to NDC
- SSP1-2.6 corresponds to SBT-WB2DC (Well-below 2°C)
- SSP1-1.9 corresponds to the reduction path of SBT-1.5°C

For the potential carbon prices for each IPCC simulated scenarios, please see https://tntcat.iiasa.ac.at/SspDb/dsd?Action=htmlpage&page=10



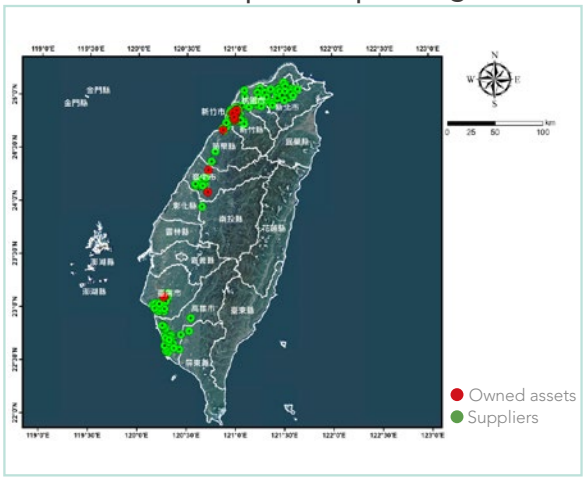

2025
Legal - Carbon Tax
Legal - Carbon Fines
Legal - Unit Capacity Charge
Technology - Not required to purchase Taipower benefits
Technology - Cost of renewable energy procurement
Net cost
Unit:NT$100 Million
40
20
0
-20
B2DC
1.5DC
NDC (net zero)
2030
Legal - Carbon Tax
Legal - Carbon Fines
Legal - Unit Capacity Charge
Technology - Not required to purchase Taipower benefits
Technology - Cost of renewable energy procurement
Net cost
Unit:NT$100 Million
40
20
0
-20
B2DC
1.5DC
NDC (net zero)
2040
Legal - Carbon Tax
Legal - Carbon Fines
Legal - Unit Capacity Charge
Technology - Not required to purchase Taipower benefits
Technology - Cost of renewable energy procurement
Net cost
Unit:NT$100 Million
40
20
0
-20
B2DC
1.5DC
NDC (net zero)
2050
Legal - Carbon Tax
Legal - Carbon Fines
Legal - Unit Capacity Charge
Technology - Not required to purchase Taipower benefits
Technology - Cost of renewable energy procurement
Net cost
Unit:NT$100 Million
40
20
0
-20
B2DC
1.5DC
NDC (net zero)

### ▷ Physical Risk Scenario Analysis

Climate risk consists of three components: Hazard, Exposure, and Vulnerability. According to the definition provided by the IPCC, Hazard represents the driving force behind climate-related events that may cause damage and losses to operational sites. Exposure refers to the location and extent to which operational sites may be negatively affected. Vulnerability encompasses adaptability and sensitivity, defining the tendency or degree to which operational sites are susceptible to disasters. Based on the aforementioned definition, quantifying the levels of Hazard, Exposure, and Vulnerability allows for the estimation of risk. By categorizing and grading Hazard, Exposure, and Vulnerability, the risk level can be calculated and serves as a crucial basis for determining the order and means of adaptation measures in subsequent actions.

ChipMOS considers extreme rainfall under climate change as the Hazard, while the resulting flooding, landslides, and mudslides are defined as Vulnerability factors. The Exposure is determined based on the location of each site. Through this approach, ChipMOS has conducted a numerical analysis of the physical risks at each site to assess the actual risk levels. To assess the Hazard component, multiple climate models (GCM/ESM) are used to simulate climate risks under four scenarios: RCP2.6, RCP4.5, RCP6.0, and RCP8.5 so as to avoid extreme simulation results. Vulnerability is analyzed based on government-issued maps and data, considering the extent and severity of disasters. Exposure is determined based on the locations of ChipMOS's owned assets and 283 supplier sites. Finally, the risk scores for the three vulnerability components at each site are classified into risk levels using a risk rating matrix. The risk levels are categorized as no risk, low risk, medium risk, and high risk. The overall risk level is represented by the highest risk level among the three vulnerability components.

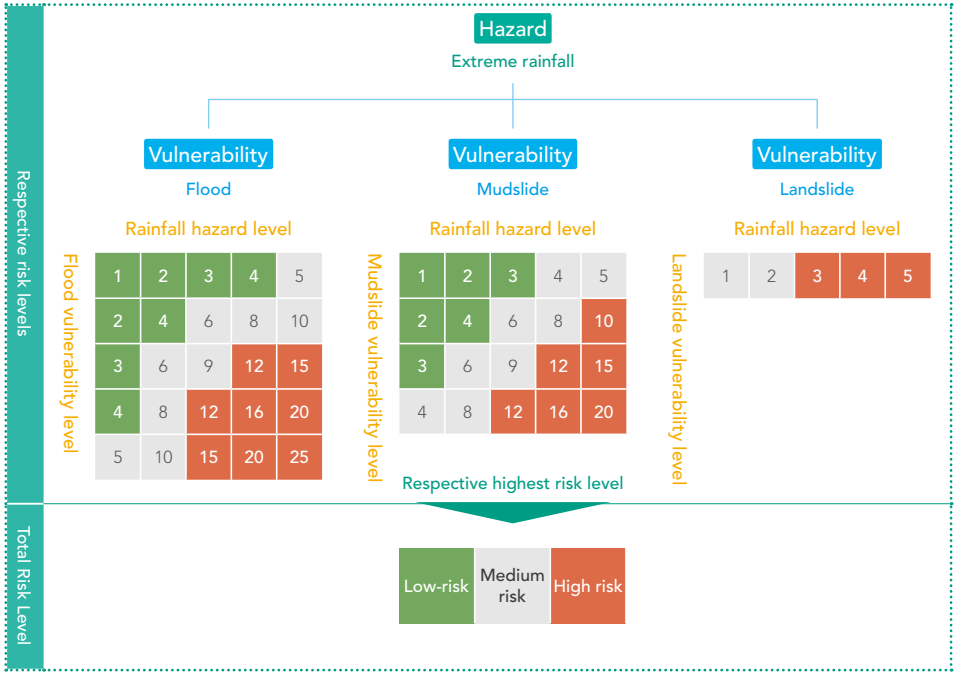
## Distribution of ChipMOS operating locations




In the sixth assessment report, the IPCC provides a clear definition of "risk" as the potential for adverse consequences to human beings and ecosystems. The climate risk framework is determined by three key elements: hazard, vulnerability, and exposure. In other words, the climate risk that ChipMOS faces can be calculated as Hazard multiplied by Vulnerability multiplied by Exposure. The three key factors are defined as follows:

| Hazard | Vulnerability | Exposure |
|---|---|---|
| It refers to the climate-related physical events, trends, or impacts that may cause damage or loss to the analyzed subject. Hazards are driven by both climate factors and non-climate factors. | It includes adaptability and sensitivity and is defined as the tendency or degree to be affected by the analyzed subject. | It is a spatial concept that describes the location or placement of a specific point or area that may be exposed to adverse impacts. |
| • Extreme rainfall | • Flood susceptibility (flood hazard map)<br>• Mudslide susceptibility (mudslide hazard map + extent of impact)<br>• Landslide susceptibility (landslide and geologically sensitive areas) | • Location of facilities |

ChipMOS has conducted risk assessments for climate change impacts on a total of 283 analyzed locations in Taiwan, which include 15 owned assets and 268 supplier sites. To avoid inconsistencies in the weighting of hazard levels resulting from directly summing the risk scores of different vulnerabilities and to ensure an accurate representation of the overall risk level, ChipMOS determines the total risk level by selecting the highest risk level among the individual risk categories during the risk level ranking process.



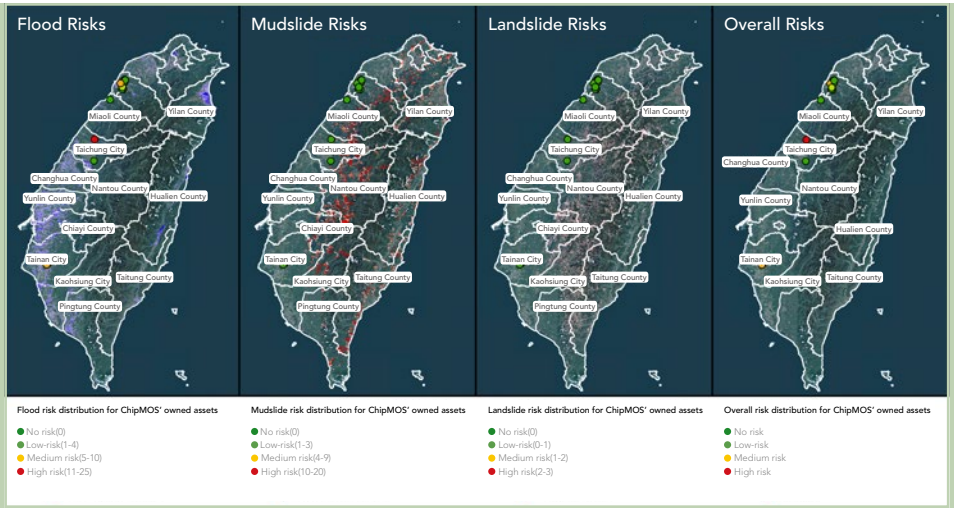
### ▷ Physical risk analysis for owned assets under the RCP 2.6 scenario

In the RCP 2.6 scenario, ChipMOS conducted a physical risk analysis for its own assets. Among these assests, the facility located in Taichung City was found to be at a higher risk due to its proximity to areas with a higher frequency of intense rainfall and the potential for flooding. Consequently, this facility was classified as having a high-risk level. To address this risk, the Company should consider implementing measures such as raising the foundation, improving drainage systems, and enhancing overall risk management protocols. On the other hand, the factories and facilities situated in Tainan City and Hsinchu City experience lower frequencies of intense rainfall under the RCP2.6 scenario, resulting in moderate to low risk levels. Nevertheless, ChipMOS remains vigilant in its approach to risk management and has developed emergency response plans and implemented risk mitigation strategies such as evacuation plans and resource allocation to ensure the safety of its employees and protect its assets. On top of that, we are also exploring options to enhance the water resistance of our buildings and strengthen our overall risk management systems to reduce potential risks and losses in the future.

| Risk value levels | Response Measures | Owned assets | | | |
|---|---|---|---|---|---|
| | | Short term | Middle Term | Mid- to long-term | Long Term |
| ● No risk | Maintaining operational sites | 8 | 8 | 8 | 8 |
| ● Low risk | Maintaining operational sites | 2 | 4 | 2 | 4 |
| ● Medium risk | Maintaining operational sites and focusing more on changes in disaster potential. | 4 | 2 | 4 | 3 |
| ● High risk | Avoid establishing new facilities in such area and relocate operational sites to locations with medium or lower levels of risk | 1 | 1 | 1 | 0 |
| Total | | 15 | | | |

Note: Short term, middle term, mid- to long-term and long-term correspond to 2021-2040, 2041-2060, 2061-2080 and 2081-2100 respectively

### Short term risk values for ChipMOS' owned assets in the RCP 2.6 scenario



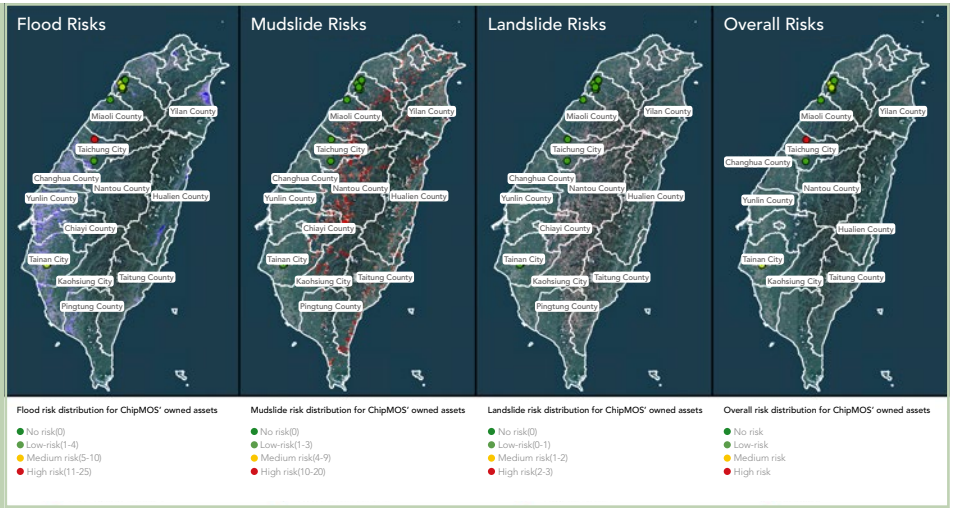

### ▷ Physical risk analysis for owned assets under the RCP 4.5 scenario

In the RCP 4.5 scenario, ChipMOS conducted a physical risk analysis for its own assets. Among these assests, the facility located in Taichung City was found to be at a higher risk due to its proximity to areas with a higher frequency of intense rainfall and the potential for flooding. Consequently, this facility was classified as having a high-risk level. To address this risk, the Company should consider implementing measures such as raising the foundation, improving drainage systems, and enhancing overall risk management protocols. On the other hand, the factories and facilities situated in Tainan City and Hsinchu City experience lower frequencies of intense rainfall under the same scenario, resulting in moderate to low risk levels. Nevertheless, ChipMOS remains vigilant in its approach to risk management and has developed emergency response plans and implemented risk mitigation strategies such as evacuation plans and resource allocation to ensure the safety of its employees and protect its assets. On top of that, we are also exploring options to enhance the water resistance of our buildings and strengthen our overall risk management systems to reduce potential risks and losses in the future.

| Risk value levels | Response Measures | Owned assets | | | |
|---|---|---|---|---|---|
| | | Short term | Middle Term | Mid- to long-term | Long Term |
| ● No risk | Maintaining operational sites | 8 | 8 | 8 | 8 |
| ● Low risk | Maintaining operational sites | 6 | 5 | 4 | 5 |
| ● Medium risk | Maintaining operational sites and focusing more on changes in disaster potential. | 2 | 1 | 2 | 1 |
| ● High risk | Avoid establishing new facilities in such area and relocate operational sites to locations with medium or lower levels of risk | 1 | 1 | 1 | 1 |
| Total | | 15 | | | |

Note: Short term, middle term, mid- to long-term and long-term correspond to 2021-2040, 2041-2060, 2061-2080 and 2081-2100 respectively

### Short term risk values for ChipMOS' owned assets in the RCP 4.5 scenario



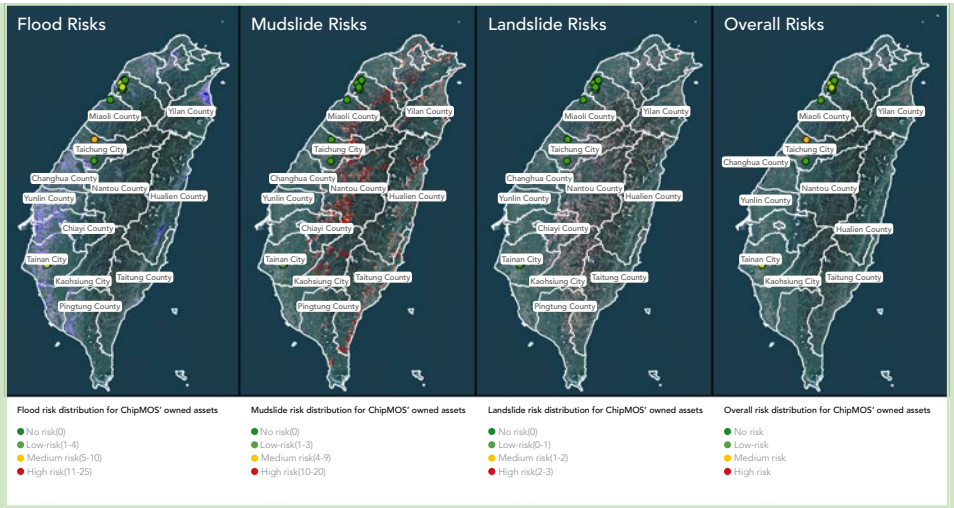
### ▷ Physical risk analysis for owned assets under the RCP6.0 scenario

In the RCP 6.0 scenario, ChipMOS conducted a physical risk analysis for its own assets. Among these assests, the facility located in Taichung City was found to be at a higher risk due to its proximity to areas with a higher frequency of intense rainfall and the potential for flooding. Consequently, this facility was classified as having a high-risk level. To address this risk, the Company should consider implementing measures such as raising the foundation, improving drainage systems, and enhancing overall risk management protocols. On the other hand, the factories and facilities situated in Tainan City and Hsinchu City experience lower frequencies of intense rainfall under the same scenario, resulting in moderate to low risk levels. Nevertheless, ChipMOS remains vigilant in its approach to risk management and has developed emergency response plans and implemented risk mitigation strategies such as evacuation plans and resource allocation to ensure the safety of its employees and protect its assets. On top of that, we are also exploring options to enhance the water resistance of our buildings and strengthen our overall risk management systems to reduce potential risks and losses in the future.

| Risk value levels | Response Measures | Owned assets | | | |
|---|---|---|---|---|---|
| | | Short term | Middle Term | Mid- to long-term | Long Term |
| No risk | Maintaining operational sites | 8 | 8 | 8 | 8 |
| Low risk | Maintaining operational sites | 5 | 7 | 5 | 4 |
| Medium risk | Maintaining operational sites and focusing more on changes in disaster potential. | 2 | 0 | 2 | 2 |
| High risk | Avoid establishing new facilities in such area and relocate operational sites to locations with medium or lower levels of risk | 0 | 1 | 0 | 1 |
| Total | | 15 | | | |

Note: Short term, middle term, mid- to long-term and long-term correspond to 2021-2040, 2041-2060, 2061-2080 and 2081-2100 respectively

