

UN Sustainable Development Goals and Sustainable Values Assessment  
**Total Impact Measurement and Management Report**





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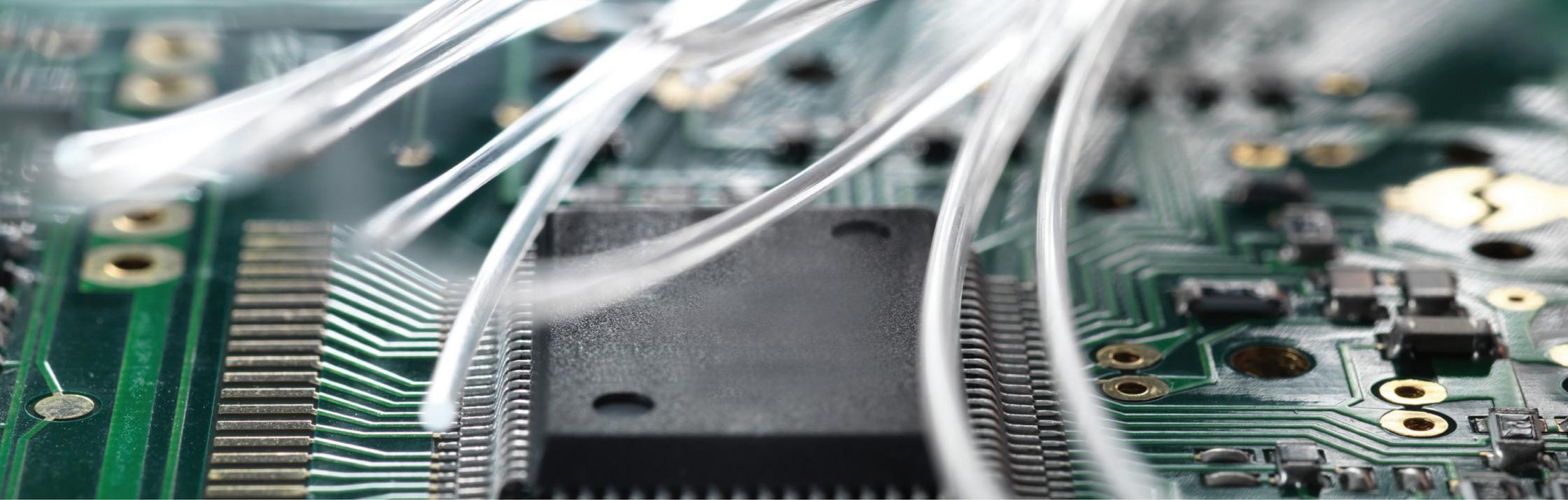
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ASEH's Total Impact Measurement & Management Report was published in accordance with PwC's Total Impact Measurement & Management (TIMM) framework and the monetization framework in the Natural Capital Protocol and Social Capital Protocol, through data 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 : ASE\_CSR@aseglobal.com



## 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.

## Part 1 :

# ASEH's Total Impact Measurement and Management

## 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.

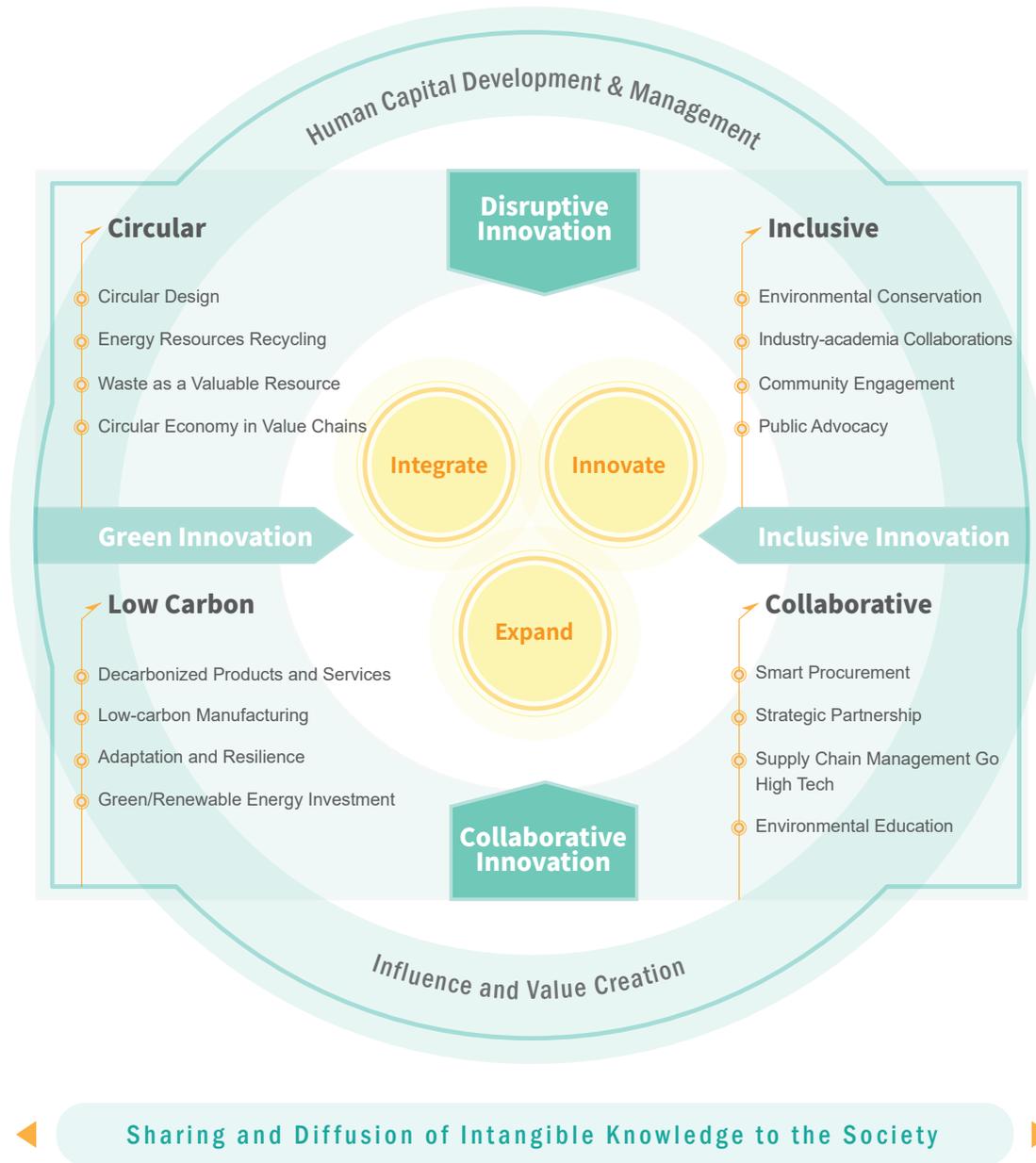
As a semiconductor industry leader on a growth trajectory, ASEH has formulated strategies to achieve long-term sustainability goals, and established clear

