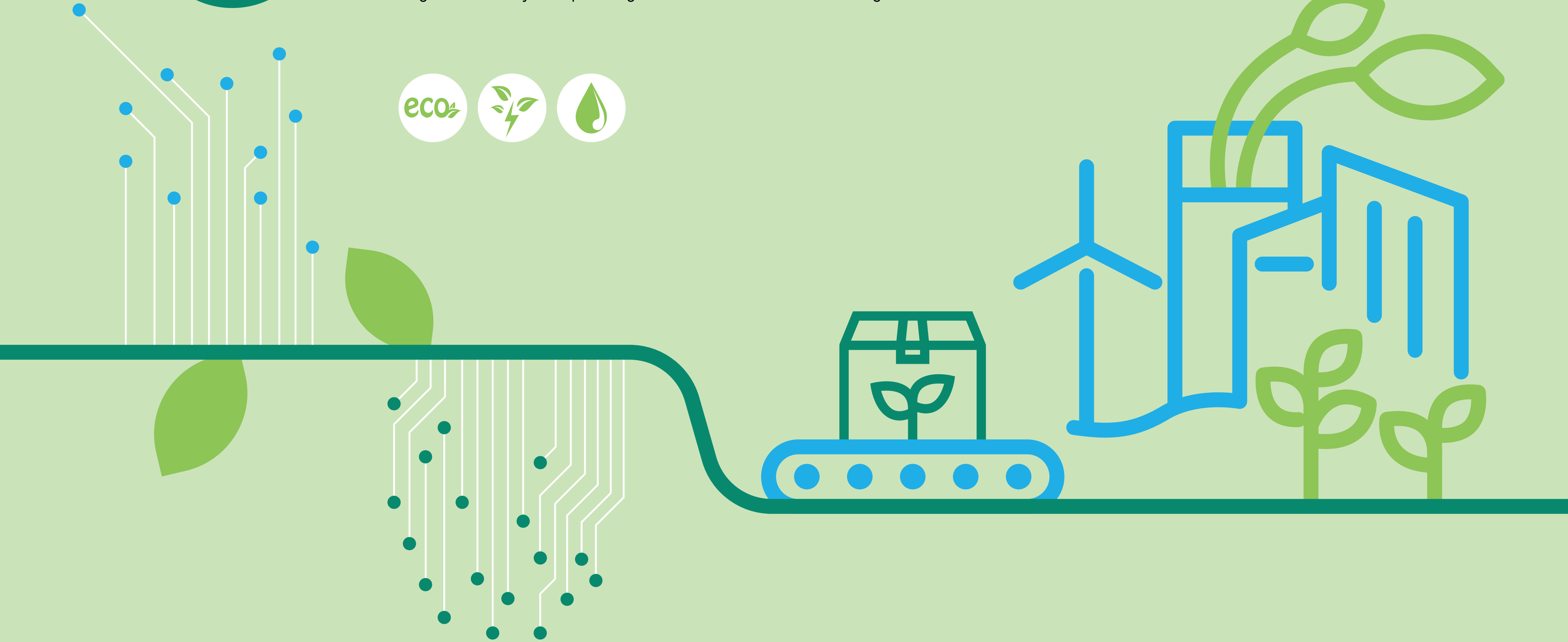
5

GREEN MANUFACTURING AND LOW-CARBON TRANSFORMATION

ASEH is committed to improving our eco-efficiency and protecting the environment by continuously enhancing resources recycling, and reducing greenhouse gas emissions, waste generation, wastewater effluent, and chemical usage. ASEH strives to develop and promote an environmentally friendly manufacturing and service concept in all facets of its enterprise. From material procurement, design, manufacturing, product use, and disposal, we conscientiously incorporate environmental impact factors at all stages of the life cycle to provide green and low-carbon manufacturing services.



2024 Key Performance

CDP Climate Change Leadership

On the CDP Climate Change Leadership List for 9 consecutive years

CDP SER Leaderboard

On the CDP Supplier Engagement Rating leader board for 6 consecutive years

CDP Water Security A List

Awarded CDP Water Security A List for 5 consecutive years

100%

Identification and assessment of climate and natural risks

100%

Implementing Carbon Pricing

28

Green certifications

Net-Zero emissions target by 2050

19%

Total electricity consumption achieved through renewable energy or REC

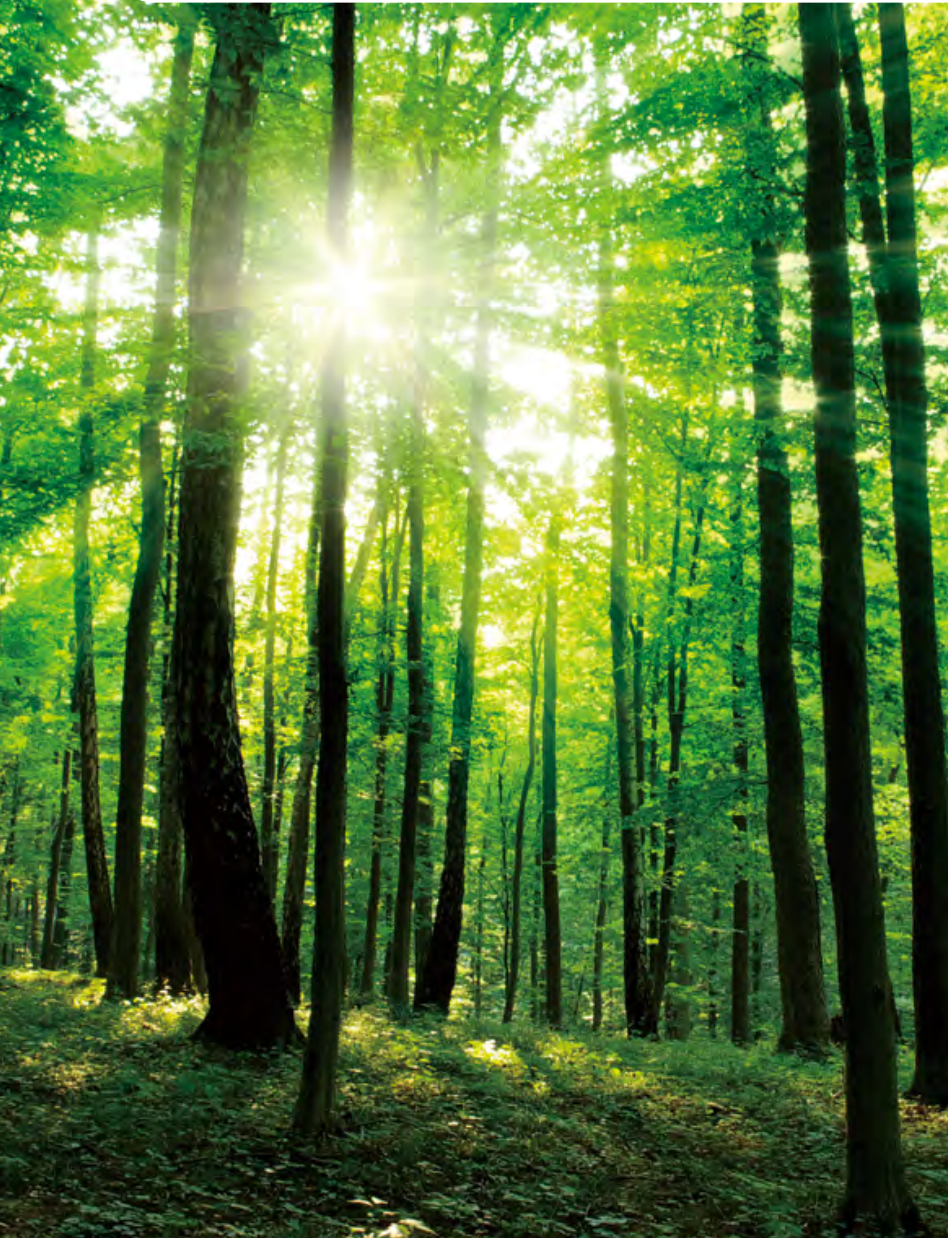
Identification of climate and natural risks affecting more than 90% of Tier 1 suppliers

Development of carbon sink methodology and carbon credits application

SDGs	Business Actions and	2024 Key Aspects	KPI	2024 Target	Status	2024 Performance	2025 Target	2030 Target
6	• Develop and implement holistic water strategies within the scope of our business and supply chain operations that are socially equitable, environmentally sustainable and economically beneficial • Protect and/or restore water-based ecosystems across our operation and supply chain	Water Resource Management	Water withdrawal intensity (water withdrawn/revenue)	31% reduction compared to 2015	Achieved	43% reduction compared to 2015	35% eduction compared to 2015	52%[1] eduction compared to 2015
			Days of production shutdown caused by phase 3 water rationing in Taiwan (water supply reduced by 30%)	0 day	Achieved	0 day	0 day	0 day
7	• Significantly increase energy efficiency, obtain remaining energy needs from renewable sources, and leverage support from suppliers to promote the similar actions across our supply chain	Energy Management	Energy saving rate achieved through energy saving and carbon reduction projects	Equivalent to 2% of the electricity demand in 2024	Achieved	Equivalent to 5% of the electricity demand in 2024	Equivalent to 2% of the electricity demand in 2025	Equivalent to 2% of the electricity demand in 2030
	• Develop and implement business models that deliver sustainable energy and energy efficiency technologies to new markets and communities		Renewable energy ratio	Renewable energy consumption accounts for 24% of total electricity consumption	Not Achieved	Renewable energy consumption accounts for 19% of total electricity consumption	Renewable energy consumption accounts for 27% of tota electricity consumption	Renewable energy consumption accounts for 42% of total electricity consumption
12	• Design and adopt a responsible, circular business model • Shift to a portfolio of goods and services that requires less resources and produces less	Waste and Recycling	Non-hazardous waste recycling rate	90%	Achieved	97%	90%	90%
			Hazardous-waste intensity (hazardous waste output/ revenue)	37% reduction compared to 2015	Achieved	53% reduction compared to 2015	41% reduction compared to 2015	61% reduction compared to 2015
13	• Align with science based climate targets to substantially reduce emissions associated with our business and supply chain operations	Climate Change[1]	GHGs intensity (scope 1 & 2 emission/revenue)	9% reduction compared to 2015	Achieved	40% reduction compared to 2015	10% reduction compared to 2015	15% reduction compared to 2015
			Absolute GHGs reduction (Scope 1 and 2)	33.6% reduction compared to 2016	Not Achieved	2.4% increase compared to 2016	37.8% reduction compared to 2016	58.8% reduction compared to 2016
			Absolute GHGs reduction (Scope 3)	10% reduction compared to 2016	Not Achieved	8%[2] reduction compared to 2020	12.5% reduction compared to 2020	25% reduction compared to 2020

1 In 2024, ASEH passed the SBTi Net-Zero target validation, setting a 1.5° C-aligned reduction target for Scope 1 and 2 GHG emissions and a Well-Below 2° C (WB2° C)-aligned reduction target for Scope 3 emissions

2 Under the current SBTi framework, companies are required to report Scope 3 emissions for both categories 11 and 12. However, in a recently published report on "Scope 3 Category 11 GHG Emissions: A Sectoral Assessment for the Semiconductor Industry" by SEMI, a global industry organization representing the semiconductor sector, it was ascertained that these categories are not applicable to the OSAT (Outsourced Semiconductor Assembly and Test) industry and should therefore be excluded. If Scope 3 emissions for categories 11 and 12 are estimated indirectly, the increase would be 0.38% compared with 2020



5.1 Climate Leadership

In response to the risks and challenges posed by climate change, ASEH remains committed to sustainable development, actively aligning with the global net-zero transition and stakeholders' expectations. We are steadily implementing low-carbon transformation strategies to enhance climate resilience and fulfil our corporate sustainability responsibilities through concrete actions. ASEH has established clear strategic pillars for low-carbon development and integrated international management frameworks to strengthen internal systems. Through responsible improvements to our production models and close collaboration with value chain partners to co-create green value, ASEH aims to continuously improve resilience in the face of climate change by routinely tracking and evaluating performance.

To encourage climate action throughout the organization, ASEH included greenhouse gas intensity targets (measured as GHG emissions per unit of revenue) and water withdrawal intensity targets (measured as water withdrawal per unit of revenue)[1] in the KPIs for designated employees and senior executives[2]—from 2021 to 2024. Each year, a third-party agency verifies performance against these targets. Employees who meet the targets are awarded restricted stock units (RSUs) as performance incentives[3].

Climate change presents ASEH with a wide array of complex challenges and opportunities, signaling both the physical impacts and transitional pressures that businesses must face. Multiple drivers—including government policy, emerging technologies, market shifts, customer expectations, and extreme weather events—are accelerating our transition toward decarbonization. Over the years, ASEH has consistently turned crises into opportunities and transformed risks into drivers of innovation. We are proactively expanding our portfolio of low-carbon solutions for global deployment, thereby strengthening our influence in low-carbon development and enhancing the resilience of our value chain. In addition, we are aligning with the Task Force on Climate-related Financial Disclosures (TCFD) and Taskforce on Nature-related Financial Disclosures (TNFD) frameworks to systematically disclose our environmental dependencies, impacts, risks, and opportunities. At the same time, we report on our interim targets and annual performance under the net-zero roadmap, further demonstrating our role as a guardian of the planet to a broader range of stakeholders.

[1] A continuous reduction of 1% in intensity per year with 2015 as the baseline year
[2] Key employees that are involved in long-term business strategy and future developments, influence business operations, and core technical talents
[3] New shares will be issued to employees at no cost, with a total issuance amount of NTD 150 million

4 Strategic Approaches	Principal Methodology		
1 Formulating Net-Zero Strategies	• **Low-Carbon Products:** Continuously expanding our product carbon footprint inventory and reduction efforts, while collaborating across the value chain to deliver viable low-carbon solutions to the global market. • **Renewable Energy:** Create a diverse low-carbon emission energy framework. • **Low-Carbon Transportation:** Use low-carbon vehicles to reduce our carbon footprint. • **Supply Chain Engagement:** Collaborate closely with suppliers to improve their carbon inventory capabilities and implement carbon reduction programs. • **Investment in Carbon Credits:** Invest in carbon sink and capture technologies to reduce environmental and social costs.		
2 Comprehensive management framework	ASEH's Enterprise Risk Management (ERM) takes guidance from the TCFD framework to integrate the management of climate change and environmental risks and opportunities. Our comprehensive management framework enables us to undertake annual risk tracking that include scenario analysis and simulation to ascertain possible risks, and control such risks within acceptable ranges, maximizing and protecting the company's interests.		
3 Socially responsible actions	**Managing Strategies**: For risks that have significant impacts to the company's strategy and financial position, the company's top management is responsible for evaluating those risks and identifying opportunities, and providing appropriate response plans and financial strategies. **Calculating Financial Impact and Administrative Costs**: Appropriate data estimation methods were selected according to parameters defined through scenario analysis, and used to calculate the actual scale of risks, opportunities and financial impacts. This will further identify the key factors influencing the possible impacts. **Defining Climate Scenarios**: Employing a climate change scenario analysis methodology to determine the probability of operational and financial impacts by simulating the changes in various parameters from future timelines and different geographic locations. **Identifying risks and opportunities**: Identifying potential climate risks and opportunities based on international trends and industry characteristics. Incorporating the perspectives of internal and external stakeholders to identify key risks and opportunities that could affect the company's operations and finances. **TCFD Framework and Analysis**: Analyzing the TCFD framework and recommendations to develop corresponding short, medium, and long-term strategies.		
4 Performance-oriented results	Adaptation: ✔ 100% oversight of the risk analysis and adaptation planning of facilities worldwide. ✔ 100% of global facilities have implemented internal carbon pricing, promoting improved energy and resource efficiency and supporting low-carbon transition. ✔ Deploying a Business Continuity Management (BCM) plan to strengthen the analysis of potential risks and emergency response mechanisms ✔ Building intelligent energy management systems to mitigate losses from supply disruption. ✔ Conducting risk assessments, green procurement and material recycling through sustainable supply chain engagement.	Mitigation: ✔ Building green factories and adopting renewable energy. ✔ Committing to Science Based Targets and net-zero emission targets. ✔ Increasing energy efficiency, promoting circular economy and expanding water reuse. ✔ Coordinating the support and promotion of supplier carbon inventory management (ISO14064 and ISO14067).	Strategic and Financial Planning: ✔ Evaluate the impacts of climate risks and opportunities, publicly disclose results annually, and participate in S&P CSA and CDP surveys. ✔ Committing to Net Zero targets through low-carbon products, renewable energy, low-carbon transportation, supply chain engagements and carbon credits. ✔ Launching sustainability-linked loans with proceeds used on green projects. ✔ Developing a long-term value chain partnership blueprint.

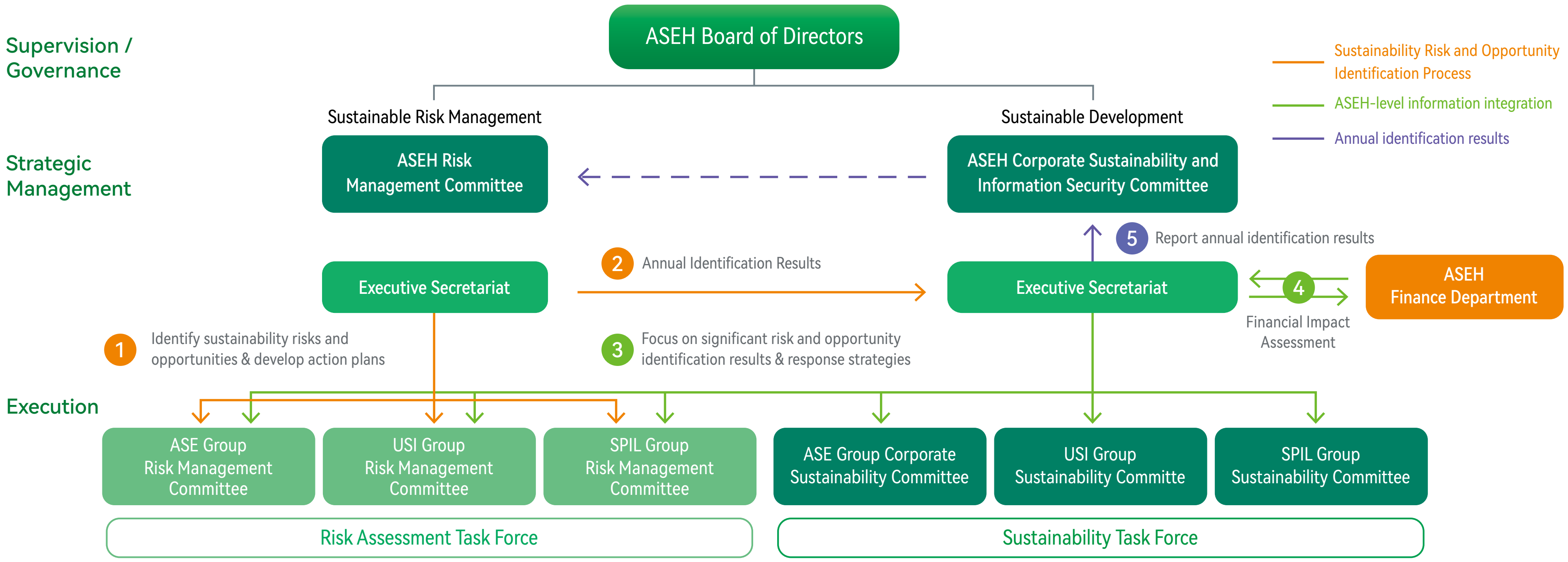
Global Climate Risk Management

Governance and Oversight

The Chief Sustainability Officer was appointed by the Corporate Sustainability and Information Security Committee (CSISC) to drive the company's climate objectives and initiatives. The CSO has the responsibility of overseeing and addressing the impact of climate- and nature-related issues on the company's operations. Each year, a report on the progress of target implementation is presented to the board of directors, allowing strategic decisions to be formulated. Related risks and opportunities are duly integrated into the company's management, operations, and business decision-making processes. The Executive Secretariat manages the general administrative affairs which include facilitating communication between committee members and organizing the sustainability resources and technology adoption across all subsidiaries. The combined approaches enable us to bridge vertical and horizontal alignment strategies for advancing climate- and nature-related sustainability.

Integrated Risk Management

We are focused on integrating sustainability risk management into our business strategy and organizational culture. We conduct identification of climate-related risks and opportunities diligently, consolidating them based on financial materiality from the perspectives of all subsidiaries, and at the corporate and holding company levels. Each operational unit is responsible for managing and responding to these risks, with findings reported to senior management at all levels. This process enhances understanding of how climate change and nature-related issues affect business operations, while reinforcing the connection between executive leadership and functional units. Through this framework, the company is able to effectively identify, assess, monitor, and control various risks, ensuring that risks arising from business activities remain within acceptable thresholds.



On the topic of climate change and the impacts to water resources, we explored both physical and transition risks. These include the assessment of acute and chronic physical risks, policy, legal, as well as technology, market, and reputational factors. We also analyze the climate risks and opportunities based on factors including resource efficiency, energy sources, products and services, market and operational resilience. Each risk is then classified according to its scope of impact, risk type, intensity, occurrence and probability. These findings are further evaluated based on their material impact and prioritized primarily by the severity of impact[1] and likelihood of occurrence[2] on a ranking chart[3]. These processes enable us to identify the most significant climate-related risks and opportunities.

In regard to physical risks, dependencies, and impacts related to climate and nature, assessment of the geographic locations of our global subsidiaries are conducted using data from government and international sources. These include Taiwan's Water Resources Agency flood risk data, the Aqueduct Water Risk Atlas developed by the World Resources Institute (WRI), the World Database on Protected Areas (WDPA) developed by the International Union for Conservation of Nature (IUCN), and Taiwan's biodiversity mapping resources[4]. These tools help identify potential physical risks under various scenarios such as water stress, flooding, landslides, and debris flows. They also assist in identifying whether facilities are located near biodiversity-sensitive areas, providing essential information for subsequent risk and opportunity analyses and strategy development.

Risks		Opportunities				
Physical Risks	Transition Risks	Resource Efficiency	Energy source	Products and Service	Markets	Resilience
• Acute Risks • Chronic Risks	• Policy risks • Legal risks • Technology Risks • Market risks • Reputational risks	• Transportation modes • Recycled materials • Water resource utilization • Production processes • Energy-efficient buildings	• Low-carbon energy • Adoption of new technologies • Regional microgrids • Policy Incentives • Participation in the carbon market	• Low-carbon Products • Research and development innovation • Adaptation and solutions • Customer behavior transformation • Diversification of operations	• Finding new business opportunities • Obtaining government cooperation • Participation in building public infrastructure • Expansion of funding sources	• Participation in renewable energy projects • Energy efficiency improvements • Alternative or diversifying resources • Supply Chain Resilience

Climate Risks and Opportunities: Identification, Impact and Action

At ASEH, climate-related risks and opportunities are identified across our entire value chain, encompassing upstream suppliers, internal operations, and downstream customers. This year, the scope of analysis was expanded to cover 110 global consolidated subsidiaries, enabling a comprehensive understanding of overall climate risks and opportunities. Based on a time-frame[5] analysis of potential impacts, the most significant risks identified are the failure to meet renewable energy procurement targets and the lack of continuous improvement in energy efficiency. On the other hand, the most promising climate-related opportunities include participation in renewable energy projects, adoption of energy-saving measures, and corporate carbon reduction goals. In response to these findings, we will continue to formulate more forward-looking and effective strategies to enhance climate resilience and seize potential opportunities for driving sustainable and transformative growth.