### Short term risk values for ChipMOS' owned assets in the RCP 6.0 scenario



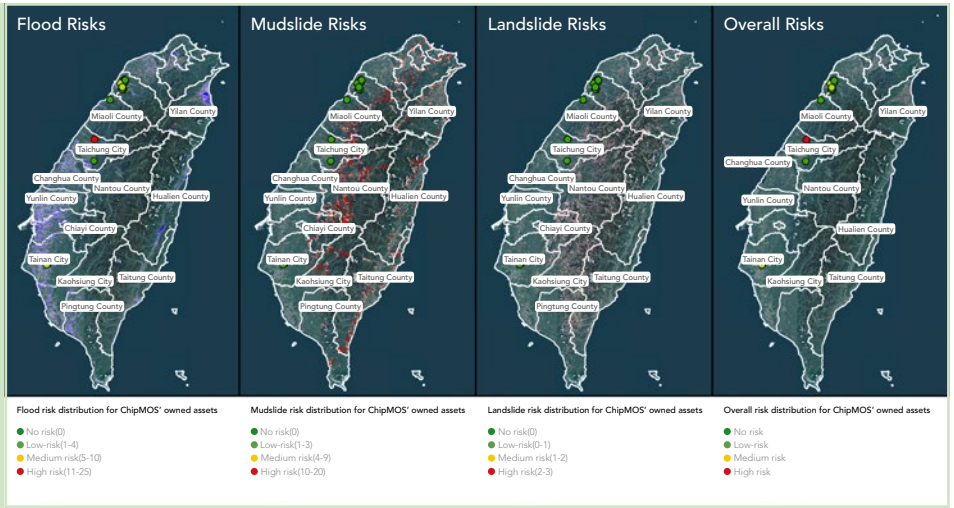

### ▷ Physical risk analysis for owned assets under the RCP 8.5 scenario

In the RCP 8.5 scenario, ChipMOS conducted a physical risk analysis for its own assets. Among these assests, the facility located in Taichung City was found to be at a higher risk due to its proximity to areas with a higher frequency of intense rainfall and the potential for flooding. Consequently, this facility was classified as having a high-risk level. To address this risk, the Company should consider implementing measures such as raising the foundation, improving drainage systems, and enhancing overall risk management protocols. On the other hand, the factories and facilities situated in Tainan City and Hsinchu City experience lower frequencies of intense rainfall under the same scenario, resulting in moderate to low risk levels. Nevertheless, ChipMOS remains vigilant in its approach to risk management and has developed emergency response plans and implemented risk mitigation strategies such as evacuation plans and resource allocation to ensure the safety of its employees and protect its assets. On top of that, we are also exploring options to enhance the water resistance of our buildings and strengthen our overall risk management systems to reduce potential risks and losses in the future.

| Risk value levels | Response Measures | Owned assets | | | |
|---|---|---|---|---|---|
| | | Short term | Middle Term | Mid- to long-term | Long Term |
| No risk | Maintaining operational sites | 8 | 8 | 8 | 8 |
| Low risk | Maintaining operational sites | 6 | 5 | 4 | 4 |
| Medium risk | Maintaining operational sites and focusing more on changes in disaster potential. | 1 | 3 | 3 | 3 |
| High risk | Avoid establishing new facilities in such area and relocate operational sites to locations with medium or lower levels of risk | 1 | 0 | 1 | 1 |
| Total | | 15 | | | |

Note: Short term, middle term, mid- to long-term and long-term correspond to 2021-2040, 2041-2060, 2061-2080 and 2081-2100 respectively

### Short term risk values for ChipMOS' owned assets in the RCP 8.5 scenario



### ▷ Physical risk analysis for suppliers under the RCP 2.6 scenario

In the RCP 2.6 scenario, ChipMOS' suppliers have 180 locations with no flood risk, while the remaining 87 locations have flood potential and 1 location has landslide potential. The number of locations in the low-risk and moderate-risk categories remains relatively stable across short to long-term time scales, ranging from 34 to 62 and 26 to 45 locations, respectively. These locations are mainly in New Taipei City, Hsinchu County, Hsinchu City, Miaoli County, Nantou County, Tainan City, and Kaohsiung City, with the main hazards being flood potential and landslide potential resulting from extreme rainfall. The number of locations in the high-risk category ranges from 0 to 9, primarily due to flood potential and landslide potential in Hsinchu County and City.

| Risk value levels | Response Measures | Suppliers | | | |
|---|---|---|---|---|---|
| | | Short term | Middle Term | Mid- to long-term | Long Term |
| No risk | Collaborate as usual | 180 | 180 | 180 | 180 |
| Low risk | Collaborate as usual | 49 | 34 | 43 | 62 |
| Medium risk | Collaborate as usual while focusing more on the hazard of disaster potential. | 34 | 45 | 39 | 26 |
| High risk | Depending on the nature of the industry, incorporate relevant disaster risk support measures and breach of contract compensation mechanisms in the contract; long-term project collaborations shall be prohibited. | 5 | 9 | 6 | 0 |
| Total | | 268 | | | |

Note: Short term, middle term, mid- to long-term and long-term correspond to 2021-2040, 2041-2060, 2061-2080 and 2081-2100 respectively

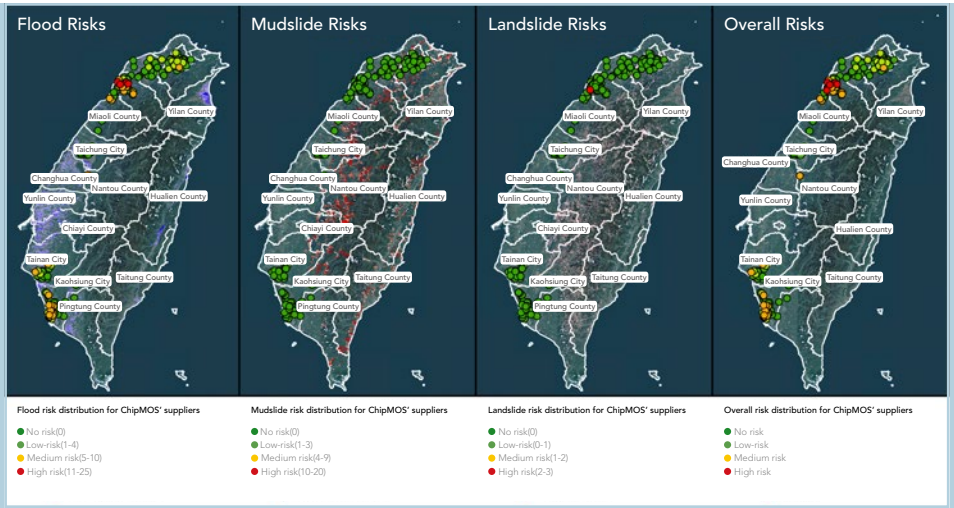
### ▷ Physical risk analysis for suppliers under the RCP 4.5 scenario

In the RCP 4.5 scenario, ChipMOS' suppliers have 180 locations with no flood risk, while the remaining 87 locations have flood potential and 1 location has landslide potential. The number of locations in the low-risk and moderate-risk categories remains relatively stable across short to long-term time scales, ranging from 42 to 51 and 32 to 43 locations, respectively. These locations are mainly in New Taipei City, Hsinchu County, Hsinchu City, Miaoli County, Nantou County, Tainan City, and Kaohsiung City, with the main hazards being flood potential and landslide potential resulting from extreme rainfall. The number of locations in the high-risk category ranges from 3 to 5, primarily due to flood potential and landslide potential in Hsinchu County and City.

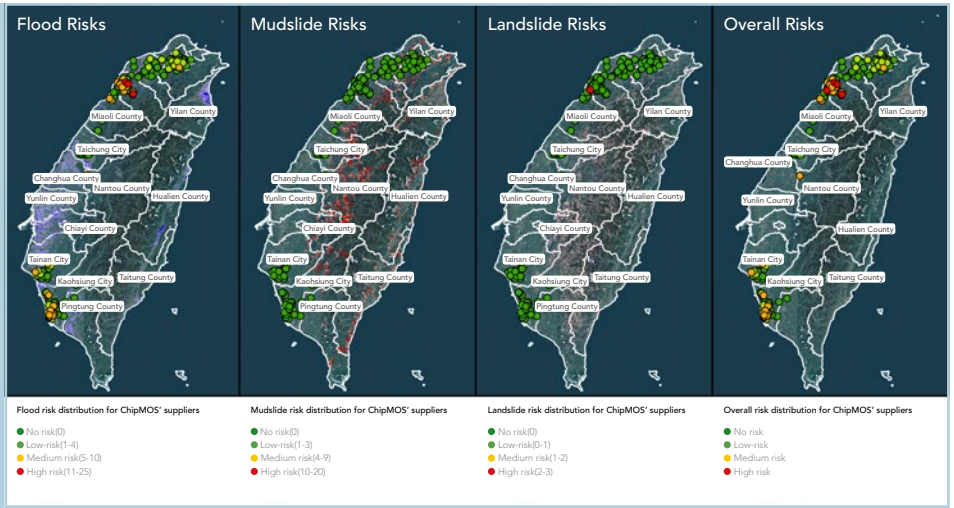
| Risk value levels | Response Measures | Suppliers | | | |
|---|---|---|---|---|---|
| | | Short term | Middle Term | Mid- to long-term | Long Term |
| No risk | Collaborate as usual | 180 | 180 | 180 | 180 |
| Low risk | Collaborate as usual | 51 | 45 | 42 | 48 |
| Medium risk | Collaborate as usual while focusing more on the hazard of disaster potential. | 32 | 39 | 43 | 36 |
| High risk | Depending on the nature of the industry, incorporate relevant disaster risk support measures and breach of contract compensation mechanisms in the contract; long-term project collaborations shall be prohibited. | 5 | 4 | 3 | 4 |
| Total | | 268 | | | |

Note: Short term, middle term, mid- to long-term and long-term correspond to 2021-2040, 2041-2060, 2061-2080 and 2081-2100 respectively

### Short term risk values for ChipMOS' suppliers in the RCP 2.6 scenario




### Short term risk values for ChipMOS' suppliers in the RCP 4.5 scenario



### ▷ Physical risk analysis for suppliers under the RCP 6.0 scenario

In the RCP 6.0 scenario, ChipMOS' suppliers have 180 locations with no flood risk, while the remaining 87 locations have flood potential and 1 location has landslide potential. The number of locations in the low-risk and moderate-risk categories remains relatively stable across short to long-term time scales, ranging from 42 to 70 and 17 to 44 locations, respectively. These locations are mainly in New Taipei City, Hsinchu County, Hsinchu City, Miaoli County, Nantou County, Tainan City, and Kaohsiung City, with the main hazards being flood potential and landslide potential resulting from extreme rainfall. The number of locations in the high-risk category ranges from 1 to 4, primarily due to flood potential and landslide potential in Hsinchu County and City.

| Risk value levels | Response Measures | Suppliers | | | |
|---|---|---|---|---|---|
| | | Short term | Middle Term | Mid- to long-term | Long Term |
| No risk | Collaborate as usual | 180 | 180 | 180 | 180 |
| Low risk | Collaborate as usual | 52 | 70 | 52 | 42 |
| Medium risk | Collaborate as usual while focusing more on the hazard of disaster potential. | 32 | 17 | 35 | 44 |
| High risk | Depending on the nature of the industry, incorporate relevant disaster risk support measures and breach of contract compensation mechanisms in the contract; long-term project collaborations shall be prohibited. | 4 | 1 | 1 | 2 |
| Total | | 268 | | | |

Note: Short term, middle term, mid- to long-term and long-term correspond to 2021-2040, 2041-2060, 2061-2080 and 2081-2100 respectively

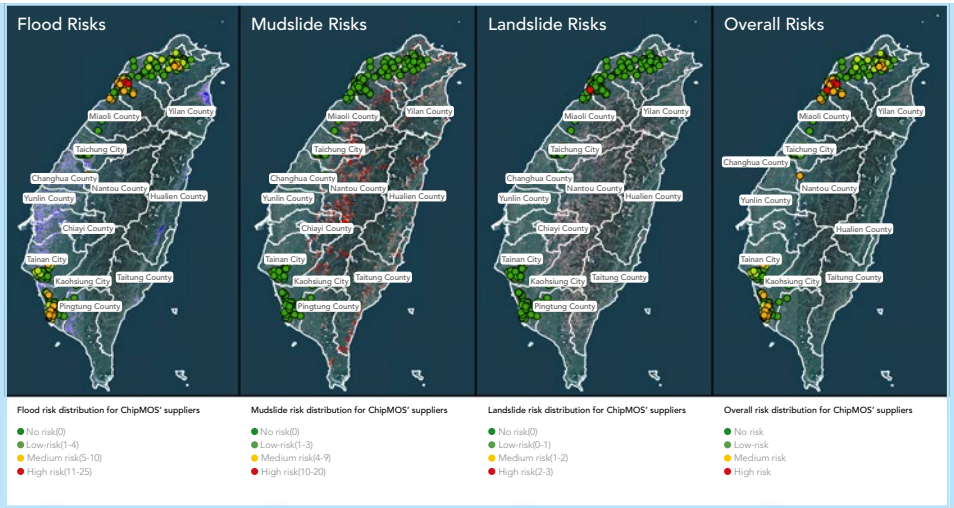
### ▷ Physical risk analysis for suppliers under the RCP 8.5 scenario

In the RCP 8.5 scenario, ChipMOS' suppliers have 180 locations with no flood risk, while the remaining 87 locations have flood potential and 1 location has landslide potential. The number of locations in the low-risk and moderate-risk categories remains relatively stable across short to long-term time scales, ranging from 37 to 56 and 31 to 46 locations, respectively. These locations are mainly in New Taipei City, Hsinchu County, Hsinchu City, Miaoli County, Nantou County, Tainan City, and Kaohsiung City, with the main hazards being flood potential and landslide potential resulting from extreme rainfall. The number of locations in the high-risk category ranges from 1 to 5, primarily due to flood potential and landslide potential in Hsinchu County and City.

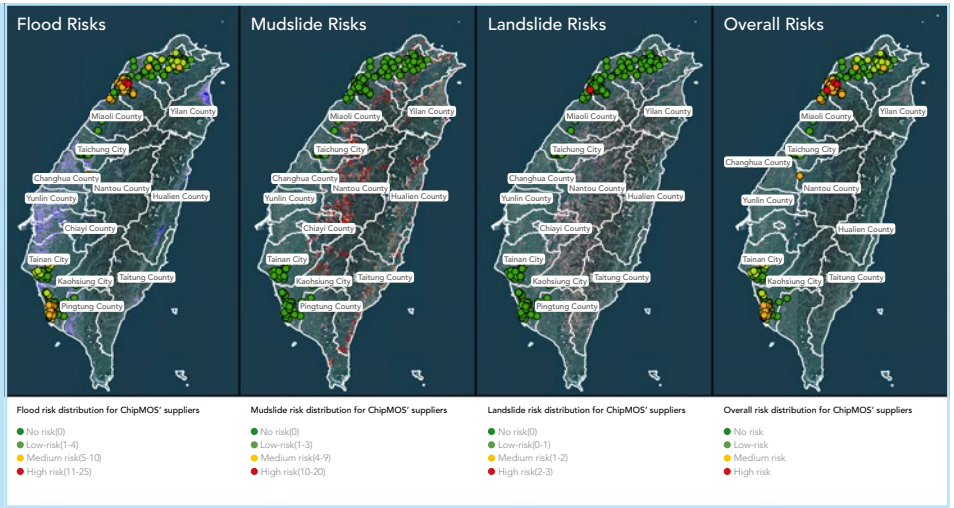
| Risk value levels | Response Measures | Suppliers | | | |
|---|---|---|---|---|---|
| | | Short term | Middle Term | Mid- to long-term | Long Term |
| No risk | Collaborate as usual | 180 | 180 | 180 | 180 |
| Low risk | Collaborate as usual | 52 | 56 | 37 | 41 |
| Medium risk | Collaborate as usual while focusing more on the hazard of disaster potential. | 32 | 31 | 46 | 43 |
| High risk | Depending on the nature of the industry, incorporate relevant disaster risk support measures and breach of contract compensation mechanisms in the contract; long-term project collaborations shall be prohibited. | 4 | 1 | 5 | 4 |
| Total | | 268 | | | |

Note: Short term, middle term, mid- to long-term and long-term correspond to 2021-2040, 2041-2060, 2061-2080 and 2081-2100 respectively

## Short term risk values for ChipMOS' suppliers in the RCP 6.0 scenario




## Short term risk values for ChipMOS' suppliers in the RCP 8.5 scenario



## 2.3.3 Responses and Actions

To address the impact of physical risks on our owned operational sites and suppliers, ChipMOS has developed the following adaptation plans for the short, medium, and long term:

| | Short term (1-3 years) | Middle term (5-10 years) | Long term (>10 years) |
|---|---|---|---|
| Our owned operational sites | **Rolling review**<br>An annual assessment of disaster risks shall be conducted for all owned asset of ChipMOS to achieve the objective of risk management.<br>**Emergency Plan**<br>Develop an emergency response protocol that includes evacuation plans and material salvage plans to ensure the safety of employees and protection of property.<br>**Construction of risk alert system**<br>Establish a risk alert system to promptly receive risk notifications and corresponding response measures during periods of high rainfall frequency. | **Construction of flood prevention system**<br>Study the geography and hydrological conditions of the area and establish an appropriate flood prevention system to mitigate the potential impact of flooding.<br>**Reinforcing structural water resistance**<br>Strengthen the water resistance of office building structures to reduce damage caused by flooding. | **Formulation of sustainable development plan**<br>Consider developing a sustainable development plan to minimize environmental impact and ensure long-term economic and environmental stability through energy conservation, emission reduction, and recycling practices. |
| Suppliers | **Rolling review**<br>An annual assessment of disaster risks shall be conducted for all ChipMOS suppliers to achieve the objective of risk management.<br>**Emergency Plan**<br>Develop an emergency response protocol that includes evacuation plans and material salvage plans to ensure the safety of workers and protection of property.<br>**Construction of risk alert system**<br>Establish a risk alert system to promptly receive risk notifications and corresponding response measures when risks occur. | **Assessment of building structures**<br>Evaluate the building structures and terrain of leased locations to gauge their ability to withstand extreme weather events, and undertake necessary reinforcement and adjustments.<br>**Strengthen emergency supplies**<br>Enhance emergency supplies to ensure that workers' basic needs will be met during extreme weather events. | **Expansion of risk management plan**<br>Consider expanding the risk management plan, including the incorporation of risk management considerations into lease agreements, communicating and coordinating with landlords, to ensure the feasibility and effectiveness of risk management. |



# 03 Risk Management


3.1 Risk Management Organization

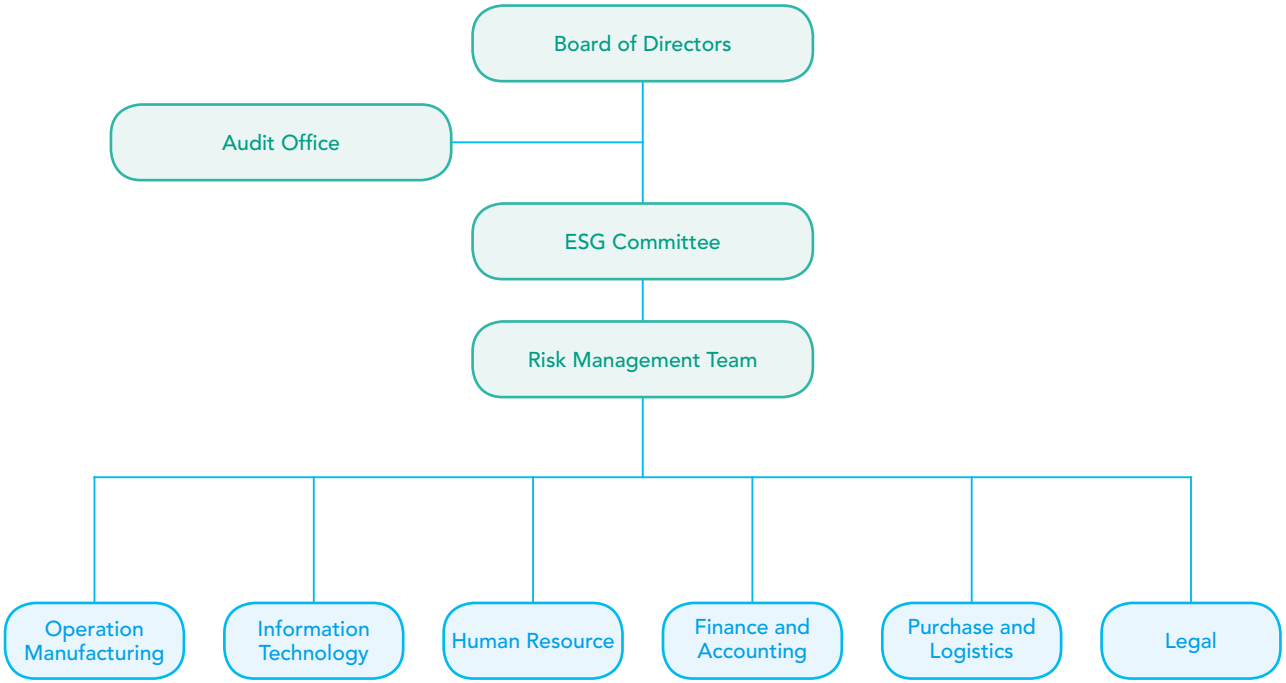
3.2 Risk Identification and Management Processes

With the development of society and the progress of science and technology, facing the changes of the environment and climate, the opening of markets and the frequent occurrence of network attacks, the fluctuation degree of various changes in the operation process increased leading to greater risks for operations. The Company must face the necessity and urgency of risk management. In view of this, ChipMOS has formulated the "Risk Management Policies and Procedures", which has been approved by the Board of Directors, to specify the scope and organization of the Company's risk management, so as to strengthen corporate governance and establish an effective risk management mechanism.