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

## 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.



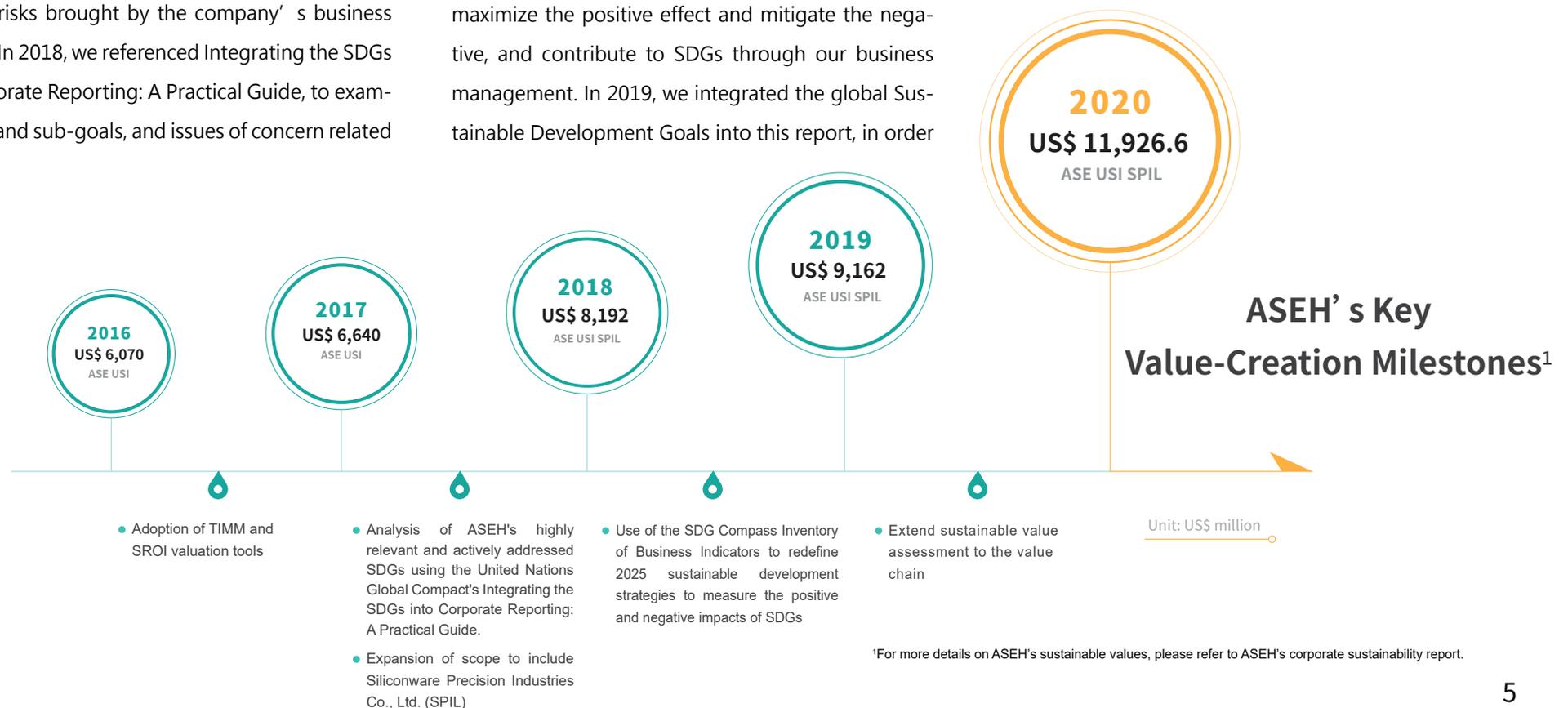
**Total Impact Value Model**

## 1.3 ASEH 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 further reviewed the goals and results of our four sustainability strategies through the SDG Compass Business Indicators, and applied monetization assessment tools to measure the contribution impact of ASEH to the most critical SDGs and their sub-targets. We evaluated the SDGs that require active efforts in order to maximize the positive effect and mitigate the negative, and contribute to SDGs through our business management. In 2019, we integrated the global Sustainable Development Goals into this report, in order

to present the assessment results of ASEH's impact in a more comprehensive manner. In 2020, we expanded the sustainable value assessment framework from our operations to the value chain, in order to understand the external impacts of value chain activities on the environment and society. Moreover, through this report, ASEH impact assessment results will be disclosed comprehensively to ASEH stakeholders.



