

2023-

Total Impact Measurement and Management Report

UN Sustainable Development Goals and Sustainable Values Assessment



CONTENTS

	Disclaimer	1	_		
			03	ASEH's Contributed Value	9
) 1	ASEH's Total Impact Measurement	2			
	and Management			3.1 ASEH'S TIMM Results	9
		/		3.1.1 Economic Impact	11
		0		3.1.2 lax impact	13
	1.1 why we measure Our impact value	Z		3.1.3 Environmental Impact	14
	1.2 Definition of Impact Value	4		3.1.4 Social Impact	20
	1.3 Valuation Milestones	5		3.2 ASEH's SDGs and Impact	28
02	The Scope of Impact Valuation	6	04	Conclusion	31
	21 Period and Scope	6			/
		7			
	2.2 Four Dimensions of impacts	/		Appondix	
	2.3 Responding to UN Sustainable	8		Appendix	
	Development Goals			Appendix 1 : Methodology and Data Collection	24
					34
				Appendix 2 : Reference for Value Transfer	37

Methodology Appendix 3 : References 38

Disclaimer

ASEH's Total Impact Measurement and Management Report assesses the transformation of the impact of ASE Technology Holding Co., Ltd. and its subsidiary companies' (hereinafter referred to as "ASEH") sustainable development into monetary value from a stakeholder's perspective. As this report has a different basis from ASEH's past, present, and future financial statement compilation and financial performance assessment, it cannot and should not be compared, analyzed, or forecast in conjunction with financial statements and financial performance. This report is therefore not a suitable basis for the assessment and determination of ASEH's past, present, or future stock trading value.

ASEH's Total Impact Measurement & Management Report was published in accordance with PwC's Total Impact Measurement & Management (TIMM) framework and the monetization framework in the Natural Capital Protocol and Social Capital Protocol, through data collection and identification of financial proxies, with the results expressed in monetary terms.

If you have any comment or suggestion, please contact us at: No.26, Chin 3rd Rd., Nanzih Dist., Kaohsiung City TEL: +886-7-361-7131 Email: ASEH_CSR@aseglobal.com 01

ASEH's Total Impact Measurement and Management

1.1 Why We Measure Our Impact Value1.2 Definition of Impact Value1.3 Valuation Milestones

2

5

1.1 Why We Measure Our Impact Value

In an aim to develop a "Better Business, Better World", the UN Global Compact initiative and the Business and Sustainable Development Commission have rallied enterprises worldwide together to undertake responsibility in sustainability and help resolve social problems, so as to achieve the UN's 17 Sustainable Development Goals (SDGs). On top of the company's obligation to maintain financial performance, we will incorporate holistic thinking in our business practice to set the pace for ASEH's sustainable development and value creation.

As a semiconductor industry leader on a growth trajectory, ASEH has formulated strategies to achieve long-term sustainability goals, and established clear sustainability management mechanisms, that promote sustainability and value creation for the industry. In response to various risks and challenges ranging from climate, energy, raw material and water supply, ASEH has drawn up four pillars of sustainability strategies: Circular, Low Carbon, Inclusive, and Collaborative. The Company hopes to find opportunities and growth momentum through the implementation of these strategies.

The Total Impact Measurement and Management (TIMM) framework developed by PwC was adopted to measure the sustainability impact of ASEH's operations to stakeholders in monetized values and also examine the effects of operations on stakeholders during decision making. The TIMM framework puts a value on impacts across the economic, tax, environment and social dimensions, and also references the monetization framework of the Natural Capital Protocol and Social Capital Protocol as a tool to analyze the source and results of sustainable value. We believe that sustainable value reporting that applies holistic thinking will facilitate corporate decision-making, performance assessment, and stakeholder communication. To that end, we have adopted a unified unit of measurement to express the combined corporate financial and ESG values in monetary terms. We hope to make use of resources that are limited to maximize sustainability value for stakeholders and reduce the negative impacts.

ASEH's Four Sustainability Strategy Pillars



Sharing and Diffusion of Intangible Knowledge to the Society

1.2 Definition of Impact Value

TIMM assesses the value of corporate operations from four dimensions - the economic impact, tax impact, social impact and environmental impact, and quantifies the impacts in monetary values. The TIMM framework is based on the perspective of the stakeholders involved in corporate operation, and not solely from the shareholders' viewpoint. It is therefore able to comprehensively portray the complete process of an enterprise's operations from resource input to the value of its production output. This has enabled the company to apply holistic thinking and tools to express the total impact and value of corporate operations to society on a timely basis. ASEH's sustainable value is hence measured by its total impact value from a stakeholder's perspective.



1.3 Valuation Milestones

ASEH believes that the continued implementation of sustainable development as a long-term strategy not only enables the strategic creation of sustainable value and gives back to society, but more importantly contributes to the attainment of the UN SDGs for 2030. We began implementing TIMM and Social Return on Investment (SROI) in 2017, and applied monetization assessment tools to track the social impact and operational risks brought by the company's business activities. In 2018, we referenced Integrating the SDGs into Corporate Reporting: A Practical Guide, to examine SDGs and sub-goals, and issues of concern related to the company's operations. We then set and track key performance indicators on this basis. In 2019, we used the SDG Compass Inventory of Business Indicators to examine the positive and negative impacts of our four major SDGs and the outcomes of our actions. In 2020, we further applied sustainable value assessment used internally to the value chain so as to understand and analyze the impact of value chain activities on the environment and society. In 2023, we associate the monetized outcomes of positive and negative impacts with significant issues. This information will then be provided to the CSC (Corporate Sustainability Committee) to serve as references for the performing of weighing and comparisons in the value creation decision-making process. By examining and analyzing the sustainability outcomes of actions by ASEH subsidiaries, we have been able to develop action plans and policies for improvements and reduce the impact of potential risks. Moreover, through this report, ASEH impact assessment results will be disclosed comprehensively to ASEH stakeholders.

ASEH's Key Value-Creation Milestones¹



¹ For more details on ASEH's sustainable values, please refer to ASEH's corporate sustainability report.

² Due to changes in the assessment basis of environmental indicators, the impact value for the year 2022 had been recalculated to facilitate comparison between the two years.



2.1 Period and Scope

The report discloses ASEH's 2023 (January 1, 2023, to December 31, 2023) information according to the economic, tax, environment, and social impacts based on the TIMM framework. The report takes into consideration financial materiality, industry relevance and place of operation, and thereby includes ASEH entities - Advanced Semiconductor Engineering, Inc. and its subsidiary (hereinafter referred to as "ASE"), Siliconware Precision Industries Co., Ltd. and its subsidiary (hereinafter referred to as "SPIL"), and Universal Scientific Industrial Co., Ltd. and its subsidiary (hereinafter referred to as "USI"). ASEH's scope of operation includes Taiwan, China, Hong Kong, South Korea, Japan, Malaysia, Singapore, Vietnam, Mexico, U.S.A., Tunisia and selected European countries.



2.2 Four Dimensions of Impacts

ASEH's sustainable value is measured by the impact value affecting stakeholder changes. Based on the UN's sustainability objectives, results of stakeholder engagement over the years and major sustainability-related issues, we measure ASEH's total impact value from four dimensions:

Dimensions	Stakeholders	Impact drivers ¹	Explanation of the production of impact value
Economic	ShareholdersSuppliersCustomersEmployees	 Profits Payroll Investment Intangible assets Regulatory compliance 	Economic value mainly consists of the creation of financial value for stakeholders and maintenance of their livelihoods through the five impact drivers.
Tax	GovernmentLocal residents	 Profit taxes Other taxes	The various types of taxes incurred from operations are directly paid to the local government to support the government's fiscal policies, and the government's investments in public infrastructure to enhance the welfare of local residents.
Environment	 Employees General public Local community	 Greenhouse gases Other air emissions Waste Water use Water pollution and recycle water Afforestation Biodiversity 	The pollutant discharges and resource extrapolations from operating activities that affect the general public. Measuring the impact on the general public and the natural ecological environment through seven related environmental impact factors.
Social	EmployeesSuppliersLocal community	 Partnerships Employee engagement and development Employee and contractor health and safety Education Social cohesion 	The different impacts that our operations have on employees, suppliers, and local communities, demonstrate ASE's value to the society.

