ASE TECHNOLOGY
HOLDING CO., LTD.

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ASE TECHNOLOGY HOLDING
CORPORATE SUSTAINABILITY REPORT

ASE TECHNOLOGY HOLDING CO., LTD.

As a global service provider of semiconductor assembly and testing, ASE Technology Holding Co., Ltd. and its subsidiaries (collectively "ASEH") is fully committed to building its core business and, strengthening research and development to maintain its leadership. The company continues to advance its corporate sustainability through a sustainability development framework that comprises of four strategic pillars - Low Carbon, Circular, Inclusive and Collaborative directions. The framework forms the basis for formulating innovative business models and best practices in key areas such as Smart Factories, Pandemic Preparedness, Energy Resources Recycling and Information Security Management. ASEH is rapidly evolving to respond proactively to industry trends and stay abreast of social changes. It is the company's responsibility to sow the seeds of a sustainability value and culture that will contribute to positive social and environmental impacts.

Energy Resources Recycling

Increasing the use of highly efficient, lower emissions and environmentally-friendly clean energy has long been a key element of ASEH's sustainability strategy. We continue to focus on reducing energy consumption, lowering carbon emissions, expanding our green supply chain and adopting the use of renewable energy. To augment our sustainability efforts, we have also begun developing smart energy technologies and investing in renewable energy projects. ASEH's total renewable energy usage has increased by 29% compared to the previous year and now accounts for 14% of the company's total energy usage. Seven of ASEH's worldwide facilities have achieved 100% renewable power, contributing to a reduction of our greenhouse gas emissions by 2.2% compared to the previous year. As of this year, ASEH has a total of 12 green factory certified facilities and 26 certified green buildings. Our total volume of recycled water increased by 9% to 28.15 million tons (the equivalent of 11,000 Olympic-size swimming pools or the annual water consumption of 280,000 people).

ASEH has deployed the NIST CSF maturity assessment at its 25 facilities worldwide, which is guided by a core operating principle embodied in the risk management framework. The five functions of the NIST framework - Identify, Protect, Detect, Respond and Recover, assess the organization's information security maturity and facilitate the comprehensive planning for internet security, and the adoption and implementation of improvement plans. The company has also consolidated its focus on key areas such as information security legal compliance, supply chain security management and requirements, internal audits for information protection and control, and trends in external cyber attacks, to enable further strategy development and practice effective governance in information security.

Information Security Management

Smart Factories

Heterogeneous Integration (HI) has given rise to new business opportunities for the future. HI technology will also support ASEH's advancement in sustainability and expansion in markets for new applications that will positively impact human life and improve their wellbeing. ASE's development in Industry 4.0 began in 2015 with investments in software and hardware for implementing lights-out factories. At the same time, the company began deploying AI-powered predictive analytics applications, Big Data integration and analytics applications, and advanced automation technologies to set the company's smart manufacturing and digital transformation in motion. There are currently eleven smart factories established and will increase to eighteen by the end of 2020.

ASEH's smart factory blueprint is focused on three major areas - automation, heterogeneous integration in machine and production systems, and heterogeneous integration in systems-in-package (SiP) miniaturization. ASEH is one step closer to achieving Industry 4.0 through the adoption of Big Data-driven design, supply chain collaborative design and integrated real time data for decision-making, providing a synergistic connection between customers, supply chain partners and ASEH. The advent of smart factories has also enabled highly intelligent designs and analytics, as well as the integration of mixed reality environments that will continue to drive industry growth and semiconductor innovation.

ASEH has implemented the most stringent measures for pandemic preparedness in its facilities around the world. Effective communication and preemptive actions are the key components of the pandemic crisis management plan that prescribe appropriate responses to mitigate impacts. We comply strictly with local health and safety regulations and diligently follow standard pandemic response operating procedures. We have also established a company-wide global pandemic task force to carry out scenario simulation, execute emergency response plans to prevent transmission, and to coordinate support for employees whose livelihoods were affected by the pandemic. These measures help us protect our employees, suppliers, customers. ASEH is investing approximately NT$10 million into the production of high-quality surgical masks by setting up a production line at ASE Kaohsiung. A class 100K clean room that is capable of producing 6,000 surgical masks per hour has been established, and allow us to maintain a high level of control over the COVID-19 crisis.

Pandemic Preparedness

Committed to a Win-Win Sustainable Future

Low Carbon

Circular

Inclusive

Collaborative

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Key Highlights

In this report, we discuss our sustainability activities in 2019.

Strategies for the Implementation of the UN Sustainable Development Goals (SDGs)

Comprehensive examination and analysis of the main SDGs (climate action, responsible consumption and production, decent work and economic growth, affordable and clean energy, clean water and sanitation, and quality education) of ASEH and the benchmarked industries in its value chain; active response to SDGs and establishment of 2025 sustainability performance targets in five major categories for the company's core operations so that our strategic goals for contributing to SDGs may undergo regular assessment and management.
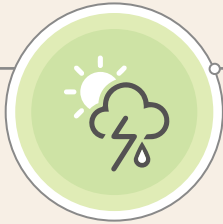
Task Force on Climate-Related Financial Disclosures (TCFD)

In keeping with the TCFD framework, ASEH takes a top-down approach to assess climate risks and opportunities by overseeing operational strategies and financial planning at the corporate-governance level. We survey critical stakeholders to solicit internal and external views on risks and opportunities, which help us to formulate management goals and adopt oversight measures for high-impact risk factors. Risk factors are categorized by geographical location and used to assess the potential short, medium, and long-term financial impacts of different substantive and transformative scenarios.

Renewable Electricity Investment

The most meaningful approach in GHG management is to migrate to non-carbon based sources of energy. In 2019, the renewable power usage of ASEH was 512,067 MWh, reaching 14.27% of our total power consumption, specifically two ASE, one SPIL and four USI facilities are operating fully on renewable power.

Green Building Certifications

As of December 2019, we have achieved 17 Taiwan EEWH certifications as well as 8 U.S.A. LEED certifications; including 1 "Diamond-rated" low-carbon certification in 2019. And we are transitioning green facilities into low-carbon building.
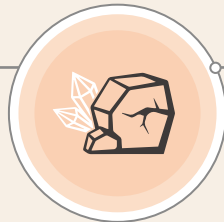
Management of Conflict Minerals

Based on our Reasonable Country of Origin Inquiry (RCOI) analysis and due diligence measures in 2019, we believe that the identified smelters or refiners (SoRs) used for all of our products (from packaging, materials, and electronic manufacturing services) are DRC Conflict-Free.
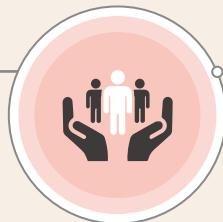
Social Welfare

In 2019, ASEH launched its 'Share the Love' social welfare program by inviting a total of 180 senior dependents of ASEH employees and senior citizens from neighborhoods near the ASE Chungli Facility and the USI Taiwan Facility to participate in a holistic health care program covering physical, mental, and spiritual health. The 'Blessed and Joyful Learning' program is dedicated to helping senior citizens in Taiwan stay healthy and active, and facilitating Taiwan's successful transformation into an aged society.

Awards and Recognitions

MEMBER OF
Dow Jones
Sustainability Indices
In collaboration with SAM *a RobecoSAM brand*

Industry Leader

Named Industry Leader in the 2016-2019 Dow Jones Sustainability Indices, and listed as a constituent of the Dow Jones Sustainability World Index and Emerging Markets Index

SAM | Sustainability Award
Gold Class 2020

Top 1% SAM Gold Class

Listed on the RobecoSAM Sustainability Yearbook 2017-2020, and awarded the "Gold Class" for four consecutive years (within 1% of top performing company's score under the Semiconductors and Semiconductor Equipment Industry Group)

CDP
DISCLOSURE INSIGHT ACTION

3 Times on the CDP A List

Named on the 2019 CDP A List for Climate Change and Leader Board for Supply Chain Engagement. ASEH is the only Taiwanese company to have made the CDP's climate change A List three times

TCSA

4 Awards

Received 2019 Taiwan Corporate Sustainability Awards (TCSA): Top 50 Corporate Sustainability Award, Corporate Sustainability Report Award (Platinum), Supply Chain Management Award and Social Inclusion Award

FTSE4Good

5 Years In A Row

Included in the FTSE4GOOD Emerging Markets Index for five years in a row (2015-2019)

FTSE4Good
TIP Taiwan ESG Index

TIP
Taiwan Index Plus

2 Consecutive Years

Listed on the 2018 & 2019 FTSE4Good TIP Taiwan ESG Index (The index has been developed in partnership with Taiwan Stock Exchange's ("TWSE") wholly-owned subsidiary, Taiwan Index Plus Corp. ("TIP"))

ABOUT OUR REPORTING

This is our 2nd CSR Report for ASEH, which is prepared in accordance with the GRI Standards: Core option. Our Corporate CSR Division is in charge of data gathering, compiling and editing. This report is available in both Chinese and English. The complete electronic version can be downloaded from our website, http://www.aseglobal.com/en/csr_report

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

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Tel: +886-7-361-7131
Email: ASE_CSR@aseglobal.com

Report Boundary

The report discloses the economic, environmental and social performance of the ASE (Advanced Semiconductor Engineering, Inc. and its subsidiaries), SPIL (Siliconware Precision Industries Co., Ltd. and its subsidiaries), and USI (USI Inc. and its subsidiaries) encompassing our semiconductor assembly (packaging), testing and materials (ATM) facilities and electronic manufacturing service (EMS) facilities, but excluding wholly owned intermediate holding companies, internal trading companies, companies in their first post-merger year and companies with less than a year operation. Any boundary adjustment of the data will be separately explained in the text of the report.

Financial figures in this report are prepared in accordance with the International Financial Reporting Standards as issued by the International Accounting Standards Board, audited by Deloitte & Touche, and expressed in US dollars unless otherwise specified.

ASE Kaohsiung

ASE Chungli

ASE Japan

ASE Korea

ASE Singapore

ASE Malaysia

ASE Kunshan

ASE Suzhou

ASE Weihai

ASE Shanghai (A&T)

ASE Shanghai (Material)

ASE Wuxi

SPIL Da Fong

SPIL Chung Shan

SPIL Zhong Ke

SPIL Hsinchu

SPIL Changhua

SPIL Suzhou

ASE Cultural & Educational Foundation

ASE Charitable Foundation

ISE Labs

USI Taiwan

USI Zhangjiang

USI Kunshan

USI Jinqiao

USI Shenzhen

USI Mexico

ASE Kaohsiung · CSR Report

SPIL · CSR Report

USI · CSR Report

Internal Review and Approval

The disclosed information and data in this report were initially verified by the relevant managers of the data/information providers. The initial draft was compiled by the Corporate CSR Division. After being reviewed by the Corporate Legal and Finance Departments, the final report was approved and authorized for issue by the Chairman of Corporate Sustainability Committee.

Other CSR Reports in ASEH

Within the ASEH, we have also published three separate CSR reports providing more detailed sustainability information of our ASE Kaohsiung Facilities (ASEKH) in Taiwan, SPIL and USI. The complete electronic version can be downloaded from https://www.aseglobal.com/en/csr_report

External Assurance

ASEH engaged Deloitte & Touche to perform an independent limited assurance in accordance with ISAE 3000 Revised for this report. The independent assurance statement can be found at the end of this report.

All ASEH sites have acquired certifications in environmental, social, information security and other relevant fields. The company's conformity with international standards ensures complete regulatory compliance in our management and control measures, and operating procedures. For more information please refer to the chart on next page:

Facility / Certification	ISO 14001 Environmental Management Systems	ISO 50001 Energy Management Systems	ISO 14067 Carbon Footprint	ISO 14045 Eco-efficiency Assessment of Product Systems	ISO 14046 Water Footprint	ISO 14064-1 Greenhouse Gases	QC 080000 Hazardous Substance Process Management System	OHS Occupational Health and Safety Management Systems [1]	ISO/IEC 27001: 2013 Information Security Management Systems
ASE Kaohsiung	●	●	●	●	●	●	●	●	●
ASE Chungli	●	●				●	●	●	
ASE Suzhou	●					●	●	●	
ASE Weihai	●					●	●	●	
ASE Wuxi	●					●	●	●	
ASE Shanghai (A&T)	●					●	●	●	
ASE Shanghai (Material)	●					●	●	●	
ASE Kunshan	●					●	●	●	
ASE Japan	●					●	●		
ASE Korea	●					●	●	●	
ASE Singapore	●					●	●	●	
ASE Malaysia	●					●	●		
ISE Labs	●								
SPIL Da Fong	●	●				●	●	●	
SPIL Chung Shan	●	●				●	●	●	
SPIL Zhong Ke	●	●				●	●	●	
SPIL Hsinchu	●	●				●	●	●	
SPIL Changhua	●	●				●	●	●	
SPIL Suzhou	●	●				●	●	●	
USI Taiwan	●	●	●			●	●	●	●
USI Zhangjiang	●	●	●			●	●	●	●
USI Kunshan	●	●				●	●	●	●
USI Jinqiao	●	●				●	●	●	●
USI Shenzhen	●	●				●	●	●	●
USI Mexico	●	●				●	●	●	●

[1] OHS Certification includes ISO 45001 or OHSAS 18001

LETTER FROM THE CHAIRMAN

> ASEH has been named Industry Group Leader in the Dow Jones Sustainability Indices for four consecutive years and is the first company in the global semiconductor industry to be listed three times on the CDP Climate Change A-List.

We are living in a rapidly changing era that is paved with challenges and jolted by turmoil. Climate change, escalating US-China trade conflict, geopolitical tensions and the coronavirus pandemic are impacting our lives like never before. This is a defining moment for business enterprises, and the need for transformation could not have come at a more pressing time than now. Technology can make a better world and this belief has driven us to commit ourselves to corporate sustainability through innovation, sustainable customer service and global co-development.

A corporate culture that encourages innovation

Low cost, multi-functionality, high performance and highly integrated features continue to drive consumer electronic trends. The semiconductor industry is reinforcing this trend by pursuing higher value system integration - highlighting the importance of innovating advanced IC and systems packaging technology for heterogeneous integration (HI). Over the course of the year, our team has remained focused on flip chip packaging, wire-bond packaging, wafer level packaging and, advanced packaging and modules. We have successfully developed several new products and technologies that enable ASEH to maintain market leadership for applications in 5G, artificial intelligence (AI), the Internet of Things (IoT), autonomous driving and smart manufacturing.

IC packaging technology has played a significant role upholding Moore's Law. While core CPU and memory IC scaling advancement continues, pan-Moore's Laws are enabling chip solutions to extend into non-traditional domains such as healthcare services and transportation logistics. Pan-Moore's Laws will drive expansion and innovation in heterogeneous integration with more complex combination of transistors, actuators, MEMS, sensors and other peripheral components. We believe that heterogeneous integration is the necessary technology for next generation applications and will spur the growth of the semiconductor industry. Smart manufacturing is a strategic approach for ASEH to advance heterogeneous integration and digital transformation. We apply artificial intelligence, big data, and cloud computing in our manufacturing operations, allowing us to help customers speed up time-to-market, provide quality products and coordinate closely with customers on product design.

Innovation is key to growth and smart manufacturing has enabled ASEH to achieve near-zero defect production, shorten production cycles and enhance production efficiency, thereby helping our customers gain a competitive edge in the market. We have also increased the value of our human capital by providing on-the-job training for manufacturing employees to transition to remote positions in facility control rooms. Through digitization, we were able to increase the number of equipment operated remotely from twenty-four to ninety. Employees benefit from such productivity with improved wages as well as a safer working environment.

Jason C.S. Chang
Chairman and CEO

Sustainable customer service

With the restriction on the ASE-SPIL merger lifted by the Ministry of Commerce of the People's Republic of China, ASEH has proceeded with the integration of both companies by prioritizing focus on advanced packaging R&D and, equipment and material procurement. The integration will lead to synergy in R&D investments, capacity building, gross margins and operating expenses, allowing us to better serve customers and maximize shareholder value. At the end of 2019, our subsidiary USI signed a share purchase agreement with the shareholders of Asteelflash, the second largest EMS company in Europe. The deal allows both Asteelflash and USI to complement each other in manufacturing locations, market and customer reach, business models and technological capabilities, and is aimed at expanding the group's footprint and long term business growth.

Green transformation is a major strategy at ASEH to combat climate change. By providing sustainable manufacturing services, we enable customers' success and bring convenience to life. In 2019, green energy accounted for roughly 14.27% of our total energy use, an increase of 1.56% compared with 2018 (12.71%). We executed 330 energy saving and carbon reduction programs, reducing total energy use by 16.7%, and achieving a carbon reduction of 437.7 ktCO$_2$e. We also leveraged on a financial instrument to support our sustainability efforts by issuing a US$300 million green bond, with the proceeds used for renewable energy, low-carbon buildings, circular economy and water management projects.

ASEH has adopted carbon management strategies, policies and systems focused on energy saving, green energy and energy storage to boost low carbon development. In addition to the existing enterprise risk management system, we adopted the Financial Stability Board's (FSB) Task Force on Climate-related Financial Disclosures (TCFD) framework to identify short, medium and long-term climate risks and opportunities, assess their operational and financial impact and severity, and propose concrete countermeasures and financial planning against potential material impacts.

Global co-development

Our supply chain partners are vital to the expansion of ASEH's value chain. We are forging strong partnerships with suppliers and actively investing in sustainable supply chain management to tackle global economic, climate and market challenges, and deliver quality products and services. To mark our appreciation and encourage performance, we presented fifteen Outstanding Supplier Awards, three Sustainability Excellence Awards, and six Sustainability Partnership Awards to our suppliers for their exceptional contribution in 2019.

Universities have always been ASEH's major innovation partners. We have collaborated with many top universities on automation technology R&D to shape the company's smart transformation and accelerate the execution of the smart factory blueprint. Industry-academia collaborations also provide opportunities for students to obtain practical experience and industry knowledge, and help retain these talents in Taiwan. On environmental technology, we are combining the strengths of the industry, academia and local communities to develop suitable technologies that aid in ASEH's green transformation. ASEH aims to share these new technologies with the industry and build a platform for technology exchange and adoption, to help reduce the environmental impact from manufacturing processes.

The prolonged Covid-19 pandemic has cast a cloud of uncertainty all over the world, and severely impacted the global economy. As an OSAT industry leader, ASEH is stepping up to navigate the industry through this extraordinary period, and continue to lead efforts in corporate sustainability. In 2019, we became the first semiconductor OSAT company to be named 'Semiconductors and Semiconductor Equipment Industry Leader' in the Dow Jones Sustainability Indices for the fourth consecutive year and the only Taiwanese company to be listed three times on the CDP Climate A list. ASEH is a beacon in the semiconductor industry promoting growth and innovation, and with our 2025 goals, we will blaze the trail in sustainability development.
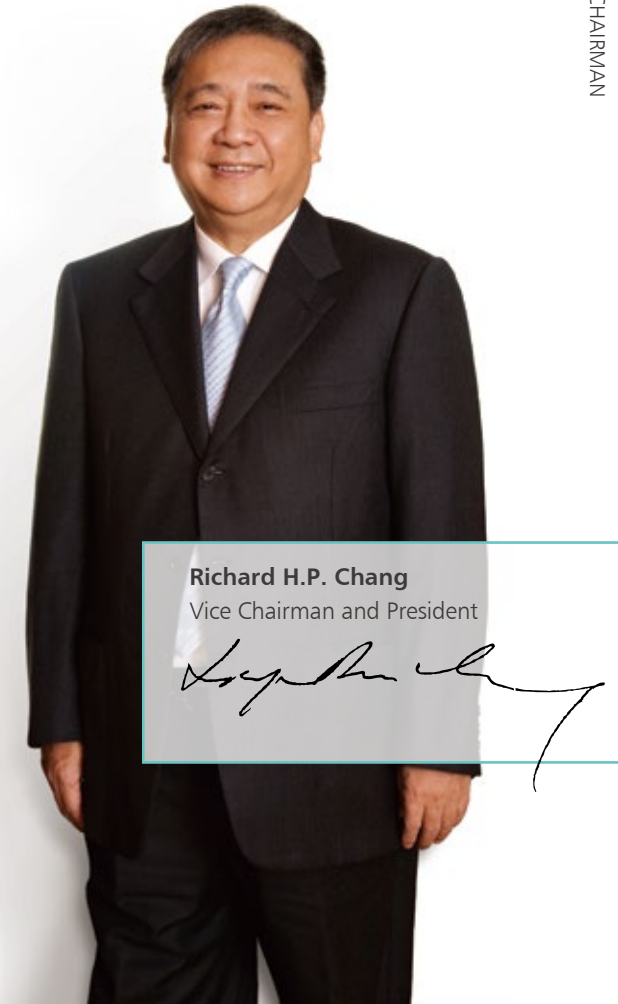
Richard H.P. Chang
Vice Chairman and President

OPERATING MODEL

1.1 Company Profile

ASE Technology Holding Co., Ltd. (TAIEX: 3711; NYSE: ASX), established in April 2018 and its subsidiaries include ASE, SPIL and USI. ASEH's mission is to create a business model that combines the strengths of member companies to enhance research and development, increase the level of competitiveness, develop an integrated supply chain and expand our global market footprint. Our structure enables us to innovate and develop miniaturized, high performance and highly integrated services for customers to increase the speed to market for their next-generation products and solutions. By integrating the group's resources, we can continue to explore strategic opportunities with industry partners to strengthen technology innovation and reduce risks, and to create a sustainable future for the industry. For details, please visit www.aseglobal.com

Service Scope

ASEH is the leading provider of semiconductor manufacturing services in assembly and test. The company offers complete turnkey solutions covering front-end engineering test, wafer probing and final test, IC packaging, materials and electronic manufacturing services and develops leading edge technologies to serve the semiconductor, electronics and digital technology market.

Material
(Substrates)

IC Design ≫ Front-end Test Engineering ≫ Wafer Fab ≫ Wafer Bump & Probe ≫ IC Packaging (Assembly) ≫ Final Test ≫ Module, Board Assembly & Test
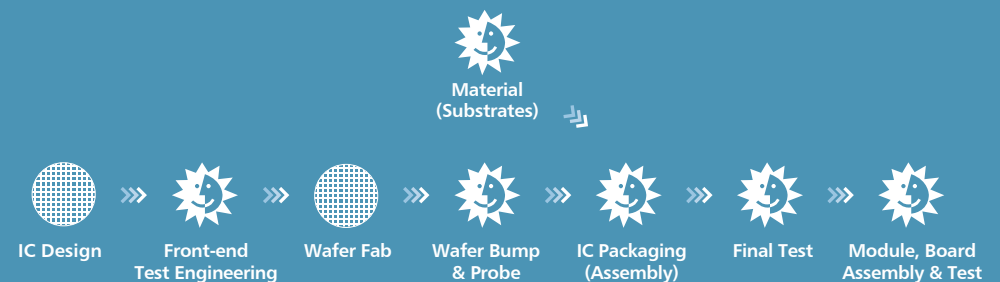
Global Operation

ASEH has a worldwide headcount of over 89,000 employees (as of December 2019). Our sales and manufacturing facilities are strategically located globally in Taiwan, China/Hong Kong, South Korea, Japan, Singapore, Malaysia, Mexico, U.S.A., Poland and key European cities (with future plans to expand in Brasil).

- ● IC Services
- ● System Services
- ● Service Centers
- ● Sales and Representative Offices
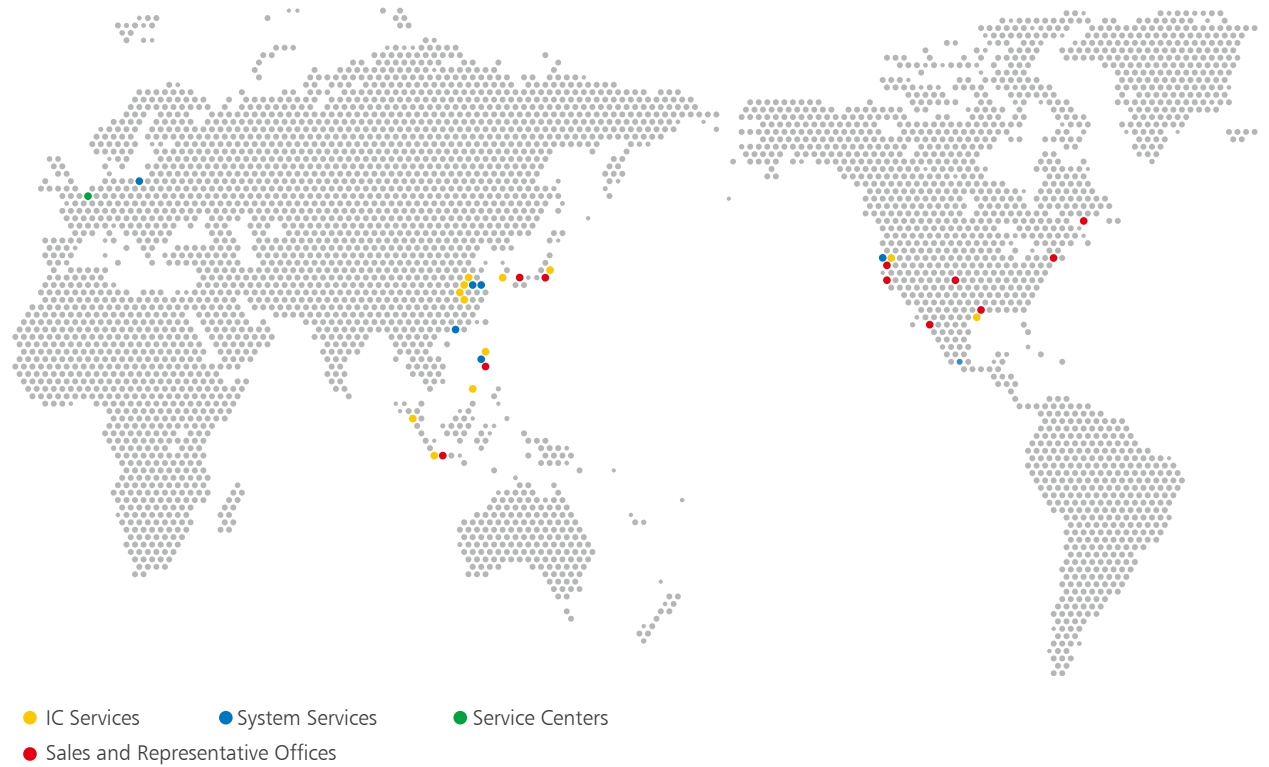
1.2 Mission and Vision

ASEH offers the best manufacturing services in semiconductor packaging/testing, substrates, and systems. We act as an extension of our customers' own operations, helping them achieve maximum success through efficient resource utilization and our extensive manufacturing chain. To stay ahead of the semiconductor technology curve, ASEH builds a highly experienced and skilled engineering team that continually innovates and develops the most advanced semiconductor technologies.

ASEH adheres to the highest corporate governance standards and transforms business philosophies into sustainable actions. As a major player of the global semiconductor chain, we carefully strategies according to industry development and trends, and seek talent and resources worldwide. We form strategic alliances with the government, industry, academia and business partners to keep innovating and create a mutually beneficial business environment. These alliances help support our sustainable development goals to achieve the betterment of mankind and ecological conservation.

ASEH Value Creation Model

In alignment with our mission and vision, and to maintain industry innovation and leadership, we incorporated future industry trends together with the feedback from our senior management and operating units on the indicators about corporate sustainability to establish the ASEH Value Creation Model.

Our value creation model consists of three strategies — Integrate, Expand, Innovate. The model enables ASEH to respond to future challenges and more importantly, it forms the basis of ASEH's foundation in integrating sustainability into our business strategy.

Integrate
resources across organizational boundary

Expand
industry influence through scale up

Innovate
value differentiation through technology
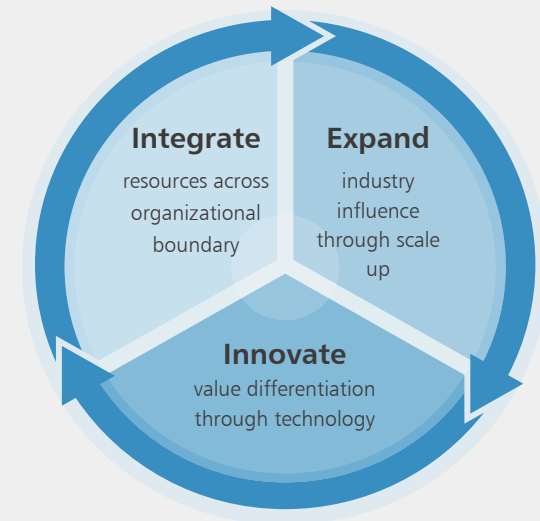
1.3 Financial Performance[1]

Our consolidated operating revenues increased by NT$42.1 billion, or 11.3% annually, to NT$413.2 billion in 2019 as compared with 2018. The revenues of the business sector of packaging and testing (excluding substrate, inter-segment and real estate revenue), increased by NT$27.4 billion, or 12.8% annually, to NT$241.6 billion in 2019 as compared with 2018. In addition, in the business sector of EMS, the revenues increased by NT$13.9 billion, or 9.2% annually, to NT$165.8 billion in 2019 as compared with 2018. The revenues have grown steadily as compared with 2018, which reflected the management team's efforts during the significant business fluctuations of 2019.

2019 Revenue

We categorize our operating revenues geographically based on the headquarters in which customers are located.

0.45%

9.35%

12.40%

18.38%

59.42%

- United States
- Asia
- Taiwan
- Europe
- Others

Annual Operating Revenues

Unit: NT$ Million

	2015	2016	2017	2018	2019
	283,302.5	274,884.1	290,441.2	371,092.4	413,182.1
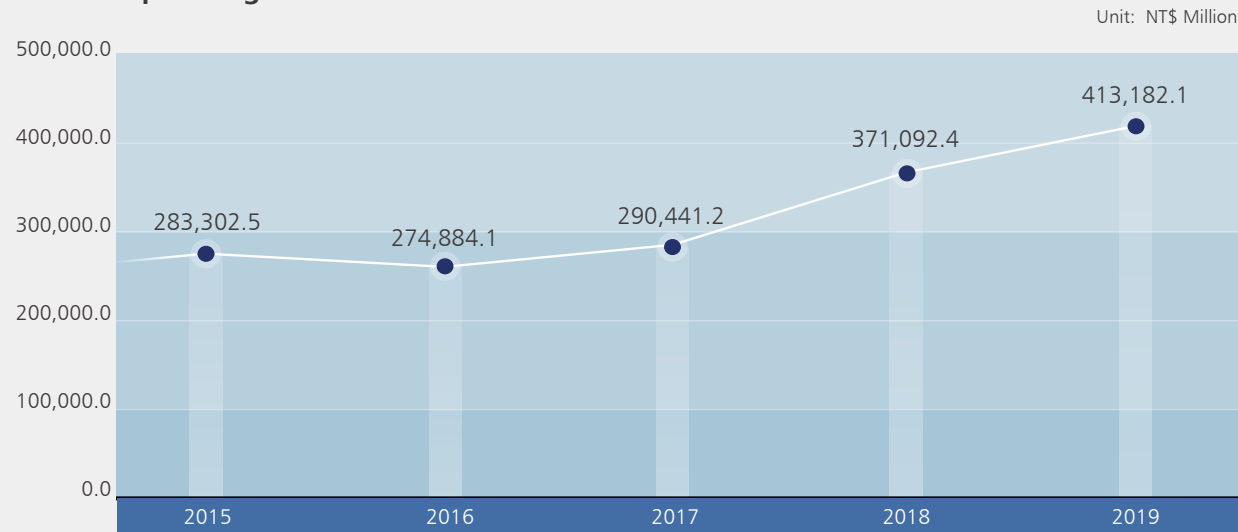
[1] For further details on financial performance, please refer to our consolidated financial report: http://ir.aseglobal.com/html/ir_financial_overview.php
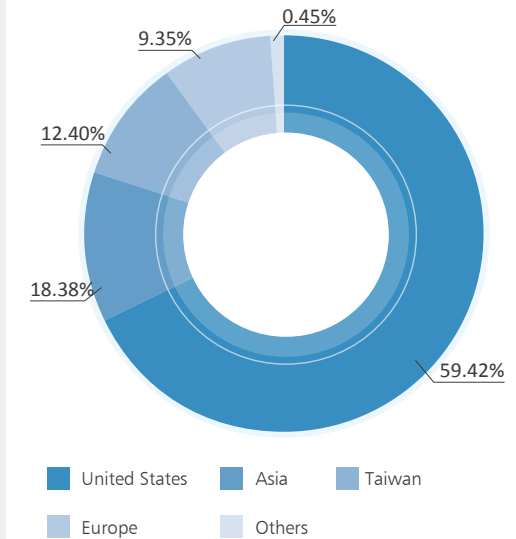
SUSTAINABLE GOVERNANCE

2.1 Organization and Structure

ASEH established the Corporate Sustainability Committee (CSC) to achieve effective implementation of corporate social responsibility and the company's sustainability targets. The CSC is headed by ASEH's Chief Operating Officer and is responsible for planning and executing the group's sustainability action plans, overseeing work progress, and reporting to the Board of Directors. The CSC has five sustainable development taskforces, for which the appropriate senior executives are appointed as taskforce coordinators who hold regular meetings on sustainability issues. Additionally, ASEH established the Corporate CSR Division as the secretariat of the CSC in order to facilitate the effective execution of the sustainability targets set by the CSC. The Corporate CSR Division is dedicated to integrating ASEH's global resources and implementing sustainable development strategies from the top down.

Board of Directors

- Identify corporate-wide sustainability mission or vision
- Declare policies, systems or relevant management guidelines

Corporate CSR Division

- Integrate corporate sustainability action plans and promote the execution of action plans
- Assess corporate-wide sustainability performance
- Lead information disclosure efforts for corporate-wide sustainability performance

Corporate Sustainability Committee

- Develop and establish corporate-wide sustainability vision, policies, and targets
- Identify risks and opportunities related to sustainability issues and determine responsive strategies and investments
- Supervise the planning and implementation of sustainability strategies
- Oversee corporate-wide sustainability performance and information disclosure

Corporate Governance Taskforce	Environment & Green Innovation Taskforce	Supply Chain Management Taskforce	Employee Care & Development Taskforce	Social Involvement Taskforce

- Develop action plans in response to the sustainability targets
- Monitor implementation progress of the action plans and evaluate performance
- Provide consultancy, as well as expertise and experience sharing for sustainability issues

Corporate Sustainability Committee Members

Jason C.S. Chang
ASEH
CEO

Tien Wu
ASEH
Group COO

Joseph Tung
ASEH
Group CFO

Jeffrey Chen
USI Inc.
Chairman

Raymond Lo
ASE Kaohsiung
General Manager

TS Chen
ASE Chungli
General Manager

Dtuang Wang
ASEH
Group CAO

All of our achievements are a result of ASEH's implementation of corporate sustainability. The Corporate CSR Division and the five sustainable development taskforces evaluate the group's annual sustainable development performance and achievements and report them to the CSC, which reviews the achievement rates for short, medium, and long-term sustainability targets. In 2019, the CSC established long-term targets for 2025 and consulted with professional consultants regarding preparatory measures for transformation toward corporate sustainability and information security governance. For more information, please refer to the relevant chapters.

2019 CSC Key Projects

Taskforce	2019 Key Projects	Partners	Positive Changes
Corporate Governance Taskforce	Corporate Governance Evaluation System	• Authorities • External Consultants • External Professional Institutions • Academic & Research Institutions • Energy Certificate Trading Companies	**Operational Benefits** • Enhancement of Corporate Governance Mechanisms • Improvement in the Eco-Efficiency of Manufacturing Processes • Implementation of Procurement Risk Management • Strengthen Employee Recruitment and Retention **Social Benefits** • Mitigation of Extreme Climate Change • Development of Local Communities • Improving the Positive Impact of Value Chain Activities
	Internal and External Evaluation of Board Performance		
	Implementation of Integrity Management		
	Information Security Management Strategy		
Environment and Green Innovation Taskforce	Incorporation of an Environmental Information System Platform (Two-Year Term)		
	Source Power from Renewable Sources of Energy		
	Implementation of Smart Grids		
Supply Chain Management Taskforce	Conflict Minerals Management		
	Supply Chain GHG Inventory Assistance Project		
	Labor Rights Risk Assessment and Improvement Plan		
	Supply Chain Greenhouse Gas Counseling Impact Assessment		
Employee Care and Development Taskforce	Employee Engagement Survey		
	Legal Compliance for Expatriate Employees		
	Development of Skilled Talent		
Social Engagement Taskforce	Establishment of Social Involvement Policies		
	Blessed and Joyful Learning Education Program (for Senior Citizens)		
	Educational Support Program for Rural and Disadvantaged Students		

Sustainable Management Framework and Strategy

We have established our sustainable management framework in accordance with our Corporate Social Responsibility Best Practice Principles and Corporate Sustainability and Citizenship Policy. We have also identified sustainable development opportunities through risk identification and close collaboration with our partners and stakeholders. ASEH works with external parties to implement its goals and targets in sustainable development, strengthen the company's business decision-making process, and create a sustainable business model.