## 3.1 Risk Management Organization

TCFD Risk Management c.

ChipMOS has set up the risk management team as the responsible unit, responsible for the implementation of risk management, with the first level supervisor as the convener to promote the financial, strategic, operational and disaster aspects of various risk management units, including operation and manufacturing, information technology, human resources, financial accounting, legal affairs and etc. Each risk management unit shall appoint a supervisor at or above the departmental level to quantitatively evaluate the occurrence frequency, impact degree and control degree of potential risks through identification, analysis, evaluation and other procedures every year, and carry out necessary operations and risk management in accordance with the regulations to ensure that the risks involved are controlled within an acceptable range and continuously monitored.






# 3.2 Risk Identification and Management Processes

TCFD Risk Management a., TCFD Risk Management b.

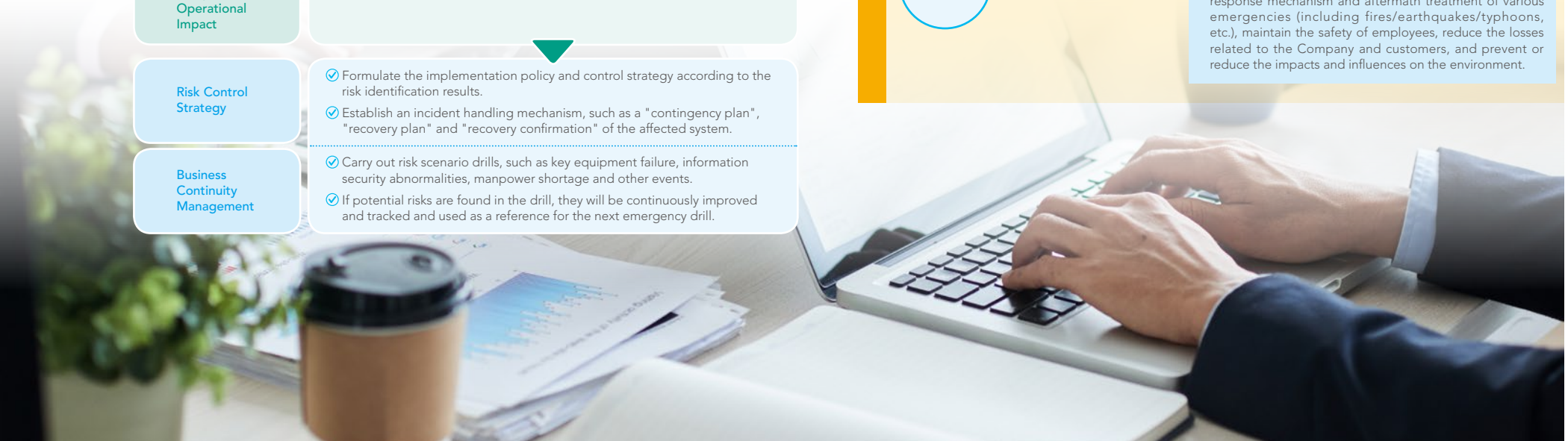
ChipMOS incorporates climate-related risks into its framework of Enterprise Risk Management (ERM) and conducts an annual review of various risks, including operational risks, climate change risks, information security risks, financial risks, supply chain risks, and compliance risks that relate to the Company's direct operations. For relevant ESG potential risk factors, ChipMOS regularly performs operational impact analysis and risk identification according to the frequency and significance of risks (e.g. the influence of finance, operations and reputation), control degree, etc., defines the priority and risk level of risk control through quantitative evaluation, and adopts corresponding risk management strategies according to the risk level, so as to promote the steady and healthy operation and sustainable development of the Company.

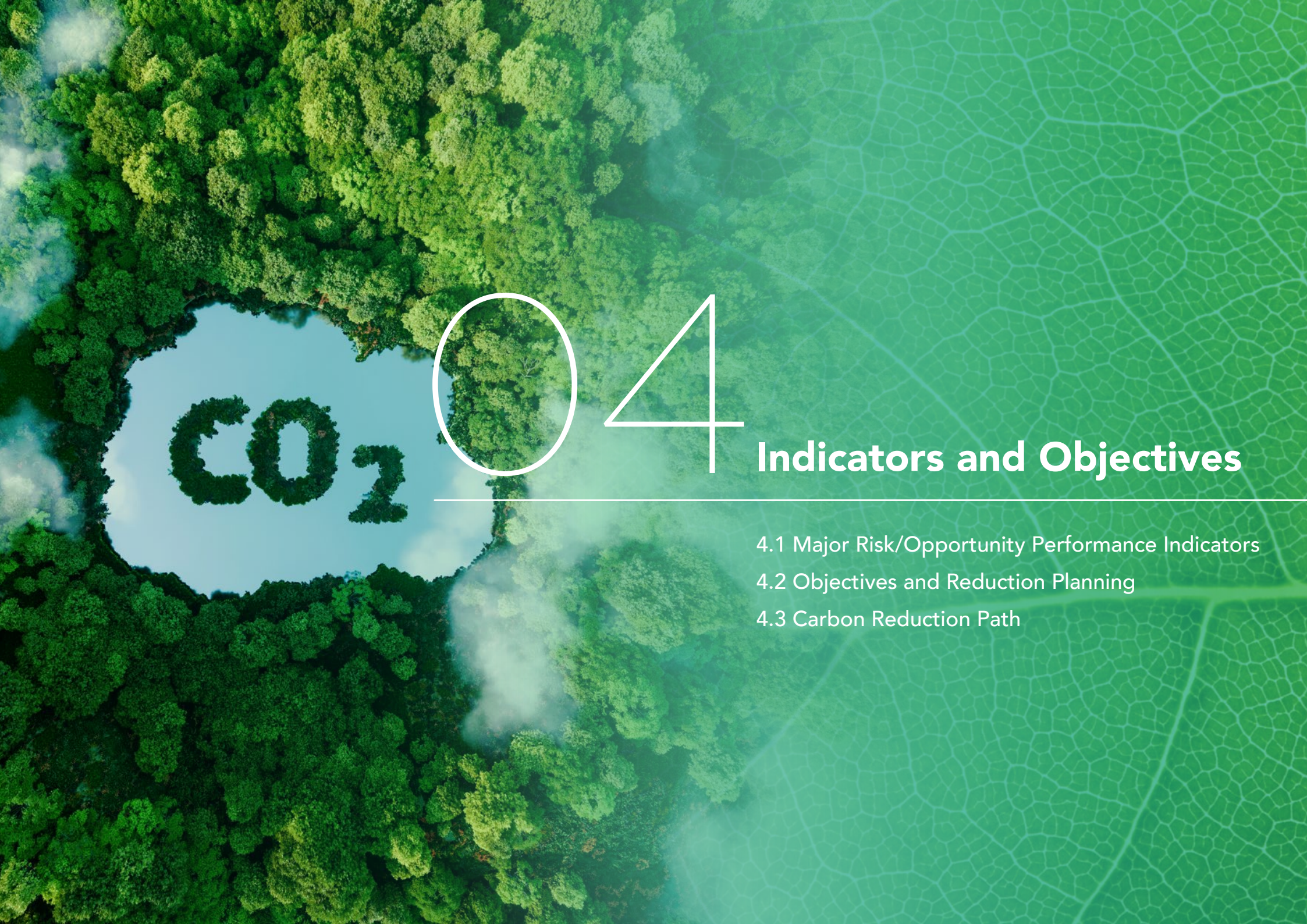
ChipMOS' Risk Management Committee reports to the Board of Directors annually on the Company's risk environment, risk management priorities, risk assessment, and response measures. The risk identification results and control strategies for 2022 can be found in Chapter 3.3 Risk Management of the 2022 Sustainability Report.

| | |
|---|---|
| Risk Analysis and Identification | ✓ Annual risk assessment: define high, medium and low risk levels according to occurrence and impact degree.<br>✓ Identify potential losses and impacts and quantify theimpact of losses. |
| Analysis of Operational Impact | |
| Risk Control Strategy | ✓ Formulate the implementation policy and control strategy according to the risk identification results.<br>✓ Establish an incident handling mechanism, such as a "contingency plan", "recovery plan" and "recovery confirmation" of the affected system. |
| Business Continuity Management | ✓ Carry out risk scenario drills, such as key equipment failure, information security abnormalities, manpower shortage and other events.<br>✓ If potential risks are found in the drill, they will be continuously improved and tracked and used as a reference for the next emergency drill. |

In 2022, ChipMOS' risk management operations identified three potential environmental risk factors: regulations related to renewable energy, carbon neutrality (carbon tax), and the risk of public service disruptions. On August 4, 2022, the Risk Management Committee reported these risks to the Board of Directors and presented specific response measures to mitigate them.

| Risk Category | Potential Risk Factors | Control Strategies and Practices |
|---|---|---|
| Environment | Climate Change Risk — Renewable Energy Regulations (Use of green power) | • We have set a target to install a green energy capacity of 6,990.4 kW, in accordance with legal requirements. This project is expected to be completed by 2023<br>Note:Climate change risks are managed in accordance with the TCFD framework |
| | Climate Change Risk — Carbon Neutrality (carbon tax) | • Strive to reduce GHG emissions at the Company's organizational boundary to cope with the cost of carbon tax at home and abroad in the future |
| | Operational Risk — Disruption of public services | • Through hazard risk and environmental identification, evaluate the risk factors in the process of business operations, grasp the risk impact, and effectively control the same.<br>• Formulate the "Contingency Event Procedure" and "Emergency Response Working Instruction" to ensure the response mechanism and aftermath treatment of various emergencies (including fires/earthquakes/typhoons, etc.), maintain the safety of employees, reduce the losses related to the Company and customers, and prevent or reduce the impacts and influences on the environment. |






# 04 Indicators and Objectives

4.1 Major Risk/Opportunity Performance Indicators
4.2 Objectives and Reduction Planning
4.3 Carbon Reduction Path

ChipMOS has incorporated climate issues into its daily operations by assessing its current situation, setting phased targets and goals, implementing specific actions, and regularly tracking progress.

ChipMOS plans to achieve net-zero emissions by 2050 as its absolute goal and set a management target in terms of greenhouse gas emission intensity (measured as the amount of carbon dioxide equivalent per unit of revenue). The target is to reduce greenhouse gas emission intensity by 55% compared to the baseline year of 2018 by 2030, gradually working towards the absolute goal of achieving net-zero emissions for the Company by 2050.

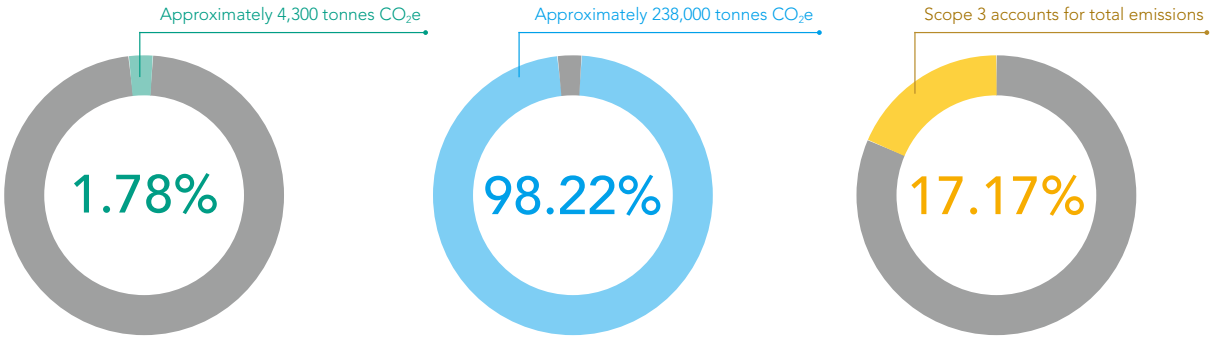
## 4.1 Major Risk/Opportunity Performance Indicators

TCFD Indicator Target a.

Regarding climate change, ChipMOS focuses primarily on reducing greenhouse gas emissions as the main indicator for reduction and control, supplemented by the indicator of "conserving and efficiently utilizing energy resources" as another target for monitoring and management.

### Reducing GHG Emissions

ChipMOS' total greenhouse gas emissions (Scope 1 + Scope 2) amount to approximately 242,312.69 metric tons of $CO_2e$, with over 98% of it attributed to the consumption of purchased electricity. And as such, the reduction of Scope 2 emissions is a critical issue for us to achieve net-zero emissions.




**Scope 1**

Hotspot Analysis:
- SF6 (26.49%)
- Refrigerant R-404A (26.48%)
- Septic tank (11.45%)

**Scope 2**

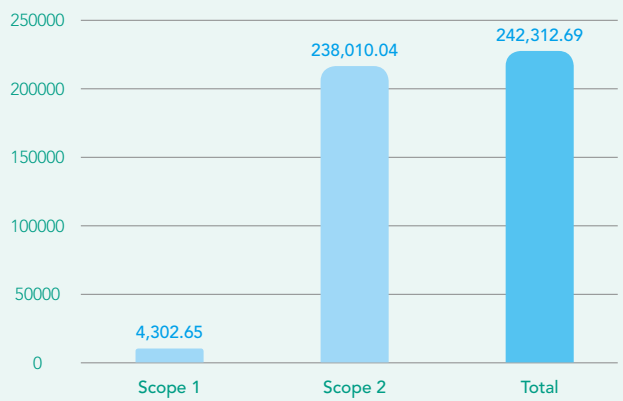
Hotspot Analysis:
- Purchased power (100%)

**Scope 3**

Hotspot Analysis:
- Indirect emissions from purchased energy - gasoline for vehicles (84.75%)
- Purchased goods - direct materials (6.37%)
- Employee Commuting - Electric Vehicles (2.75%)

### Emissions and Intensity of Scope 1 and 2 for 2022

Unit:Tonnes $CO_2e$




**Scope 1 + 2 Emission Intensity**

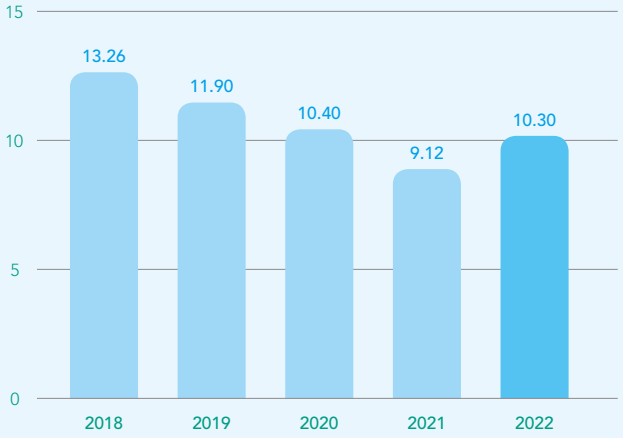
10.30 Tonnes $CO_2e$/ Current Revenue (NT$ 1 million)

Note 1: The power emission coefficient - 0.495 Kg$CO_2e$/ kWh announced by the Bureau of Energy in 2022 is taken as the calculation basis for 2022.