¹ Impact factors are the chief factors and sources of influence on stakeholders. Corporate operations involve multiple issues and therefore, we must first consolidate the activities and domains exerting the most important impact on stakeholders before we can effectively inventorize the changes and influence of various impact factors on stakeholders.

2.3 Responding to UN Sustainable Development Goals

As a global leader in semiconductor assembly and testing, ASEH's approach to the UN SDGs is to closely align the goals with its core business. Since 2018, the company outlined five steps - Understanding SDGs, Defining Priorities, Goal Setting, Integration, and, Disclosure and Communication, to incorporate the SDGs into ASEH's core business strategy. ASEH re-examined the SDGs that are relevant to our industry and business operations, and took stock of SDGs and sub-goals that required our active involvement. We identified 6 Tier 1 SDGs: Quality Education (SDG 4), Clean Water and Sanitation (SDG 6), Affordable and Clean Energy (SDG 7), Decent Work and Economic Growth (SDG 8), Responsible Consumption and Production (SDG 12), and Climate Action (SDG 13). In response to the results of international standards and norms, sustainable investment assessments, and issues of concerns to stakeholder, "biodiversity" is included in important evaluation items related to the company's long-term sustainability goals. Therefore, Life Below Water (SDG 14) and Life on Land (SDG 15) are added in our focus in 2022. On those SDGs that require active responses, we examined the correlation between our four sustainability strategies, KPI, and Tier 1 SDGs this year, then made adjustments and included SDGs into the long-term goals of our sustainability management. We are leveraging on our strengths to work together with both upstream and downstream partners to bring change and innovation to the industry and society.



ASEH's Contributed Value

03

3.1 ASEH's TIMM Results	9
3.1.1 Economic Impact	11
3.1.2 Tax Impact	13
3.1.3 Environmental Impact	14
3.1.4 Social Impact	20
3.2 ASEH's SDGs and Impact	28



9

In 2023, ASEH recorded a decline in packaging, testing, and EMS revenue due to the softening of the overall semiconductor industry and electronics market performance. This has in turn reduced our profits and the amount of employee bonus payouts. As a result, the overall economic value generated dropped by 13% from the previous year. Notwithstanding the decline in economic value, we expanded our investment in R&D and procurement of capital equipment during the course of the year, to maintain the company's market leadership. These activities generated a 5.3% increase in the value of our economic investments and a 4.3% increase in the value of our intangible assets, demonstrating our dimensions determination to improve our performance and product quality despite challenging circumstances. Tax expenditures in 2023 increased by 4.8% over the previous year due to earnings growth in 2022 and tax payments on the disposal of a subsidiary in Korea.

Two main sources of environmental impacts were water resource consumption during the production process and greenhouse gasses emitted from the use of electricity. Our renewable energy usage reached 20% of the total electricity consumption in 2023. On the other hand, we adopted the three major strategies of reduction, reuse, and recycling in the consumption of water resources. Investments were made in every plant to improve water recycling, thereby reducing environmental impacts caused by water consumption and Environmental increasing economic benefits. Since two manufacturing sites were included in the scope of calculation this year, negative effects of water consumption and wastewater pollution dimension slightly increased by 1% compared to 2022, and the negative environmental impact of our operations increased by 2% compared to 2022. In the future, we will actively invest in environmental protection and fulfill our pledge to use the proceeds raised through our green bonds to construct commercial used green facilities and establish water recycling plants, water treatment plants, and a real-time waste water monitoring system that would mitigate environmental impacts and promote human health. In the meanwhile, we continued to invest in ecological conservation, and therefore the positive impact of ecological conservation in 2023 increased significantly by 48% compared to last year.

Social dimension

Economic

and tax

The overall 2023 value of our social impact fell by 24.7% compared with 2022. This was largely caused by a lacklustre economic environment that resulted in a 26% decrease in ASEH's annual local procurement amount. Despite a challenging year, the company continued to increase its investments in social support for the community. Excluding the value of corporate volunteer contributions, investments in social cohesion activities increased by 21.87% in 2023 over the previous year. Our active contribution to social welfare programs help to improve the well-being of the public and the community, as well as protect environmental resources. In addition, we had increased our investments in environmental education and job training by 53%.

Explanations and management strategies for the various areas can be found in relevant sections of ASEH's 2023 ESG report, along with key dimensions of our ESG performance in conjunction with assessment and management.



2022-2023 ASEH Sustainable Values

unit: US\$ million

3.1.1 Economic Impact

ASEH's export-oriented business operations is a major contributor to the country's GDP and economy. Within the TIMM framework, the economic dimension creates major positive impacts to ASEH's stakeholders. Based on stakeholders' (employees, shareholders, suppliers, and customers) perspective, economic dimensions include five main impact factors: profit, payroll, investment, intangible assets, and regulatory compliance.

Profit

ASEH is a public company in Taiwan, Shanghai and the United States. Shareholders include financial institutions, corporations, individuals and foreign investors. ASEH's profitability and earnings distribution bring financial satisfaction and livelihood maintenance to our shareholders. Hence, we use the net profit reported to the United States Securities and Exchange Commission (the "SEC") as a financial proxy for meeting shareholders' financial satisfaction and livelihood maintenance.

Payroll

ASEH employees are the main payroll stakeholder. Employees gain financial satisfaction and maintain their livelihood through salaries, and drive economic development through daily consumption. Adhering to the SROI¹ principle of not over-claiming, we use annual personnel costs, salary expenses, withheld labor and health insurance premiums, retirement pension and so on as our financial proxy.

Investment

ASEH plays a key role in the global semiconductor industry, and procures a sizable number of machinery and equipment, expands facilities and leases assets every year to maintain technology leadership and sufficient production capacity. Hence, the main stakeholders of our capital expenditure and operating leases are the suppliers of our property, plant and equipment, and the lessor of business assets. These stakeholders are financially supported by our capital expenditures and leasing activities, that further drive economic prosperity. To attribute the long-term impacts of machinery and equipment purchases and facility expansion over the span of each year, the annual real estate, plant and equipment depreciation expenses, depreciation expenses charged on right-of-use assets, operating lease expenses and repair expenses are used as the financial proxy for the financial support received by our suppliers each year.

¹Social Return on Investment Guide, 2012.

Intangible
Assets

ASEH maintains a high standard of research and development to continue its innovation and leadership in the industry. Investments in research and development affect our supply chains, employees and customers, and the impact on each is as follows: acquire the latest technologies, increase workplace competitiveness, and acquire products with leading technologies. The amortization expense of intangible assets and, research and development expenses are used as the financial proxy for the contribution of intangible assets. In recent years, to encourage the R&D team to optimize key components, manufacturing processes, and product development technologies, our company has continued to increase its investment in R&D expenses and has provided cash rewards to employees who have made significant contributions to research efforts.