[1] The impact severity rating is determined by evaluating three dimensions: financial impact, business continuity impact (BCM), and reputational impact. Each dimension is scored on a scale from 1 to 5, and the highest score among the three is taken as the final impact severity rating
[2] The likelihood of occurrence is categorized into five levels: Extremely Unlikely – Once every 15 to 20 years; Unlikely – Once every 10 to 15 years; Possible – Once every 5 to 10 years; Highly Likely – Once every 1 to 5 years; Almost Certain – Once every year
[3] Scores are assigned on a scale of 1 to 5 for both severity and likelihood, with 1 representing the lowest level and 5 the highest. The significance of each risk or opportunity is ranked by multiplying the impact score by the likelihood score. The top three items with the highest combined scores are prioritized accordingly
[4] Taiwan's biodiversity mapping includes areas designated under various legal frameworks: nature reserves under the Cultural Heritage Preservation Act, national parks under the National Park Law, nature protection areas under the Forestry Act, important wetlands under the Wetland Conservation Act, wildlife protection areas under the Act on Wildlife Conservation, coastal protection areas under the Coastal Zone Management Act, and non-regulated designated conservation corridors under Taiwan's National Ecological Network
[5] Categorized into short-term (within 3 years), mid-term (3 to 5 years), and long-term (over 5 years)

Climate Change			Timeframe of Impact	Scenario Description	Impact Explanation	Location in the value chain	Potential Financial Impact	Financial Impact Assessment (Million USD)	Management Approach	Management Cost (Million USD)
Risk	1	Failure to meet renewable energy procurement targets	Short-term Mid-term	Failure to meet customers' low-carbon transition requirements	Market competitiveness	• Directly operated by the company • Upstream or supply chain • Downstream or end-user	• Increase direct costs • Loss of existing customers • Decline market demand	751.85 | 1,452.66	1. A renewable energy procurement platform has been established, with the Taiwan site fulfilling its obligations as a major electricity user. 2. Renewable energy usage across subsidiaries is monitored quarterly, with ongoing efforts to increase adoption and improve sustainability performance.	1.66
Risk	2	Failure to continuously improve energy efficiency	Short-term Mid-term Long-Term	Ineffective management of energy efficiency	Increase in operational expenses	• Directly operated by the company • Downstream or end-user	• Increase direct costs	27.66 | 29.90	1. Production processes are being optimized to enhance energy efficiency and reduce operational impact. 2. Subsidiaries are required to adopt the ISO 50001 Energy Management System, with ongoing efforts to improve energy performance and reduce reliance on conventional energy sources.	13.14
Opportunity	1	Participate in renewable energy projects and adopt energy-saving measures	Short-term Mid-term Long-Term	• Low-carbon energy transition helps mitigate the risk of energy price fluctuation. • Energy efficiency management enhances operational resilience.	• Acquire low-cost resources or generate investment returns • Reduce energy consumption and operating costs • Enhance corporate sustainability image	• Directly operated by the company • Upstream or supply chain • Downstream or end-user	• Reduced operating costs through climate change adaptation measures • Energy diversification • Enhancing competitive capability	28.78 | 32.38	1. Renewable energy procurement is being gradually implemented across multiple sources—including solar, wind, and hydro—to diversify energy inputs and support sustainability goals. 2. The ISO 50001 Energy Management System is being implemented to enhance energy efficiency and reduce reliance on conventional energy sources. 3. Supply chain transformation is actively driven by engaging suppliers to improve manufacturing processes, adopt energy-saving technologies, and participate in performance tracking and evaluation programs.	24.36
Opportunity	2	Corporate Emissions Reduction Goals	Short-term Mid-term Long-Term	Set carbon reduction targets and actively promote emission reductions	• Achieving carbon reduction goals can lower financial risks • Enhance corporate reputation	• Directly operated by the company • Upstream or supply chain • Downstream or end-user	• Reduced carbon pricing costs • Improved competitiveness	74.41 | 297.63[1]	1. The company has committed to Science Based Targets initiative (SBTi) net-zero goals, with action plans developed around five strategic pillars to ensure progressive realization of its net-zero pledge. 2. Efforts are underway to expand product carbon footprint assessments and drive emissions reductions, enabling the delivery of low-carbon products and services to customers.	24.64

[1] Among ASEH's current operational sites, the countries subject to carbon fee regulations include Taiwan and Singapore. However, the direct emissions from the Singapore site are significantly below the local carbon fee threshold. Therefore, the Singapore site's financial impact is not included in the scope of this assessment

Scenario Simulation and Adaptive Management

	Scenario	Time	Parameters Used	Analysis Results		
				Upstream (Supply Chain)	Operational Sites	Downstream (Customer)
Physical	SSP1-RCP2.6	2021-2100	• Overlay Analysis - Flooding caused by extreme rainfall of 650 mm over 24 hours - Landslide and geological hazard-prone areas - Potential debris flow stream locations	The increasing frequency and intensity of extreme rainfall events have raised the risk of disaster-related losses, while the proportion of suppliers unable to deliver on time due to flooding has also increased.	All self-owned operational sites are located outside landslide and debris flow potential zones. However, some sites are exposed to flood risks, potentially leading to operational disruptions and losses.	Flooding may lead to operational disruptions and transportation delays, thereby increasing the risk of delayed deliveries to customers.
	SSP2-RCP4.5	2021-2100				
	SSP3-RCP7.0	2021-2100				
	SSP5-RCP8.5	2021-2100				
Transition	SBT-NZ	2024-2050	• Carbon Tax/Fee - Taiwan's carbon fee is set at 10 USD/ tCO_2e - Carbon tax/fee parameters for China and other overseas regions are based on the SSP1-1.9 carbon price scenario, which is approximately 651 USD/ tCO_2e by 2050 • Market Risks - It is assumed that approximately 50% of customers have made climate-related commitments, and among them, have imposed low-carbon requirements on their suppliers. Failure to meet these requirements may result in risks such as loss of orders or termination of partnerships. • Renewable Energy Costs - **Solar PV:** 0.048–0.168 USD/kWh - **Offshore Wind:** 0.075–0.153 USD/kWh - **Onshore Wind:** 0.033–0.137 USD/kWh • The average cost of carbon removal is 235 USD/tCO_2e	As carbon reduction regulations become increasingly stringent worldwide, suppliers may face higher carbon management costs. Some of these costs could be passed on to customers, thereby increasing pressure across the supply chain.	Under the SBT-NZ target scenario, the company is projected to experience peak carbon tax and market risks in 2037 due to non-compliance. However, these risks are expected to decline steadily as the company advances its transition strategy, approaching near zero by 2047. Overall, the cost of implementing the transition strategy is significantly lower than the potential carbon fees and market losses that could result from a 'business-as-usual' scenario.	As stakeholder concern over climate change intensifies and more countries implement carbon tax systems, an increasing number of customers are demanding low-carbon transitions for products and services. Failure to meet these requirements could negatively impact revenue.
	IEA-NZE	2024-2050			Under the IEA-NZE target scenario, compliance is achieved in the early stages of the transition. However, as emission reduction requirements become more stringent over time, potential carbon tax/fee and market risks are expected to emerge starting in 2037.	
	IEA-APS	2024-2050			Under the IEA-APS target scenario, the company's current transition strategy already meets the required targets and is not expected to face carbon tax or market risks.	
	IEA-STEPS	2024-2050			Under the IEA-STEPS target scenario, the company's current transition strategy already meets the required targets and is not expected to face carbon tax or market risks.	

Physical Risks

Climate change is intensifying extreme rainfall which has the potential to trigger flooding, landslides and debris flows that disrupt operations. As such, we apply the IPCC framework of Hazard × Vulnerability × Exposure to conduct a physical risk assessment. In the analysis, hazard refers to extreme rainfall under climate change scenarios; vulnerability[1] includes the resulting flooding, landslides, and debris flows; exposure[2] is defined by the geographical location of each operational site. A quantitative physical risk analysis is conducted for each site under climate change conditions. The assessment references multiple Shared Socioeconomic Pathways (SSPs) and Representative Concentration Pathways (RCPs), specifically: SSP1-RCP2.6; SSP2-RCP4.5; SSP3-RCP7.0; SSP5-RCP8.5[3]. These scenarios are simulated across different time scales[4], and the resulting risks are categorized into three levels[5] for management purposes.

Risk levels for ASEH (Taiwan region) under various climate change scenarios and timeframes

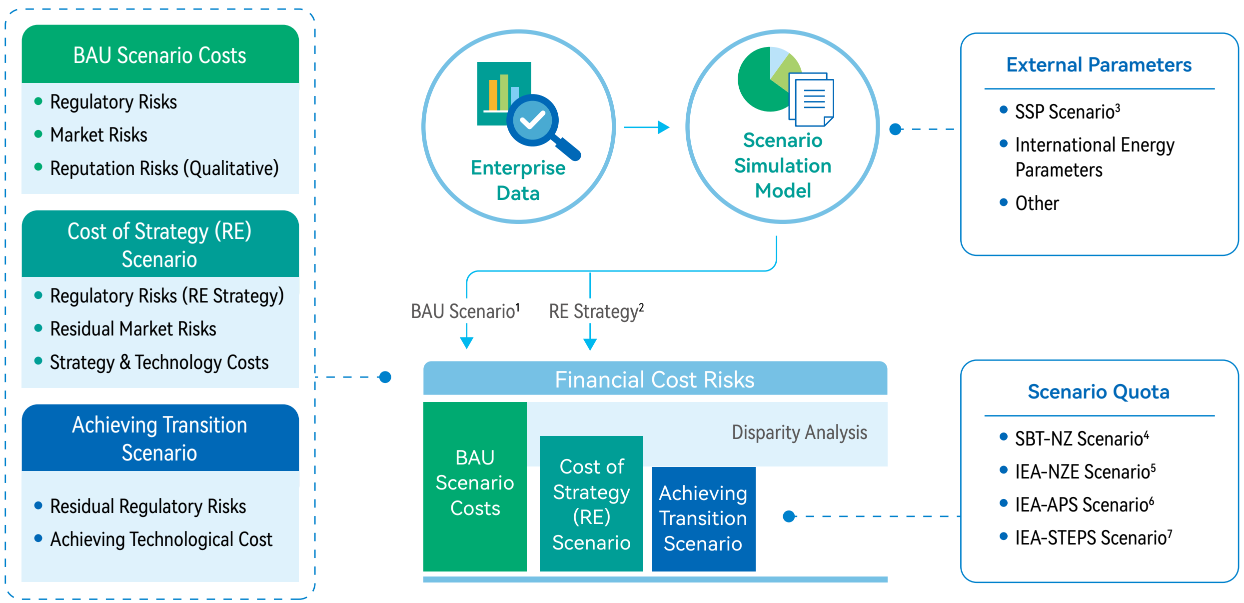
Risk Levels	SSP1-RCP2.6				SSP2-RCP4.5				SSP3-RCP7.0				SSP5-RCP8.5			
	Short	Medium	Medium-to-Long	Long	Short	Medium	Medium-to-Long	Long	Short	Medium	Medium-to-Long	Long	Short	Medium	Medium-to-Long	Long
Medium Risk	1	1	1	1	1	1	2	1	1	1	1	2	1	1	1	2
High Risk	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Simulation Results	All 16 sites in the Taiwan region are situated outside areas identified as sensitive to landslides or debris flows, while 1 to 2 sites located in the central region are considered to have potential flood risks.															
Mitigation / Adaptation	Adaptation plans implemented in Improved in the past 5 years ● Flood risks based on a 200-year return period were proactively addressed at the design phase of our plant constructions. Mitigation measures included elevating the foundation, enhancing drainage systems, as well as installing permeable pavements and waterproof gates. These physical adaptations are supported by ongoing operational management plans and scenario-based emergency drills, ensuring climate resilience and minimizing potential impacts. ● Emergency Response Management: When natural disasters such as typhoons, earthquakes, heavy rainfall, or flooding meet predefined activation criteria, an emergency command center is promptly established. Each unit is required to report the extent of damage, response progress, and recovery status at regular intervals based on the severity of the impact. In the event of a disaster-related incident, a post-event investigation is conducted after response and recovery efforts to identify root causes and recommend corrective actions, preventing recurrence and enhancing overall resilience.															

1 Vulnerability is assessed by referencing disaster maps published by the Taiwanese government, analyzing both the extent and severity of potential hazards
2 Exposure is analyzed based on the geographical location of each facility
3 RCP stands for Representative Concentration Pathway which, when paired with SSPs (Shared Socioeconomic Pathways), integrates socioeconomic factors into greenhouse gas emission scenarios. SSP1-RCP2.6 represents a low-emission mitigation scenario; SSP2-RCP4.5 represents a moderate-emission scenario; SSP3-RCP7.0 represents a high-emission scenario; SSP5-RCP8.5 represents an extremely high-emission scenario
4 Short-term: 2021–2040; Mid-term: 2041–2060; Mid-to-long-term: 2061–2080; Long-term: 2081–2100
5 Risk levels are classified according to a scoring matrix as follows: No Risk: 0; Low Risk: 1–4; Medium Risk: 5–10; High Risk: 11–25

Risk levels of suppliers in the Taiwan Region under various climate change scenarios and time periods

Risk Levels	SSP1-RCP2.6				SSP2-RCP4.5				SSP3-RCP7.0				SSP5-RCP8.5			
	Short	Medium	Medium-to-Long	Long	Short	Medium	Medium-to-Long	Long	Short	Medium	Medium-to-Long	Long	Short	Medium	Medium-to-Long	Long
Medium Risk	20	22	15	13	29	18	17	18	18	20	24	27	19	22	18	25
High Risk	5	8	8	6	7	5	6	7	7	7	8	8	8	6	6	8
Simulation Results	A climate risk simulation analysis was conducted for 290 suppliers in Taiwan under various climate change scenarios across short-, medium-, and long-term timeframes: • None of the 290 suppliers are located in areas identified as sensitive to landslides or debris flows. • We identify at-risk suppliers by integrating extreme rainfall scenario with flood and landslide potential. The simulation results show that high-risk suppliers account for approximately 1.7% to 2.8%, while medium-risk suppliers represent around 4.5% to 10.0%.															
Mitigation / Adaptation	• A climate risk map for suppliers has been established to identify and monitor those with potential exposure, enabling enhanced oversight and risk management. • Regular sustainability forums are held to facilitate the sharing of management practices and technologies, fostering collective efforts to strengthen climate resilience across the supply chain.															

Transition Risk and Financial Impact Analysis



[1] Under the Business As Usual (BAU) scenario, no greenhouse gas reduction measures are implemented. For facilities in Taiwan, the carbon emission factor for electricity is based on the 2050 net-zero pathway. For facilities in China and other overseas locations, the emission factor is based on the SSP2-RCP4.5 pathway

[2] Under the Renewable Energy (RE) strategy, ASEH plans to purchase renewable energy with the goal of achieving RE100 by 2050. Taiwan sites: RE25 by 2025, RE42 by 2030, RE72 by 2040, and RE100 by 2050. China sites: Already achieved RE100 and will maintain it through 2050. Overseas sites: RE66 by 2025, RE71 by 2030, RE89 by 2040, and RE100 by 2050

[3] The Shared Socioeconomic Pathways (SSPs) are models based on different socioeconomic assumptions

[4] SBT-NZ Scenario: Corresponds to the 1.5˚C low-carbon transition pathway, the most stringent carbon tax requirements, and the long-term net-zero target approved by the Science Based Targets initiative (SBTi) for ASEH

[5] IEA-NZE Scenario: Defined by the International Energy Agency (IEA) as the pathway to achieving net-zero emissions by 2050. This scenario assumes that governments worldwide implement more ambitious climate policies, significantly improve energy efficiency, and rely solely on energy system transformation—excluding additional carbon reduction measures such as carbon capture and offsets—to achieve net-zero targets

[6] IEA-APS Scenario: Defined as the scenario in which governments and industries fully implement their stated climate pledges and targets. In this scenario, the pathway to net-zero emissions includes not only energy system transformation but also additional carbon reduction measures such as carbon capture and carbon removal. It is used to assess the gap between current national commitments and the global goal of limiting temperature rise to 1.5˚C

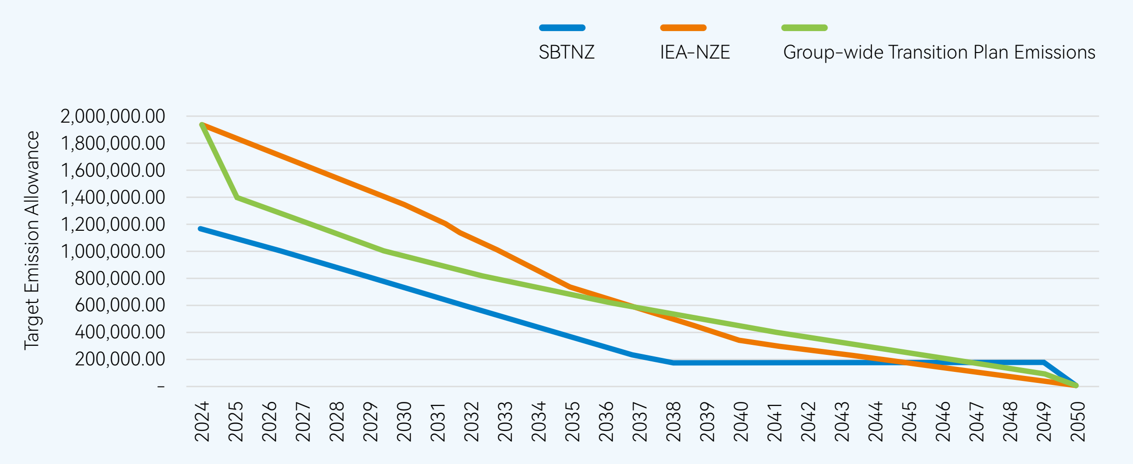
[7] IEA-STEPS Scenario: Defined by the International Energy Agency (IEA) as a scenario that considers only announced policies and the extent of their implementation. It accounts for real-world constraints such as insufficient policy enforcement and infrastructure barriers, making it the scenario most closely aligned with current development trends

Assessment Framework for the Climate-Related Transition Risks of ASE Holdings

Transition Scenario	Financial Calculation	
	Financial Impact Prior to Taking Action	Management Cost After Taking Action
BAU	• Regulations (Carbon tax/fee) • Market risks	• Additional costs of green energy[1] • Cost of beyond value chain mitigation (BVCM)[2]
RE100		

Regulatory Risks	Financial Factors	Cost Category
Carbon tax/fee	• Carbon fee: 10 US$/t$CO_2$e • China and overseas sites_SSP1-1.9 carbon price: Approximately 651 US$/t$CO_2$e by 2050.	Regulatory cost
Cost of procuring renewable energy	• Solar photovoltaics: 0.048-0.168 US$/kWh • Offshore wind power: 0.075-0.153 US$/kWh • Onshore wind power: 0.033-0.137 US$/kWh	Operating costs
Carbon removal cost	Conservative use of direct air capture technology: 85-345 US$/t$CO_2$e • Technical immaturity: 340 US$/t$CO_2$e • Average price: 235 US$/t$CO_2$e • Technical maturity: 130 US$/t$CO_2$e	-

ASEH's Emission Pathways under Different Transition Targets



We began by classifying the boundaries of our operations into Taiwan, China and overseas sites. Climate transition risks including regulatory, market, technological, and reputational factors are assessed according to the International Financial Reporting Standards (IFRS) S2 transition scenario guidelines. Based on the assumption of continuous business growth[3], we determined that the financial impacts of different transition scenarios are aligned with temperature pathways below 2° C and even 1.5° C. This includes comparing the financial implications of a Business as Usual (BAU) approach versus the RE100 strategy, as well as the management costs required to meet external pressures. We also estimate the potential financial outcomes[4] of strategies already implemented or planned and compare them to the projected costs of achieving net-zero targets, identifying any gaps between the two.

1. Subtract the cost of gray energy from the cost of green energy
2. Companies can mitigate carbon emissions by reducing the costs of actions outside the value chain, which include supporting carbon reduction and removal technologies within the value chain, as well as purchasing carbon offsets
3. Electricity Consumption Growth Simulation for ASEH Facilities: For facilities in Taiwan, the simulation assumes a continuous annual electricity consumption growth rate of 1.41%, based on the average growth over the past four years. For facilities in China, the growth rate is estimated using the SSP1-1.9 scenario's electricity consumption growth ratio for the Asia region. For overseas facilities, the growth rate is estimated using the SSP5-8.5 scenario's electricity consumption growth ratio applied on the Asia region
4. Reference Parameters Include: IPCC AR6 (Intergovernmental Panel on Climate Change Sixth Assessment Report) SSP scenarios; Internationally recognized reports such as those from IRENA, IEA, and publicly available climate policies from national governments; Domestic sources including energy parameters from the Taiwan Bureau of Energy and Taiwan Power Company; Custom-defined parameters, including baseline emission factors and both current and long-term mitigation and transition strategies

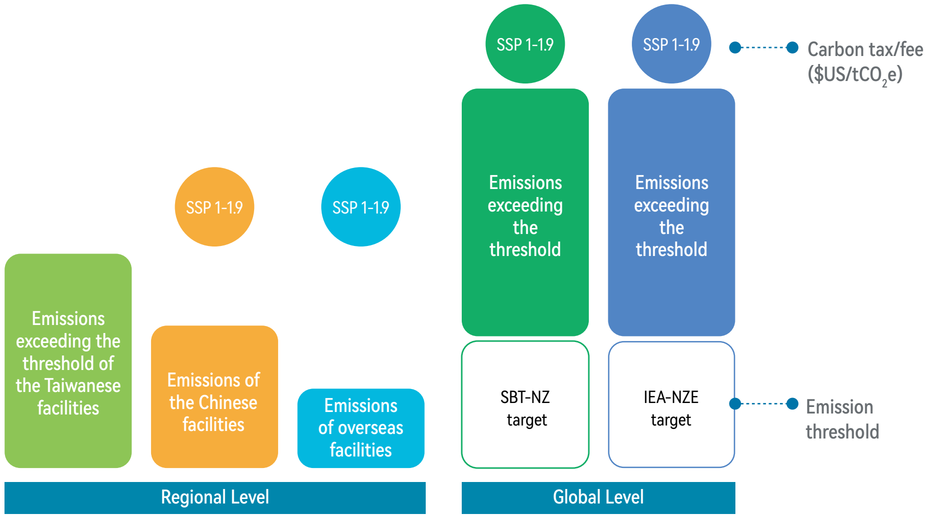
The development of a corporate-wide RE100 strategy allows the company to fully meet the transition targets outlined in both the IEA Announced Pledges Scenario (APS) and the IEA Stated Policies Scenario (STEPS). Our SBT reduction pathway plans are aimed at an annual emissions reduction of 4.2%, with residual emissions projected to reach 10% by around 2038. As the proportion of low-carbon energy procurement increases year by year, we estimate that our SBTi Net-Zero targets (SBT-NZ) would likely be achieved by 2047. Additionally, while the company is initially able to comply with the IEA Net Zero Emissions by 2050 Scenario (IEA-NZ), starting in 2037, increasingly stringent emissions requirements will make it difficult to rely solely on renewable energy. Therefore, additional carbon reduction measures will be necessary to meet the targets.

(1) Estimation of Potential Financial Risks under the Transition Strategy

Carbon tax risk assessments are conducted from both regional and global perspectives. At the regional level, the analysis draws on local government policies to assess the resilience of transition strategies in each area:

- Based on Taiwan's carbon fee regulations, we applied a carbon price of 10 USD/tCO_2e, with a threshold of 25,000 tons of annual emissions for estimation. (A total of 9 facilities in Taiwan are regulated under the carbon fee scheme, which could help avoid carbon fees for approximately 225,000 tCO_2e.)
- Most of our facilities in China and overseas lack clearly defined carbon fee/tax regulations. Therefore, the strictest carbon pricing system is used for estimation. For China, the carbon price threshold is set based on its 2060 net-zero target pathway. For other overseas sites, which span multiple countries, the SSP2-4.5 emissions scenario is used to estimate carbon pricing.

At the global level, the assessment focuses on the gap between ASEH's overall transition strategy and the company's net-zero targets. The SBTi Net-Zero Target (SBT-NZ) and the IEA Net-Zero Emissions Scenario (IEA-NZE) are used as benchmark thresholds. The analysis also assumes potential carbon tax risks if targets are not met, applying the strictest carbon price conditions for estimation.



Regional Level: The results show that under the no-action scenario, the financial impact of carbon pricing in Taiwan is relatively low – at less than 0.1% of revenue, due to the lower carbon fee rate (10 USD/tCO_2e) compared to the SSP1-1.9 scenario. In contrast, we face a higher carbon tax impact in China due to a larger number of facilities and the use of a stricter carbon pricing scenario. Under the transition strategy, the adoption of low-carbon energy significantly reduces Scope 1 & 2 emissions, thereby lowering the carbon tax risk substantially.

Global Level: As the share of low-carbon energy use increases, carbon fee costs are incurred only from the remaining Scope 1 emissions. Since there are no emission threshold exemptions set for overseas facilities, and the carbon tax parameters are based on the most stringent scenario, the carbon tax/fee risk is estimated to remain below 1% of total revenue. This projection is also based on the consideration of our RE100 target achievement by 2050. Overall, the carbon fee expenditure under the transition strategy is significantly lower than the potential costs under the no-action scenario.

In the SBT-NZ target scenario, carbon fee costs are concentrated in the initial years, peaking in 2037, and gradually declining until they disappear after 2047 as emissions meet the target and carbon tax risks are eliminated. SBT-NZ requires an annual emission reduction of 4.2%, with only residual emissions remaining by 2037 and net-zero by 2050. Because the SBT target is not fully achieved by 2037, carbon fee costs in that year are relatively high. Under the IEA-NZE target, potential carbon tax/fee risks may begin to emerge starting in 2037 due to increasingly stringent emission requirements. However, even under this scenario, the carbon fee expenditure remains significantly lower than in the no-action case, thanks to the existing transition strategy.

