

ASE Technology Holding Co., Ltd.

Total Impact Measurement and  
Management Report

2018

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## Disclaimer

ASEH's Total Impact Measurement and Management Report assesses the transformation of the impact of ASEH's sustainable development into monetary value from a stakeholder's perspective. As this report has a different basis from the 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 the ASEH's past, present, or future stock trading value.

## Part 1: ASEH's Total Impact Measurement and Management Report

### 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 to together 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 the ASEH's sustainable development and value creation.

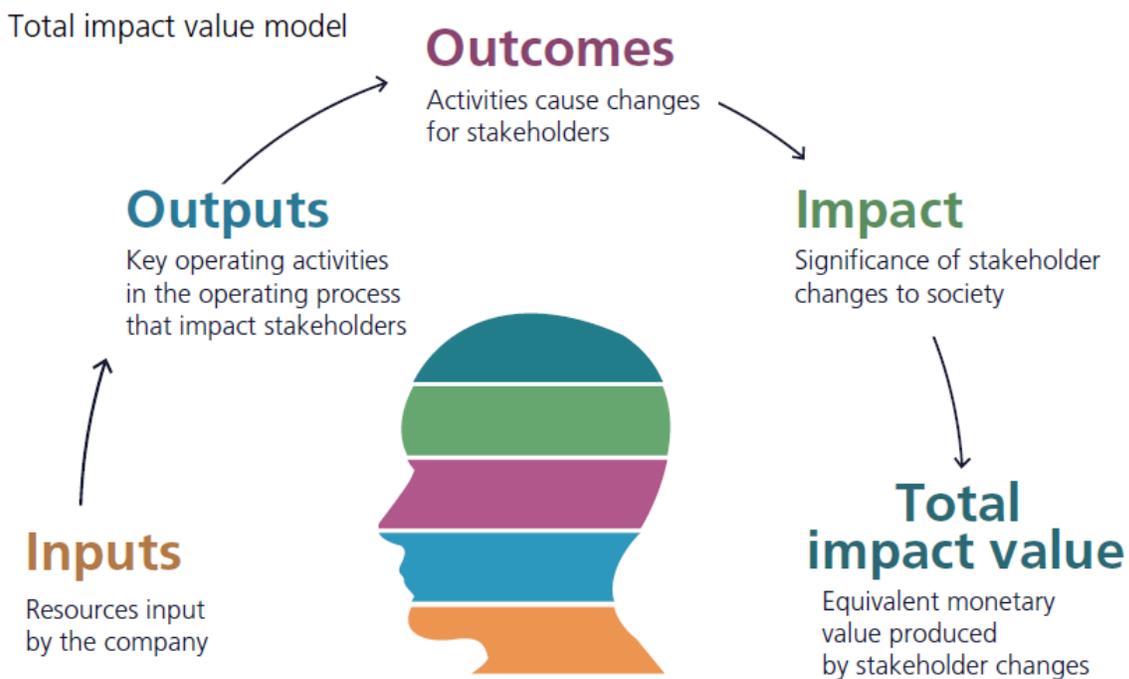
ASEH implemented the Total Impact Measurement and Management (TIMM) framework in 2017 to examine the impact on stakeholders during the course of operations. In 2018, we continue to measure total impact using TIMM and added evaluation items such as employee health and safety and positive environmental benefits so as to capture a more complete non-financial performance.

From the perspective of stakeholders and the four dimensions, namely economy, tax, environment, and social, we measure the sustainable value of ASEH's operations on the society, based on the impact value it generates on the stakeholders. We also reference the monetization framework of Natural Capital Protocol and Social Capital Protocol, and cooperate with PwC Taiwan in adopting its Total Impact Measurement and Management (TIMM) framework as the tool for analyzing the source and result of sustainable value. We hope that with integrated thinking, together with corporate finance value and ESG value, we can express in a uniform unit of measure, which is currency. We believe that sustainable value reporting with integrated thinking will enable better corporate decision-making, performance measurement and communication with stakeholders.