Regulatory Compliance

We conduct all our business activities in strict compliance with applicable laws and regulations. To ensure legal compliance, ASEH maintains regular updates on domestic and foreign laws and policies that affect its operations, and prioritizes regulatory compliance at all of its business locations. Requiring our subsidiary companies to report immediately all incidences of non-compliance that resulted in penalties has become the key focus of risk management within company's internal control. Attorney fees for legal cases (excluding annual consulting fees), litigation costs and the amount of fines are identified as financial proxy for negative impacts.

Economic Impact Path Diagram

Impact Driver	Activity/Output	Outcome/Impact	Monetary Valuation	
Profits	Profit distribution		Net profit reported on US Securities & Exchange Commission Form 20-F	
Payroll	Payroll and welfare given	Stakeholders' financial satisfaction and livelihood	Yearly personnel costs, salary expenses, withheld labor and health insurance premiums, and so on	
Investment	Capital expenditure	maintenance	Yearly real estate, plant, and equipment depreciation expenses, depreciation expense charged on right-of-use assets, operating lease expenses, repair expenses, and so on	
Intangible Assets	Intangible Assets Research and development activities, and intellectual property purchase property and intangible assets e		Yearly intangible asset amortization expenses and research and development expenses	
Regulatory Compliance	Attorney fees for legal cases, litigation costs, and the amount of fines	Cause financial or reputational damage	Litigation costs, legal consulting fees, fines, penalty and so on	

3.1.2 Tax Impact

ASEH's global business operations are located in Taiwan, China/Hong Kong, South Korea, Japan, Singapore, Malaysia, Vietnam, Mexico, U.S.A., Tunisia and selected European countries. We believe that it is our duty to pay taxes that contribute to promoting local economic growth and corporate sustainable development. As an indirect stakeholder, the local government allocates tax revenue to social infrastructure, addressing the needs of the local population, who are the direct stakeholders, and creating welfare for them. Hence, the tax payment is identified as a financial proxy for impacts and benefits that local residents derive from us. Since different types of taxes are associated with different operating activities, we classify taxes on the business activities into 2 categories – profit taxes and other taxes.

Profit Taxes	Profit taxes are incurred when the company's business activities generate profits, and are mainly income tax, the main tax used to support the expenditures of local governments, and contributes to the well-being of local residents. Hence, we include profit taxes as an influencing factor based on ASEH's ESG policy and management.
Other Taxes	In addition to profit taxes, we have also identified other taxes incurred by our business activities that affect local governments and residents. We included tax/charges and fees related to the holding and use of movable and immovable properties, and environment-related and human resources.

Tax Impact Path Diagram

Impact Driver	Activity/Output	Outcome/Impact	Monetary Valuation
Taxes	Tax payment	Improve people's wellbeing	Income tax paid, property and real estate related taxes, and environmental/personnel incurred tax/ charges and fees

3.1.3 Environmental Impact

Apart from striving to reduce environmental impact by boosting our resource efficiency, and reducing greenhouse gases and wastewater discharges, waste production and chemical use, we also mitigate the negative impacts of our operation and value chain activities on the ecosystem through biodiversity monitoring and restoration such as afforestation, Chinese Box Turtle conservation, and marine conservation. We seek to actively comply with stakeholder requirements and expectations by quantifying the impacts of our operating processes. We apply the methodology in the 2015 PwC TIMM framework on monetized corporate environmental impact. We conducted our analysis of the environment dimension according to the natural capital impact assessment procedures in the Natural Capital Protocol issued by the Natural Capital Coalition in 2016. In 2023, ASEH's overall environmental impact of US\$-340 million is mainly attributed to resource consumption and environmental emissions from its business activities. We further applied the sustainable value assessment method used internally to the value chain. In 2023, the monetized value of the environmental impact of our greenhouse gas emissions amounted to US\$-2,352 million. The main sources of impact included product and service procurement, investment, and external influence of capital goods.

Monetized Environmental Impact Assessment Procedures



Greenhouse Gas Emissions In 2023, ASEH's total GHG emissions (Scope 1+2) was 1,724,621 tCO₂e. Besides conducting the inventory of Scope 1 and 2 GHG emissions, ASEH conducted a full inventory of Scope 3 GHG emissions for the first time, recording a total emission of 9,891,845 tons. We cited the quantified effect of the social cost of CO_2e in the Report on the Social Cost of Greenhouse Gases issued by the US EPA (2023). Social cost of carbon (SCC) is the monetization of the social cost of carbon emissions, and assessment items include health, building deterioration, economic losses, agriculture and timber loss, desertification and other ecosystem services. We selected the scenario of a 2% social discount rate in the SCC as the basis for calculation. After adjusting for inflation and conversion into USD using 2023 rates, the social cost of one ton of CO_2e is determined at US\$237.75.

2022-2023 Greenhouse Gas Value Chain Outcomes





Greenhouse Gas Management Impact Pathway

Input	Measurement	Output	Environmental Benefits
USD 34 million	Greenhouse Gas Management Project	 Renewable energy consumption accounts for 20% of total electricity consumption, of which 12 facilities are RE100 compliant. 574 carbon reduction projects that resulted in a carbon reduction of 603,327 tCO₂e GHG emission (Scope 1+2) intensity reduced by 45% compared to the base year 2015 Absolute GHGs reduction (Scope 3) reduced by 50% compared to the base year 2020 	 Reduce the social cost of carbon emissions Reduce the risk of using unclean energy Reduce negative impacts on climate action

ASEH adopts 3 key approaches in its carbon reduction management, namely, reducing carbon in the manufacturing processes, in buildings and developing low-carbon energy
projects. Our factories apply innovative solutions such as the smart energy management systems to increase energy efficiency, and we encourage internal energy reduction
measures through technology sharing and competitions. At the same time, we continue to develop plans for the upgrade of existing buildings, and construction of new green
buildings to mitigate the carbon footprint of our business operation.

 To address the GHG emissions generated during our production processes, we are actively promoting carbon reduction initiatives. This includes the installation of point-of-use abatement systems for processes that utilize fluorinated GHGs. Additionally, we are substituting perfluorocarbons (PFCs) with low global warming potential gases and replacing CF₄ with O₂ in our plasma etching processes. In 2023, these efforts resulted in a total reduction of 6,925 tCO₂e.

Other Air Emissions

In 2023, ASEH's total SO_x, NO_x, VOCs and particulate matter emissions was 327 tons. We determined the social cost of these emissions after referencing assessment items in the natural resource costs issued by Trucost in 2016, including human health, agricultural crops, forests, materials and acidification of bodies of water.

Waste

ASEH used landfill, incineration, solidification and other methods to handle 9,492 tons of hazardous waste and 9,645 tons of non-hazardous waste in 2023. We referenced the natural resource costs issued by Trucost in 2016, in which assessment items include local and global pollution, noise and visual disturbances.

Total water intake of ASEH factories was 21,468 megaliters in 2023. We referenced the natural resource costs issued by Trucost in 2016. In view of the possibility that the company's water consumption may indirectly cause displacement of other water consumption opportunities, the assessment items in this study consisted of direct non-consumer use and ecosystem services. The monetization coefficient of water resource consumption in 2023 was 1.75 (USD/ton), and the monetization coefficient of ASEH in each place of operation is adjusted based on the purchasing power in different countries. Furthermore, we also included malnutrition and water-borne diseases into assessment items. Since there were no figures for Taiwan, the monetization coefficient we used is the loss of lives caused by malnutrition determined using the life cycle assessment (LCA) methodology proposed by Pfister et al. (Pfister, S., Koehler, A., Hellweg, 2009). When assessing whether the use of water resources may cause poor nutrition, we included the scarcity of water resources in the geographical areas in question, the percentage of water used for agricultural purposes, and the human development index among our considerations. We also referenced the LCA model of Motoshita et al., 2010 (Motoshita, M., Itsubo, N., Inaba. A., 2010), which was used to determine the loss of lives in South Korea caused by water-borne diseases. The purchasing power of other regions is adjusted using China's coefficient to determine their respective monetization coefficient.