ASEH Sustainable Management Framework

Corporate Social Responsibility Best Practice Principles
Corporate Sustainability and Citizenship Policy

Mission
- Have a positive influence on the society

Vision / **Principles**
- Provide a unified solution for creating efficient semiconductors
- Elevate R&D capability
- Compliance with highest corporate governance standards
- Implement sustainable business philosophies
- Cost control
- Integrated risk management
- Development of advanced technology
- Demonstration of a responsible attitude

Strategies
- Circular
- Inclusive
- Low Carbon
- Collaborative

Operation
- **Assembly** ASE and SPIL
- **Testing** ASE and SPIL
- **Material** ASE
- **Module** USI

Stakeholder
- Shareholders
- Employees
- Customers
- Suppliers
- Government
- Industry Unions and Associations, NGOs
- Media
- Community

Dimensions
- Integrity and Accountability
- Innovation Service
- Green Manufacturing and Low-Carbon Transformation
- Inclusive Workplace
- Responsible Procurement
- Corporate Citizenship

Objectives
- Ensure that the products, components, and raw materials associated with the ASEH value network can all be recycled, and maximize their efficiency and value while using them
- Establish ASEH emerging business models to create social value
- Develop ASEH into a climate leader and provide the global market with low carbon solutions
- Accelerate sustainable growth and social development as well as co-create shared value by engaging in collaborative innovation

Enriching and Promoting Sustainable Culture

While we continue to strengthen our competitive position, we are also actively fulfilling our corporate social responsibility through multi-faceted sustainability programs. The spirit of CSR is firmly embedded into our corporate culture and forms a significant part of our employees' everyday lives. We connect with external stakeholders to form an ever-expanding virtuous cycle that helps our business partners understand the culture of sustainability at ASEH. We have set a 30-year time frame to advance our sustainability development and continually examine the innovativeness of our plans throughout the process. The core values of ASEH's social responsibility are predicated upon these integrated efforts that achieve maximum synergy and keep pace with the times.

• Business Partners
• External Stakeholders
• Society
Innovativeness ▶
Originality ▶
• **Sustainability Culture**
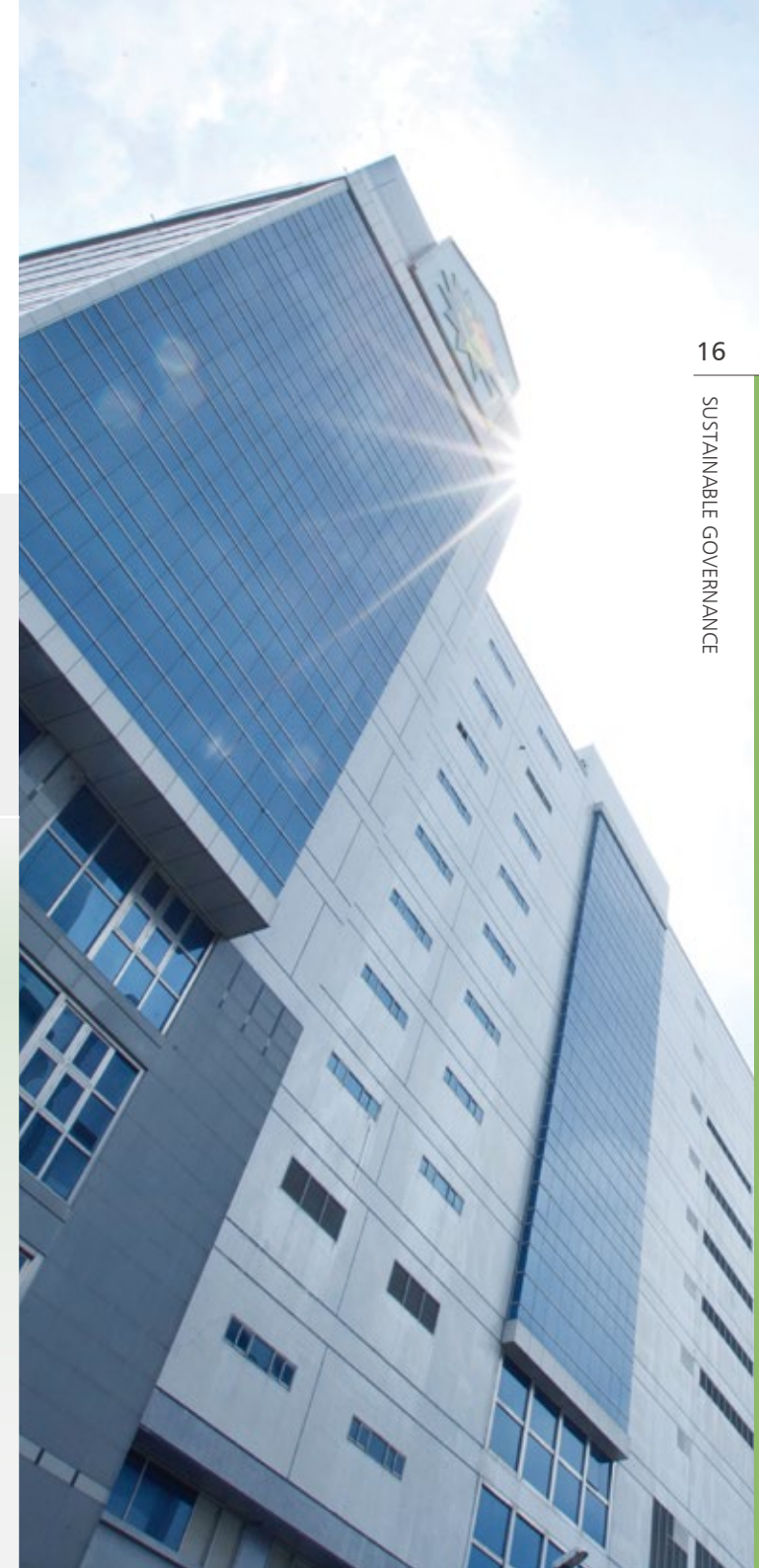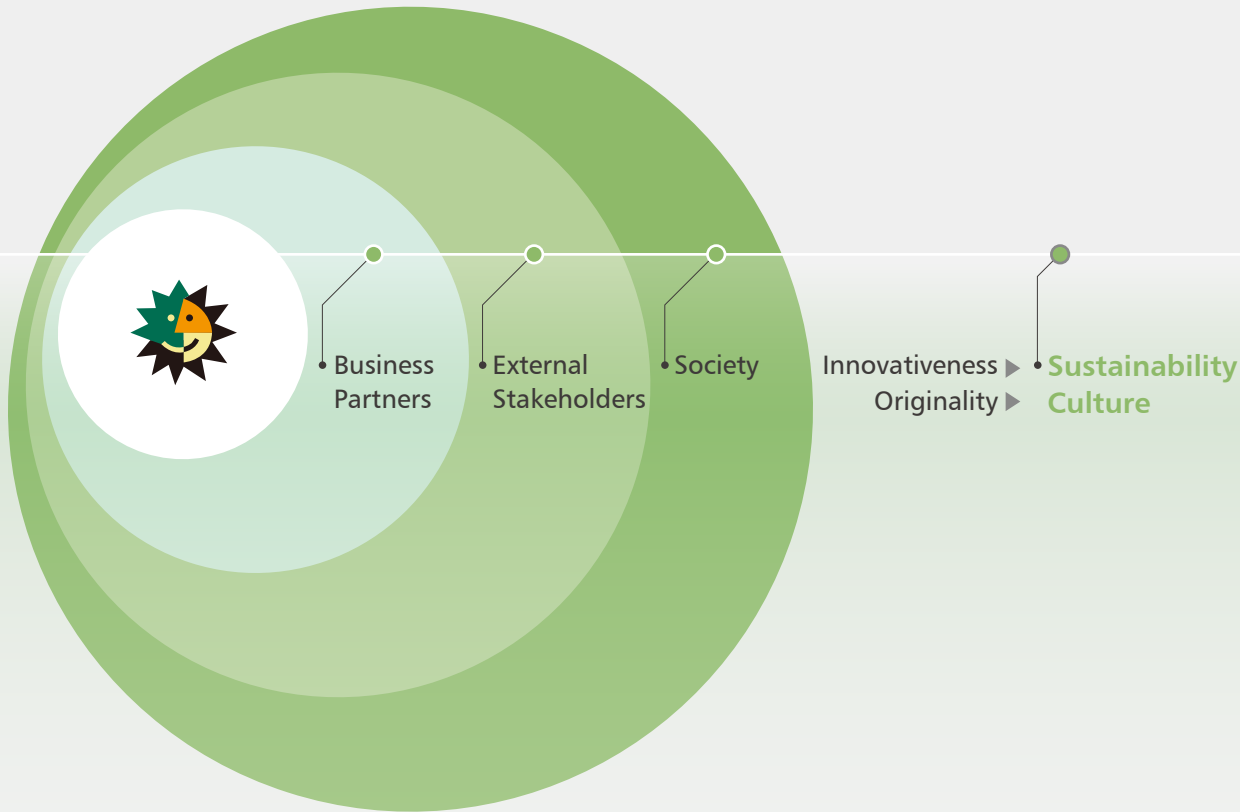
2019 was an active year of sustainability development for ASEH. 1) Economic performance. Throughout the year, we held supplier sustainability meetings at our key global sites. We evaluated suppliers' SDG performance, and created the Supplier Sustainability Awards to encourage suppliers to commit and support the company's SDGs. 2) Environmental performance. We co-organized the 'Circular Economy Forum' with the Taiwan Alliance for Sustainable Supply (TASS) to promote a supply chain circular economy within TASS members and ASEH suppliers in particular, and the semiconductor industry, in general. To combat global warming, we advocated the building of energy efficient living spaces and co-hosted the 'Low Carbon Building Forum' with academic institutions. Members and representatives from the construction industry associations were invited to the forum to share their ideas on balancing urban development and environmental protection through the use of eco-friendly building materials and the adoption of low carbon design. 3) Social performance. We work closely with local communities to contribute to an inclusive social development and organize social cohesion activities such as the 'Blessed and Joyful Learning' holistic health care and education program for 180 senior citizens at our ASE Chungli and USI Taiwan facilities.

Corporate culture is a key driver of corporate sustainability. In addition to our annual CSC Meeting and CSR Kick-off Meeting, the Corporate CSR Division has also organized six lectures to promote a CSR-centered corporate culture and share sustainability issues and achievements with employees. Through a diverse curriculum of online training and group activities including management sustainability forums for our managers and sustainability training for new employees, we were able to raise awareness and strengthen ASEH's corporate sustainability culture.

ASEH is a member of the Responsible Business Alliance (RBA). ASEH requires all the manufacturing facilities of its subsidiaries to complete the annual RBA self-assessment questionnaire (SAQ) in order to identify any potential labor, environmental or ethical risks in their operations. In parallel, ASEH adopted the RBA Validated Assessment Program (VAP) to audit the environmental and social aspects of sustainable management at these facilities, including the implementation of management systems and their performance. In 2017, the CSC mandated that all ASEH manufacturing facilities worldwide implement the RBA VAP by 2019. Audits of these facilities conducted by independent third-party auditors serve as the basis for future improvements and effectively reduce operational risks.

ASEH has achieved its goal set in 2017 to adopt the VAP at 24 facilities in Taiwan, China, South Korea, Japan, Malaysia, Singapore, Mexico and the U.S.A. We provide the audit reports from these facilities to our customers via the RBA-Online system.

CSR Culture Promotion Lecture

SPIL Supplier Day
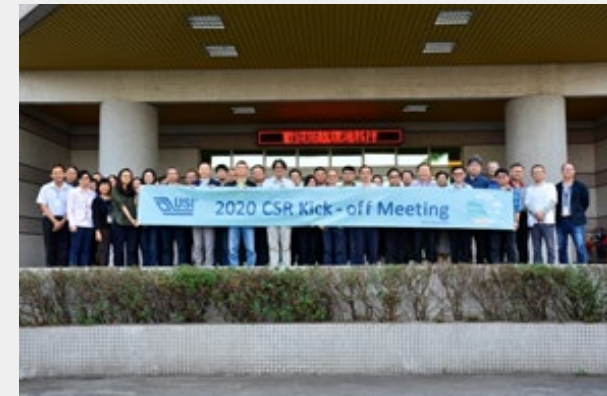
USI CSR Kick-off Meeting

2.2 Sustainability Strategies

Strategy-setting is the key to achieving long-term sustainability targets that tackle global climate challenges, uncertainties in the energy supply, and risks related to supply shortages of water, raw materials and other resources faced by businesses. To that end, ASEH has established four strategic sustainability pillars: Low Carbon, Circular, Inclusive and Collaborative, to help identify opportunities and growth drivers. We are committed to the creation of sustainable value and, to extending our strategic influence through external stakeholder communication and joint efforts with various interest groups to achieve a virtuous cycle of sustainability.

Human Capital Development & Management

Circular
- Circular Design
- Water Cycle
- Waste/Reusable Resource Management

Inclusive
- Social Impact
- Social Innovation

Disruptive Innovation

Green Innovation

Integrate **Innovate**

Inclusive Innovation

Expand

Low Carbon
- Carbon Management
- Low Carbon Products/Services
- Adaptation & Resilience
- Enable Sustainable Lifestyles
- Green/Renewable Energy Investment

Collaborative Innovation

Collaborative
- Smart Procurement
- Strategic Partnership
- Supply Chain Management Go High Tech

Capitalization of Corporate Value

◄ **Sharing and Diffusion of Intangible Knowledge to the Society** ►

Sustainability Vision

In our annual CSC Meeting, we review the achievement rates of our sustainability goals, and disclose the progress toward goals and the status of projects, providing visibility to employees, partners, customers and the general public. In 2019, we established our long-term sustainability targets for 2025 based on major sustainability topics and their relative importance to our business operations. These targets serve to strengthen the correlation between the SDGs and our sustainability strategies, leading to the ultimate fulfillment of ASEH's commitment to corporate social responsibility.

Strategic Approach and Goals of Key Issues

On schedule   Room for improvement

Dimensions	2019 Key Issues	Business Impact on ASEH	Strategic Approach	2025 Target	Progress/ Status
Integrity and Accountability	Regulatory Compliance	Compliance with all applicable laws ensures public trust and helps reduce financial risks that would occur either directly through fines or indirectly through impacts on reputation.	Ensure compliance with all applicable laws: Continuously promote compliance awareness through education and training, and improve compliance management systems and processes.	• Cases involving violations by ASEH：0 • Major cases involving violations by ASEH subsidiaries：0	
	Business Ethics	Establishing norms of business conduct and ethics, and creating an honest and responsible culture are key to our long-term business success.	Implement business conduct and ethics-related policies and regulations: Continue to promote education and training, commit to comply with ethical standards in all ASEH business activities, and ensure the effectiveness of reporting systems by audit.	• Employee training coverage : 100% • Subsidiary roll-out coverage : 100%	
Innovation Service	R&D and Innovation	Continuous innovation of technologies lower costs, improve efficiency, thereby reducing resource consumption and energy consumption. In addition, business model innovation on the value chain can increase ASEH's core competitiveness and enable expansion capacity.	• Set up a patent reward program to encourage patent applications, that will strengthen the company's operations and IP portfolio. • Establish patent applications as the Key Performance Indicator of the Annual Objective Deployment (AOD).	9,000 patents granted [1]	
	Customer Relationship Management	Good customer relationship management helps to improve our customers' satisfaction and loyalty, thereby increasing our profit and core competitiveness.	Continuously enhance customer communication: Providing diverse communications channels to enable instant interaction and communication with customers; enhance information security management to ensure the confidentiality and integrity of customer proprietary information.	Customer satisfaction: 90%	

[1] The number of approved patents includes the number of abandoned patents and expired patents.

Dimensions	2019 Key Issues	Business Impact on ASEH	Strategic Approach	2025 Target	Progress/ Status
Green Manufacturing and Low-Carbon Transformation	Energy Management	Having an effective energy management system helps to increase our energy efficiency and lower our energy costs, thereby reducing our energy consumption and GHG emissions.	Continue to improve energy management: Establish standardized management systems through ISO 50001, improve energy efficiency through PDCA improvement method, and build smart energy management systems to facilitate precise control and lower standby mode energy consumption.	• More than 2% energy saving ratio (current year's energy saving from projects/total electricity consumption of the year) • Renewable energy to account for 27% of total energy consumption by 2025.	
	Climate Change	Climate change is now regarded as the major global environmental issue. As ASEH continues to expand, the company becomes increasingly energy-dependent and faces growing pressure from customers, government and other stakeholders to shift to renewable energy.	Reduce GHG emissions & provide green manufacturing services: Green facilities (efficient building designs), energy conservation, efficient use of natural resource, adopting renewable energy (such as solar installations and green power purchases), and green product design.	• GHG intensity (GHG emissions per revenue): achieve 10% reduction from 2015 to 2025 • Non-renewable energy intensity (non-renewable energy consumption per revenue): achieve 10% reduction from 2015 to 2025	
	Water Resource Management	Effective water resource management diminishes the impact of water shortages on ASEH and the value chain, and strengthens corporate competitiveness.	Establish sustainable water recycling system: Set up ASEH water management objective and strategy based upon integrated circular thinking.	• Water use intensity (water use per revenue): achieve 10% reduction compared to 2015 • Day(s) of production shutdown in Taiwan facilities due to phase 3 water rationing (30% volume reduction of water supply): 0	
	Waste and Circular	Effective waste management can reduce waste generation and related costs, and continuously reduce ASEH's operational impact on the environment.	Improve source management: Identify and develop materials and production process with circular potential to minimize waste.	• General waste recycling rate: 90% • Hazardous waste intensity (hazardous waste generated per revenue): achieve 10% reduction compared to 2015	
Inclusive Workplace	Talent Attraction and Retention	Good labor relations promote organizational harmony and improve organizational competitiveness.	Implement employee engagement survey and feedback mechanisms: Encourage employees to actively participate in company activities, solicit for feedback using our employee engagement survey, and offer competitive compensation and benefit programs.	• Deployment of employee engagement survey: employee engagement at 85% or above with a survey response rate of 95% or above • Turnover rate less than 20%	
	Talent Development	Good training and development programs help attract and retain talents, and create a pleasant working environment, thereby enhancing ASEH's productivity, strengthening innovation and enhancing profitability.	Enhance talent development and training effectiveness: Provide challenging and valuable professional career for employees by offering training and promotion opportunities within the company.	• Training effectiveness system deployed at 85% of company facilities worldwide • Key talent retention rate greater than 90%	

Dimensions	2019 Key Issues	Business Impact on ASEH	Strategic Approach	2025 Target	Progress/ Status
Inclusive Workplace	Human Rights	Upholding fundamental rights of employees as well as creating an environment that guarantees human rights are essential for a sustainable business.	Protection of human rights: Prohibition of forced labor, child labor, discrimination and harassment; ensuring rights of freedom of association and privacy; provision of reasonable working hours and appropriate compensation and benefits.	• Complete assessment of human rights risks for foreign labor • Facilities that do not meet the RBA working-hour guidelines should set up a system for monitoring overtime hours.	
	Occupational Health and Safety	Having an advanced and proactive health and safety management system is conducive to reducing absenteeism and improving productivity and quality.	Continuously improve health and safety management system: Make all reasonable efforts to prevent accidents and promote health.	• Disabling Frequency Rate (F.R.) and disabling Severity Rate (S.R.) less than 0.4 and 5 respectively • Major injury and occupational disease: 0 case	
Responsible Procurement	Sustainable Supply Chain	Establishing a sustainable supply chain is a win-win strategy that strengthens the protection of our suppliers' employees and assets and indirectly improves our competitiveness.	Ensure supply chain's sustainable development: Establish partnerships with our suppliers to ensure that they provide a safe working environment, their employees are respected and dignified, and their operations are ethical and environmentally friendly.	• Signing of Code of Conduct Agreement and completion of sustainability risk self-assessment by all new suppliers • Completion of sustainability risk survey by all first-tier suppliers • Completion of sustainability risk survey by over 50% of non-first-tier suppliers • Completion of sustainability audits conducted on 100 first-tier suppliers • Critical direct material suppliers of packaging and material service complete foreign workers' human rights risk assessment and improvement: 100%	
Corporate Citizenship	Social Involvement	Active community development through strategic charitable and educational programs, and social work helps to build positive and constructive relationships at the local level, strengthen our social license to operate and create a well-educated workforce for future recruitment.	Social involvement strategies: Environmental Conservation, Industry-academia Collaborations, Community Engagement and Public Advocacy	• Over 100 industry-academia collaboration projects on environmental technology • Over 500 students (potential talent for facilities) participating in the industry-academia collaboration program • Over 1,000 disadvantaged students attending the after school program	

2.3 UN Sustainable Development Goals and Sustainable Values Assessment

ASEH is building upon its technology leadership to steer the semiconductor industry towards greater sustainability. Since 2017, we have adopted the Total Impact Measurement and Management (TIMM) framework and Social Return on Investment (SROI) analysis to assess the social impacts and operational risks of the company's business activities using monetary valuation tools. In 2018, we began referencing the United Nation's Integrating the SDGs into Corporate Reporting: A Practical Guide to map out sustainable development goals (SDG) and sub-targets that need to be actively addressed. 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. After two years of continuous improvement, these outcomes have laid the groundwork for the Corporate Sustainability Committee to formulate a value creation pathway. 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. As such, we are able to fulfill our vision of promoting the United Nations' 2030 SDGs via our own core competencies.

Major ASEH valuation milestones

- Adoption of TIMM and SROI valuation tools
- Use of the SDG Compass Inventory of Business Indicators to redefine 2025 sustainable development strategies
- To Measure the positive and negative impacts of SDGs.

US$ 6,070	US$ 6,640	US$ 8,192	US$ 9,162
2016	**2017**	**2018**	**2019**
ASE USI	ASE USI	ASE USI SPIL	ASE USI SPIL

- Analysis of ASEH's highly relevant and actively addressed SDGs using the United Nations Global Compact's Integrating the SDGs into Corporate Reporting: A Practical Guide.
- Expansion of scope to include Siliconware Precision Industries Co., Ltd. (SPIL)

Unit: USD million

ASEH valuation model ▶

Integration
Integration of industry chains with internal and external resources

Expansion
Expansion of industry scale to increase industry influence

Innovation
Strengthening technologies and R&D to create value through differentiation.

ASEH Sustainable Strategy

Low Carbon
Circular
Inclusive
Collaborative

13 CLIMATE ACTION
7 AFFORDABLE AND CLEAN ENERGY
6 CLEAN WATER AND SANITATION
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
4 QUALITY EDUCATION
8 DECENT WORK AND ECONOMIC GROWTH

Economic Impact
US$ 5,724

Tax Impact
US$ 299

2019 ASEH Sustainable Value
US$ **9,162**

Social Impact
US$ 3,240

Environmental Impact
US$ -101

Shareholders
Customers
Employees
Government
Suppliers
Community

Contributions to global SDGs

In 2019, we adopted sustainability management measures for prioritized SDGs (decent work and economic growth, quality education, and climate action) to generate more positive impacts and contributions. Our business activities help boost GDP and local economies while at the same time, our business returns are invested into employee benefits, social welfare and renewable energy to give back to society. Demands on environmental resources in our business operations can result in negative impacts on the SDGs of affordable and clean energy, responsible consumption and production, and clean water and sanitation. We have therefore committed ourselves to mitigating these impacts by focusing on sustainability programs through our low carbon and recycling strategies. In 2020, we are refining our goals for 2025 based on our four major sustainability strategies, so as to fulfill our commitment toward realizing these SDGs.

2019 Sustainable value — US$ 9,162

- Partnership 2,892.3
- Employee engagement and development 297.1
- Education 4.1
- Social cohesion 11.7
- Employee health and safety 35.4
- Greenhouse gases -90.7
- Other air emissions -0.7
- Waste -3.0
- Water use -59.6
- Water pollution -8.5
- Recycle water 61.1
- Other taxes 78.1
- Profit taxes 221.4
- Payroll 2,610.7
- Profits 610.8
- Investment 1,767.7
- Intangibles 734.6

2018 Sustainable value — US$ 8,192

- Partnership 2,472.6
- Employee engagement and development 207.5
- Education 6.7
- Social cohesion 11.7
- Employee health and safety 10.1
- Greenhouse gases -79.0
- Other air emissions -0.8
- Waste -3.8
- Water use -53.2
- Water pollution -3.0
- Recycle water 49.4
- Other taxes 69.2
- Profit taxes 223.0
- Payroll 2,302.3
- Profits 895.9
- Investment 1,516.6
- Intangibles 567.3

Unit: USD million

Sustainability value and impacts

ASEH adopted the Total Impact Measurement and Management (TIMM) framework for sustainability valuation to quantify the sustainable value of the company's impacts in the economic, tax, environmental and social dimensions. In 2019, ASEH generated US$ 9,162 million worth of sustainable value for stakeholders, which is 12% higher than in 2018. The sustainable value of positive impacts increased by US$ 970 million.

Economic and tax dimensions: Growth in ASEH's business activities has resulted in substantial profit and economic value for shareholders, suppliers, employees and the government while helping to maintain the high quality of its R&D and innovation capabilities. In 2019, the total value generated increased by 8% mainly through the expanded recruitment of talent, issuance of employee stock option plans, increases in manufacturing capacity, investment in equipment and intangible assets, and initiation of multiple research and development projects to improve the company's competitiveness.

Environmental dimension: Environmental impacts primarily stem from the consumption of power, water, and chemicals and raw materials in the manufacturing and service processes. We therefore increased the percentage of renewable energy from 12% to 14% and water reuse by 24%. We also fulfilled our pledge to use the proceeds raised through 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.

Social dimension: The primary outcomes are the establishment of supplier partnerships and, employee development and support. The value of social impacts in 2019 increased by 20% compared to 2018. The difference in value stemmed from an increase in local procurement compared to the previous year, which increased the assessed value of local employment and economic prosperity, and the positive developments in supplier and employee competitiveness created a heightened level of giving back to the community.

2018~2019 ASEH Sustainable Values

■ 2019 ■ 2018 Unit: USD million

Dimension	2019	2018
Social	3,241	2,708
Environmental	-101	-90
Tax	299	292
Economic	5,723	5,282
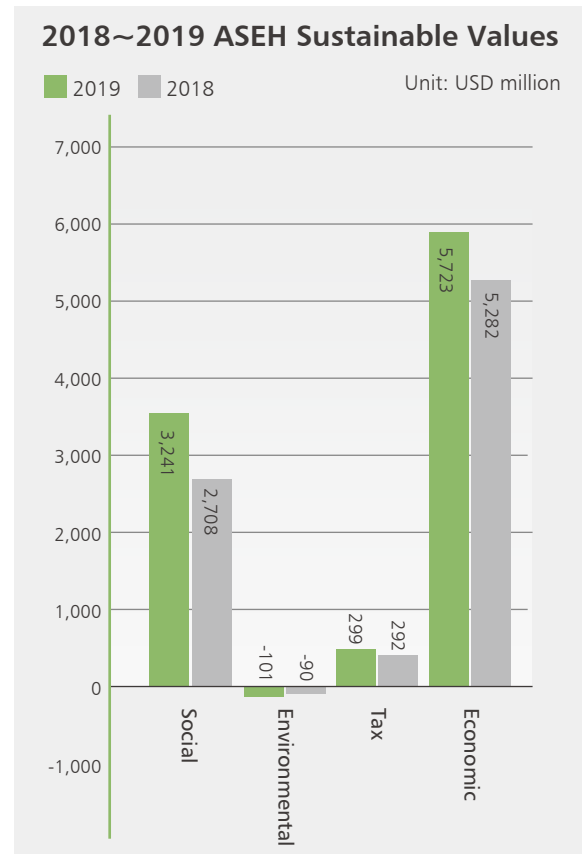
Environmental impact

In 2019, ASEH's overall environmental impact of US$101 million is mainly attributed to resource consumption and environmental emissions from its business activities. We have paid close attention to the energy and resource efficiency of our facilities and put in place environmental programs to generate positive impacts and mitigate the external cost on the environment. In 2019, the merger with SPIL and the accompanying growth in output resulted in a greater environmental impact. However, compared to 2018, there was a significant reduction in the impact of hazardous and non-hazardous waste, and a minor reduction in impacts from air pollutants; there was a slight increase in impacts due to greenhouse gas emissions and water use. We shall continue to invest in renewable energy to achieve carbon neutrality, increase water efficiency to reduce our ecological footprint, and expand the scope of our environmental impact management to reach our sustainable development goals of low carbon emissions and recycling.

Assessment of environmental impacts in 2019[1]:

Input	Output	External Impact
The manufacturing activities at ASEH's nineteen semiconductor assembly and testing facilities and six electronics manufacturing facilities in Taiwan,China, South Korea, Japan, Singapore, Malaysia, the US, and Mexico. Major demand for raw materials, energy consumption of 3,588,895 MWh (3,076,829 MWh of non-renewable energy and 512,067 MWh of renewable energy), total water use of 24,177 megaliter, and investment in environmental protection US$30 million.	**Greenhouse gas emissions (↓)** Scope 1 greenhouse gas emissions: 98,880 tCO_2 Scope 2 emissions:1,695,223 tCO_2e Total greenhouse gas emissions reduced by 40,500tCO_2e (2.21%) compared to 2018 **Air pollutant emissions[2] (↑)** Total air pollutant emissions[2] of 255 tons, 29 tons (13.03%) more than in 2018 **Waste disposal (↓)** Disposal of 11,850 tons of hazardous waste and 3,098 tons of non-hazardous waste; total waste disposal reduced by 3,099 tons (17.17%) compared to 2018. **Water use (↑)** Total water withdrawals of 24,177 megaliters, 1.32 megaliters (0.01%) more than in 2018 **Waste water discharge (↓)** Wastewater[3] discharge of 18,778 megaliters, 230 megaliters (1.25%) less than in 2018	• ASEH's overall environmental impact totaled US$101 million. Assessed external impacts include employee and public health, property damage, financial losses, impacts to ecosystems, and natural capital losses and other impact pathways. The major SDGs affected by negative external impacts are clean water and sanitation, affordable and clean energy, responsible consumption and production, and climate action. • The overall positive environmental impact totaled US$61 million, which is 23.45% higher than that of 2018. Major corrective actions taken included the use of pollution prevention and control technologies to mitigate impacts due to waste water discharge. The adoption of a water recycling management system for our manufacturing processes resulted in the recycling of a total of 28,138 megaliters of waste water. These measures resulted in positive contributions to the SDGs of clean water and sanitation and responsible consumption and production. • Negative impacts due to waste disposal were reduced by US$740,000 compared to 2018. Major corrective actions taken included the adoption of recycling management measures. The amount of recycled organic waste water, plastics, liquid waste containing cyclopentanone, and other waste totaled 54,847 tons, an increase of 9.7%. • ASEH's major policy initiative to invest in sustainable energy resulted in a 26.06% increase in sustainable energy purchases in 2018, which resulted in a positive contribution of US$19 million

Note: ↓ : decrease; ↑ : increase

Social impact

Social impact assessment allows ASEH to manage the sustainability values generated in areas including supplier partnerships, employee engagement and development, employee health and safety, and education and community cohesion. In 2019, ASEH's overall social impact totaled US$3,241million, with US$3,227 million directly resulting from the company's operations[4]. The value is mainly attributable to supplier partnerships and human capital development and support, and has resulted in positive impacts on quality education, decent work and economic growth, and responsible consumption and production.

[1] For more information on ASEH's sustainable values, please refer to ASEH's Total Impact Measurement and Management Report 2019.

[2] Air pollutants include sulfur oxides, nitrogen oxides, volatile organic compounds, and particulates.

[3] Waste water pollutants include suspended solids, ammoniacal nitrogen, copper, nickel, phenols, oils (extracted with n-hexane), cadmium, lead, total chromium, hexavalent chromium, zinc, arsenic, fluoride, nitrate nitrogen, phosphate, dissolved iron, dissolved manganese, selenium, tin, boron, molybdenum, sulfide, and toxic organic compounds.

[4] The value of social impacts resulting directly from the company's operations is calculated by monetizing social impacts. The calculations therefore excluded public welfare activities and non-industry-academia educational projects.

Social Impact Assessments 2019:

Input	Output	External Impact
Direct operations: Inputs directly related to the operations of ASEH and its subsidiaries include: • Organization of educational training, seminars, and forums for suppliers to enhance suppliers' capabilities • Sustainability audits of 115 raw materials suppliers • Procurement of 40% of raw materials from local suppliers[1] • Comprehensive employee engagement survey • Regular risk assessment and continuous improvement of occupational health and safety • Investment of approximately US$3 million in employee health checkups • Investment of approximately US$1 million in industry-academia occupational training	**Supplier partnerships:** • Supplier audit results[2] showed that 42% of nonconformities were related to occupational health and safety, 26% were related to labor, and 22% were related to management systems, with 10% in the miscellaneous category. • 365 suppliers participated in supplier educational training, seminars and forums **Employee engagement and development:** • Employee engagement surveys showed an engagement rate of 83% with a response rate of 82.1% **Employee health and safety:** • 156 occupational injuries, including 138 physical injuries, 4 chemical injuries and 14 ergonomic injuries • Over 82,400 employees participated in health checkups **Education:** • Conducted a total of 97 industry-academia projects on innovative semiconductor research and development.	**Social impact resulting directly from operations totaled US$3,227 million. Substantial outcomes include:** • **Supplier partnerships:** We used the cost approach valuation and contingent valuation methods to assess that the value generated totaled US$2,892 million, including that corrective action reduced the suppliers' property losses and occupational hazard risks, and the training improved suppliers' capabilities. Over 91% of our suppliers have shown improved competitiveness and business expansion through educational training. • **Employee engagement and development:** Survey results showed that investment in human capital builds a sense of achievement and belonging in the workforce and improves employee competitiveness and management capabilities. Based on the degree of these outcomes, it was estimated that the social value generated was US$297 million. • **Employee health and safety:** We used the cost approach valuation to assess the positive and negative impacts of healthier work environments and occupational injury incidents. Positive impacts included the increased chance of disease recovery and reduced financial stress from medical costs due to employee health checkups, which were assessed at a value of US$36 million. Negative impacts included harm to employees' physical, mental, and spiritual wellbeing due to occupational injury incidents, which were assessed at a negative value US$500,000. • **Education:** We used the value transfer method to assess the social value of industry-academia occupational training related to business activities, which totaled US$2 million. The major outcome was the increased operational efficiency achieved by the acquisition of technological advantages and industry talent through the various R&D projects and teaching programs conducted via industry-academia collaborations with multiple colleges and universities.
Indirect operations: • To promote social cohesion, ASEH and its subsidiaries organized public welfare activities and invested a total of approximately US$3 million in seven categories: community development, community care, care for disadvantaged families, healthcare sponsorships, arts and culture sponsorships, sports sponsorships, and reforestation. • Investment of US$1 million in education, including environmental education	• A total of 227 outputs in social cohesion activities, including 7 in community development, 101 in community care, 56 in care for disadvantaged families, 1 in healthcare sponsorships, 39 in arts and culture sponsorships, 21 in sports sponsorships, and 2 in reforestation • A total of 29 outputs in education, including 23 in environmental education and 6 in other categories	• We used the value transfer method to assess the social value of public welfare activities that promote social cohesion, which totaled US$12 million. Of these activities, arts and culture sponsorships accounted for the largest percentage at 46%, followed by reforestation and care for disadvantaged families, both of which accounted for 15%. The three major outcomes-promotion of artistic literacy among the general public, improvement of local water quality through environmental protection, and improved efficiency of local community resources-have improved the well-being of the residents of local communities. • We used the value transfer method to assess the social value of environmental education, which was estimated to be US$2 million. The major outcome was improved environmental awareness in the general public and their ability to incorporate eco-friendly actions and behavior into everyday activities.