## 1.2 What Is TIMM?

The impact of environmental and ecological deterioration, shortages of energy and natural resources, intensifying climate change, tighter government control, and lack of revolutionary breakthroughs in information technology are creating immense global challenges. Apart from the tradition of assessing corporate financial value based on a shareholder interest, we also hope to gain an understanding of the potential risks and opportunities that our company will face as it pursues sustainable development.

The TIMM (Total Impact Measurement and Management, TIMM) proposed by PwC, assesses the value of corporate operations from the four dimensions of economic impact, tax impact, social impact and the environmental impact, and uses monetized value as a unit of expression. The TIMM framework is based on the perspective of the enterprise’s stakeholders involved in corporate operations, and not solely on 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 use holistic thinking and tools to express the total impact and value of corporate operations to society on a timely basis. The ASEH’s sustainable value is hence measured by its total impact value from a stakeholder’s perspective.



## Part 2: About This Report

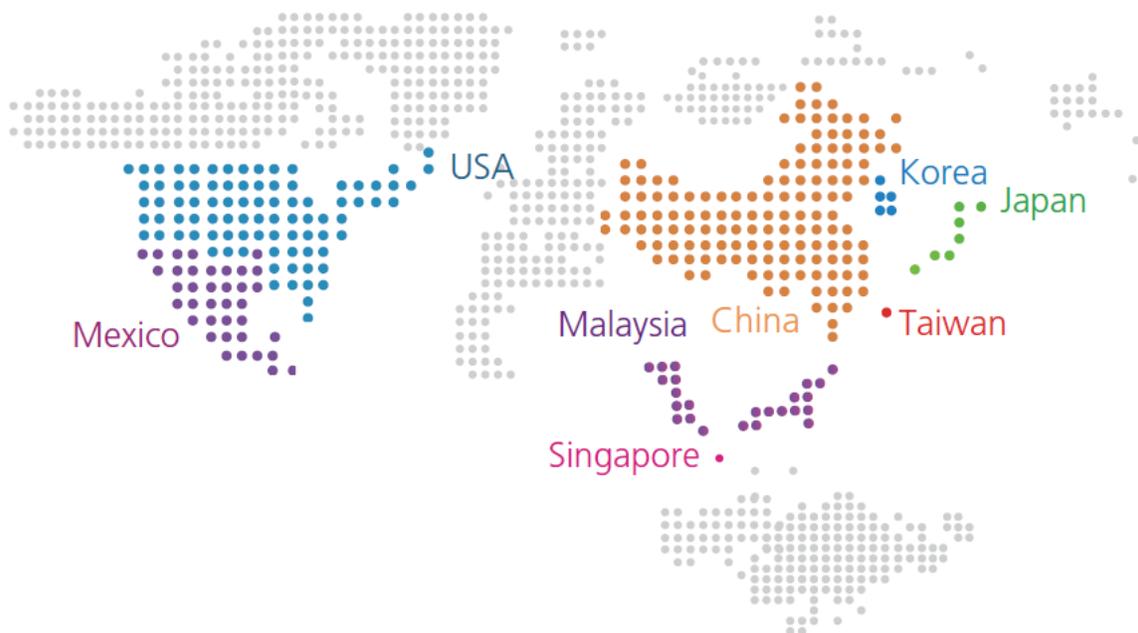
### 2.1 Reporting Period and Scope

The report discloses ASEH's 2018 (January 1, 2018, to December 31, 2018) information measured using TIMM framework, which comprises the dimensions of economy, tax, environment, and social.

Taking into consideration financial materiality, industrial relevance, and place of operation, ASEH, as mentioned in the report, includes 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 Inc"), which are used as basis for calculating the total impact during the above period.