Disability Adjusted Life Years (DALY) was proposed by the World Trade Organization (WTO) and refers to the years of life lost due to illness or years of healthy life lost. DALY is now extensively applied in the fields of public health and health impact assessments. The value of statistical life (VSL) is cited for the monetary value of DALY, and we referenced the VSL of OECD countries at US\$3.4 million (USD in 2011) (OECD, 2012). After considering life expectancy and the age of premature mortality, the value of DALY is calculated at US\$185,990. Finally, we used a value transfer methodology to convert the values provided by the OECD to values for the regions where ASE's plants are located. We employed an appropriate inflation conversion method and determined the monetization coefficient for malnutrition and water-borne diseases in each region to be 0.000252 (USD/ton) in 2023.

Wastewater discharge of ASEH factories was 15,386 megaliters in 2023. Toxic substances that are hazardous to human health and nutrient salts that affect the ecosystem are factored into water pollution. With regard to toxic substances, due to limitations in data availability and current publications, we only consider types of pollutants that are regulated and actually discharged. Toxic pollutants may directly harm human health through polluted water sources or indirectly harm human health (e.g. eating contaminated fish), and the health hazards may be divided into carcinogenic and non-carcinogenic. We relied on the USEtox LCA model to analyze the dose-response effects of different pollutants, and obtained the relative risk characterization factors and DALY values for water-borne pollutants. We also employed the average carcinogenic and non-carcinogenic coefficients provided by Huijbregts et al. (Huijbregts, Rombouts LJA, Ragas AMJ, Van de Meent D., 2005) in calculations. We used a value transfer methodology to convert the values provided by the OECD to values for the regions where ASEH's plants are located, and employed an appropriate inflation conversion method to obtain monetization coefficients for the impact of water pollution on health in the various areas.

Water Pollution

Water Use

The excessive discharge of nutrient salts into bodies of water can cause massive algae growth which depletes oxygen and results in eutrophication. Besides the economic loss and higher cost of using the bodies of water, this will also result in the loss of water recreational value, private property value (lower housing prices), decreased catches, and affect the ecosystem (e.g. wetlands improve water conservation). We referenced freshwater eutrophication in the LCA ReCipe (Hierarchist version) Midpoint method to assess the factors limiting freshwater eutrophication – phosphorus. The Willingness to Pay (WTP) approach by Swedish scholar Ahlroth (2009) is used for the monetization coefficient. The benefit transfer function is used to convert Swedish values into values for regions where ASEH factories are located, and suitable inflation has also been factored in.

Recycled Water

Total amount of water recycled by ASEH factories was 39,475 megaliters in 2023. The use of recycled water will simultaneously reduce water consumption displacement and wastewater pollution. We referenced the LCA method proposed by Pfister et al. in 2009 (Pfister, S., Koehler, A., Hellweg, 2009), to determine the loss of lives caused by malnutrition on this basis. To determine the effect of wastewater pollution in recycled water, we relied on the USEtox LCA model to obtain the relative risk characterization factors and DALY values for water-borne pollutants, and referenced freshwater eutrophication in the LCA ReCipe (Hierarchist version) Midpoint method to assess the factor limiting freshwater eutrophication – phosphorus. We also employed the average carcinogenic and non-carcinogenic coefficients provided by Huijbregts et al. (Huijbregts, Rombouts LJA, Ragas AMJ, Van de Meent D., 2005) in calculations.

Water Recycling and Reuse Impact Pathway

Input	Measurement	Output	Environmental Benefits
USD 42.1 million	Water Recycling Project	 16 water conservation projects that saved a 1.28 million tons per year Enable a recycling rate of 78% 	 Reduce the opportunity cost of using other water resources Reduce the consumption of water for agricultural use and the risk of water contamination Reduce the risk of water contamination due to water scarcity

• ASEH adopts three water use strategies: reduce, reuse, and recycle. The main source of water-use is tap water. Total water withdrawals in 2023 amounted to 21.468 million tons, while water withdrawal decreased by 8% compared to the previous year.

 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 and Chungli are 70%, ASE Malaysia is 50% and ASE Singapore is 37%. The robust recycling methodology at the facility result in a 12% reduction in effluent discharge, and significantly alleviated the manufacturing sites' pressure on water consumption and wastewater discharge.

Afforestation Project

In 2023, ASEH planted more than 300,000 trees, covering a total afforestation area of 31.68 hectare in Taiwan, Inner Mongolia and Ningxia. Afforestation has the benefits of conserving water sources, reducing soil erosion, sequestering carbon, and purifying the air. We refer to the Ecological Benefits of Vegetation Restoration in Yijinhuoluo Banner of Inner Mongolia published by Jiang Liwei et al. in 2019 (Jiang Liwei, Lu Zeyang, Gong Yinting, Yan Shiwei, 2019) and use the replacement cost method to calculate the forest ecosystem service value of the afforestation area. That is, we assess the value of forestland restoration through the expected savings in social costs such as water storage projects, sewage treatment, soil removal, dust filtration, industrial oxygen production, and carbon emissions, and suitable inflation has also been factored in.

The Chinese box turtle, which is a terrestrial freshwater turtle, is the only species of its kind in Taiwan. Considering long-term poaching and threats to Chinese box turtle's habitat, ASEH has been contributing to the restoration and conservation efforts of the Chinese Box Turtle Conservation Team from the National Chung Hsing University. The years of research experience have significantly improved the success rate of rewilding. The 1,085 turtles were released and a noticeable increase in population density of nearly 2-3 times can be observed before and after the release. This year, we successfully completed the genetic population grouping of 410 individuals, identifying their respective genetic lineages. By establishing a genetic grouping database, we have created a reference that can be used for future release or artificial breeding and restoration efforts. We continue to promote Chinese box turtle conservation and awareness through various education programs with a total of 137 activities in Taiwan during the project period that attracted participation from of over 29,060 individuals. On the other hand, ASEH engages with local governments, diving shops and general public to develop coastal clean-up activities and clean up coastal and ocean litter. The project of "ASE guardians of the seas", in addition to conducting beach and ocean clean-up activities in the northeast coast, Green Island, and Liuqiu Island, has expanded its scope to include several offshore islands of Taiwan and popular diving spots such as Penghu, Orchid Island, and Kenting. A total of 35 beach clean-ups and 48 ocean clean-ups were carried out, with 1,945 participants, resulting in the removal of 3.97 tons of marine and coastal litter. Additionally, we collaborated with the Taoyuan City Government to support activities of the Coastal Patrol Teams, Environmental Fleet, and Environmental Diving Teams, and together with volunteers, we cleared 310 tons of waste from the coast, ocean, and seabed. Furthermore, starting from Penghu, we mobilized

In addition to the above-mentioned terrestrial and marine ecological restoration and conservation actions, there are also initiatives such as the Reforestation Project and public tree planting programs. We promote the cooperation of the stakeholders including our employees, research institutions, local governments and local residents to enhance the awareness of environmental protection and the restoration of indicator species. We then used the value transfer methodology to determine that the benefit of biodiversity projects was US\$4.4 million.