[1] Please refer to Chapter 7.1 of this report (Supply Chain Overview)

[2] Please refer to Chapter 7.3 of this report (Supply Chain Sustainability Management)

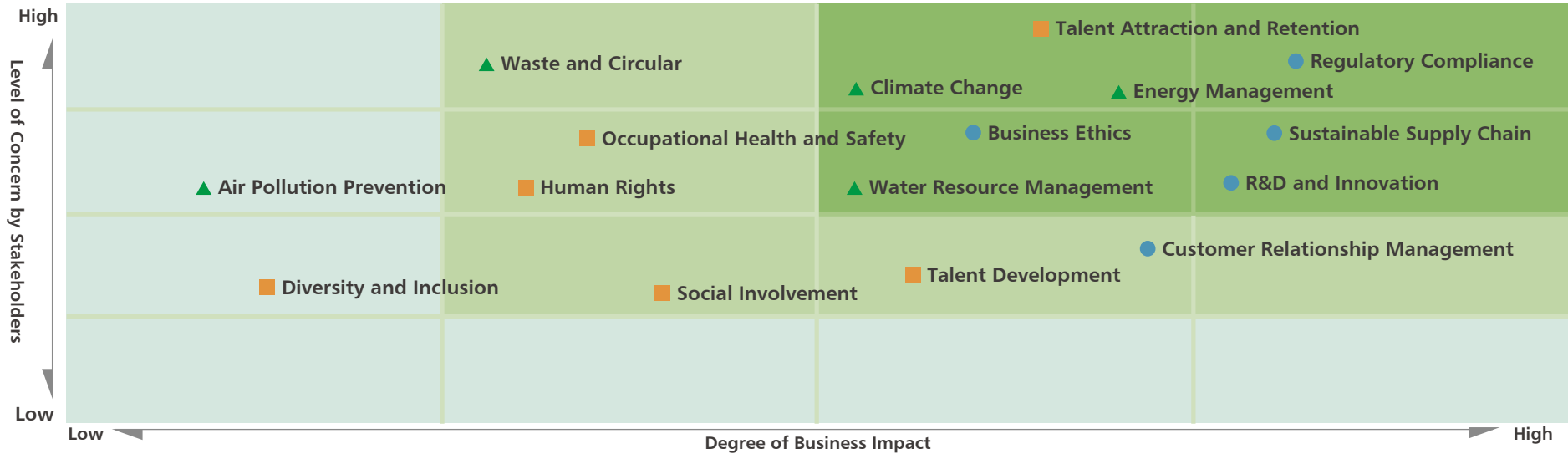## 2.4 Materiality Assessment and Stakeholder Communication

Materiality Assessment

ASEH develops its materiality assessment framework according to GRI Standards, AA 1000 Stakeholder Engagement Standard (SES), and Principles of identification, analysis and confirmation. The framework allows ASEH to determine major sustainable development issues, plan relevant strategies, and serves as the basis for compiling the CSR report. For the 2019 Corporate Social Responsibility Report, the CSC collated feedback from 2,297 stakeholders to determine the relative importance of different sustainability issues to our business operations. A 37-member team led by ASEH's chief operating officer, chief financial officer, chief administration officer, along with the chairperson, general manager/senior executive of key ASEH subsidiaries, selected 14 major issues to be prioritized in driving corporate sustainability and setting long-term sustainability targets.

Step 1
Identification: Inclusiveness

To identify relevant and important issues, ASEH referenced international standards & regulations, sustainable investment ratings and industry peers as well as stakeholder communications. A total of 40 related issues were generated and classified under 17 sustainable development categories.

5 Economic Issues
6 Environmental Issues
6 Social Issues

International standards and regulations: GRI Standards, SASB, SDGs, RBA
Sustainability Investment Assessment: DJSI, CDP, MSCI ESG Index, FTSE4Good Emerging Index
Global semiconductor industry: Benchmarking sustainability policies and practices from semiconductor companies listed on the DJSI index
Stakeholder Engagement: Analysis of online media reports and regular/occasional stakeholder communication to evaluate stakeholders' perception on sustainability issues

Step 2
Analysis: Materiality

We follow guidelines from GRI Standards to rate the importance of issues based on the level of stakeholder concern and the effect on the operations of the organization. ASEH collects stakeholder concerns through its routine communication and the use of questionnaires. Senior management are empowered to determine the level of importance and relevance of these findings based on the respective impact to their organizations.

2,297 Stakeholders

The degree of concern from stakeholders is a key factor in determining the significance of a particular issue. ASEH has designed a questionnaire on sustainability that drew a total of 2,297 stakeholders' responses. Respondents include employees (991), customers (101), shareholders (30), suppliers (977), government (64), industry unions/associations (10), and community (124).

37 CSC Members

Integrating ESG (environmental, social and governance) into the company's core operations is a key driver for ASEH's corporate sustainability. A 37-member team of senior management leaders and CSC members participate actively in evaluating the impact of each sustainability topic on the company's revenues, risks and customer satisfaction, and ranking the level of each topic's importance according to the impact.

Step 3
Confirmation: Responsiveness

14 Key Issues

The CSC initially identified 11 material issues that are of importance to stakeholders and of impact to the company's sustainable development. After further deliberation, the CSC combined sustainable manufacturing with innovation and R&D, and added energy management, climate change, human rights, and social involvement. The assessment ultimately yielded 14 issues of materiality that form the basis for the disclosures in the 2019 CSR report and formulating internal sustainable management goals.

20 Sub-topics

A further 20 sub-topics (19 GRI-specific and 1 ASEH-specific) for disclosures were derived from the 14 issues. Other topics of lower priority will also be concurrently disclosed in the report.

Results of Materiality Assessment

● Economic ▲ Environmental ■ Social

Level of Concern by Stakeholders (vertical axis: Low → High)

Degree of Business Impact (horizontal axis: Low → High)

- ■ Talent Attraction and Retention
- ● Regulatory Compliance
- ▲ Waste and Circular
- ▲ Climate Change
- ▲ Energy Management
- ■ Occupational Health and Safety
- ● Business Ethics
- ● Sustainable Supply Chain
- ▲ Air Pollution Prevention
- ■ Human Rights
- ▲ Water Resource Management
- ● R&D and Innovation
- ● Customer Relationship Management
- ■ Diversity and Inclusion
- ■ Talent Development
- ■ Social Involvement

Material issue, GRI material topic and involvement with the impact

Material Issue Group		GRI Material Topic	Where the Impact Occurs			Our Involvement with the Impacts		
			Procurement	Manufacturing Facilities	Communities	Direct	Indirect	Business
Economic	Regulatory Compliance	Environmental compliance, Socioeconomic compliance	✓	✓		●		
	R&D and Innovation	Innovation management*		✓		●		
	Business Ethics	Anti-corruption, Anti-competitive behavior	✓	✓		●		
	Sustainable Supply Chain	Procurement practices, Supplier environmental assessment, Supplier social assessment	✓					●
	Customer Relationship Management	Customer privacy		✓				●
Environmental	Water Resource Management	Water, Effluents and Waste		✓		●		
	Energy Management	Energy		✓		●		
	Climate Change	Emissions		✓		●		
	Waste and Circular	Water, Effluents		✓		●		
Social	Talent Attraction and Retention	Employment, Labor/management relations		✓		●		
	Talent Development	Training and education		✓		●		
	Human Rights	Human rights assessment, Forced or compulsory labor, Supplier social assessment	✓	✓		●		●
	Occupational Health and Safety	Occupational health and safety		✓		●		
	Social Involvement	Local community			✓		●	

* Issues important to ASEH but not included under the GRI standards

Stakeholder Communication

We define stakeholders as a group or an organization that can affect or be affected by ASEH. Based on the 5 major principles (dependency, responsibility, influence, diverse perspective, tension) of the AA1000 SES-2011 Stakeholder Engagement Standard (SES), we have identified 7 major categories of stakeholders. They are categorized into two groups based on whether the impact is direct or indirect. Our direct stakeholders include shareholders, employees, customers, and suppliers/contractors; our indirect stakeholders include community residents (media), government, industry unions and associations.

We engage with our stakeholders through a variety of means, depending on the nature of the relationship. The methods of engagement will vary depending on the stakeholders, the issues of concern and the purpose of engagement.

Stakeholder	Communication Mechanisms[1]	2019 Issues of Concerns	2019 Communication Key Outcome[2]
Customers	• Customer quarterly business review meeting • Customer audits • Customer service platform • Technical forums	• R&D and Innovation • Sustainable Supply Chain • Customer Relationship Management	• Satisfied customer percentage is 92% in 2019, which exceeded our "90% satisfied customer" target.
Employees	• GM mailbox • Intranet web site • Satisfaction survey on employees • Dedicated employee helpline	• Occupational Health and Safety • Human Rights • Talent Development • Talent Attraction and Retention	• To promote a sustainable safety culture, we organized a seminar on the revision of GRI 403 at our facilities in China. We also adopted standard operating procedures for handling occupational hazard incidents and notifying local authorities within a specified time limit. There were no occupational fatalities at ASEH in 2019. • In 2019, we conducted our second employee engagement survey, organized over 410 employee communication seminars for new employees, 320 forums for foreign employees, and 570 employee feedback meetings at our facilities worldwide.
Shareholders	• Annual and quarterly financial reports • Quarterly earnings conference • Annual shareholders' meeting • Quarterly institutional investors' conference	• Business Performance • Talent Attraction and Retention • Energy Management	• In 2019, our consolidated operating revenues were NT$413.2 billion, representing an increase of approximately NT$42.1 billion, or 11.3% as compared with 2018.
Suppliers/ Contractors	• Supplier questionnaire survey • Supplier on-site audits • Annual supplier forum • Supplier capacity-building activities	• Occupational Health and Safety • Business Ethics • Human Rights • Sustainable Supply Chain	• After assessing over 100 suppliers worldwide, we presented the Sustainability Excellence Award to three of our suppliers and the Sustainability Partnership Award to six.

[1] We communicate with each stakeholder at irregular intervals unless otherwise indicated.

[2] For more information, please see relevant chapters and sections of this report.

Stakeholder	Communication Mechanisms[1]	2019 Issues of Concerns	2019 Communication Key Outcome[2]
Government	• Communication meetings, conferences, forums or seminars held by government authorities • Proactive dialogue with government authorities • Reporting through government portal	• Regulatory Compliance • Water Resource Management • Climate Change • Occupational Health and Safety	• Co-worked with other companies in the semiconductor packaging and testing industry to establish the TSIA ESH Committee for addressing the issues of industrial safety and environmental protection as well as propose amendments in environmental protection regulations to the government. • ASECL was awarded a Fire Safety Certificate by the Taoyuan City Government Fire Department.
Community, NGOs and Media	• Community perception surveys and needs assessments • Communication meetings, forums, seminars or workshops held by NGOs • Volunteer activity cooperation with NGO • Press releases • Spokesperson interviews • Company's website	• Social Involvement • Waste and Circular • Regulatory Compliance • Water Resource Management	• We held a press event for media and non-profit foundations, and organized forums and facility visits for concerned professionals to learn about the technologies behind semiconductor manufacturing and ASEH's achievements in environmental protection. • We contributed US$2.1 million in support of environmental conservation programs, charitable activities and civic educational programs through collaboration with 50 NGOs.
Industry Unions and Associations	• Organizational member conference • Technology forums held by industry unions/associations	• Regulatory Compliance • Business Ethics • Waste and Circular • Sustainable Supply Chain	• We engaged over 140 external organizations and contributed US$0.9 million in public policy and industry development. • The 15T Circular Economy Alliance was established to build a cross-industry exchange platform and achieve industry consensus. • Collaboration with the Chung-Hua Institution for Economic Research and Taiwan Institute of Economic Research to promote the smart grid.

[1] We communicate with each stakeholder at irregular intervals unless otherwise indicated.

[2] For more information, please see relevant chapters and sections of this report.

INTEGRITY AND ACCOUNTABILITY

ASEH commits to constructing sound corporate governance, conducting business ethically and complying with all laws and applicable regulations where we operate.

ASEH strives to establish an organizational culture of integrity and accountability, maintain high standards of ethics, effective corporate governance and accountability mechanisms in every aspect of its business, as well as conduct business based on the principle of social responsibility and business ethics to serve both the company's and shareholders' long-term interests.

Key Performance

97

Hours[1]

Continuous Education for
Board Members

Assessment

Performance Assessment of Board
and Functional Committees

CG100

TWSE Index

Continued listing on the TWSE
Corporate Governance 100 Index
(TWSE CG100 Index)

ASEH proactively reviews its corporate governance practices and effectiveness in implementation using the Corporate Governance Evaluation System launched by the Financial Supervisory Commission ("FSC"). A self-assessment process increases top management executives' awareness in strengthening corporate governance policies, and will help raise the standards of ASEH's corporate governance.

In 2019, ASEH was among the top 20% best performing listed companies with better ratings in the categories of "Information Transparency" and "Corporate Social Responsibility".

In 2019, ASEH was again selected to be a constituent stock of the "TWSE Corporate Governance 100 Index (TWSE CG100 Index)" based on the 2018 assessment of our corporate governance, liquidity tests and financial indicators. To achieve good corporate governance, we will continue to focus on strengthening the structure and operations of the board, protecting the rights and ensuring fair treatment of shareholders, and incorporating sustainable practices into corporate governance.

[1] Total training hours = course duration x number of people

3.1 Board of Directors

The ASEH board of directors (the "Board") established the "Audit Committee " , "Compensation Committee" and "Risk Management Committee" (established in 2019)[1], to convene meetings and perform duties as prescribed in the charters and/or within applicable laws and regulations. The committees also submit proposals for Board resolution, and report the status of matters relating to their respective functions to the Board. In parallel, the Group Internal Audit Department conducts periodical audits and presents audit results to the Audit Committee and the Board. In 2019, Du-Tsuen Uang, Group Chief Administration Officer, was appointed as the chief corporate governance officer to facilitate the operation of the Board[2]. We also established the Group Resources Integration & Steering Committee to oversee manufacturing resource allocation between our three major subsidiaries by helping to improve their manufacturing efficiency, avoid duplication of R&D investments, and harmonize manufacturing standards across all facilities. This top down initiative improves our business performance and drives down operating expenses resulting in lower prices for our products and services. Ultimately, we strive to build a more robust supply chain to serve customers adequately.
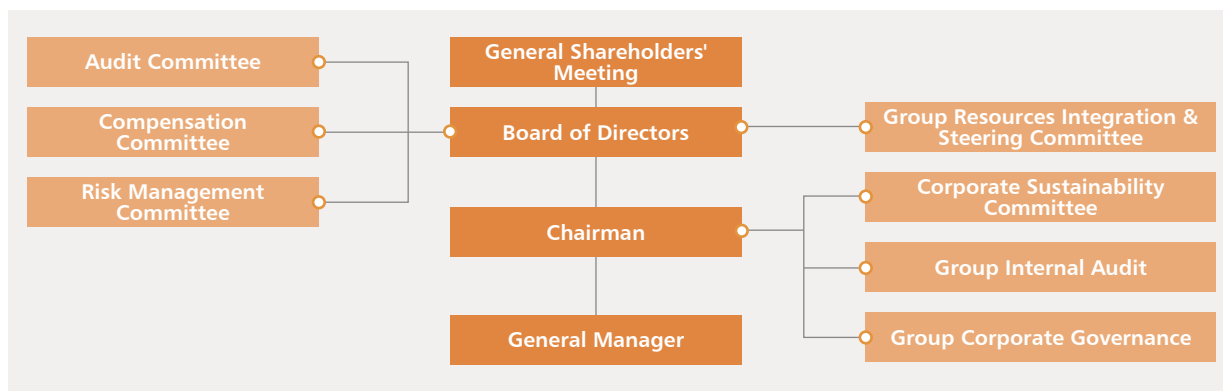
Structure and Responsibilities of the Board of Directors

The Board is the highest governing body of ASEH. Jason Chang has served as Chairman and Chief Executive Officer of ASEH since its founding on April 30, 2018. He is also Chairman of Advanced Semiconductor Engineering Inc. ("ASE") since ASE's listing on the Taiwan Stock Exchange in 1989, and concurrently, the Chief Executive Officer since 2003. As a strategic leader, the Chairman has led the company through consolidating core businesses, tackling challenges, and creating new business opportunities, to achieve market leadership in the semiconductor assembly and test industry. ASEH has developed a management succession plan and regularly evaluates the succession planning progress to ensure the company's sustainability[3].

The second Board consists of thirteen members, each serving a three-year term. Three of the members are independent directors[4]. In addition to the scope of authorities and duties granted by or in accordance with the Taiwan's Company Act and ASEH's Articles of Incorporation on Shareholders Resolutions, the Board is actively engaged in the supervision of the overall operations of the company, business strategy formulation and development, risk identification in operation, finance, taxation, and overseeing, planning and implementation of ASEH's corporate sustainability.

In 2019, a total of twelve Board meetings were convened and attended by at least two independent Board members in their supervisory capacity or by proxy. The average Board meeting attendance rate was 87%. To manage and avoid conflicts of interest, directors or the corporates they represent involving conflicts of interest which may jeopardize the interest of the company, are not allowed to participate in the discussions, exercise their votes, nor vote on behalf of other directors[5].

Diversity of the Board of Directors

ASEH's Corporate Governance Best Practice Principles lists the guidelines, management objectives and goals for selecting the Board[6] and takes into account diverse and complementary factors such as: gender, age, nationality, culture, professional background and industry experience[7]. Members of the Board come from different professional backgrounds with global market perspectives and possess the abilities to conduct risk oversight.

1 For further details on the composition and responsibilities of the Audit Committee, Compensation Committee and Risk Management Committee, please refer to our 2019 Annual Report English version (http://ir.aseglobal.com/attachment/20200624145004499205400_en.pdf), Form 20-F "Item 6" or ASEH's company website : http://ir.aseglobal.com/html/ir_committees.php.

2 For more details on the corporate governance execution and training status, please refer to ASEH's company website and visit http://cms.ase.todayir.com.tw/html/client_tw/ase/attachment/20200623103628213874643_en.pdf.

3 For further details on succession planning, please refer to ASEH's company website and visit https://www.aseglobal.com/content/en/csr_succession_planning.html.

4 Independent directors are as defined in Rule 10A-3 under the U.S.A.Securities Exchange Act of 1934 as well as defined by the Regulations Governing Appointment of Independent Directors and Compliance Matters for Public Companies by Taiwan FSC.

5 For further details on directors' attendance of meetings and information regarding conflict of interest, please refer to our 2019 Annual Report English version.

6 For further details on the status of directors' diversity and management objectives and goals achieved, please refer to ASEH's company website and visit http://cms.ase.todayir.com.tw/html/client_tw/ase/attachment/20200522181950242183794_en.pdf.

7 For further details on the composition of the Board, and professional backgrounds and industry experiences of Board members, please refer to 2019 Annual Report English version "Ch. 3. Corporate Governance Report" or 2019 Form 20-F "Item 6".

Continuous Education for Board Members

The Board plays a vital role in the organization. To expand the knowledge and competencies of our board members to effectively respond to evolving global and domestic corporate governance and sustainability challenges, a robust board education program was put in place. Based on industry requirements, educational and experience background of board members as well as the results from the performance evaluation of the Board, we facilitate the board members with the course planning and activities. From time to time, board members attend courses organized by external parties according to their needs. ASEH board members have continued to participate in continuous education on corporate governance and sustainability during their tenure, averaging more than the regulatory requirement of 6 hours per director per year.

2019 Training Courses for Board Members

Course Name	Total Training Hours (Course Duration * Number of Trainees)
Substantial Civil and Criminal Liabilities of Directors and Supervisors and Case Studies under Corporate Governance	39 hours
How Does a Director Avoid Breach of Trust and Non-arm's Length Transaction	3 hours
Legal Compliance Advocacy Conference for Insider Equity Trading of Public Companies 2019	3 hours
Brief Introduction of Main Specifications of the Fair Trade Act and the Impact of the Global Antitrust Specifications on Taiwanese Enterprises	3 hours
The Impact of Economic Substance Act and Global Anti-Tax Avoidance on the Corporate Governance from the Perspective of the Directors and Supervisors	33 hours
Update Summary of Significant Accounting and Auditing Laws and Regulations	1 hour
The Impact of Anti-Tax Avoidance and Its Countermeasures	1 hour
Introduction of the National Risk Assessment Report and Case Analysis on Anti-Money Laundering and Counter Financing of Terrorism	2 hours
The Impact of Tariff on Enterprises under US-China Trade War and Its Countermeasures	3 hours
Directors' Responsibilities and Risk Management under the Latest Corporate Governance Blueprint	3 hours
Promotion Forum of ESG Investment	3 hours
Innovation, Digital Technology and Competitive Advantage	3 hours
Total number of training hours	97 hours

Board Participation in Sustainability Governance

The Board is directly involved in supervising and managing the performance of ASEH's economic, environmental and social decisions. For example, the Board resolved to promote environmental protection efforts in Taiwan by contributing an amount of US$3.3 million (NT$100.0 million)[1], appointed independent directors to serve in the review committee for the "ASEH Supplier Sustainability Award"[2]. In addition, six directors serve as members of the CSC and regularly monitor the implementation results and future plans of sustainability programs.

Board Performance and Compensation

We have formulated compensation policies for our top management to support strategy of sustainable business. The compensation of the CEO and other top management is approved by the Board. In addition to individual performance, the compensation of top management is also determined based on the achievement of the company's financial[3] and nonfinancial performance targets. The nonfinancial performance included the reputational risks, customer satisfaction, feedback from stakeholder engagement, environmental and social performance as well as ASEH 2025 Sustainability Goals with 30 long-terms targets.

To enhance overall efficiency of the Board and to measure the performance of the Board and individual members with respect to leading and supervising the company's performance, we established an evaluation system that incorporates non-financial indicators as well as sustainability-related elements[4]. In addition to an internal performance self-evaluation at the end of 2019, the Board conducted its first performance evaluation of the functional committees. The evaluation focused on the level of participation in ASEH's operation, awareness of the duties, quality of its decision-making, composition and election of the members and internal control. Proposals for improvement were provided to raise the Board's level of competence and operating efficiency. The evaluation results were submitted to the members of the Compensation Committee in 2020 to serve as

[1] Since 2014, ASE has donated NT$100 million annually to promote environmental protection in Taiwan and the program will continue after the establishment of ASEH.

[2] ASE has organized the Supplier Sustainability Awards every year since 2016 and will continue to do so after the establishment of ASEH.

[3] such as the performance of operating revenues, operating profits, net income, and EPS.

[4] such as the board members' realization of the ASEH's commitment to sustainability, including corporate governance, environment, employees, supply chain, society, and stakeholders. For further details, please refer to "Corporate Sustainability and Citizenship Policy" on ASEH's company website at http://www.aseglobal.com/en/csr_corporate_sustainability_policy.html

references for director compensation, and published on the company website[1].

Compensation for top management includes both cash and stock options. The characteristics of the industry and the nature of the company's business are taken into consideration when determining the ratio of bonus payout based on the short-term performance of top management and the time for payment of the variable part of compensation. Furthermore, we believe that the ownership of company shares by the directors who hold senior management positions help align their interests and actions with the interests of ASEH's shareholders; therefore, in 2018, we formulated "Stock Ownership Guidelines". To enhance corporate governance and ensure the accountability of financial results, in 2018, we also formulated "Clawback Policy" to reserve the right to cancel and require reimbursement of any variable compensation received by the CEO and CFO to the extent permitted by applicable laws. These two important documents were publicly disclosed in ASEH website[2].
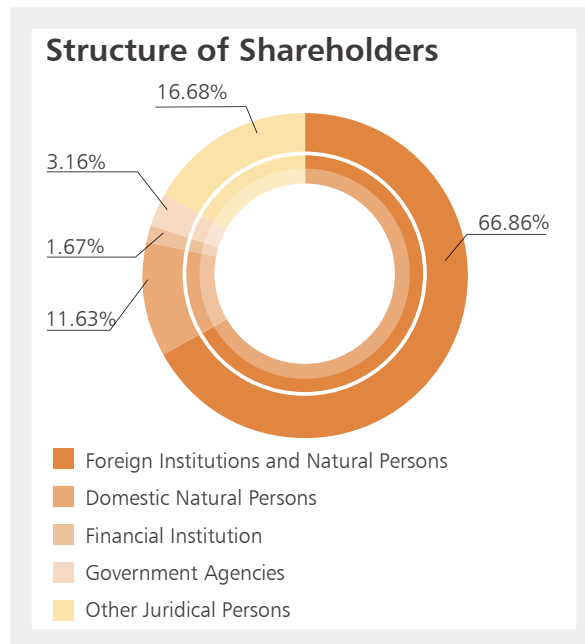
Shareholder Rights and Interests

To ensure shareholders' rights of being fully informed of, participating in and making decisions over important matters of the company, we have actively responded to TWSE's promotion of corporate governance related measures. These measures include a candidate nomination system for Board member elections[3], an electronic voting system, case-by-case voting at shareholder meetings, and the disclosure of voting results on a case-by-case basis. The shareholders' meetings are held in an effective, legal and convenient way for shareholders to exercise their shareholders' rights, encouraging shareholders participation in corporate governance and thereby leading to improved attendance at shareholders' meetings.

[1] For further details on 2019 Board Performance Evaluation Results, please refer to ASEH's company website and visit http://cms.ase.todayir.com.tw/html/client_tw/ase/attachment/20200703105340263870161_en.pdf
[2] For more important documents related to ASEH, please refer to ASEH's company website and visit http://ir.aseglobal.com/html/ir_doc.php
[3] The independent directors were elected in accordance with the candidate nomination system set out in the amended ASEH's "Articles of Incorporation" at the extraordinary general shareholders' meeting on June 21, 2018. Then the shareholders' meeting approved to amend ASEH's "Articles of Incorporation" regarding candidate nomination system for all of the board member elections on June 27, 2019.

Structure of Shareholders

- 16.68%
- 3.16%
- 1.67%
- 11.63%
- 66.86%

- ■ Foreign Institutions and Natural Persons
- ■ Domestic Natural Persons
- ■ Financial Institution
- ■ Government Agencies
- ■ Other Juridical Persons

Information Transparency

We place great emphasis on the stakeholders' right to know, and faithfully comply with applicable regulations regarding information disclosure in order to provide them with regular and timely information on company financial conditions and business operations, major internal documents, and corporate governance status, etc. through diversified channels. These channels include the company website, Market Observation Post System (MOPS), annual report, SEC Filing Form 20-F, corporate sustainability report, quarterly earnings release, press conference and annual shareholders' meeting. To treat stakeholders equally, we concurrently disclose the information of the preceding matters in both Chinese and English.

3.2 Economic Performance and Tax Governance

ASE Technology Holding Co., Ltd. Tax Policy

ASE Technology Holding Co., Ltd, and its subsidiaries (collectively "ASE Technology Holding") believe that being an honest and responsible taxpayer fosters economic growth and contributes to long term business sustainability. ASE Technology Holding is committed to the following:

1 Complying with all applicable tax laws and regulations of all countries in which we operate and duly reporting and paying all necessary taxes in a timely manner.

2 Taking into consideration of both short term and long term tax impacts when making major business decisions.

3 Being transparent and disclosing tax information in accordance with applicable regulations and reporting requirements.

4 Paying taxes on the profits earned from business activities conducted in relevant jurisdictions and ensuring intra-group transactions are conducted at arm's length.

5 Not using tax havens and tax structures that are meant for tax avoidance or aggressive tax planning.

6 Constructing an appropriate mechanism to evaluate potential tax risks which are given rise to our global manufacturing and sales activities.

7 Developing mutually trustful and respectful relationships with tax authorities in the countries we operate, and communicating with them on tax matters where appropriate.

Our principal executive offices and facilities are located in Taiwan and China/Hong Kong. More than 90% of the our operating revenues, profit before income tax, income tax expense and income tax paid is accounted by business activities conducted in Taiwan and China/Hong Kong and not more than 5% of the our operating revenues, profit before income tax, income tax expense and income tax paid is accounted by business activities conducted in the rest of each individual country. The statutory tax rates in Taiwan and China are 20% and 25%, respectively. Most of our China subsidiaries qualified as high and new technology enterprises were entitled to a reduced income tax rate of 15% and were eligible for super deduction for qualified research and development expenses. Additionally, some of our China subsidiaries utilized loss carry-forward to reduce their tax payments.
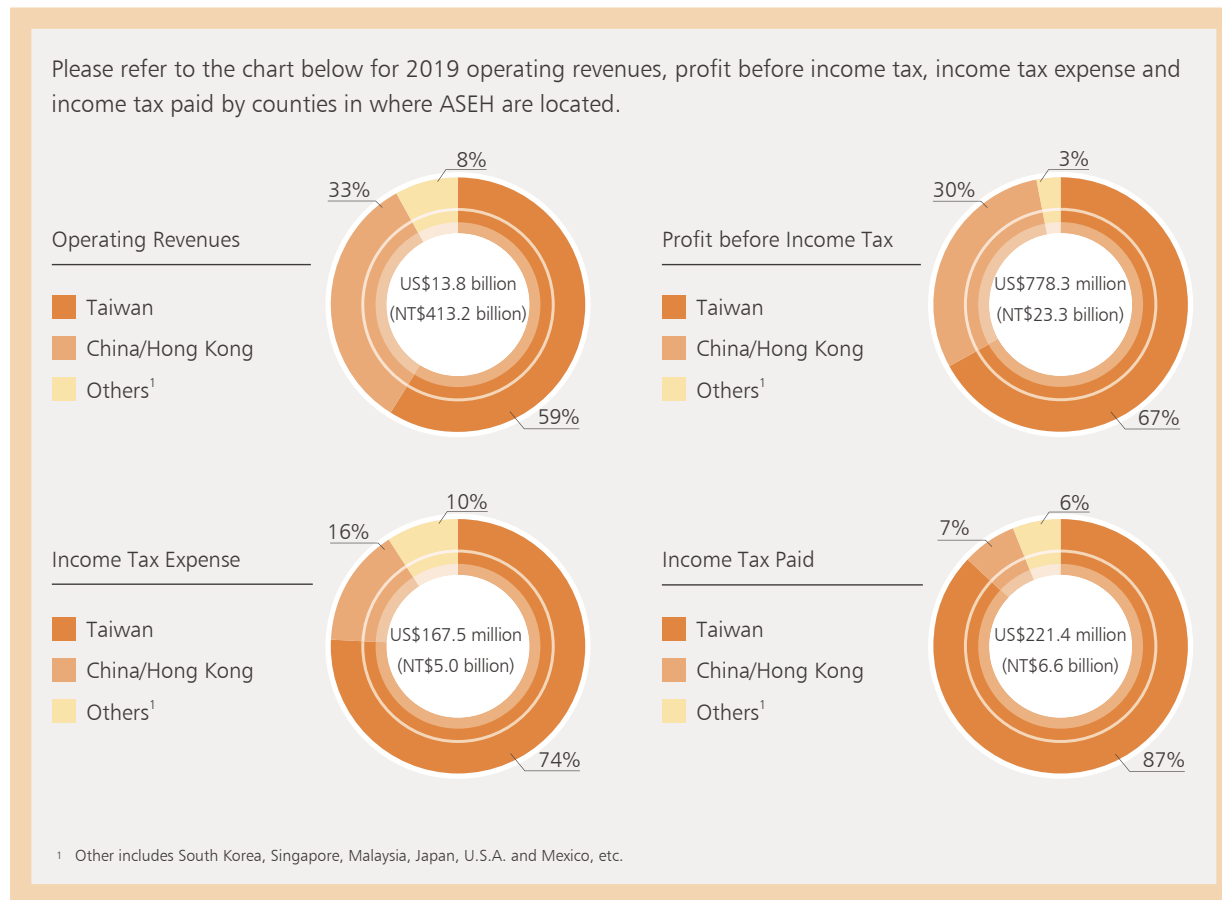
Consistent with our core values, ASEH is committed to fully meeting tax obligations while also being financially responsible for the potential effects that tax payments might have on our business activities and being supportive of corporate innovation, research and development, reinvestment and sustainable investment initiatives in accordance to government policy.

As a multinational corporation, ASEH's tax contribution is international in scope and covers a wide range of public tax systems around the world. In addition to income tax, ASEH also contributes numerous other taxes including property tax, environmental tax and employment tax.

In view of the sophisticated nature of tax matters and the global scale that ASEH operates on, we continuously monitor and assess changes in relevant tax laws and regulations and implement internal training to ensure that employees have the necessary level of skill and awareness for tax issues. In addition to the internal training, we also have external tax advisors dedicated to providing us with the foresight to mitigate the potential tax-associated risks.

Please refer to the chart below for 2019 operating revenues, profit before income tax, income tax expense and income tax paid by counties in where ASEH are located.

Operating Revenues
- Taiwan
- China/Hong Kong
- Others[1]

8%
33%
US$13.8 billion
(NT$413.2 billion)
59%

Profit before Income Tax
- Taiwan
- China/Hong Kong
- Others[1]

3%
30%
US$778.3 million
(NT$23.3 billion)
67%

Income Tax Expense
- Taiwan
- China/Hong Kong
- Others[1]

10%
16%
US$167.5 million
(NT$5.0 billion)
74%

Income Tax Paid
- Taiwan
- China/Hong Kong
- Others[1]

6%
7%
US$221.4 million
(NT$6.6 billion)
87%

[1] Other includes South Korea, Singapore, Malaysia, Japan, U.S.A. and Mexico, etc.

Our effective tax rate and cash tax rate were 21.5% and 28.4%, respectively, both of which are higher than the industry average tax rate of 15.26% and the industry average cash tax rate of 14.12% based on SAM CSA Companion in "Semiconductors and Semiconductor Equipment" industry group.

3.3 Business Ethics

Policies and Specifications

The Board has successively approved and published ethical corporate management related regulations which clearly specify the policies and specification, behavior guidelines, operational procedures and grievance systems to prevent unethical behaviors. These policies aim to shape ASEH's culture of honesty and responsibility and to realize its commitment of compliance to the highest ethical standards in ASEH's overall business activities.

Organization and Authority

As the highest governance body of ASEH's business conduct and ethics, the CSC coordinates and supervises the establishment and implementation of the ethical corporate management policies and specifications. The CSC periodically reviews the promotion of business conduct and ethics and the compliance of policies and specifications, and reports to the Board. The Corporate Governance Taskforce under the CSC promotes ethical policies and specifications to our global manufacturing sites and assists in managing and adopting appropriate policies and specifications to ensure ethical management in compliance with the requirements of local laws and regulations. Global manufacturing sites are responsible for planning the internal organization, structure, and allocation of responsibilities, formulating standard operating procedures and conduct guidelines in accordance with corporate policies and specifications, and promoting awareness and educational activities with respect to ethics policy in internal management and in daily operation. The Group Internal Audit is in charge of supervision to ensure the operating effectiveness of reporting system.

1 "ASEH Members" includes all employees, officers, supervisors and directors of ASEH, its subsidiaries and joint ventures.

Education and Promotion

To guide ASEH Members[1] and the company's stakeholders to better understand ASEH's business ethics standards, we set up "Code of Business Conduct and Ethics" area of the company website and disseminate our ethical related policies, guidelines, practices, and implementation status of the Board and management levels within the company. We also communicate ASEH's concept of business ethics and company's specific practices through education, promotion and online training and various methods.

2019 Programs and Implementation:

- We have conducted comprehensive communication programs on the process and the management of 'Procedures for Handling Whistleblowing Cases of Unethical Conduct' with the general managers and staff at 15 business locations around the world. In addition, our team has visited 17 offices across Taiwan, China, Japan, South Korea, Singapore, and Malaysia to explain clearly the policies and procedures for handling whistleblower reports of unethical conduct, and we encourage employees to take the initiative in exposing dishonest practices so as to strengthen the company's reporting system and its mechanisms for the detection and prevention of fraud.

- Education and training programs
  1. The board members attended the training session on the "Substantial Civil and Criminal Liabilities of the Directors and Supervisors and Case Studies under Corporate Governance", including regulations on insider trading and short-swing profit rule (a total of 39 hours fulfilled by 13 participants).