## Part 2 :

# The Scope of Impact Valuation

## 2.1 Period and Scope

The report discloses ASEH's 2020 (January 1, 2020, to December 31, 2020) 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 20 semiconductor assembly<sup>2</sup> and test manufacturing (ATM) plants and 6 electronic manufacturing service (EMS) plants in Taiwan, China, Korea, Japan, Singapore, Malaysia, the US, Poland and Mexico.

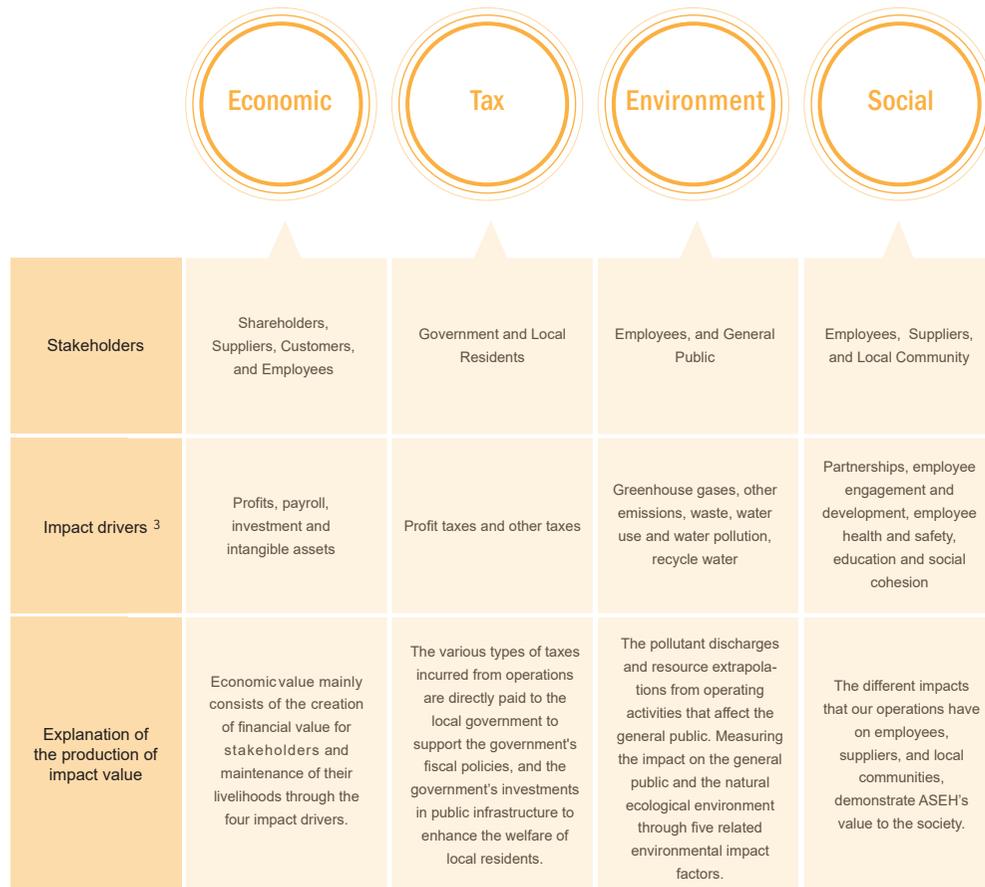


**ASEH's Operating Locations**

<sup>2</sup>ISE Labs China was included in the 2020 scope of coverage for ASEH's manufacturing operations.

## 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:



<sup>3</sup> 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<sup>4</sup>: 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). 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 Value Creation Model

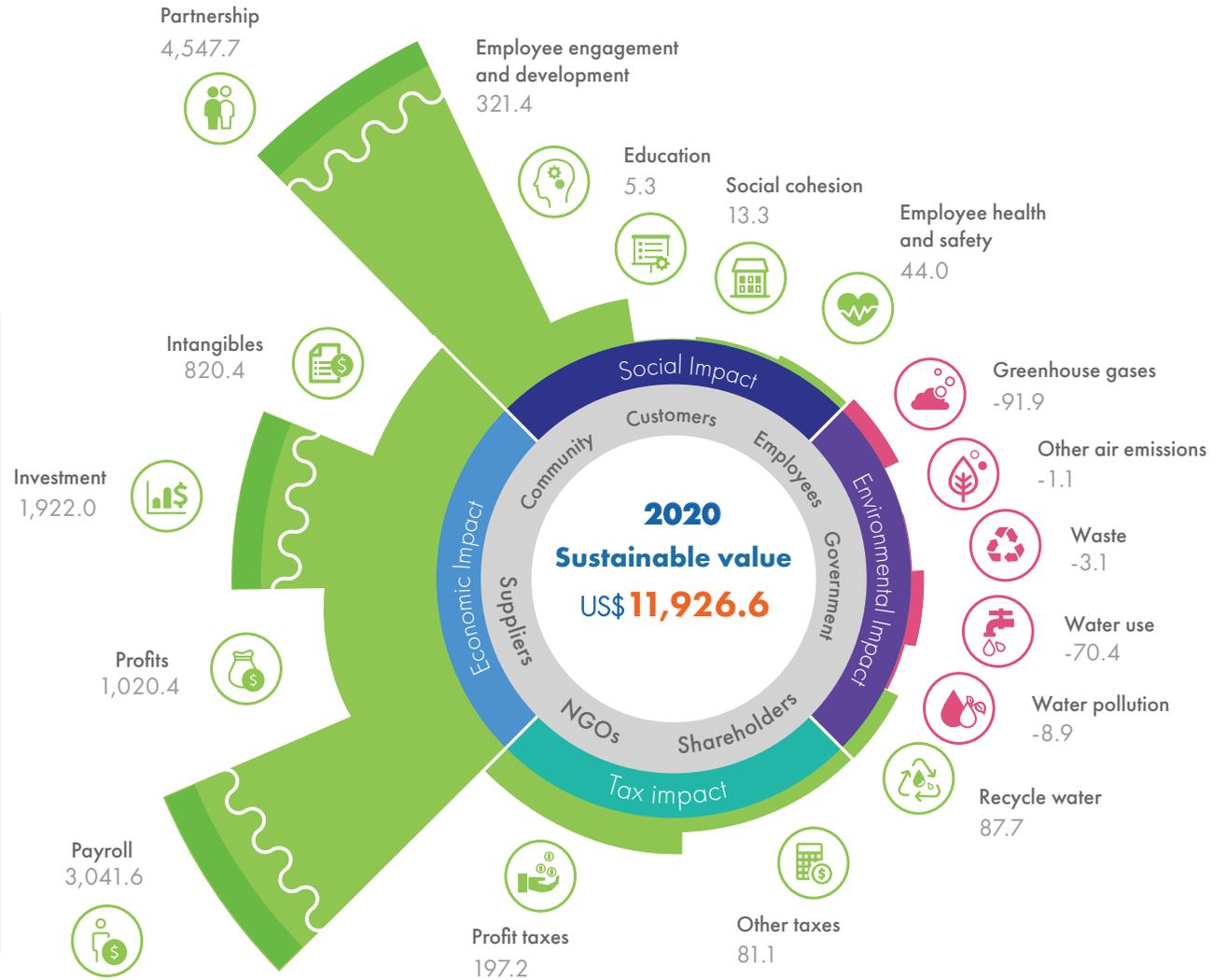
<sup>4</sup> For more details on the assessment, please refer to our 2018 Corporate Sustainability Report English version "2.4 Practice of SDGs".