Environm	Environmental Impact Pathway					
Impact Driver	Activity/Output	Outcome/Impact	Monetary Valuation			
Greenhouse gases	GHG Emission (Scope 1 and 2)	Human health, building deterioration, economic losses, agriculture and timber, desertification, and other ecosystem services	Reference: Accredited publication on the social costs incurred by greenhouse gas emissions			
	Emissions of pollutant (SO _x)	Human health, forestry, materials $^{\scriptscriptstyle 1}$, and water acidification				
Other air	Emissions of pollutant (NO _x)	Human health, crops, and forestry	Reference: Accredited publication on the social			
emissions	Emissions of pollutant (VOCs)	Human health, crops, and forestry	costs incurred by air pollution			
	Emissions of pollutant (PM10)	Human health				

¹Impact on building materials.

Biodiversity

Impact Driver	Activity/Output	Outcome/Impact	Monetary Valuation	
Waste	Hazardous and non-hazardous waste (recycling and reused are excluded)	Local and global pollution, audio and visual nuisances	Reference: Accredited publication on the social costs incurred by waste	
Water use	Water consumption	Direct non-consumptive uses, indirect uses (ecosystem function), malnutrition, and water borne disease	Reference: Accredited publication on the social costs incurred by water use	
Water	Release of regulated contaminants ¹	Human health	Reference: Accredited publication on the social	
pollution	Release of nutrient (Phosphorus)	Recreation, property values, and fish stock	costs incurred by water pollution	
Recycled	Reduce water consumption	Mitigate crowding out of direct non-consumptive water use, ecosystem service, malnutrition and waterborne disease	Reference: Accredited publication on the social	
water	Reduce release of regulated contaminants ¹	Reduce harm to human health	cost generated by water consumption and wastewater discharge	
Afforestation	Restore woodland vegetation	Ecosystem services such as water conservation, soil erosion reduction, carbon sequestration, and air purification	Reference: Accredited publication on social costs saved by forest ecosystem services	
Biodiversity	Land and marine ecology restoration	Ecology conservation awareness and species restoration	Reference: Accredited publication on social costs saved by ecology restoration	

¹Regulated contaminants considered in this study: phenols, hexane extracts, cadmium, plumbum, chrome, hexavalent chromium, copper, zinc, nickel, arsenic, and silver.

3.1.4 Social Impact

Apart from direct financial impacts on investors, ASEH's operating activities will affect different stakeholders and produce positive and negative impacts of varying social significance. We referenced assessment procedures in the Social Capital Protocol issued by the World Business Council for Sustainable Development in 2016 and the Social Return on Investment (SROI) issued by the UK government's Office of the Third Sector, in order to determine the sustainable value created in each aspect, including supplier partnerships, employee engagement and development, employee and contractor health and safety, and education and social cohesion. In 2023, ASEH's overall social impact totaled US\$4,831 million, with US\$4,808 ² million directly resulting from the company's operations.

² The value of social impacts resulting directly from the company's operations is calculated by excluding public welfare activities and non-industry-academia educational projects.

As a key player in a high-tech industry, ASEH works with more than thousands of suppliers globally to manage a complex semiconductor industry supply chain and meet the needs of customers worldwide. Hence, the building of stable partnerships with suppliers to create a better business environment and achieve social cohesion form the core values of our sustainable development.

Supplier Partnerships

Based on the principle of materiality, we identified important activities in ASEH's business process that had an effect on the supply chain in 2023, including supplier sustainability audits, supplier training, local procurement, and supplier sustainability awards. We duly determined the material impact on suppliers and to measure financial proxy variables, we applied the educational and training costs conducted by external consultants, the benefit values of revenue from suppliers, the mitigation of property losses due to improvements in audit shortcomings, contributions from local procurement, and the investment of supplier sustainability award.

Based on the cost approach and contingent valuation methods, the value created through partnerships with suppliers was US\$4,492 million, that resulted in 26% decrease compared with 2022. The main impacts caused by a lackluster economic environment that resulted the local procurements decreasing. However, despite the decline in the economy, the value created by the company's education and training this year has increased significantly by 68%, because the number of suppliers participating in the education training or workshops (such as carbon inventory and sustainability forums, etc.) has increased in this year, showing that ASEH and its suppliers attach great importance to sustainability-related issues.

Employees are key to maintaining ASEH's overall operations and we view them as a critical component of our core values and a major stakeholder.

In 2021, we introduced a new framework and new measurement indicators, restructuring the employee survey to a sustainability engagement survey which includes employee experience indicators and employee engagement indicators towards the company. Besides providing employees with financial satisfaction and taking care of their livelihood through salaries and benefits, we summarized the material impact generated, and focused on career development programs, work environment and healthcare programs. We consolidated performance bonuses, amount of company subsidies and allowances, mental wellbeing course fees, consensus building and motivational course fees, and professional management training course fees as the monetized value of the financial proxy.

Employee Engagement and Development

The 2023 employee engagement survey recorded as score of 77% and employee coverage as 95%. Based on the results of the 2023 questionnaire survey and after the transfer of impact value, we calculated the effect of ASEH's personnel management and employee training on employees at US\$240 million. Outcomes include increasing employees' sense of achievement and sense of belonging, enhancing employee cohesion and management capabilities, and improving mental health. The top two outcomes which resonated most with employees are enhancing employee cohesion (82%), and mental health improvement (78%).

This year, we not only reviewed the company's overall positive feedback but also focused on recognition levels among direct and indirect employees across subsidiaries to gain deeper insights into employee engagement by role. The analysis showed that, overall, direct employees tend to have a lower positive response rate than indirect employees, except in two areas-management capabilities and sense of achievement-where both groups share similar levels of positive feedback. Moving forward, we are committed to enhancing perceptions among direct employees in areas like mental health, employee cohesion, and sense of belonging. By building effective communication channels, we aim to ensure that all employees maintain a high level of connection with the company.

Employee's and contractor's health and safety is vital to maintaining good labor-management relations, operational efficiency and organizational commitment. ASEH promotes a healthy workplace and monitors workplace accidents to understand the positive and negative impacts on the work environment, and to also determine if the company is providing employees and contractors a safe and healthy work environment.

Employee and Contractor Health and Safety

We used the occupational injuries of employees and contractors, health examinations and health insurance as influencing factors of employee engagement. The number of ASEH employees that received health examinations was 59,949 in 2023. A total of 129 occupational injuries and 28 occupational disease occurred, among which, 5 were contractor injuries. We then assessed the issue of employee health based on occupational accident subsidies, health examination expenses and health insurance premiums.

We calculated the social value of employees and contractors of positive effects at US\$45 million, and outcomes included higher probability of recovery from illness and less financial pressure from medical expenses. With regard to negative effects, the harm to employees physically and mentally was assessed at US\$0.5 million. We will continue to improve our occupational safety and health measures to effectively prevent injuries and illnesses caused by work, and eliminate the 1% negative effect it accounted for in the employees' and contractors' health and safety indicator.

ASEH has business operations located in various parts of the world. We engage actively with the local community where we conduct our business, and participate in various public welfare programs to ensure that we enhance the positive impact on the natural environment and society, while allowing the public to better understand ASEH's approach to sustainability.

Social Cohesion

ASEH invested approximately US\$4.5 million in 182 social cohesion programs in 2023, including 27 public development programs; 50 community care programs; 62 care for disadvantaged families programs; 3 healthcare sponsorships; 29 arts and culture sponsorships; 11 sports sponsorships. Due to the large number and complexity of stakeholders at each business location, we analyzed secondary data and referred to public SROI reports to match activities with the chain of events. We then use the value transfer methodology to assess the positive and negative effects on communities and residents.

Public welfare programs that boost social cohesion created US\$15.7 million in social value, without taking into account the value contributed by corporate volunteers. Among which, care for disadvantaged families accounted for the highest percentage at 35%, followed by arts and culture sponsorships at 34% and community care at 16%. Overall, SROI was 3.51 with the top three outcomes as follows: increasing public literacy in the arts, raising the efficiency of resource utilization by local communities, leading to improvements in the well-being of residents and raising the self-esteem of children from disadvantaged families through education.