  2. Business conduct and ethics-related education and training were provided to all levels of employees in person, via online courses and e-mail at 21 business locations worldwide. The topics included the following:

★ Ethical Related Regulations

- **Code of Business Conduct and Ethics**

- **Corporate Governance Best Practice Principles**

- **Corporate Social Responsibility Best Practice Principles**

- **Ethical Corporate Management Best Practice Principles**

- **Procedure for Ethical Management and Guidelines for Conduct**

- **Administrative and Practice Procedures to Prevent Insider Trading**

- **Fair Competition and Antitrust Laws Compliance Policy**

- **Guidance of Prevention of Corruption**

- **Policy and Procedures for Complaints and Concerns Regarding Accounting, Internal Accounting Controls or Auditing Matters**

- **Procedures for Handling Whistleblowing Cases of Unethical Conduct**

(1) Business conduct and ethics-related issues such as human rights, ethical management, regulatory compliance, and information security (308,380 participants for a total of 590,735 hours)

(2) Responsible Business Alliance (RBA) Code of Conduct course (52,407 participants for a total of 38,503 hours)

(3) Employee Code of Conduct at all business locations (38,246 participants for a total of 16,295 hours)

Consultation and Report

We have established channel of consultation for ASEH Members and various internal and external reporting channels[1]. ASEH Members or any third party may report to the internal or external channels, either using their own identity or anonymously. Investigation and improvements were made according to related reported issues, emphasizing on the importance of business ethics and integrity by providing educational training (such as e-mail advocacy and online quizzes). We are committed to keeping the whistleblower's identity and reporting contents confidential, and protecting him/her from any unfair treatment or retaliation as a result of the violation reporting.

In 2019, we received 15 cases reported through the "Code of Conduct Compliance Reporting System". Among them, 6 cases were not accepted due to insufficient information, while 4 were non-related cases. Of the remaining 5 cases that are related to ethics matters, no misconduct was detected in 3 cases after thorough investigations. The rest 2 cases contain the same allegations which are still under investigation from 2018 and are thus combined together to be further investigated (for more information, please refer to the table below). The department involved has strengthened its anti-corruption measures and policies, such as code of conduct and ethics awareness and training program at site video walls or via video, department weekly meeting and signing declaration letter by employees. The program covering rate is 100%. Moreover, we enhanced improvement and control measures after a thorough review of all related procedures at the same time. We have finished further education and training programs to ensure employees fully understand the new working procedures and guidelines and follow them correctly.

In 2018, for the purpose to reinforce the whistle-blowing mechanism, ASEH appoints an independent third party to assist in handling any reporting regarding insiders' misconducts and provide legal services in the subsequent investigation.

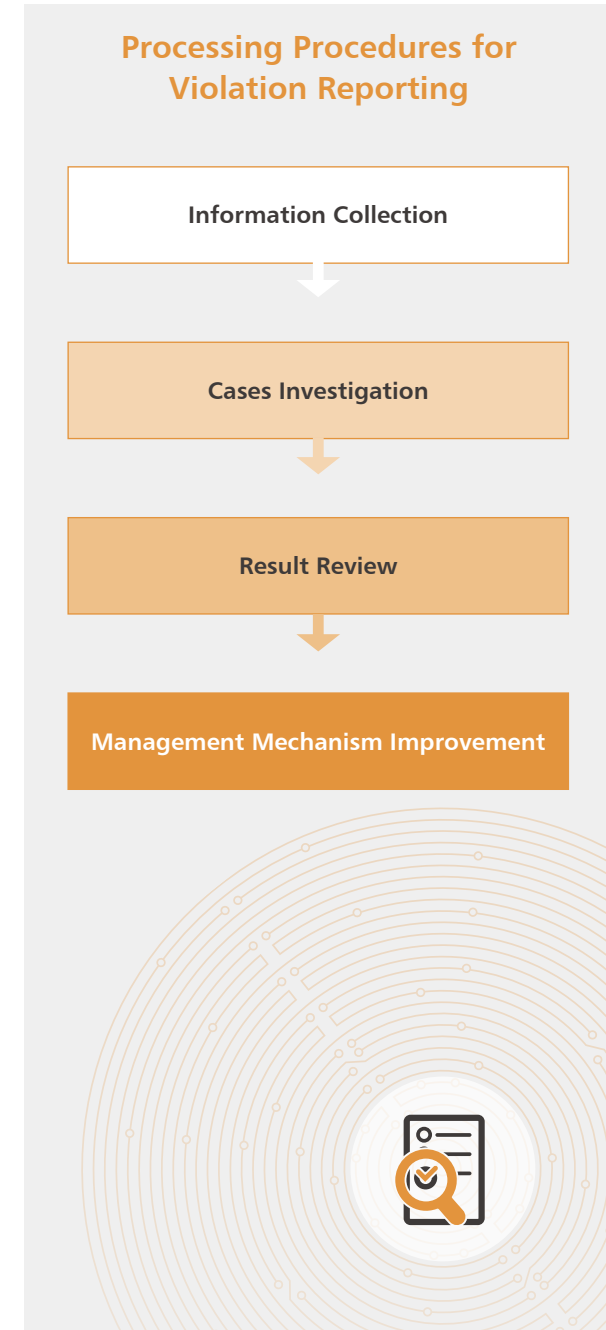### Cases Received by Code of Conduct Compliance Reporting System

	2018	2019
Not accepted (cases lack sufficient information to conduct further investigation)	11	6
Not related to ethics matters	3	4[*]
Related to ethics matters	2[**]	5[***]
Total	16	15

  * The 4 cases involve employees' personal complaints and were forwarded to the HR department to handle.
 ** The 2 cases contain the same allegations and are thus combined together for investigation, and the investigation is not concluded yet.
*** Of them, 2 cases contain the same allegations which are still under investigation from 2018, and are thus combined for further investigation.

[1] For further details on internal and external report channels, please refer to ASEH's website - http://www.aseglobal.com/en/csr_business_conduct_ethics.html

Processing Procedures for Violation Reporting

Information Collection

Cases Investigation

Result Review

Management Mechanism Improvement

3.4 Risk Management

The ability to discover internal and external operational risks in advance, and to properly assess and process these risks, is important to effectively prevent and reduce loss exposures. In December 2019, ASEH's board of directors established a risk management committee, and in accordance with its Charter, appointed two independent directors and one member to the committee. Our board of directors is the highest level decision-making body for risk management and endorses major risk management decisions based on corporate strategies and changing business landscapes. The committee shall be responsible for managing the Company's overall risk management, implement the decisions of the board of directors in connection to risk management, coordinate and promote cross-organization risk management plans, supervise and manage overall risk control and remedial mechanisms of the Company and its subsidiaries, review and integrate all risk control reports. The committee submits an annual report to the board and updates periodically on matters related to risk management implementation and recommendations for improvements. ASEH's subsidiaries are also required to establish corporate risk management teams responsible for each subsidiary company's risk management and are accountable to the board's risk management committee.

We manage risks through designated departments and functions ("risk functions") across all of our organizations. In addition, we have Enterprise Risk Management ("ERM") programs implemented in our major manufacturing sites (i.e.,

ASE Kaohsiung, Chungli, Shanghai (A&T), Shanghai (Material), Kunshan, Suzhou facilities, Real Estate Group as well as the USI Group) as well as all group-level functional departments.

Risks or events that might have an influence on our business objectives are identified and evaluated, in order to decide on appropriate responses. In addition, the identification and management of long-term emerging risks[1] are embedded into our ERM program.We have established the mechanism of prevention, early warning, emergency response, crisis management and business continuity plans that mitigate, transfer or avoid risks. We are confident that by having a sound management program, ASE has effectively kept the respective risk scenarios under control.

In our ERM program, corporate level and operational level risks are identified, prioritised and reported within risk registers[2]. The risk registers include a description of the overall risk, characteristics (scenario and impact) of the risk; and current risk management activities including mitigation strategy/control measures. The identified risks are assessed in terms of likelihood and impact to determine their risk level, and then mapped onto a Risk Map according to their risk level[3] and control effectiveness. Further risk mitigation plans are defined to reduce the residual risk if judged necessary. Major risks, together with suitable risk response plans, were reported to top management and the progress will be monitored periodically.

Organization Chart of Risk Management Committee

ASEH Board of Directors → ASEH Risk Management Committee — Executive Secretariat (ICM/CAO); ASEH Risk Management Committee → ASE Group Risk Management Committee, SPIL Group Risk Management Committee, USI Group Risk Management Committee

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[1] We define an emerging risk as: an issue that is perceived to be potentially significant in future but do not currently exists, or a previously known issue that is evolving in unexpected ways with unanticipated.

[2] The risk registers include a description of the overall risk, characteristics (scenario and impact) of the risk; and current risk management activities including mitigation strategy/control measures.
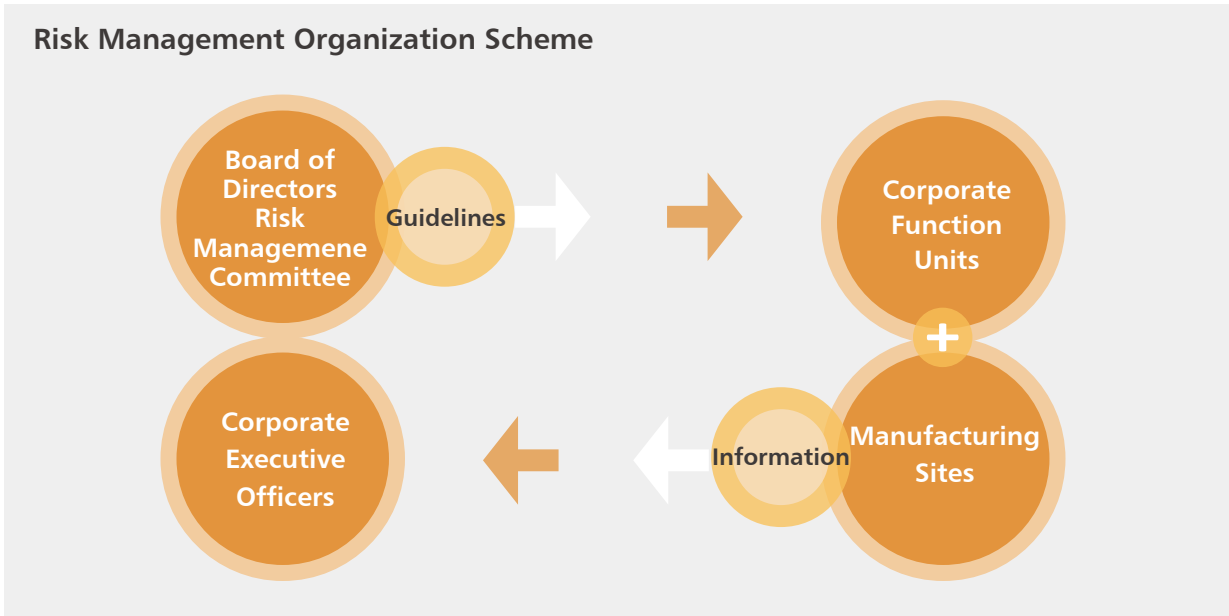
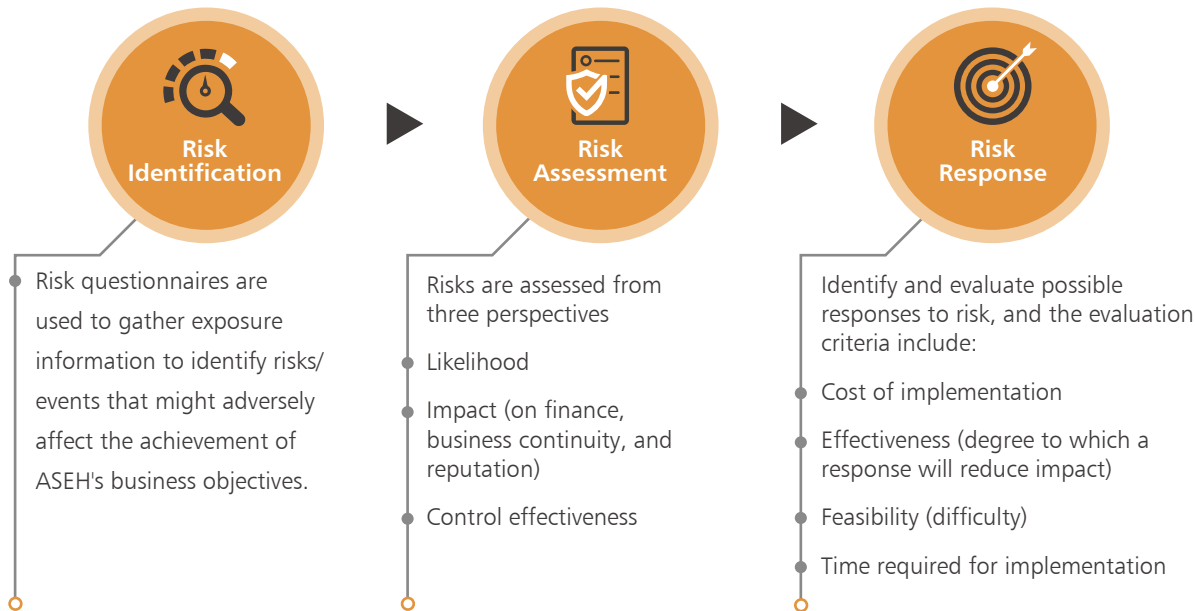[3] Risk levels are determined according to the likelihood and impact of risks.
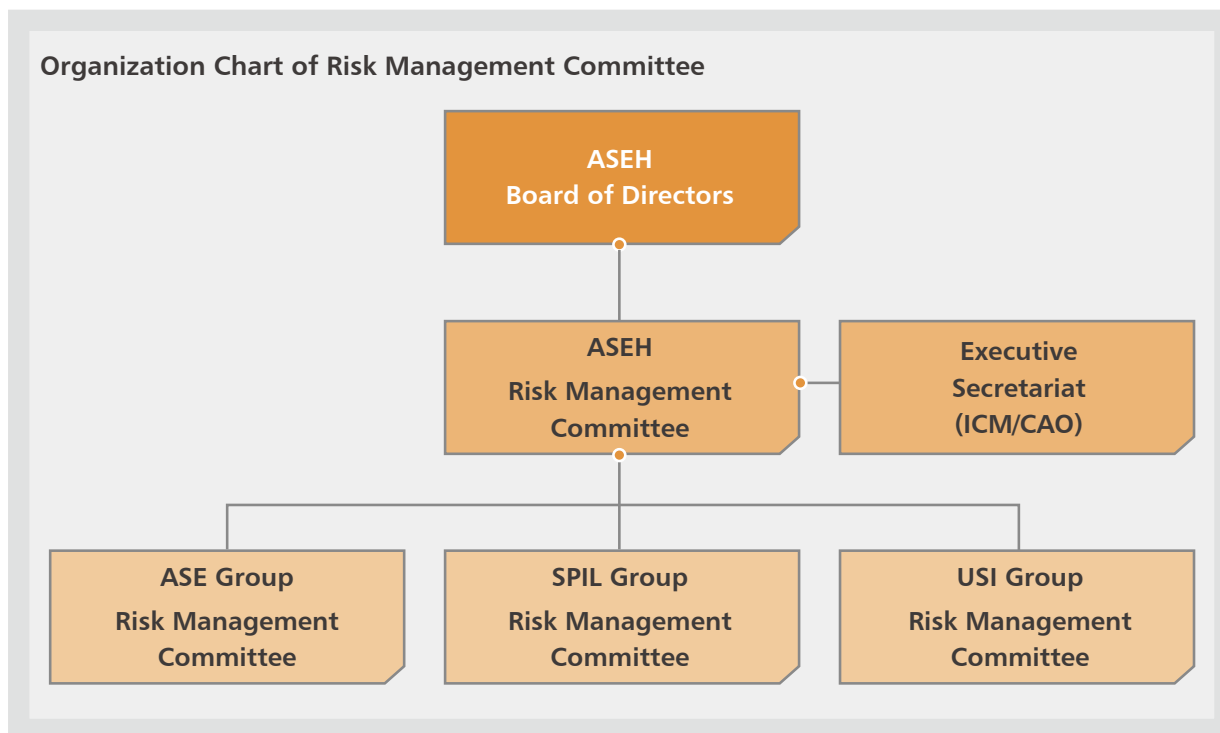
We had introduced a top-down ERM approach to connect the top management with the rest of the organization on risk matters and ensure sound management of corporate-wide risks. Specifically, our top management are invited to identify key risks that are "top of mind" for the company. These top-down identified risks are then reviewed through our current ERM process, enhancing the efficiency and effectiveness of the decision-making process across the organization.

Risk Management Integrated with Internal Controls and Internal Audits

We view internal controls as an important part of ERM. ERM is more effective with internal controls that cover risk responses and other ERM processes in place. We identify and document all of our major risks together with related controls. The effectiveness of controls are reviewed in the annual Control Self Assessment. In addition, we redesigned our risk assessment system and linked our current internal control activities to corresponding risk scenarios such that a complete list of internal control measures can be pre-defined in the system to help our risk functions to more accurately assess the effectiveness of risk control. Finally, our internal audit system carries out independent appraisals of the implementation of key risk mitigation plans by our risk functions thereby ensuring that risks are properly managed.

Risk Management Organization Scheme

Board of Directors Risk Managemene Committee → Guidelines → Corporate Function Units

+

Corporate Executive Officers ← Information ← Manufacturing Sites

Risk Management Process

Risk Identification ▶ **Risk Assessment** ▶ **Risk Response**

Risk Identification
- Risk questionnaires are used to gather exposure information to identify risks/ events that might adversely affect the achievement of ASEH's business objectives.

Risk Assessment
- Risks are assessed from three perspectives
- Likelihood
- Impact (on finance, business continuity, and reputation)
- Control effectiveness

Risk Response
- Identify and evaluate possible responses to risk, and the evaluation criteria include:
- Cost of implementation
- Effectiveness (degree to which a response will reduce impact)
- Feasibility (difficulty)
- Time required for implementation

We identify and analyze possible risks for our business, operation, and provide corresponding monitoring measures and control mechanisms for those risks that are of high impact.

Long-term Emerging Risks

New technology development/investment risks

Risk description

5G and artificial intelligence (AI) related products bring huge business opportunities. Among them, the identification and development of advanced packaging technology for the relevant chip solutions has a great impact on the future revenue of ASE. If ASE fails to focus its limited resources on developing the right packaging technology, it will affect R&D efficacy.

Potential Impact

Failure to properly evaluate and identify customer segment and key technologies to be developed will result in
1. The product not meeting the market demand after development.

2. The company incurring huge labor costs and unable to achieve the corresponding R&D returns due to mismatched talent for key technical positions.

3. Emphasis is on improper selection of technology for development, which affects equipment investment evaluation.

4. Missing the development period of key technology areas, affecting the company's competitiveness.

Response Strategies

Establish a new technology risk assessment platform prior

to development or investment. Regular exchanges and discussions between the R&D and market analysis teams, and research institutions, material suppliers, equipment vendors and customers, on the types of technologies required for the targeted application markets and focusing on the development of advanced packaging products/technology. Setting short-, medium-, and long-term R&D plans, and focusing R&D resources on selected key projects.

Accelerated development of smart manufacturing, and the lack of sufficient talent to support the company's shift to automation

Risk description

The future of automotive and healthcare applications is dependent on the trend of high quality products, and ASE is leveraging on years of knowledge accumulation to focus on smart manufacturing to tap on these opportunities. Automation is replacing human labor to perform analysis of production parameters and data, and will require a major adjustment in the skills needed in manpower planning. The speed by which ASEH is able to transform its manpower needs, has an impact on the efficiency of the company's business operations.

Potential Impact

Industry development in AI, Internet of Things, 5G and information security has accelerated the shift to factory automation, that captures and analyzes data to increase operational efficiency. In the era of digitalization, the company's manpower planning will need to keep up with this shift. The inability to react quickly to the manpower needs of digital transformation will reduce the company's competitiveness and impact business returns.

Response Strategies

Identify jobs within the company that require upgrading to keep up with corporate development goals for the future, and provide skills training in areas such as CIM automation and AI technology. Retraining and upgrading the workforce enables employees to improve their skills to adapt to the rise of new technology, leading to higher employee retention rate and mutual trust. Effective training and development programs will strengthen employee engagement, increase productivity, innovation and performance, and create a positive impact on corporate sustainability.

The disruptive impact of epidemics on the supply chain

Risk description

Emerging infectious diseases have always posed a threat to global health. Covid-19, caused by the pneumonia viral strain that originated from China in late December 2019, is a highly infectious disease that has now spread fast and furious worldwide and straining the capacities of healthcare systems. Many countries closed their borders to mitigate the spread, causing a huge disruption to global supply chains. The global technology supply chain may be severely stretched if these electronics, telecommunications and semiconductor companies rely on supplies from a single region. Such disruption will affect the accuracy of ASE's capacity building and will impact ASE's net profits.

Potential Impact

The sharp decline in economic activity may expose the potential weakness of the world economy, and is expected to cause global economic growth to decline -3.1% in 2020. The spread of the virus has also caused

the world economic recovery to stall, and metastasized the effects of the supply chain disruption. Although the virus may be under control the negative impact on consumer and economic activity may continue because people will remain cautious for a while.

Response Strategies

1. Enhance visibility of delivery dates and inventory levels, closely monitor inventory days and supply partners. Develop strategies for alternative procurement and manufacturing in different parts of the world to mitigate supply chain disruptions.

2. Formulate a global supply chain and emergency response strategy, and establish a supplier risk assessment process to mitigate supply chain disruptions. Practice dual sourcing of key components to ensure continuous supply, in case of unpredictable events such as natural disasters, political unrest or pandemics.

3. The company has established a system for supplier risk assessment, to help identify major events in various regions and continue to monitor and effectively manage the various risks that may affect the supply chain. The system ensures that back up suppliers in different geographical locations can be quickly triggered to support the gap and avoid supply chain disruptions caused by unforeseen interruptions in Tier 1 and Tier 2 supply partners.

Financial Risk

Changes in Interest Rate: Except a portion of long-term borrowings and bonds payable at fixed interest rates, the Group was exposed to interest rate risk because group entities borrowed funds at floating interest rates.

Changes in market interest rates will lead to variances in effective interest rates of borrowings from which the future cash flow fluctuations arise. The Group utilized financing instruments with low interest rates and favorable terms to maintain low financing cost, adequate banking facilities, as well as to hedge interest rate risk.

Changes in Exchange Rate: The Group had sales and purchases as well as financing activities denominated in foreign currency which exposed the Group to foreign currency exchange rate risk. The Group was mainly subject to the impact from the exchange rate fluctuation in US$ and JPY against NT$ or CNY. We entered into a variety of derivative financial instruments to hedge foreign currency exchange rate risk to minimize the fluctuations of assets and liabilities denominated in foreign currencies.

Internal Control and Auditing

Internal Control

Our internal control policies are based on the Regulations Governing Establishment of Internal Control Systems by Public Companies established by the FSC and relevant regulations established by the U.S.A. Securities and Exchange Commission. The policies take into account our actual operational activities, are designed and approved by our managers and the board, and are implemented and managed by our managers, the board, and other employees. The policies include Entity level and Activity level; the objectives of these policies are to define the scope and standards of the internal control system for our business units and subsidiaries, ensure the effectiveness of internal control design and implementation, facilitate

ASEH Internal Control Management Process

sound company operations, and achieve the following goals:

1 Operational effectiveness and efficiency

2 Reliable, timely, transparent reports in compliance with relevant regulations

3 Compliance with relevant laws and regulations

Every year, all of our subsidiaries conduct internal control self-assessments. The scope of the assessments covers the design and implementation of the company's internal control systems (e.g., Segregation of Duties Assessment, system authority management, chart of Authority Management, and Sarbanes-Oxley internal control assessment). The purpose is to implement a self-supervisory mechanism that allows a rapid response to environmental changes, based on which we can adjust the design and implementation of internal control systems, and improve the quality and efficiency of internal control. In 2019, to strengthen the supervision and management of ASEH subsidiaries, USI[1] was included in the group's internal control framework. By enabling both the document control and organizational structure to be effectively linked, we were better able to respond to changes in USI's product business units.

We conduct regular internal control education and training for our subsidiaries, and develop risk radar charts from self-assessment results, internal and external audit

1 Including Taiwan and China facilities of USI.

feedback; to be used as indicators for internal control improvement. We have also set up an e-platform for employees to gain access to information on internal control processes, management methods, legal policies, education and training and organization, that will help strengthen their awareness of internal control. Senior management from our subsidiaries were often invited to engage in indepth discussions on areas of concern for tone at the top and, determine the key to communicating and implementing effective internal control.

With the advent of Industry 4.0, all ASEH locations have begun to use information application software or automated control processes. In order to achieve corporate efficiency improvement and risk control objectives, external consultants and experts are widely invited to share the design, application and authorization management mechanism of process robots. In addition, the Group also continuously optimizes the design of the Group's internal control and risk management platform, regularly executes audit authority, functional division of labor, and risk management activities, and helps to consolidate and analyze the operation status of internal control related management activities and detect risks through e-system to reduce manual operations cost and improve the efficiency of self-evaluation, and provide real-time and useful information to help management as a basis for decision-making, to ensure the achievement of operating goals.

Internal Audit

The Group Internal Audit under the board assists the board and the managers in inspecting and evaluating the validity of the internal control system, as well as assessing the effectiveness and efficiency of the company's operations; the reliability, timeliness and transparency of reports; and compliance with regulations. It also offers suggestions for improvements when necessary to ensure the continued effective implementation of the internal control system.

The Group Internal Audit allocates an appropriate number of qualified, full-time internal auditors based on factors including the scale of the investment, business conditions, management requirements, and relevant laws and regulations to perform internal auditing tasks from an independent, objective, and impartial standpoint. Our competency standards for internal auditors comply with the provisions stipulated by the competent authorities. Auditors undergo professional training on an annual basis and take part in relevant business training organized by accreditation bodies or by the company itself to upgrade their capabilities and the quality of their audits as well as to continuously improve auditing procedures and verification processes and skills. In this way, they can actively develop their auditing and supplementary verification tools and upgrade the effectiveness of their auditing work.

The Group Internal Audit has established a risk-focused internal audit system to carefully evaluate the risks in each subject in every audit category. The assessment results are then used to determine the focus, scope, method, procedures and frequency of the auditing work, as well as determine the significant risks that should be prioritized and where checks need to be strengthened. In this way, the company can achieve the most efficient allocation of auditing resources and keep the board and

managers updated regarding the status of its internal control operations. Managers can thereby understand existing shortcomings or hidden risks, and effectively assist the company and subsidiaries in improving the internal control system, risk management, and corporate governance.
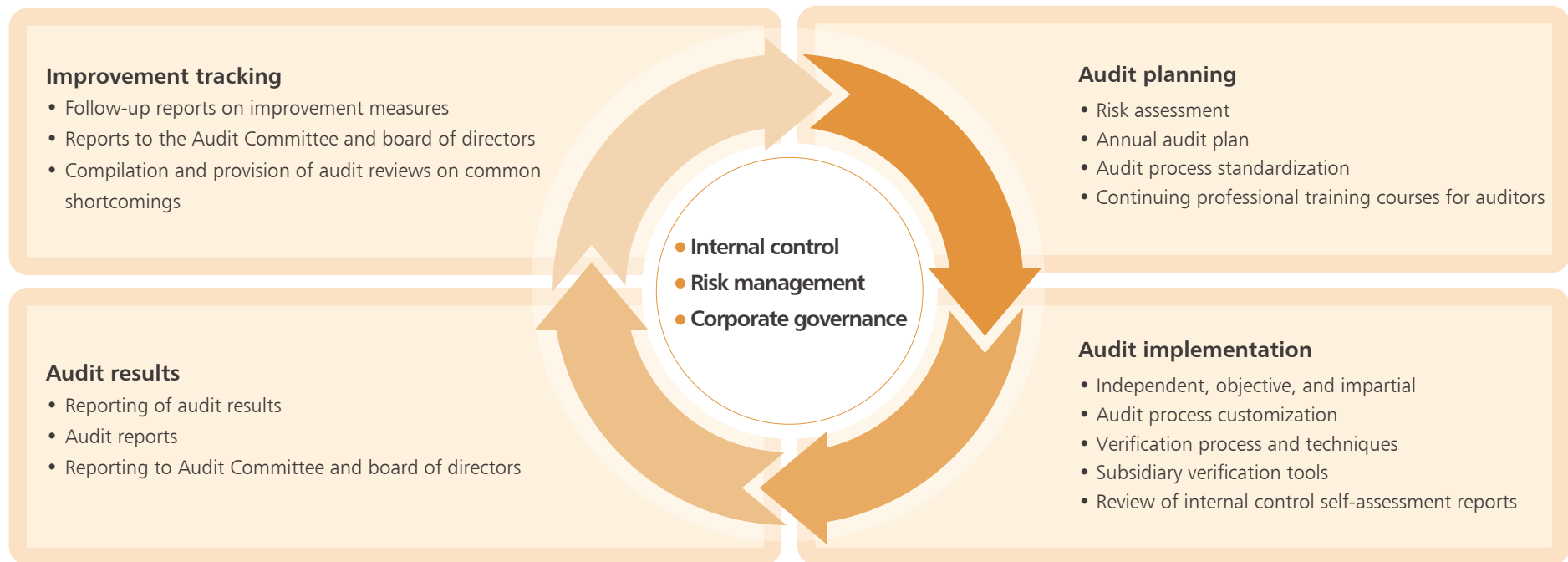
The Group Internal Audit reviews the internal control self-assessment reports of the company and its subsidiaries' on an annual basis along with improvements to the internal control shortcomings and anomalies discovered during audits. These serve as a basis for the board and CEO to assess the validity of the overall internal control system and for issuing statements on the internal control system.

The Group Internal Audit delivers audit reports and follow-up summary reports to the independent directors on a monthly basis for reference purposes. The supervisor of the Group Internal Audit also attends the Audit Committee's quarterly meetings to report to independent directors the audit results. Moreover, if there is any special situation, the supervisor of audit will immediately report to the independent directors that there is no such special situation in 2019. So far, the independent directors of the company have communicated well with the internal audit supervisor. The supervisor also reports to the board on the progress and findings of auditing operations, and follows up on and internal audit requests and suggestions raised by independent directors, the Audit Committee and the board. These requests and

suggestions are administered and reported within a specified time period.

Throughout 2019, we have completed the optimization of the group's audit operation management system, and are committed to planning the development of the new SOX self-assessment system, improving the ability of internal auditors to analyze data, coordinating the internal audit resources of the group, and strengthening the content and quality of audit reports and working papers, upgrading the skills and capabilities of employees, integrating our internal audit resources, and improving the content and quality of our reporting in order to elevate the value and effectiveness of internal audits.

Internal Audit Management Process

Improvement tracking
- Follow-up reports on improvement measures
- Reports to the Audit Committee and board of directors
- Compilation and provision of audit reviews on common shortcomings

Audit planning
- Risk assessment
- Annual audit plan
- Audit process standardization
- Continuing professional training courses for auditors

- Internal control
- Risk management
- Corporate governance

Audit results
- Reporting of audit results
- Audit reports
- Reporting to Audit Committee and board of directors

Audit implementation
- Independent, objective, and impartial
- Audit process customization
- Verification process and techniques
- Subsidiary verification tools
- Review of internal control self-assessment reports

3.5 Human Rights Management

Human Rights Policy

For the protection and promotion of human rights, ASEH supports and respects international standards, including the UN Universal Declaration of Human Rights, the first & second principles of UN Global Compact, UN Guiding Principles on Business and Human Rights, ILO International Labor Standards, Declaration of Fundamental Principles and Rights at Work, as well as relevant local laws and regulations. Additionally, ASEH implements human rights protection by joining the RBA. ASEH has established human rights management principles accordingly to protect the human rights of all ASEH's employees and also expects our suppliers to uphold these principles in order to protect the human rights.

Four Principles

1 Protect

ASEH complies with all labor and gender equality related laws and regulations where we operate, and provides employees with a safe and healthy work environment.

2 Remedy

ASEH vows to maintain an accessible and open grievance mechanism, and to take immediate remedial measures if any violation of human rights issues occurred.

3 Respect

ASEH forbids forced labor, child labor, discrimination, and harassment, and guarantees the freedom of association, privacy, reasonable working hours and appropriate compensation and benefits.

4 Management

ASEH continuously promotes human rights education, regularly assesses human rights risks, reports and discloses assessment results to top executives and to the public.

Human Rights Governance

In order to adequately manage human rights issues that arise from operating a global business, ASEH implements risk management at all facilities, collates and reports the information to the CSC at regular meetings.

Employee and operation-related human rights issues are managed by the Employee Care and Development Taskforce, using the RBA management. On community and environmental human rights issues, each facility implements environmental monitoring and survey community feedback locally to identify risks. For suppliers, the Supply Chain Management Taskforce conducts supplier sustainability assessments to identify related risks.

Management of Human Rights Risk

ASEH has adopted human rights management practices that follow PDCA procedures and include risk identification, assessment, monitoring, control, and disclosure. In a reflection of the different roles played by ASEH, we focused our human rights management efforts on our employees, suppliers, and local communities, performing due diligence with each group and providing whistle-blowing channels to prevent any human rights violations.

The human rights risks of our manufacturing and business activities are mainly related to employee and local community interest groups. We used the RBA Self-Assessment Questionnaire (SAQ) and Validated Audit Process (VAP) to perform risk management at our facilities worldwide. By examining the results of our human rights risk assessments of the past three years, we were able to identify issues and interest groups that were vulnerable to human rights risks and prepare corresponding mitigation and compensation measures. According to the assessment results, potential human rights risk issues include working hours, emergency preparedness, occupational safety, free choice of employment, and compensation and benefits. Each year, we have drawn up mitigation measures, which include raising human rights awareness via human rights training, ensuring sufficient manpower, management of working hours, improving occupational safety, and preventing occupational hazards. For more information, please refer to Chapter 6.4: Occupational Safety and Health of this report.

For the human rights risk factor of compensation and benefits, we adopted the living wage methodology under the framework suggested by Richard Anker in his paper (published in 2011) and book (co-written with Martha Anker; published in 2017). We examined laborer wellbeing and basic living standards to better

understand our employees' basic food, clothing, shelter, and transportation needs, along with the money needed to cover necessary education, social insurance, and other expenses. After determining a living wage based on the characteristics of each individual company, we compared it to the typical wages at each company in order to understand whether those wages were sufficient to support our employees and provide them with acceptable living conditions. When the program was put into practice it helped us promote human rights by making compensatory wage adjustments and ensuring basic rights and quality of life for our employees and their families, thus improving employee cohesion and fulfilling ASEH's responsibility as an employer.

We assessed human rights risks associated with the company's suppliers using supplier sustainability risk assessment questionnaires and the RBA Self-Assessment Questionnaire (SAQ). The company performed sustainability risk assessments on all tier-1 suppliers and conducted risk identification through the RBA Validated Audit Process (VAP), which includes an audit of human rights issues. Based on the assessment results, we identified working hours, compensation and benefits, occupational safety, emergency preparedness, and responsible mineral sourcing as major human rights risks. We then identified potential high-risk suppliers and adopted measures to verify and lower any risks. For more information, please refer to Chapter 7: Responsible Procurement of this report.

PLAN

Identify vulnerable human rights risks targets and topics, implement human rights risk assessment through corresponding due diligence methods, and provide a grievance mechanism to safeguard the rights of each stakeholder.

DO

Implement human rights risk management in the daily operation process, starting with the policies, measures, education and documenting, to avoid possible human rights risk events and damages.

Human Rights Risk Management Process of ASEH

ACTION

Develop mitigation measures and compensation measures for human rights risks and targets that are vulnerable, plan future human rights risk management objectives, and implement continuous improvement mechanisms.

CHECK

Conduct risk assessment methods based on different subjects, conduct annual human rights risk surveys, identify risk issues and targets, and report them to CSC.