IC assembly, testing, and material (ATM) plants and electronic manufacturing services (EMS) plants from eight operating areas are included in the calculation, namely Taiwan, China, South Korea, Japan, Singapore, Malaysia, the United States, and Mexico

Distribution of the ASE Group's business locations



## 2.2 Four Dimensions of Impacts

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

Dimensions	Stakeholders	Impact drivers <sup>1</sup>	Explanation of the production of impact value
Economic	Shareholders Suppliers Customers Employees	Profits, payroll, investment and intangibles	Economic value mainly consists of the creation of financial value for stakeholders and maintenance of their livelihoods through the four impact drivers.
Tax	Government Community	Profit taxes and other taxes	The various types of taxes incurred by operations are directly paid to the local government to support the government's finances, and the government invests tax money in public development enhancing the welfare of local people.
Environment	Employees Community	Greenhouse gases, other emissions, waste, water use and water pollution, recycle water	The pollutant discharges and consumption of resources entailed by operations affect the public. Five kinds of environmental impact drivers influence the public and the natural ecology.
Social	Employees Suppliers Community	Partnerships, employees engagement and development, employee health and safety, education and social cohesion	The operating processes have different impacts on employees, suppliers, and local communities, which is how operations provide value to society.

<sup>1</sup> Impact factors are the chief factors and sources of influence on stakeholders. Because corporate operations involve numerous matters, we must first derive the activities and domains exerting the most important impact on stakeholders before we can effectively inventory the changes and influence of various impact factors on stakeholders.

### Part 3: Total Impact Value of the ASEH

The ASEH reported sustainable value of US\$8.19 billion in 2018 through adopting the TIMM framework to identify and quantify the economic, tax, environmental, and social value created for stakeholders by ASEH’s operating activities. Assessment of economic impact indicates that payment of wages to employees accounted for the largest share of economic impact with regard to the creation of value for stakeholder in the form of financial satisfaction and livelihood maintenance through ASEH’s operations. Tax impact consists mainly of taxes from profits, which is directly connected with the profitability of our operations, and represents financial support for local government and enhancement of public welfare. In the case of manufacturing, negative environmental impacts are inevitable in the process of creating economic value. Our environmental assessment results indicate that the monetized impact of greenhouse gases and water use were the largest of such impacts. Among social impacts, supplier partnerships and employee engagement and development accounted for the greatest share of monetized impact. Explanations and management strategies for the various areas can be found in relevant sections of ASEH’s 2018 CSR report, along with key aspects of our CSR performance in conjunction with assessment and management.



**ASEH's 2018 Sustainable Value Maps**

### 3.1 Economic Impact

The ASEH’s export-oriented business operations is a large contributor to the countries’ GDP and economy making a significant contribution to local economic activities. Within the TIMM framework, the economic dimension creates major positive impacts to ASEH’s stakeholders.

Based on stakeholders' (employees, shareholders, vendors, and customers) perspective, economic dimensions include four main impact factors: Salaries, profit, 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 and salary expenses, withheld labor and health insurance
Investment	Capital expenditure		Yearly real estate, plant, and equipment depreciation expenses, operating lease expenses, fixed asset repair expenses
Intangibles	Research and development activities, and intellectual property purchase		Yearly intangible asset amortization expenses and research and development expenses

### 3.2 Tax Impact

The ASEH's global business operations are located in Taiwan, China, South Korea, Japan, Singapore, Malaysia, Mexico, 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 - taxes on profits and other taxes.

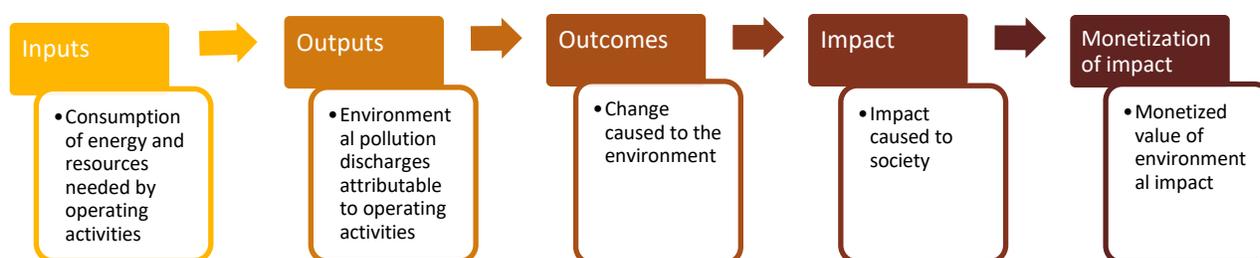
#### Tax impact path diagram

Impact driver	Activity / Outcome	Outcome / Impact	Monetary Valuation
Taxes	Tax payment Research and development activities, and intellectual property purchase	Improve people's wellbeing	Yearly actual cash tax payments

### 3.3 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 of the TIMM framework on the monetized corporate environmental impact issued by PwC in 2015. 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.