Note 2: The cope of the inventory shall cover all of ChipMOS' facilities in Taiwan, as well as its Shanghai and U.S. subsidiaries

### Emissions and Intensity of Scope 1 and 2 Trend Chart

Unit:Tonnes $CO_2e$/ Current Revenue (NT$ 1 million)



## 2022 Scope 3 Emissions

| | Category | Calculation Boundaries and Assumptions | Emissions (Tonnes $CO_2e$) |
|---|---|---|---|
| Scope 3 | Upstream transportation and distribution | Inventory all GHG emissions generated during transportation for all raw materials and consumables purchased in the year | 108.75 |
| | Downstream transportation and distribution | Inventory all GHG emissions generated during transportation of products and tally the volume of gasoline and diesel fuels used by relevant vehicles | 84.87 |
| | Employee commuting | Employee commuting encompasses means of transportation such as driving a car, riding a motorcycle or taking public transportation | 2,782.73 |
| | Business travel | Business travel shall cover all means of land/sea/air transportations (such as taking the high-speed railway for domestic business trips) | 73.05 |
| | Products purchased | • Raw materials and consumables purchased for production-related purposes at the fabs<br>• Emissions from the generation (by electricity or fuel) of externally purchased energy that do not fall under Scope 1 and 2 | 45,759.65 |
| | Capital Goods | Inventory of machinery and equipment procured during the year | 10.18 |
| | Disposal of solid and liquid wastes | Waste disposal inventory, such as the volume of annual waste disposal (i.e. domestic garbage, recycled items and so forth) | 1,320.86 |
| | Use of assets | Emissions from Asset Use (Electricity Consumption) | 87.73 |
| Total | | | 50,227.83 |

Note 1: Global Warming Potential (sourced from the IPCC's 2021 sixth assessment report)

Note 2: The scope of the inventory shall cover all of ChipMOS' facilities in Taiwan, as well as its Shanghai and U.S. subsidiaries

## Base Year for Greenhouse Gas Calculation

Unit:Tonnes $CO_2e$

| Category | Type of Fab | Hsinchu fab. | Zhubei fab. | Zhubei fab. 2 | Hukou fab. | Tainan fab. | Tainan fab. 2 | Shanghai subsidiary | U.S. subsidiary |
|---|---|---|---|---|---|---|---|---|---|
| Scope 1+2 | Base Year | 2022 | | | | | | | |
| | Total Emissions in the Base Year | 49,377.38 | 40,470.82 | 10,400.34 | 30,905.21 | 80,011.10 | 31,118.06 | 1.19 | 28.59 |
| Scope 3 | Base Year | 2022 | | | | | | | |
| | Total Emissions in the Base Year | 9,548.90 | 10,015.31 | 2,326.99 | 5,544.92 | 17,024.81 | 5,744.39 | 4.79 | 17.72 |

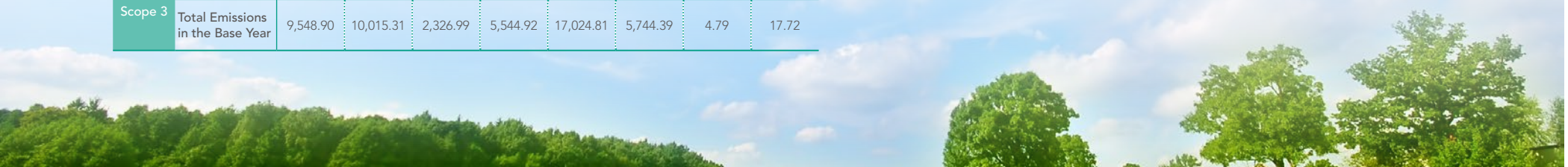
## Conserving and Effectively Using Energy Resources

| Other climate related indicators | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| Power (Megawatt Hour) | 421,204 | 438,232 | 449,151 | 466,290 | 494,358 | 480,854 |
| Energy intensity per unit of revenue Gigajoule (GJ)/ NT$ 1 million | 85.06 | 86.21 | 80.38 | 73.44 | 65.30 | 74.04 |
| Renewable energy (Megawatt Hour) | 0 | 0 | 0 | 0 | 5 | 8 |
| Total water intake (1 million liters) | 1,469.926 | 1,534.352 | 1,768.055 | 1,949.253 | 1,798.515 | 1,767.131 |

# 4.2 Objectives and Reduction Planning

TCFD Indicator Target b.&c.

Using 2018 as the baseline, the goal is to reduce greenhouse gas emission intensity by 55% compared to the baseline year by 2030 and achieve net-zero emissions by 2050. ChipMOS procured 5 and 8 renewable energy certificates (RECs) respectively in 2021 and 2022. Not only that, we also planned to purchase an additional 35 RECs in 2023. These actions reflect the Company's commitment to enhancing energy efficiency, promoting conservation of energy and water, reducing greenhouse gas emissions, implementing water recycling, and utilizing recycled materials. We shall actively seek strategies to minimize carbon footprint and integrate climate change considerations into our corporate governance. Furthermore, ChipMOS will strengthen the supervisory mechanisms of its senior management as part of its ongoing efforts to transition towards low-carbon operations. In addition to implementing energy-saving improvement measures internally in 2023, we also plans to achieve short-term goals of installing additional solar power facilities in both 2023 and 2024 so that we can reach the targets of adding 4.5 MW and 1.5 MW of solar energy capacity.



# 4.3 Carbon Reduction Path

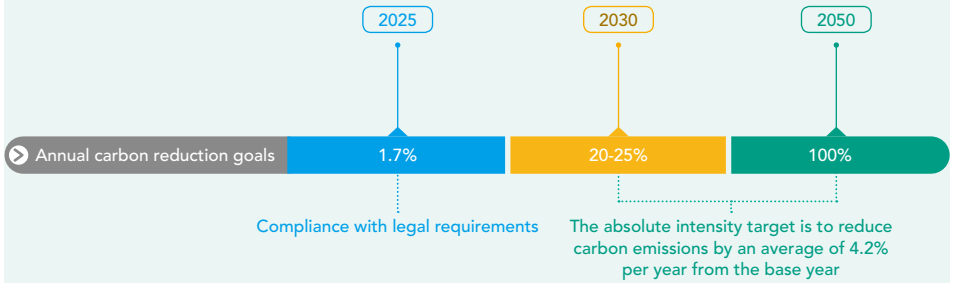
In response to the Financial Supervisory Commission's official launching the "Sustainable Development Roadmap for TWSE- and TPEx-Listed Companies" in 2022 and SEC in the U.S. requiring companies to disclose their GHG emissions and any climate-related risks information that may have "material impacts" on their business, and EPA in Taiwan announcement in 2022 of the amendment to "include ChipMOS as the second batch of subjects for inventory and registration of GHG emissions", we have initiated proactive actions:

1. ChipMOS shall complete the 2022 Greenhouse Gas Check and verifications for all fabs in Taiwan along with its Shanghai and U.S. subsidiaries by May 2023 so that the scope of coverage will be consistent with its Financial Report.

2. For its Hsinchu fab., Zhubei fab., Hukou fab., Tainan fab. and Tainan fab. 2 with GHG emissions exceeding 25,000 metric tons of $CO_2e$ each year, ChipMOS shall complete their verifications and register relevant outcomes for 2022 on the EPA platform before the end of August 2023.

ChipMOS' primary focus in its net-zero emission strategy is to prioritize compliance with legal requirements. The initial step involves the installation of renewable energy facilities or power generation equipment in accordance with the regulations outlined in the Renewable Energy Development Act before 2025. Building upon that, ChipMOS has adopted the SBT 1.5°C framework (with a goal of reducing carbon emissions by 4.2% annually) and taken consider customer demands for product decarbonization and green energy into consideration in the Company's Roadmap to Carbon Reduction and green power construction plans for 2026. More specifically, we will conduct a thorough inventory and implement relevant measures within our fabs to reduce carbon emissions and improve energy efficiency. This includes optimizing operational conditions, reducing equipment energy consumption, implementing smart energy management systems, and enhancing lighting efficiency. In addition to these internal efforts, ChipMOS will be exploring other feasible avenues, such as developing our own renewable energy facilities, acquiring unified green energy certificates, or investing in green energy certificates. ChipMOS' green energy deployment plan is designed to align with international trends in green energy technology, respond to changing customer needs, and periodically adjust our implementation strategies in light of existing industry standards to ensure practicality. On top of that, the Company will also expand its renewable energy facilities, such as solar or wind power, and the gradual increase in the deployment of green energy certificates so that we will eventually accomplish our long-term goal of net-zero emissions by 2050.

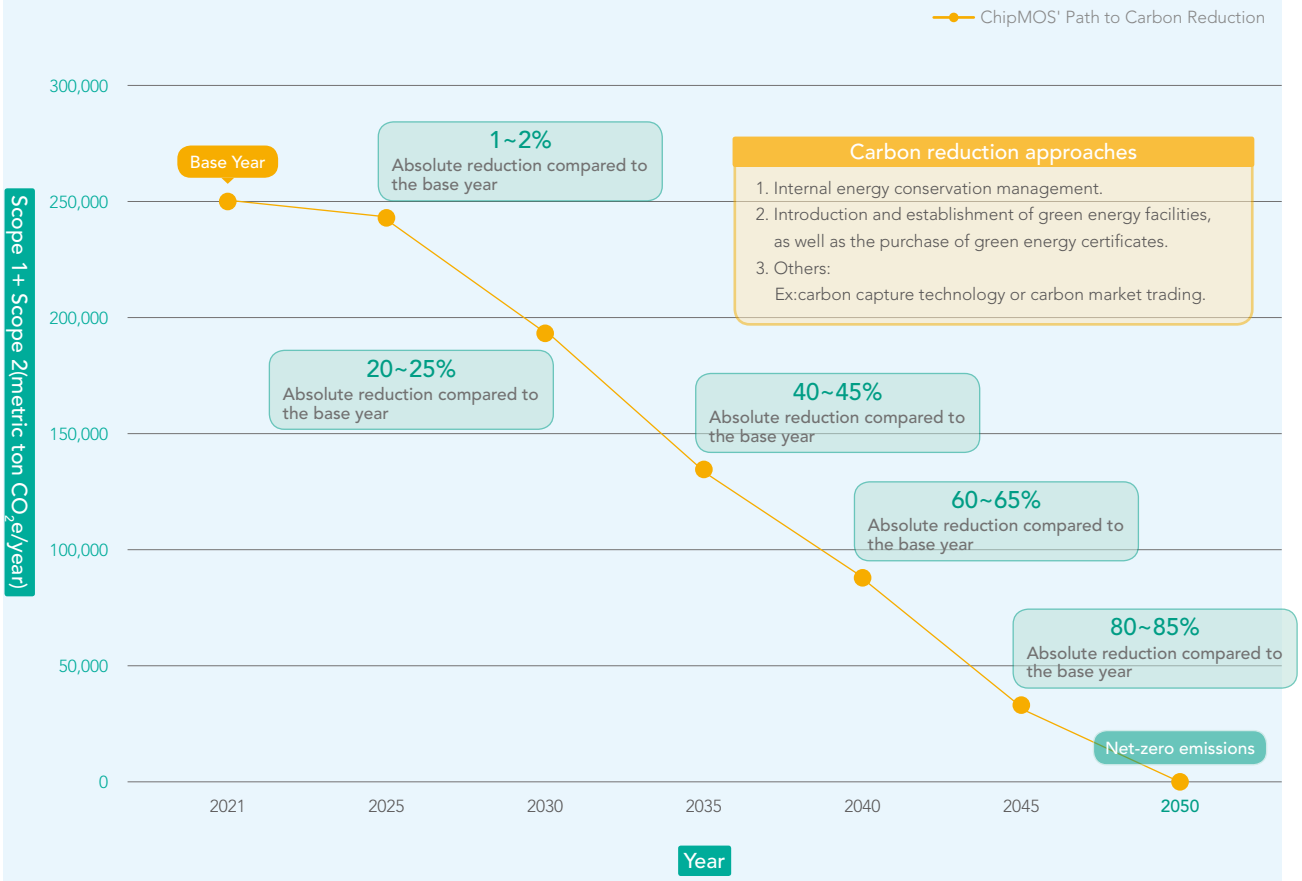
## Net-zero emission goals




| | |
|---|---|
| 2009 | • Voluntary inventory and verification<br>• Installation of two solar power generation facilities |
| 2021 | • ISO 14064:2018 inventory verification<br>• Installation of four solar power generation systems |
| 2022 | Buy back of 990.45 kW of leased solar power |
| 2023 | • Completion of additional 4,500 kW self-built solar energy facility for own use<br>• Planning of net-zero emission pathway |
| 2024 | Completion of additional 1,500 kW self-built solar energy facility for own use |
| 2025 | Completion of the installation of 1~2% green energy capacity or certificates. (Based on the power consumption in 2021 as the baseline) |
| 2030 | • GHG gas emission intensity reduced by 55% compared to the baseline year (2018)<br>• Completion of the installation of 20~25% green energy capacity or certificates. (Based on the power consumption in 2021 as the baseline) |
| 2030-2050 | ChipMOS plans to install approximately 15-20% green energy capacity or certificates (based on the electricity consumption in 2021) over five-year intervals, including 2035, 2040, 2045, and 2050 to achieve the net-zero carbon emissions target by 2050.<br><We will continue to monitor relevant trends in green energy technology and make adjustments as necessary> |
| 2050 | Net-zero carbon emission |



## ChipMOS' Roadmap to Carbon Reduction





# 05 Climate Actions


5.1 Carbon Reduction Initiatives

5.2 Sustainable Supply Chain Engagement

5.3 Green Manufacturing

5.4 Water Resources Management



# 5.1 Carbon Reduction Initiative

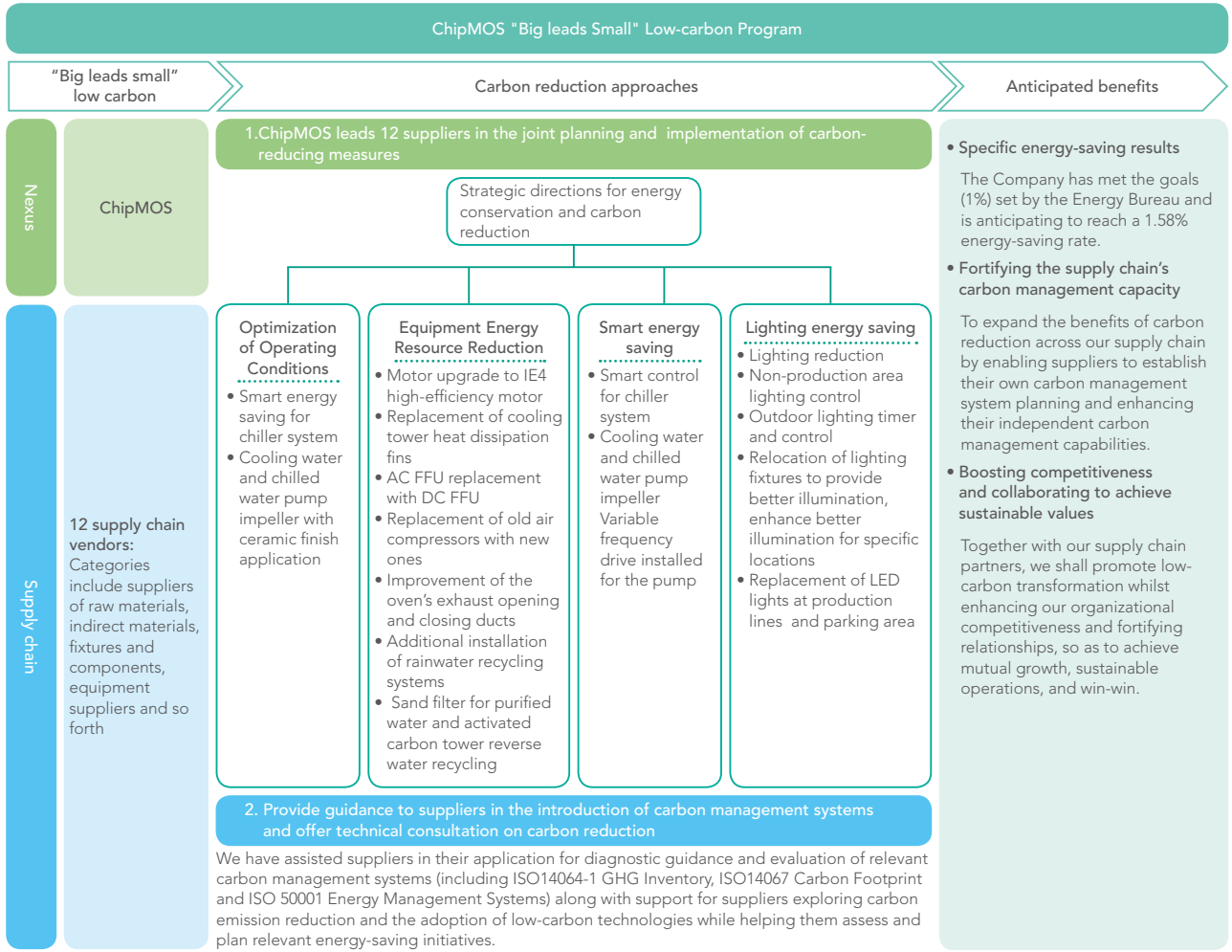
| | |
|---|---|
| Tainan City Government "Net-Zero Coaching Group" | Responding to the call from Tainan City Government, ChipMOS participated in the "Net-Zero Coaching Group" along with other companies, schools, organizations including TSMC, UMC, Kun Shan University of Science and Technology, National Cheng Kung University's Research Center for Energy Technology and Strategy, Far East University and Southern Taiwan Science Park Administration to share our own experiences in energy conservation at relevant organizations such as enterprises, schools departmental stores, hotels and so forth. The Coaching Group also provides services such as energy efficiency diagnostics and reduction strategies so that more experienced companies can assist those with lesser experience by guiding members of the supply chain to promote greenhouse gas reduction and collectively work towards the goal of net-zero emissions. |
| Responsible Business Alliance (RBA) | RBA, the Responsible Business Alliance, is dedicated to environmental policies and the well-being of its employees. Participants acknowledge that environmental responsibility is a crucial aspect of producing top-quality products. They integrate it into their design and manufacturing practices to minimize environmental impact, preserve natural resources, and safeguard the health and safety of both people and the global environment. (ChipMOS is one of the members of RBA, and we adhere to the RBA's Code of Conduct). |
| Taiwan Semiconductor Industry Association (TSIA) | TSIA has joined international organizations focused on industrial safety and environmental protection to enhance industry reputation. For example, it actively participates in meetings of the Environmental, Health, and Safety (EHS) working group of the World Semiconductor Council (WSC), the International Technology Roadmap for Semiconductors (ITRS) conferences, and the International Semiconductor Environmental, Safety, and Health (ISESH) technical symposium. When environmental, health, and safety issues are brought to attention, TSIA engages in deliberations regarding pertinent matters. (ChipMOS is a member of TSIA and we adhere to TSIA regulations. We have also participated actively in relevant international collaborations as our way of supporting the development of Taiwan's semiconductor industry). |
| Taiwan Alliance for Sustainable Supply (TASS) | The Taiwan Alliance for Sustainable Supply Chain (TASS) was established in 2016 with the aim of creating "green supply chain management standards, promoting certification, and establishing a platform for the sharing of sustainable supply information". (ChipMOS is a member of TASS and we adhere to TASS regulations.) |
| Environmental Protection and Development Promotion Foundation | ChipMOS, along with other companies at the Southern Science Industrial Park, has established the Environmental Protection and Development Promotion Foundation. ChipMOS' manager serves as a director of the foundation. The foundation aims to address environmental and conservation issues within the science park, and the Company has provided suggestions and recommendations on environmental protection and safety and health matters. |
| Water and Electricity Committee | ChipMOS, along with other companies at Southern Science Industrial Park, has established the Water and Electricity Committee. The supervisor of ChipMOS serves as the Deputy Convener of the Power Division, and this committee reviews the water and electricity conservation performance within the park, addresses issues related to the quality of power supply, the types and characteristics of renewable energy, and the challenges associated with purchasing renewable energy. It also addresses the renewable energy procurement requirements of different enterprises within the park. |

# 5.2 Sustainable Supply Chain Engagement

## Collaborating and guiding our suppliers towards low-carbon transition

▷ 2023 Industrial Development Bureau, MOEA - Low-carbon Program for Big leads Small in Manufacturing Industries

In 2023, ChipMOS took the initiative to participate in MOEA's Industrial Bureau's subsidy program for the low-carbon and intelligent upgrading and transformation of the manufacturing industry. Our plan is to promote the transition to low-carbonization by adopting a "big leads small" approach. From 2023 to 2025, we will function as the hub of relevant activities and drive 12 supply chain manufacturers to swiftly adopt low-carbon technologies, equipment, and management practices. This transformation will enhance our organizational resilience, improve overall industry competitiveness, and together, we will create sustainable value.