ASEH as a/an	Policy	Interest Group	Human Rights Issues	Due Diligence	Complaint Mechanism
Employer	ASEH Human Rights Policy	• Foreign employees • All employees	Freely Chosen Employment, Working Hours, Wages and Benefits, Non-Discrimination, Occupational Safety, Emergency Preparedness, Sexual Harassment	RBA Self-Assessment Questionnaire (SAQ) and Validated Audit Process (VAP)	1. Internal whistle-blowing channels: the internal whistle-blowing channels of subsidiary companies 2. External reporting channel: www.aseglobal.com/en/csr_business_conduct_ethics.html
		• Child laborers	Young Workers		
Purchaser	ASEH Supplier Code of Conduct	• All suppliers	Freely Chosen Employment, Young Workers, Working Hours, Wages and Benefits, Occupational Safety, Emergency Preparedness, Responsible Sourcing of Minerals	Supplier sustainability questionnaires/RBA SAQ, on-site audits, and RBA VAP to survey and assess human rights risks	
Contributor to community development	ASEH Corporate Social Responsibility Best Practice Principles	• Local communities	Water Management, Noise Pollution, Air Pollution	Monitoring of noise, effluent, and emissions sources at ASEH facilities	

Human rights management standards and regulations:
1. "ASEH Human Rights Policy", please visit: http://www.aseglobal.com/en/csr_human_rights_management.html
2. "ASEH Corporate Social Responsibility Best Practice Principles", please visit: http://ir.aseglobal.com/attachment/20180713163117124148942_en.pdf
3. "ASEH Code of Business Conduct and Ethics", please visit: http://ir.aseglobal.com/attachment/20180622151727139618980_en.pdf
4. "ASEH Supplier Code of Conduct", please visit: www.aseglobal.com/en/pdf/ASE_Holding_Supplier_CoC_EN_2018.pdf

ASEH Human Rights Risk Matrix
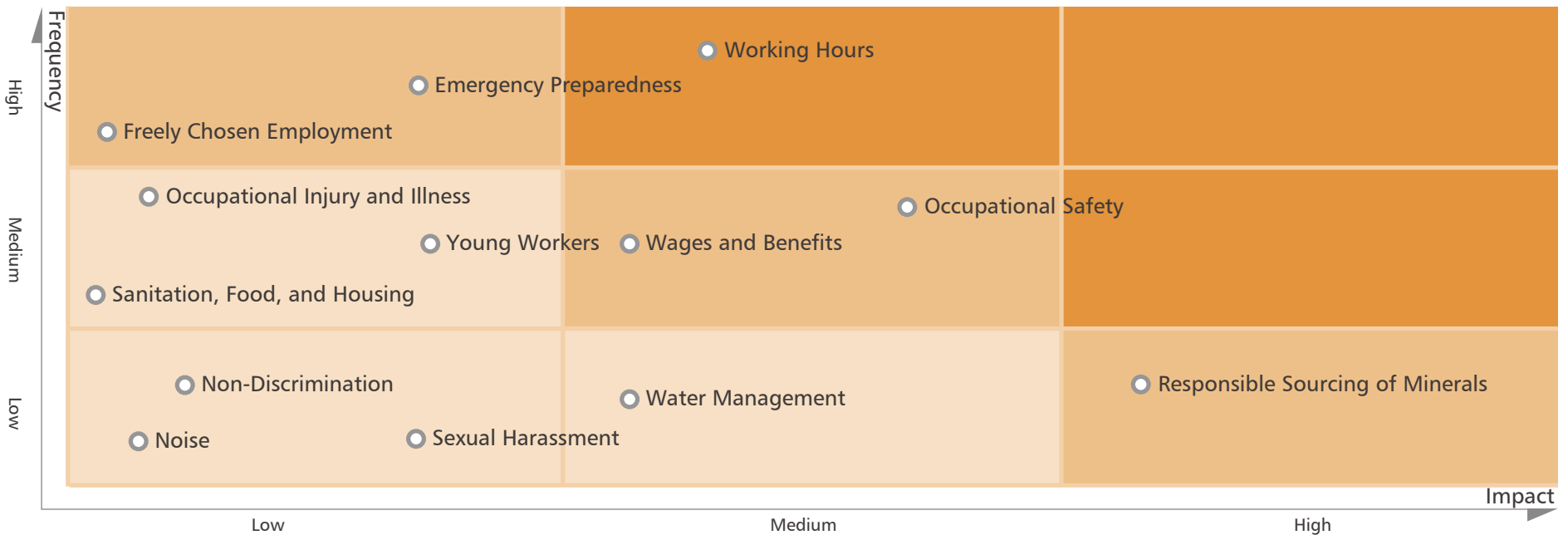
Mitigation measures for human rights risks

Target	Employee		Suppliers		
	Labor	Health and Safety	Labor	Health and Safety	Ethics
Risk issues	Working Hours Freely Chosen Employment Wages and Benefits	Occupational Safety Emergency Preparedness	Freely Chosen Employment Working Hours Wages and Benefits	Occupational Safety Emergency Preparedness	Responsible Sourcing of Minerals
Mitigation measures	• Employment of sufficient manpower to meet manufacturing capacity and prevent manpower shortages and overtime • Establishment of working hours management system to alert employees and their direct superiors of overtime work. • Organization of human rights training courses • Compliance with local laws and regulations; regular review and revision of employee handbooks and regulations	• Establishment of COVID-19 pandemic emergency response plan; enforcement of personal hygiene; and tracing of employee contact history. For more information, please refer to Chapter 6.4: Occupational Health and Safety—Health Promotion. • Public fire safety measures in accordance with the recommendations of the National Fire Protection Association; enhanced training in disaster preparedness and safety education. For more information, please refer to Chapter 6.4: Occupational Health and Safety—Disaster Preparedness and Emergency Response of this report.	• Annual audits or RBA VAP to assess suppliers' human rights risks through company subsidiaries in order to mitigate risks. • Requiring suppliers to adopt corrective measures for human rights risks and conduct follow-up on implementation. • For more information, please refer to Chapter 7.3: Supply Chain Sustainability Management-Supplier Sustainability Audit Mechanisms of this report.		
Compensation measures	• Adoption of living wage calculation methodology and establishment of overtime management and tracking mechanism to prevent employees from working for seven or more consecutive days. • Financial compensation and revision of labor policy for employees whose travel rights are violated • Disbursement of unpaid wages to terminated employees within the specified period of time set forth in local laws and regulations	• Health assessments performed by professional physicians in medical consultation to help employees with self-health management. • Assistance with medical insurance claims • Regular emergency evacuation drills for fire, earthquake, and composite disasters; review and improvement of warning and prevention measures.	• Requiring suppliers to provide guidance or financial compensation, or to implement policy changes or other compensatory measures for employees whose human rights have been violated. • For more information, please refer to Chapter 7.3: Supply Chain Sustainability Management-Supplier Sustainability Audit Mechanisms of this report.		

1 The human rights training courses organized at ASEH subsidiaries in 2019 totalled 197,692 hours.

3.6 Regulatory Compliance

ASEH's Group Chief Administration Officer was appointed as the chief corporate governance officer through a resolution passed at the Board Meeting on June 21, 2019. In addition to the inherent duties of the position, he is also responsible for supporting the Board on legal compliance matters and supervising legal compliance at all subsidiaries. The corporate legal department cooperates with all subsidiaries to establish standards to identify legal compliance. The corporate legal department is also responsible for the timely updating of regulatory requirements and ensuring effective management of high risks issues through identification of potential risk impacts by each subsidiary. In parallel, relevant departments

are required to participate in public regulatory hearings held by government agencies and provide feedback on legislative drafts if necessary, so as to gain early insight into legislative trends and priorities.

ASEH continued to improve its internal environmental protection and occupational safety legal compliance audits in 2019. We also place emphasis on legal compliance issues faced by the technology industry in relation to trade secret protection and the handling of labor incidents, as well as on the management of regulatory compliance with major legislative acts such as the Labor Incident Act and the Trade Secrets Act and

import and export regulations and prohibitions. Through systematic implementation, the revision of internal regulations, and employee training and communication, ASEH has improved legal awareness among its employees and those of its subsidiaries.

In 2019, ASEH continued to comply with the Company Act, Fair Trade Act, Securities and Exchange Act, and other major laws and regulations governing corporate governance in publicly listed companies in Taiwan. We have not violated any of the aforementioned laws and regulations and shall continue to pursue a perfect record in legal compliance for all of our business activities.
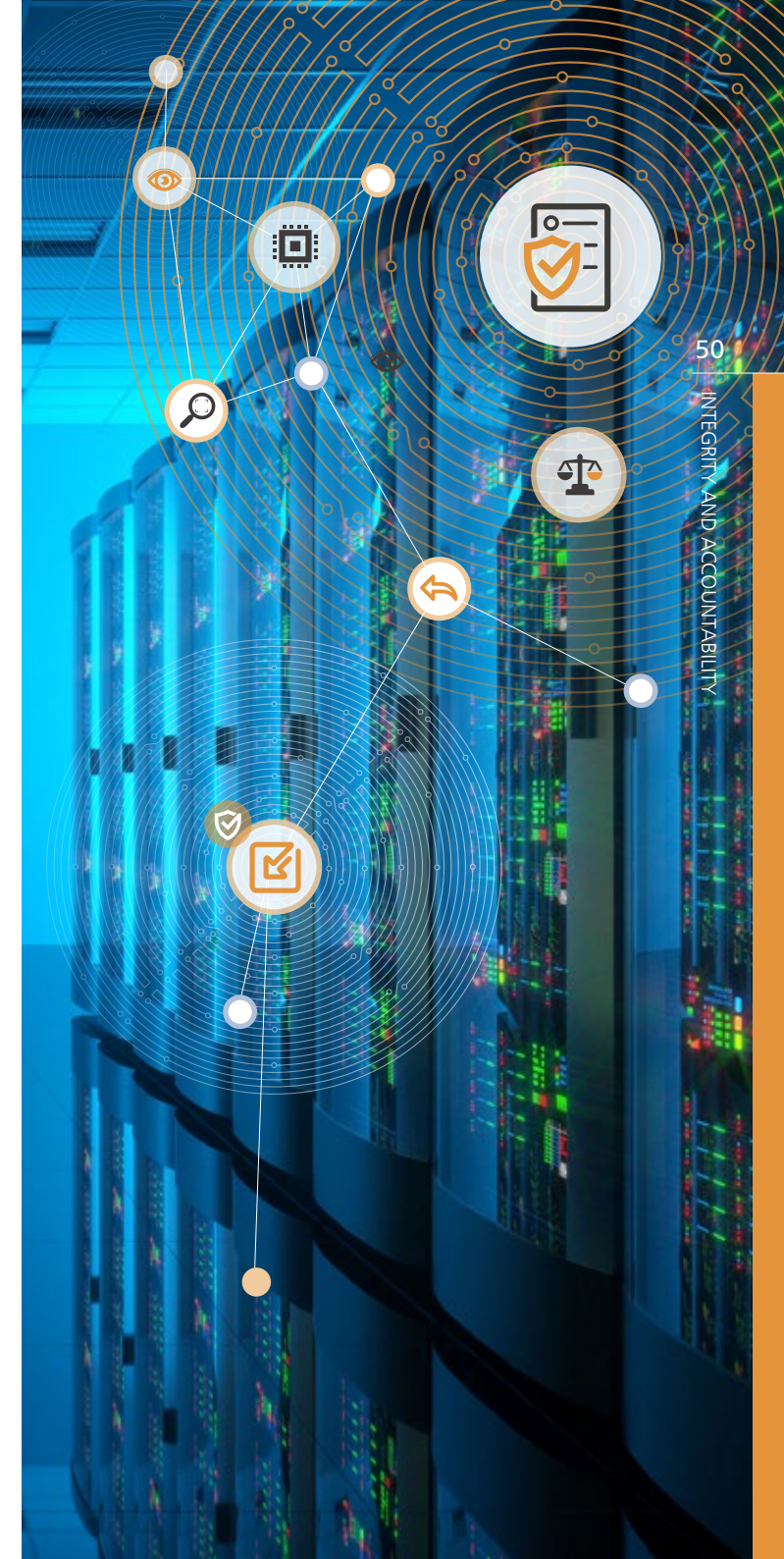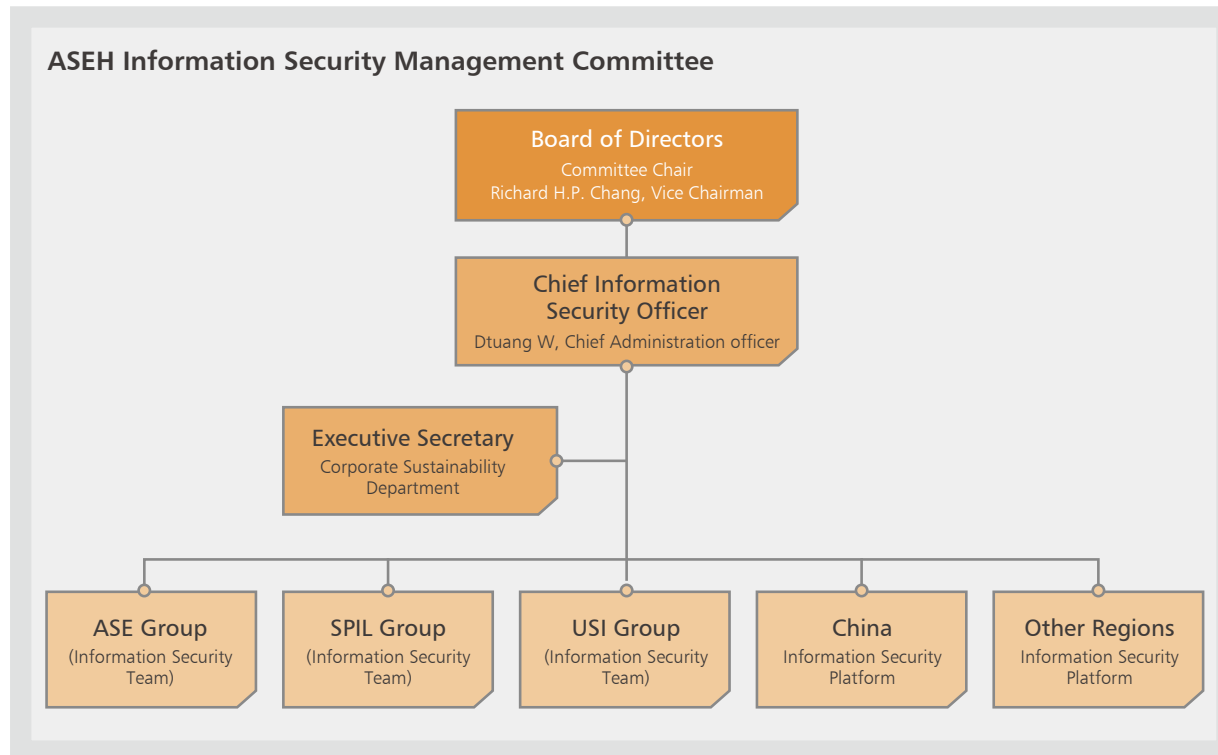
Regulatory Compliance Process

Identify the Laws and Regulations

Developing an inventory of applicable laws and regulations adopted in the countries where ASEH's primary operations exist

Laws and Regulations Update

Our legal department monitors and updates accordingly the inventory of applicable regulations, and conveys the updated statutes to respective departments at each operation site for regulatory identification on a regular basis

Compliance Inspection

Ensuring compliance through cross-departmental internal audits or external audits

Mechanism and Measures

Designating a person-in-charge of regulatory identification in the respective departments at each site, and authorizing the designated person to ensure compliance to applicable laws and regulations, and to report the state of compliance to his or her superior

3.7 Information Security Management

Information Security Policy and Organization

The ASEH Information Security Management Committee was established by the ASEH Board of Directors' Corporate Sustainability Committee (CSC) to ensure corporate governance in response to the company's acceleration towards smart manufacturing. The Committee is dedicated to enhancing information security, preventing and mitigating information security threats and risks by developing strategic plans for information security, establishing benchmarks for information security maturity assessments, promoting information security risk management in ASEH subsidiaries, and coordinating internal and external technologies, resources and information. The ASEH Information Security Management Committee is headed by the chief information security officer, who is responsible for establishing the information security management framework, regular reviews of all ASEH subsidiaries' information security management and incident response plans, and the submission of the information security governance report to the Board of Directors in the last quarter of each fiscal year. ASEH is committed to corporate sustainability and has formulated its *Information Security Policy* https://www.aseglobal.com/en/pdf/2020_ASETH_ISMP_EN.pdf as the foundation on which its corporate management practices are built to ensure the security of the information assets of the company, employees and suppliers.

ASEH Information Security Management Committee

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                    Board of Directors
                     Committee Chair
               Richard H.P. Chang, Vice Chairman
                           |
                  Chief Information
                  Security Officer
          Dtuang W, Chief Administration officer
                           |
        Executive Secretary
        Corporate Sustainability
             Department
                           |
    ┌──────────┬──────────┬──────────┬──────────┐
 ASE Group  SPIL Group  USI Group    China    Other Regions
(Information (Information (Information Information  Information
 Security    Security    Security    Security    Security
  Team)       Team)       Team)      Platform    Platform
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Information Security Maturity Assessment

As a multi-international company with leading edge IC assembly, testing and material technologies, it is especially important for ASEH to adopt a highly integrative, compatible and flexible information security maturity assessment model. In addition to our major subsidiaries - ASE Kaohsiung and Universal Scientific Industrial, obtaining the ISMS (information security management systems) ISO 27001 certification, ASEH adopted the National Institute of Standards and Technology (NIST) Cybersecurity Framework (CSF) maturity assessment tool. The NIST CSF combines a competency model with global open standards to create a risk-based management framework for continuous assessment of and improvements to an organization's information security. The framework organizes its core into five functions - Identify, Protect, Detect, Respond and Recover, which are used to assess the organization's information security maturity, promote comprehensive planning for internet security and execute regular improvement plans.

The NIST CSF's five major functions are broken down into 23 categories and 108 subcategories. Based on these categories, ASEH designed an assessment table that cross-references the company's attributes, technologies, cyber-attacks and cyber-threats, to conduct comprehensive assessments of major subsidiaries' performance. ASEH also carried out industry benchmarking on information security maturity, and integrated information security legal compliance into its supply chain security management, internal information protection and control, and the group's auditing system.

Cyber Security Resiliency
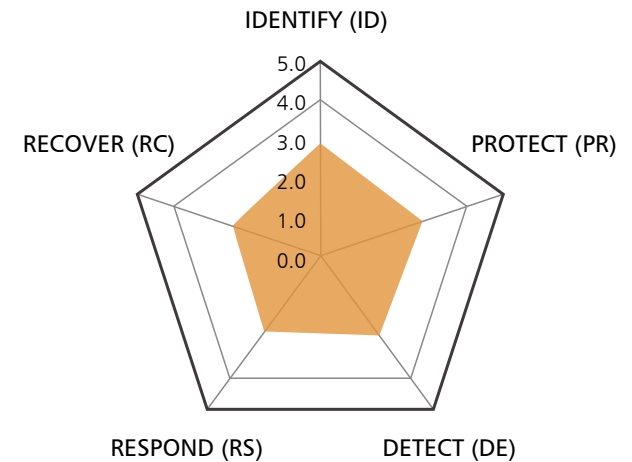
ASEH Summary Scores

Key Thinking of Security Trends: Continuously Operating Cybersecurity Evaluation Framework

First step

Based on the Cybersecurity assessment tool, the organization determines the overall inherent risk level of the organization based on the nature and direction of the organization's business, with regard to digital channels and the development status of electronic services.

Third step

Analyze the status of the organization in Cybersecurity and the differences in Cybersecurity management objectives, and assist the management in planning follow-up activities,
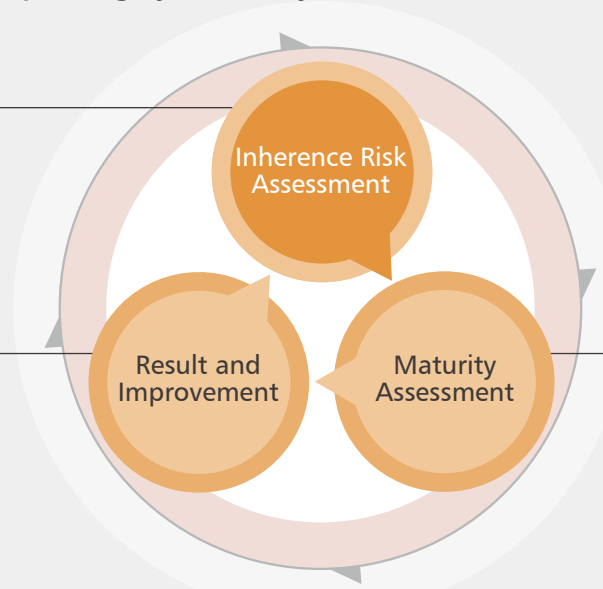
Second step

The organization evaluates the maturity of each control field according to the Cybersecurity evaluation framework and confirms the current Cybersecurity control maturity.

Inherence Risk Assessment

Result and Improvement

Maturity Assessment

NIST CSF

IDENTIFY
PROTECT
DETECT
RESPOND
RECOVER

Implementation and Protection of Information Security

To ensure business continuity in the company's operations and business activities, ASEH conducts an annual disaster recovery drill to mitigate the risk of service disruptions caused by impacts from major crisis events to the company's information systems. The drill plan includes the task team organization chart, scope, time, critical information systems, participating departments, participating personnel and their tasks, recovery personnel, steps and procedures, resources required, risk management, and post-drill review and improvements. The drill prepares the company for prompt disaster response to ensure the continuous operation of information systems in times of crisis. To ensure that appropriate management procedures will be observed by employees in the event of an emergency, ASEH has established procedures for the reporting and handling of information security incidents. The procedures allow employees to report any security incidents to ensure prompt handling, followed by efficient responses that will mitigate information security risks. ASEH has had no major information security incidents in the past three years. To maintain its information security capabilities and performance, the company commissions a third-party auditor to conduct an annual audit and review of its information security performance, during which a vulnerability scan and penetration test are performed to ensure that the company's information systems and network environment are compliant with the code of practice for information security management. ASEH protects its trade secrets and client data through strict enforcement of its information security policy and client privacy protection measures. In the event of a sudden external cyber-attack, representatives of ASEH subsidiaries immediately convene to exchange technical information, update and discuss responses and countermeasures. External experts on information security are also invited to these meetings to conduct reviews and analyses. This proactive approach, coupled with the prompt analysis and handling of information security incidents, form a comprehensive information security safety net.

In addition to mitigating the company's operational risks from a corporate governance standpoint, raising our employees' information security awareness and enhancing the company's operational capabilities play a major part in ASEH's information security management policies. All ASEH employees participate in the company's annual Proprietary Information Protection (PIP) training course, which involves training on information security policy, management framework, and control measures. In 2019, 47,959 employees participated in the PIP training course for a total of 32,428 training hours. Employees who violate the company's information security policy are subject to a set of information security disciplinary procedures that also takes into account the employee's performance. The preceding measures reduce the exposure of the company to potential penalties and legal liabilities, and lessen impacts on its business operations. ASEH is committed to enhancing its information security technologies and capabilities, and spares no effort in the training of information security personnel and establishing back-ups. Through the deployment of information security regulations and standards, we aim to continue the integration of our management systems and technology, and to foster the comprehensive development and improvements of our information security management. In parallel, by assuring our supply chain partners and stakeholders of the robustness of ASEH's information security infrastructure, we are helping to ensure that the company's future and competitive edge are secured in the era of smart manufacturing.

INNOVATION SERVICE

Innovation is the key to sustainable human development. Through innovation, ASEH improves product value, makes human lives easier in a smart era and elevates social well-being. We take into careful consideration regarding sustainability in manufacturing - integrating environmental protection and social innovation at a product's design stage. As a result, ASEH has produced more efficient products and helped customers lower their power consumption when using our products, contributing to a reduction in greenhouse gas emissions. The effects of product usage on human health were also considered and efforts have been made to manufacture products with non-hazardous materials.

ASEH is committed to improving and protecting the environment by enhancing raw material usage efficiency, recycling resources, reducing wastewater discharge and greenhouse gas emissions, and reducing waste generation and chemical use. We strive to develop and promote comprehensive, environmentally friendly services and manufacturing processes that consider the environmental impact at various stages of the product lifecycle including raw material procurement, design & development, manufacturing, product use, and product disposal. This has enabled ASEH to provide the most environmentally friendly, green manufacturing services.

4.1 R&D and Innovation

ASEH continuously invests in research and development ("R&D") of advanced semiconductor packaging technology and cultivates experienced and skilled engineering teams to meet customers' needs for product performance enhancement and cost reduction. Our research and development expense increased 23.0% to NT$18,395.3 million (US$615.0 million) in 2019, compared to NT$14,962.8 million in 2018, accounting for about 4.5% and 4.0% of operating revenues in 2019 and 2018, respectively. As of December 31, 2019, we have an R&D team of 10,768 employees, an increase of 5% compared with 10,283 R&D employees at the end of 2018.

Driven by the new wave of 5G, high-speed transmission, low latency plus AI, the Internet of Things, autonomous driving, and smart manufacturing, the semiconductor industry chain strives to move towards a higher system integration level via heterogeneous integration, which enable functional integration enhancement and scale-down technology to go hand in hand to create a more efficient smart networking environment and device.

Key products and technologies successfully developed in 2019 are as follows:

(1) Flip Chip Packaging (FCP): certified manufacturing process for 7 nm and 10 nm chips, the 14 nm/16 nm copper-electroplating process/Low-K dielectric FCP application and silver-alloy wires for hybrid flip chip ball grid array packages.

(2) Wire-bond packaging: the development of second generation advanced embedded component packaging, pressure sensor packaging, the technology of copper/ gold bonding wires with ultra-fine spacing and wire internals, and Mobile DRAM.

(3) Wafer Level Packaging: Advanced Fan out with bridge die (HDCL), Fan Out DBG (Dicing before grinding) Technology), CPD wafer with 8 Hi HBM Grinding Technology, Silicon Photonic component technology, Through-Wafer Via, glass substrate panel packaging, hexahedral Wafer Level Chip Scale Packaging (WLCSP), Fan-Out PoP Chip product development, and the die-to-wafer fitting process.

(4) Advanced packaging and module: low power consumption antenna design and packaging, flexible substrate panel and packaging, dual side thinning and wireless communication module, and 5G antenna packaging product development.

Our research and development teams work closely with our supply chain partners including material and equipment suppliers to maximize scale and efficiency in technology development. We also work closely with key customers on new product and manufacturing collaborations. In addition, we collaborate with academic and industry organizations such as the National Sun Yat-Sen University, National Cheng Kung University, National Taiwan University, Tsing Hua University, and ITRI on advanced packaging and testing technology development.

Technology Platforms

R&D is costly and time-consuming, and choosing the right products/technologies as R&D targets in the early stages is imperative to bringing the risk level down. To address this, ASEH has established a market analysis task force consisting of internal team of R&D staff, research institutions, suppliers, equipment manufacturers and customers. Through the task force, the Company is able to regularly exchange views on the latest market developments with players in the industry, focus on new product/technology development to meet emerging market demand, set short-, medium- and long-term R&D targets, and concentrate its resources on priority projects. In 2019, we held 60 seminars with research institutions, 100 workshops with suppliers and equipment manufacturers, and 60 technology blueprint alignment meetings with customers.

ASEH has established a Technology Board consisting of experts from a wide range of professional disciplines to achieve horizontal integration and effective technology development through the integration of technology and knowledge sharing and the creation of a platform for in depth analysis and discussions. Furthermore, we have a "best known method" (BKM) platform that can be accessed globally to encourage employees to share innovative engineering technologies. As of 2019, a total of 20 manufacturing sites and more than 4,000 employees have registered on the KM platform. The platform featured five categories, namely: "e-OJT, Technology Board, BKM, Green Innovation/ Climate Change, and Customers/Competitors/Suppliers/ Consultants/Seminar Materials" and contained more than 6,000 technology related data records that had been viewed more than 20,000 times. ASEH will continue to improve the KM platform functions and strengthen the development of engineering technology to elevate the company's competitiveness and development potential.

Smart Factory

• Achieving heterogeneous integration through smart manufacturing and driving social changes through innovation

Social innovation through heterogeneous integration

The extensive application of artificial intelligence in healthcare is driving more chip integration that combines different functionalities such as sensors, microprocessors, controllers and MEMS to process biometric data and monitor the surrounding environment. The technological development in smart healthcare solutions will greatly improve healthcare quality and human well-being. As the world's largest semiconductor assembly and test company, ASEH is a leader in heterogeneous integration and is providing customers cutting edge technology to design and manufacture high-performance miniaturized chip solutions. Besides healthcare applications, heterogeneous integration in semiconductor packaging will spur growth in other fields such as the automotive, aerospace and defence industry.

Multi-functionality, high performance, energy efficient and highly integrated features on an increasingly small form factor continue to drive smart technology chip design trends. At ASEH, we have developed a proprietary SiP-id™ (System-in-Package intelligent design) design kit that aggregates the requirements of wafer-, package-, and system-level design into a unified and automated flow, enabling customers to overcome challenges in product design, shorten time to market, and accelerate the development of innovative product applications. SiP-id also helps designers reduce the number of design iterations and improve throughput, that will vastly shorten the time needed to design and verify ultra-complex SiP packages.

Industry 3.9—Connecting seamlessly with customers' product design

Digital transformation of our manufacturing processes enable us to bridge the gap with customers and their design process. To realize our smart factory blueprint, we have focused on three major areas - automation, heterogeneous integration in machine and production systems, and heterogeneous integration in SiP miniaturization. The deployment of AI, Big Data and cloud computing have optimized our manufacturing processes to identify and analyze problems, self-adapt and initiate solutions. In 2011, we established the ASE CIM Committee to build the company's foundation for automation. Our planning for smart factories began in 2015, and by the end of 2019, we have already established eleven smart factories. We plan to increase the number to eighteen by the end of 2020, which will house manufacturing processes in wafer bumping, flip chip packaging, SiP packaging, wafer-level packaging and wafer probing.

In 2018, we have implemented the Industry 3.5 'centralized monitoring', followed by the Industry 3.7 'Big Data-driven design' in 2019. These are significant milestones in our progress towards Industry 4.0 that enabled us to achieve a near-zero defect quality environment, shorten production cycles and enhance production efficiency that help customers gain a competitive edge in the market. We have also increased the value of our human capital by providing on-the-job training for manufacturing employees to transition to remote positions in facility control rooms. Through digitization, we were able to increase the number of equipment operated remotely from twenty-four to ninety. Employees benefit from such productivity with improved wages as well as a safer working environment. We are now working towards achieving Industry 3.9 by connecting our manufacturing processes seamlessly

with our customers' product design and establishing ASEH as a premier provider of heterogeneous integration solutions.

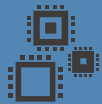### Collaboration with material and equipment suppliers to achieve smart manufacturing

ASEH is one of the first OSAT (outsourced semiconductor assembly and test) companies to adopt smart manufacturing. Among the challenges we have faced was the complexity of our manufacturing processes, which prevented us from adopting standard industry solutions and practices. It was also difficult to integrate the diverse range of manufacturing processes at our facilities, leading us to develop customized software and hardware in house. To support our smart manufacturing process, we extended the concept of heterogeneous integration into our procurement procedures. First, we adopted SEMI's Equipment Communications Standards to establish our equipment procurement policy, whereby our equipment suppliers are obliged to comply with. We then established automation goals for our smart factories and collaborated with equipment suppliers in the development of hardware and firmware. This approach helps local suppliers to develop the automation capabilities necessary to create automated semiconductor assembly and testing equipment tailor-made for the software developed by ASEH's automation team. Our material suppliers are also key partners in our adoption of smart manufacturing. Through the standardization of 2D barcodes for substrates and lead frames, we further enhanced the traceability throughout our manufacturing processes, allowing customers to track their products in real time.

Social impact of smart factories

ASEH's adoption of smart factory concepts began with a strong foundation in automation and forms a strategic

approach to advance heterogeneous integration by digitally connecting customers, suppliers and our manufacturing systems. The creation of business value from ASEH's smart factory development has helped to drive semiconductor industry growth and innovation, as well as uphold the extension of Moore's Law. The smart factory is also accelerating ASEH's digital transformation and has helped ASEH increase human capital value, lower employee overtime and reduce occupational hazards; resulting in a reduction in social costs by approximately NT$300 million. We collaborated with our suppliers to develop software and equipment tailor-made for our semiconductor assembly and testing facilities, generating revenue of approximately NT$2 billion for our equipment suppliers and NT$660 million in local procurement. ASEH's smart manufacturing has positively impacted our customers, helping them seize new business opportunities and develop innovative applications that provide greater benefits and convenience to society.

The impact of ASEH smart factories

Procurement
- Generated approximately NT$2 billion in revenue for the smart manufacturing supply chain
- Created 269 jobs in the supply chain
- Generated NT$660 million in local procurement, facilitating economic development

Manufacturing
- Increased the value of our human capital through upskilling in automation and AI for 400 employees
- Accelerated ASEH's digital transformation in manufacturing, lowered employee overtime, resulting in a reduction of social costs by approximately NT$300 million
- Reduction in occupational hazards by incorporating workplace safety measures

Customer service
- Enabled customers to develop innovative product applications, that provide greater benefits and convenience to society
- Improved product yields shorten time to market, helping customers develop new markets
- Revenues generated from smart factories amount to over NT$10 billion

Note 1: Employee overtime was calculated using accumulated data since the adoption of digital transformation until the end of 2019. We referenced data from the Eco-costs database to analyze the reduction in risks to health damage due to a reduction in overtime and work hours from the implementation of factory automation. The data was converted into monetary value according to OECD (Organization for Economic Co-operation and Development, 2012) guidelines.

Note 2: The amount of revenue generated and the number of jobs created in the supply chain were calculated using input-output analysis (IOA). In our calculation, we used the data from the OECD Input-Output Tables and the EXIOBASE 2 database as references and assumed that all suppliers are based in Taiwan.

Automation Technologies introduced in 2019:

- Intelligent Material Handling System (IMHS)

  (1) We have implemented a real-time dispatching system to prioritize manufacturing lot orders, and a material control system (MCS) to manage and monitor the material handling. MCS coordinates with the wafer transport system and manufacturing execution system (MES) to transport wafer cassettes to the designated storage facility or production line by overhead hoist transfer (OHT). The new system dramatically reduces wait times and increases the overall efficiency of transport logistics.

  (2) We have integrated the MES with the vehicle dispatching system and elevator controllers to allow optimized arrangement of the schedules and routes of autonomous vehicles to transport goods between different floors. These vehicles recharge automatically and can run uninterrupted for up to 24 hours on a full charge, which is ideal for consolidating manufacturing processes across different floors.

  (3) We have installed machine arms on self-navigating delivery vehicles, thereby allowing the processing or loading/unloading tasks across various manufacturing processes. The result is the integration of automatic material-handling across manufacturing lines and elimination of repetitive and tiresome tasks that free up employees for more valuable work.

  (4) We have implemented a smart automatic storage retrieval system that is capable of monitoring finished products and in-process inventory to maximize space utilization such that the inventory is processed on a first-in, first-out (FIFO) basis

in an accurate and efficient way. The system significantly increases the efficiency in the use of space, time and labor.

- Intelligent Predictive Maintenance (IPdM)

  IPdM utilizes statistical and dynamic methods to simplify the database and reduce the overfitting of predictive models for feature extraction and selection. Through data classification, multiple regression analysis and time series modeling, the root cause of a failure can be quickly identified and when the next breakdown is likely to occur can be predicted. With IPdM, maintenance staff can be informed of when and what types of issues might arise and move proactively to solve them, thus avoiding unplanned downtime, preventing financial losses due to unsatisfactory product quality, and improving the productivity of manufacturing equipment.

- Automated Packaging Lines

  Automated Packaging Lines adjust workflow processes according to each customer's requirements, including the automatic transfer of materials, weighing, label printing, label verification with a CCD (charge-coupled device) sensor, packing, inventory taking, package sorting, and finally, sealing the box for delivery. The entire automated process increased the efficiency in the packing and shipping logistics and at the same time, improved workplace safety for employees.

- Equipment Maintenance Training with Augmented Reality (AR)

  Equipment maintenance training can now be conducted with augmented reality. A virtual technician guides rookie engineers through every step of the maintenance and repair process using AR technology to enhance the learning experience with audiovisual cues and interactive tasks. AR training allows trainees to feel as if they are working on the equipment

hands-on. It also has an off-line practice mode for new hires to hone their skills. Even employees with zero experience can learn to perform maintenance on a relatively complex machine with efficiency after completing the corresponding AR tutorial on their tablet computers.