#### Monetized value assessment procedures



#### Environmental impact path diagram

Impact driver	Output	Outcome / Impact	Monetary Valuation <sup>2</sup>
Greenhouse gases	GHG Emission (Scope 1 and 2)	Human health, built environment, economic disruption, agriculture and timber, desertification, and other ecosystem services	The social costs incurred by greenhouse gases is referred to the literature (See References 1.)
Other air emissions	Emissions of pollutant(SOx)	Human health, forestry, materials (Note 1), and water acidification	The social costs incurred by other air emission is referred to the literature (See References 1.)
	Emissions of pollutant(NOx)	Human health, crops, and forestry	

<sup>2</sup> Please refer to the explanation of methodology in the fourth section for an account of environmental financial proxies.



Impact driver	Output	Outcome / Impact	Monetary Valuation <sup>2</sup>
	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	The social costs incurred by waste is referred to the literature (See References 7.)
Water use	Water consumption	Direct non-consumptive uses, indirect uses(ecosystem function), malnutrition ,and water borne disease	The social costs incurred by water use is referred to the literature (See References 6. and 7.)
Water pollution	Release of regulated contaminants (Note 2)	Human health	The social costs incurred by water pollution is referred to the literature (See References 2. and 7.)
	Release of nutrient (Phosphorus)	Recreation, property values, and fishstock	
Recycle water	Reduce water consumption	Mitigate crowding out of direct non-consumptive water use, ecosystem service, malnutrition and waterborne disease	Reference external articles on social cost generated by water consumption and wastewater discharge
	Reduce release of regulated contaminants (Note 2)	Reduce harm to human health	

Note 1 : Impact on building materials.

Note 2 : Regulated contaminants considered in this study: phenols, hexane extracts, cadmium, plumbum, chrome, hexavalent chromium, copper, zinc, nickel, arsenic, and silver.

### 3.4 Social Impact

Apart from direct financial impacts on investors, the ASEH's operating activities will inevitably affect different stakeholders and produce positive and negative impacts and varying social significance. The impact of our business activities on society is quantified according to 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.

#### Social impact path diagram

Impact Driver	Activity / Output	Outcome / Impact	Monetary Valuation
Partnership	Supplier audit	Improve supplier's competitiveness	Perceived value according to suppliers survey questionnaires.
	Supplier training		
	Technology transfer and assistance in development	Mass production on new product/technology	Suppliers' revenue from the new product/technology.
	Localize procurement	Create local job opportunity and promote local economic prosperity	Amount of local purchases.
Employee Engagement and Development	Compensation and Benefits	Employee's financial satisfaction and livelihood maintenance	Actual amount of salaries received by employees.
	Employee Career Development Work Environment Employee caring	Promote managerial capabilities / Improve self-accomplishment Enhance job competitiveness Raise a sense of belongings	Performance bonuses Company benefits and subsidies. Training and development class expenses
Employees health and safety	Number of workplace injuries	Employee physical/psychological injury	Disability payment amount
	Employee health check	Increase healing chance of employee health issues	Health check expense
	Health insurance expense	Reduce employee financial impact as a result of health issues	Health insurance expense
Education	Semiconductor class	Improve the quality of talent in the	Converted using the value transfer method <sup>3</sup>

<sup>3</sup> Based on the value transfer model explained in the Social Capital Protocol, we take SROI reports certified by Social Value International or SROI reports with similar topics from Taiwan as our reference literature. We have also



Impact Driver	Activity / Output	Outcome / Impact	Monetary Valuation
		semiconductor industry	
	Industry-university cooperative research project	Enhance research capability and competitiveness of semiconductor and technology industry	
	School environmental education	Implement environmental protection in life	
	Community environmental education		
Social Cohesion	Community development and care	Enhance social welfare	
	Minority groups care	Improve the well-being of residents	
	Afforestation activities	Ecology restoration and conservation	
	Medical sponsorship	Improve local medical level	
	Arts and sports sponsorship	Cultural influence and physical and mental satisfaction	

reviewed impact pathways in the literature, and paired these pathways with the content of ASE's social cohesion and educational project activities. After pairing, we transferred the percentage of value attributable to the impact pathway in question to ASE's social cohesion and educational activities, which provided a basis for calculation of the SROI generated by these social cohesion and educational activities, and further allowed the calculation of value to society.