Climate change poses challenges to human survival and global economic stability. And as such, ChipMOS aims to collaborate with its supply chain partners to establish mechanisms for addressing climate change-related issues. Together, we shall accelerate efforts to improve carbon emissions within the global supply chain.

ChipMOS has established a robust new supplier selection process and adheres to the RBA Code of Conduct as its supplier management policy guidelines. Not only that, reviews are conducted for the implementations of process management, green product, Responsible Business Alliance (RBA) and health and safety management, to ensure the candidates meeting all the requirements of product quality, and free-of-prohibited substance, environmental protection as well as protections to employees. At the same time, we are committed to promoting a local procurement strategy and providing supplier guidance with the aim of enhancing overall competitiveness and achieving mutual success.

### Supplier Management Procedure

**Assessment criteria:**

- Engineering technical capability, quality management system, pricing, services (including capacity and delivery time commitment)
- Status of International Quality Management Certification
- Process management, green products, RBA and safety and health management

- Targets: qualified suppliers of direct and indirect materials who have transaction during the quarter.
- Purpose: ensure the proper functioning of the fab's quality management systems
- Method: Assessment results shall be dealt with and appropriate measures shall be taken based on four corresponding levels




- Method: Audits and reviews for each item based on RBA's major focus areas
- Criteria: labor, occupational health and safety, environment, management system, occupational ethics

- Coached and encouraged suppliers to obtain certification in international standards
- Improve the oversights identified during assessment/audit/order process

## Guidelines/Standards for Suppliers

**Supplier Integrity Policy**

When signing procurement contracts with suppliers, we ask suppliers to include clauses on ethical conduct to ensure that suppliers understand ChipMOS' commitment to integrity and honesty in all business activities.

**Suppliers signing the Declaration of Corporate Social Responsibility**

ChipMOS is committed to conform to the standards of RBA's code of conducts, and to ensure the suppliers understand such, we require raw material suppliers, production equipment suppliers and service providers to sign the Declaration of Corporate Social Responsibility, which clearly requires the partners in the supply chain to fulfill the corporate social responsibilities together. As of the end of 2022, a total of 265 suppliers have signed the Declaration of Corporate Social Responsibility; the signature reply rate is 100%.

## Local sourcing strategy

By enhancing the local sourcing strategy, ChipMOS reduces the supply chain risks, as well as the carbon emission in the overall supply chain and creates the local jobs. The term "local supplier" refers to the manufacturing plants of suppliers locate at the same area as the production bases of ChipMOS. For instance, if a manufacturing plant of a supplier locates in Taiwan, this is a local supplier to ChipMOS' plants in Taiwan.

## Boosting Suppliers' Green Competitiveness

To ensure more effective management and oversight of the environmental performance of both direct and indirect material suppliers, ChipMOS continues to conduct climate change/water security surveys among its suppliers. The supplier questionnaire distribution rate increased from 80% (70 companies) in 2022 to 82% (99 companies) in 2023, response rate 100%. In 2023, we will be focusing specifically on distributing the questionnaire to the top 20 greenhouse gas emitters (13 companies). The carbon and water survey investigates seven major topics, including climate governance, climate advocacy and action, compliance with applicable regulations or drivers, adoption of international standards, goal-setting for management, organizational greenhouse gas emissions assessment, and organizational water security assessment. Upon collecting and analyzing the survey responses, ChipMOS will carefully review the feedback from suppliers and based on the analysis results and improvement suggestions, offer constructive feedback to suppliers for discussion and explore the feasibility of implementing improvements. This collaborative approach will enhance the overall green competitiveness of the supply chain.

## Working towards sustainable management with our suppliers

ChipMOS expects all suppliers to embrace its concept of sustainable operations and meet relevant requirements for product quality. In cases where deficiencies are identified during assessments, audits, or the order process, ChipMOS will provide various forms of communication, training, and guidance to support improvement. Both parties shall strive for mutual learning and growth, ensuring that any deficiencies are addressed and prevented from recurring. The Company will also offer ongoing guidance and encouragement to suppliers in obtaining international standard certifications. This initiative aims to drive improvements in the quality and competitiveness of their products.

## Green procurement

To promote the green procurement and consumption, ChipMOS's goal is to procure the materials and equipment lowering the environmental burdens and meeting the quality requirements, and procures the products with international and domestic environmental labels recognized by the Green Procurement Program of the Environmental Protection Administration. With the active promotion of the Company, from 2018 to 2022, for consecutive five years, the Company has been awarded as the "Outperforming Green Procurement Enterprise," recognized by the Hsinchu County Government and Tainan City Government.

Statistics of Green Procurement Amounts

| Year | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Amount of Green Procurement (Unit: NT$ 10,000) | 4,315 | 2,341 | 7,595 | 8,967 | 10,163 |

Note 1: The data of procurement amounts are based on the Company's filing to the Environmental Protection Administration for the disclosure on the "Private Enterprise and Organization Green Procurement Reporting Platform"

Note 2: In 2019, no green building material was procured, so the green procurement amount is relatively lower

# 5.3 Green Manufacturing

## Achieving Continuous Improvement through the Introduction of Management Systems and Certification Labels

Through the greenhouse gas inventory, ChipMOS has identified that over 98% of the organization's total greenhouse gas emissions come from purchased electricity. Therefore, energy management within the facilities has become a top priority. Since 2014, we have been implementing energy-saving initiatives in a systematic manner across our facilities. We have introduced the ISO 50001 Energy Management System to achieve systematic management of energy within our organization. In 2014, our Tainan fab voluntarily adopted the ISO 50001 Energy Management System and obtained certification. In 2017, the Hsinchu fab also obtained ISO 50001 Energy Management System certification.

By integrating energy-saving and carbon reduction strategies and solutions across departments, setting energy baselines, and regularly reviewing and tracking the effectiveness of energy-saving initiatives in the Environmental Safety, Health and Energy Management Committee meetings, we aim to reduce energy consumption in our products. This is achieved through equipment replacement and upgrades, parameter adjustments in equipment operations, and the implementation of high-efficiency energy-saving devices.

## ChipMOS fabs certificated in ISO Management System

| Item | Hsinchu fab. | Zhubei fab. | Zhubei fab. 2 | Hukou fab. | Tainan fab. | Tainan fab. 2 |
|---|---|---|---|---|---|---|
| ISO 14001 Environment Management System | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ISO 14064-1 Greenhouse Gas Check | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ISO 50001 Energy Management System | ✓ | | | | ✓ | ✓ |

## Green Factory Label

Responding to the government's initiative, ChipMOS became the first operating facility (Tainan fab.) in Taiwan to receive the Green Factory Label in 2014. Not only that, the Company has applied for extension of this accreditation in 2017, 2020, and 2022 and passed relevant reviews to maintain the validity of the Green Factory Label. In addition, our Hsinchu fab. has also applied and received the Green Factory Label for the first time in 2022.

### ChipMOS was invited by MOEA to share the implementation of green factory

In 2022, ChipMOS was invited by the Industrial Development Bureau to take part in the "Decade of Green Factory Outcome Presentation" as a member to share its experiences in carbon reduction and relevant implementations with the audience.



Hsu, Yuan-Feng, the Executive Vice President attended and received the award on behalf of the Company, as well as shared the practical experience of green factory promotion.

### ChipMOS' northern and southern fabs that received the Green Factory Label in 2022

In 2022, the Company launched its Green Factory Label project, focusing on the implementation of green building standards and clean production assessments at our fabs in northern and southern Taiwan. We engaged consultants to provide guidance throughout the process. A total of 48 members participated in the project, attending 8 meetings and training sessions. The project lasted for six months, and our fabs in both northern and southern Taiwan successfully obtained the Green Factory Label.

- **Time:** 2022/6-2022/12
- **Participating units:** Production and Manufacturing, Facility Eng. Division, Safety Health and Environment Office, Q.R.A. Center and Human Resource Center
- **Focus of promotion:** Management of energy resources and water resources, recycling and reuse of packaging materials, waste recycling, sustainable innovation - energy transition, green management and social responsibilities

## Energy conservation management actions

In order to make more effective use of energy resources in important manufacturing sites, we continue developing various energy-saving schemes, extend the scope of promotion from the public environment to the production end, carry out source control, and strive to create a low-carbon green energy production environment. Our specific measures include: upgrading of production equipment such as clean room system, ice water system, lighting reduction system, air conditioning reduction system and production machine environment. Through comprehensive system assessments and integration, we aim to enhance our equipment's energy efficiency. In 2022, ChipMOS invested a total of NT$ 27.055 million NTD for improvements in four major energy-saving categories. This resulted in a total reduction of 2,952 metric tons of $CO_2e$ emissions and an electricity savings rate of 1.17%.

| Equipment Energy Resource Reduction | Smart Energy Saving | Lighting Energy Saving | Optimization of Operating Conditions |
|---|---|---|---|
| • AC FFU replaced with DC FFU<br>• Replacement of energy-efficient air compressors<br>• Replacement of cooling tower heat dissipation fins<br>• Replacement of energy-efficient motors | • Smart control for chiller system<br>• Cooling water and chilled water pump impeller with variable frequency drive installed for the pump | • Installation of solar-powered street lights at the fabs<br>• Replacement of LED lights in the production areas<br>• Non-production area lighting control | • Vacuum system-optimized the number of operating units<br>• Chiller system-optimized automatic pressure control |

## Major Energy Saving Solutions in 2022

| Energy Saving Category | Number of Projects | Investment (NT$1,000) | Annual Benefits (NT$1,000) | Annual Power Saved (Megawatt Hour) | Annual Energy Saved (Million Joules) | Carbon Reduction (Tonnes $CO_2e$) | ROI | Energy Saving Rate |
|---|---|---|---|---|---|---|---|---|
| Equipment Energy Resource Reduction | 11 | 17,571 | 6,066 | 1,989 | 7,160,389 | 985 | 2.9 | 0.40% |
| Smart Energy Saving | 2 | 7,443 | 1,934 | 634 | 2,282,522 | 314 | 3.8 | 0.13% |
| Lighting Energy Saving | 3 | 1,241 | 68 | 22 | 79,769 | 11 | 18.4 | 0.004% |
| Optimization of Operating Conditions | 8 | 800 | 9,620 | 3,154 | 11,354,573 | 1,561 | 0.1 | 0.64% |
| Total | 24 | 27,055 | 17,688 | 5,799 | 20,877,253 | 2,871 | 1.5 | 1.17% |

Note 1: Calculation method of annual benefits: annual power saved *1 kWh electricity charge – NT$3.05

Note 2: Carbon Reduction is calculated as 0.495kg/ kWh based on the emission coefficient announced by the Energy Administration in 2022

Note 3: ROI calculation method: input amount / annual benefits

Note 4: Energy Saving Rate= power saved in 2022 / total power consumption in 2021 (subject to the calculation method of the Energy Administration)

## Green Energy Use

Since the power consumption of manufacturing is the most significant source of GHG emissions for ChipMOS, we strive to minimize the generation of purchased power and continue to invest in renewable energy sources. In order to provide clean energy for our fabs, we have built solar power facilities in Tainan fab since 2012. In 2012, we built rooftop solar panels and signed a contract with Taipower to switch to green power supply, and we will build a second solar power system in 2019. In 2021, fab-wide will be united, and we will expand the use of renewable energy in the northern fabs. In 2021, we have completed the installation of 4 additional solar power systems with a total capacity of 990.45 kW. (Hsinchu fab., Hukou fab., Zhubei fab. 2 and Tainan fab.)

To actively achieve the carbon reduction goal, ChipMOS' next stage will focus on the self-generation and self-consumption of solar energy, by planing to achieve 4.5 MW renewable energy in 2023. By 2024, we plan to obtain 1.5 MW renewable energy, bringing the total installed capacity to 6,990.45 kW. By 2025, renewable energy will account for 1.7% of total electricity consumption. For the mid-and long term, we will assess the possibility of purchasing and developing other green energy sources while increasing the ratio of renewable energy usage to fulfill more ambitious reduction goal.

The progress for green energy:

- **2022:** Purchased 8 renewable energy certificates, which accounted for 0.002% of its total energy usage
- **2022:** Bought back the solar rooftop leased, total installed capacity to 990.45 kW.
- **2023:** Leased land for constructing solar power facility, total installed capacity to 4,500 kW.
- **2024:** Lease more land for constructing solar power facility, the installed capacity by 1,500 kW, bringing ChipMOS total installed capacity to 6,990.45 kW.
- **2024~2030:** Continuing to increase the proportion of renewable energy through self-built solar power systems, purchasing renewable energy certificates, and exploring other green energy sources.

## Internal Carbon Pricing

ChipMOS has been actively promoting various energy-saving measures and strives to improve energy efficiency. Between 2019 to 2022, ChipMOS actively promoted the use of renewable energy and continued to expand the installation of solar power generation equipment. Taking into account factors such as internal adjustment costs, internal/external carbon costs, investments in renewable energy, and green power procurement, ChipMOS has updated its internal carbon pricing annually to be applied in energy efficiency investment assessments and set its internal carbon price at NT$ 5,818 per metric ton. It has been publicly disclosed in the CDP questionnaire and the calculation formula is as follows:

T-REC purchase cost for green energy certificates (TWD 6,000/MWh) - Off-grid power purchase cost from Taiwan Power Company (TWD 3,120/MWh) /Electricity carbon emission coefficient (0.495)
= (TWD 2,880/MWh) / 0.495 Tonnes $CO_2e$ ≒ TWD 5,818/Tonnes $CO_2e$

## Product Carbon Footprint

In an effort to consolidate a foundation for the promotion of green products, green processes and green design, ChipMOS has proactively responded to the requirements of customers' carbon management plans. Apart from the carbon emission disclosure plan that covers GHG emissions, the Company has implemented carbon footprint inventory for specific product series starting from 2012 and continued to plan for the inventory of other products. In addition, the results of our carbon inventory have been verified by authorized third parties in accordance with ISO 14067/PAS 2050 standards to ensure the delivery of reliable carbon emission data to our customers. As of 2022, the Company has completed the carbon footprint inventory for 10 product series.

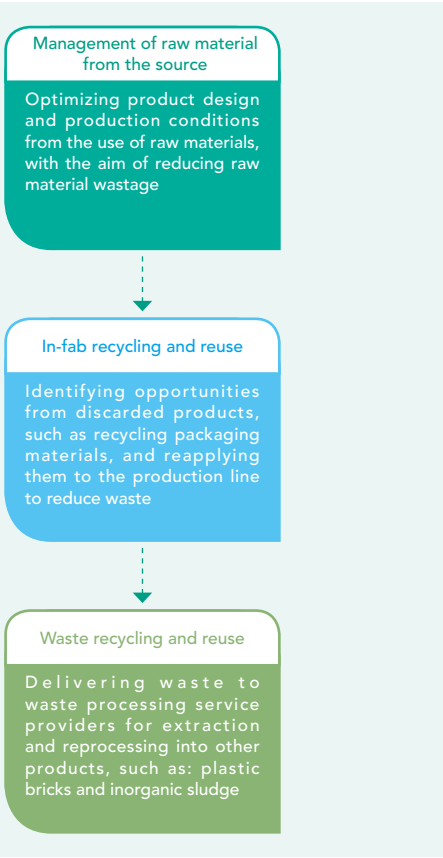
Being an assembly and packaging OEM service provider, ChipMOS has inventoried its carbon footprint as a service provider and analyzed the volume of GHG emission during each phase of its product lifecycles in order to achieve precise control over the exact hot spot of carbon reduction in its value chain. This would allow the Company to collaborate with its supply chain and external partners towards the goal of carbon reduction. Here at ChipMOS, the effort of carbon reduction not only runs from top-down but is also implemented duly from bottom to the top, starting from our entry-level employees working in unison, involving everyone to facilitate carbon management in our day-to-day management. By starting from our own operations and main line of business, we endeavor to inspire all employees to inculcate the spirit of carbon reduction.