Degree of Financial Impact \ Strategic Scenario			BAU Strategy	Low-Carbon Energy Transition Strategy
Regional (Local Government Regulations)	Taiwan[1]	2030	<0.1%	<0.1%
		2040	<0.1%	<0.1%
		2050	<0.1%	<0.1%
	China	2030	0.1-1%	<0.1%
		2040	1-5%	<0.1%
		2050	1-5%	<0.1%
	Overseas	2030	0.1-1%	0.1-1%
		2040	0.1-1%	0.1-1%
		2050	1-5%	<0.1%
Global (Net-Zero Scenario)	ASEH (SBT-NZ)	2030	1-5%	0.1-1%
		2040	1-5%	0.1-1%
		2050	5-10	<0.1%
	ASEH (IEA-NZE)	2030	1-5%	<0.1%
		2040	1-5%	0.1-1%
		2050	5-10%	<0.1%

[1] In Taiwan, carbon fees are levied based on regulatory registration numbers. Each regulated entity is granted an exemption quota of 25,000 tCO_2e. Due to the complexity of actual fee calculations, A total of 9 facilities in Taiwan are subject to carbon fee regulations, with an assumed total exemption amount of approximately 225,000 tCO_2e

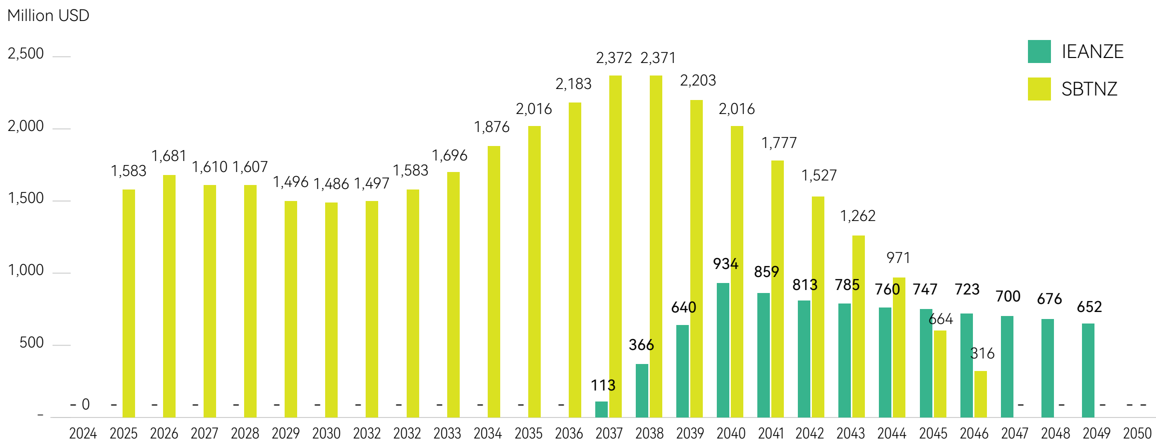
[2] Assumed that approximately 50% of customers have made climate-related commitments, and among them, have imposed low-carbon requirements on their suppliers. Failure to meet these requirements may result in risks such as loss of orders or termination of partnerships

(2) Market Risk Analysis of the Global Net-Zero Transition

Failure to meet our customers' low-carbon requirements may result in revenue loss[2]. The market risk assessment is conducted under the most stringent scenario, taking into account the net-zero target achievement rate, production value, potential revenue loss due to decarbonization requirements, and the proportion of affected customers. The affected production value refers to products or customers with decarbonization requirements; failure to meet these requirements could result in the loss of a significant portion of revenue and market share.

Under the current low-carbon energy transition strategy, there remains a certain level of market risk between 2025 and 2046, as the SBT-NZ target has yet to be achieved. However, as the transition progresses and emissions align more closely with global net-zero targets, overall risk begins to decline from 2038, and by 2050, market risk will be eliminated. Although the transition strategy initially meets IEA-NZ requirements, the standards become increasingly stringent over time, making it difficult to maintain compliance beyond 2037. Nevertheless, due to our persistent efforts in low-carbon energy transition, the overall market risk remains significantly lower than under a no-action scenario.

Degree of Financial Impact \ Strategic Scenario		SBT	IEA-NZE
ASEH	2030	5-10%	<0.1%
	2040	>10%	>10%
	2050	<0.1%	<0.1%

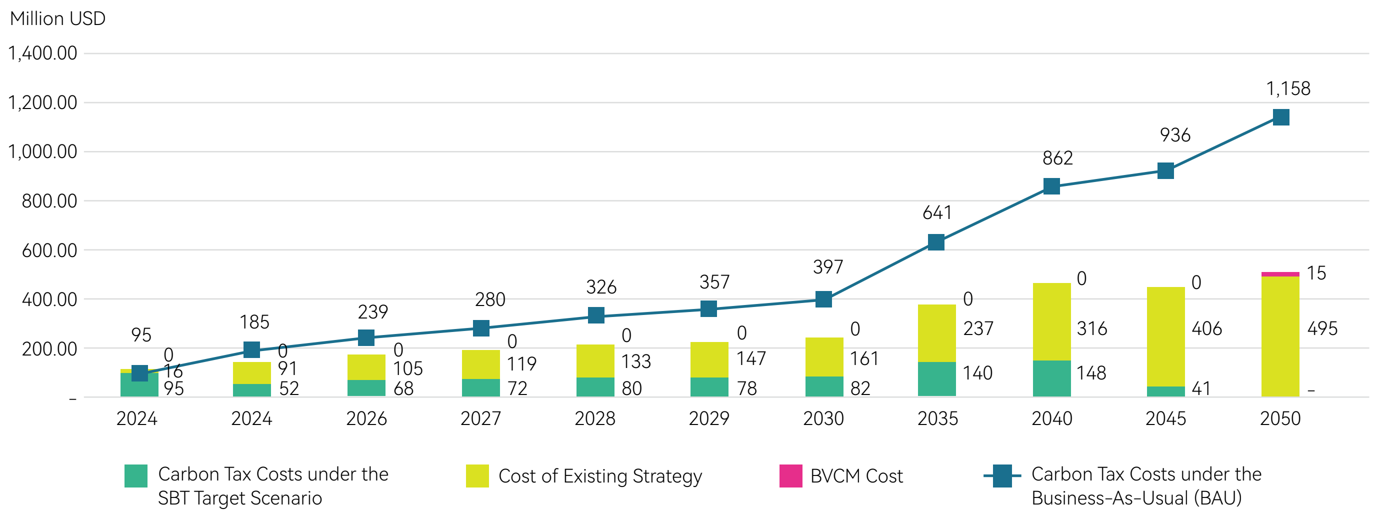


(3) Management Costs of the Global Net-Zero Transition

Under the net-zero transition scenario, our primary management costs stem from carbon taxes/fees. After 2040, the main cost will shift towards renewable energy procurement as the use of renewable energy increases. According to SBT-NZ standards, companies that reduce emissions by 90% or more by 2050 are allowed to use carbon removal or storage technologies to offset residual emissions that cannot be eliminated. Since Scope 2 emissions can be reduced through the transition to low-carbon energy, carbon removal technologies are expected to be prioritized for offsetting Scope 1 emissions. Beginning in 2040, overall emissions are expected to align with the SBT-NZ pathway and thus Beyond Value Chain Mitigation (BVCM) is not required before 2050. BVCM costs are estimated based on an average carbon removal price of USD235/tCO_2e, resulting in an expected expenditure of approximately USD15 million by 2050.

Based on the outcomes of the above 2 scenarios, a low-carbon energy transition strategy results in significantly lower financial impact compared to a no action scenario. At ASEH, we have defined distinct short-, medium-, and long-term renewable energy targets. Using 2016 as the baseline, our goal is to increase the renewable energy share by 3% annually, reaching RE25 by 2025, RE72 by 2040, and RE100 by 2050. For our facilities in China and overseas, the medium-term goal is RE100. We will exercise some degree of flexibility on the RE targets for facilities in Taiwan, adjusting them in phases and implementing renewable energy procurement plans based on market supply conditions accordingly.

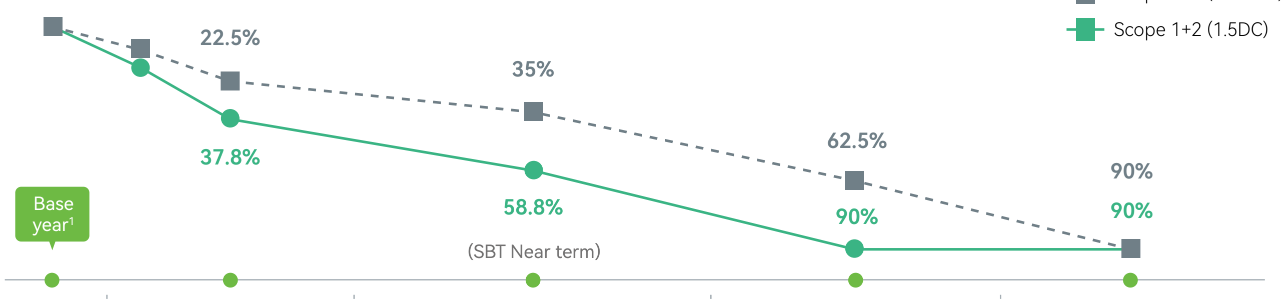
		Degree of Financial Impact
ASEH	2030	0.1-1%
	2040	1-5%
	2050	1-5%



Metrics and Targets

ASEH received approval from the Science Based Targets initiative (SBTi) in 2021 for its near-term emissions reduction targets. In 2022, we further committed to net-zero emissions, and in 2024, our long-term net-zero target was also validated by SBTi. To support this commitment, ASEH has established clear short-, medium-, and long-term carbon reduction targets (100% coverage). Emissions thresholds have been established for each subsidiary, and internal carbon pricing is being gradually introduced based on the operational characteristics of each entity. By quantifying and assigning value to greenhouse gas emissions, this system not only strengthens internal motivation for decarbonization but also enhances our ability to manage external policy risks. To further drive internal accountability and reductions, GHG emissions intensity and water efficiency have been incorporated into the incentive structure for senior management. From top leadership to employees at each facility, we are working together to advance net-zero transformation.

scope 1+2



2016

2025
- 27% RE use at production facilities worldwide
- Achieve >50% product carbon footprint inventory coverage

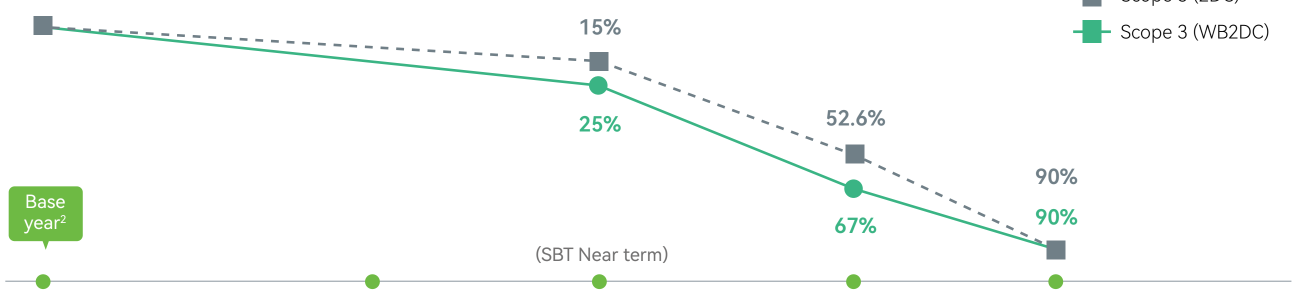
2030
- 42% RE use at production facilities worldwide
- Carbon capture technology cooperation and application
- 100% of RE use in offices within key facilities
- The carbon footprint of key products was reduced by 2% per year

2040
- 72% RE use at production facilities worldwide
- 100% conducting product life cycle assessment (LCA)
- 100% low carbonization of business vehicles and forklifts

2050
- Carbon removal technology
- Achieving net zero target of residual carbon emissions through carbon credit or related methodologies

Net Zero

scope 3



2020
- Conducting 100% GHG inventory and verification at production facilities worldwide
- Implementing low-carbon logistics
- Guiding key suppliers' inventory and verification: greenhouse gas (GHG) and product carbon footprint (CFP)

2025
- Rate of first-level supply chain engagement: 20%
- Using low-carbon materials
- Promote energy transition in invested companies

2030
- Rate of first-level supply chain engagement: 50%
- Promote energy transition in the supply chain
- Promote energy transition in invested companies

2040
- Rate of first-level supply chain engagement: 100%
- Application of carbon capture technology

2050
- Carbon removal technology
- Achieving net zero target of residual carbon emissions through carbon credit or related methodologies (BVCM[3])

Net Zero

[1] Scope 1 and 2 base year emissions: 1,763,221 tCO_2e
[2] Scope 3 base year emissions: 19,636,385 tCO_2e. In a recently published report on "Scope 3 Category 11 GHG Emissions: A Sectoral Assessment for the Semiconductor Industry" by SEMI, a global industry organization representing the semiconductor sector, it was ascertained that these categories are not applicable to the OSAT (Outsourced Semiconductor Assembly and Test) industry and should therefore be excluded from Category 11&12. (https://discover.semi.org/scope-3-category-11-ghg-assessment-download-form.html)
[3] Beyond Value Chain Mitigation (BVCM), these actions include support for the value chain to decrease carbon emissions, carbon removal technology, purchasing carbon credits, etc.

Net-Zero Actions

To actively implement the science-based emissions reduction targets approved by the Science Based Targets initiative (SBTi), ASEH has clearly defined both near-term and long-term decarbonization goals. We monitor progress through a digital management platform and hold quarterly technical exchange meetings to support five strategic actions, with a core focus on low-carbon product development. These include the use of renewable energy in manufacturing, requiring suppliers to provide low-carbon materials and high-efficiency equipment, promoting decarbonization across land, sea, and air transportation, and investing in carbon credits — all contributing to a phased achievement of transition goals. By fully integrating an internal carbon pricing mechanism across all manufacturing facilities, ASEH internalizes the cost of greenhouse gas emissions to drive internal transformation and deliver increasingly low-carbon products and services to future generations.

Management and Supervision of the CSISC

- Public Disclosure and Performance Execution
- Implementing Carbon Pricing to Facilitate Internal Action Plans
- Establishing a Green Solutions Platform to Foster Consensus and Technical Exchange
- Setting Near-Term and Long-Term SBT Targets Aligned with Net-Zero Pathway
- Developing course of action in 5 key areas and a Carbon Reduction KPIs Management System
- Establishment of a Net-Zero Dashboard Management Platform for Quarterly Monitoring of Progress

Net-Zero transition

Supply Chain Engagement [1]

2030 Key Decarbonization Engagement Suppliers
- Achieve 100% GHG inventory coverage
- Achieve 80% product carbon footprint inventory coverage

Low-carbon Transportation

2030 Low-Carbon Transport Goals
- Forklifts: >85%
- Company cars: 50%
- Company-owned trucks: 40%
- Upstream/Downstream land transport: 10%

Low-Carbon Products

- Achieve >50% revenue coverage from products with carbon footprint assessments by 2030
- Reduce the carbon footprint of key products by 2% each year

Renewable Energy

2030 Renewable Energy (RE) Targets
- Offices: 100% RE
- Overall RE usage ≥ 42%

Investment in Carbon Credits

- Invested in over 2 forest management projects to generate carbon credits

[1] Please refer to Chapter 7, "Responsible Procurement."

Internal Carbon Pricing

To strengthen climate risk management and identify sustainability transition opportunities, ASEH began introducing internal carbon pricing in 2021 to promote low-carbon investments and boost energy efficiency. Currently, carbon pricing is implemented across 100% of our facilities, aligning fully with our climate-related strategies and objectives.

Internal carbon pricing allows us to identify and capture emerging low-carbon opportunities with high business potential to enhance our corporate competitiveness. At the same time, it enhances our effectiveness in complying with applicable regulations including the conduct of a comprehensive cost-benefit analysis on our carbon reduction efforts. Our internal carbon pricing system is integrated into select carbon reduction projects and financial planning to strengthen our climate risk adaptability, and support the further implementation of company-wide climate policies and goals, demonstrating our commitment to sustainable development and responsible investment.

- In line with the concept of "implicit price," each ASEH facility sets its own internal carbon prices (expressed in 43 USD/tCO_2e).
- Based on actual emissions and annual reduction targets, each manufacturing facility prepares an annual budget that reflects its internal carbon price. The budget would then be used in carbon reduction initiatives and low-carbon investments to reduce Scope 1 and Scope 2 greenhouse gas emissions, which would in turn help the facility reach its carbon reduction targets.

Sources of transportation emissions

Inventory		Reduction actions
Cargo transportation	Forklifts On-site trucks	• Gradually replaced the vehicle with low-carbon transportation equipment, such as hybrid, electric, natural gas, and hydrogen vehicles from year to year • Reduce the use of fuel-powered transportation equipment
	Upstream transportation and distribution Downstream transportation and distribution	• Adopt low-carbon land transportation solutions (to be implemented in collaboration with the supply chain) • Establish a platform that integrates upstream and downstream transportation equipment and transportation distances • Use land or sea transportation rather than air transportation for materials with longer delivery times and flexible shipping schedules
People transportation	Company vehicles Employee commuting Business travel	• Select low-carbon or public transportation modes • Minimize the use of fuel-powered transportation equipment • Reward employees with carbon coins for low-carbon commuting • Install charging piles and battery exchange stations • Replace physical meetings with video conferencing
Fuel and energy-related		• Air Transport: Adopt Sustainable Aviation Fuels (SAF) • Maritime Transport: Introduce low-carbon fuels and gradually reduce Greenhouse Gas Fuel Intensity (GFI) over time

Low-Carbon Transportation

The use of low-carbon transportation is a key link in our journey towards net-zero emissions. We have categorized the field of transportation into cargo transportation, people transportation, and fuel and energy-related activities when inventorying land, sea, and air transportation. In 2024, we have already achieved 49% low-carbonization across all transportation modes. We have plans to fully low-carbonize the transport modes within the factories as well as upstream and downstream land transportation by 2045.

- **Low-carbonization of company vehicles, forklifts and trucks:** The goal is to achieve 100% by 2040 and 2045.
- **Logistics Providers Engagement:** Initiate the phased replacement of fossil fuel-powered vehicles, supporting the overall supply chain in reducing transportation-related emissions.

Low-Carbon Transportation Plan

	Upstream and downstream land transportation	On-site trucks	Company vehicles	Forklifts
2024	-	24%	14%	85%
2030	10%	40%	50%	>85%
2035	30%	60%	75%	>90%
2040	60%	80%	100%	100%
2045	100%	100%		

Low-Carbon Products

The first step in our low-carbon product action plan is to establish a carbon inventory of products as a baseline for performance measurement. ASEH has directed our three key subsidiaries to take concrete actions in reducing the product carbon footprint and accelerating our goal of carbon neutrality. To that end, our subsidiaries have conducted ISO 14067 carbon footprint and ISO 14045 eco-efficiency assessment of their respective products, identifying raw materials in greenhouse gas emission hotspots throughout the manufacturing process, engaged with suppliers to facilitate the development of low-carbon materials and switch to low-carbon materials, and increased the use of renewable energy in the manufacturing process. These actions closely resonate with ASEH's philosophy of "producing more with less" and the principle of sustainable manufacturing by integrating key sustainability considerations throughout the product life cycle from the design stage, through manufacturing and distribution. Low-carbon products ultimately help to reduce greenhouse gas emissions and minimize their impact on the environment.

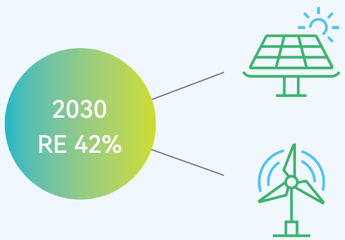
- 2030：Achieve the scope of product Life Cycle Assessment (LCA) > 50%
- 2040：Achieve 100% coverage of product carbon inventory
- Reduce the carbon footprint of key products 2% per year

Product life cycle	Key Sustainability Considerations
Product life cycle	• Select materials with low carbon emissions • Use recycled materials • Adopt high-density packaging design to reduce the amount of materials required
Manufacturing	• Enhance production efficiency in manufacturing processes • Minimize the use of energy resources • Promote the recycling of energy resources • Use renewable energy
Distribution	• Minimize the use of product packaging materials • Use recyclable packaging materials • Optimize distribution routes • Use green energy vehicles
Usage	• Reduce power consumption of products • Prolong the durability of products
Waste	• Adopt an end-of-life recyclable component design

Expanding the use of renewable energy

In 2021, ASEH established the "Renewable Energy Platform" in response to global energy transition. We plan to continuously increase the proportion of renewable energy use through various means including the consumption of self-generated electricity, corporate power purchase agreements (CPPA), and purchase of unbundled energy attribute certificates (EACs). In addition, we are also integrating the approaches of different regions' energy markets into our action plans to help the company reach its 2030 goal whereby 42% of total electricity consumption is from renewable energy sources.

2022	2023	2030
• Completed the first phase of CPPA	• Initiated the second	• Achieve the target of renewable energy consumption accounting for 42% of total electricity through the use of self-generated and procured renewable electricity



75% Solar photovoltaics
(self-generated and purchased)

25% Wind power
(onshore and offshore)

Investing in Carbon Credits

The use of carbon credits forms the last mile in ASEH's journey to net-zero emissions. In compliance with the SBTi's framework, we anticipate to utilize carbon credits to offset our remaining carbon emissions beyond 2040 with priority placed on carbon removal credits. ASEH participated in the first batch of carbon credit trading at the launch of the Taiwan Carbon Solution Exchange in 2023, which also represented our first carbon credit trading from the Voluntary Carbon Market (VCM). The carbon credits are associated with a Chilean landfill gas (LFG) capture project. This project aligns closely with our commitment to six of the United Nations Sustainable Development Goals (SDGs)[1], that allows us to drive environmental sustainability and the sustainable development of the local community and economy.

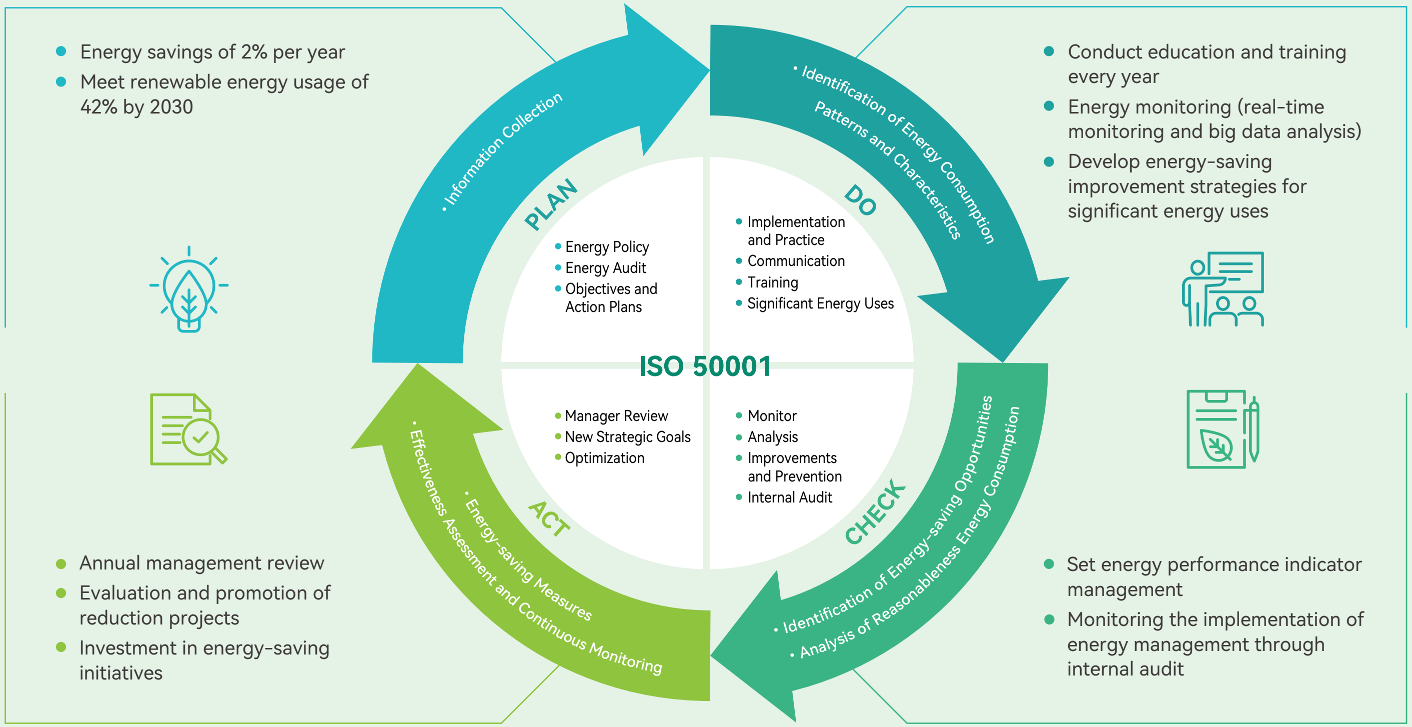
ASEH is committed to acquiring carbon credits of the highest quality in the voluntary carbon market, and at this stage, we are focusing on forest carbon sinks. While Afforestation and Reforestation (AR) are the only ways to acquire forest carbon credits in Taiwan at present, there are other carbon credit types available for consideration at the international level, such as the Improved Forest Management (IFM) and Avoid Deforestation (AD). In an effort to develop more diverse types of forest carbon credit projects that are in line with international standards, ASEH has partnered with the ASE Environmental Protection and Sustainability Foundation and joined forces with the International Climate Development Institute to develop an innovative carbon offset project involving forests in Taiwan. The 'Project of Increasing carbon sink from the low stock forests' has been submitted to the Ministry of Environment for review and approval. The project adopts the Verified Carbon Standard (VCS) as its primary reference, but also applies methodologies from international organizations like the Climate Action Reserve (CAR), the America Carbon Registry (ACR), and the J-Credit Scheme. The aim of the project is to formulate a comprehensive and localized carbon offset program for forest management that meets international standards of measurement, reporting, and verification (MRV). After the "Project of Increasing Carbon Sink from Low Stock Forests" passed the Ministry of Environment's review and was officially announced in 2024, in 2025 we will apply this methodology to collaborate with Taiwanese forest farmers and assist them in obtaining carbon credits, thereby promoting sustainable forest management. Upon approval from the ministry, we will expand the application of this methodology and help local forest farmers undertake activities for the sustainable management of forest land, and consequently be eligible for forest carbon credits.