## Part 3 :

# ASEH's Contributed Value

## 3.1 ASEH's TIMM Results

ASEH adopted the TIMM framework for sustainability valuation to quantify the sustainable value of the company's impacts in the economic, tax, environmental and social dimensions. In 2020, ASEH generated US\$11,926.6 million worth of sustainable value for stakeholders, which is 30% higher than in 2019. The sustainable value of positive impacts increased by US\$2,764 million.



Unit: USD million

## 2020 ASEH TIMM Result

## Economic and tax dimensions

The pandemic accelerated digital transformation and created new business opportunities that resulted in an increase in business and profitability for ASEH. The value created in 2020 increased by 18% due to revenue growth from a stay-at-home economy and a corresponding increase in employee remuneration. There was also an increase in employee headcount and conversion of employee stock options. Our strategy is to continue investing in capital equipment and plant expansions to build up capacity, and in R&D to acquire more patents. These investments maximize our organizational synergy and will allow us to capture future business opportunities as well as strengthen our competitiveness.

Explanations and management strategies for the various areas can be found in relevant sections of ASEH's 2020 CSR report, along with key dimensions of our CSR performance in conjunction with assessment and management.

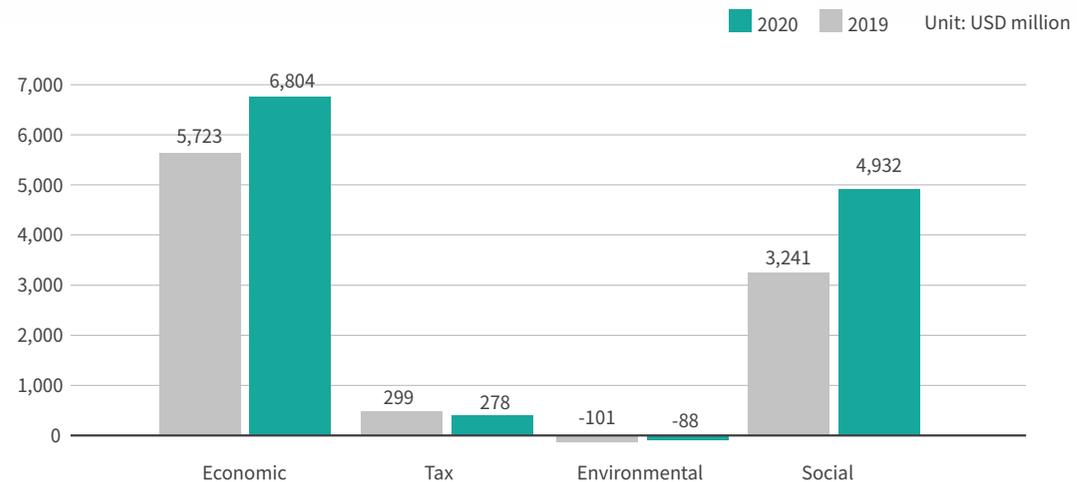
## 2010-2020 ASEH Sustainable Values

## Environmental dimension

Water consumption during the production process and greenhouse gas emission from the use of electricity continue to be our two main source of environmental impacts. As such, we have increased our renewable energy usage, reaching 18% of the total electricity consumption in 2020. In parallel, 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 increasing economic benefits. In 2020, the positive effects created from recycled water usage grew by 44%, while the overall environmental impact of our operations decreased by 13% compared to 2019. In the future, we will actively invest in environmental protection and use the proceeds from our green bonds to construct 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 addition, the environmental impacts from the value chain are largely caused by greenhouse gas emissions beginning from procurement of products and services, upstream transportation and delivery, and external impacts of capital and finances. We have prioritized the purchasing of low-carbon raw materials and equipment, establishing of low-carbon plants and introducing of green transport to reduce our impact.