### As of the end of 2022, we have completed the carbon footprint inventory for 10 serial products




## Circular Economy

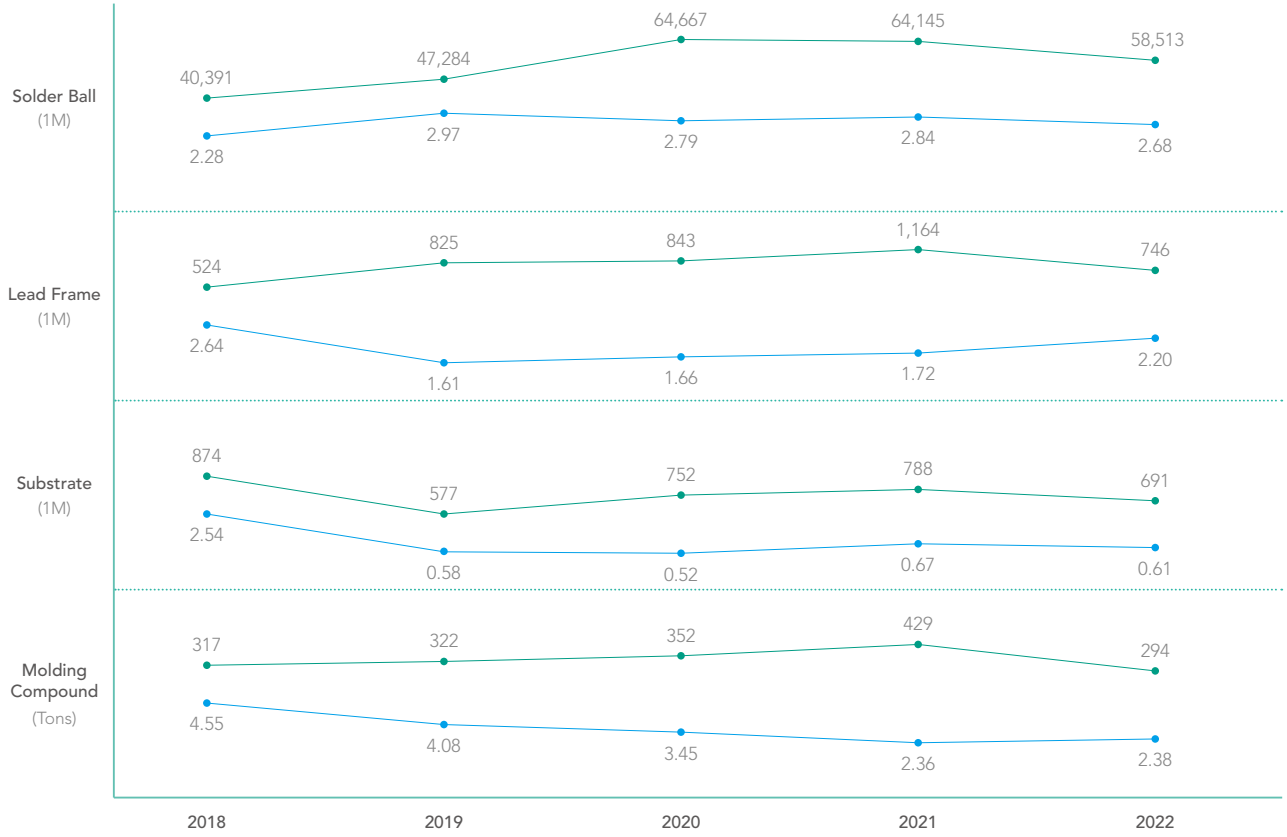
ChipMOS has been actively promoting circular economy and based on the ISO 14001 Environmental Management System, the Company conducts environmental impact assessment and response management every year from the perspective of product life cycle, including raw material supply, in-fab production and manufacturing, and waste disposal. In our manufacturing and production processes, we proactively explore reduction and circular solutions. Through approaches like Reducing, Reusing and Recycling, we aim to maximize the value of resource reuse and minimize our environmental impact. By implementing these strategies, we can effectively conserve resources and mitigate the environmental consequences of our operations.



## Reduction of Material Source

ChipMOS' manufacturing processes involve the use of the following raw materials: Solder Ball, Lead Frame, Substrate, Molding Compound and etc. We are committed to reduction from the source and minimizing waste by analyzing the annual material consumption rate. Through analyses of usage patterns for relevant materials, we have optimized their utilization through improved coordination between production machines and consolidated material usage. This approach aims to enhance material efficiency and reduce waste throughout our operations.

### ▷ Use of Raw Materials in the Last Five Years




Note 1: Consumption Rate = (Actual use volume - BOM standard use volume)/BOM standard use volume x100%
Note 2: BOM = Abbreviation for "Bill of Material"

## Reusing of Main Packaging Materials

ChipMOS provides professional packaging and testing services. During the transportation of customers' supplied chips and IC products, we need to use wafer boxes and trays as the carrying tools, in combination with cartons and sponge buffer materials to achieve the effects of product protection. In order to reduce waste generation, we strive to maximize the efficiency of packaging materials by recycling and reusing reusable packaging materials whenever possible.

### ▷ Reused Volume of Package Materials

| Item (Unit) | | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| Tray (Pcs) | Reused Rate (%) | 139% | 150% | 118% | 150% | 170% |
| Carton (MT) | Reused Rate (%) | 103% | 106% | 109% | 110% | 114% |
| Rubber Band (kg) | Reused Rate (%) | 86% | 88% | 90% | 91% | 93% |
| Wafer Box (MT) | Reused Volume | 77.98 | 113.7 | 137.4 | 139.1 | 120.2 |

Note 1: Main packaging materials are recycled and reused in ChipMOS fabs.
Note 2: Reused rate = Reused volume / Purchase Volume
Note 3: The main source of the wafer boxes is the original box used for the purchase of products supplied by customers and the recycling after the chips are cut off the assembly line. ChipMOS has specially assigned persons clean to remove the labels and dirt on the boxes and then recycle the same for shipment. Therefore, there is no purchase volume.
Note 4: The purchased rubber bands are used for some of the customers' poor products, which shall be returned together with the finished products, so they cannot be recycled in the fab. The customers whose defective products are handled by ChipMOS can obtain rubber bands and trays for recycling after scrapping.

## Fab-wide inventory of packaging materials for carbon reduction

Starting from 2022, ChipMOS has been conducting an inventory of carbon emissions from packaging materials throughout all fabs with the intention of identifying additional opportunities for carbon reduction. After conducting a thorough assessment of packaging materials across all fabs and analyzing their carbon emissions, the top five contributors to carbon emissions from packaging materials are identified as follows: reels/rolls/trays, anti-static bags, protective tapes, cardboard boxes, and carriers. These five categories account for over 95% of the total carbon emissions from packaging materials. We will actively engage our internal personnel, suppliers and customers to discuss various aspects, including packaging design, reduction at the source by suppliers, the possibility of recycling and reusing packaging materials at the customer end, and appropriate end-of-life disposal methods. We will continue to evaluate and seek opportunities for carbon reduction in packaging materials.

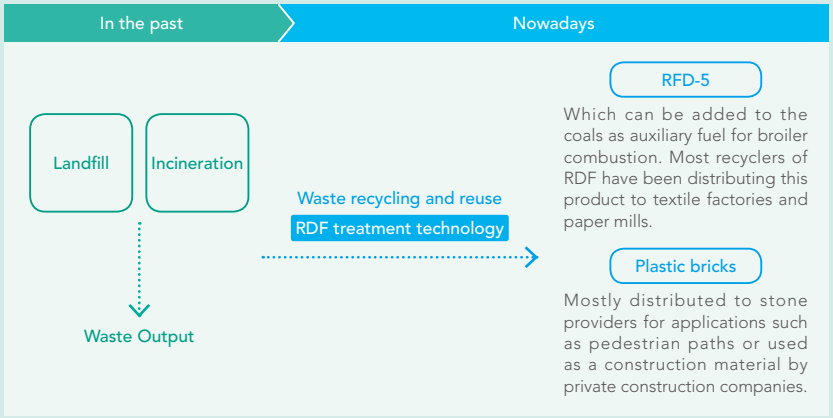
## Turning Wastes into Resources

### Case 01 Recycling and reuse of waste molding compound



In the past, the disposal methods for "waste molding compound" at our fabs have been landfilling and incineration. However, since 2018, we have been actively seeking ways to improve the reuse of waste molding compounds and have started to engage authorized waste management service providers who utilize RDF (Refuse-Derived Fuel) technology to convert the waste into usable products. As of 2022, as much as 74.14% of ChipMOS' molding compound have already been recycled into plastic brick products. In 2023, we will continue to work with our recyclers and strive to bring our recycling rate up to 80%.

**Waste molding compound treatment**




### Case 02 100% recycling and reuse for inorganic sludge

Due to the specific characteristics of our production, inorganic sludge is produced during the treatment of waste/sewage water at Tainan fab. and Zhubei fab. It is created by adding chemical coagulants into wastewater so that floc, suspended particles or specific soluble pollutants will clump together. In order to ensure sustainable reuse of relevant resources, ChipMOS has decided to no longer dispose inorganic sludge by means of solidification or landfill. Instead, we have commissioned authorized disposal service providers to perform relevant physical/thermal processes on the sludge produced at our fabs for 100% recycling, creating an end-product that can be used as raw material, material, fuel, construction filling, land improvement or an additive in mixed concrete, civil engineering mix material or low-strength pre-mixed concrete.

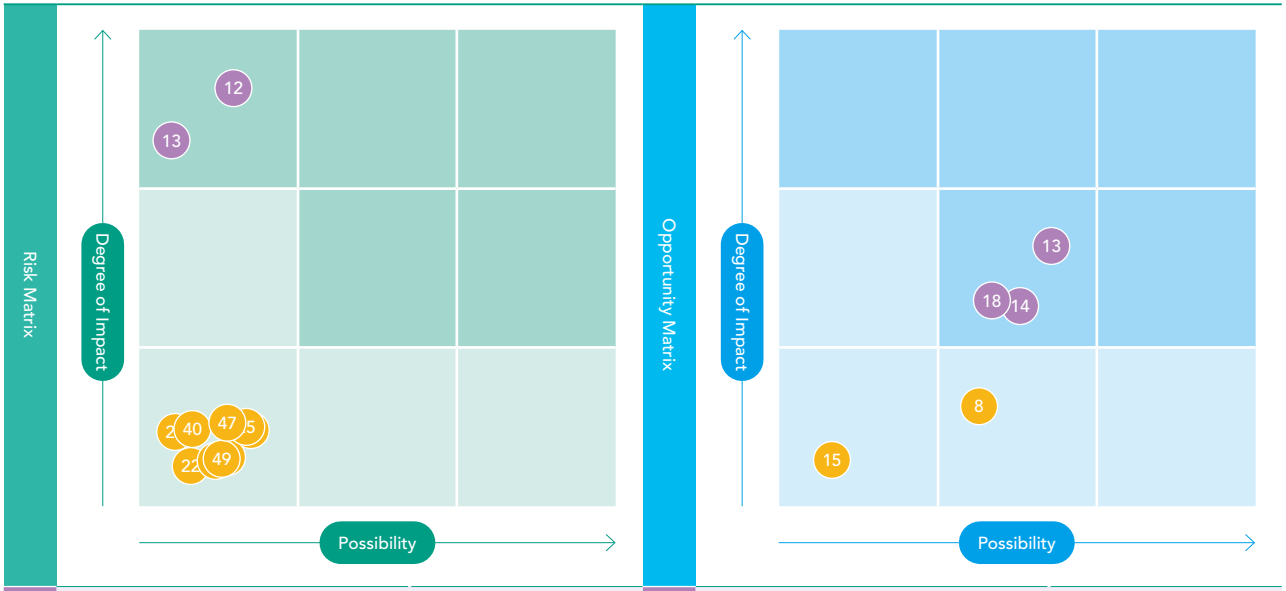


## 5.4 Water Resources Management

To cope with the high volume of process water consumption, making good use of water resources is the policy that ChipMOS has been actively promoting. Because of the extreme climate change has prolonged the impact of the dry season, we are facing the risk of water shortage. Therefore, it is more important to manage water resources effectively and identify relevant risks and opportunities.

According to the result of water risks and opportunity identification by ChipMOS ESG Committee in 2021, the Company has to manage a total of 51 water risks, including 2 major water risks; 19 water opportunities in total, including 3 major water opportunities. These add up to a total of 70 risk and opportunity items.

### Water Risks and Opportunities




| | | |
|---|---|---|
| Major Water Risks | 12 Water supply interruption<br>13 Extreme water shortage | Major Water Opportunities: 13 Water efficiency; 14 Waste water recovery; 18 Adaptability |
| Non-major Water Risks | 11 Drought<br>22 Water price change<br>23 Water control regulations<br>24 Quality / quantitative discharge standard of drainage water<br>25 Mandatory water efficiency, water saving, recycling or process standards<br>27 Uncertainty of new regulations<br>40 Flood<br>47 Seasonal or annual variation in water supply<br>49 Plastic particles | Non-major Water Opportunities: 8 Production process; 15 Green building |

| Source of Risk | Risk Description | Location of Occurrence | Time of Occurrence | Potential Impact | Financial Connection | Management Practices |
|---|---|---|---|---|---|---|
| Water supply interruption | The water supply interruption caused by natural or other human factors has affected the operation of the Company or its vendors. | • Within the Organization<br>• Suppliers | Short term / long term | • Increase of direct cost (short term)<br>• Decrease of operational income (short term)<br>• Operation disfunction of the Company (long term) | • Increase of the cost of carried (purchased) clean water sources<br>• The fab. cannot operate normally due to water interruption, a daily loss of turnover NT$100~200 Million.<br>• The water volume of each incoming water tank can last for 2-7 days. It is estimated that the water supply in the fab will be interrupted for one day in 2025, and the production must be maintained by waterwheel, with the cost increased by NT$1.83 Million. It is estimated to be NT$2.046 Million in 2030 and NT$3.224 Million in 2050. | • Hukou fab. followed the statutory application and built the 1,080 CMD anti-drought wells in 2021.<br>• Entering contracts with water truck provider in advance for the dry seasons, to meet the water consumption required by the fabs.<br>• The storage tank volume of each incoming water tank can maintain the fab. water supply for 2-7 days. |
| Extreme Water Shortage | Extreme water shortage caused by natural or other human factors, with the severity increasing with time. | Within the Organization | Long Term | • Decrease of operational income<br>• Operation disfunction of the Company | • The fab. cannot operate normally due to water interruption, a daily loss of turnover NT$100~200 Million.<br>• The water volume of each incoming water tank can last for 2-7 days. It is estimated that the water supply in the fab will be interrupted for one day in 2025, and the production must be maintained by waterwheel, with the cost increased by NT$1.83 Million. It is estimated to be NT$2.046 Million in 2030 and NT$3.224 Million in 2050. | |

| Source of Opportunity | Opportunity Description | Location of Occurrence | Time of Occurrence | Potential Impact | Financial Connection | Management Practices |
|---|---|---|---|---|---|---|
| Water use efficiency | Improve the use efficiency of operating water. | Within the Organization | Middle Term | Decrease of Operating Costs | The reduction in water charges (sewage treatment fee + tap water fee) caused by the reduction in water consumption is NT$16.4 Million. | Continued to invest in process water recycling equipment. |
| Recycling of wastewater | Recycling process or reusing of water for people's livelihood. | Within the Organization | Middle Term | Decrease of Operating Costs | The reduction in water charges (sewage treatment fee + tap water fee) caused by the reduction in water consumption is NT$16.4 Million. | Continued to invest in process water recycling equipment. |
| Adaptability | Increase their resilience to the impact of climate change. | Within the Organization | Middle Term | Adaptation to climate change | The cost of waterwheel will be reduced by NT$223,000 in 2025, and NT$250,000 in 2030, and NT$394,000 in 2050. | • Hukou fab. followed the statutory application and built the 1,080 CMD anti-drought wells in 2021.<br>• In 2022, Zhubei fab. built its process water recycling equipment 550 CMD. |

## Water Alert and Response

In order to mitigate the potential impact to the Company's operation from water risks, ChipMOS has been actively monitoring the use of water resources. During the dry season, we track the storage capacity of the source reservoir every week, and each fab closely monitors the volume of tap water reservoir. If it is lower than the early warning value, we immediately confirm whether the water supply system inside and outside the fab is normal, so as to facilitate subsequent emergency treatment. We have continued to collect water resource usage data and utilized the WRI (World Resources Institute) risk assessment tool to identify the water supply risk levels in the regions where our fabs are located. This helps us understand the impact of ChipMOS on the water source areas and allows us to strengthen water management measures accordingly.

## Measures in the event of a drought

Set water storage alert threshold; each fab has to check that water storage is kept at >95% each day

Entering contracts with water truck provider in advance to meet the water consumption required by the fabs

Implement short, medium, and long-term voluntary water-saving measures at our fabs, such as reducing the frequency of RO system flushing and increasing the utilization of process and cooling water through recycling.

## Process water recycling to improve water use efficiency

ChipMOS' water resource management focuses on the two-pronged approach of source water conservation and process water recycling. We have set clear goals, developed water usage strategies and endeavor to balance environmental responsibility with revenue growth. Ever since 2008, Tainan fab has been investing in the construction of water recycling equipment for grinding and cutting processes. Through the use of ultrafiltration membranes, process water is filtered and recycled for reuse in the manufacturing processes. Since 2015, Tainan fab has been using more process recycled water per day than the amount of tap water used. In 2022, the volume of process recycled water reached 115% of the tap water usage. Through the utilization of process water recycling equipment, the fab has effectively reduced water intake from the water source area by 1.3 times [(Note 1)]. This has minimized the environmental impact of operations to the lowest possible level.

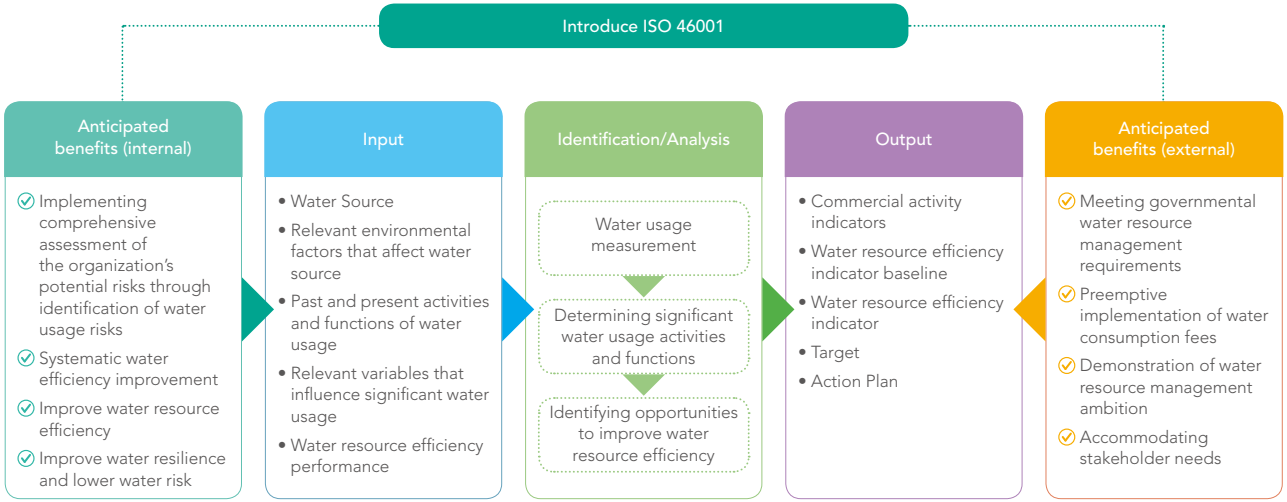
In 2022, taking into consideration the production process characteristics of the fabs, ChipMos was more proactive in investing in the construction of a new process water recycling facility (550 CMD) at Zhubei fab. The facility is expected to recycle approximately 200.7 million liters of process water per year, which helps us effectively address the increasing water demand resulting from rapid capacity expansion. Over the past 15 years, the accumulated recovered water has reached 11,364.141 million liters, equivalent to nearly 4,546 international standard swimming pools saved [(Note 2)].

Note 1: Our Tainan fab has identified the water sources (such as Zengwen Reservoir, Wushantou Reservoir, and Nanhua Reservoir) as having a medium to low water risk level. Through the use of process water recycling equipment, ChipMOS has reduced its water intake, resulting in a decrease in the water impact on the water source areas from 0.494% to 0.214%, which is equivalent to a 1.3-fold reduction.

Note 2: Calculated according to 2.5 million liters of an international standard swimming pool (FINA).