[1] These SDGs include SDG 4 Quality Education, SDG 7 Affordable and Clean Energy, SDG 8 Decent Work and Economic Growth, SDG 11 Sustainable Cities and Communities, SDG 13 Climate Action, and SDG 17 Partnerships for the Goals

5.2 Energy and Carbon Management

Energy Management[1]

To effectively manage internal energy usage and increase energy efficiency, ASEH is progressively implementing the ISO 50001 Energy Management System to meet its planned goal of achieving 100% certification by 2025. The PDCA (Plan-Do-Check-Act) management model is used to control energy costs and reduce unnecessary energy consumption. We have taken a proactive approach to inculcating an energy saving culture amongst our employees by conducting essential education annually, and holding events or competitions to sow the seeds of sustainable development to support our business growth.

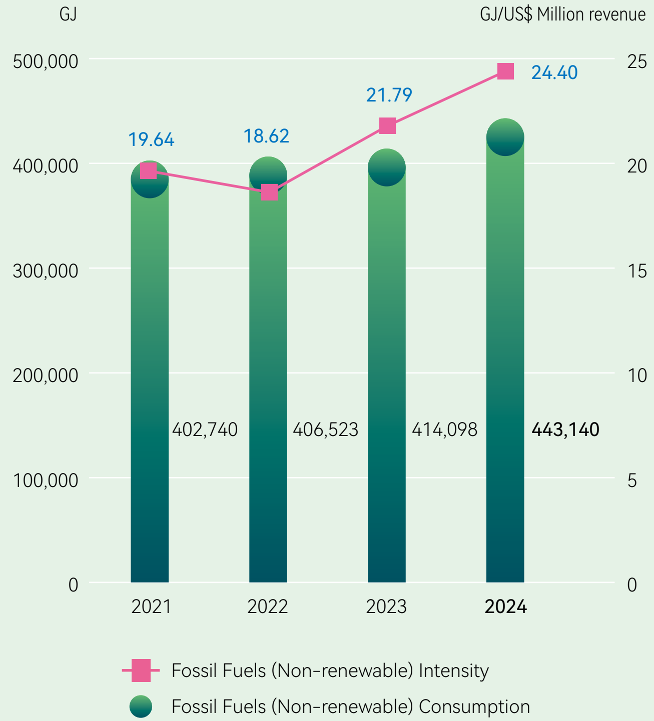


[1] Total energy consumption within the organization = (non-renewable fuel/electricity consumption) + (renewable fuel (electricity) consumption)+(purchased electricity, heating, cooling and steam)

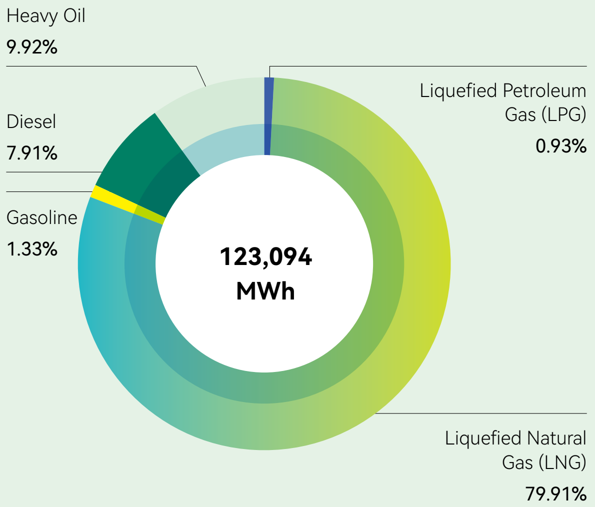
Fossil Fuels (Non-renewable)

Petroleum gas, natural liquefied gas(LNG), gasoline, diesel, and heavy oil are the main fossil fuels used[1] at ASEH, accounting for a total consumption of 443,140 GJ[2] in 2024. Of which, LNG used in stackers and emergency power generators accounted for the highest proportion at 79.91%, followed by heavy oil for generating steam. In recent years, our dependency on fossil fuels have been reduced through the gradual introduction of transportation modes and the use of substitute fuels and clean energies.

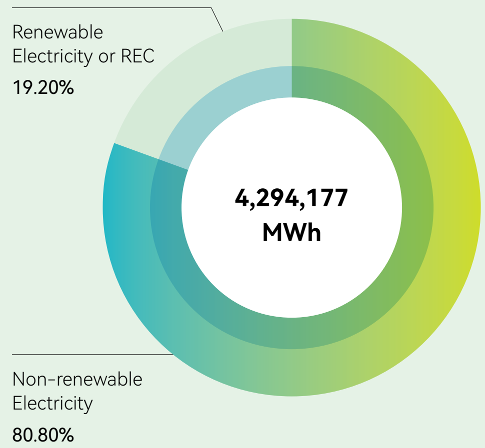
Fossil Fuels (Non-renewable) Consumption and Intensity



Fossil Fuels



Electricity



Fossil Fuels (Non-renewable fuels)	GJ	MWh
Liquefied Petroleum Gas (LPG)	4,123	1,145
Liquefied Natural Gas (LNG)	354,105	98,362
Gasoline	5,912	1,643
Diesel	35,058	9,738
Heavy Oil	43,942	12,206
Total	**443,140**	**123,094**

Electricity	MWh
Non-renewable Electricity	3,469,776
Renewable Electricity or REC	824,401
Total	**4,294,177**

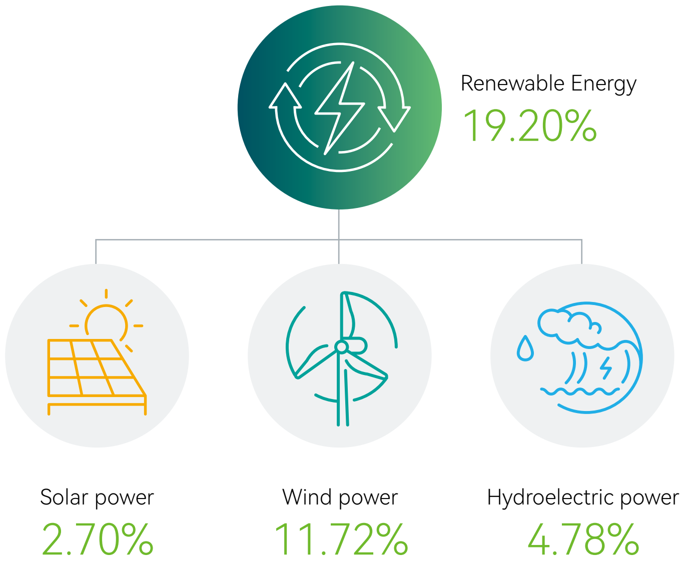
[1] Fossil Fuels (Non-renewable fuels) are used in: (a) Facilities: Emergency power generators, boilers, (b) Transport: Stackers, company vehicles, (c) Air pollution preventive equipment
[2] The calorific value of fuel refers to the unit calorific value table of energy products

Electricity and Renewable Energy Consumption

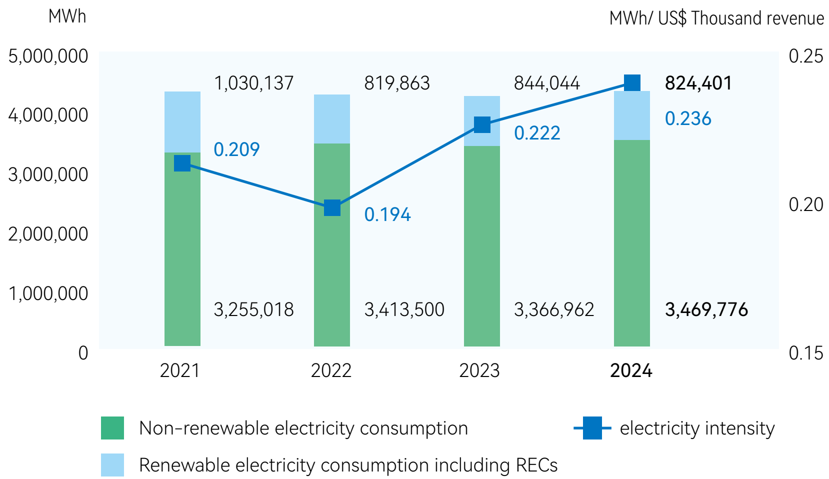
ASEH is increasing the use of renewable energy and developing a diversified power supply portfolio to strengthen its climate resilience.We established the "Renewable Energy Platform" to consolidate the energy procurement of all our three subsidiaries. In addition, we managed to work with the value chain on the collective procurement of renewable energy, which not only increased the proportion of renewable energy used by our partners but also indirectly reduced greenhouse gas emissions overall.

In 2024, our total electricity consumption totaled 4,294,177 MWh, while electricity consumption increase by 1.98% compared with 2023. The electricity intensity per unit of revenue recorded a increase of approximately 6.73%.

In line with ASEH's commitment to the SBTi net-zero by 2050, we are progressively increasing the use of renewable energy through solar power (installed at our facilities), external procurement of renewable energy, and acquisition of RECs. 88% of our global facilities used electricity from renewable sources including RECs. Our renewable electricity usage totaled 824,401 MWh and accounted for 19.20% of total energy consumption. 10 of our global facilities[1] obtained 100% of their electricity from renewable energy sources including RECs.

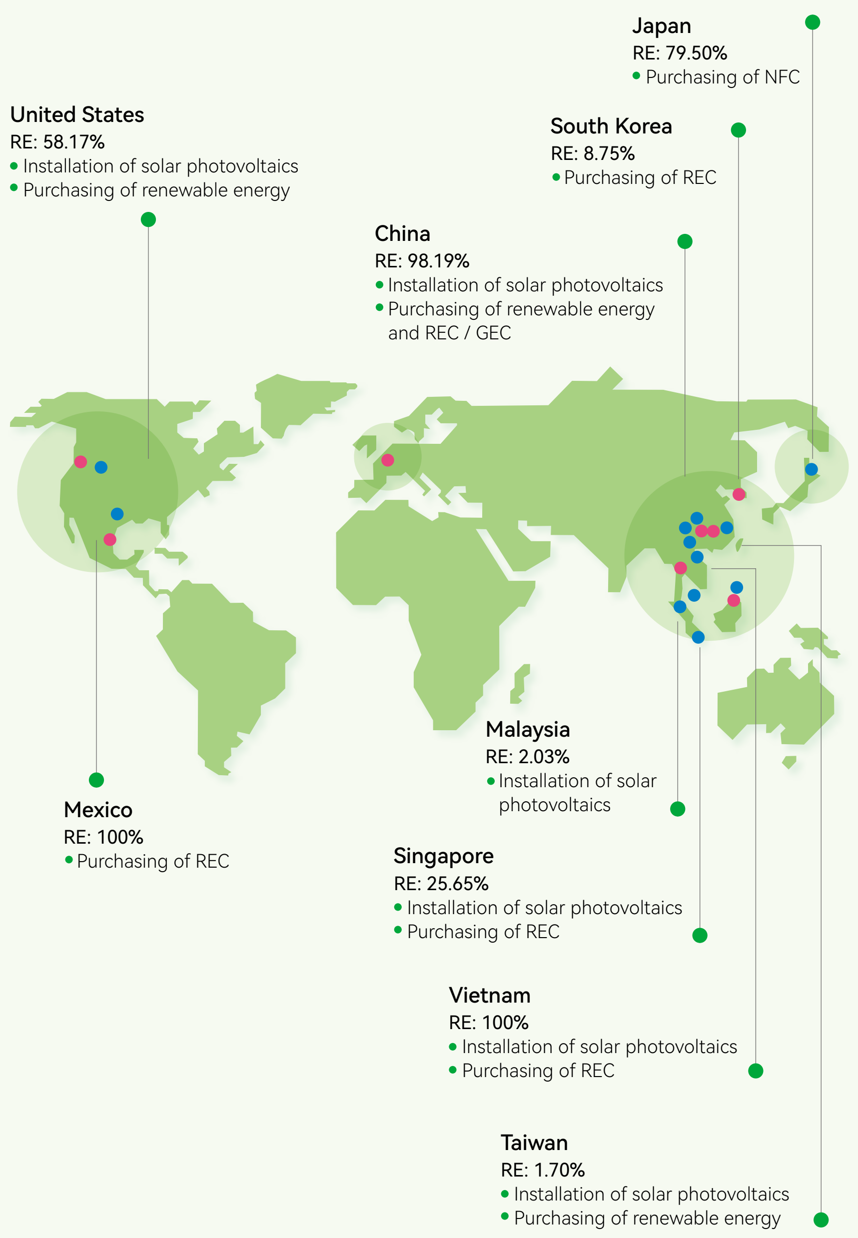


Electricity Consumption and Intensity



Renewable Energy (MWh)	Self-generated	Purchasing	RECs
Solar power	7,107	49,404	59,205
Wind Power	-	17,653	485,572
Hydroelectric Power	-	-	205,460
Total	7,107	67,057	750,237

[1] 100% of electricity from renewable energy sources including RECs: (1)ASE:SH(M), WX (2)USI: ZJ, KS, JQ, HZ, MX, HPH, AFG SUZ (3) SPIL: SZ



Smart Energy Monitoring and Management

To better manage our energy efficiency, we have established a minimum threshold of a 2% electricity savings relative to the annual power demand at our manufacturing facilities. We are also closely monitoring the energy intensity from non-renewable energy sources and high-energy consuming equipment at our facilities, with the goal of reducing energy usage.

In recent years, ASEH has been advancing AI-driven green manufacturing to optimize overall process efficiency through the company's internally-designed Industrial AI (IAI) Platform that integrates AI models, real-time data analytics and image recognition. In addition, the implementation of robust AI management has also effectively reduced carbon emissions and resource consumption. Our IAI platform is modular and scalable, and has been progressively deployed across our manufacturing facilities, laying the groundwork for a replicable and sustainable manufacturing framework. This aligns with the company's broader goal of building smart green factories, offering a scalable, innovative, and environmentally impactful model for transformation within the global manufacturing sector. Going forward, we continue to expand our collaboration across the industrial value chain, working with suppliers to develop low-carbon materials and energy-efficient equipment. These efforts have been well received by customers and have contributed to product carbon footprint reduction, generating synergistic decarbonization outcomes.

- SPIL

In 2024, ASEH implemented AI-powered energy-saving measures that are projected to reduce electricity consumption by approximately 2 million kWh per year. These measures are concurrently rolled out across all our locations to boost energy efficiency and carbon reduction efforts at each site.

1. AI-Control for Chilled Water Systems: Using big data analytics, over 100,000 operational combinations were analyzed to build optimal energy models. AI helps to identify the most energy-efficient operating mode for the chilled water system, leading to a significant reduction in energy consumption.
2. AI-Control for Air Compression Systems and Fan Filter Units (FFU): Machine learning algorithms identify the most optimal energy efficiency control strategies that reduce energy consumption of these systems without affecting operational performance.

- ASE Kaohsiung

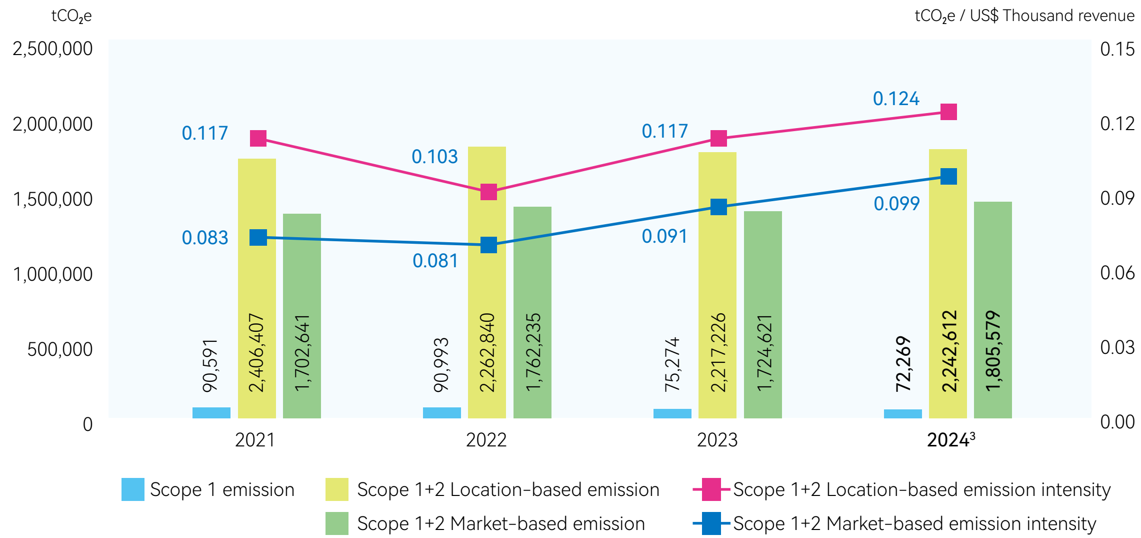
1. AI-Control for Chilled Water Systems: Using AI to analyze cleanroom air-conditioning needs enables the chilled water system to automatically adjust chilled water pump flow rates, optimizing cooling performance and reducing electricity consumption by approximate 2%.
2. Smart Management Platform for Air Compression Systems: A smart management platform was established for air compression systems, with baseline energy consumption benchmarks defined by experts at each facility. The system integrates real-time alerts for energy usage deviations and supports optimization strategies to ensure air compressors consistently operate under energy-efficient conditions. Since implementation, the platform has achieved overall energy efficiency improvements ranging from 2% to 6%.

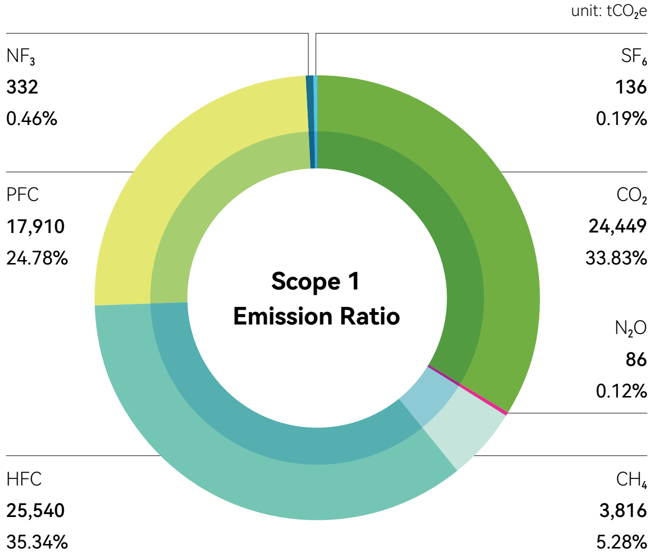
Greenhouse Gas Emissions Management

ASEH has achieved 100% control over greenhouse gas emissions in all of its global sites, following ISO 14064-1 standards. In 2024, the Scope 1 and Scope 2 emissions[1], calculated based on market-based approaches, amounted to approximately 1.81 million[2] tCO_2e, with a 40% reduction in greenhouse gas intensity per unit of revenue compared to the baseline year 2015. Since the main source of emissions in the industry is electricity usage, continuous efforts have been made to improve energy efficiency. In 2024, 19 sites obtained the ISO 50001 certification, covering 73% of the total sites. Additionally, a phased approach has been adopted to procure renewable energy or certificates, gradually increasing the proportion of renewable energy usage based on market maturity in various operating locations worldwide, to attain the reduction targets in 2030 and progressively Net-zero. The major emission category in Scope 3, accounting for 83% of the total emissions, is the procurement of goods and services. In response, we have taken proactive measures to collaborate across the value chain and initiate greenhouse gas and product carbon footprint assessments for suppliers. We provide guidance and support in assessing suppliers' greenhouse gas emissions and product carbon footprints. We also actively engage in various aspects of emissions reduction through technical sharing, cross-industry cooperation, and incentive programs. In recent years, we have also invested in subsidiary companies to assist in greenhouse gas assessments and share emission reduction technologies. Our goal is to enhance the industry's ability to assess emissions across the supply chain, analyze carbon reduction hotspots, and foster collaborations in implementing carbon reduction actions by sharing carbon reduction technologies.

	Activity	Emission (tCO_2e)
Scope 1	Stationary Combustion	21,363
	Mobile Combustion	2,630
	Fugitive Emissions	27,200
	Process Emissions	21,049
	Land use, land use change and forestry (LULUCF)	27
Scope 2 (Market-based)	Electricity	1,718,881
	Heating/Cooling/Steam/ Compressed air	14,429
Scope 3		18,067,529

Greenhouse Gas Emissions and Intensities





[1] The electricity carbon emission factor is calculated based on that of local sites
[2] Greenhouse gas inventory reveals emission scope with operational control and the Global Warming Potential derived from the IPCC Sixth Assessment Report

Scope 3 Emission Source	Emission (tCO_2e)	Emission factor	Reduction Courses of Action
Purchased goods and services	14,999,675	SimaPro 9.6.0.1 / Ecoinvent 3.10/EF Database 3.1	• Prioritize the purchase of low-carbon materials/ recycled materials • Encourage the use of renewable energy
Capital goods	2,210,464	SimaPro 9.6.0.1 / Ecoinvent 3.10 / EXIOBASE	• Prioritize the purchase of low-carbon equipment and build low carbon facilities
Fuel- and energy-related activities	379,145	SimaPro 9.6.0.1 / EXIOBASE/USLCI	• Progressively increase the use of renewable energies
Upstream transportation and distribution	209,262	SimaPro 9.6.0.1 / USLCI / Agri-footprint	• Replace current plan with low-carbon transportation solutions • Minimize the use of product packaging materials • Establish a platform that integrates upstream and downstream transportation equipment and transportation distances
Downstream transportation and distribution	61,588	SimaPro 9.6.0.1 / USLCI / Agri-footprint	
Waste generated in operations	15,629	SimaPro 9.6.0.1 /USLCI /Carbon Footprint Information Platform	• Promote circular economy and adopt an end-of-life recyclable component design
Business travel	1,818	GOV.UK-Conversion factors: full set	• Rationalize business travels • Replace physical meetings with video conferencing
Employee commuting	32,323	SimaPro 9.6.0.1 / USLCI	• Offer carbon coins to encourage low-carbon commuting • Promote public transportation
Upstream leased assets	5,439	SimaPro 9.6.0.1 / EXIOBASE / EU & DK Input Output Database	• Improve energy efficiency
Downstream leased assets	25,901	Carbon Footprint Information Platform	
Investments[1]	126,285	Scope 1 and Scope 2 greenhouse gas emissions of investee companies	• Providing Guidance on Greenhouse Gas Inventory and Promoting Emission Reduction
Total	18,067,529		

[1] The GHG inventory data of ASEP Cayman Ltd and Cyland Corp were still undergoing third-party verification prior to the publication of ASEH's sustainability report
USI Hirschmann Car Communication GmbH, Hirschmann Car Communication Holding S.a.r.l, USI Asteelflash and related subsidiaries, comprising a total of 21 companies, have completed the GHG inventory and are expected to complete third-party verification in 2026

Energy Saving and Carbon Reduction Projects

ASEH adopts 4 key approaches in its carbon reduction management; carbon reduction in manufacturing processes[1], carbon reduction in buildings[2], low-carbon energy development projects[3], and operational and value chain decarbonization[4]. In 2024, we invested a total of approximately US$24 million on 1008 projects, resulting in an emission reduction of 565,806 tCO_2e.

Reduction Scope	Category	Key carbon reduction hotspots	Energy Saving (MWh)	Energy Saving (GJ)	Carbon Reduction (tCO_2e)	Investment (US$)
Scope1+2	Carbon reduction in manufacturing processes	• Scope1: Electrification of transportation	–	–	2	31,000
		• Scope2: Enhancing energy efficiency in processes, equipment, and systems through operational optimization, upgrades, and routine maintenance.	186,730	672,229	94,029	7,773,823
Scope2	Carbon reduction in buildings	• Developing innovative smart energy management systems that optimizes energy efficiency. • Introducing internal carbon pricing, sharing in-house technologies, and holding energy-saving competitions to encourage proactive plant-wide improvement efforts.	39,962	143,864	20,203	5,277,455
Scope2	Low-carbon energy	• ASEH's renewable energy platform coordinates centralized procurement, gradually implementing the low-carbon energy transition in phases.	865,405	2,967,857	451,572	11,203,906
Scope3	Operational and value chain decarbonization	• Encourage employees to switch to electric vehicles for commuting by installing charging and battery swap stations, reducing indirect emissions beyond operational activities.	–	–	–	18,000

1 Carbon reduction in manufacturing processes includes enhanced performance and decarbonization in the manufacturing process, pneumatic system, pure/waste water systems, equipment replacement, motors and drives, automation and smart control system, waste heat and cold recovery
2 Carbon reduction in buildings includes saving energy in lighting and air conditioning systems
3 Low-carbon energy includes self-generated renewable energy, purchasing renewable energy and purchasing renewable energy certificates
4 Operational and value chain decarbonization includes Scope 3 reduction measures such as employee commuting, company policies or behavioral changes

Scope2 Carbon reduction project			Investment	Performance	
Category	Number	Content	Total investment fees (US$)	Energy Saving (MWh/year)	Carbon Reduction (tCO_2e/year)
Lighting System	52	• plementing Smart Controls • Using High-efficiency LED	84,415	4,333	2,167
Air Conditioning System	159	• Parameters Adjustment • Replacing Low-efficiency equipment	5,178,096	35,210	17,828
Pneumatic System	92	• Parameters Adjustment • Replacing Low-efficiency equipment	2,547,908	40,975	20,454
Enhanced Performance	444	• Optimizing Parameters • Refinement of Operational Processes • Optimization of Machine Idle Time	519,700	110,938	56,355
Pure/waste Water Systems	18	• Optimizing Parameters • Machine and Equipment Maintenance • Water Recycling	154,712	914	454
Equipment Replacement	67	• Process Machine Equipment Replacement • Replacement of Old Parts and Materials	2,832,305	14,312	7,055
Motors and Drives	87	• Replacement of Low-efficiency Motors • Installation of Variable Frequency Drives	1,276,685	12,107	6,014
Automation and Smart Control System	36	• Installation of Automatic Controllers • Implementation of Smart Management in Manufacturing Process	-	4,257	2,103
Waste Heat and Cold Recovery	9	• Heat Recovery • Recycling of Waste Cold	457,457	3,590	1,774
Draught Proofing	3	• Improvement of cleanroom air leakage	-	4	2
Site Conslidation/closure	1	• Workforce / equipment downsizing	-	3	2
Energy-saving operation strategy	1	• Adjustment of freight or passenger elevator operations	-	49	24
Low-carbon Energy	37	• Self-generated Solar Power • Purchasing Renewable Energy / RECs	11,203,906	824,405	451,572

5.3 Water Stewardship

Water Governance

Managing our water resources is a top priority at ASEH, and we aim to continuously improve and optimize the use of water resources efficiently. From establishing management objectives to assessing major areas of water usage, the adoption of ISO 46001 Water Efficiency Management Systems enables us to identify risks and opportunities, and develop water-saving measures, risk mitigation strategies and various action plans. As of 2024, a total of five manufacturing sites have been certified under the ISO 46001 Water Efficiency Management System. These sites include ASE Kaohsiung and ASE Chungli, as well as SPIL Dafeng, Zhongke, and Zhongke II facilities. Moving forward, we will continue to expand the implementation of the ISO 46001 standard to additional sites, reinforcing our commitment to sustainable water resource management.