Automated Guided Vehicle (AGV)＋Robod

Conveyer

OHT

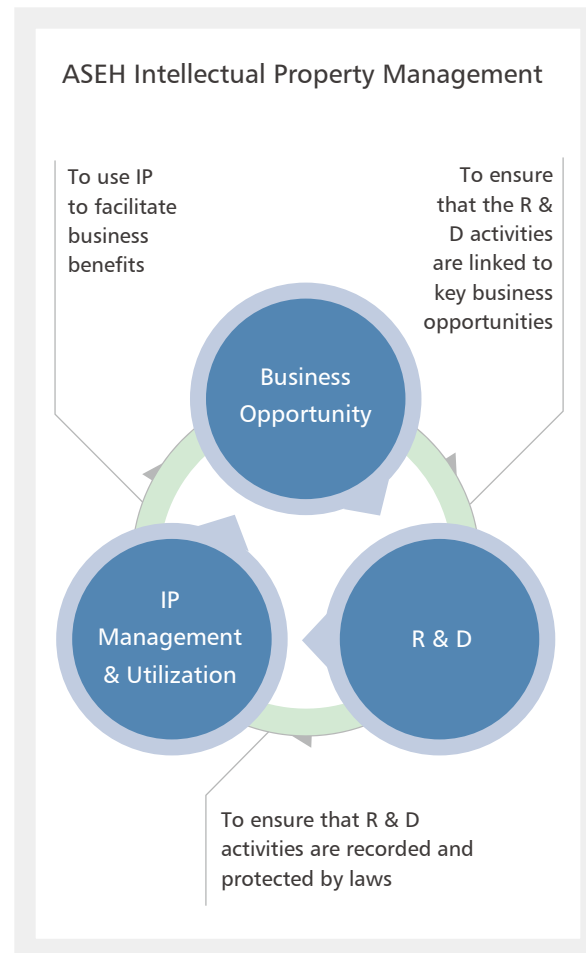## Intellectual Property Management

Intellectual property (IP) is an important aspect of a company's innovation management. Effective IP management helps to maintain ASEH's leading position in corporate innovation.

ASEH's IP management is closely embedded into its overall business operation planning and implementation to form a continuous innovation cycle consisting of "business opportunity", "R & D" and "IP management and utilization". The innovation cycle includes the following three phases:

1. Research and development activities are conducted in response to market's prospective demands, to ensure that the R & D activities are linked to key business opportunities.

2. Through our effective IP application system and tools, R & D activities are carefully recorded and processed for intellectual property rights protection (e.g. patents, trademarks and trade secrets).

3. High-value IP helps to facilitate business success, obtain orders from customers, develop more new business opportunities, thereby creating a positive sustainable cycle. In addition, by protecting R & D achievements with intellectual property rights, an IP protective wall is established to prevent others from plagiarizing ASEH's technologies and to defend against the threat of competitors with their intellectual property.

As of January 31, 2020, we hold and maintain a total of 5,707 patents including 2,440 Taiwan patents, 1,689 U.S. patents, 1,545 P.R.C. patents and 33 patents in other jurisdictions. These patent portfolios cover various semiconductor packaging technologies and electronic manufacturing technologies. In addition, as of January 31, 2020, we also had a total of 1,473 pending patent applications including 154 in Taiwan, 503 in the United States, 786 in P.R.C. and 30 patents in other countries.

ASEH Intellectual Property Management

To use IP to facilitate business benefits

To ensure that the R & D activities are linked to key business opportunities

Business Opportunity

IP Management & Utilization

R & D

To ensure that R & D activities are recorded and protected by laws

4.2 Sustainable Manufacturing

To manage product life cycles and mitigate environmental impacts, ASEH has formulated five sustainable manufacturing principles and adopted the 'do more with less' concept. Hazardous substance management is an integral part of sustainable manufacturing and ASEH has established regulations and standards that follow international guidelines like the IECQ QC 080000, ROHS, REACH, Energy Star, EU Energy-related Products Directive as well as adhere to customers' requirements to provide a complete environmentally friendly solution. At the same time, through extensive analysis, testing and R & D at our green laboratory, we identify areas of improvement beginning at the source, to develop green materials and testing techniques, green manufacturing processes and eco-friendly packaging materials.

Sustainable Manufacturing Declaration

ASEH is committed to:
- Complying with all applicable laws and regulations.
- Managing hazardous substances in parts and materials that are used in manufacturing.
- Providing product solutions that are compact, lightweight and energy efficient.
- Continuously enhancing resource recycling, reducing greenhouse gas emissions, waste generation, wastewater effluent and chemical usage.
- Reducing product packaging and wastes.

Green Laboratory

Our green laboratory is dedicated to the following:
- Evaluation and development of green materials: Evaluation of non-toxic or low toxic product raw materials and process chemicals.
- Development of environmental testing technology: Establishment of monitoring technology, mechanism and standard, compliant with world environmental regulations.
- Development of Green Process: Improve utilization rate of chemicals or raw materials; evaluate recovery, reduction and reproduction technologies for waste, wastewater and chemicals.
- Development of Environment-Friendly Packaging: Develop bio-composite packaging materials.

Sustainable Design
- Low power consumption
- High packaging density
- Less materials
- Process simplification
- Adopting recyclable component designs

Do More with Less (Reducing environmental impacts while increasing product value)

Sustainable Material Usage
- Select materials compatible with environmental ecology and low carbon emission
- Search for materials to substitute for hazardous substances.

Sustainable Procurement
- Hazardous substance management
- Green Procurement
- Use only DRC conflict-free minerals from reliable sources to achieve the objective of a supply chain without any conflict procurement

Sustainable Packaging and Logistics
- Reduce product packaging and wastes
- Use recyclable packaging materials
- Optimize delivery routes and increase delivery load
- Adopting greener transport alternatives

Sustainable Manufacturing
- Increasing the efficiency of materials and components
- Increasing manufacturing efficiency
- Reducing GHGs emissions and use renewable energy
- Reduce water consumption and wastewater discharge
- Reducing waste and recyclable

Sustainable Manufacturing Related Projects

	Implementation strategies	Details
Materials	➢ Selection of materials with low environmental impact ➢ Innovative development of materials from recycling	☑ Replaced chemical agents with viable alternatives ☑ Recycled waste epoxy molding compound to produce SiO_2 materials ☑ Recycled waste phenolic resin to produce activated carbon
Design	➢ Use of products with low power outputs ➢ Use of high-end packaging technologies	☑ Designed a wireless IoT communications module for the development of a new generation of energy efficient products ☑ Improved manufacturing technologies and product functionality while driving down material costs
Manufacturing	➢ Improvements to energy efficiency ➢ Recycling and reuse of chemicals ➢ Internal recycling and reuse of equipment and components	☑ Introduced system-wide intelligent controls; reduced gas emissions throughout the manufacturing process (eg. 40% reduction in nitrogen consumption) ☑ Recycled and reused organic compounds such as cyclopentanone and propanone ☑ Improved the design of equipment and components to extend their life cycles
Packaging and logistics	➢ Recycling and reuse of packaging materials ➢ Use of simplified packaging ➢ Selection of low-impact materials ➢ Adoption of green logistics	☑ Recycled and reused packaging/buffer packing materials such as PE plastic bags, wafer-level packaging, foamed plastics, etc. ☑ Recycled and reused plastic pallets ☑ Reduced reliance on carton by reusing corrugated carton and logistic crates ☑ Phased out poly foams with high environmental impact ☑ Deployed electric transport vehicles ☑ Adopted transport alternatives with lower carbon emissions (replaced air freight with ocean ship services)

In 2019, ASEH invested NT$11.5 millions to promote large-scale environmental sustainability projects through industry-university cooperation, which deliver notable contributions to our 2020 environmental targets on reducing water withdrawal (4 related projects) and reducing hazardous waste (2 related projects).

Product Life Cycle Assessment

ASEH has been gradually adopting ISO 14067 (carbon footprint) and ISO 14005 (eco-efficiency) standards as references to assess the environmental footprint of the company's operations and product life cycle, and in an effort to increase the value and raise the green standards in our products.

As of the publishing of this report, ASEH has completed a comprehensive assessment of five of its major packaging product lines (BGA, Lead Frame, CSP, Flip Chip, and Bumping). In 2019, the Company performed an in-depth analysis of substrates with significant environmental impacts based on its internal research findings on IC packaging. Results of the analysis helped the Company identify key materials in the various stages of these substrates' life cycles that were potentially harmful to the environment, which then led the Company to reduce its reliance on these materials and search for viable alternatives. ASEH will continue to perform product life cycle analyses for a broader range and depth of products. The Company is also planning to launch a database for carbon footprint management in order to prepare itself for the research and development of low-carbon products.

ASEH also provides customers with manufacturing-related services to help them develop energy efficient products including wireless communication modules, point-of-sale (POS) machines, ATX multi-rail power supply units, motherboards, smart handheld devices, NAS systems, SSDs and server systems. Dual-stage product impact assessment simulations were used to analyze product performance at the end-user with the information used by product development to develop energy and carbon saving products that will reduce greenhouse emissions.

Reduction Assessment of The Product Usage Stage

ton CO₂e

	62,000	70,000	63,000	103,670
	2016	2017	2018	2019
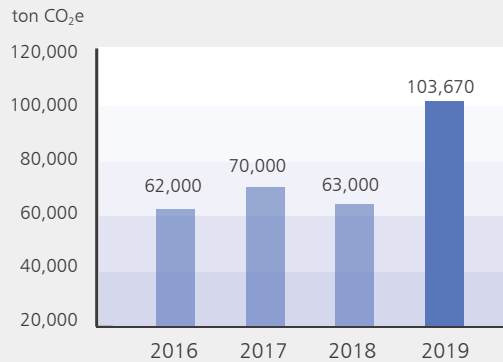
Life cycle assessment

● Complied   ▲ Plan   NA Not evaluated

Type	Products	Carbon footprint	Eco-efficiency
IC Packages	➢ BGA package	●	●
	➢ Leadframe package	●	●
	➢ Chip Scale Package(CSP)	●	●
	➢ Flip Chip package	●	●
	➢ Bumping	●	●
	➢ SIP	▲	▲
Substrate		●	●
Testing Service		●	●
End Product	➢ 4G dual-band communications module	●	NA
	➢ XnBay smart server	●	NA

Smart Manufacturing

ASEH is looking to increase its product value while lessening environmental impacts.

$$\text{Eco efficiency} \uparrow = \frac{(\text{Value}) \uparrow}{(\text{Imapct}) \downarrow}$$

Action plan:

- Reduce material use intensity
- Reduce energy intensity
- Prevent the dispersion of harmful environmental agents

- Increase the rate of recycling
- Achieve maximum adoption of renewable energy
- Improve product durability
- Increase service intensity

Year	Product	Assessment Result		Recommendations for Improvement
2016	BGA	• Significant environmental impact: Electricity purchased for the manufacturing process. • Negative impact of material：Gold wire was approximately six times that of copper wire.		• Replacing gold wires with copper wires. • Optimizing energy efficiency during manufacturing and using renewable energy. • Selecting materials compatible with environmental ecology and low carbon emission
	Communication modules	• Significant environmental impact: Electricity purchased for the manufacturing process. • Negative impact of material：integrated circuits, ceramic substrates, and iron frame exhibited.		
2017~2018	Bumping	• Significant environmental impact: Electricity purchased for the manufacturing process. • Negative impact of material：Solder paste (lead-free)	• Decarburization • Dematerialization	• Reducing polluting emissions and impact on the environment, such as use of boron-free developers.
	Sales management systems, Network storage systems, Smart handheld devices, WiFi modules, Motherboards and Solid-state drives	Estimated energy efficiency across product life cycle stages based on Energy Star standards Y2017：64,841,852 kWh. Y2018：38,847,948 kWh.		• Performing dual-stage product impact assessments; incorporate the concepts of product recycling and social return on investment; enhance the sustainable marketing of products; increase brand competitiveness to provide a complete assessment of product sustainability. • Strengthening green and energy-saving design of products
2019	Substrate	• Significant environmental impact: Electricity purchased for the manufacturing process. • Negative impact of material：gold potassium cyanide, oxygen-free copper, urea-formaldehyde boards, and NaOH		• Selecting materials compatible with environmental ecology and low carbon emission • Optimizing energy efficiency during manufacturing.

4.3 Products and Services

ASEH provides the design, manufacturing and enabling of many electronic end products, including smartphones, PCs, tablets, game consoles, security chip cards, automotive sensors, entertainment systems and many more. We offer a broad range of advanced and legacy semiconductor packaging and testing services as well as electronic manufacturing services. The semiconductors we package are used in a wide range of end-use applications, including communications, computing, and consumer electronics, industrial, automotive and other applications. Our testing services include front-end engineering testing, wafer probe, final testing and other related semiconductor testing services. Our electronics manufacturing services are used for various applications, including computers, peripherals, communications, industrial applications, automotive electronics, and storage and server applications.

Customer Service

Our key customers typically operate in the semiconductor and electronics industries. Our five largest customers together accounted for approximately 46.4%, 46.2% and 51.1% of our operating revenues in 2017, 2018 and 2019 respectively. To achieve total customer satisfaction, we uphold world-class quality and reliability for our products and services through thoughtfully defined quality assurance methodologies. Our quality assurance systems impose strict process controls, statistical in-line monitors, supplier control, data review and management, quality controls and corrective action systems.
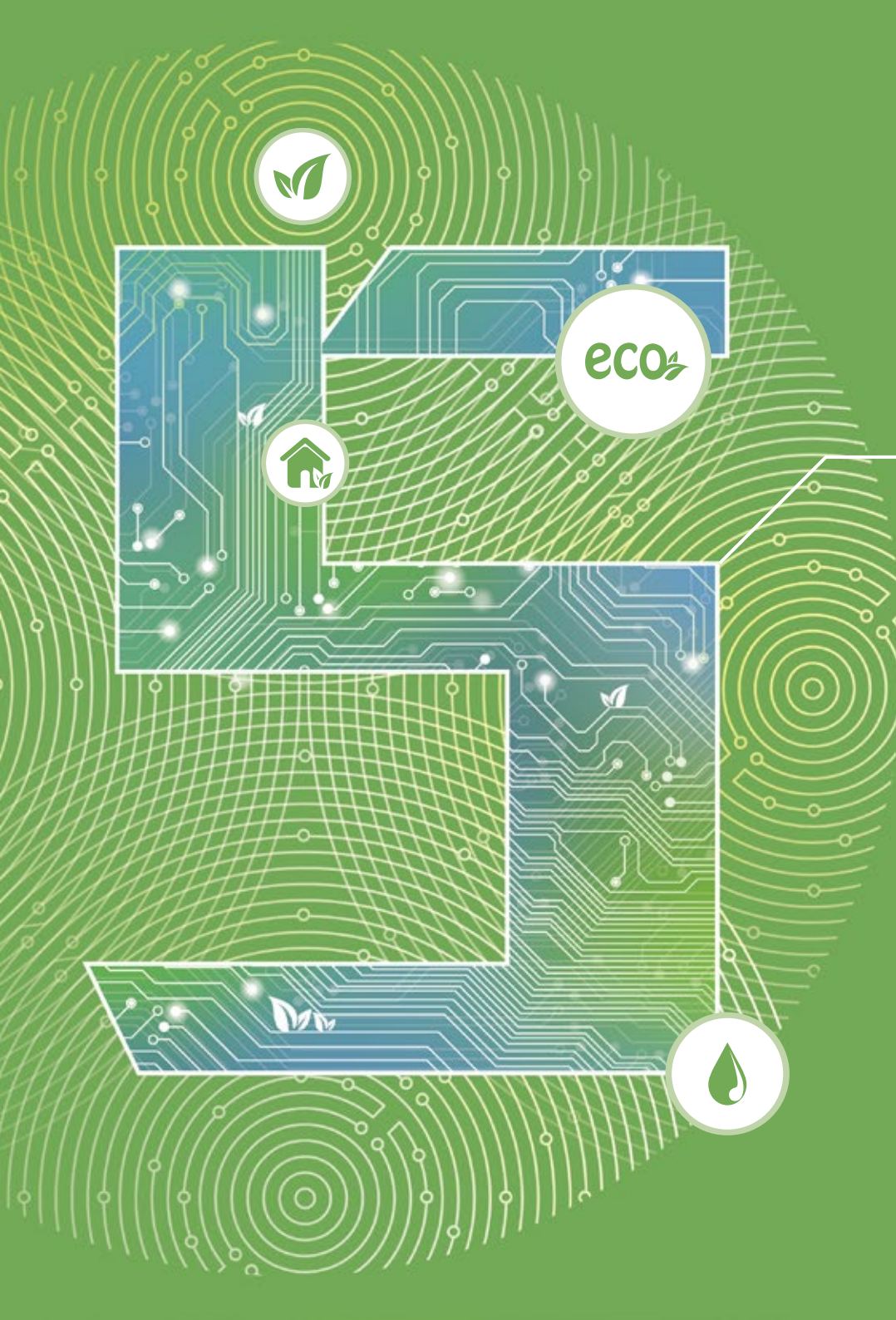
To ensure that customer suggestions are properly delivered and processed, we have a dedicated team in place for reporting feedback and customer communication. We provide multidimensional communication channels for customers such as technical forums and regular email updates to customers on significant company events, milestones and business highlights. We actively participate in various industry events to allow customers to understand our advanced technology through presentations and forums.

Our "Customer Satisfaction Survey" includes a section to find out customers' rating on our subsidiaries' QCDST (Quality-Cost-Delivery-Service-Technology), as well as their opinions on ASEH and our subsidiaries' corporate sustainability. The survey results are integrated into our TQMM system (Total Quality Micro-Management System) to help management and employees to continuously improve customer satisfaction.

Customer Satisfaction Trend

Year	Satisfaction
2016	90%
2017	92%
2018	91%
2019	92%
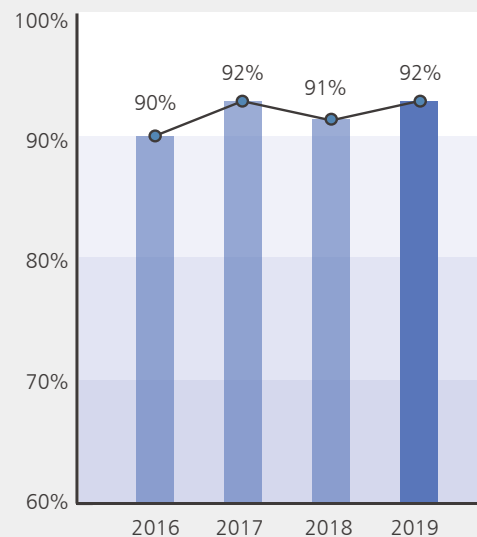
GREEN MANUFACTURING AND LOW-CARBON TRANSFORMATION

ASEH is committed to improving our eco-efficiency and protecting the environment by continuously enhancing resources recycling, and reducing greenhouse gas emissions, waste generation, wastewater effluent, and chemical usage.

ASEH strives to develop and promote a environmental friendly manufacturing and service concept in all facets of its enterprise. From material procurement, design, manufacturing, product use and disposal, we conscientiously incorporate environmental impact factors at all stages of life cycle to provide green and low carbon manufacturing services.

A CDP — Listed on the annual CDP A List for the third time

Leader Board CDP — Listed on CDP Global Supply Chain Report Leader Board for two consecutive years

Stakeholder engagement on Climate Change and Water Risks

Financial Risk and Opportunity Assessment from climate change

14% — Renewable electricity accounts for 14% of total electricity consumption

100% CO₂ — 100% greenhouse gas emission verification and climate change risk assessment

599,833 MWh — 330 energy saving and carbon reduction projects implemented resulting in 16.7% electricity savings

Simulation of water risk assessments under various scenarios

2 — Launched a second issue of green bonds

26 — Received 26 green building, and 12 green factory certifications

SDGs	Business Action	2019 Material Aspects	KPI	2019 Target	Status	2019 Performance	2020 Target	2025 Target
6 CLEAN WATER AND SANITATION	• Develop and implement holistic water strategies that are socially equitable, environmentally sustainable, and economically beneficial within the scope of our operations and supply chain • Protect and/or restore aquatic ecosystems surrounding our operations and supply chain	Water Resource Management	Water withdrawal intensity (Water withdrawal/revenue)	4% reduction compared to 2015	Achieved	5.3% reduction compared to 2015	5% reduction compared to 2015	10% reduction compared to 2015
		Water Resource Management	Number of days of production shutdown caused by Phase III water rationing at Taiwan's facilities (water supply reduced by 30%)	0 days	Achieved	0 days	0 days	0 days
7 AFFORDABLE AND CLEAN ENERGY	Significantly increase energy efficiency, procure remaining energy needs from renewable sources, and promote the same practices across the supply chain	Energy Management	Energy saving ratio from energy saving and carbon reduction projects	2% of total 2019 electricity consumption	Achieved	16.7% of 2019 power needs	2% of 2020 power needs	2% of 2025 power needs
	Develop and implement business models to deliver sustainable energy and energy efficiency technologies to new markets and communities	Energy Management	Renewable electricity ratio	9% of total 2019 electricity consumption	Achieved	14% of total 2019 electricity consumption	12% of total 2020 electricity consumption	27% of total 2025 electricity consumption
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	• Design and adopt a responsible, circular business model • Shift to a portfolio of goods and services that require and promote resource efficiency and negligible waste output	Waste and Circular	Non-hazardous waste recycling rate	90%	Achieved	92%	90%	90%
		Waste and Circular	Hazardous waste intensity (Hazardous waste output/ revenue)	4% reduction compared to 2015	Achieved	29% reduction compared to 2015	5% reduction compared to 2015	10% reduction compared to 2015
13 CLIMATE ACTION	Substantially reduce emissions from our operations and those associated with our supply chain, in close alignment with climate science studies	Climate Change	GHG intensity (GHG emissions/ revenue)	4% reduction compared to 2015	Achieved	15% reduction compared to 2015	5% reduction compared to 2015	10% reduction compared to 2015
			GHG verification	100%	Achieved	100%	100%	100%

Global economic development is gradually decoupling from carbon emissions due to a rapidly evolving market environment that impacts companies and business models. An increasing degree of stakeholder scrutiny on resource conservation and climate change issues have, in parallel, raised the level of pressure on existing business practices. Climate change has posed challenges to products, services, businesses, industries and governments but it has also unlocked new opportunities and new markets, and the formation of strategic alliances. Climate change is a market disruptor, and ASEH is in a leadership position to harness this disruption through measured responses to market needs. To achieve ASEH's Environmental Goals 2025, we have adopted the United Nations Framework Convention on Climate Change (UNFCCC or FCCC) guidelines and the "common but differentiated responsibilities (CBDR)" concept to drive our facilities to submit management targets drawn up in accordance to their operation scale and capabilities. Under the supervision of the CSC Environment and Green Innovation Taskforce, each facility's progress is monitored by tracking the performance dashboard of power consumption, water withdrawal, waste, etc. We have also established a Green Solutions Sharing Platform to promote sustainable design in new product development, such as minimizing material usage; developing and selecting materials with low carbon footprints; supervising hazardous substance; achieving higher energy and water resource efficiency in the manufacturing process; and sharing management-related knowledge and practices in manufacturing, waste products and gas emissions. We actively encourage our employees to address environmental sustainability issues and jointly improve the company's environmental performance.

5.1 Climate Leadership

Milestones

1 Establish low-carbon strategies

2 Include low-carbon strategies in the management framework

3 Fulfill corporate social responsibility

4 Implementation outcomes
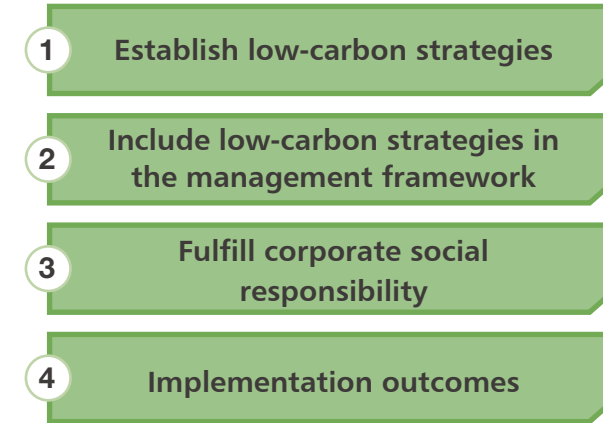
The four major milestones in ASEH's climate change and energy resource management are 1) formulating low-carbon strategies, 2) integrating these strategies into the management framework, 3) implementing these strategies, and 4) assessing implementation outcomes. ASEH's climate leadership stems from bringing low carbon solutions to the global market and, through balancing operational growth and low-carbon transformation targets that meet stakeholders' expectations. Climate change and energy resource management present a host of challenges and opportunities, and developments in climate policy, technology, and decarbonization as well as natural disasters can drastically impact ASEH's operations. In response to the public's rising concerns regarding climate change, businesses must put an equal emphasis on adaptation and mitigation. ASEH has set an excellent example for the industry by establishing clear low-carbon strategies, introducing international management standards to strengthen its internal control systems, taking responsible actions to improve current business models and bring positive change to its value chain partners, and assessing implementation outcomes. To that end, ASEH is better able to make informed strategy revisions, align corporate values with business practices and connect the four major milestones into a coherent framework.

Target Setting
- Common but differentiated responsibility
- Maintaining flexibility

Performance Measurement
- Data collection
- Performance evaluation

Environment and Green Innovation Taskforce

Exemplary Dissemination
- Green solutions
- Sustainable design
- Sharing platform

Follow-ups & Improvements
- Sites report
  Gap analysis
  Enhancement plan

Four major milestones	Principal Methodology
1 Establish low-carbon strategies	✓ Integrated carbon management: establish a comprehensive carbon management strategy, policy and system based on energy saving, green energy and energy storage, to reduce carbon emissions. ✓ Green and renewable energy investment: establish strategies on green and renewable energy investment, reduce environmental external costs, and seize green business opportunities. ✓ Low-carbon products and services: establish feasible carbon-reduction projects. ✓ Adaptation and resilience: Identify vulnerabilities to climate change and develop adaptation strategies. ✓ Create a sustainable culture: Cultivate a "green" corporate culture and become a leading low-carbon solution provider.
2 Include low-carbon strategies in the management framework	Manage climate-related risks and opportunities within ASEH's enterprise risk management (ERM) framework by adopting the recommendations issued by the Task Force on Climate-related Financial Disclosures (TCFD is formed by the Financial Stability Board). Systematically manage climate change uncertainties combined with outcomes from situation analyses and simulation, and control these risks within acceptable parameters, so as to protect and advance the company's overall interests.

3 Fulfill corporate social responsibility

Planning strategies — For substantial financial impacts, the results from top-level management reviews are used to devise concrete measures and financial plans to respond to potential risks and business opportunities.

Calculating financial impacts — From the parameters defined through scenario analysis, selected data estimation methods are used to measure the scale and calculate the financial impacts of risks and opportunities.

Defining climate-related scenarios — From the identified critical risks and opportunities, each facility will set its climate change scenario analysis methodology to simulate various parameter changes in the future to determine management or financial areas that are likely to be impacted.

Identifying risks and opportunities — Climate-related risk and opportunity issues are selected based on global trends and industry characteristics. A standardized method is established to assess the rate and extent of impact, in addition to drawing out a risk and opportunity matrix to identify the sources of risks and opportunities with significant influence on management.

Analyzing TCFD framework and indices — The contents of the TCFD framework and indicators are analyzed to strengthen response strategies.

4 Implementation outcomes

Adaptation:
✓ Assess the water risk at ASEH facilities worldwide to identify areas of water stress and establish adjustment roadmaps
✓ Construct new factories[1] according to green building standards, establish potential flood analyses and emergency response measures
✓ A smart grid was established to meet internal energy needs and prevent power rationing from causing production losses at our facilities
✓ Establish a supplier sustainability management process, conduct risk assessments, green procurement and product reuse[2]

Mitigation:
✓ Introduce ISO 14064-1 and ISO 50001 for greenhouse gas emission reductions and energy conservation
✓ Trial participation in the Science Based Targets (SBT) initiative for carbon footprint reduction
✓ Purchase renewable energy and renewable energy certificates (RECs); invested in solar power equipment to develop green energy
✓ Improve energy efficiency, promote energy saving and water recycling and reuse programs[3]

Strategic and financial planning:
✓ Continue participation in DJSI and CDP Investor Survey on Climate Change
✓ Establish a long-term blueprint for value chain partnerships and participate in Apple's Supplier Clean Energy Program to increase the use of renewable energy
✓ Stakeholder engagement regarding climate change and water risk
✓ Quantify financial impacts of climate change risks and opportunities
✓ Launched second green bond issuance of US$ 300 million in October 2019

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[1] Management costs, please refer to Environmental Expenditures and Investments > Operating Costs > Resource Circulation Costs.
[2] Management costs, please refer to Environmental Expenditures and Investments > Upstream/Downstream Costs.
[3] Management costs, please refer to Environmental Expenditures and Investments > Operating Costs.

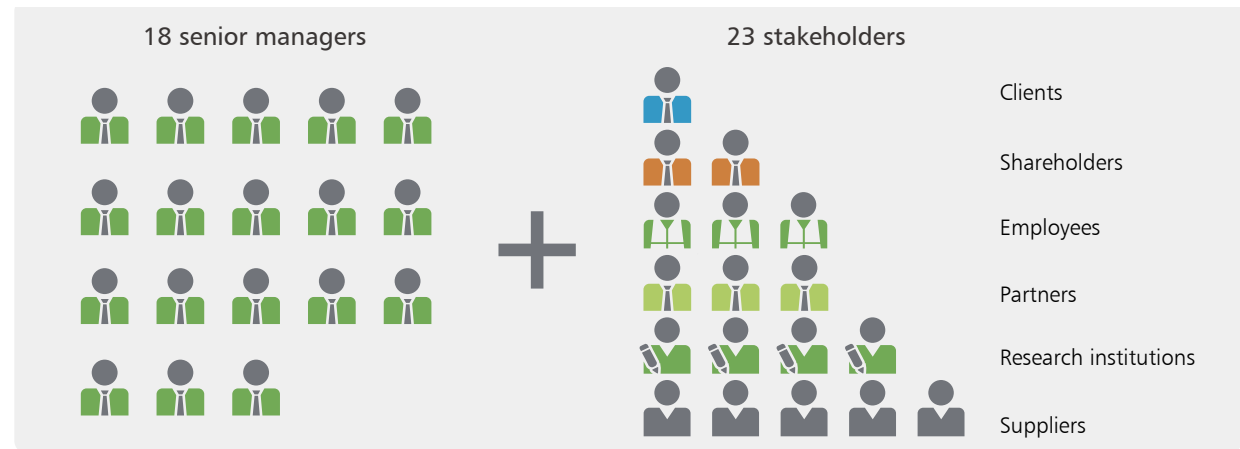## Structure of Climate-related Financial Disclosure

Risk Governance	Strategies	Risk Management	Metrics and Objectives
a. Board's oversight of climate change-related risks and opportunities b. Role of management in assessing and managing climate change-related risks and opportunities	a. Identify short-, medium- and long-term climate change-related risks and opportunities b. Determine impact of climate change-related risks and opportunities on organization's operations, strategies and financial planning c. Assess the resilience of organization's strategies under different climate-related scenarios	a. Identify and assess climate change related risks b. Process for managing climate-related risks c. Integrate processes for identifying, assessing, and managing climate-related risks into the organization's overall risk management	a. The metrics used by the organization to assess climate change-related strategies and risk management procedures b. Greenhouse gas emissions and related risks c. The targets used by organization to manage climate change related risks and opportunities and performance
Organizational Response Management			
The CSC is the highest organization level in sustainability management and comprised of top management executives who also serve as members of the board of directors. The Environment and Green Innovation Taskforce under the CSC is responsible for environmental protection and climate change-related issues. (Please refer to 2.1 Organization and Structure for details)	a. According to our management timeline targets, short-term is defined as less than three years, mid-term as three to five years and long-term as more than five years. Short-term risks mainly come from cost of raw material, existing and emerging renewable energy regulations, and the frequency and intensity of extreme weather events. Mid-term risks include the cost of GHG emissions, investment and transition to low-carbon technology and changes in customer behaviour and preferences. Stigmatization of sector, low-carbon market economy transition, and incremental changes in climate parameters are classified as long-term risks. b. Areas impacting operations include products, services, supply chain, customers, research and development, and adaptation and mitigation measures. Our strategy is impacted by resource limitations and the search for sustainable strategy partners to optimize semiconductor industry value. Major areas impacting our financials include revenue, management cost, capital acquisition, and assets and liabilities. c. Three types of climate scenarios, 2°C, Nationally Determined Contributions (NDCs), and Business as Usual (BAU), are adopted to perform simulation analysis of transformational and physical risks.	a. Various documents and forms that are used to identify climate change risks and opportunities are revised annually. Said forms and documents are regularly distributed to sites worldwide for them to assess their own risks. b. The results of risk and opportunity identification are presented in the CSC meeting for relevant committee members and task forces to work out response measures. c. Climate change and various operational risks are consolidated in the ERM system to be identified, evaluated, and managed regularly according to standard operating procedures.	a. Greenhouse gas emissions, energy resources used, and waste produced per unit of revenue generated were used as indicators for the company to measure the risks and impact of its operations; the feasibility of using internal carbon pricing to lower said risks was evaluated. b. The fees and taxes on fossil fuels imposed by relevant laws constitute the risk posed from direct energy emissions. The risk of indirect energy emissions is calculated by assessing the increasing rate of renewable electricity use, which increases operating costs. For other indirect upstream/downstream emissions within current risk controls, carbon reduction is negligible and hence, a hindrance to reducing a product's carbon footprint. c. Greenhouse gas, energy resource, water resource, and waste reduction targets were developed; more efficient products to lower carbon emissions have been designed.

A key factor influencing corporate policies on climate change risks and opportunities is the perspective of the company's stakeholders and senior management on these issues. ASEH conducted a questionnaire survey on climate change and water risks targeting external stakeholders and internal senior executives. The results of the survey will enable the company to reinterpret the meaning of climate change risks at the corporate level through the analysis of the responses and exploring the differences in their perspectives on the level of impacts to ASEH.
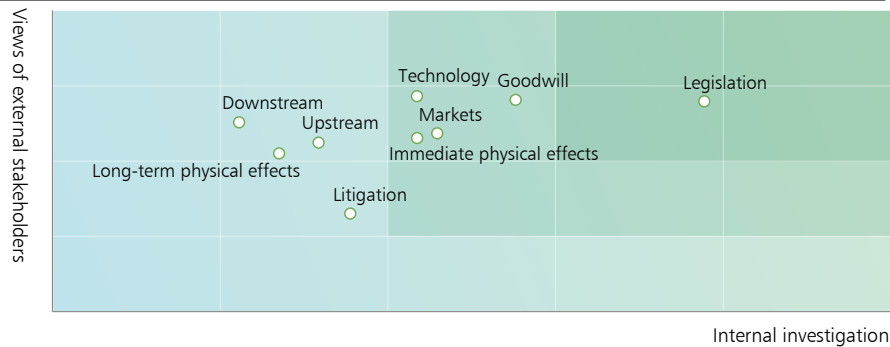
The selection criteria of the participating stakeholders were based on their understanding of ASEH as well as knowledge of environmental risk management. Participants included shareholders, customers, partners, suppliers, industry and research organizations, and a small selection of employees. Internally, we also consulted a number of senior executives to understand their views of the company's core values. This was the first-ever combined internal and external survey we have conducted to assess the types of effects including the financial impact of climate change on the company. Overall results indicated that external stakeholder views on risks and opportunities were consistent with management; with

transformation risks outweighing physical risks, and regulatory requirements posing the biggest impact to transformation risks. On climate change, most respondents suggested adopting low-carbon energy sources and increasing energy efficiency, followed by developing low-carbon products and utilizing resources more efficiently. Views on water opportunities demonstrate the strongest consensus, with most respondents calling for better water efficiency, higher water recycling and reuse rate, and the diversification of water sources. The study provided convincing data points to serve as an important management guide for ASEH's roadmap on environmental issues.