## Social dimension

The primary outcomes are the establishment of supplier partnerships and, employee development and support. The value of social impacts in 2020 increased by 52% compared to 2019. The difference in value stemmed from an increase in local procurement by 57% in 2020, which increased the assessed value of local employment and economic prosperity. The total resources invested in community and education rose by 28% and 27% respectively in 2020 compared to the year prior. We have been participating in social welfare through various channels to improve the well-being of the community and its people, and maintain environmental resources.



### 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 four main impact factors: profit, payroll, investment, and intangible assets.



Economic Impact Path Diagram

Impact Driver	Activity/Output	Outcome / Impact	Monetary Valuation
Profits	Profit distribution	Stakeholders' financial satisfaction and livelihood maintenance	Net profit reported on US Securities & Exchange Commission Form 20-F
Payroll	Payroll and welfare given		Yearly personnel costs, salary expenses, withheld labor and health insurance premiums, retirement pension, and so on
Investment	Capital expenditure		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	Research and development activities, and intellectual property purchase		Yearly intangible asset amortization expenses and research and development expenses



#### 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 SROI<sup>5</sup> 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 expense 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.



#### 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.

<sup>5</sup>Social Return on Investment Guide, 2012.

### 3.1.2 Tax Impact

ASEH's global business operations are located in Taiwan, Mainland China, Hong Kong, South Korea, Japan, Singapore, Malaysia, Mexico, Poland and the US. We believe that it is our duty to pay taxes that contribute to promoting local economic growth and corporate sustainable development. The local government is the stakeholder indirectly influenced by our tax payment while local residents receive the ultimate impact. Our taxes enable the local government to build the infrastructure that contributes to social development and meeting local residents' needs. 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 CSR 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.



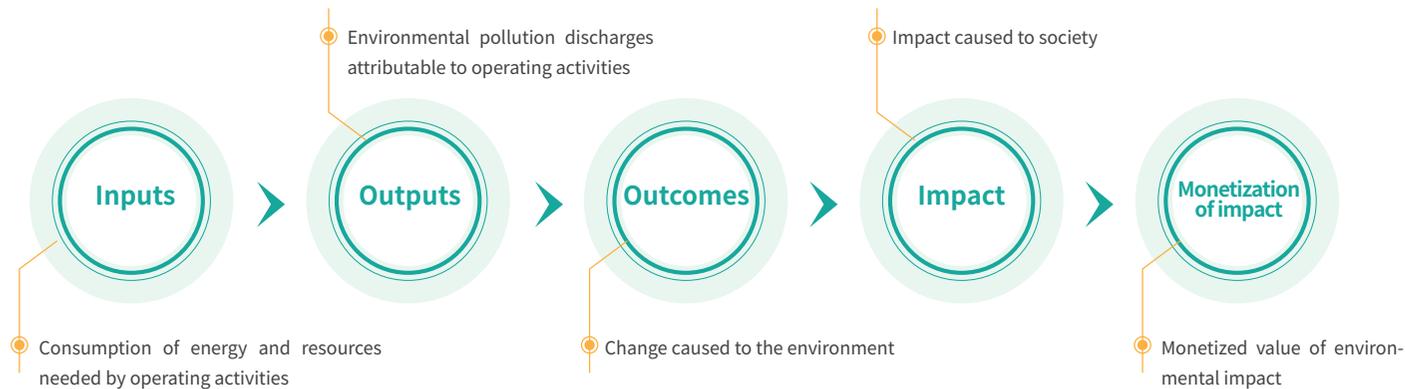
Tax Impact Path Diagram

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 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 Coa-

lition in 2016. In 2020, ASEH's overall environmental impact of -US\$88 million is mainly attributed to resource consumption and environmental emissions from its business activities. This year, we will apply the sustainable value assessment method used internally to the value chain. In 2020, the monetized value of the environmental impact of our greenhouse gas emissions amounted to -US\$1,110 million. The main sources of impact included product and service procurement, upstream transportation and distribution, and external influence of capital goods.



### Monetized Environmental Impact Assessment Procedures



## Greenhouse Gas

In 2020, ASEH's total GHG emissions (scope 1 + 2) was 1,752,602 tCO<sub>2</sub>e, of which carbon credits amounting to 540,722 tons purchased in Taiwan, China, and Mexico were already deducted from the 2020 emissions. 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 21,179,759 tons. We cited the quantified effect of the social cost of CO<sub>2</sub>e in the Technical Support Document on the Social Cost of Carbon issued by the US EPA (Ahlroth, 2009). 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 3% social discount rate in the SCC as the basis for calculation. After adjusting for inflation and conversion into USD using 2020 rates, the social cost of one ton of CO<sub>2</sub>e is determined at US\$52.42.



## Other Air Emissions

In 2020, ASEH's total SO<sub>x</sub>, NO<sub>x</sub>, VOCs and particulate matter emissions was 279 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 10,887 tons of hazardous waste and 2,884 tons of non-hazardous waste in 2020. We referenced the natural resource costs issued by Trucost in 2016, in which assessment items include local and global pollution, noise and visual disturbances.



## Water Use

Total water intake of ASEH factories was 24,961 megaliters in 2020. 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 2020 was 1.61 (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. (2009) (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 ASEH'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 0.067 (USD/ton) in 2020.



## Water Pollution

Wastewater discharge of ASEH factories was 19,454 megaliters in 2020. 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 (eg. 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. (2005) (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.

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 (eg. 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 34,438 megaliters in 2020. 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. (2005) (Huijbregts, Rombouts LJA, Ragas AMJ, Van de Meent D., 2005) in calculations.