Care for Disadvantaged Families Impact Pathway



Community Care Impact Pathway

Input	Activity	Output	Stakeholders	Outcome	Impact Value
USD 264.1	<text><image/><text></text></text>	 25,000 LED light tubes installed Deployed at 26 schools 540,000 kWh of electricity can be saved, and 267 tCO₂e of carbon emissions be reduced per year 	Students	Improve personal well-being through good lighting Improve personal well- being through sufficient quantity of sporting goods Generate more funds for equipment and teaching aids through electricity cost savings. Improvements in the efficiency of campus funds utilization Reduce carbon emissions by saving electricity and using renewable energy, thereby enhancing social well-being Due to equipment sponsorship, existing funds can be used more effectively to provide students with diverse sports equipment	Rural Areas and Communities, LED Installation Projects USD 642.2
USD 1.9	<text><image/><text></text></text>	 Provided 319 sets of sports equipment (such as basketballs, yoga mats, etc.) 7 schools benefited 614 students benefited 	Schools		Promote circular economy and sponsor sporting goods for rural elementary schools USD 4.7

Arts and Culture Sponsorships Impact Pathway



Access to highly skilled human resource talent is key for ASEH to maintain its leadership in a competitive semiconductor industry. The semiconductor industry continues to experience strong demand for skilled workers and at ASEH, cultivating talent and semiconductor technologies are very important elements in our business process and strategy. Public values and consumption habits affect product demand and the direction of developments in the entire technology industry. Through public advocacy and active engagement with the community and in campuses, ASEH aims to influence consumer behavior to achieve growth and sustainable development for the company.

Education

In 2023, ASEH worked together with many academic institutions and invested approximately US\$8.4 million in a total of 130 education programs, including academiaindustry research and development, career counselling and employment matching programs. These programs have allowed ASEH to strengthen its technological advantages and gain access to quality employment candidates. Furthermore, ideas of sustainability are incorporated into corporate operations through the promotion of environmental conservation, road adoption and other social welfare programs, in order to raise the green awareness of employees and the public.

We used the value transfer methodology to determine that the SROI of education programs was 4.58, and that US\$38.3 million in social value was created, of which business-related industry-academia collaboration generated approximately US\$31.1 million. Main outcomes include better operational efficiency and industry competitiveness. Approximately US\$7.2 million was generated by environmental education, and main outcomes include better recognition and attitude towards environmental conservation of the public, as well as incorporating actions to protect the environment in their daily life.

Environmental Education Impact Pathway

Input	Activity	Output	Stakeholders	Outcome	Impact Value
USD 489.9	<text><image/><text></text></text>	 7 preschool environmental education activities 50 environmental education tours of Shimen Reservoir for primary schools 9 environmental education videos Trained 19 environmental education tour guides 	Volunteer - Residents -	Raise students' awareness of environmental protection and implementation of environmental sustainability actions in daily lives Cultivate students' attitude of respect for life and ecological care Raise awareness of environmental protection through education and training and implementation of environmental sustainability actions in daily lives Enhance public participation, volunteering and enthusiasm for charity Improve relationships with family, friends, and colleagues	'Paradise' Project on the development of age-friendly sustainable environment education in Taoyuan USD 1,858.6
					Unit: thousand US\$

Social Impact Pathway

Impact Driver	Activity/Output	Outcome/Impact	Monetary Valuation
	Supplier sustainability audit	Improve cupplice's competitiveness and	Property losses or external training fees
Supplier	Supplier training	optimize supplier's management system	Perceived value according to supplier survey questionnaires
Partnerships	Local procurement	Create local job opportunity and promote local economic prosperity	Local procurement value
	Supplier Sustainability Awards	Support excellent suppliers to sustainable transition	The cost of Supplier Sustainability Awards
Employee Engagement and Development	Employee career Development work environment Employee care	Increase sense of belonging Increase mental health Enhance management capabilities Increase sense of achievement Enhance cohesion of employees	Mental wellbeing course fees Company benefits and subsidies Training and development expenses Consensus building and motivational course fees
Freedow and	Number of occupational injuries	Employee and contractor physical/ psychological injury	Disability payments
Employee and Contractor Health &	Employee health check Increase in recovery rate of employee with health issues		Health screening expenses
ourcey	Health insurance expense Reduce financial impact to employee as a of health issues		Health insurance expenses

Impact Driver	Activity/Output	Outcome/Impact	Monetary Valuation
	Public development	Improvement in the knowledge and analytical abilities of public issues	
Social Cohesion	Community care	Improvement of resource usage benefits	Converted using the value transfer methodology ¹
	Care for disadvantaged families	Improvement of self-identity and education benefits	
	Healthcare sponsorship	Increased healthcare resources and quality of life	
	Arts and culture sponsorship	Improved artistic knowledge	
	Sports sponsorship	Increased human interactions and group cohesiveness	
Education	Occupational education and training	Increased employment opportunities for participants in industry-academia collaborations	
	Environmental education Improved environmental awareness and implementation in daily life		

Based on the value transfer model described in the Social Capital Protocol, we benchmarked against SROI reports certified by Social Value International or SROI reports with similar topics from Taiwan. We have also reviewed impact pathways in the publications, and matched these pathways with ASE's social cohesion and educational programs. We then transferred the percentage of value attributable to the impact pathway to ASE's social cohesion and educational programs, which provided a basis for calculation of the SROI generated and the value to society.

3.2 ASEH's SDGs and Impact

ASEH has identified Sustainable Development Goals (SDG) as our priorities. This year, we continued to evaluate our progress through the SDG common indicators of The SDG Compass Business Indicators database. The analysis showed that ASEH has created positive impacts and contributions for SDG 8 (Decent Work and Economic Growth), SDG 4 (Quality Education), SDG 12 (Responsible Consumption and Production), SDG 14 (Life below Water), and SDG 15 (Life on Land). These were mainly attributed to the establishment of supplier partnerships, and the increase in local procurement opportunities that benefited the local economy and created jobs in areas where we operate in. Through supplier education and training, and sustainability audits, we have improved the suppliers' understanding of sustainability issues and trends, reduced risks to occupational safety, optimized current management measures, driven overall supply chain improvements in economic productivity and resource efficiency, and provided the knowledge and skills needed for sustainable development. We also use operating profits, investments and intangible assets to drive the GDP and the local economy, further improving the dignity of labor and standard of economic productivity.



As our business grows, we understand that issues arising from the demand on environmental resources in our operations, and the social impacts we create due to our environment, could negatively affect SDG 7 (Affordable and Clean Energy), SDG 13 (Climate Action), and SDG 6 (Clean Water and Sanitation). Therefore, we continue to increase environmental protection related investments, focus on improving resource efficiency and conversion rate, and actively develop diverse and clean energy sources. We have increased our renewable energy use ratio over the years in response to climate change and net zero requirements, allowing more efficient use of natural resources and sustainable management. We are also gradually improving the resource efficiency in consumption and production, and are actively minimizing the external social cost of SDGs. To fulfill our global sustainability goals, we have formulated our 2030 performance goals embedded within the core of our business, in accordance with the company's four major sustainability strategies. Our SDG responses will become strategic indicators of ASEH's periodic evaluation and management, that will enable the company to lead the industry and bring positive impacts to global sustainable development.