Participants in the climate change and water risk opportunities and impacts survey

18 senior managers + 23 stakeholders

Clients
Shareholders
Employees
Partners
Research institutions
Suppliers

Climate Change Risks

Views of external stakeholders

Technology Goodwill
Downstream
Upstream Markets Legislation
Long-term physical effects Immediate physical effects
Litigation

Internal investigation

Climate Change Opportunities

Views of external stakeholders

Energy sources
Products and services
Resilience
Markets Resource efficiency

Internal investigation

Water Risks

Views of external stakeholders

Legislation
Immediate physical effects
Goodwill
Long-term physical effects
Litigation

Internal investigation

Water Opportunities

Views of external stakeholders

Water resource Water efficiency
Products and services Resilience
Markets

Internal investigation

Scenario Analysis and Financial Impact

Rigorous application of procedures and methodologies are essential for transparency in climate-related financial disclosures. Faced with transition risks due to climate change, ASEH has assessed potential financial impacts in four different areas: 1.5°C and 2°C emissions reduction scenarios, Nationally Determined Contribution (NDC) scenario, impacts on business reputation and market share loss. For the 1.5°C and 2°C carbon emissions reduction scenarios, the cost of emissions reduction as of 2050 was assessed using science-based emissions reduction targets. We applied the NDC scenario on our Taiwan facilities and offices to calculate the potential annual operating costs based on current and future laws and regulations on renewable energy and the projected expansion of manufacturing capacity. To determine impacts on business reputation and market share loss, we calculated the minimum and maximum potential financial losses over the next ten years based on ASEH's global market share and green product revenues. In regard to physical risks, we assessed the impact of water scarcity on revenues from our Taiwan facilities in the RCP 2.6 and RCP 8.5 emissions scenarios[1] by calculating the correction ratios of decreases in precipitation and growth in manufacturing capacity.

Emissions reduction scenarios
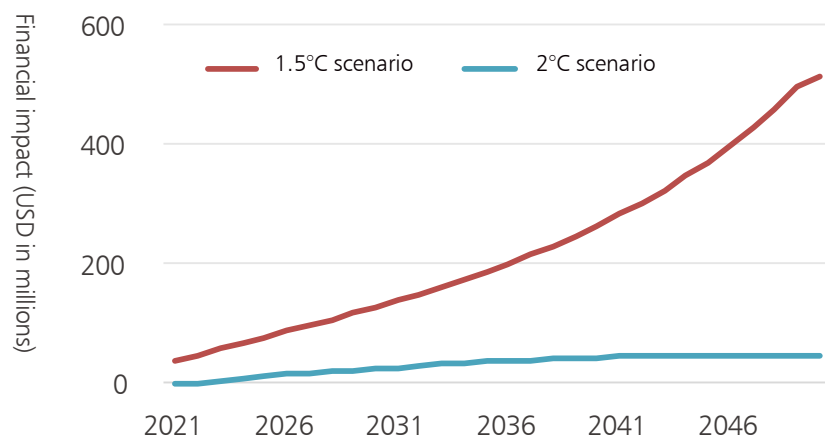
NDC scenarios
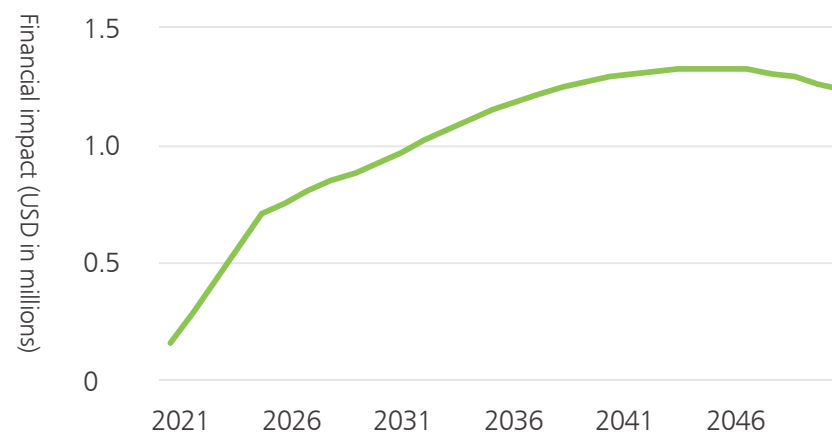
[1] The RCP 2.6 is a pathway that limits global warming to below 2°C and leads to a CO_2e concentration in the range of 430-480 ppm. The RCP 8.5 scenario is a high emissions business-as-usual (BAU) scenario with a 4.1°C to 4.8°C rise in temperature that leads to a CO_2e concentration of over 1,000 ppm (IPCC, 2014, AR5).

Impact on business reputation

Financial impact (USD in millions)

Minimum impact on business reputation — Maximum impact on business reputation

2021 2022 2023 2024 2025 2026 2027 2028 2029 2030

0 — 1,000 — 2,000 — 3,000

Loss in market share

Financial impact (USD in millions)

Minimum loss in market share — Maximum loss in market share

2021 2022 2023 2024 2025 2026 2027 2028 2029 2030

0 — 2,500 — 5,000 — 7,500 — 10,000

Water scarcity (Taiwan)

Financial impact (USD in millions)

RCP 2.6 scenario — RCP 8.5 scenario

2021 2023 2025 2027 2029 2031 2033 2035 2037 2039

0 — 1,000 — 2,000 — 3,000 — 4,000 — 5,000 — 6,000

Greenhouse gas emissions management

ASEH introduced ISO 14064-1 for the quantification and reporting of greenhouse gas emissions, to all its facilities across the globe[1]. Based on industry standard calculations, the Company emitted 1,794,103 metric tons of Scope 1 and Scope 2 carbon dioxide equivalents (CO_2e)[2,3] in 2019. Scope 2 (energy consumption) accounts for 99% of emissions, and Scope 1, 5%. or Scope 1 emissions, most (i.e., 61%) were created during the manufacturing processes. Compared to 2018, emissions in 2019 increased by 163,944 tCO_2e (10.06%). This increase is due to the inclusion of SPIL for the entire year in 2019 versus eight months in 2018. On a positive note, emissions intensity dropped by approximately 5%, from 0.135 tCO_2e per US$ 1,000 in revenues in 2018 to 0.130 tCO_2e per US$ 1,000 in 2019. For Scope 2 emissions, the majority of our facilities around the world are powered by electricity purchased from public thermal power plants. To keep track of energy consumption and boost energy efficiency, 14 facilities received ISO 50001 certification in 2019, equivalent to an achievement rate of 56%.

2019 Scope 1 & 2 Emission Category and Ratio

Unit: tCO_2e

1,681,317 (93.7%)

13,905 (0.8%)

98,880(5.5%)

- Stationary combustion 24,528 (1.4%)
- Mobile combustion 2,395 (0.1%)
- Process emissions 59,884 (3.3%)
- Fugitive emissions 12,073 (0.7%)
- Scope 2 - Electricity
- Scope 2 - Steam
- Scope 1
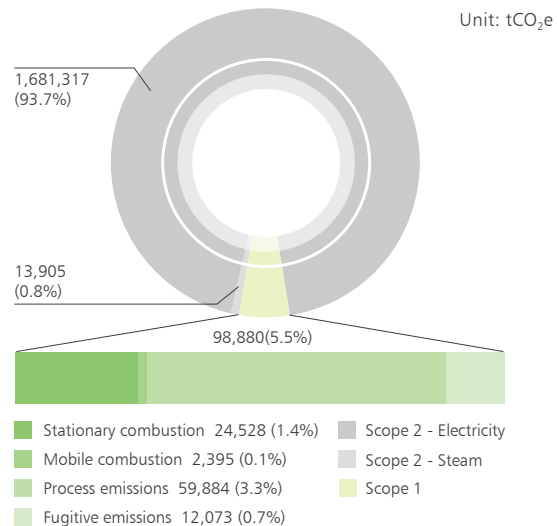
Greenhouse Gas Emissions and Intensities
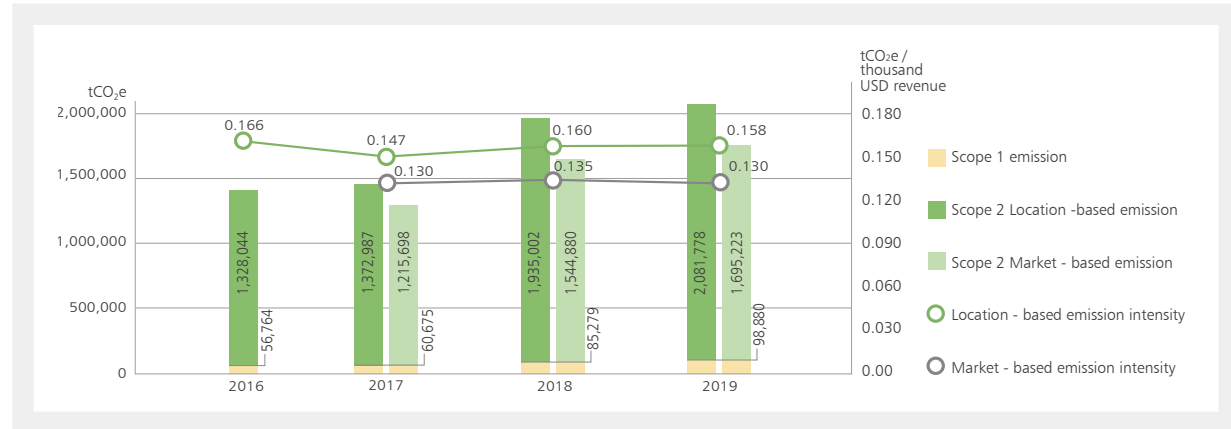
We have also identified the sources of Scope 3 emissions along our value chain through emissions estimates. In 2019, ASE Kaohsiung, ASE Chung Li, USI Taiwan and SPIL Taiwan have completed the ISO14064-1 Scope 3 verification. Verification and validation methodologies enable us to identify the major sources of greenhouse emissions and develop plans for carbon footprint mitigation. We will also roll out worldwide training in accordance with the updated ISO 14064-1:2018, to educate employees on Scope 3 emissions.

2019 Scope 3 Emissions[4]			
Source of emissions	Emissions (tCO_2e)	Reference for emission factor	Means of reduction
Fuel and energy-related activates	270,249	EPA Product Carbon Footprint Database	Continue to increase the percentage of renewable energy
Purchased goods and services	281,135	EPA Product Carbon Footprint Database	Prioritize the procurement of low-carbon materials
Upstream transportation and distribution	10,093	EPA Product Carbon Footprint Database	Use green transportation
Waste generated in operations	12,778	EPA Product Carbon Footprint Database	Recycle waste materials
Employee commuting	27,615	EPA Product Carbon Footprint Database and research data	Promote public transportation
Business travel	2,677	Distance x emission factor	Amend travel regulations to limit unnecessary business trips
Downstream transportation and distribution	16,738	Product weight(kg) x Σ (Emission factor based on transport mode)(kgCO₂e/tkm) x Distance(km))	Simplify packaging and switch to green delivery alternatives
Fixed assets	976,585	Classification by industry and summation of greenhouse gas emissions generated by each industry	Prioritize the purchase of low-carbon equipment and construction of low-carbon plants
Downstream leasing	54,553	Emission inventory for energy consumption (energy consumption x energy emission factor)	Boost energy efficiency

1 Due to disruption from the Covid-19 pandemic, the schedule for the ISO14064 third party verification at our US California-based ISE Labs Inc has been further delayed. Nevertheless, ISE has already completed its GHG inventory assessment and its data has been duly included in the reporting of ASEH's total GHG emission data.

2 The consolidation approach is followed by operational control, and this includes all packaging, testing, materials (ATM), and electronic manufacturing service (EMS) facilities. Our inventory of greenhouse gases include: CO_2, CH_4, N_2O, HFC, PFCs, NF_3, SF_6.

3 The electricity usage emissions were calculated by the emission factor from sites' local utilities. Global warming potential (GWP) values refer to IPCC Fifth Assessment Report, AR5.

4 The Global Warming Potential (GWP) is quoted from the IPCC's Fifth Assessment Report.
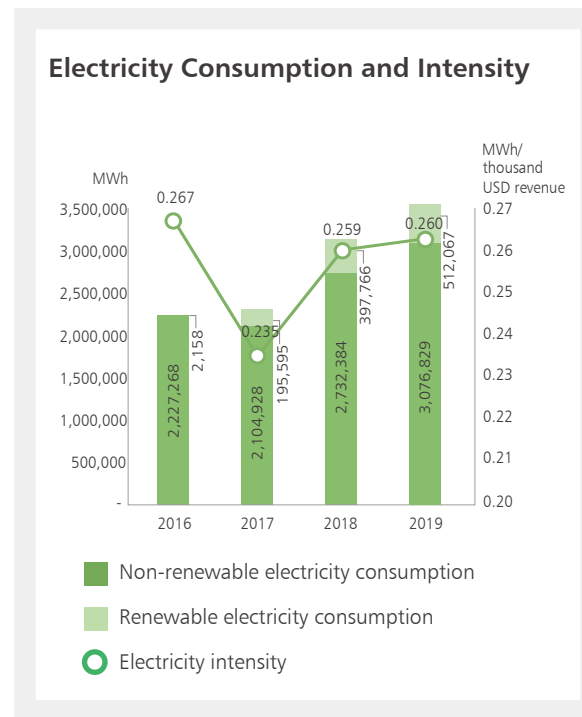
Fossil (Non-renewable) Fuels

Our The major fuel consumption is liquefied natural gas (LNG), totaled 318,429 GJ[1] in 2019. Fuel is primarily used for electric generators, forklifts, company cars, boilers, and air pollution control equipment (e.g., zeolite rotor concentrators). Natural gas accounts for roughly 80% of all fossil fuel use at ASEH facilities. The adoption of waste heat recovery and high efficiency boilers in 2019 reduced fossil fuel consumption by 28% compared to 2018.
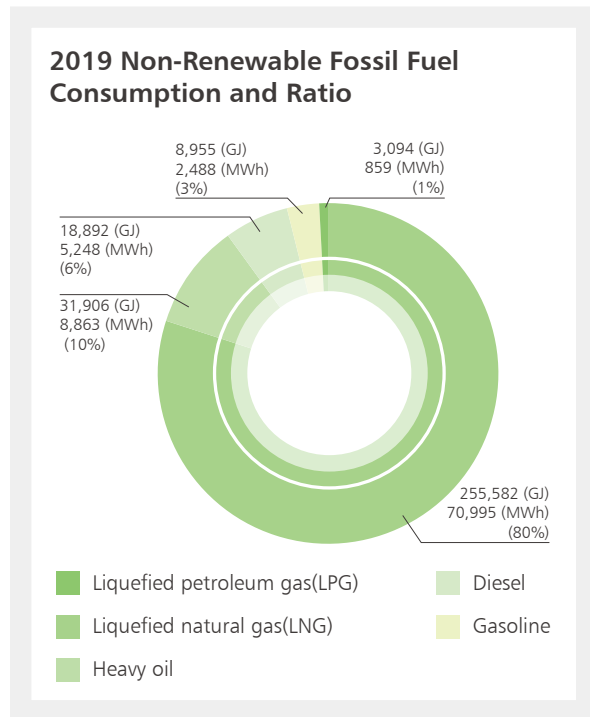
Power usage

ASEH's electricity consumption is 3,588,896 MWh in 2019, a 12.78% increase of 458,746 MWh compared with 2018. The main reasons for the increase are due to the company's operational expansion and the inclusion of SPIL's 2019 consumption data was included for the entire year in the calculations for 2019 but only (SPIL contributed only eight months of consumption data in 2018). Renewable energy (including RECs) accounted for 14.27% of all energy sources, up 1.56% from 2018. Additionally, energy intensity is 0.26 MWh/thousand USD revenue[2] in 2019; it was down 0.57% in 2019 compared to 2018.

2019 Non-Renewable Fossil Fuel Consumption and Ratio

8,955 (GJ)
2,488 (MWh)
(3%)

3,094 (GJ)
859 (MWh)
(1%)

18,892 (GJ)
5,248 (MWh)
(6%)

31,906 (GJ)
8,863 (MWh)
(10%)

255,582 (GJ)
70,995 (MWh)
(80%)

- ■ Liquefied petroleum gas(LPG)
- ■ Liquefied natural gas(LNG)
- ■ Heavy oil
- ■ Diesel
- ■ Gasoline

Electricity Consumption and Intensity

MWh

	2016	2017	2018	2019
Non-renewable	2,227,268	2,104,928	2,732,384	3,076,829
Renewable	2,158	195,595	397,766	512,067
Electricity intensity	0.267	0.235	0.259	0.260

MWh/thousand USD revenue

- ■ Non-renewable electricity consumption
- ■ Renewable electricity consumption
- ○ Electricity intensity

[1] Fuel heating value is referred from the "heating value of energy products" table. Our total internal energy consumption = non-renewable fuel consumption + renewable fuel (electricity) consumption + purchased and used electricity, heating, cooling and steam = 13,394,097 GJ.

[2] This data includes all packaging, testing, materials (ATM), and electronic manufacturing services (EMS) facilities, excluding real estate.

Energy conservation and carbon footprint reduction

Through the diagnosis of energy conservation hotspots, ASEH is targeting the adoption of low-carbon energy, energy conservation in manufacturing, and building facilities to reduce its carbon footprint. The company has diversified its energy sources to reduce reliance on fossil fuels, to reduce the carbon footprints of its products and services and strengthen its climate resilience. We are committed to establishing alternative energy sources to replace fossil fuels and shift towards a green industry and renewable energy development. In 2019, we used 512,067 MWh of renewable energy, which accounted for 14.27% of our annual power consumption, up 29% from 397,766 MWh in 2018.

Across the globe, ASEH currently has 7 facilities completely powered by renewable energy. SPIL's Suzhou facility has installed a solar energy system with a capacity of 2,150 kW that generated 936.3 MWh of power in 2019[1]. Combined with purchased solar energy, SPIL Suzhou contributed 985 tCO_2e in greenhouse gas reductions. To address power shortages, most ASEH facilities have implemented planned power outages as well as Low Frequency Demand Disconnection (LFDD). Through real-time power usage monitoring and the incorporation of renewable energy and energy storage systems to simulate power usage scenarios, ASEH has been able to establish an optimal energy management model to achieve our environmental and economic goals.

In 2019, ASEH carried out 330 innovative energy conservation and carbon reduction projects. Through the adoption of ISO 50001 Energy Management Systems, the projects resulted in an estimated electricity savings of 599,833 MWh (equivalent to 16.7% of the year's electricity demand), which equates to an emissions reduction of 437,737 tCO_2e[3] the annual electricity consumption of 170 thousand Taiwanese households[4].

Country	Facility	Development Method	2019 Renewable Energy Consumption(MWh)	Ratio to the Facility's Electricity Consumption(%)
Taiwan	ASE Kaohsiung[2]	Solar power installation	34	<1%
U.S.A.	ISE Labs	Solar power installation	307	5%
China	ASE Kunshan	Solar power purchase	2,042	5%
	ASE Wuxi	Solar power installation	0.55	<1%
	ASE Weihai	I-RECs purchase	52,800	100%
	ASE Suzhou	I-RECs purchase	80,114	100%
	ASE Shanghai MTL	I-RECs purchase	9,347	10%
	ASE Shanghai A&T	I-RECs purchase	12,000	16%
	USI Zhangjiang	I-RECs purchase	69,873	100%
	USI Jinqiao	I-RECs purchase	52,987	100%
	USI Shenzhen	I-RECs purchase	33,385	100%
	USI Kunshan	I-RECs purchase	24,002	100%
	SPIL Suzhou	I-RECs purchase	173,294	100%
		Solar power purchase	936	
Mexico	USI Mexico	I-RECs purchase	929	10%

[1] The data for electricity generation estimated from April to December 2019.
[2] K26's solar power generation has accumulated Taiwan Renewable Energy Certificates (T-RECs) since August 2017; for cumulative amount, see the National Renewable Energy Certification Center (https://www.trec.org.tw/)
[3] The CO2 equivalent is calculated based on each facility's local electricity emission factor.
[4] The calculation is based on the household electricity consumption, 292 kWh, per month estimated by Taipower Company in 2018.

Major Energy Saving and Carbon Reduction Projects

Type	Major Projects	Annual Energy Saving(MWh)	Annual Energy Saving(GJ)	Annual Carbon Reduction(tCO$_2$e)
Process	DI water recycling in sawing machine, Vacuum pump adjustment, Smart meter installation, Computer replacement and Machine optimization	81,991	295,167	45,635
Building Services	Lighting enhancement, Chilled water system optimization, Variable Frequency Drive (VFD) installation to air conditioning, Heat recovery and Rationalization of ventilation	5,785	20,825	3,324
Low-carbon logistics	Adoption of Low-carbon transport, such as electric forklifts and hybrid electric trucks	0	0	54
Subtotal		87,776	315,992	49,013
Low Carbon Energy	Solar power installation and purchase, Renewable energy certificate purchase	512,057	1,843,408	388,724
Total		599,833	2,159,400	437,737

ASE KH

[ASE Kaohsiung] Heat pump system application.

ASE M

[ASE Malaysia] Optimize Plant 2 Chiller System Operation.

USI ZJ

[USI Zhangjiang] Facility improved air compressor energy efficiency, which reduced operating costs and improved compressed air quality.

SPIL SZ

[SPIL Suzhou] SPIL Suzhou Facility adopted a solar power system.

Smart Grid

Strategies for smart grid implementation

1. Zero-carbon transformation of energy structure

2. Smart energy management

In 2018, ASEH commissioned the Chung-Hua Institution for Economic Research and the Taiwan Institute of Economic Research to conduct a two-stage research and validation study. The study involved the simulation of possible scenarios using a grid that automatically responds to energy use combined with renewable energy and energy storage systems. The grid can reduce peak demand and optimize power use, thus bringing both environmental and financial benefits.

We shared our experience and technologies with our industry competitors and have made policy proposals regarding the development of smart grids in the industry to government agencies in the hope of facilitating collaboration and expanding the benefits of smart grids.

Smart energy management system

- Analysis and load management based on energy use of plants within facilities
- Simulation and control of strategic scheduling of energy use

EMS

Smart Manufacturing

Distribution & Scheduling

Renewable Energy System

Smart Factory

Smart Grid

Power Plant

Energy Storage System

Generator System

Renewable Energy Power Plant
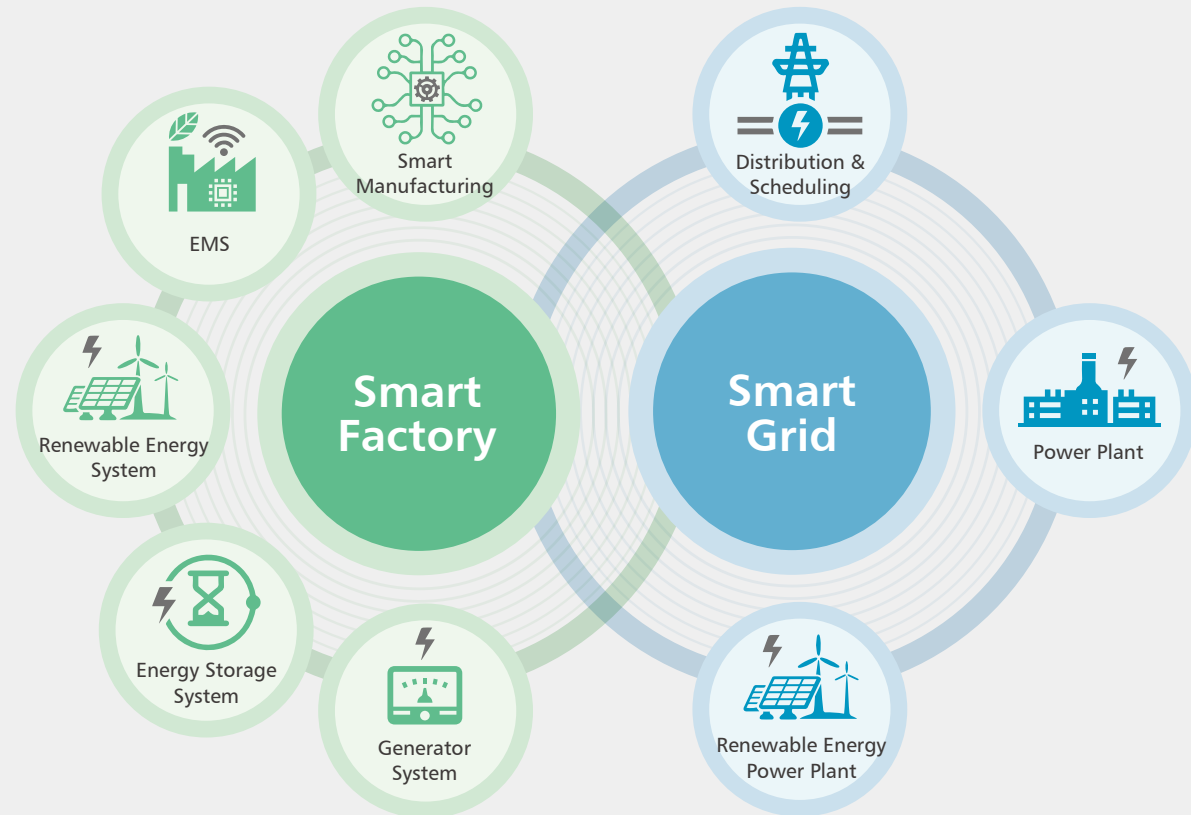
5.2 Water Resource

Three-stage risk assessment

To gain insight into water risks at our facilities worldwide, we conducted the three-stage analysis and assessment of water resources risks:

1 First Stage

Utilized the International Aqueduct tool
We first utilized the Aqueduct tool developed by the World Resources Institute (WRI) to examine the baseline water stress level at each facility. WRI's baseline water stress measures the ratio of total water withdrawals[1] to available renewable[2] surface and groundwater supplies[3]. Higher values indicate more competition among users, resulting in higher water scarcity risk. By WRI water stress level, we analyzed the water stress condition in oversea 17 facilities and Taiwan 8 facilities.

Corrected water risk data
The Aqueduct tool was developed using a large global database which lacks local data from Taiwan and uses data of China instead. For this reason, we asked an academic research institution to replace the data in the original database with accurate local data published by the Taiwanese authorities and then utilized the model to assess and analyze the water withdrawals in different watersheds and at different ASEH facilities. We therefore opted to use the revised data as the basis for risk classification.

Water risk management of supply chain
We also require our suppliers to comply with our Supplier Code of Conduct and develop water management plans to record, classify, and monitor water use and discharge, adopt water conservation measures as much as possible, and control pollution pathways.

WRI water stress level of oversea facilities

Mid Low 1
High 8
Very High 2
Low 14
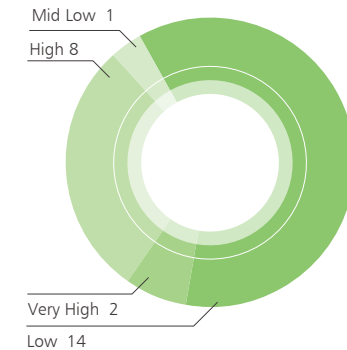
2 Second Stage

Simulated and analyzed by different heating scenarios
By calculated the percent variation of both water consumption and water availability, we examined month-to-month differences in water supply and demand at our eight Taiwanese facilities.
Using past dry-season precipitation records from October to June, we simulated the percentage decrease in precipitation at the eight facilities from 2021 to 2040 under the RCP 2.6 and RCP 8.5 scenarios to assess future drought variations due to climate change. Greater differences resulted in higher month-to-month variations, which lead to greater potential risk of impacts on facility operations. The analysis showed that 8 facilities in Taiwan experience greater month-to-month variations in water supply and demand due to their geographical location and water usage.

Dry season precipitation correction ratio

Maximum 92%
91%
RCP 2.6
RCP 8.5
86% Average 86%
80% Minimum
82%
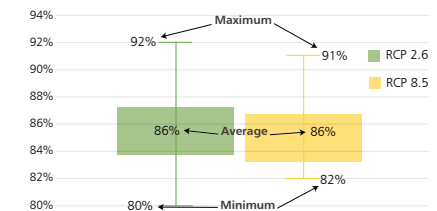
3 Third Stage

To enhance the risk adjustment and capacity
To overcome environmental challenges and minimize the impact of water risks, we examined the adaptability of high-water-risk facilities for the third stage of the risk assessment. Currently, water risks at our facilities stem from five factors: lack of infrastructure, increasing water stress, seasonal variations, climate events, and government policies encouraging enterprises to return to Taiwan. We defined a water supply decrease of over 10% as a mild shortage and a decrease of over 30% as a severe shortage, and used these standards to assess future water risks and adopt the following adaptation measures:

1 ASEH attends closely to reservoir level alerts every year to prepare for early dry seasons and deploy water trucks in advance.

2 Water rationing shall be extended and become more frequent. ASEH regularly checks its water storage and recycling equipment to ensure optimal performance.

3 Due to the significant differences in water consumption in different months, ASEH has refined its manufacturing capacity planning to account for the corresponding water allocation during drought-prone months.

[1] Water withdrawals include domestic, industrial, irrigation, and livestock consumptive and non-consumptive uses.
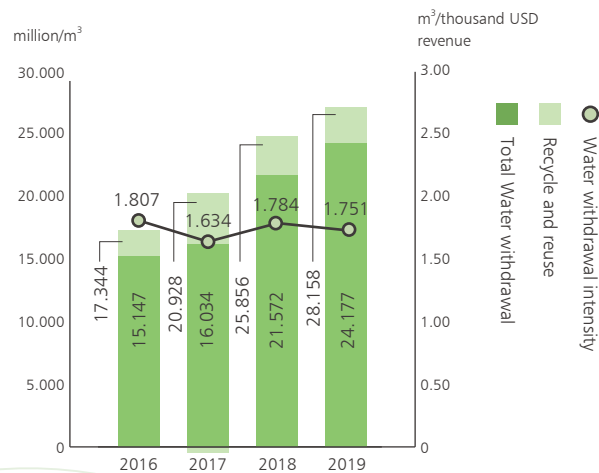[2] Available renewable water supplies include the impact of upstream consumptive water users and large dams on downstream water availability.
[3] https://www.wri.org/publication/aqueduct-30

Water withdrawal and reuse

ASEH has adopted three water-use strategies—reduce, reuse and recycle. Total water withdrawals in 2019 amounted to 24,177,331 tons[1], with the largest source of water being tap water[2]. Our facilities record water use with water meters and water bills. This year, in order to differentiate between different water sources, some of our facilities have begun measuring total dissolved solids (TDS) in addition to total water withdrawals.

ASEH facilities that measure TDS in the water include the operations in Kaohsiung, Shanghai Assembly & Test, Wuxi, Japan, Malaysia and Singapore; USI's facilities in Jinqiao, Kunshan, Shenzhen and Taiwan; and SPIL's facilities in Da Fong, Chung Shan, Zhong Ke, Hsinchu, Changhua and Suzhou. TDS measurement has not yet been adopted at other facilities due to a lack of legal requirements[3]. In 2019, water use intensity decreased by 5.3% compared to the previous year, while total water withdrawals increased by roughly 10% due to the company's merger with SPIL. (which was also the reason behind the increase in greenhouse gas emissions). We are committed to increasing water reuse at our facilities in order to improve water efficiency. In 2019, ASEH recycled 28,158,345 tons[4] of water, which accounted for 116% of the total water withdrawals of the year.

2019 Water Withdrawal and Intensity

million/m³   m³/thousand USD revenue

Legend:
- ■ Total Water withdrawal
- ▨ Recycle and reuse
- ⬤ Water withdrawal intensity

	2016	2017	2018	2019
Recycle and reuse	17.344	20.928	25.856	28.158
Total Water withdrawal	15.147	16.034	21.572	24.177
Water withdrawal intensity	1.807	1.634	1.784	1.751

[1] The data includes that of all ASEH facilities that offer assembly, testing, and material services and electronics manufacturing services.

[2] 4,940,000 tons of groundwater were used at the facilities in USI Taiwan, ASE Chungli, SPIL Dafeng, SPIL Zhongshan and SPIL Changhua. 580,000 tons of rainwater were harvested and reused at the facilities in ASE Kaohsiung, ASE Kunshan, SPIL Hsinchu, and SPIL Zhong Ke. 430,000 tons of reclaimed water were produced at the ASE Kaohsiung Nanzih Export Processing Zone's water recycling plant model. ASEH's remaining water use is sourced from tap water.

[3] 9A.1 Sustainability Data—Environmental Data, B. The amount of water withdrawals and discharge in water-stressed regions.

[4] Estimates for the amount of water recycled are attained through water meter records and the efficiency of water recycling equipment at our facilities.

Water reclamation facilities

In 2013, we began constructing the largest water reclamation facility in Taiwan for processing wastewater that has met effluent guidelines. The recycled water will be re-used at our local facilities. The second phase of the water recycling facility began operations in 2019.

Our water reclamation facility utilizes multi-media filtration (MMF), reverse osmosis (RO), and ultrafiltration (UF) systems to process effluents into purified water that is 20 times cleaner than tap water. The processed water is distributed to the surrounding manufacturing facilities for reuse, thereby accomplishing our goals of water conservation and effluent reduction.

- 1st water reclamation Facility (ASE Kaohsiung Facility): Construction began in 2013
  Phase 1 (2015): 50% recycling rate; processed 20,000 metric tons of reclaimed water per day
  Phase 2 (2019): 70% recycling rate; processed 30,000 metric tons of reclaimed water per day

- 2nd water reclamation Facility (ASE Chungli Facility): Construction began in 2014
  Phase 1 (2015): 65% recycling rate; processed 4,800 metric tons of reclaimed water per day
  Phase 2 (2019): 70% recycling rate; processed 5,400 metric tons of reclaimed water per day

ASE Kaohsiung
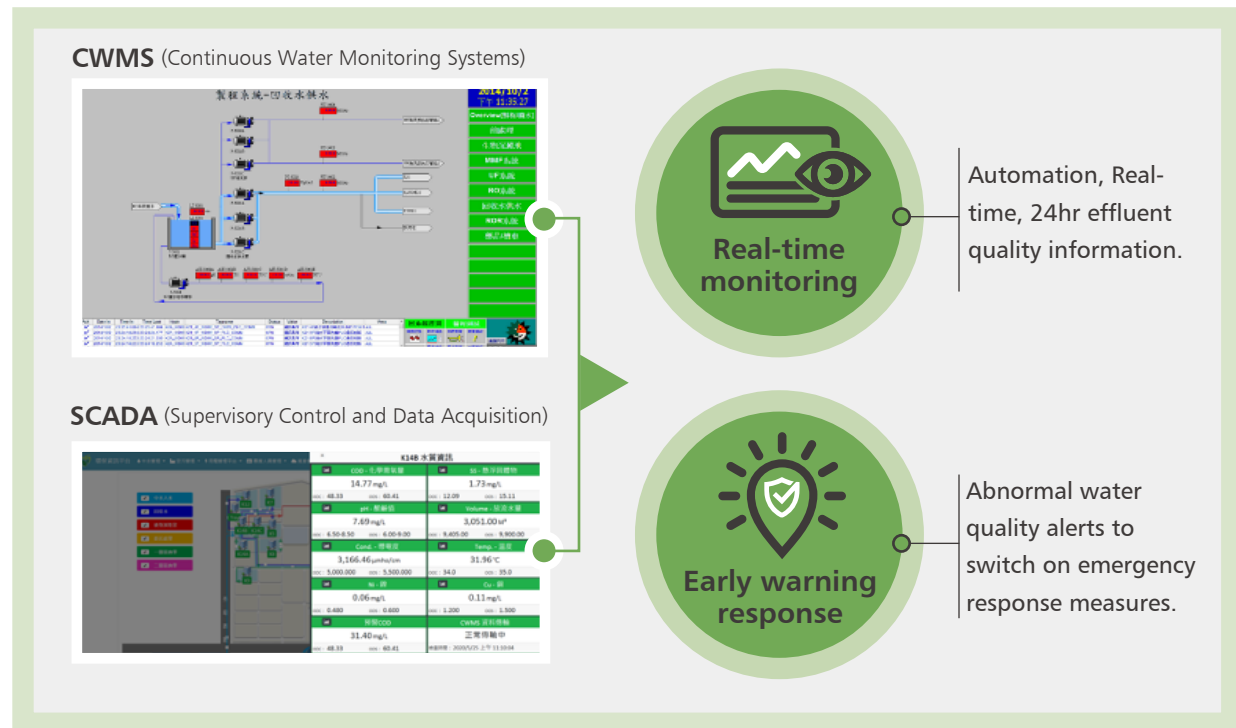

ASE Kaohsiung

ASE Chungli

Waste water management and control

In 2019, 18,780 thousand tons[1] of effluent was discharged[2] at ASEH facilities, with the discharge of effluents into surface and ground water accounting for 93% of total effluents discharged, and the discharge of effluents into marine waters accounting for 7%, and total water consumption[3] was 5,399 thousand tons.ASEH has adopted an effluent management system more stringent than that stipulated by law (see the Appendix for ASEH Environmental Data-C. Effluent water quality at facilities with waste water treatment plants), and regularly/continuously monitors effluent water quality to safeguard local bodies of water from negative environmental impacts. ASEH commissions external service providers to conduct quarterly offline sampling and water quality analysis, and the company's internal environmental protection lab conducts further water quality tests on waste water. The purpose of these measures is to improve the monitoring and management of effluent discharge and ensure regulatory compliance. This year, some of our facilities have adopted the measurement of total dissolved solids (TDS) in water discharge in order to differentiate between water sourced from freshwater and other environments. ASEH facilities that measure TDS in water discharge include the ASE Japan Facility, ASE Singapore Facility, SPIL's Facility in Da Fong, Chung Shan, Zhong Ke, Hsinchu, Changhua and Suzhou. The ASE Chungli Facility measures TDS from conductivity[4], while the remaining facilities have yet to adopt TDS measurement due to a lack of legal requirements[5]. ASEH continues to upgrade and replace waste water treatment plants every year to improve water recycling rates and treat unrecyclable waste water at sewage treatment plants.