## Environmental Impact Path Diagram

Impact Driver	Activity / Output	Outcome / Impact	Monetary Valuation
Greenhouse gas	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 gases emissions
Other air emissions	Emissions of pollutant (SOx)	Human health, forestry, materials <sup>6</sup> , and water acidification	Reference: Accredited publication on the social costs incurred by air pollution
	Emissions of pollutant (NOx)	Human health, crops, and forestry	
	Emissions of pollutant (VOCs)	Human health, crops, and forestry	
	Emissions of pollutant (PM10)	Human health	
Waste	Hazardous and non-hazardous waste (recycling and re-used 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 pollution	Release of regulated contaminants <sup>7</sup>	Human health	Reference: Accredited publication on the social costs incurred by water pollution
	Release of nutrient (Phosphorus)	Recreation, property values, and fish stock	
Recycled water	Reduce water consumption	Mitigate crowding out of direct non-consumptive water use, ecosystem service, malnutrition and waterborne disease	Reference: Accredited publication on the social cost generated by water consumption and wastewater discharge
	Reduce release of regulated contaminants	Reduce harm to human health	

<sup>6</sup> Impact on building materials.

<sup>7</sup> Regulated 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 health and safety, and education and social cohesion. In 2020, ASEH's overall social impact totaled US\$4,932 million, with US\$4,916<sup>8</sup> million directly resulting from the company's operations.



#### Supplier Partnerships

As a key player in a high-tech industry, ASEH works with over 2,000 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.

Based on the principle of materiality, we identified important activities in ASEH's business process that had an effect on the supply chain in 2020, including supplier RBA audits, supplier training and local procurement. 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 improve audit shortcomings, and contributions from local procurement.

Based on the cost approach and contingent valuation methods, the value created through partnerships with suppliers was US\$4,548 million. The main impacts are economic benefits derived from local procurements in the regions where our business operations are located, driving local employment and creating economic prosperity. Furthermore, the cooperation allows suppliers to understand the issues and trends of sustainability, improve occupational safety and reduce risks, and optimize existing management measures. Among our suppliers, 90% enhanced their competitiveness and expanded their business.



#### Employee Engagement and Development

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.

ASEH determines the willingness of employees to say, share, and strive at work based on the model of employee engagement<sup>9</sup> published by Aon Hewitt in January 2015. 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, and professional management training course fees as the monetized value of the financial proxy.

Based on the results of the questionnaire survey<sup>10</sup>, we calculated the effect of ASEH's personnel management and employee training on employees at US\$321 million. Outcomes include increasing employees' sense of achievement and sense of belonging, and enhancing their competitiveness and management capabilities. Comparatively, competitiveness in the workplace was slightly lower than other outcomes at 83%, but had the highest perceived value to employees at roughly 3 times higher than other outcomes, which proved that improving communication abilities and work skills were the most important to employees.

<sup>8</sup> 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.

<sup>9</sup> ASEH adopts the Aon Hewitt's human resource management system, and applies the theoretical foundation and model for quantification and data collection. For the Model of Employee Engagement, January 2015, Aon Hewitt, please visit <https://www.asia.aonhumancapital.com/document-files/thought-leadership/people-and-performance/model-of-employee-engagement.pdf>

<sup>10</sup> ASEH conducts a comprehensive employee engagement survey every two years. In 2020, the approval of employees regarding the results was calculated according to the 2019 AON Questionnaire analysis results.



## Employee Health and Safety

Employee 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 a safe and healthy work environment.

We used the occupational injuries of employees and suppliers, health examinations and health insurance as influencing factors of employee engagement. The number of ASEH employees that received health examinations surpassed 55,094 in 2020. A total of 112 occupational injuries occurred, among which, 2 were supplier 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 positive effects at US\$44 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\$0.4 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' health and safety indicator.



## Social Cohesion

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 reduce the impact on the natural environment and society, while allowing the public to better understand ASEH's approach to sustainability.

ASEH invested approximately US\$3 million in 240 social cohesion programs in 2020, including 13 public development programs; 126 community care programs; 60 care for disadvantaged families programs; 4 healthcare sponsorship; 24 arts and culture sponsorships; 11 sports sponsorships; 2 reforestation programs. 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\$13 million in social value. Among which, arts and culture sponsorships accounted for the highest percentage at 25%, followed by care for disadvantaged families at 22% and reforestation at 19%. Overall, SROI was 3.84 with the top three outcomes as follows: improvement of local water quality through ecological protection, increase in the public's artistic literacy, and raising the efficiency of resource utilization by local communities, leading to improvements in the well-being of residents.





## Education

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.

In 2020, ASEH worked together with many academic institutions and invested approximately US\$3 million in a total of 123 education programs, including academia-industry 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 projects was 2.07, and that US\$5 million in social value was created, of which business-related industry-academia collaboration generated approximately US\$2.5 million. Main outcomes include better operational efficiency and industry competitiveness. Approximately US\$2.8 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.

<sup>11</sup>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 ASEH's social cohesion and educational programs. We then transferred the percentage of value attributable to the impact pathway to ASEH's social cohesion and educational programs, which provided a basis for calculation of the SROI generated and the value to society.