ASEH's Sustainable Value Creation Framework

	Strategies Sustainability		2030 Target	SDGs
Low Carbon	 Decarbonized Products and Services Low-carbon Manufacturing Adaptation and Resilience Green/Renewable Energy Investment 	Green Manufacturing	 Renewable electricity ratio : 42% of total electricity consumption GHG intensity : 15% reduction compared with 2015 Water use intensity : 52% ¹ reduction compared with 2015 General waste recycling rate > 90% Hazardous waste intensity : 61% ² reduction compared with 2015 	
Circular	 Circular Design Energy Resources Recycling Waste as a Valuable Resource Circular Economy in Value Chains 	Supplier Partnership	 Signing of Code of Conduct Agreement and completion of sustainability risk self-assessment √ 100% for new suppliers Completion of sustainability risk survey √ 100% for all tier-1 suppliers ✓ Over 50% for Non-tier 1 suppliers Completion of sustainability audits conducted √ 100 tier-1 suppliers ✓ 100% for high-risk tier-1 suppliers 	Have a positive influence on the society d cutty built d cutty f cutty
Inclusive	 Environmental Conservation Industry-academia Collaborations Community Engagement Public Advocacy 	Social Involvement	 Environmental Conservation ✓ LED light tubes installed at over 170 schools Industry-academia Collaborations ✓ Over 2,000 students attending semiconductor courses ✓ Over 450 industry-academia collaboration projects Community Engagement ✓ Over 2,000 disadvantaged students attending the after school program ✓ Reach 30,000 volunteers Public Advocacy ✓ Over 25 sustainability initiatives 	Image: Second Bit with the second
Collaborative	 Smart Procurement Strategic Partnership Supply Chain Management Go High Tech Environmental Education 	Human Capital	 Turnover rate : less than 20% Employee engagement more than 85%; survey coverage more than 95% Zero cases of occupational disease and major injury Disabling Injury Frequency Rate (FR) < 0.5; Disabling Injury Severity Rate (SR) < 9 Employee absenteeism rate < 2.3% 	

¹ ASEH was able to reduce 46% water withdrawal intensity in 2023 from the 2015 level, exceeding the 2030 target of 15%. As such, the 2030 goal was changed from 15% to over 52% in 2024. ² ASEH was able to reduce 58% hazardous waste generated intensity in 2023 from the 2015 level, exceeding the 2030 target of 15%. As such, the 2030 goal was changed from 15% to over 61% in 2024.



ASEH expresses its sustainability performance in monetary values, through the four sustainability strategic goals and results. The purpose of the valuation is to determine the economic, tax, environmental and social impact of our business process on stakeholders based on a uniform monetization standard. We hope to completely capture the impacts of our non-financial performance, and to generate positive value for our stakeholders through effective management and performance in sustainability.

ASEH generated US\$12,462 million in sustainable value for stakeholders in 2023. On the economic impact, employee salary and benefits generated the highest monetized impact, demonstrating ASEH's substantial influence on the labor market where it operates. When it comes to taxes, ASEH continues to uphold its core value as an honest taxpayer and refrain from performing transactions solely for tax purposes. On the environmental dimension, we recorded significant reductions in negative impacts from other air emissions and water use, further demonstrating our resolution and relative success in renewable energy usage, facilitating air pollution control, increasing water resource efficiency, and circular solutions in resource reduction. In 2023, we applied the SROI framework to quantify the impacts of our business operations and value chain activities on the environment based on SDG14 Life Below Water and SDG15 Life on Land. On the social dimension, we focus on the sustainable values created through supplier partnerships, and employee engagement and development, that allow ASEH to further create extraordinary value for suppliers and employees through its operations. In response to the negative impacts created in 2023, ASEH will step up efforts to mitigate negative environmental and social impacts to stakeholders.

As we continue to improve our competitiveness, we will also continue to strengthen our corporate sustainability management. We apply financial and non-financial measurements, as well as evaluate operating and non-operating activities to analyze the positive and negative effects of external impacts on the operations of our subsidiary companies. The analysis

allows factory management to make better business decisions, and the valuation results provide the basis for the Corporate Sustainability Committee to plan our value creation path that formulates improvement actions and decisions that will reduce the impact of potential risks. In 2023, we continually expanded our sustainable value evaluation from our own operations to the value chain, that enables us to understand the environmental impact on the value chain from indirect greenhouse gas emissions. Our next step is to reflect the true value created by the value chain, and to that end, we will extend the scope of impact measurement upstream. We will leverage on our industry leadership to increase the influence on sustainability, and work together with upstream and downstream partners to bring about change and innovation for benefit of the industry and society.

Item	Item Impact Mitigation Action		2023 Key Outcome
Greenhouse gases gases	The social cost of human health, architectural and asset damages and economic losses caused by greenhouse gas emissions.	 Moving towards low-carbon energy transformations Establish and purchase renewable energy Execute energy-saving and carbon reduction solutions Expand investments in carbon reducing equipment Adopt low-carbon substitute materials 	 GHGs intensity (Scope 1+2): 45% reduction compared to 2015 Scope 3 GHG emissions: 50% reduction compared to 2020 Renewable energy and certificate accounts for 20% of total electricity usage Executed 574 cases to reduce 603,327 tCO₂e
Other air emissions	The social cost of threats to human health, agriculture loss, forest loss, resources depletion, and acidification of water caused by other air emissions.	 Introduce high-efficiency processing equipment Worked with academia to study the processing efficiency of air pollutants The closed negative pressure design increases the collection rate Substitute cleaning materials 	• Our VOCs emissions have decreased 18% in 2023. We will strengthen our emission management to focus on source emissions and facility upgrades to reduce the environmental impact caused by the concentration of air pollution emissions.
Waste	The social cost of local and global pollution, visual and auditory disruption caused by the hazardous and non- hazardous waste treatment process.	 Waste reduction at source Introduced circular economy operating models Adopted environmentally friendly substitute materials 	 Non-hazardous waste recycling rate achieved 97% Hazardous waste intensity: 58% reduction compared to 2015 ASE Kaohsiung had implemented a recycling project for used beverage cups, successfully recovering approximately 8,400 discarded cups annually. For every three beverage cups, one eco-friendly crossbody bag can be made. In total, 11,400 discarded beverage cups were collected, resulting in the production of 3,800 eco-friendly crossbody bags.

Item	Item Impact Mitigation Action		2023 Key Outcome
Water use	The social cost of ecosystem service devaluation, malnutrition, and waterborne diseases caused by water usage.	 Established a waste water recycling plant Promote water saving projects Invested in water recycling equipment Rainwater collection and utilization 	 Water use intensity: 46% reduction compared with 2015 Promoted 16 water saving projects which saved 1.28 million tons per year The recycling rate of process water increased to 78%
Water pollution	The social cost of threats to human health, decrease of tourism value, devaluation of real estate, and post-harvest fish losses caused by water pollution.	 Continuous monitoring of water quality/volume Waste water recycling and cyclic reuse Distribution of chemicals Develop innovative processes and technologies through academia- industry cooperation 	 Water discharge intensity: 55% reduction compared with 2015 Distribution of chemicals for 15 plants
Employee health and safety	The effect of work injuries on the physical and psychological wellbeing of employees.	 Established organizational structure, management guidelines and procedures, and periodic audit procedures in the OHS Management System Formulated management measures for occupational injury and accident reporting and investigation procedures Health screening for employees Stipulated combined disaster handling and recovery plans 	 59,949 employees participated in health checkups, invested approximately US\$3.3 million Completed 379 drills for earthquakes, fire and chemical disasters Accumulated over 290,000 hours of occupational health and safety education and training, reaching 248,872 participants

33

Appendix 1 : Methodology and Data Collection

This report was prepared according to the Natural Capital Protocol, Social Capital Protocol, and the monetization framework for SROI. The TIMM framework proposed by PwC was also employed as an analytical integration tool based on the GRI and integrated reporting framework. Data used in calculations are divided into primary data and secondary data. Primary data is raw data from ASEH, while secondary data are projections based on the database, referenced from relevant publications or derived in this report.