- Collect water usage/reuse data from each facility.
- Identify water risks and opportunities.
- Establish water resource management objectives.
- Develop water conservation projects for facilities and improvement/adaptation plans for high-risk facilities.
- The target for water withdrawal intensity: reduce 52% water withdrawal intensity in 2030 from the 2015 level.

- Implement water conservation projects and improvement/adaptation plans in each facility.

- Manage and review the effectiveness of water resource management in each facility, continuously improving water resource efficiency.

- Monitor the effectiveness of water resource management in each facility to ensure alignment with management objectives.

Risk and Opportunity Management

Water related Risks and Opportunities

Based on the 2024 site identification and weighted assessment results, in water management, regulatory requirements on water use and mandatory standards on water efficiency, conservation, recycling, or processes are identified as relatively significant water-related risks, while wastewater recovery and reuse are recognized as the greatest opportunities.

Water			Time scale	Scenario description	Explanation on potential impact	Position in the value chain where the risk occurs	Potential impact on finance	Financial impact assessment (Million USD)	Management approaches	Management costs (Million USD)
Risk	1	Drought	Short term	Production sites face growing water risks as droughts become more frequent and rainfall events more concentrated.	Some manufacturing processes that rely on ultrapure water and cooling water may face temporary suspension or capacity constraints due to drought-related risks.	• Directly operated by the company • Upstream or supply chain • Downstream or end-user	• Increased indirect costs • Increased capital expenditures • Overall revenue decreased	100-177	1. Promote water recycling, adopt water-saving technologies, and continuously optimize processes to reduce reliance on third-party water sources, improve water efficiency, and lower overall consumption. 2. Establish real-time water monitoring and alert systems, along with a platform for drought risk assessment and management. 3. Simulate drought and water rationing scenarios in advance to develop response mechanisms and ensure operational resilience.	11
Risk	2	Limited access to groundwater rights	Medium term	Due to geographical conditions, certain facilities rely on groundwater as a primary or backup water source. However, challenges in securing groundwater extraction rights have constrained water supply availability.	A reduction in water supply could lead to a decline in production capacity, ultimately impacting revenue.	• Directly operated by the company	• Increased indirect costs • Increased capital expenditures • Overall revenue decreased	141-707	1. Establish water recovery systems and implement water-saving control measures to reduce dependence on raw water sources. 2. Develop contingency plans to share process water resources among facilities or nearby industrial parks.	47
Opportunity	1	Water efficiency-Wastewater recycling	Short term	Water from manufacturing processes or domestic wastewater is being recycled and reused.	Improve the reuse rate of process and domestic wastewater to strengthen drought resilience and optimize water resource allocation, while reducing water consumption and wastewater treatment costs.	• Directly operated by the company	• Climate change adaptation • Reduced operating costs • Enhanced brand value	3.5	1. Continue implementing process water recovery projects to reduce raw water intake, enhance water efficiency and drought resilience, and lower adaptation costs. 2. Implement water recycling and reuse technologies in tandem with environmental education to promote sustainability awareness and enhance social capital. 3. Identify and develop alternative potential water sources.	12
Opportunity	2	Resilience - climate change	Short term	Enhancing Resilience to Climate Change Impacts	Recycling process water can reduce freshwater costs, improve water use efficiency, and decrease dependence on freshwater sources. These efforts help prevent operational disruptions, strengthen competitiveness, and create opportunities for revenue growth and investment.	• Directly operated by the company • Upstream or supply chain • Downstream or end-user	• Climate change adaptation • Improved competitiveness Seized • Investment opportunities	299-498	1. Recycle wastewater into production processes to reduce dependence on freshwater and enhance resilience against operational impacts from water scarcity. 2. Improve water resource management to strengthen climate resilience and gain competitive advantages with less time and resource input.	87.6

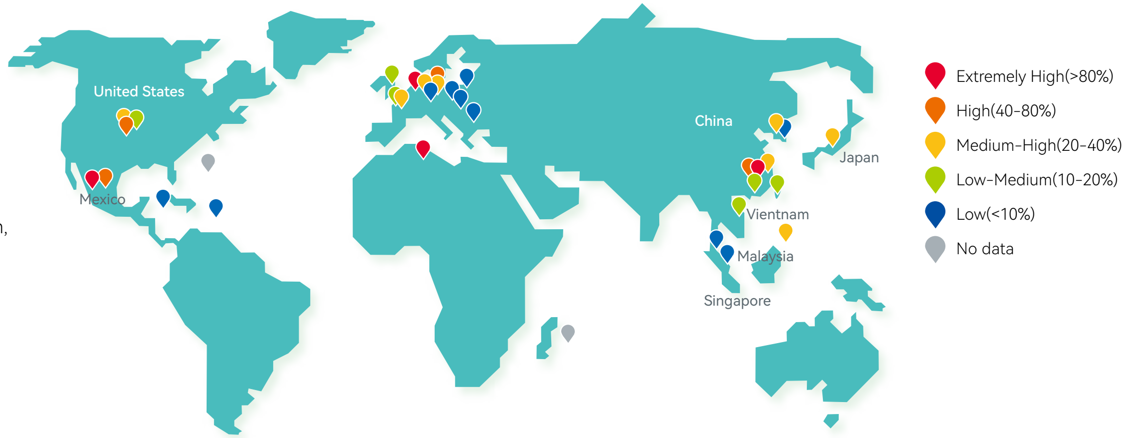
Physical Risk Analysis

Global Water Risk Analysis

ASEH adopts the Aqueduct indicators established by the World Resources Institute (WRI) to conduct water risk analysis[1]. We analyzed a total of 110 facilities[2] worldwide in Taiwan, China, Hong Kong, Japan, South Korea, Malaysia, Singapore, Vietnam, Philippines and other Asian countries, as well as America (such as the United States, Mexico, etc.), Europe (Belgium, France, Poland, Germany, the United Kingdom, the Czech Republic, etc.) and Africa (Mauritius, Tunisia) and other regions.

Baseline water stress risk analysis[3]

- **20.9%** Extremely high: East China, Belgium, Mexico, Tunisia
- **5.5%** High: East China, Mexico, the United States, Germany
- **14.5%** Medium - High: East China, Japan, the United States, France, Luxembourg, Germany, Philippines, South Korea
- **33.6%** Low - Medium: Taiwan, South China, the United States, France, the United Kingdom, Japan, Vietnam
- **22.7%** Low: South Korea, Singapore, Malaysia, British Virgin Islands, Cayman Islands, Poland, Hungary, Czech Republic, Germany, Romania
- **2.7%** No data: Bermuda, Mauritius



Baseline overall water risk[4]

- **4.5%** Extremely high: Tunisia, Mexico
- **22.7%** High: East China, Vietnam, Philippines
- **12.7%** Medium - High: South China, Mexico, the United States, Germany, Belgium
- **47.3%** Low - Medium: Taiwan, the United States, Japan, Malaysia, British Virgin Islands, France, Poland, Luxembourg, Germany, Hungary, the United Kingdom, Romania
- **4.5%** Low: South Korea, Singapore, Czech Republic, Germany
- **8.2%** No data: Bermuda, Cayman Islands, Mauritius

[1] In 2023, WRI launched Aqueduct 4.0, the latest version of its water risk analysis framework
[2] Analysis Boundary: Locations of Subsidiaries Included in ASE Technology Holding's Global Consolidated Financial Statements.
[3] Baseline water stress：Measuring the ratio of total water demand to available renewable surface and groundwater supplies. A high baseline water stress indicates greater competition for water among users
[4] Baseline overall water risk is composed of 13 water risks, including baseline water stress, baseline water consumption, interannual variability, seasonal variability, groundwater table decline, riverine flood risk, coastal flood risk, drought risk, untreated connected wastewater, coastal eutrophication potential, unimproved/no drinking water, unimproved/no sanitation, and peak RepRisk country ESG risk index. Scores are aggregated by category (i.e., physical risk quantity, physical risk quality, and regulatory and reputational risk) and weighted according to the importance of the watershed to obtain a national-level water security score

We apply the WRI Aqueduct tools to assess the water stress levels under three climate change scenarios (i.e., BAU, OPT, and PES[1]) over different time scales. Observed from the number of water stress levels under different climate change scenarios and different time scales, the number of ASEH facilities worldwide with an "extremely high" water stress level is on a downward trend compared to the baseline. However, the number of ASEH facilities worldwide with a "high" water stress level exhibits an upward trend. Meanwhile, the number of ASEH facilities around the world with a "medium-to high," "low-to-medium," or "low" water stress level remains unchanged.

Number of ASEH's facilities worldwide under different climate change scenarios, time scales and water stress levels

Scenario / Level	Baseline	BAU			OPT			PES		
		2030	2050	2080	2030	2030	2050	2080	2050	2030
Extremely high	5	0	0	6	5	0	1	0	0	1
High	2	7	7	1	2	7	6	7	7	6
Medium to high	1	2	1	1	3	2	1	4	2	1
Low to medium	15	14	15	15	13	14	15	12	14	15
Low	3	3	3	3	3	3	3	3	3	3

Global Drought Risk Analysis

ASE Technology Holding Co., Ltd. evaluates drought risk by assessing the likelihood of drought occurrence, the population and assets exposed, and the vulnerability of these exposed elements to the adverse impacts of drought. This comprehensive risk indicator is calculated based on three key components: hazard, exposure, and vulnerability. Historical analyses of precipitation deficits are utilized to represent the hazard aspect. Exposure factors include population density, crop coverage, and water stress levels. Vulnerability is assessed through social, economic, and infrastructure conditions, reflecting the capacity of communities and assets to withstand drought impacts. By integrating these dimensions, ASE Technology Holding provides a holistic assessment of drought risk to inform sustainable management and resilience strategies. Drought risk is quantified on a scale of 0-5, ranging from low to high risk, with higher values indicating higher risk. We analyzed a total of 110 facilities[2] worldwide in Taiwan, China, Hong Kong, Japan, South Korea, Malaysia, Singapore, Vietnam, Philippines and other Asian countries, as well as America (such as the United States, Mexico, etc.), Europe (Belgium, France, Poland, Germany, the United Kingdom, the Czech Republic, etc.) and Africa (Mauritius, Tunisia) and other regions.

Drought Risk Analysis

35.5% Medium - High
East China, Philippines, France, Poland, Hungary, Tunisia, United Kingdom, Czech Republic, Romania

28.2% Medium
South Korea, Singapore, Malaysia, South China, Mexico, Vietnam, Japan, Belgium, Germany, Luxembourg, the United States

7.3% Low - Medium
Japan, the United States

29.1% No data
Taiwan, Bermuda, British Virgin Islands, Cayman Islands

[1] Business As Usual (BAU) is the SSP3-RCP7.0 scenario, which is relatively free of climate policy intervention. It not only represents a medium-to-high forcing path as SSP3 combines relatively high social vulnerability and radiative forcing, but also has strong land use changes and high NTCF emissions. Meanwhile, Optimistic (OPT) is the SSP1-RCP2.6 optimistic scenario, which represents a low forcing path. Its simulation results show that the multi-modal average will fall below 2° C in 2100. Pessimistic (PES) is the SSP5-RCP8.5 pessimistic scenario, which exhibits strong reliance on fossil fuel development and represents a high forcing path

[2] Analysis boundary: Sites of ASEH Global Consolidated Subsidiaries

Water Scarcity Risk Analysis of the Taiwan Facilities

As most of ASEH facilities are located in Taiwan, it is crucial to closely monitor water scarcity risk in the region. We have divided our Taiwan facilities into 15 areas based on the supplying water reservoirs by referencing the local government database[1], before assessing[2] the historical frequency of water scarcity events at each reservoir and the frequency of water scarcity risks under different climate change scenarios.

- We analyze the historical frequency of water scarcity events and the probability of water scarcity from different climate change scenarios at each facility's water supply sources. According to the analysis results, the historical frequency of water scarcity events is lower in Hsinchu, Taichung, and Changhua areas, followed by Taoyuan and Nantou areas, and higher in the Kaohsiung area. Under the SSP1-RCP2.6 and SSP2-4.5 scenarios, there is no significant difference between the rainfall at all our Taiwan facilities and the historical average. However, under the SSP3-RCP7.0 and SSP5-RCP8.5 scenarios, the probability of water scarcity over the medium term (2040 to 2100) and beyond increases in north and central Taiwan, but does not change significantly in the Kaohsiung area.
- We assess the water scarcity risk at each Taiwan facility under each scenario using a combination of historical observations and the water scarcity probability, and water scarcity risk[3] measurement matrices under different scenarios: High-risk facilities will be given priority attention and adaptation measures such as continuously enhancing water efficiency, adding water storage facilities, and establishing emergency backup water sources will be implemented to address drought risks and water shortages. Identification, analysis and putting in place appropriate response plans enable us to bolster the resilience of our operations across different scenarios.

Water scarcity risks of the Taiwan facilities under various scenarios

Historical observation \ Future (the probability of water scarcity)	Decrease (<-10%)	Unchanged (<10%)	Increase (10-20%)	Significant increase (>20%)
Low				
Moderate				
High				

- ■ Maintain: The impact on water resources is low and current management procedures can be maintained.
- ▲ Attention: For areas with historically medium to high water shortage incidents, more attention.
- ● Alert: For areas with historically high water shortage incidents, more attention on management procedures is needed.
- ★ Priority alert: Areas with a history of high water shortage incidents and a high probability of water scarcity in the future will receive priority attention and implement adaptation measures.

Water scarcity risks of the Taiwan facilities under various scenarios

Area (Number of facilities)	SSP1-RCP2.6				SSP2-RCP4.5				SSP3-RCP7.0				SSP5-RCP8.5			
	Short term	Medium term	Medium to-long term	Long term	Short term	Medium term	Medium to-long term	Long term	Short term	Medium term	Medium to-long term	Long term	Short term	Medium term	Medium to-long term	Long term
Taipei City + New Taipei City (2)	■	■	■	■	■	■	■	■	■	▲	▲	▲	■	■	▲	▲
Taoyuan+New Taipei (2)	★	★	★	●	★	★	★	★	★	★	★	★	★	★	★	★
Hsinchu (1)	■	■	■	■	■	▲	▲	■	▲	▲	▲	●	■	▲	▲	▲
Taichung (4)	■	■	■	■	▲	▲	▲	▲	▲	▲	▲	●	▲	■	▲	▲
Changhua (2)	▲	▲	■	■	▲	▲	▲	▲	▲	●	●	●	▲	▲	▲	▲
Nantou (4)	●	●	▲	▲	●	●	●	●	●	★	●	★	●	●	●	●
Kaohsiung (1)	★	★	●	●	★	★	★	★	★	★	★	★	★	★	★	★

1 Nanshi River, Feicui Reservoir, Shimen Reservoir, Baoshan and Baoer Reservoirs, Yongheshan Reservoir, Liyutan Reservoir, Mingde Reservoir, Shigangba (Deji Reservoir), Hushan Reservoir, groundwater, Sun Moon Lake Reservoir, Zengwen Wutoushan Reservoir, Nanhua Reservoir, Kaoping Kaoping Weir (including underground water) and Fengshan Reservoir

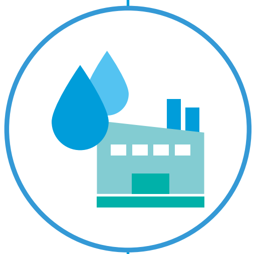
2 We define a water scarcity event as one in which the reservoir capacity falls below the lower limit. The probability of water scarcity under climate change scenarios is measured using the Standardized Precipitation Index (SPI) as a reference indicator

3 High-risk areas: regions with multiple historical water shortages and a high likelihood of future scarcity. Medium-risk areas of concern: regions with many historical water shortages but a low likelihood of future scarcity

Physical Risk Adaptation

For our manufacturing sites, we continuously monitor potential future water scarcity events through annual water risk scenario assessments. At the same time, the facilities will continue to implement various adaptation measures, such as increasing water recovery rates, establishing wastewater recycling systems, increasing reserve water capacity, or reducing reliance on groundwater sources, with a view to not only minimizing the impact of water scarcity in the future, but also bolstering resilience to wet and dry seasons across all ASEH facilities. ASEH Holdings has implemented enterprise risk management and Business Continuity Management (BCM) in 100% of its key production sites to ensure that both existing and new facilities can continue operations when faced with climate risks. In particular, under the global risks of rising temperatures and drought, a series of drills have been established in addition to the launch of BCM plans to implement ASEH's operational risk management. Furthermore, ASEH consistently invests in and expands green factory-related facilities, which include: accounting for heavy rainfall/flood potential during construction and installing infrastructure damage prevention mechanisms (including flood gates); laying highly permeable sidewalks around the premises; building water supply support systems for factory-adjacent areas; investing in biodiversity, and launching biodiversity restoration actions.

External Indicators



Internal Indicators

WRI External Indicators

1. WRI Drought Indicators
2. WRI Water Stress Indicators

Climate Change Localized Indicators

3. Monthly Water Supply and Demand Correlation Indicators
4. Drought Frequency Indicators
5. Impact Level Indicators

Water Resource Indicators

6. Water Storage Tank Reserve Capacity Indicators
7. Water Recovery Rate Indicators
8. Water Consumption Indicators per Unit of Output
9. Indicators of Business Operation Caused by Water Shortage
10. Indicators of Property Damage Caused by Water Shortage

● Current Indicators ● Future Scenario Indicators

Adaptation plans implemented in Improved the efficiency of the water recovery process

ASEH's water supply system in the past 5 years

- Installed water storage facilities in ASEH factories
- Installed water support systems in factory-adjacent areas
- Installed a rainwater recovery system
- Enhanced wastewater treatment capacity and recovery rate
- Installed a rainwater recovery system

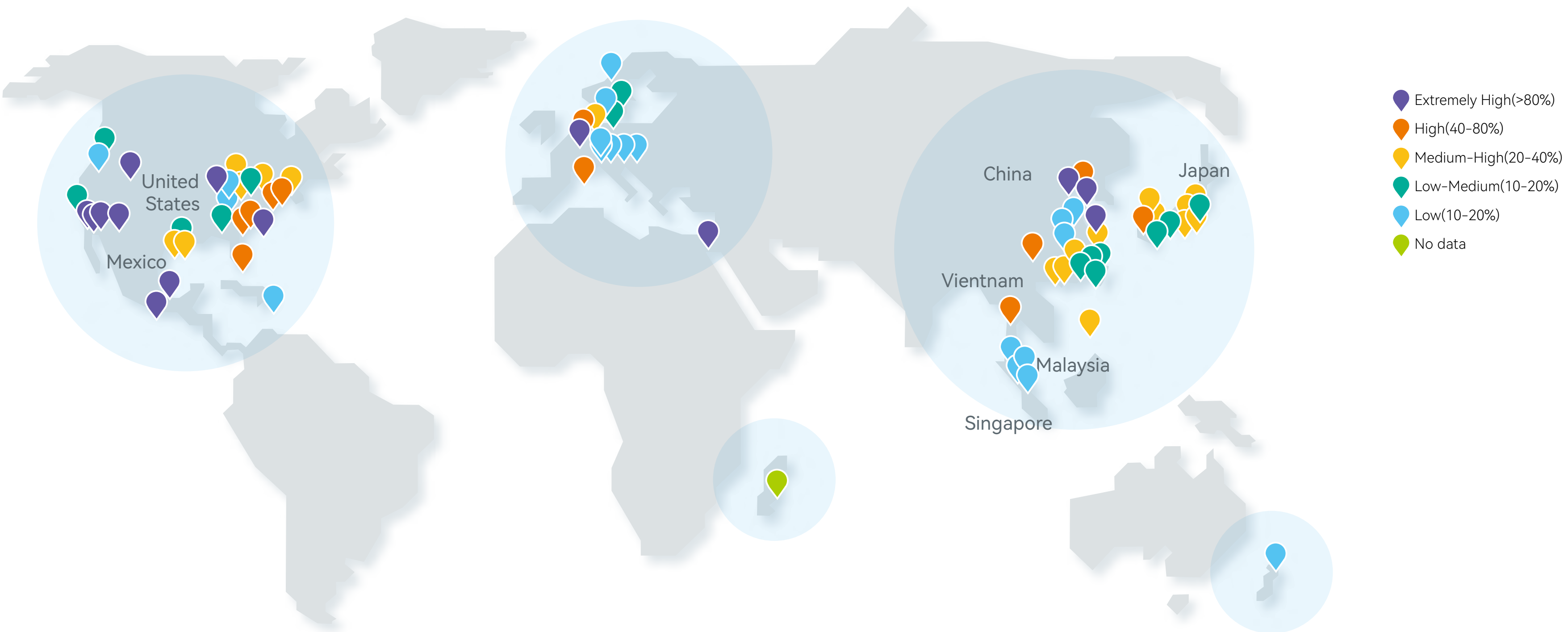
Supply Chain Environmental Risk Analysis

Rapid climate change is causing more natural disasters, and these climate induced events have the potential to disrupt our operations and expose our supply chain to significant risks that further impact our business continuity. To mitigate such risks, ASEH works hand-in-hand with suppliers to implement mitigation and adaptation actions, ensuring operational stability and enhancing climate resilience. We have initiated climate, natural and biodiversity risk assessments on our supply chain, and conducted a comprehensive examination to determine potential disaster risks over short, medium, and long-term periods.

Global Water Risk Analysis

Baseline Water Stress Simulation

Using the WRI database, the Company conducted an analysis of water stress for 748 supplier locations worldwide. The baseline water stress analysis results[1] (shown in the figure below) revealed that approximately 13.9% of suppliers are situated in areas with extremely high stress, primarily in Mainland China and the United States. 4.6% of suppliers are located in areas with high stress, mainly in Mainland China, South Korea, and the United States.



[1] Baseline water stress: Measures the ratio of total water demand to available renewable surface and groundwater supplies. A high baseline water stress indicates greater competition for water among users

Analysis of Climate Disaster Risks for Suppliers

Based on the locations of Taiwanese supplier sites within the water supply areas of various reservoirs, we referenced historical data of water shortages at different reservoirs, and projected the probability of water shortages under the climate change scenario to assign different levels of attention (maintain, monitor, priority monitoring) to supplier sites in each region, using the water shortage risk matrix as illustrated below. Selected suppliers must consistently enhance water resource efficiency, expand water storage facilities, and establish emergency backup water sources. This will improve operational resilience in various situations and prevent disruptions to company operations in the event of a disaster. We will continue to monitor the other suppliers and adjust our level of attention where necessary, in order to effectively manage the risk of water shortage.

Risk Alert Level for Supplier Water Shortage[1]

Region	SSP2-4.5				SSP3-7.0				SSP5-8.5			
	Short term	Medium term	Medium to- long term	Long term	Short term	Medium term	Medium to- long term	Long term	Short term	Medium term	Medium to- long term	Long term
Northern Taiwan[2]			★ Taoyuan City, New Taipei City (73)	★ Taoyuan City, New Taipei City(73)		★ Taoyuan City, New Taipei City (73)	★ Taoyuan City, New Taipei City (73)	★ Taoyuan City, New Taipei City (73)			★ Taoyuan City, New Taipei City (73)	★ Taoyuan City, New Taipei City (73)
Central Taiwan[3]						★ Miaoli (5) Nantou (4)	★ Miaoli (5)	★ Miaoli (5) Nantou (4)	★ Miaoli (5)		★ Miaoli (5)	★ Miaoli (5) Nantou (4)
Southern Taiwan[4]						★ Kaohsiung (36)						

★ Priority alert: If the probability of water shortage events increases due to climate change, discussions on improvement should be prioritized.