## Introduction of ISO 46001 Water Efficiency Management Systems in 2023

ChipMOS intends to introduce ISO 46001 Water Efficiency Management Systems in a rolling manner between 2023-2024 in the hopes of establishing water use standards, performance indicators and goals, action plans, routine evaluation and audit mechanisms through systematized management so as to bolster the organization's overall water efficiency and strengthen its anti-drought response capabilities.




## ISO 14046 Water Footprint

ChipMOS also improved the water resource efficiency of its supply chain through the water footprint inventory. Moreover, we follow ISO 14046 and have third-party verification to improve the reliability of data. Since 2014, ChipMOS has completed the ISO 14046 water footprint verification of series products, and has passed the third-party certification, so as to effectively master the water resource status of production and provide customers with reference. The Inventory of Product Water Footprint includes: LCD Driver IC for COF (Chip on Film), LCD Driver IC for COG (Chip on Glass), 8 inch and 12 inch Gold Bump Wafer, Ball Grid Array (BGA) and Quad Flat No-lead Package (QFN), etc.





# 2

# Biodiversity and Natural Conservation



# 06

# Introduction of TNFD

6.1 Supplier's Natural Risks

6.2 Natural Risks of Our Own Operations

6.3 Site Analysis

The Task Force on Nature-related Financial Disclosures (TNFD) was established in 2021 in response to the growing demand for incorporating natural factors into financial and business decision-making. The TNFD provides a risk management and disclosure framework that organizations of all sizes within all jurisdictions can use to identify, assess, manage, and disclose their dependencies, impacts, risks, and opportunities related to nature. As a market-led global initiative, the ultimate goal of TNFD is to support a shift in global financial flows away from nature-negative outcomes and towards nature-positive outcomes.

TNFD's official framework is set to be formally released in September 2023. Nonetheless, ChipMOS has taken proactive measures by deploying the draft framework beta v0.4 released in March 2023 for the identification and management of nature-related risks. The Company has also conducted assessments of its organizational operations, operational sites, and suppliers' dependencies on and impacts to natural capital. Furthermore, ChipMOS has also published its TNFD report and engaged in stakeholder communication. Similar to TCFD, the TNFD framework also revolves around four pillars and establishes disclosure requirements in the areas of governance, strategy, risk and impact management, and indicator targets. To maintain a high level of consistency in climate and nature disclosure reporting, TNFD has retained the 11 key disclosure elements from TCFD. However, building upon this foundation, TNFD has introduced additional requirements in the strategy pillar, specifically the inclusion of "coverage of priority areas," and in the risk and impact management pillar, the addition of "coverage of stakeholder engagement" in the disclosure requirements. ChipMOS has followed the LEAP methodology recommended by the taskforce to develop disclosure content that aligns with the framework requirements. This involved several steps, including biodiversity significance analysis, scope assessment, positioning of natural interfaces, assessment of priority nature-related dependencies and impacts, evaluation of significant risks and opportunities, and response and management. By completing these steps, the Company shall deliver disclosure content that is in accordance with the framework requirements.

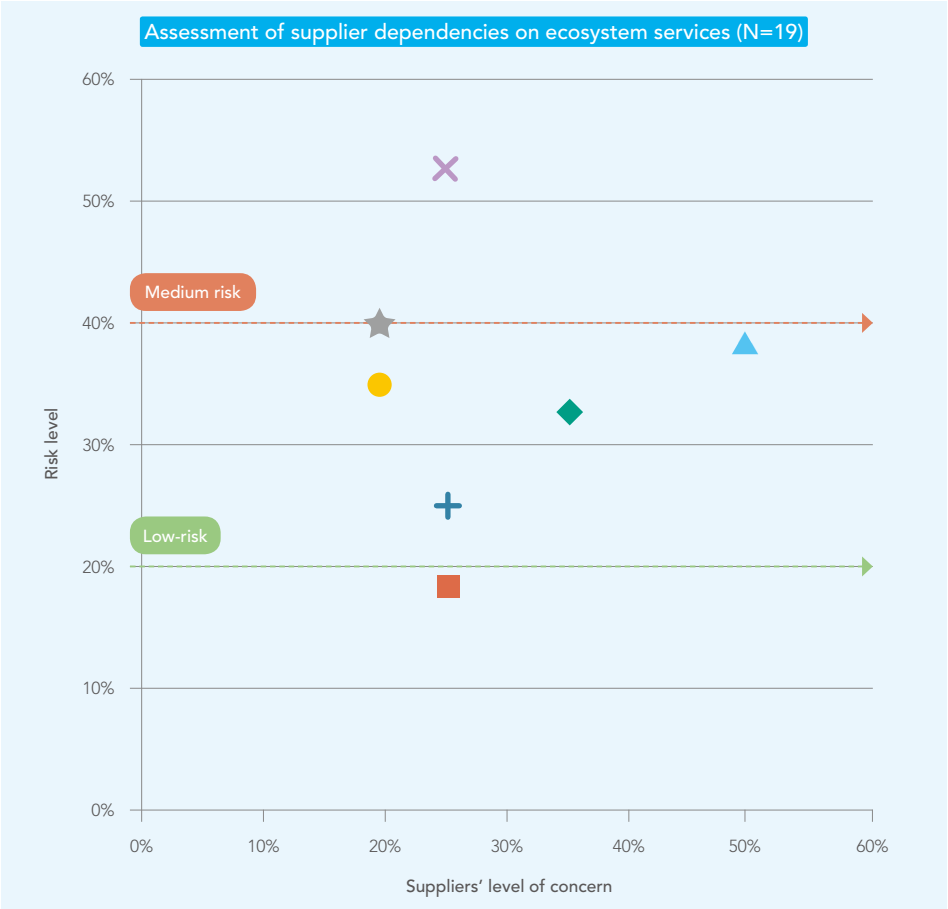
ChipMOS takes the following factors into its consideration of significant operational issues relating to biodiversity:

| Factor of consideration | Method of appraisal |
|---|---|
| Level of concern | The higher the number of enterprises facing an environmental dependency or impact issue mentioned in the response, the higher the percentage of attention represents the extent of exposure of this issue among stakeholders |
| Level of impact | The impact level on businesses from environmental issues of concern to stakeholders. Depending on discrepancies in the level of dependency and impact, different topics may be applicable |
| Level of dependency impact | The impact level on business operations following a disaster can vary significantly, ranging from severe consequences such as fab shutdowns to minor effects such as disruption in the working environment. The assessment of impact is primarily based on the degree of financial implications. Whether contingency measures are in place to mitigate the impact of the disaster. |
| Extend of impact influence | The impact represents the potential for pollution emissions or alterations to the local ecosystem resulting from business activities. Therefore, assuming no management measures are in place, these activities carry the highest level of risk, and the company can reduce its risks through the development of management measures and mitigation targets. |
| Management measures | Whether basic control measures been established |
| Mitigation targets | Whether specific targets of mitigation been set and duly followed-up |



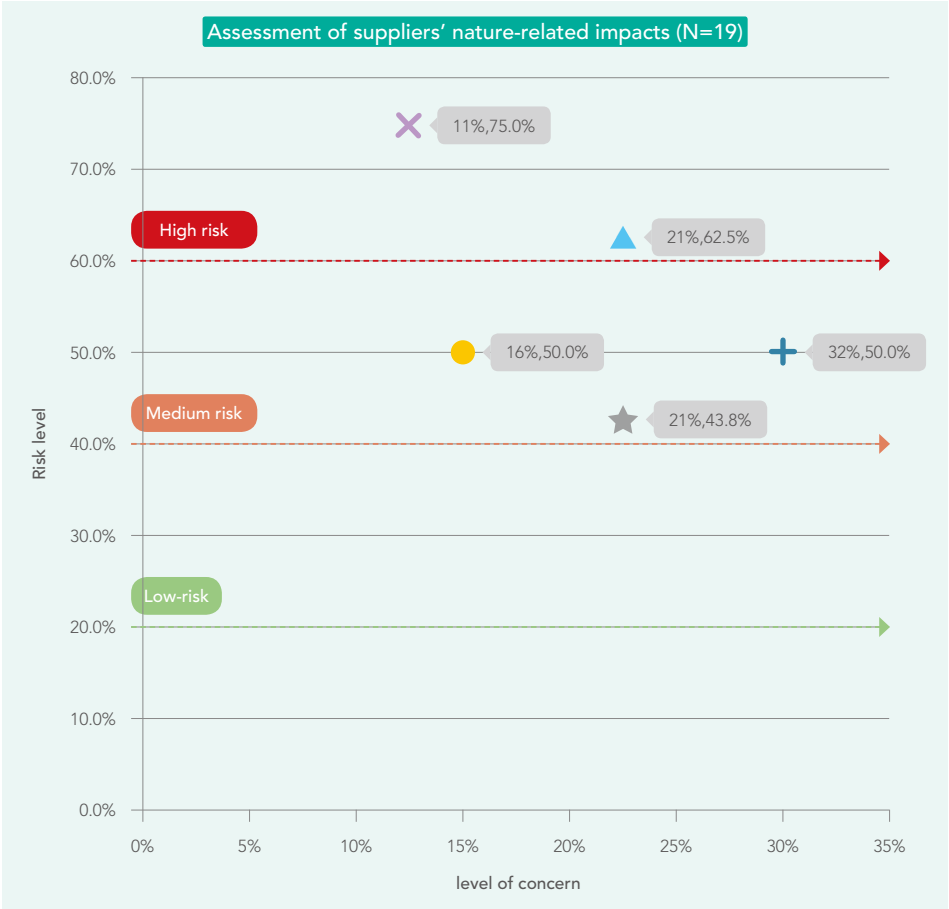
# 6.1 Supplier's Natural Risks

By issuing questionnaires to internal staff and suppliers and conducting statistical analysis on valid responses, ChipMOS has obtained the following assessment results regarding the organization and suppliers' reliance on ecosystem services and the impact assessment on nature. Based on the current level of dependence on ecosystem services, extreme rainfall leading to flooding or prolonged drought resulting in water scarcity poses a moderate to high risk for suppliers. The operational and production activities of suppliers, particularly their use of fossil fuels and metal mineral resources, are identified as the most significant factors impacting on nature.




◆ A.High temperature ■ B.Decline in air quality ▲ D.Insufficient water resources ✕ E.Extreme rainfall

★ G.Drought ● N.Noise and occurrence of large-scale vibrations (including earthquake) + O.Outbreak of a pandemic



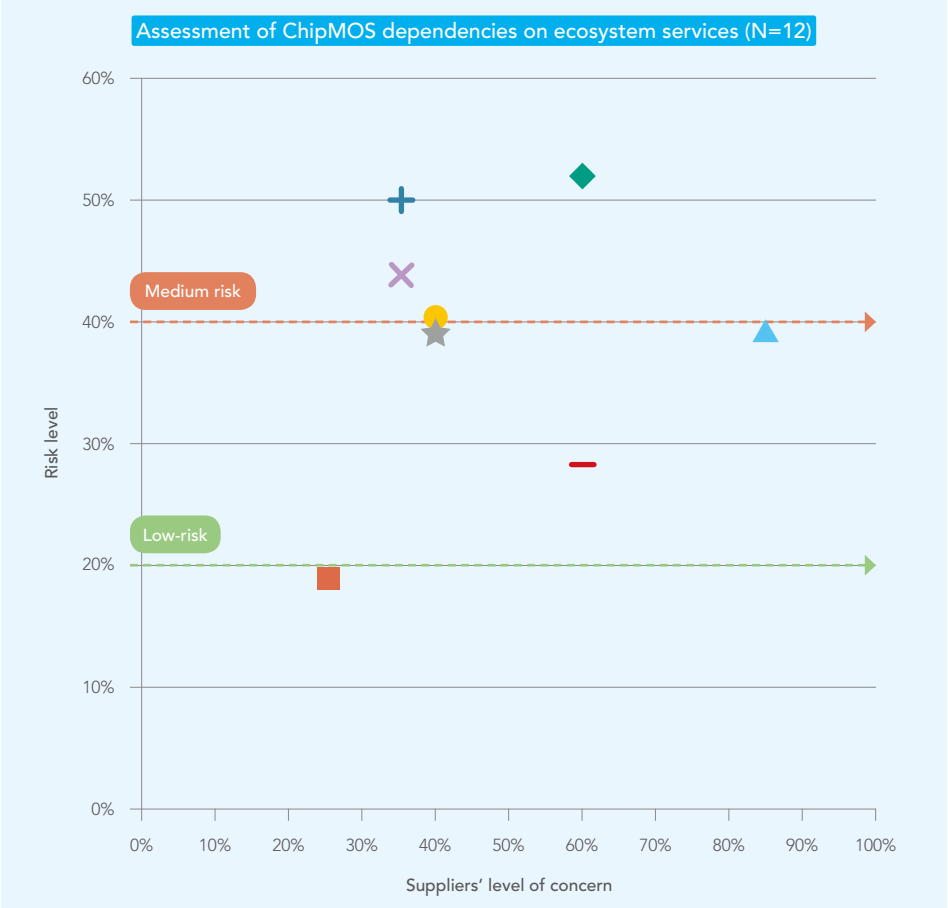

▲ Use of mineral resources, such as: Metallic and non-metallic

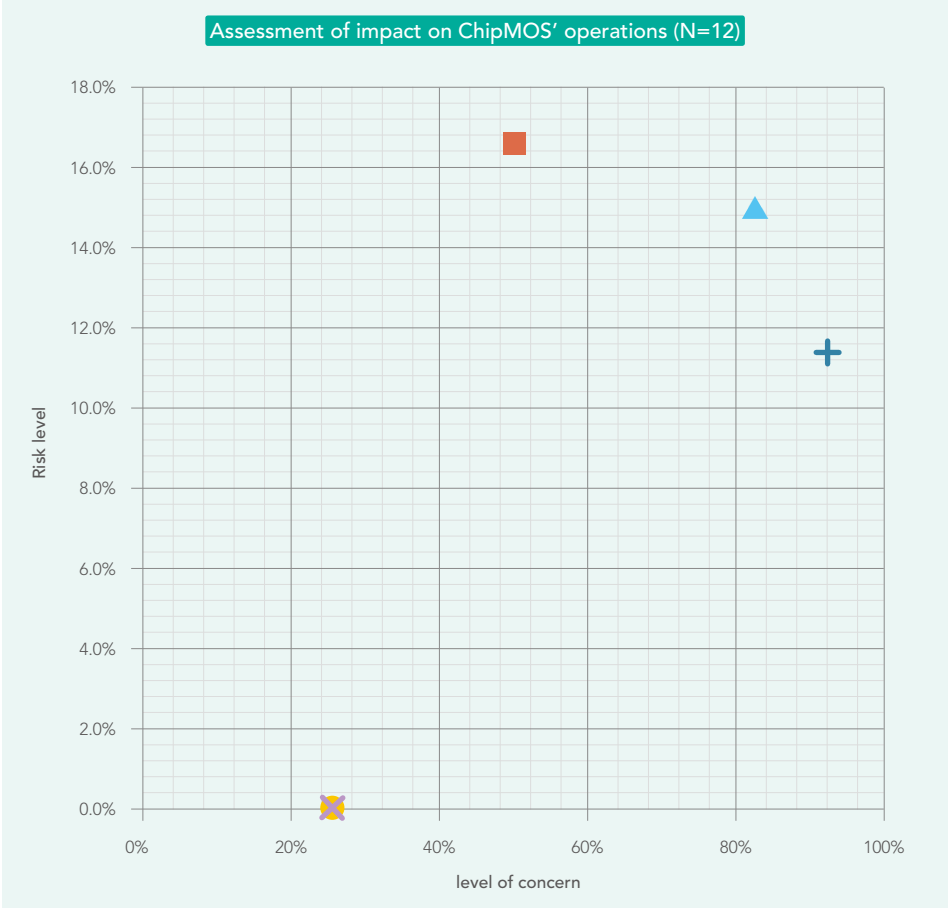
✕ Use of fossil fuels and energy, such as steam, electricity and thermal energy

★ Production of GHG ● Production of air pollutants (non-GHG) + Production of waste

## 6.2 Natural risks of our own operations

ChipMOS' operations are highly reliant on temperature and rainfall patterns within ecosystem services. This means that in the occurrence of climate disasters such as high temperatures, extreme rainfall, or uneven rainfall, ChipMOS' operations would be in a moderate-risk state. Similar to the impact on nature from suppliers, the use of fossil fuels and energy resource consumption remains the most significant impact on ChipMOS' operations compared to other factors. The extent of this impact is expected to gradually decrease as ChipMOS progresses with energy transition initiatives and the development of water resource recycling and utilization.




◆ A.High temperature ■ B.Decline in air quality ▲ D.Insufficient water resources ✕ E.Extreme rainfall

★ F.Uneven distribution of rainfall ● G.Drought + M.More intense wind disasters (i.e. sandstorms, typhoons and etc.)