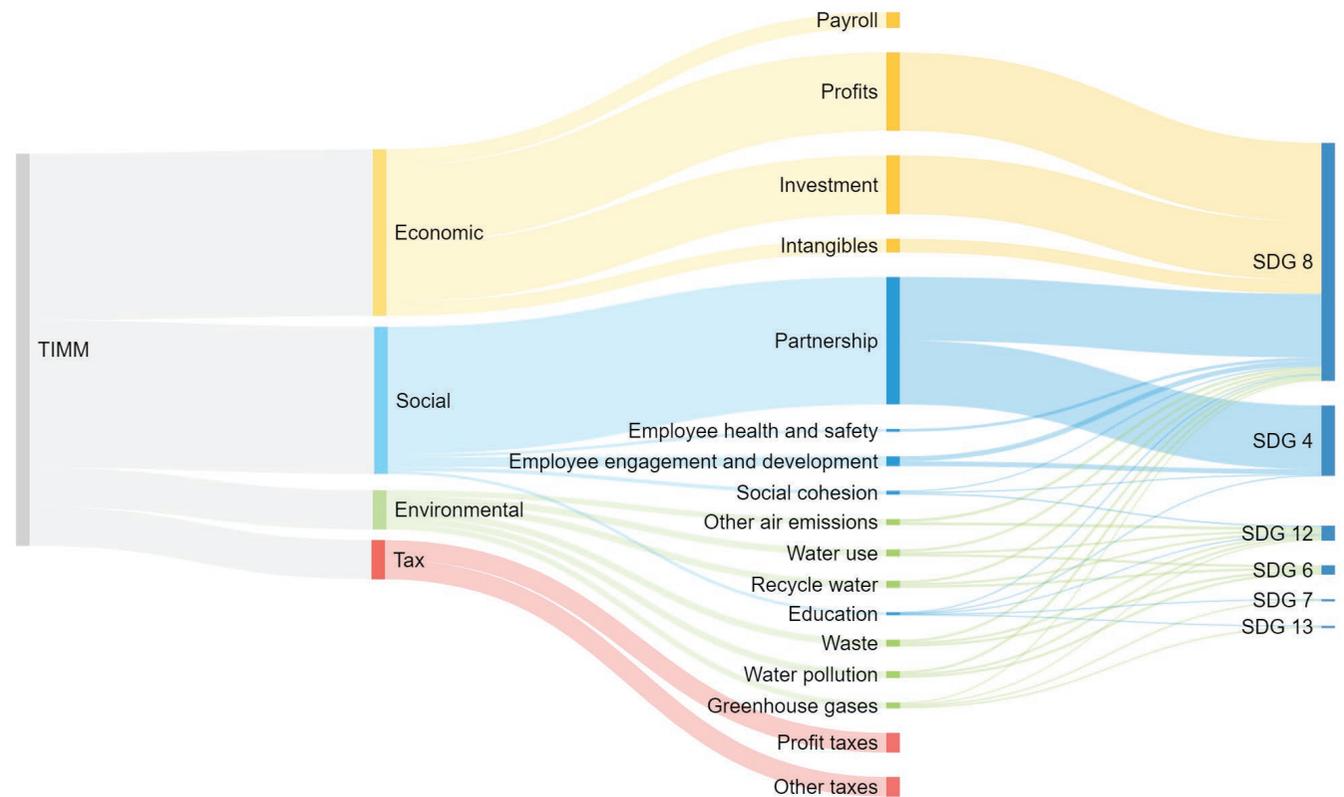


## Social Impact Path Diagram

Impact Driver	Activity / Output	Outcome / Impact	Monetary Valuation
Supplier Partnerships	Supplier RBA audit	Improve supplier's competitiveness and optimize supplier's management system	Property losses or external training fees
	Supplier training		Perceived value according to supplier survey questionnaires
	Local procurement	Create local job opportunity and promote local economic prosperity	Local procurement value
Employee Engagement and Development	Employee career development Work environment Employee caring	Increase employees' sense of achievement and sense of belonging Enhance their competitiveness and management capabilities	Mental wellbeing course fees, performance bonuses, company benefits and subsidies training and development expenses
Employee health and safety	Number of occupational injuries	Employee physical/psychological injury	Disability payments
	Employee health check	Increase in recovery rate of employee with health issues	Health screening expenses
	Health insurance expense	Reduce financial impact to employee as a result of health issues	Health insurance expenses
Social Cohesion	Public development	Improvement of public issue understanding and analytical abilities	Converted using the value transfer methodology <sup>11</sup>
	Community care	Improvement of resource usage benefits	
	Disadvantaged families care	Improvement of self-identity and education benefits	
	Afforestation activities	Improvement of water quality	
	Healthcare sponsorship	Increased healthcare resources and quality of life	
	Arts and culture sponsorship	Improved artistic knowledge	
Education	Sports sponsorship	Increased human interactions and group cohesiveness	Converted using the value transfer methodology
	Occupational education and training	Improved management efficiency	
	Environmental education	Improved environmental awareness and implementation in life	

### 3.2 ASEH's SDGs and Impact

Since 2019, ASEH has identified 6 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) and SDG 4 (Quality education). 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 RBA 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.



**ASEH's SDG Impacts and Contributions Flow Diagram**

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 12 (Responsible consumption and production), SDG 8 (Decent work and economic growth), SDG 7 (Affordable and clean energy) and SDG 13 (Climate action). 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 2025 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 achieve the UN SDGs and create a better world.



## ASEH's Sustainable Value Creation Framework

## Part 4 :

# Conclusion

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\$11,926.6 million in sustainable value for stakeholders in 2020. This year, we will apply the sustainable value assessment method used internally to the value chain. In 2020, the monetized value of the environmental impact of our greenhouse gas emissions amounted to -US\$1,110 million. The main sources of impact included product and service procurement, upstream transportation and distribution, and external influence of capital goods. 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. Our environmental impact is mainly attributed to resource usage and environmental emissions from business activities. Greenhouse gas emissions from the value chain are mainly attributed to procurement of products and services, upstream transportation and delivery, and capital and finances. To reduce external environmental costs, we continue to increase investments in environmental protection, improve resource efficiency and conversion, develop diverse and clean energy sources, increase water efficiency and adopt green transportation. We will also expand the management scope of our environmental impact that helps fulfill our low-carbon mission and strategic vision of circularity. 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 2020, ASEH will step up efforts to mitigate negative environmental and social impacts to stakeholders.