[1] Water supply: Keelung City, New Taipei City (Xinshan Reservoir + Xishi Reservoir + Shuangxi); Taipei City, New Taipei City (Nanshi River + Feicui Reservoir); Taoyuan City, New Taipei City (Shimen Reservoir); Hsinchu area (Baoshan Reservoir + Baoer Reservoir + Yongheshan Reservoir); Miaoli area (Yongheshan Reservoir + Liyutan Reservoir + Mingde Reservoir); Taichung area (Liyutan Reservoir + Shigang Dam (Deji Reservoir)); Changhua area (groundwater + Hushan Reservoir + Shigang Dam (Deji Reservoir)); Nantou area (surface water + groundwater); Yunlin area (Hushan Reservoir + Jiji Weir); Chiayi area (Lantan Renyi Reservoir + Zengwen Wushantou Reservoir); Tainan area (Zengwen Wushantou Reservoir + Nanhua Reservoir); Kaohsiung area (Kaoping Weir (including underground water) + Fengshan Reservoir)

[2] Northern Taiwan: Taipei City, New Taipei City, Taoyuan City, Hsinchu

[3] Central Taiwan: Miaoli, Taichung City, Changhua, Nantou, Yunlin

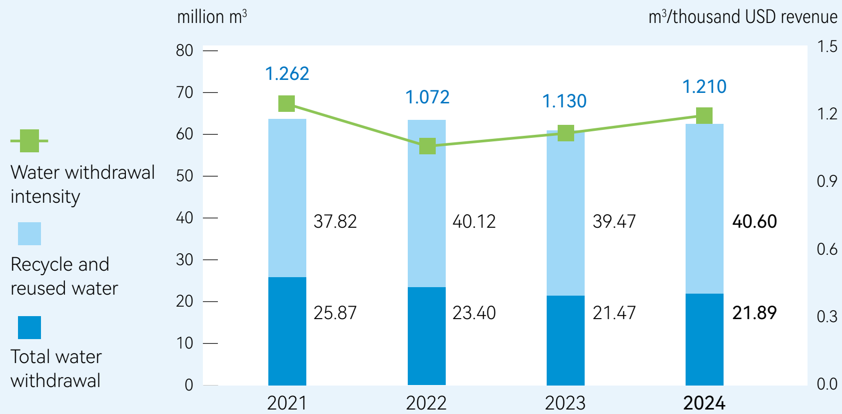
[4] Southern Taiwan: Chiayi, Tainan, Kaohsiung

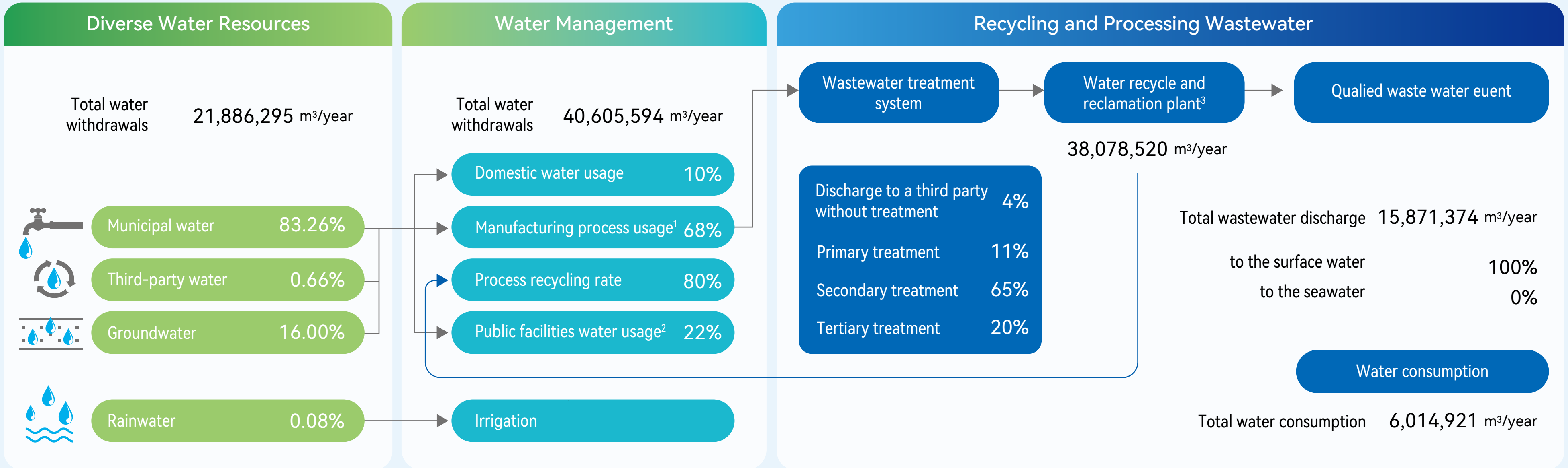
Water Withdrawal and Reuse

ASEH adopts three water use strategies: reduce, reuse, and recycle. The main source of water-use is tap water. Total water withdrawals in 2024 amounted to 21.89 million tons, while water withdrawal increased by 2% compared to the previous year. The water use intensity per unit revenue (including rainwater) was affected by the revenue decrease to increase by 7% compared with the previous year, but reaching our goal of a 43% decrease compared to the baseline in 2015.

The wastewater reclamation recycling systems were established in ASE Kaohsiung, Chungli, Malaysia, and Singapore facilities to support wastewater treatment that meets local regulations. The wastewater reclamation recycling rate of ASE Kaohsiung is 76% , ASE Chungli is 70%, ASE Malaysia is 50%, and ASE Singapore is 25%. The robust recycling methodology at the facility in effluent discharge, and significantly alleviated the manufacturing sites' pressure on water consumption and wastewater discharge.

Water Resource and Water Withdrawal Intensity





Description:
1. Manufacturing process water use includes manufacturing water use cycle, cleaning/grinding water, electroplating water recycling, and other reuse.
2. Public water use includes washing tower discharge, cooling tower discharge, purified/wastewater systems recycling and reuse.
3. Water reclamation includes recycling and renewal of processed water that meets guidelines, supplying the manufacturing water usage cycle.

Water Saving Projects

In 2024, our successful launch of 35 conservation projects involved 3.47 million USD in capital expenditures and operating expenses, which saved a remarkable 1.5 million tons per year. To improve employees' awareness, knowledge, and skills, we generally provide water resource efficiency-related training for employees, a total of training lessons for 3,070 hours, 123 people. That will assist employees in discovering water-saving opportunities in daily operations and propose and implement improvement projects. Incentive mechanisms were implemented to encourage employees to propose feasible solutions to save water that resulted in, an increase of 2% year-on-year recycling rate to 80%. In response to increasing water scarcity and climate-related operational risks, we remain committed to enhancing water management capabilities across our sites. Going forward, we will implement water pricing projects at key facilities[1] to incentivize conservation, improve water-use efficiency, and promote reuse, taking concrete actions to advance circular economic benefits from sustainable water use.

Water Saving Projects			Investment	Performance
Project Type	Number	Description	Investment fees (US$)	Performance (tons/year)
Process recycling rate	19	Add a recycling system to process and recycle machine wastewater	982,543	564,157
Water recycle and reclamation plant	0	Wastewater reclaim efficiency improvement	–	–
Wastewater recycling	12	1) Strip grind wastewater reuse 2) New construction project for organic wastewater recycling	2,470,590	915,354
Public facilities water usage	1	Water spray for garden	11,664	2,592
Domestic water usage	3	Toilet tap and flush water altered to water saver	2,045	14,912
Total	35		3,466,842	1,497,015

[1] Key facilities are defined as facilities with both high revenue contribution and significant water consumption

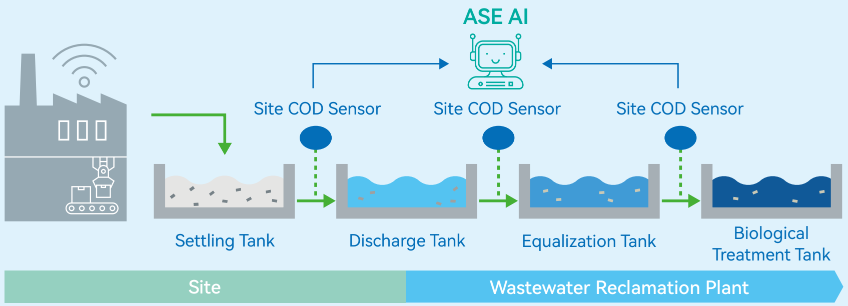
Wastewater Management

In 2024, 15,871,374 tons[1] of effluent was discharged, and our total water consumption was 6,014,921 tons. We conduct internal water quality tests, while also outsourcing offline sampling and water quality analysis to ensure strict control and ecology management of the aquatic environment. In addition, our effluent management adheres to local regulations and discharge water standards. A number of our facilities have set internal goals that are higher than regulatory requirements by consistently monitoring the effluent quality, and employing AI algorithms to optimize and increase the amount of recycled water and reduce water withdrawal. Currently, there are 15 facilities that collect and classify chemicals used in the manufacturing process, so that each type can be treated independently based on its effluent characteristics, and hence, improving the efficiency of our effluent treatment processes. In order to provide employees with clean water and proper sanitation across our operations, we have adopted the WASH (Water, Sanitation, and Hygiene) approach as well as established wastewater treatment facilities. We will continue to conduct regular health and environmental education to further enhance employees' awareness of water security.

AI-driven Early Warning System in Wastewater Monitoring

The AI-powered wastewater monitoring and early warning system utilize historical data and model learning models to collect and analyze wastewater parameters in real time. When anomalies are detected based on deviations from historical patterns, the system triggers a recommended response protocol that includes immediate identification and notification of relevant personnel to ensure real time problem solving. All abnormal information and recovery statuses are automatically compiled into reports, facilitating subsequent analysis and decision-making, and reducing the risk of recurrence.

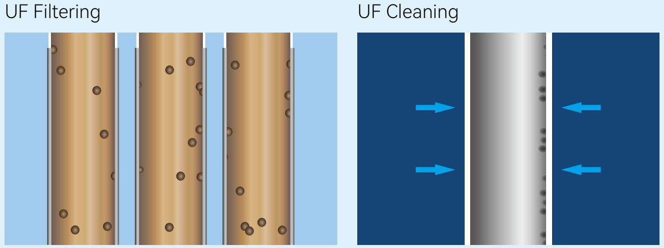
Benefits: Reduces response time by 2 hours.



Intelligent Membrane Filtration System

ASE Kaohsiung's in-house development of an AI-powered UF (Ultrafiltration) prediction system has modeled approximately 200,000 data entries through big data collection and database construction. The system uses seven key features to identify highly correlated combinations, offering a novel solution for optimizing differential pressure monitoring and cleaning cycles. Powered by AI technologies, the system continuously analyzes operational data to predict trends.

Benefits: water savings of 365,000 cubic meters per annum.



[1] Two electronic manufacturing services facilities (USI Kunshan and Mexico) do not have on-site wastewater treatment facility, so the amount of wastewater discharge is estimated. Others' data is recorded from water meters

5.4 Circular Resources

Waste Management

ASEH adopts source reduction measures and prioritizes the use of eco-friendly materials to minimize waste generation and reduce environmental pollution. We require all facilities to complete ISO14001 certification, and collect and track each facility's environmental-related data from the environmental management platform on a quarterly basis. Facilities that have not achieved the targets will need to propose improvement plans to reduce their waste output and increase their recycling rate. In 2024, a total of 76,857 tons of waste was generated; a positive progress towards our goal of zero landfill. To manage the compliance of waste disposal contractors, each facility conducts regular annual audits of their contractors through online, paper-based, and on-site inspections (a total of 268 sessions). Additionally, unannounced audits are carried out to prevent environmental pollution incidents. To improve waste resource utilization, we have adopted the circularity model with a goal of 90% recycling rate for non-hazardous waste. In 2024, the hazardous waste intensity (hazardous waste generated per revenue) decreased by 53% compared with 2015, resulting in a 93% general and hazardous waste recycling rate which is a 2% increase from the previous year. We also provided employees with education and training on environmental issues, totaling approximately 176.47 training hours for 43,881 participants. This training initiative effectively boosts employees' awareness and understanding of waste reduction, enabling the company to integrate the ethos of waste reduction into its operations and achieving its ultimate goal of zero waste to landfill.

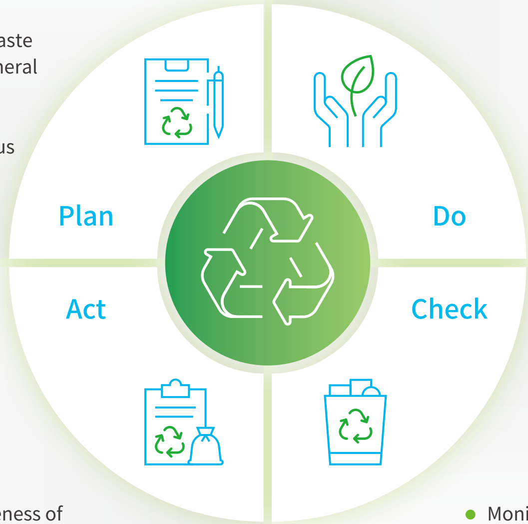
- At our facilities, local government regulations mandate a close to zero landfill for hazardous waste. As such, there still remains approximately 1% of general waste that must be disposed of in landfills, which is 1% less than last year.
- ASE Kaohsiung K21 has achieved UL 2799 Zero Waste to Landfill Platinum Level validation[1]. Additionally, USI Shanghai-Shengxia and Zhangjiang Facilities have each obtained UL 2799 Zero Waste to Landfill Gold Level validation[2].
- To ensure that waste removal is environmentally friendly and conducted responsibly, we have commissioned qualified local vendors to recycle and process 100% of the generated waste within the border. AI-based automatic monitoring of waste collection vehicle movements is being gradually implemented to ensure that waste handling does not impact the environment.

Plan

- Collect the amount of waste produced and recycle it from each facility.
- Identify waste related risks and opportunities.
- Establish waste reduction strategies and management objects.
- Develop waste reduction projects and improvement plans for every facility.
- The target for non-hazardous waste recycling rate：achieve 90% general waste recycling rate
- The target for hazardous waste intensity：reduce 61% hazardous waste generated intensity in 2030 from the 2015 level.

Do

- Environmental-related data from each subsidiary is collected and tracked quarterly through the environmental management platform.
- Implement waste reduction projects and improvement plans in each facility.



Check

- Monitor the effectiveness of waste management in each facility to ensure alignment with management performance.

Act

- Manage and review the effectiveness of waste management, and propose enhanced improvement measures.

[1] Platinum Level validation: The highest designation; this claim is validated by UL Solutions when a facility can prove that it consistently achieves a landfill waste diversion rate of 100%

[2] Gold Level validation: This designation is reserved for facilities that have achieved a landfill diversion rate of 95% to 99% or greater

Production/Testing

Product manufacturing

tons/year
76,857

Waste Management

Hazardous waste

tons/year: 22,497 | Ratio: 29%

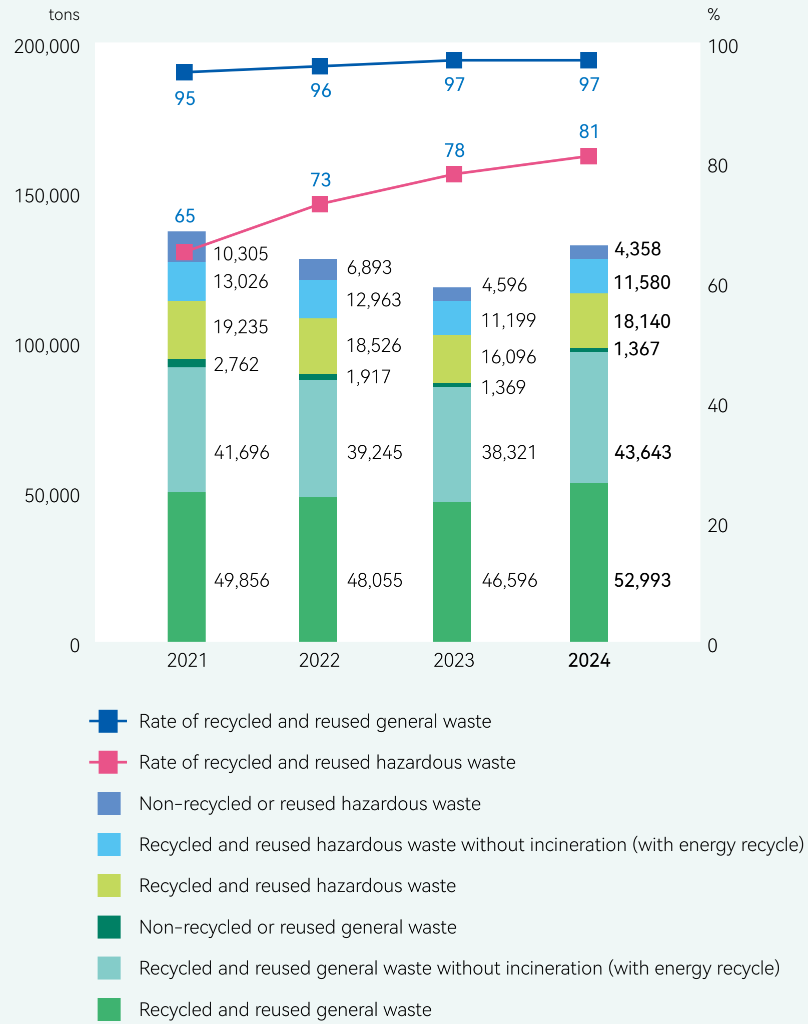
	tons/year	Ratio
Recycle[1]	18,140	81%
Recycle & Reuse	11,580	51%
Incineration (with energy recycle)	6,560	29%
Landfill	0	0%
Incineration (without energy recycle)	695	3%
Others	3,662	16%

General waste

tons/year: 54,360 | Ratio: 71%

	tons/year	Ratio
Recovery[2]	52,993	97%
Recycle & Reuse	43,643	80%
Compost	1,903	2%
Incineration (with energy recycle)	8,257	15%
Landfill	1,039	2%
Incineration (without energy recycle)	328	1%
Others	0	0%

Waste Output and Recovery Rate

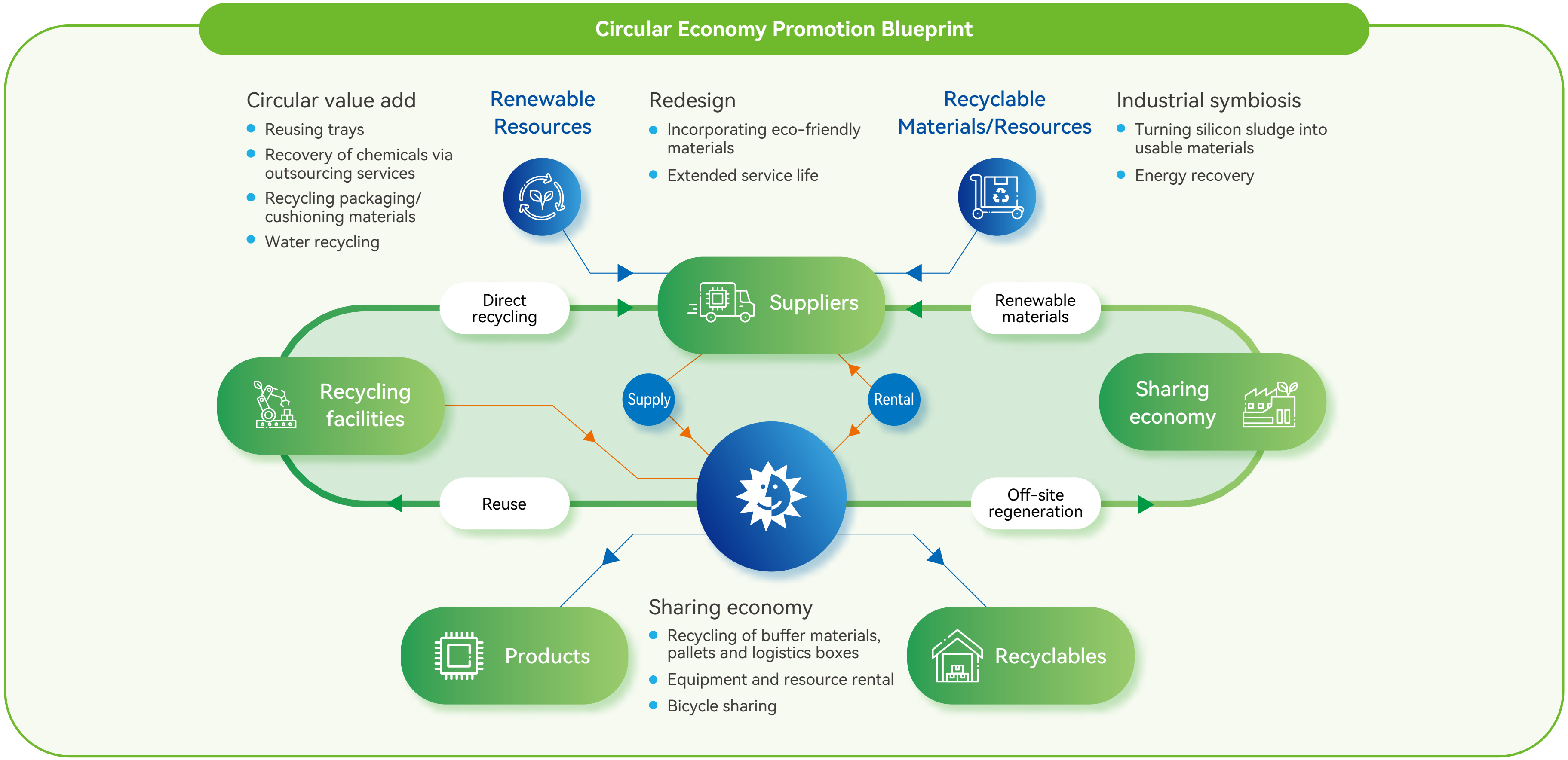


Description:
1. Recrycled hazardous waste includes incineration (with energy recycle)
2. Recycled general waste includes compost and incineration (with energy recycle)

Description:
(1) Rate of recycled general waste reached 97% > target recycling rate (90%)
(2) Rate of recycled hazardous waste in 2024 (81%) was 78% higher than the previous year (3%)
(3) Rate of recycling of hazardous waste (excluding incineration with recycled energy) was 19%

Striving Toward a Circular Economy

The concept of the circular economy has garnered greater global attention in recent years as concerns with the continuous depletion of natural resources grow. To optimize the use of Earth's resources, the application of relevant expertise and the weighing of economic benefits are prime factors in implementing a circular economy. At ASEH, we are putting the circular economy in action by adopting five key approaches direct recycling, reuse, off-site regeneration, renewable materials and supply and leasing. We collaborate actively with suppliers and business partners across the industry chain to build a semiconductor circular economy through practical actions such as redesign, value-added circularity, recycling and recovery, shared economy, circular agriculture, and industrial symbiosis. In addition, we have formed alliances with organizations in our industry and from other sectors to examine the life cycles of resources and identify areas where resources can be reduced, recycled, and reused to prolong their lifespan, and maximize resource efficiency. In 2024, we spent approximately USD 1.37 million and launched a total of 38 circular economy projects, resulting in approximately USD 17.57 million cost saving, and the consumption of about 14,454 tons of resource material per year.



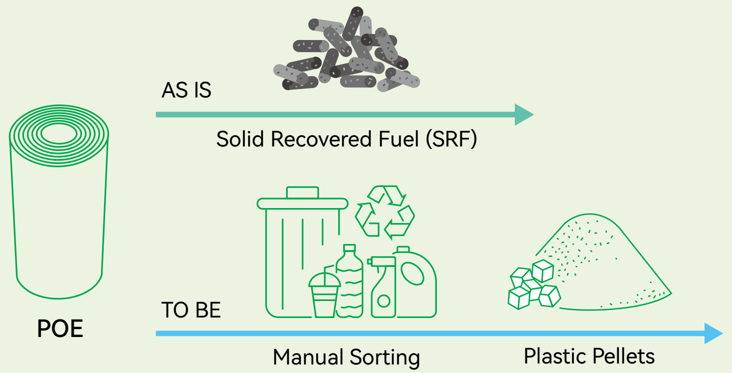
Non-hazardous Waste Project and Beneficial Result			Investment	Performance	
Project Type	Number of projects	Description	Total investment cost (USD)	Total annual saving (USD)	Total substance weight (ton/year)
Energy recycling	2	Incinerate mixed waste such as household garbage, waste plastic (non-chemical properties), waste wooden pallets, and combustible materials for energy recovery and reuse	20,935	2,482	160
Packaging material recycle	5	Recycle and reuse packaging materials such as trays, pallets, and cardboard boxes	47,575	401,809	375
Packaging material reduction	2	Reduce the use of single-use packaging materials	49,100	195,297	325
Packaging material reuse	9	Recycle and reuse wafer packaging materials	544,462	16,142,697	5,693
Other	10	1) Crush waste plastic packaging materials and remanufacture them into plastic pellets 2) Use sintering to process waste compression-molded plastic and replace virgin materials (natural aggregate) with it for the production of eco-friendly bricks	290,221	639,304	5,053
Total	28	-	952,293	17,381,589	11,606

Hazardous Waste Project and Beneficial Result			Investment	Performance	
Project Type	Number of projects	Description	Total investment cost (USD)	Total annual saving (USD)	Total substance weight (ton/year)
Energy recycling	2	High-concentration organic waste liquid, organic wiping cloths, and filter cartridges are processed through incineration and distillation, and then reprocessed into fuel for boiler combustion to generate thermal energy	1,517	-	196
Packaging material recycle	1	Empty chemical containers are recycled, cleaned, and reused	-	3,015	53
Other	7	Alkaline copper-containing waste liquid and organic solvents are recovered through distillation	415,563	184,687	2,599
Total	10	-	417,080	187,702	2,848

Plastic Recycling Center

To address the challenges of sorting diverse categories of plastic waste and the difficulties associated with downstream reuse, ASE Kaohsiung established a Plastic Recycling Center in 2022. This center centralizes and manages plastic waste previously scattered across various storage areas. Based on the circularity concept, the center explores new technologies to enhance the treatment of waste foam (POE - Polyolefin Elastomer). Materials that were once only recyclable into solid recovered fuel (SRF) are now refined into plastic pellets, expanding the possibilities for reuse. Embracing the philosophy that "waste is a misplaced resource" and aiming for "zero waste," the center collaborates with supply chain partners to promote the reuse and recycling of packaging materials, effectively reducing the volume of waste generated.