	Information on the distribution of fina	ncial resources was	directly obtained from	n financial statements	or the accounting sys	stem of ASEH.
Economio		Payroll	Profit	Investment	Intangible Assets	Regulatory Compliance
Economic	Primary data	V	V	V	V	V
	Extrapolated from Primary data	V	V	V	V	V

Information on tax was directly obtained from financial statements or the accounting system of ASEH.

_		Profit taxes	Other taxes
Tax Primary data		V	V
	Extrapolated from Primary data	V	V

We studied the 2016 Natural Capital Protocol by the Natural Capital Coalition to monetize the environmental impact generated from greenhouse gas and other air emissions, waste material, water resource and wastewater management.

1. Information collection : The information collected during the compilation of this report included both primary and secondary data, and great effort was taken to ensure the reliability and validity of the collected data. However, due to geographical limitations or lack of reference data, it was impossible to obtain monetization information for some social impacts.

		Greenhouse gases	Other air emissions	Water use	Water pollution	Waste	Recycle water	Afforestation	Biodiversity
	Primary data	V	V	V	V	V	V	V	V
ironment	Extrapolated from Primary data	V	V	V	V	V	V	V	V
	Secondary data	V	V	V	V	V	V	V	V
	Extrapolated from Secondary data	V	V	V	V	V	V	V	V

2. Adjustment on the basis of purchasing power in different countries/areas:

The coefficient of monetization used in this project have always been based on the value transfer methodology, and we have collated monetization data from research reports by academic experts, international organizations and NGOs. In order to determine the monetized values in areas where our facilities are located, the basic monetized value was adjusted according to the PPP GNI (purchasing power parity gross national income). As Taiwan was not included in the World Bank database, we derived the values from data obtained through the Taiwan Directorate General of Budget, Accounting and Statistics, and the IMF (International Monetary Fund).

3. Adjustment for inflation:

Env

Apart from adjusting for regional differences using PPP and GNI¹, we will adjust the data using the US dollar inflation rate² to reflect the monetized values for 2023.

¹GNI values for various countries were obtained from information published by the World Bank: https://www.imf.org/en/Publications/WEO/weo-database/2021/April ²USD inflation rate reference: http://www.usinflationcalculator.com/ Primary data (including stakeholder interviews and surveys¹) and secondary data (accredited documents and literature on social studies) obtained through stakeholder engagement were employed to assess the monetized value of the impact of ASEH's business activities on local residents. We also determined the social impact value on employees, suppliers, and the public using the value transfer methodology².

Our report employs mainly the input-output model, social return on investment (SROI)³ and value transfer methodology. The input-output model was used in conjunction with stakeholder engagement to obtain the monetized value of the social impacts of ASEH's business activities on stakeholders. The SROI and value transfer methodology were used in conjunction with the materiality principle to select higher value activities as well as referring to SROI reports certified by Social Value International (SVI) to verify if these programs' stakeholders, chain of events, and outcomes were consistent with those in the SROI reports and use this basis to estimate the resulting value.

	Suppliers Partnership	Employee engagement and development	Employees health and safety	Social cohesion	Education
Primary data	V	V	V	V	V
Extrapolated from Primary data	V	V	V	V	V
Secondary data	V	V	V	V	V
Extrapolated from Secondary data	V	V	V	V	V

¹ The analyzed information of the 2023 supplier education and training is based on the previous survey questionnaire. The SROI methodology related calculation parameters were recalculated based on the related questionnaires selected from the education and training of subsidiaries in 2023, and social impact was calculated based on average value per person. ² Social Capital Protocol, WBCSD, 2016, p51

³ We converted the resulting values in accordance with the seven major principles found in the SROI methodology: Involvement of stakeholders, understand what changes, value the things that matter, only include what is material, do not over-claim, be transparent, and verify the result.

Social

Appendix 2 : Reference for Value Transfer Methodology

Item	Reference Report
Public Development	The outcomes and value of SOUL's advanced SROI training course
Community Care	The Cedar Foundation Community Inclusion Programmes SROI
Care for Disadvantaged Families	Social Return on Investment (SROI) Report of Taiwan Dream Project on Dahu Community
Healthcare Sponsorship	Healthwise Hull SROI Forecast
Arts and Culture Sponsorship	Turner Contemporary: Art Inspiring Change Social Value Report
Sports Sponsorship	Bums off Seats SROI Evaluation Report
Environmental Education	《Cherish the Earth, Spread Love Far SROI Report》 2018 SROI Report
Occupational Education and Training	The Cornwall Exchange: A Social Return on Investment (SROI) Report
Biodiversity	Restore the Earth Foundation Cypress Reforestation Social Return on Investment Report

Appendix 3 : References

- AhlrothS. (2009). Developing a weighting set based on monetary damage estimates. Method and case studies.
- 2 Huijbregts, Rombouts LJA, Ragas AMJ, Van de Meent D. (2005). Human-toxicological effect and damage factors of carcinogenic and non-carcinogenic chemicals for life cycle impact assessment. Integrated Environmental Assessment and Management 1 (3), p. 181-244.
- 3 Natural Capital Coalition. (2016). Natural Capital Protocol.
- 4 Social Capital Coalition. (2016). Social Capital Protocol.
- 5 The SROI Network. (2012) A guide to Social Return on Investment.
- 6 PwC. (2013). Measuring and managing total impact: A new language for business decisions.
- 7 Trucost. (2016). Accounting for Natural Capital Costs Associated with Chinese Financial Institutions- Banking Sector Case Study.
- 8 Jiang Liwei, Lu Zeyang, Gong Yinting, Yan Shiwei. (2019). The Ecological Benefits of Vegetation Restoration in Yijinhuoluo Banner of Inner Mongolia.
- 9 The International <IR> Framework, Traditional Chinese version, December 2015.
- 10 《The outcomes and value of SOUL's advanced SROI training course 》, https://socialvalueuk.org/report/the-outcomes-and-values-of-souls-advanced-sroi-training-course/
- 11 《The Cedar Foundation Community Inclusion Programmes》, https://socialvalueuk.org/report/the-cedar-foundation-community-inclusion-programmes-sroi/
- 12 《Social Return on Investment (SROI) Report of Taiwan Dream Project on Dahu Community Supported by CTBC Holding and CTBC Charity Foundation》, https://socialvalueuk.org/ report/sroi-taiwan-dream-project-dahu-community/
- 13 《Healthwise Hull SROI Forecast》, https://socialvalueuk.org/report/healthwise-hull-sroi-forecast/
- 14 «Turner Contemporary: Art Inspiring Change Social Value Report», https://socialvalueuk.org/report/turner-contemporary-art-inspiring-change/
- 15 《Bums off Seats SROI Evaluation Report》, https://socialvalueuk.org/report/bums-off-seats-sroi-evaluation-report/
- 16 《The Cornwall Exchange: A Social Return on Investment (SROI) Report》, https://socialvalueuk.org/wp-content/uploads/2018/12/The-Cornwall-Exchange- SROI.pdf
- 17 《Cherish the Earth, Spread Love Far SROI Report》, https://corporate.fetnet.net/content/corp/tw/CSR/ReportDownload.html
- 18 《Supplier Guidance Project for the Implementation of ISO 14064-1 Greenhouse Gas Inventory Social Return on Investment (SROI) Report》, https://socialvalueuk.org/reports/supplier-guidance-project-for-the-implementation-of-iso-14064-1-greenhouse-gas-inventory-social-return-on-investment-sroi-report/