Item	Impact	Mitigation Action	2020 Key Outcome
Greenhouse gas	The social cost of human health, architectural and asset damages and economic losses caused by greenhouse gas emissions	<ul style="list-style-type: none"> <li>➤ Moving towards low-carbon energy transformations</li> <li>➤ Establish and purchase renewable energy</li> <li>➤ Execute energy-saving and carbon reduction solutions</li> <li>➤ Expand investments in carbon reducing equipment</li> <li>➤ Adopt low-carbon substitute materials</li> </ul>	<ul style="list-style-type: none"> <li>➤ Revenue density of greenhouse gas units reduced by 21%</li> <li>➤ Renewable energy and certificate accounts for 18% of total electricity usage</li> <li>➤ Executed 300 cases, saving 16.8% of electricity usage</li> <li>➤ Unit revenue electricity density decreased by 12%</li> </ul>
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.	<ul style="list-style-type: none"> <li>➤ Introduce high-efficiency processing equipment</li> <li>➤ Worked with academia to study the processing efficiency of air pollutants</li> <li>➤ The closed negative pressure design increases the collection rate</li> <li>➤ Substitute cleaning materials</li> </ul>	<ul style="list-style-type: none"> <li>➤ Emission intensity of unit revenue decreased by 14%</li> </ul>
Waste	The social cost of local and global pollution, visual and auditory disruption caused by the hazardous and non-hazardous waste treatment process.	<ul style="list-style-type: none"> <li>➤ Waste reduction at source</li> <li>➤ Introduced circular economy operating models</li> <li>➤ Adopted environmentally friendly substitute materials</li> </ul>	<ul style="list-style-type: none"> <li>➤ Increased general and hazardous waste recycling rate by 3.8%</li> <li>➤ Recycled materials for reuse in the plant, outsourced the processing for reuse by other industries. Total volume of materials processed equaled 30,442 tons.</li> </ul>
Water use	The social cost of ecosystem service devaluation, malnutrition, and waterborne diseases caused by water usage.	<ul style="list-style-type: none"> <li>➤ Established a waste water recycling plant</li> <li>➤ Promote water saving projects</li> <li>➤ Invested in water recycling equipment</li> <li>➤ Rainwater collection and utilization</li> </ul>	<ul style="list-style-type: none"> <li>➤ Unit revenue water usage density decreased by 16%</li> <li>➤ Promoted 22 water saving projects. The recycling rate of process water increased by 6% compared to last year</li> <li>➤ Expenditure for recycling and reuse of water resources reached USD36 million</li> </ul>
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	<ul style="list-style-type: none"> <li>➤ Continuous monitoring of water quality/volume</li> <li>➤ Waste water recycling and cyclic reuse</li> <li>➤ Distribution of chemicals</li> <li>➤ Develop innovative processes and technologies through academia-industry cooperation</li> </ul>	<ul style="list-style-type: none"> <li>➤ Distribution of chemicals for 15 plants</li> <li>➤ Expenditure for recycling and processing efficiency of waste water reached USD14.43 million</li> <li>➤ Conducted 24 development projects for innovative water processing technologies through academia-industry cooperation</li> </ul>
Employee health and safety	The effect of work injuries on the physical and psychological wellbeing of employees	<ul style="list-style-type: none"> <li>➤ Established organizational structure, management guidelines and procedures, and periodic audit procedures in the OHS Management System</li> <li>➤ Formulated management measures for occupational injury and accident reporting and investigation procedures</li> <li>➤ Stipulated combined disaster handling and recovery plans</li> </ul>	<ul style="list-style-type: none"> <li>➤ Conducted over 400 drills in plants around the world</li> <li>➤ Accumulated over 370,000 hours of occupational health and safety education and training</li> </ul>

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 Sustainable Development Committee to plan our value creation path that formulates improvement actions and decisions that will reduce the impact of potential risks. In 2020, we 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.



## 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.

### Economic

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

	Payroll	Profit	Investment	Intangible Assets
Primary data	V	V	V	V
Extrapolated from Primary data	V	V	V	V

### Tax

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

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

### Environment

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
Primary data	V	V	V	V	V	V
Extrapolated from Primary data	V	V	V	V	V	V
Secondary data	V	V	V	V	V	V
Extrapolated from Secondary data	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

Apart from adjusting for regional differences using PPP and GNI<sup>12</sup>, if the monetization value is derived from data prior to 2017, we will adjust the data using the US dollar inflation rate<sup>13</sup> to reflect the monetized values for 2020.

<sup>12</sup> GNI values for various countries were obtained from information published by the World Bank: <https://www.imf.org/en/Publications/WEQ/weo-database/2021/April>

<sup>13</sup> USD inflation rate reference: <http://www.usinflationcalculator.com/>

## Social

Primary data (including stakeholder interviews and surveys<sup>14</sup>) 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 methodology<sup>15</sup>.

Our report employs mainly the input-output model, social return on investment (SROI)<sup>16</sup> 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

## 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 Vulnerable Families	Social Return on Investment (SROI) Report of Taiwan Dream Project on Dahu Community
Reforestation	Restore the Earth Foundation Cypress Reforestation Social Return on Investment Report
Medical Sponsorship	Healthwise Hull SROI Forecast
Arts Sponsorships	Turner Contemporary: Art Inspiring Change Social Value Report
Sports Sponsorships	Bums off Seats SROI Evaluation Report
Environmental Education	《Cherish the Earth, Spread Love Far SROI Report》 2018 SROI Report
Vocational Training	The Value of Hamelin Trust's Roots and Shoots: An SROI Analysis

<sup>14</sup> The analyzed information of the 2020 supplier education and training is based on the 2019 survey questionnaire. The SROI methodology related calculation parameters were recalculated based on the related questionnaires selected from the education and training of subsidiaries in 2020, and social impact was calculated based on average value per person.

<sup>15</sup> Social Capital Protocol, WBCSD, 2016, p.51.

<sup>16</sup> 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.

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