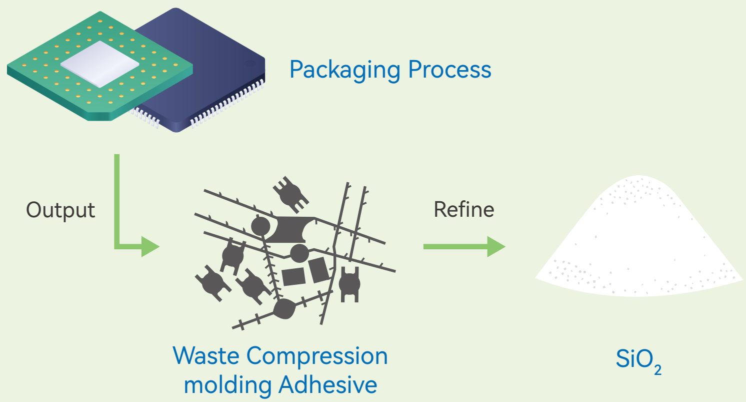
Benefits: Annual conversion of 978 tons of plastic waste into reusable products.



Advancing the Recycling of Waste Compression Molding Adhesive

Since 2021, ASE has been working with recycling companies to repurpose waste compression molding adhesive generated from the encapsulation processes into reusable bricks through physcial processing. Between 2022 and 2023, the sintering process was introduced to convert the waste into raw materials for cement and silica. In 2024, advancements were made to refine the waste into high-purity silicon powder resulting in the development of SilicStep™, a line of eco-friendly and comfortable silicon-based slippers made from low-carbon raw materials. These products are now available through major retail channels, marking a successful transformation of industrial waste into green consumer goods and significantly reducing environmental impact.

Benefits: Annual conversion of 1,053 tons of waste compression molding adhesive into commercial products.



5.5 Air Emissions Control

Air Emissions Control

Air pollutants emitted in 2024 include VOCs[1], SO_x[2], NO_x[3] and particulate pollutants[4]. We adopted the use of wet scrubbers, activated carbon adsorption equipment, condensation equipment, chemical scrubbing, biological scrubbing, UV photolysis, zeolite concentration rotor incineration systems, and other preventive equipment to manage process gases and control the concentration of air pollutant emissions. In 2024, the number of VOCs emissions decreased 61% compared with the previous year. In addition to the original treatment and prevention equipment, we will strengthen our emission management to focus on source emissions and facility upgrades and improvements to reduce the environmental impact caused by the concentration of air pollution emissions.

Operational Manufacturing

Source Management

- Replace existing high VOC concentration materials with clean, low/no VOC content materials
- Strengthen sealed negativepressure environments
- Academic collaborations to optimize treatment efficiency
- Optimization of Scrubber Performance and Operation
- Alternative Raw Material Strategies

Preventive Equipment

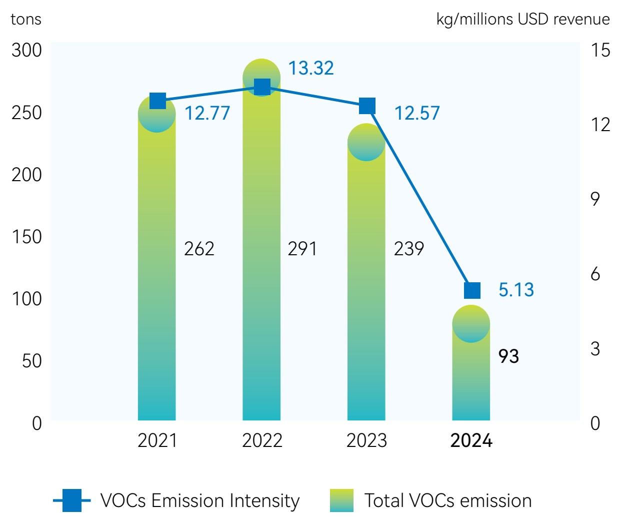
High-efficiency Treatment Equipment

- Web scrubbers
- Activated carbon adsorption equipment
- Condensation equipment
- Chemical scrubbing
- UV photolysis oxidation
- Zeolite concentration rotor incineration

Emissions Monitoring

	tons
VOCs	93
SO_x	27
NO_x	55
$PM_{10}/PM_{2.5}$	31
Ozone depleting substances	-

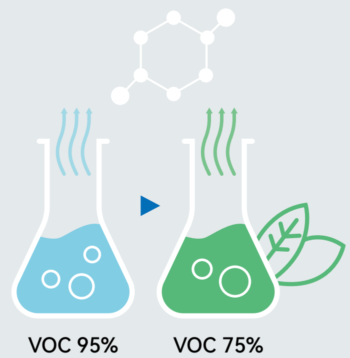
VOCs Emission and Intensity



Raw Material Substitution Strategy

Exhaust gases generated during semiconductor manufacturing contain high concentrations of volatile organic compounds (VOCs) that pose risks to both the environment and human health. Therefore, directly reducing VOC emissions is a critical priority. As part of our raw material substitution strategy, we actively replaced the high-concentration ethanol (95%) used in production processes with a lower-concentration ethanol (75%). This adjustment effectively reduced VOC emissions, contributing to environmental protection and emission reduction goals.

Benefits: Reduction of VOCs by 2,920 kg/year



[1] VOCs are calculated using public coefficients, and are either directly measured or calculated using mass balance
[2] SOx are calculated using public coefficients or converted through the concentration ratio
[3] NOx are calculated using public coefficients or directly measured
[4] Particulate pollutants are calculated using public coefficients or directly measured

AI Monitoring of Air Pollution Control Equipment

Our AI monitoring system is built upon existing air pollution control equipment and is designed to support smart management and digital upgrades. By analyzing data and integrating key operating parameters, the system incorporates seven key parameters—inlet airflow rate, inlet concentration, circulating water volume, liquid nitrogen ratio, airflow rate, pressure differential, and pH value—to calculate and predict pollutant reduction efficiency. AI is further applied to simulate and optimize parameter configurations, thereby enhancing treatment efficiency, reducing pollutant concentrations, and lowering operating costs. This comprehensive approach improves environmental performance and carbon reduction outcomes, ultimately reducing the environmental burden.

Benefits: Reduction of VOCs by 6,764 kg/year

Seven Key Parameters

- Inlet Airflow Rate
- Inlet Concentration
- Circulating Water Volume
- Liquid Nitrogen Ratio
- Airflow Rate
- pH Value

\+

Feature Engineering and Combination

Dashboard

- AI-Driven Parameter Optimization through Simulation
- Predict Pollutant Reduction Efficiency
- Prediction of abnormal situations 30 minutes from now
- Real-Time Push Notifications

5.6 Green Facility

Low Carbon Buildings and Green Factories

Reducing the carbon emissions of buildings is a critical step to slowing down climate change. Since 2012, we have transformed existing facilities and built new facilities and offices that comply with international low carbon building standards. Through quantifying and analyzing the entire lifecycle of building carbon emissions, carbon reduction was driven from the design stage and promoted along the value chain to build a sustainable campus. We have also integrated the evaluation of clean production in the manufacturing process, with green buildings to achieve Green Factory Certification, meeting low carbon goals at both hardware and software levels. In the future, we will continue to work towards obtaining certification for 100% of our new facilities, and demonstrate our firm commitment to green transformation.

Green Building Certificate
28 [1]

EEWH
8 Diamond、3 Gold、1 Silver、5 Bronze、2 Qualified
19 [2]

LEED
5 Platinum、3 Gold
8 [3]

Low-Carbon Building Diamond
1 [4]

Green Factory
14 [5]

Clean Production facilities
22

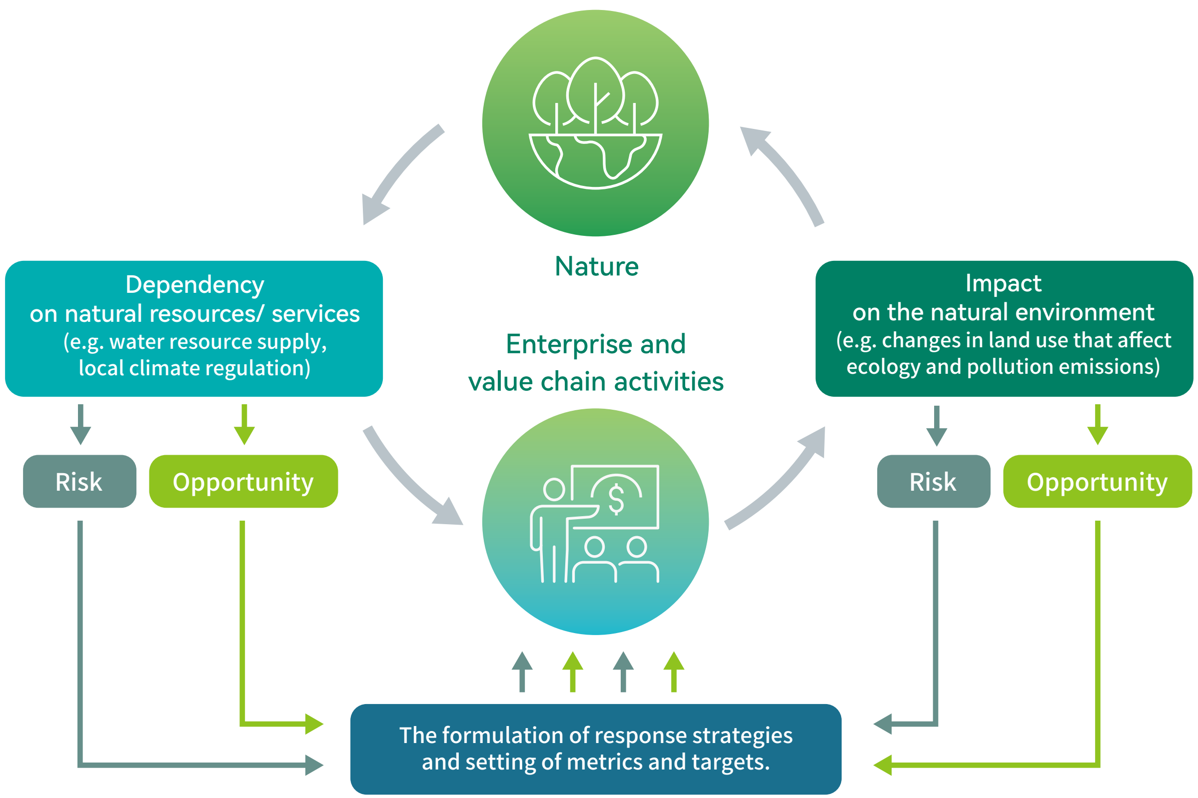
[1] The cumulative number of domestic and international green building certifications obtained to date
[2] EEWH Certification: K3/K4/K5/K7/K11/K12/K14B/K15/K16/K21/K22/K26/KH-dom/CL-A/ CL-K&L/CL-B/CL-M/SPIL Zhong Ke /USI-NK
[3] LEED Certification: K12/K21/K22/K26/CL-K&L/ K23/CN-HQ/CN-SH
[4] Low-Carbon Building Diamond Grade: K24
[5] Green Factory: K3/K5/K7/K11/K12/K15/K21/K22/CL-A/CL-K&L/CL-B/CL-M/SPIL-ZK /USI-NK

5.7 Biodiversity

Risk assessment

ASEH have adopted the TNFD-LEAP guidance for nature-related issues. The steps involved using data collected to locate the interface between our subsidiaries' global locations with biodiversity-sensitive areas (Locate). Next, we evaluate the dependencies and impacts of our subsidiaries' operational activities on nature (Evaluate) and, analyze corresponding risks and opportunities based on dependencies and impact pathways. Key risks and opportunities are properly assessed (Assess) and response strategies, monitoring indicators and management objectives are devised for priority risks and opportunities. Lastly, we continuously improve on our preparation to respond to nature-related risks and opportunities, and to publicly report on the company's material nature-related issues (Prepare).

Dependency, impact, risk, opportunity pathway

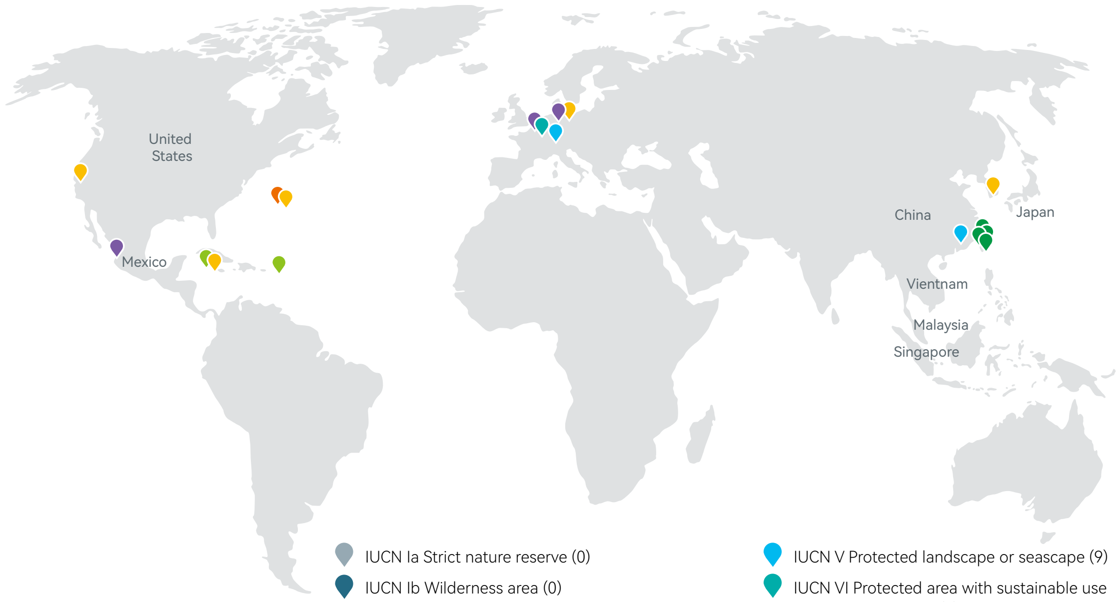


LEAP	Response Measures
L **Locate:** Identify biodiversity-sensitive areas	By integrating data from the World Database on Protected Areas (WDPA) and Taiwan's biodiversity mapping resources, ASEH has mapped the dependencies of 100% of our global operations with their surrounding ecosystems to assess potential impacts on biodiversity.
E **Evaluate:** Assess dependencies and impacts	We designed a questionnaire based on relevance and impact levels to evaluate the ecosystem services that our 26 global manufacturing sites rely on, as well as the potential nature-related impacts from these operations.
A **Assess:** Evaluate nature-related risks and opportunities	We conducted pathway analyses on the top five dependencies and impacts in relation to current site operations, identifying associated nature-related risks and opportunities.
P **Prepare:** Develop response strategies and implement actions	Based on the ecological conditions of each site, ASEH is developing tailored response strategies and rolling out phased action plans to mitigate ecological impacts.

Overlay Analysis of Natural and Biodiversity Hotspots

In nature-related risk analysis, we first identify the existence of any biodiversity sensitive locations surrounding our facilities based on the geographic locations of our 110 facilities[1] worldwide using the International Union for the Conservation of Nature (IUCN) World Database on Protected Areas (WDPA) and Taiwan's biodiversity values map(including Taiwan's relevant ecological conservation laws and regulations and the scope of protected areas designated by non-governmental organizations, e.g. "Coastal Conservation Zone" designated by Ministry of the Interior and "Taiwan Ecological Network Conservation Corridors" designated by Ministry of Agriculture), whereupon a two-kilometer radius is drawn around the center of a facility site as its potential impact area. According to the findings of the overlay analysis, 13 facilities are adjacent to protected areas listed in the IUCN Category II National park, 2 facilities are adjacent to a protected area listed in IUCN Category III Natural monument or feature, 14 facilities are adjacent to a protected area listed in IUCN Category IV Habitat or species management area, 9 facilities are adjacent to a protected area listed in IUCN Category V Protected landscape or seascape, 1 facility is adjacent to a protected area listed in IUCN Category VI Protected area with sustainable use of natural resources,7 facilities are adjacent to a protected area listed in other IUCN categories, while 6 Taiwan sites are adjacent to the non-regulated Taiwan Ecological Network Conservation Corridors. As the facilities on these sites operate in compliance with local laws and regulations, no apparent ecological impact has been observed. We will continue to monitor these facilities and present any adverse impact of our facilities on the ecosystem.

Results of biodiversity conservation area analysis for ASEH's own assets



- IUCN Ia Strict nature reserve (0)
- IUCN Ib Wilderness area (0)
- IUCN II National park (13)
- IUCN III Natural monument or feature (2)
- IUCN IV Habitat or species management area (14)
- IUCN V Protected landscape or seascape (9)
- IUCN VI Protected area with sustainable use of natural resources (1)
- Others (7)
- Taiwan Ecological Network Conservation Corridors (6)

Region (Number of suppliers)	IUCN Ia Strict nature reserve	IUCN Ib Wilderness area	IUCN II National park	IUCN III Natural monument or feature	IUCN IV Habitat or species management area	IUCN V Protected landscape or seascape	IUCN VI Protected area with sustainable use of natural resources	Other
Taiwan (16)								
Mainland China (32)						5		1
Northeast Asia (5)					1			
Southeast Asia (9)								
Europe (16)					3	4		5
North America (10)					2		1	1
Central America (16)			13	2	8			
Other (4)								

[1] Analysis boundary: Sites of ASEH Global Consolidated Subsidiaries

Biodiversity-Sensitive Area Analysis of Manufacturing Facilities in Taiwan[1]

Dadu Plateau Low Mountain Conservation Corridors
Key Species: Leopard cats, Formosan crab-eating mongoose, Ring-necked Pheasant, Gray-faced Buzzard, etc.

Nantou Low Mountain conservation corridors
Key Species: Leopard cats, Formosan Pangolin, Yellow-margined Box Turtle, etc.

Bagua Mountain Low Mountain Forest Conservation Corridors
Key Species: Leopard cats, Formosan crab-eating mongoose, Formosan small indian civet, Fairy pitta, etc.

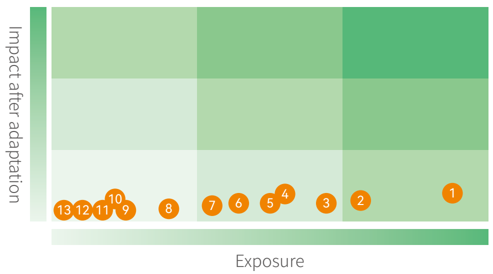
Wu River Basin Conservation Corridors
Key Species: Leopard cats, Golden-stripe gudgeon, etc.

- Coastal Zone Management Act – Coastal conservation Zone
- Cultural Heritage Preservation Act – Natural Reserves
- Wetland Conservation Act – Wetlands of Importance
- National Park Act – National Parks
- Wildlife Conservation Act – Wildlife Refuges
- Wildlife Conservation Act – Major Wildlife Habitats
- National Park Act – Natural Reserves
- Conservation Corridors

Evaluating Nature-related Dependencies and Impacts

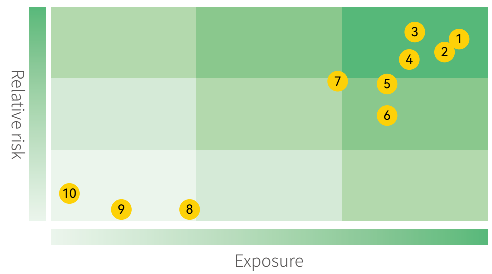
Our facilities worldwide conduct individual evaluation of the dependencies and impacts on nature from their operations. The facilities are required to select natural disasters or natural resource shortages of concern to them, and assess the extent of these disasters and issues and their current state of adaptation, thereby identifying the ecosystem services on which their operations depend upon. We investigate whether these facilities engage in activities that cause ecological damage, depletion of resources, environmental pollution, and interference with the ecosystem, as well as whether these facilities have put in place management measures for the said activities or pollution, thereby identifying the impact of activities in these facilities on nature. From the compilation of all facilities' data, the number of facilities that are concerned about a particular issue is used as a measure of exposure, and the impact of the issue on the facilities after adaptation represents relative risk. The survey results are presented in the following matrix, where the top five issues are selected as priority topics for the purpose of risk and opportunity analysis based on the materiality principle.

ASEH's Dependency Materiality Matrix (After Adaptation)



1. Extreme heat
2. Uneven rainfall
3. Extreme rainfall
4. The occurrence of large-scale epidemic diseases
5. The occurrence of storm disasters (e.g., sandstorms and typhoons)
6. Insufficient water resources
7. Drought occurrences
8. Large-scale noise and vibration occurrences (including earthquakes)
9. Flood occurrences
10. Shortage in the supply of fossil fuels
11. Degradation of air quality
12. Deterioration in the quality of water
13. Eutrophication occurrences

ASEH's Impact Materiality Matrix



1. Waste
2. Greenhouse gas emissions
3. Indirect energy utilization
4. Emissions of non-greenhouse gas air pollutants
5. Water resource utilization
6. Fossil Fuel Utilization
7. Process wastewater
8. Mineral utilization
9. Soil pollution
10. Proximity to biodiversity sensitive locations

[1] A two-kilometer radius is drawn around the center of each facility site to define its potential impact area

Major Nature-related Risk and Opportunity Metrics

We set corresponding indicators to monitor the status of the top five dependencies and impacts identified through materiality screening. We then analyzed the dependency and impact pathways to determine the corresponding risks and opportunities, allowing us to further conduct financial impact assessments and draw up response strategies. To fulfill our vision of coexisting with nature in harmony, we apply risk mitigation measures on an ongoing basis, and seize the right opportunities that will not only ensure the company's profitability, but also limit our impact on the environment.

Dependencies and impacts on nature				Risks		Opportunities		Response strategies
Items		Explanation	Metrics	Explanation	Financial impacts	Explanation	Financial impacts	
Dependencies	1	Relying on local climate regulation services to avoid high scorching temperatures	Temperature	High scorching temperatures could affect the efficiency of air conditioning equipment, which in turn leads to the need for additional air-conditioning equipment or higher electricity bills.	• Capital expenditure • Operating cost	Enhancing efficiency in the use of energy resources	Reduced operating costs	1. Improve ventilation and step up the use of air conditioning across manufacturing facilities while optimizing the efficiency of chillers.
	2	Relying on precipitation characteristics regulation services to avoid disasters such as droughts	Rainfall data from the Weather Bureau	Droughts cause water shortages, which in turn leads to the need to replenish water using water trucks.	• Capital expenditure • Operating cost	Bolstering resilience to droughts	Reduced financial losses in the event of a drought	1. Improve water recycling efficiency and reduce the need for water withdrawal. 2. Develop a backup mechanism for water tankers to enhance resilience to droughts.
	3	Relying on precipitation characteristics regulation services to avoid disasters such as uneven rainfall	Rainfall data from the Weather Bureau	Heavy rains result in floods at manufacturing facilities, which not only causes damage to equipment, but also disrupts traffic and thus prevents employees from getting to work.	• Capital expenditure • Operating cost	Bolstering resilience to floods	Reduced financial losses in the event of a flood	1. Put in place flood prevention measures and conduct flood prevention emergency response drills to enhance resilience to floods.
	4	Relying on biological control services to avoid or mitigate the impact of large-scale communicable diseases	Statistics on communicable diseases from the Center for Disease Control	The epidemic could potentially result in work stoppages.	• Revenue	Enhancing resilience to large-scale communicable diseases	Reduced financial losses in the event of a large-scale communicable disease	1. Establish an emergency response or control mechanism within manufacturing facilities. 2. Build our own face mask factory to ensure the available of epidemic prevention supplies to support normal operations in the event of an outbreak.
	5	Relying on storm mitigation services to avoid storm damage	Weather data from the Weather Bureau	Frequent or stronger typhoons may cause damage to equipment (i.e., being blown away or water damage), higher risk for employees when getting to work, and increased cost of attendance due to typhoon leave.	• Capital expenditure • Operating cost	Enhancing resilience to wind disasters	Reduced financial losses in the event of a wind disaster	1. Establish a typhoon warning system across manufacturing facilities, which includes making announcements on typhoon warnings, conducting pre-typhoon inspections to bolster typhoon prevention measures, and setting up a typhoon response team.