## Part 4: Methodology and Data Collection

This report employed the Natural Capital Protocol, Social Capital Protocol, SROI, and the TIMM framework proposed by PwC as analytical integration tools.

### I. Economy

Information on financial resource allocation was extracted from first hand data compiled by ASEH. We referred to and analyzed relevant literature when determining the impact of salaries and intangible assets on stakeholders and the industry.

	Payroll	Profits	Investment	Intangibles
Primary data	V	V	V	V
Extrapolated from Primary data	V	V	V	V

### II. Taxes

Information on tax payment was extracted from first hand data compiled by ASEH.

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

### III. Environment

We studied the Natural Capital Protocol launched in 2016 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 restrictions or lack of reference data, it was impossible to obtain monetization information for some social impacts.

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

	Greenhouse gases	Other air emissions	Waste	Waste use	Water pollution	Recycle water
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, 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<sup>4</sup> 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, if the monetization value is derived from data prior to 2016, we will adjust the data using the US dollar inflation rate<sup>5</sup> to reflect the monetized values for 2018.

## IV. Society

Primary data (including stakeholder interviews and surveys) 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 the ASEH's business activities on local residents. We also determined the social impact value on employees, suppliers, and the public using the value transfer method<sup>6</sup>.

Our report employs mainly the input-output model, social return on investment (SROI)<sup>7</sup> and value transfer methodologies. The input-output model was used in conjunction with stakeholder engagement to obtain the monetized value of the social impacts of the ASEH's

<sup>4</sup> GNI values for various countries were obtained from information published by the World Bank: <https://data.worldbank.org/indicator/NY.GNP.PCAP.PP.CD>

<sup>5</sup> USD inflation rate reference: <http://www.usinflationcalculator.com/>

<sup>6</sup> Social Capital Protocol, WBCSD, 2016, p51

<sup>7</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.



business activities on stakeholders. The SROI and value transfer method 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.

	<b>Partnership</b>	<b>Employee engagement and development</b>	<b>Employees health and safety</b>	<b>Social cohesion</b>	<b>Education</b>
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

## Part 5: Conclusions

In 2018, ASEH attempts to express in monetary value, the key dimensions of management, along with CSR performance. To us, it is not about pursuing an accurate figure that represents a certain meaning but how to bring higher values to stakeholders through our CSR management and performance with a consistent currency benchmark.

In 2018, ASEH created sustainable value of US\$8,193,278 in thousand. For the economic dimension, issuing employee salary and benefits generate the highest monetized impact, which shows ASEH's high influence on the labor market of its place of operation. For the tax dimension, we exhibit corporate core values by being an honest taxpayer and not transacting in active tax purpose. For the environmental dimension, after understanding the obvious impact drivers, we enhance our technologies on energy-saving and wastewater recycling, and strive towards minimizing environmental impact. Social dimension is mainly contributed by sustainable value created from supplier partnership, and employee engagement and development, which shows ASEH creates extraordinary values for suppliers and employees through its operations. In the future, we will put more emphasis on the overall measurement of social dimension, and include significant impact factors such as safety and health to calculate the social return of investment of ASEH's social activities, and specifically manage and maximize social values.

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ASEH's Total Impact Measurement & Management Report is performed in reference to PwC's Total Impact Measurement & Management (TIMM) framework and the monetization framework in the Natural Capital Protocol and Social Capital Protocol. We collaborate with PwC Taiwan to gather information, identify financial proxies and analyze sustainable value sources and results.

If you have any comment or suggestion, please contact us at:

No. 26 Jingsan Road, Nanxun Processing and Export Zone, Kaohsiung City

TEL:+886-7-361-7131

Email : ASE\_CSR@aseglobal.com