– N.Noise and occurrence of large-scale vibrations (including earthquake)

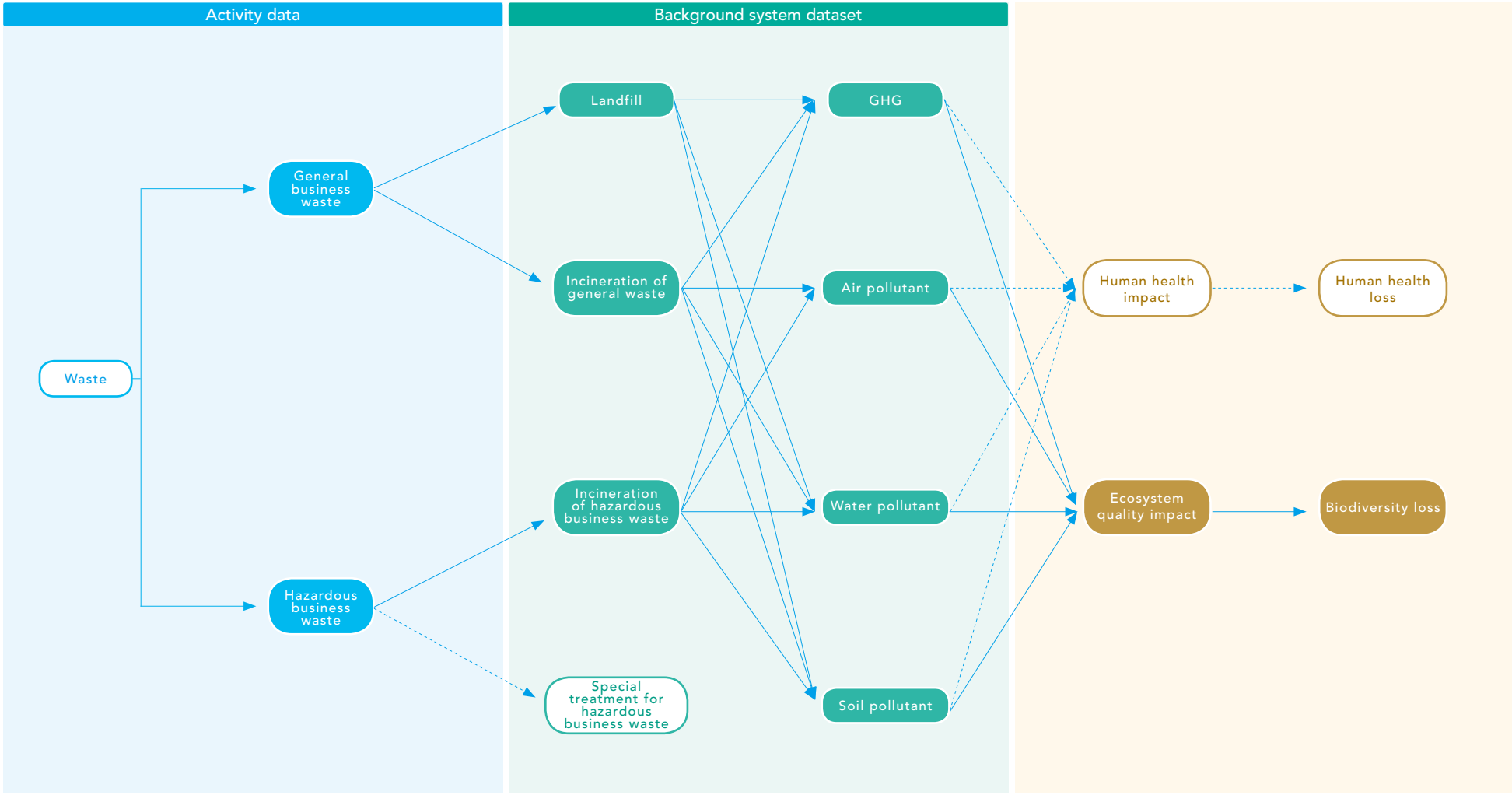
■ Use of fossil fuels and energy, such as steam, electricity and thermal energy

▲ Production of GHG ✕ Production of air pollutants (non-GHG) + Production of waste

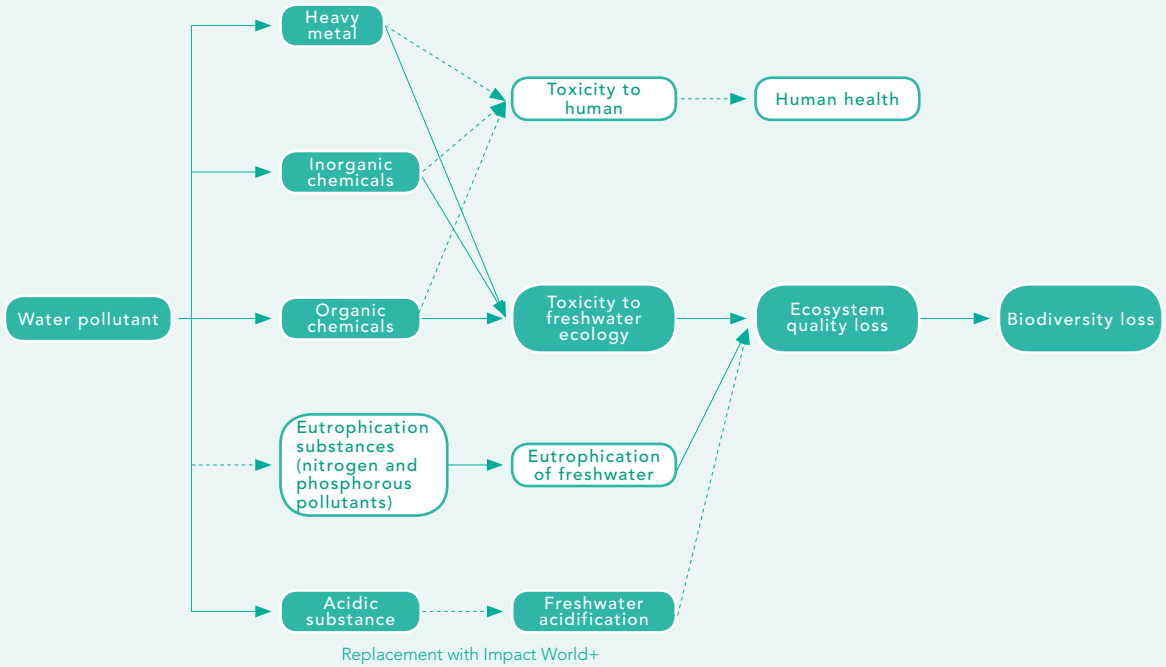
● Production of process wastewater (wastewater that contains pollutants such as chemicals or heavy metals)

The impact assessment of ChipMOS' operations on biodiversity can be further separated into impacts from wastewater and waste. The biodiversity impact from wastewater is relatively smaller compared to the impact from waste disposal. The assessment of wastewater impact is based on the evaluation of detected chemical substances. On the other hand, the impact characterization factor for waste disposal is higher. From a biodiversity impact perspective, waste disposal has a higher impact.

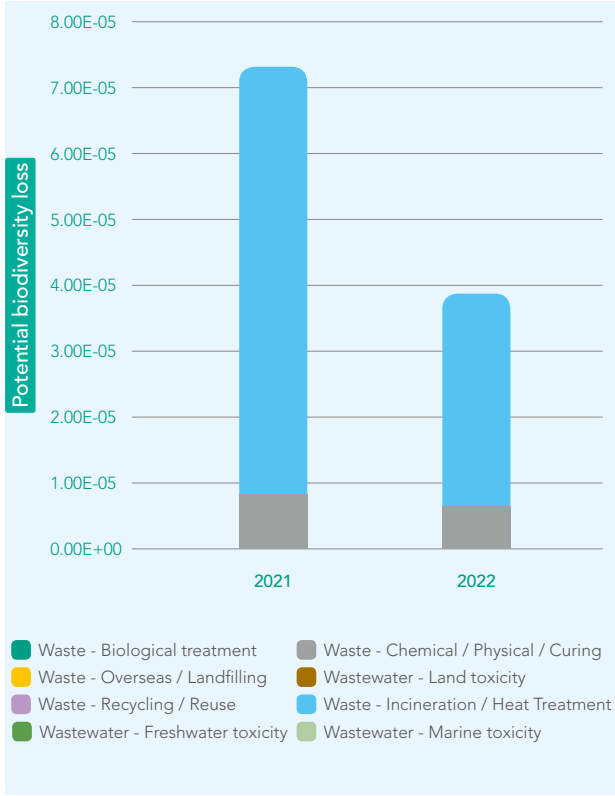
## Flowchart of impact on biodiversity caused by ChipMOS' wastes generated from organizational operations



## Flowchart of impact on biodiversity caused by ChipMOS' wastes generated from organizational operations

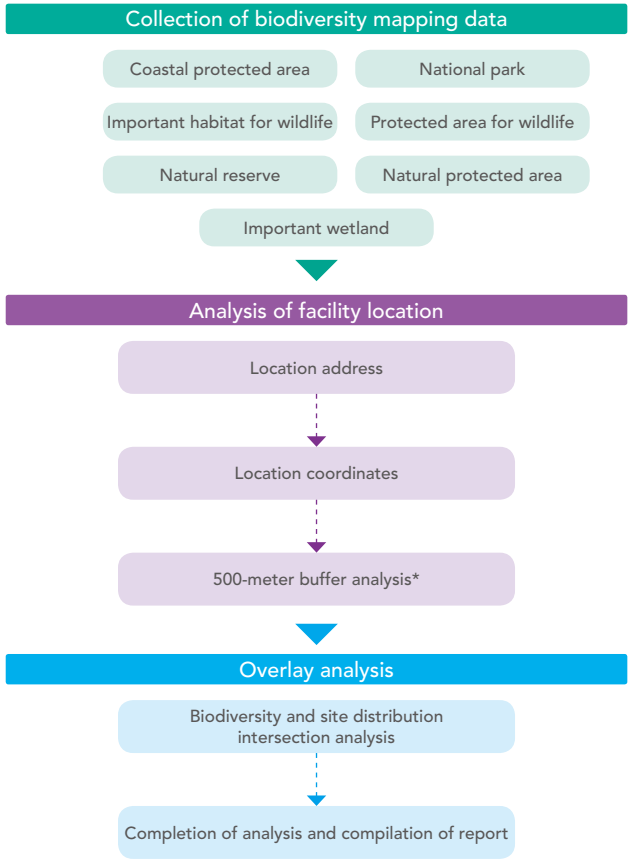



## Impact of wastewater and waste on biodiversity



## 6.3 Site analysis

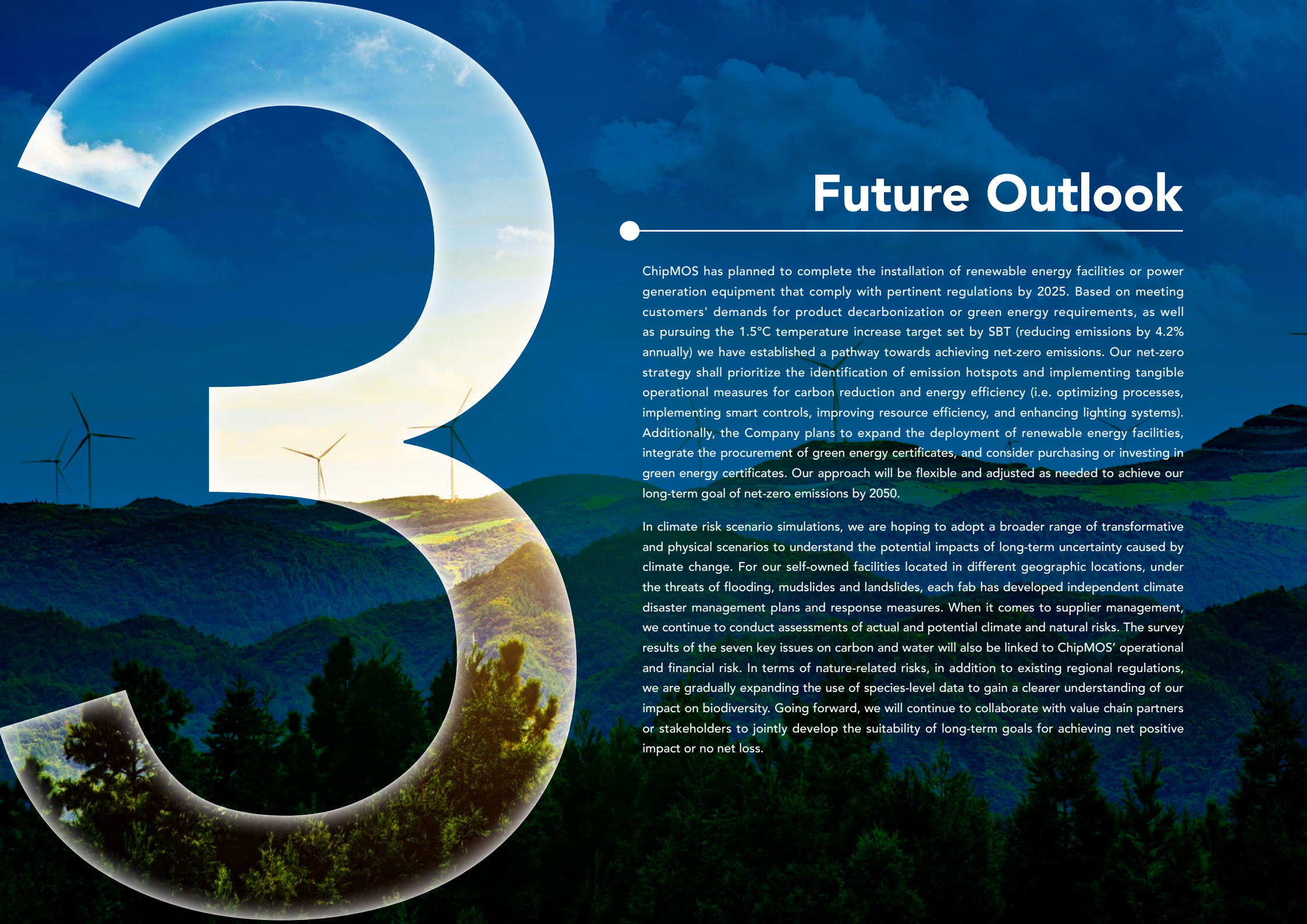
Based on the 283 locations analyzed by ChipMOS for climate change risks and biodiversity impacts (including 15 owned assets and 268 supplier sites), potential pollution and noise impacts have been identified at these sites. The analysis involves conducting a fixed-range environmental analysis, overlaying biodiversity mapping data. However, there may be cases where the impacts extend beyond physical boundaries such as embankments and rivers, requiring further assessment of the extent of impact.




Out of the total of 283 locations, there are 8 sites (all supplier sites) that have potential biodiversity impacts. These sites are located in various cities: 5 in New Taipei City, 1 in Taoyuan City, 1 in Hsinchu City, and 1 in Tainan City. The affected areas include important wetlands (such as those in the Danshui River Basin, Taoyuan's Reservoir and Canal Wetlands, Xiangshan, and Sicao), a national park (Taijiang), wildlife protected areas, and important wildlife habitats.

| Municipality | Coastal protected area | National park | Protected area for wildlife | Important habitat for wildlife | Natural reserve | Natural protected area | Important wetland |
|---|---|---|---|---|---|---|---|
| Tainan City | | ✓ Taijiang National Park | | | | | ✓ Sicao Important Wetland |
| Taoyuan City | | | | | | | ✓ Taoyuan's Reservoir and Canal Wetlands |
| New Taipei City | | | ✓ | ✓ | | | ✓ Danshui River Basin Important Wetland |
| Hsinchu City | | | | | | | ✓ Xiangshan Important Wetland |





# Future Outlook

ChipMOS has planned to complete the installation of renewable energy facilities or power generation equipment that comply with pertinent regulations by 2025. Based on meeting customers' demands for product decarbonization or green energy requirements, as well as pursuing the 1.5°C temperature increase target set by SBT (reducing emissions by 4.2% annually) we have established a pathway towards achieving net-zero emissions. Our net-zero strategy shall prioritize the identification of emission hotspots and implementing tangible operational measures for carbon reduction and energy efficiency (i.e. optimizing processes, implementing smart controls, improving resource efficiency, and enhancing lighting systems). Additionally, the Company plans to expand the deployment of renewable energy facilities, integrate the procurement of green energy certificates, and consider purchasing or investing in green energy certificates. Our approach will be flexible and adjusted as needed to achieve our long-term goal of net-zero emissions by 2050.

In climate risk scenario simulations, we are hoping to adopt a broader range of transformative and physical scenarios to understand the potential impacts of long-term uncertainty caused by climate change. For our self-owned facilities located in different geographic locations, under the threats of flooding, mudslides and landslides, each fab has developed independent climate disaster management plans and response measures. When it comes to supplier management, we continue to conduct assessments of actual and potential climate and natural risks. The survey results of the seven key issues on carbon and water will also be linked to ChipMOS' operational and financial risk. In terms of nature-related risks, in addition to existing regional regulations, we are gradually expanding the use of species-level data to gain a clearer understanding of our impact on biodiversity. Going forward, we will continue to collaborate with value chain partners or stakeholders to jointly develop the suitability of long-term goals for achieving net positive impact or no net loss.

# Appendix

| TCFD Index | | |
|---|---|---|
| Level | General Industry Indicators (2021 edition) | Page |
| Governance | a.The Board of Directors oversees climate-related risks and opportunities | 8 |
| | b.The management's function in the assessment and management of climate-related risks and opportunities | 8 |
| Strategy | a.The organization has identified short-term, medium-term, and long-term climate-related risks and opportunities | 11 |
| | b.Climate-related risks and opportunities that have significant impacts on the organization's business, strategy, and financial planning | 14 |
| | c.The organization's strategic resilience factors different scenarios of climate change into consideration, including the 2°C or lower scenarios | 13 |
| Risk Management | a.The organization's processes of identifying and assessing climate-related risks | 24 |
| | b.The organization's processes of managing climate-related risks | 24 |
| | c.The organization's approach to integrating and incorporating overall risk management in the identification, assessment and management of climate-related risks | 23 |
| Indicators and Objectives | a.Relevant indicators used by the organization for the assessment of climate-related risks and opportunities under compliance with strategic and risk management procedures | 26 |
| | b.Emission volume and relevant risks for Scope I, II, and III (if applicable) | 27 |
| | c.Goals of the organization in managing climate-related risks and opportunities and performance of related objectives | 27 |

## Relevant Publications

- ChipMOS Sustainability Report : https://www.chipmos.com/english/csr/report.aspx
- ChipMOS Annual Report : https://www.chipmos.com/english/ir/year.aspx
- ChipMOS Environmental Policy : https://www.chipmos.com/english/csr/editor.aspx?CCID=26

| TNFD Index | | |
|---|---|---|
| Level | Indicator (2023 V.04) | Page |
| Governance | A.Describe the board's oversight of nature-related dependencies, impacts, risks and opportunities | 8 |
| | B.Describe management's role in assessing and managing nature-related dependencies, impacts, risks and opportunities. | |
| Strategy | A.Describe the nature-related dependencies, impacts, risks and opportunities the organization has identified over the short, medium, and long term. | 44~49 |
| | B.Describe the impact of nature-related risks and opportunities on the organization's businesses, strategy, and financial planning | |
| | C.Describe the resilience of the organization's strategy, taking into consideration different scenarios. | |
| | D.Disclosure of the locations of assets and/or activities within the organization's direct operations, as well as relevant upstream and/or downstream and/or financing locations, which are considered important areas | |
| Risk & Impact Management | A.(I) Describe the organization's processes for identifying and assessing nature-related dependencies, impacts, risks and opportunities | 44~49 |
| | A.(II) Describe the organization's processes for managing nature-related dependencies, impacts, risks and opportunities | |
| | B.Describe the organization's procedures for managing nature-related dependencies, impacts, risks and opportunities, including all relevant action plans | |
| | C.Describe how processes for identifying, assessing, and managing nature-related risks are integrated into the organization's overall risk management | |
| | D.Describe how stakeholders, (including rights-holders) are engaged by the organization in its assessment and response to nature-related dependencies, impacts, risks and opportunities | |
| Indicators and Objectives | A.Describe the metrics used by the organization to assess and manage nature-related risks and opportunities in line with its strategy and risk management process. | 44~49 |
| | B.Disclose the metrics used by the organization to assess and manage direct, upstream and, if appropriate, downstream dependencies and impacts on nature. | |
| | C.Describe the targets used by the organization to manage nature-related dependencies, impacts, risks and opportunities and performance against targets. | |


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