Dependencies and impacts on nature				Risks		Opportunities		Response strategies
Items		Explanation	Metrics	Explanation	Financial impacts	Explanation	Financial impacts	
Impacts	1	Business waste produced in the company's production process will have an impact on the environment.	1. Total waste recycling rate 2. Hazardous waste disposal capacity	The amount of business waste produced is reduced, and/or the proportion of recycled waste is raised in response to sustainability trends, laws and regulations, or customer requirements.	• Compliance cost	1. Enhancing company goodwill 2. Commoditizing waste	1. Enhanced company goodwill, which in turn leads to customer recognition and opportunities to increase revenue 2. Revenue from the commoditization of waste and reduced waste disposal costs	1. Enhance source management to reduce waste generation. 2. Adopt a circular economy model with the implementation of waste recycling and commoditization to increase recycling rate. 3. Carry out our own R&D initiatives or engage in industry-academia collaboration to develop waste recycling technologies.
Impacts	2	Direct and indirect greenhouse gas emissions from the company's operations will have an impact on the climate.	Greenhouse gas emissions	1. Greenhouse gas emissions are being reduced in response to the trend of sustainability transition, laws and regulations or customer requirements. Or the government has imposed carbon tax/fee forcibly aimed at compelling companies to reduce carbon. 2. Climate change causes extreme weather. Floods, droughts and other climate disasters affect the normal operations of enterprises.	• Compliance cost • Capital expenditure • Revenue	1. Enhancing company goodwill 2. Low carbon products	1. Enhanced company goodwill, which in turn leads to customer recognition and opportunities to increase revenue 2. Revenue from the low carbon products	1. Reduce greenhouse gas emissions by using renewable energy to replace fossil energy. 2. Carry out our own R&D initiatives or engage in industry-academia collaboration to develop product manufacturing processes with low carbon emissions or carbon capture technology.
Impacts	3	The process of acquiring indirect energy sources (i.e., electricity, heat, steam, and cooling), which are used in large quantities throughout the company's operations, will have an impact on the environment.	Percentage of electricity savings achieved by implementing energy conservation and carbon reduction programs	The cost of producing energy increases in response to environmental protection requirements, which increases the cost of purchasing energy resources.	• Operating cost	Enhancing efficiency in the use of energy resources to reduce operating costs	Reduced energy costs	1. Increase energy efficiency by introducing ISO 50001 energy management system. 2. Carry out our own R&D initiatives or engage in industry-academia collaboration to develop product manufacturing processes with low energy consumption.
Impacts	4	Emission of general air pollutants (i.e., NOx, SOx, PM2.5 and VOCs) from the company's operations will have an impact on the environment.	VOC emissions	Air pollutant emissions are being reduced in response to the trend of sustainability transition, laws and regulations or customer requirements.	• Compliance cost	Enhancing company goodwill	Enhanced company goodwill, which in turn leads to customer recognition and opportunities to increase revenue	1. Enhance the efficiency of air pollution reduction facilities. 2. Adopt new air pollution reduction technologies and equipment. 3. Carry out our own R&D initiatives or engage in industry-academia collaboration to develop product manufacturing processes that cause low levels of air pollution or high-efficiency air pollution reduction technologies.
Impacts	5	The process of acquiring water resources, which are used in large quantities in the company's operations will have an impact on the environment.	Water withdrawal intensity	1. Owing to increasing water stress levels from growing water consumption among companies, the government has imposed water conservation charges or forcibly raised the water recycling ratio aimed at compelling companies to save water. 2. In line with global sustainability transition trends, customers are requesting a reduction in water withdrawal.	• Compliance cost • Operating cost	1. Enhancing company goodwill 2. Enhancing efficiency in the use of water resources to reduce operating costs	1. Enhanced company goodwill, which in turn leads to customer recognition and opportunities to increase revenue 2. Reduced water withdrawal costs	1. Increase water recycling efficiency to reduce the need for water withdrawal. 2. Carry out our own R&D initiatives or engage in industry-academia collaboration to develop product manufacturing processes with low water consumption.

Supply Chain Environmental Risk Analysis

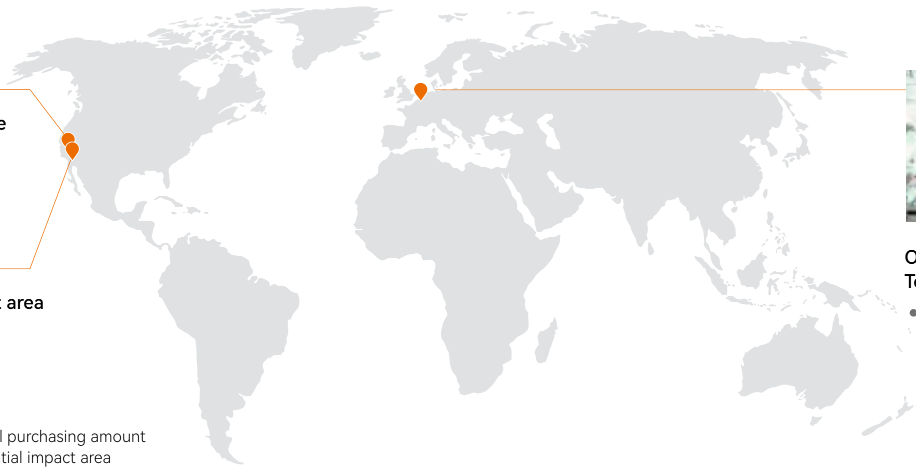
For ASEH's biodiversity risk analysis, we identify the existence of any biodiversity sensitive locations surrounding the geographic locations of our 784 suppliers worldwide using the International Union for the Conservation of Nature (IUCN) World Database on Protected Areas (WDPA), where a two-kilometer radius is drawn around the center of a supplier as its potential impact area. According to the findings from the overlay analysis, the number of biodiversity-sensitive locations near our global suppliers is shown in the following table, with some suppliers being close to at least one sensitive location. For those suppliers that are close to at least one sensitive location, we prioritize our attention on them and ensure that they establish or enhance their strategies for biodiversity, no-deforestation, and/or land conservation. These strategies must at a minimum, include commitments to monitor, prevent, mitigate, and address local ecosystem impacts to ensure the stability and resilience of company operations.

Region (Number of suppliers)	IUCN Ia Strict nature reserve	IUCN Ib Wilderness area	IUCN II National park	IUCN III Natural monument or feature	IUCN IV Habitat or species management area	IUCN V Protected landscape or seascape	IUCN VI Protected area with sustainable use of natural resources	Other
Taiwan (290)	1	-	-	-	11	-	-	-
Mainland China (242)	-	-	-	-	-	8	-	6
Northeast Asia (125)	-	-	-	-	47	4	5	2
Southeast Asia (21)	-	2	-	-	-	-	-	-
West Asia (2)	-	-	-	-	1	-	-	1
Europe (21)	-	-	-	2	8	7	-	11
North America (79)	-	-	-	2	3	17	1	3
Central America (1)	-	-	1	-	-	-	-	-
Other (3)	-	-	-	-	-	-	-	-

Biodiversity-Sensitive Area Analysis of Global Suppliers[1,2]

IUCN V – Protected landscape or seascape
- Upper Newport Bay
- San Joaquin Freshwater Marsh

IUCN IV - Habitat or species management area
- Los Penasquitos Canyon



Other-
Terrestrial and Inland Waters Protected Areas
- Nature Reserves owned by professional nature management organizations

1 The definition of significant supplier as follow: Critical supplier Top 85% of direct material purchasing amount
2 A two-kilometer radius is drawn around the center of each facility site to define its potential impact area

In addition, given the availability of a rich and diverse biodiversity mapping in Taiwan, and the significance of the local semiconductor ecosystem, particular attention was given to 290 suppliers based in Taiwan. We identified the existence of any biodiversity sensitive locations surrounding these suppliers' operations using Taiwan's biodiversity mapping, where a two-kilometer radius is drawn around the center of a supplier as its potential impact area. According to the findings from the overlay analysis, the number of biodiversity-sensitive locations near the suppliers in Taiwan, classified according to IUCN protected area categories, is compiled in the table below. Similar to the global risk analysis, we prioritized our attention on those suppliers that are close to at least one sensitive location, requiring them to develop corresponding strategies to ensure the stability and resilience of company operations.

Region (Number of suppliers)	Ia Cultural Heritage Preservation Act - natural reserves	II National Park Act - National Parks	III Forestry Act - Nature Reserve	IV Wildlife Conservation Act - Wildlife Refuges /Major Wildlife Habitats	IV Wetland Conservation Act - Wetlands of Importance	V Coastal Zone Management Act - Coastal conservation zone	Other Conservation Corridor/Key Biodiversity Area
Northern Taiwan (212)	1	-	-	14	69	2	74
Central Taiwan (32)	-	-	-	-	-	-	20
Southern Taiwan (46)	-	-	-	-	5	-	18

Biodiversity-Sensitive Area Analysis of Suppliers in Taiwan[1]

IUCN IV- Habitat or species management area
- Important Wetlands
- Wildlife Protection Area
- Important Habitats for Wildlife and Plants

IUCN Ia- Strict nature reserve, IUCN IV- Habitat or species management area, IUCN V- Protected landscape or seascape
- Nature Reserve
- Important Wetlands
- Coastal Protected Area

IUCN IV- Habitat or species management area
- Important Wetlands
- Wildlife Protection Area
- Important Habitats for Wildlife and Plants

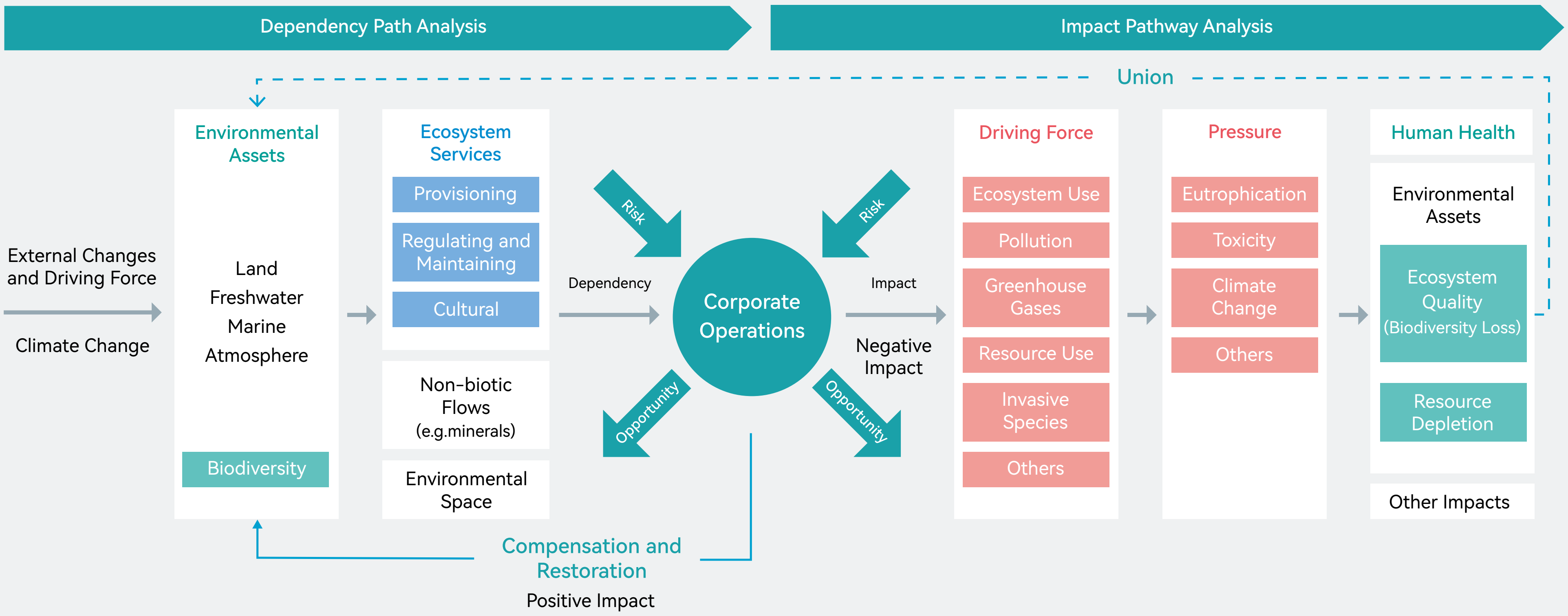
- Coastal Zone Management Act - Coastal conservation Zone
- Cultural Heritage Preservation Act - Natural Reserves
- Wetland Conservation Act - Wetlands of Importance
- National Park Act - National Parks
- Wildlife Conservation Act - Wildlife Refuges
- Wildlife Conservation Act - Major Wildlife Habitats
- National Park Act - Natural Reserves
- Conservation Corridors

[1] A two-kilometer radius is drawn around the center of each facility site to define its potential impact area

Potentially Disappeared Fraction of species[1]

To better understand the impact of its operations on nature, we evaluated both the potential and actual biodiversity loss resulting from environmental emissions including greenhouse gases, air pollutants, water pollutants, and waste disposal, across 26 manufacturing sites. Through scientific data analysis and impact pathway modelling, we aim to identify how operational activities directly or indirectly contribute to habitat degradation, species loss, and ecosystem service decline. Based on these findings, we will implement risk control and improvement measures.

Dependency and Impact Structure



[1] Potential biodiversity loss (PDF): the likelihood of ecosystem degradation caused by pollutant emissions into the natural environment

Impact / Category	Potential Pollutants	Environmental Impact	Ecosystem Damage
Greenhouse Gas Emissions	GHGs (CO_2、N_2O、CH_4、HFCs、PFCs、SF_6、NF_3)	• Changes in climate conditions (rising temperatures, altered precipitation patterns, shifting climate zones) • Rising temperatures disrupt the global atmospheric energy balance • Ocean acidification • Rising sea levels	• Energy imbalance increases the frequency of extreme weather events (such as droughts and floods), leading to changes in terrestrial biodiversity • Declining dissolved oxygen levels in the ocean results in changes in marine biodiversity • Rising sea levels impact terrestrial ecosystems
Air Pollutants	NO_x, SO_x, PM2.5/PM10, Volatile Organic Compounds (VOCs)	• Th formation of acid rain increases hydrogen ion concentration in precipitation and soil	• Acidic soils affect terrestrial flora and fauna
Water Pollution	COD, BOD, SS, nickel, copper, nitrate nitrogen, orthophosphate	• Nutrient enrichment in water bodies leads to eutrophication, reducing dissolved oxygen • Heavy metals biomagnify in the food chain, resulting in aquatic toxicity and reduced species abundance	• Eutrophication leads to fish mortality • The collapse of benthic communities leads to unstable food webs • Heavy metal poisoning impairs fish reproduction
Waste	Plastics, electronic waste	• Pollutant emissions generated from the final treatment of waste disposal • Emission data modelling for various treatment technologies utilizing the Ecoinvent database • Assessment of impacts on biodiversity using the LC-Impact methodology	• Ecosystem impacts from air emissions, wastewater discharges, and resource use associated with waste treatment processes

The company has adopted the GLAM Phase 3 released in 2024 by UNEP and SETAC as the primary impact assessment model. Due to the current database gap with the GLAM framework, the LC-Impact methodology was adopted as a comparable alternative for assessing waste management. These models help us understand the potential impact of various pollutants on biodiversity. Analysis results show that greenhouse gases, air pollutants, water pollutants, and waste have relatively minor impacts on biodiversity across terrestrial, freshwater, and marine ecosystems. The most significant potential biodiversity losses are found in freshwater ecosystems, with greenhouse gases and water pollution as the primary drivers.

Affected Ecosystems	Biodiversity Loss (PDF) [1]
Terrestrial	9.61×10^{-8}
Freshwater	4.26×10^{-6}
Marine	2.69×10^{-7}

[1] Rate at which pollutant emissions may contribute to global terrestrial species loss

Impact of Greenhouse Gases on Ecosystems

Ecosystem	Cause	Key Pollutants	Result (PDF)	Findings	Mitigation Plan
Terrestrial	Climate change	GHGs	8.68×10^{-8}	Climate change driven by GHG emissions affects all ecosystems, with freshwater ecosystems being comparatively more affected.	Reducing emissions, protecting ecosystems, and enhancing climate adaptation are effective ways to mitigate impacts.
Freshwater	Climate change	GHGs	3.89×10^{-6}		
Marine	Climate change	GHGs	2.12×10^{-7}		

Impact of Water Pollution on Ecosystems

Ecosystem	Cause	Key Pollutants	Result (PDF)	Findings	Mitigation Plan
Freshwater	Toxicity, eutrophication	Toxic chemicals; nitrogen, phosphorus	3.66×10^{-7}	Water pollution significantly impacts fresh water and marine ecosystems, with eutrophication and toxic substances posing serious threats to biodiversity and ecological balance.	Preventing pollution at its source, alongside ecological restoration and continuous monitoring, is key to safeguarding the health of aquatic ecosystems.
Marine	Eutrophication	Nitrogen	5.63×10^{-8}		

Impact of Air Pollutants on Ecosystems

Ecosystem	Cause	Key Pollutants	Result (PDF)	Findings	Mitigation Plan
Terrestrial	Acidification	So_x, No_x	9.27×10^{-9}	Acidification is a slow and cumulative process; while the short-term impact of acidification on terrestrial ecosystems is relatively minor, long-term biodiversity loss is possible.	Controlling air pollutant emissions and strengthening ecosystem monitoring and restoration are key to maintaining the health of terrestrial ecosystems.

Impact of Waste on Ecosystems

Ecosystem	Cause	Key Pollutants	Result (PDF)	Findings	Mitigation Plan
Terrestrial	Combined assessment	LCI data & characterization model	2.72×10^{-6}	The disposal of waste (including incineration and landfilling) affects all ecosystems.	Enhancing waste management systems and promoting circular economy strategies can effectively reduce ecological risks.
Freshwater	Combined assessment	LCI data & characterization model	2.20×10^{-6}		
Marine	Combined assessment	LCI data & characterization model	2.45×10^{-6}		

Through this biodiversity loss assessment, we can confirm that ongoing reductions in greenhouse gas emissions, aligned with net-zero targets, can significantly lower potential impacts on biodiversity. Meanwhile, long-term monitoring mechanisms will be established for water pollutants. Based on emission characteristics and ecological risk, the following indicators will be prioritized: COD, BOD, SS, copper (Cu^{2+}), nickel (Ni^{2+}), nitrate nitrogen, and orthophosphate.

Implementation Actions

ASE Kaohsiung – TNFD-LEAP Action Plan

In 2023, the Kaohsiung Facilities initiated a biodiversity risk and opportunity assessment using the TNFD-LEAP framework, with a focus on the relationship between its manufacturing activities and the natural environment, including the ecological impacts of its operational processes. The assessment identified opportunities for both improvement and ongoing maintenance in key areas, including enhancing circular water use, establishing eco-friendly on-site infrastructure, maintaining and strengthening environmental management, and deepening engagement with local communities. In 2024, ASE Kaohsiung Facilities launched the following action plans and performance results based on the opportunities and areas for maintenance identified through the TNFD assessment:

Positioning		Action Plan	Performance
Opportunity	Enhance circular water use to reduce reliance on natural water resources	Manufacturing Processes: • Adjusted upstream machine operating parameters to reduce DI water usage in rinsing systems, increasing water recovery • Introduced new cutting tools to increase feed speed and reduce water flow during cutting Facility Operations: • Expanded systems to increase reclaimed water volume • Optimized operational procedures of recycling systems to further enhance water reclamation	• Tap water usage in 2024 decreased by 4.7% compared to 2023 • Water recycling rate in 2024 increased by 2.4% compared to 2023
	Establish eco-friendly infrastructure within the facility	Installed small-scale bird window strike prevention measures on windows	Coverage of protective measures increased by 4.5%
Maintenance	Maintain and strengthen environmental management within the facility	Effluent concentrations remained significantly below regulatory standards	Actual values were approximately 87%–99% lower than legal limits
	Continue fostering positive relations with local communities	• Established an energy-saving volunteer team to assist local residents with the maintenance of public facilities, including conducting water and electricity audits and making necessary adjustments • Invited nearby elementary schools and water patrol teams to co-organize river cleanup events	Number of events increased by 50%

ASE Chungli – Huangqian Creek Restoration Project

Beginning in 2024, ASE launched a three-year ecological restoration project aimed at restoring the ecosystem services of the creek and advancing toward the policy goal of achieving a net positive impact (NPI) on biodiversity.

5.8 Environmental Expenditures and Investments

ASEH adopted the "Industry Guidelines for Environmental Accounting" published by Environmental Protection Administration of Taiwan. We combined our existing accounting systems with environmental control coding to classify our environmental expenditures into categories in accordance with the nature of costs incurred. Our environmental expenditure is calculated and analyzed quarterly to ensure data accuracy and facilitate effective assessment.

Environmental Costs

ASEH's total environmental costs for 2024 amounted to US$ 160.25 million, with capital expenditure and expense accounting for 45.81% and 54.19% respectively.

Unit:US$ million

Category		Description	2021		2022		2023		2024	
			Capital Investments	Operating Expenses	Capital Investments	Operating Expenses	Capital Investments	Operating Expenses	Capital Investments	Operating Expenses
Operating Cost	Pollution Prevention Cost	Air, water, other pollution prevention, etc.	33.5	18.9	41.7	22	73.9	20.9	63.45	20.92
	Resource Circulation Cost	Efficient utilization of resources, waste reducing, recycling, and disposal, etc.	7.0	41.8	16.2	39.5	7.5	29.3	5.89	31.43
Upstream/Downstream Cost		Green procurement, recycling of used products, etc.	0.7	5.7	3.4	7.1	0.1	2.0	1.10	22.62
Administration Cost		Manpower engaged in environmental improvement activities and environmental education, acquisition of external environment licenses/certification, government environmental fees, etc.	0.1	11.2	0.5	11.5	0.2	11.3	2.96	10.20
Social Activity Cost		Donations to, and support for, environmental groups or activities, etc.	-	3.7	-	4.0	-	3.6	-	1.61
Environmental Remediation Cost[1]		Pollution remediation, insurance fees, environmental fines, and litigation costs, etc.	-	0.01	-	0.0002	-	0.01	0.01	0.01
Others		Global environmental conservation cost and cost to develop products to curtail environmental impact at the product manufacturing stage, etc.	0.01	0.04	-	0.1	-	0.03	-	0.05
Total			41.3	81.4	61.8	84.2	81.8	67.1	73.4	86.8

[1] Environmental Remediation Cost: Legal fees incurred by ASE Kaohsiung for administrative consultation and settlement agreement, and costs related to non-major incidences (less than US$10,000/case) at ASE Chungli and USI Nantou. For the year 2024, we were not subjected to any major financial penalties of greater than US$10,000, or non-financial penalties such as facility shutdown or litigation records. For more details, please refer to Appendix: Environmental Data- F. Environmental Violations.2024

Environmental Benefits

ASEH records environmental benefits generated from activities that reduce impacts on the environment. Our total environmental benefits for 2024 amounted to US$84.31 million.

Unit:US$ million

Category	Description	2021		2022		2023		2024	
		Environmental Benefits	Economic Benefits	Environmental Benefits	Economic Benefits	Environmental Benefits	Economic Benefits	Environmental Benefits	Economic Benefits
Cost Savings	Reduction in costs due to energy saving and carbon reduction projects	1,107,145 MWh	62.8	938,236 MWh	50.1	1,022,276 MWh	60.38	1,050,966[1] MWh	49.26
	Reduction in water costs due to water saving projects	37,817,390 metric tons	16.7	45,880,154 metric tons	19.3	47,214,933 metric tons	18.81	48,035,891 metric tons	22.51
	Reduction in waste disposal costs due to waste recycling	69,091 metric tons	18.7	52,207 metric tons	13.5	49,520 metric tons	11.32	56,315 metric tons	12.54
Total		-	98.2	-	82.9	-	90.5	-	84.3

Our estimated environmental capital expenditures for 2025 will be approximately US$36.36 million. The board of directors has resolved in 2024 to contribute around US$3.7 million (NT$100.0 million) through the ASE Environmental Protection and Sustainability Foundation to fund various environmental projects in 2025.

Sustainable Financing

At ASEH, sustainable financing serves as a strategic catalyst to advance our low-carbon ambition and accelerate business transformation in response to climate change. To demonstrate this commitment, we have concurrently issued two Green Bonds, structured sustainability-linked Loans, and in 2025, signed a sustainability-linked syndicated loan that directly ties our financial terms to the three key ESG demensions. By directing green capital into initiatives such as energy efficiency improvements, circular resource utilization, and sustainable supply chain development, we aim to strengthen our sustainability performance while collaborating closely with suppliers to embed sustainable practices across the value chain. Going forward, we will continue to assess and pursue green investment opportunities that help drive the global value chain toward a low-carbon, sustainable future.

- **2014:** Advanced Semiconductor Engineering, Inc. issued a 3-year Green Bond with a total value of US$300 million via indirect shareholding of its subsidiary, Anstock II Limited.
- **2019:** ASEH issued Green Bonds with 3 year (type A) and 5 year (type B) terms respectively at a total value of US$300 million.
- **2021 to present:** ASEH entered into Sustainability-linked Loans with multiple banks.
- **2025:** ASEH signed a NT$50 billion Sustainability-Linked Syndicated Loan with 17 financial institutions.

[1] The reduction in electricity by using renewable energy and purchasing I-REC is included