Real-time effluent management system at ASE Kaohsiung

To better monitor the water quality of the effluent discharge from each plant, ASE Kaohsiung incorporated the Continuous Water Monitoring Systems (CWMS) and Supervisory Control and Data Acquisition (SCADA) systems into its real-time effluent management, providing detailed water quality information and alerts.

1. Automated effluent monitoring and online updates of system threshold values

2. Real-time water quality monitoring and threshold value optimization

3. Abnormal water quality alerts

4. Automatic updates of allowable limits set by local environmental protection authorities

CWMS (Continuous Water Monitoring Systems)

SCADA (Supervisory Control and Data Acquisition)

Real-time monitoring — Automation, Real-time, 24hr effluent quality information.

Early warning response — Abnormal water quality alerts to switch on emergency response measures.

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[1] Three electronic manufacturing services facilities (Kunshan, Shenzhen, and Mexico) do not have on-site wastewater treatment facility, so the amount of wastewater discharge is estimated. Others' data is recorded from water meters.
[2] Discharge of effluents into surface and groundwater refers to effluent discharged into rivers, lakes, sewer systems, or underground water-bearing strata.
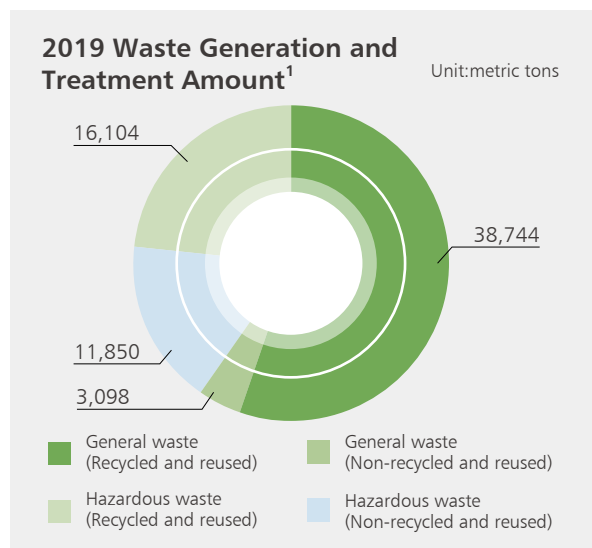[3] The water storage capacity has not been identified in 2019 but we will plan to collect this relevant data.
[4] Conductivity of 2,000 μS/cm = TDS of 1,000 ppm.
[5] 9A.1 Sustainability Data—Environmental Data, C. Effluent quality of our facilities with on-site wastewater treatment.
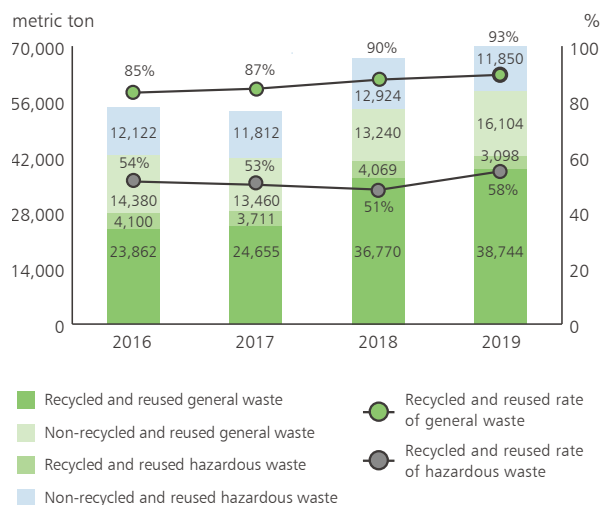
5.3 Waste

Waste Generation and Recycling

ASEH adopts source reduction measures and prioritizes the use of eco-friendly materials to minimize waste generation and reduce environmental pollution. In 2019, we generated 69,795 metric tons of waste, including 41,841 metric tons of general waste (59.9%) and 27,954 metric tons of hazardous waste (40.1%). Non-recyclable business waste in 2019 was 14,948 tons, a decrease of 2,045 tons from 16,993 tons in the previous year. By embracing the concept of a Circular Economy, ASEH was able to improve waste recycling and reuse, resulting in an average recycling rate of 79%, an increase of 4% from 75% last year. The recycling rate of general waste is 93% while hazardous waste is 58%, compared with 90% and 51% in 2018 respectively. Recycled general and hazardous waste amounted to a total volume of 54,847 metric tons. The concept of Circular Economy will continue to drive ASEH's future expansion plans and deliver benefits in reducing waste and protecting the environment.

2019 Waste Generation and Treatment Amount[1]

Unit:metric tons

16,104

38,744

11,850

3,098

- ■ General waste (Recycled and reused)
- ■ General waste (Non-recycled and reused)
- ■ Hazardous waste (Recycled and reused)
- ■ Hazardous waste (Non-recycled and reused)

Waste output and recovery rate

metric ton %

70,000 / 100

85% 87% 90% 93%

	2016	2017	2018	2019
Non-recycled hazardous	12,122	11,812	12,924	11,850
			13,240	16,104
	14,380	13,460	4,069	3,098
	4,100	3,711		
Recycled general	23,862	24,655	36,770	38,744

54% 53% 51% 58%

- ■ Recycled and reused general waste
- ■ Non-recycled and reused general waste
- ■ Recycled and reused hazardous waste
- ■ Non-recycled and reused hazardous waste
- ● Recycled and reused rate of general waste
- ● Recycled and reused rate of hazardous waste

ASEH adopts ISO 14001 Environmental Management principles and encourages players from different industry segments to collaborate and jointly build a blueprint for resource recycling. The company also leverages external resources and industry-academia collaborations to improve waste management and reduce the emission of pollutants. Programs initiated include waste reduction (sludge drying and volume reduction, in-house processing of high molecular weight organic solutions, reduced use of liquid wipes, reduction in waste from activated carbon desiccant packs, and reduction in alcohol bottle waste through package redesign), reuse (reuse of epoxy molding compounds), and recycling (waste cyclopentanone solvent recycling), that helped save the company US$ 3,581,000 in waste treatment costs.

1 The waste weight data is calculated by summing up the weight of each trip to remove the waste.

Industry-academia collaboration to refine sludge treatment processes.

Sewage sludge from various ASE sites are consolidated and sent to our water recycling facility to undergo a drying process to further reduce its volume before it is collected by waste management companies. This process reduces the annual production of sludge waste by at least 3,247metric tons, saving the Company US$ 2,390,000 in waste treatment outsourcing costs.

Organic waste treatment

In-house treatment of organic waste reduces the amount of waste outsourced to waste treatment companies by 1,055 metric tons, achieving US$ 1,060,000 in cost savings.

Moving Towards a Circular Economy

Finite natural resources that are depleting over time and, intense climate and ecological changes are driving companies like ASEH to consider technology and economic benefits to help transition the company to a circular economy. ASEH's transition to a circular economy comprises of 5 key elements: direct recycling, reuse, off-site regeneration, renewable materials, supply and rental.

ASEH is collaborating closely with its business and supply chain partners, to build a circular economy in the semiconductor industry, through fostering the adoption of redesign, circular value-add, recycling and recovery, sharing economy, circular agriculture and industrial symbiosis. To that end, ASEH has formed several industry alliances and cross-industry partnerships that help maximize resource efficiency by identifying areas to reduce, recycle and reuse, and introducing low carbon transport logistics in the manufacturing process.

Case study: In 2019, ASEH invested US$ 463,000 to reduce, reuse and recycle packaging material which resulted in savings of US$ 1,889,000 as well as an annual CO_2 emission reduction of 3,191 metric tons. On average, each dollar invested generated 4.1 dollars in savings. Packaging material recycling was the most cost-effective (10.1 dollars in savings per 1 dollar invested) of the three strategies. In terms of carbon dioxide equivalents (CO_2e), the Company helped reduce global emissions by 68.9 metric tons for every US$ 10,000 it invested, with packaging material reuse being the most effective (281.5 metric tons per US$ 10,000 invested) strategy to achieve emission reductions.

Method	Description	Costs (USD)	Total savings (USD)	Annual CO_2 emission reduction (tCO_2e)	Savings per USD1 cost (USD)	CO_2 emission reduction per USD10,000 (tCO_2e)
Reduce	Reduced the use of cardboard boxes, packaging wrap; redesigned packaging to require less material.	334,000	698,000	422	2.1	12.6
Reuse	Reused vacuum packaging wraps, cardboard boxes, pallets, trays, and paper products	93,000	826,000	2,618	8.9	281.5
Recycle	Recycled wooden crates, cardboard boxes, wrap, barrels, etc.	36,000	365,000	151	10.1	41.9
Total / Average		463,000	1,889,000	3,191	4.1	68.9

Circular Economy Promotion Blueprint

Circular value add
- Reusing trays
- Recycling packaging/cushioning materials
- Recovery of chemicals via outsourcing services (e.g., recovery of cyclopentanone and recovery /reuse of alkaline etching solutions)
- Reusing empty barrels
- Reusing pallets

Redesign
- Incorporating eco-friendly materials
- Replacing acetone with boron-free developers/alcohol
- Improving manufacturing processes (reducing use of chemicals)

Industrial symbiosis
- Turning silicon sludge into usable materials
- Reusing silicon dioxide from sealing strips
- Refining waste metal solutions
- Recycling rejects
- Reusing waste plastics

Circular agriculture
- Turning kitchen waste into compost

Recycling and recovery
- Turning organic waste solutions into energy
- Recycling wastewater from manufacturing processes
- Recycling chemicals in our plants (recovery of acetone)

Sharing economy
- Promoting resource sharing
- Equipment and resource rental

5.4 Green Facility

All ASEH's production facilities worldwide have received ISO 14001, ISO 14064-1[1] and IECQ HSPM QC 080000 certifications. There are 14 facilities (56% of all facilities) have obtained ISO 50001 certification. ASE's Kaohsiung facility has also implemented ISO 14067, ISO 14046 and ISO 14045 standards to better manage the product life cycle's carbon emissions, water consumption and eco-efficiency.

Environmental Management System and Certification

ISO 14001 Environmental Management System	IECQ HSPM QC 080000 Hazardous Substance Process Management	ISO 14064-1 Greenhouse Gas Emission[2]
Scope: 100%	Scope: 100%, excluding ISE Labs *	Scope: 100%

ISO 50001 Energy Management System	ISO 14067 Carbon footprint	ISO 14046 Water footprint
Scope: ASE Kaohsiung, Chungli; USI Taiwan, Zhangjiang, Jinqiao, Shenzhen, Kunshan, Mexico; SPIL Dafong, Chungshan, Hsinchu, Changhua, Zhongke and Suzhou	• Product & service types: Leadframe, BGA, Chip Scale Package (CSP), Flip Chip, Bumping, Substrate and testing / Scope: ASE Kaohsiung • 4G dual-band communications module/Scope: USI Zhangjiang • XnBay smart server/Scope: USI Taiwan	Scope: ASE Kaohsiung

ISO 14054 Eco-Efficiency	ISO 14051 Material Flow Cost Accounting
Product types: Leadframe, BGA, Chip Scale Package(CSP), Flip Chip, Bumping and Substrate / Scope: ASE Kaohsiung	• Product type: USB-C Dock G4/Scope: USI Taiwan • Product type: Flip Chip/Scope: ASE Kaohsiung

* As an IC testing facility, ISE Labs is exempted from IECQ HSPM QC 080000 certification.

[1, 2] Due to disruption from the Covid-19 pandemic, the schedule for the ISO14064 third party verification at our US California-based ISE Labs Inc has been further delayed. Nevertheless, ISE has already completed its GHG inventory assessment and its data has been duly included in the reporting of ASEH's total GHG emission data.

Air Emissions Control

Air pollutant emissions in 2019 include 208 tons of VOCs[1], 9.5 tons of SOx[2], 27.3 tons of NOx[3], 10.6 tons of particulate matter[4], and 0 tons of ozone-depleting substances[5]. ASEH reported slightly higher emissions (4 metric tons, an increase of 2%) of volatile organic compounds (VOCs) in 2019, mainly due to the increased production volume.

ASEH uses various techniques to manage and control emissions from the manufacturing process including wet scrubbers, activated carbon adsorption equipment, condensation equipment, chemical scrubbing, biological scrubbing, UV light, zeolite concentration rotor incineration system.

In addition to the existing infrastructure for meeting future expansion, we plan to enhance the following scopes in our gas emission management plan.

- Adopt materials with low/no VOC content to replace existing ones with high VOC concentration.

- Continue to equip facilities with high-efficiency processing equipment (such as the zeolite concentration rotor incineration system, active carbon adsorption equipment, etc.).

- Optimization of biological treatment systems via collaborative studies on the biological treatment efficiency of air pollutants and academic analysis of microbial composition and treatment efficiency.

- Adopt sealed negative-pressure design to improve gas collection efficiency and collect pollutants from stationary sources.

Low Carbon Buildings and Green Factories

Increasing the energy efficiency and reducing the carbon emissions from buildings are critical in slowing down climate change. As part of ASEH's green building initiatives, the company had already begun to transform existing factories and offices, and build new ones that conform to green building standards. In keeping with ASEH's commitment to low-carbon manufacturing, we are transitioning green factories into low-carbon buildings by introducing the 'carbon footprint of buildings' concept in 2015, in which the carbon emissions of buildings were quantified and analyzed throughout their lifecycle to drive carbon reductions from the design stage.

In 2019, ASE K24 became the first ever semiconductor packaging plant to receive a low-carbon building certification. Going forward, ASEH is in a leadership position to work together with industry partners to build sustainable industrial parks. In addition to more investments in low-carbon buildings, ASEH is also evaluating clean manufacturing as an integral part of 'green factory' certification and we aim to have all of our new facilities duly certified in future.

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1   VOCs are calculated using public factors, and are either directly measured or calculated using mass balancing.

2   SOx is calculated using public factors, or converted using the composition ratio.

3   NOx is calculated using public factors, or directly measured.

4   PM is calculated using public factors, or directly measured.

5   Only emissions of ozone depleting substances used as raw materials during manufacturing activities are considered. Other Vaporization activities related to manufacturing activities are not considered part of the business main activities and are therefore excluded from disclosure.

26 Green Certificte

17 EEWH (**7** Diamond, **1** Silver, **7** Copper, **2** Qualified)   **8** LEED (**4** Platinum, **4** Gold)   **1** BCF (Diamond)   **+6** Green Buildings   **+1** Low Carbon Buildings

2012	2013	2014	2015	2016	2017	2018	2019	2020~
		K7, K21			K26			K9
		K5, K16		CN-HQ	CL-K&L			CL-C
		K4, K15		K22, K14B	K26, CL-B	KH-dorm		K24, CL-M
K12	K12	K3, K11	CL-K&L	K21, CL-A	K23, Taichung-B	CN-SH, K22	BCFd K24	BCFd K25, K25, USI-NK

12 Green Factory   **+5** Green Factory

2012	2013	2014	2015	2016	2017	2018	2019	2020~
			K3		K-21			K9
			K5		K7	CL-K&L		K24
			K11		CL-A	CL-B		K25
			K12		CL-B	Taichung-B	K22	CL-M, K15

Low Carbon Buildings CO_2 CO_2

* Green Factory Label" can be obtained after passing the certification of "Green Building certification" and "Clean Production Assessment". "Clean Production Assessment" is conducted by the Industrial Development Bureau (IDB) of the Ministry of Economic Affairs (MOE) and based on the concept of "clean production" as defined by the United Nations Environment Programme (UNEP).

5.5 Environmental Expenditures and Investments

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

Environmental Costs

ASEH's total environmental costs for 2019 amounted to US$87.4 million, with capital expenditure and expense accounting for 48% and 52% respectively.

USD million

Category		Description	2016		2017		2018		2019	
			Capital Investments	Operating Expenses	Capital Investments	Operating Expenses	Capital Investments	Operating Expenses	Capital Investments	Operating Expenses
Operating Cost	Pollution Prevention Cost	Air, water, other pollution prevention, etc.	23.9	7.2	12.2	8.0	20.0	15.4	29.7	13.5
	Resource Circulation Cost	Efficient utilization of resources, waste reducing, recycling, and disposal, etc.	4.1	11.8	12.4	15.0	8.6	12.0	10.6	15.5
Upstream/Downstream Cost		Green procurement, recycling of used products, etc	0.9	0.7	0.56	0.3	0.4	1.3	0.7	3.6
Administration Cost		Manpower engaged in environmental improvement activities and environmental education, acquisition of external environment licenses/ certification, government environmental fees, etc.	-	8.1	-	8.1	-	9.3	0.5	9.7
Social Activity Cost		Donations to, and support for, environmental groups or activities, etc.	-	3.2	-	3.4	-	3.9	0.1	3.4
Environmental Remediation Cost (Violation cases)		Fines, recovery of the environmental degradation, degradation suits, and insurance fees, etc.	-	0.2 (0 major case*)	-	0.2 (0 major case*)	-	0.1 (2 major case*)	-	0.05 (0 major case*)
Others		Global environmental conservation cost and cost to develop products to curtail environmental impact at the product manufacturing stage, etc.	-	0.03	-	0.07	-	0.06	0.02	0.1
Total			28.9	31.2	25.2	35.1	29.0	42.1	41.6	45.8

* We defined major cases as the environmental-related fines or penalties greater than US$10,000. In 2019, we didn't receive any major environmental-related fines or penalties, and we were not subjected to any major non-financial penalty or litigation that results in facility shutdown.

Environmental Benefits

ASEH records environmental benefits generated from activities that reduce impacts on the environment. Our total environmental benefits for 2019 amounted to US$71.4 million.

USD million

Category	Description	2016		2017		2018		2019	
		Environmental Benefits	Economic Benefits	Environmental Benefits	Economic Benefits	Environmental Benefits	Economic Benefits	Environmental Benefits	Economic Benefits
Cost Savings	Reduction in electricity costs due to energy saving projects	197,576 MWh	15.1	60,988 MWh	5.4	483,405 MWh	44.6	599,833 MWh	52.0
	Reduction in water costs due to water saving projects	15,096,545 metric tons	6.0	15,175,519 metric tons	6.7	22,934,123 metric tons	9.5	28,158,345 metric tons	11.5
	Reduction in waste disposal costs due to waste recycling	38,243 metric tons	6.4	38,115 metric tons	7.6	50,011 metric tons	6.5	54,847 metric tons	7.9
Total			27.5	-	19.7	-	60.6	-	71.4

Our estimated environmental capital expenditures for 2020 will be approximately US$24.3 million. The board of directors has resolved in 2020 to contribute around US$3.3 million (NT$100.0 million) through the ASE Cultural and Educational Foundation in environmental projects in 2020.
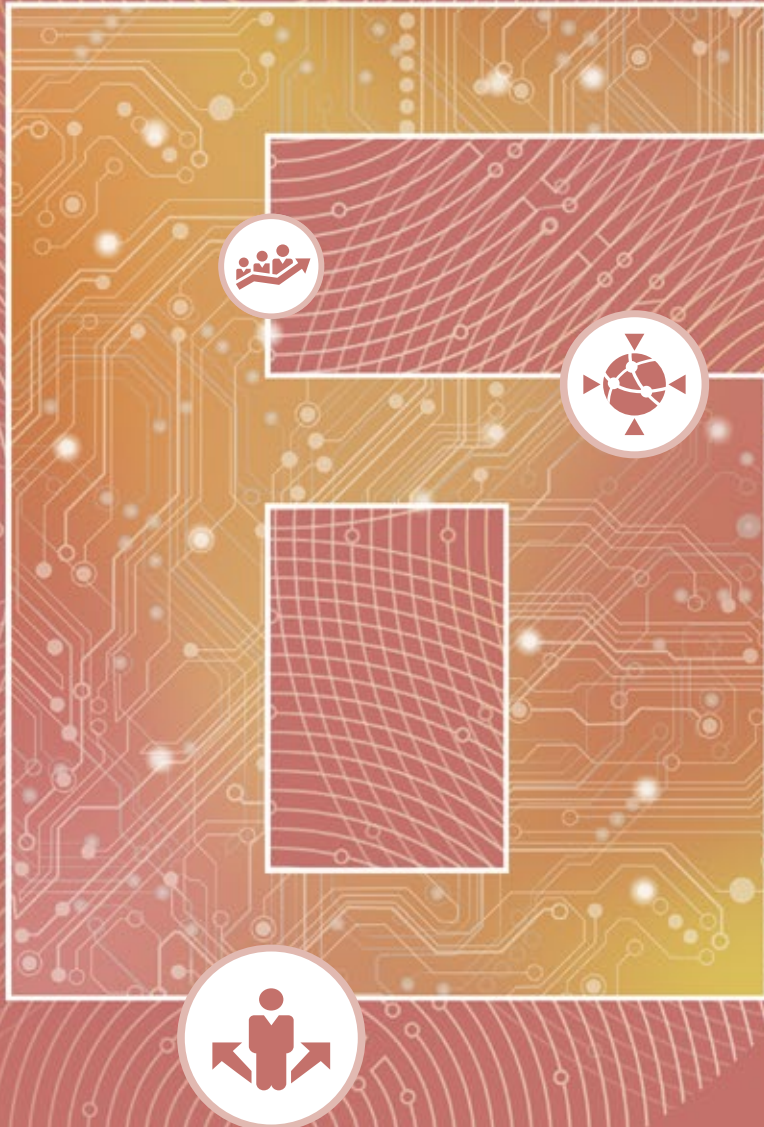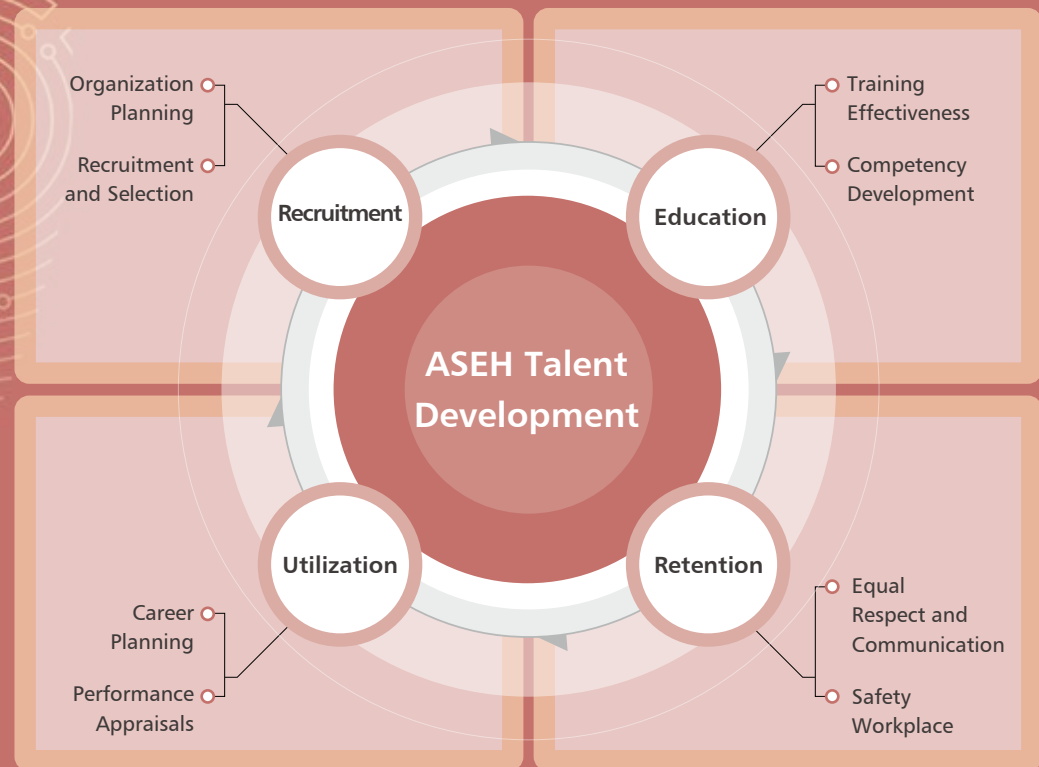
Green Bond

To demonstrate our commitment on transition to low-carbon and climate resilient growth, ASE Inc. issued Asia's first corporate US$300 million Green Bond through our subsidiary Anstock II Limited in July 2014. The first green bonds matured in July 2017, and ASEH launched a second US$300 million Green Bond in 2019. Proceeds from the issuance of the bonds will be invested in developing renewable energy and related technologies, increasing energy efficiency, promoting energy conservation, reducing greenhouse gas emissions, recycling and reusing waste materials, and water conservation/purification/recycling. ASEH has created largest green factory cluster among world's semiconductor assembly and test industry and Taiwan's largest rate of water recycling plant. ASEH has obtained 26 Green Building certifications for 18 factory buildings and on an annual basis, the ability to reduce 350,000 tCO_2e, and achieve an accumulated water recycling volume of 6.58 million metric tons. Going forward, we will continue to assess and plan meaningful green investments, with the aim of further promoting the use of green financial instruments in Taiwan, and driving the development of a low-carbon sustainable industry.

INCLUSIVE WORKPLACE

ASEH is committed to protecting human rights, ensuring diversity in our workforce and providing employees with a safe, healthy and stimulating work environment.
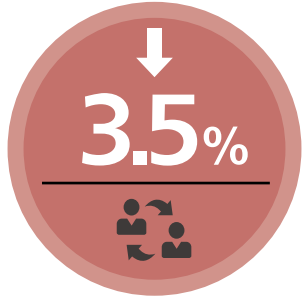
ASEH is committed to continuously invest in talent cultivation by motivating employees to further their career within the company and retaining highly skilled and experienced employees. We respect the rights of our employees and we strive to provide a safe, comfortable, healthy and productive workplace for our employees.

Organization Planning

Recruitment and Selection

Training Effectiveness

Competency Development

Recruitment

Education

ASEH Talent Development

Utilization

Retention

Career Planning

Performance Appraisals

Equal Respect and Communication

Safety Workplace

20/19 Key Performance

28,000
New Hire Employee

↓3.5%
Turnover Rate Compared to 2018

34%
Total of ASEH Headcounts join Labor Union

SDGs	Business Actions	2019 Material Aspects	KPI	2019 Target	Status	2019 Performance	2020 Target	2025 targets
4 QUALITY EDUCATION	Ensure that all employees have access to vocational training and life-long learning opportunities	Talent Cultivation and Development	Employee engagement	Employee engagement at 73% or over	Achieved	Employee engagement of over 83%	Employee engagement at 80% or over	Employee engagement at 85% or over
			Turnover rate	Reduced by approximately 3% compared to 2018	Achieved	Reduced by approximately 3.5% compared to 2018	Turnover rate is less than 30%	Turnover rate is less than 20%
		Human resource development	Adoption of training effectiveness system	Adopted by 70% of company facilities worldwide	Achieved	Adopted by 72% of company facilities worldwide	Adopted by 75% of company facilities worldwide	Adopted by 85% of company facilities worldwide
8 DECENT WORK AND ECONOMIC GROWTH	Formulate and support a comprehensive workplace safety framework to ensure decent working conditions for all employees across the industry	Occupational Health and Safety	Cases of occupational disease and major injury	Zero cases of occupational disease and major injury	Not Achieved	One case of occupational disease at USI	Zero cases of occupational disease and major injury	Zero cases of occupational disease and major injury
			• Disabling Injury Frequency Rate (FR) • Disabling Injury Severity Rate (SR)	FR and SR average lower than the semiconductor industry mean rate[1]	Not Achieved	FR : 0.829 SR : 11.486	FR and SR 1% lower than the semiconductor industry mean rate	FR and SR 5% lower than the semiconductor industry mean rate

[1] Average disabling injury FR and SR in the Taiwanese semiconductor manufacturing industry in 2019 were 0.57 and 8, respectively.
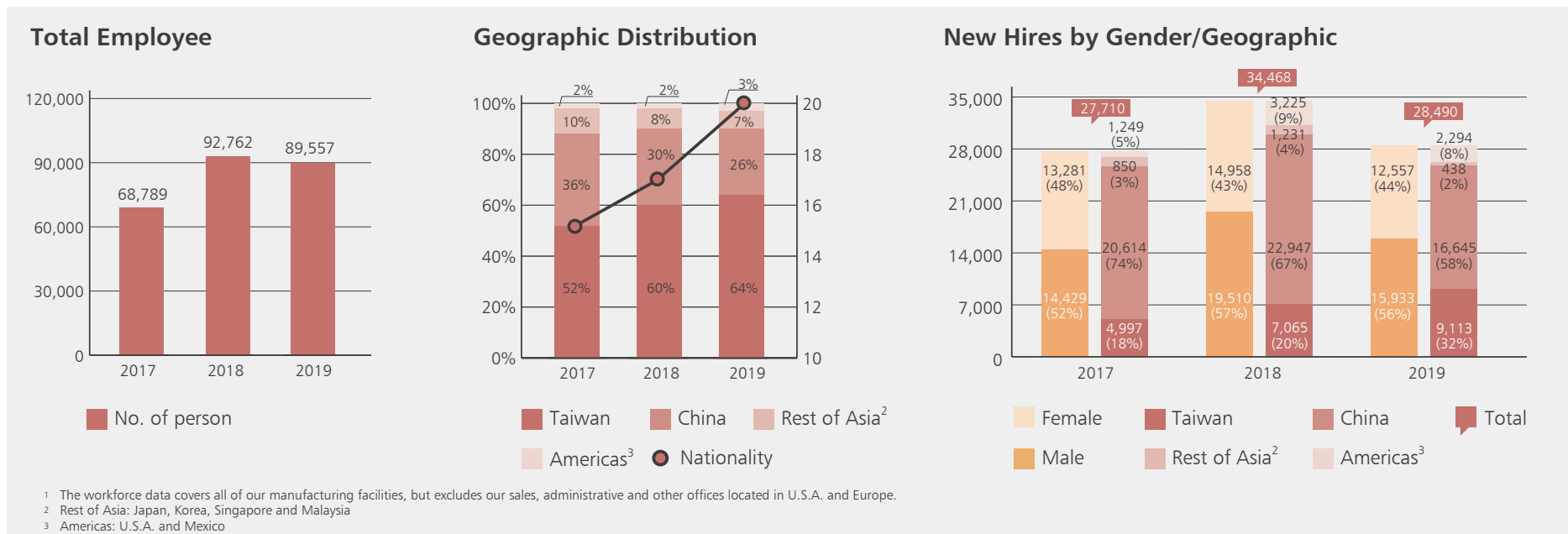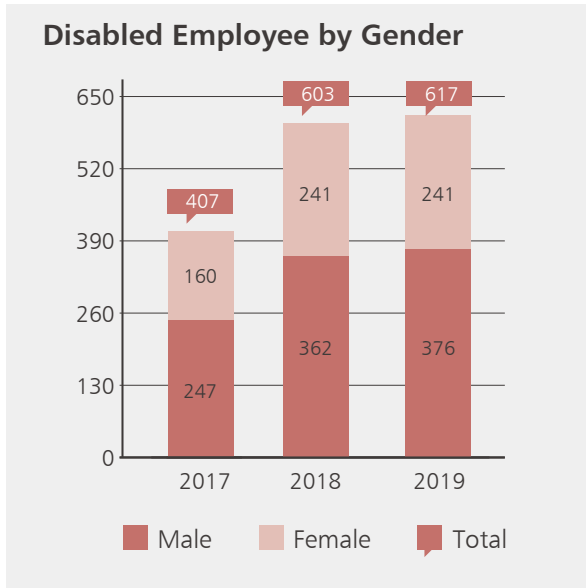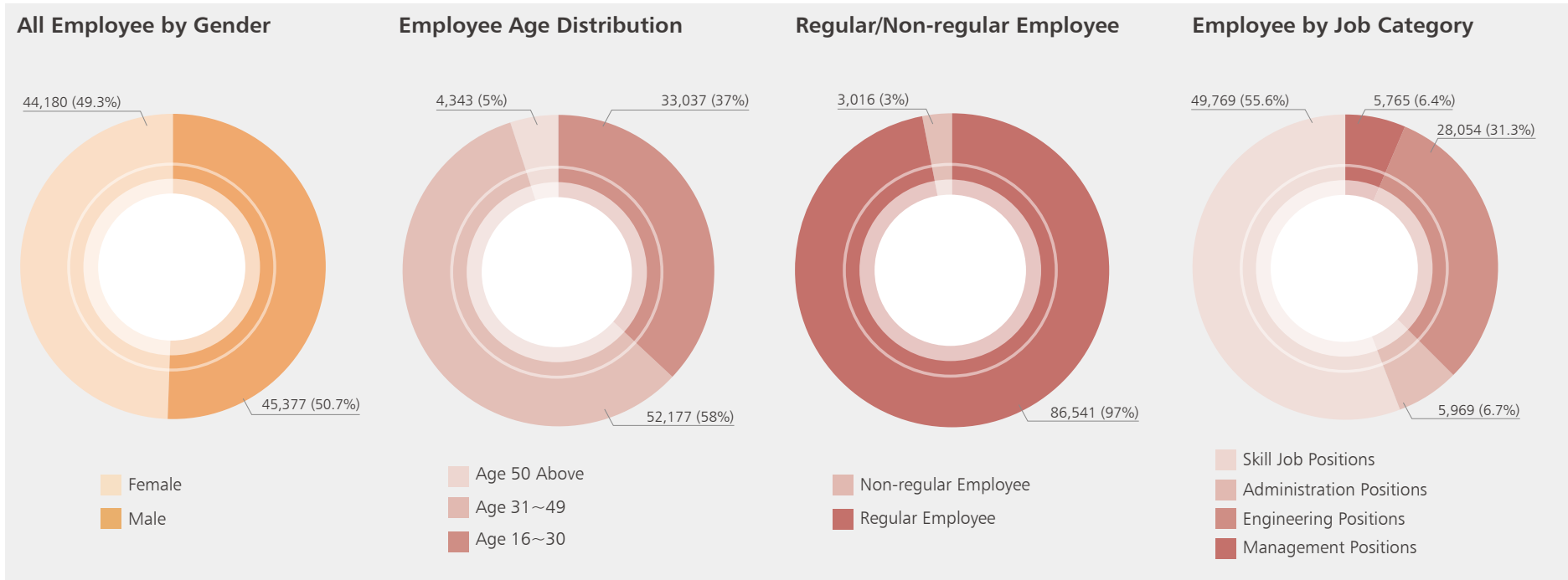
6.1 Global Recruitment and Diversity

ASEH's corporate recruitment policy takes into account the condition and culture of the local community where our facilities operate, and the relevant job characteristics. We recruit through various channels including campus recruitment, employee referrals, industry-academia internship programs, the R&D substitute service program, executive search firms, recruitment fairs, online recruitment and digital job boards. In 2019, ASEH recruited approximately 28,000 employees in more than 20 countries. ASEH's recruitment strategy has provided momentum for the company to continue its growth and innovation, and increase its competitive edge to meet the needs of customers and the evolving market.

ASEH has established an inclusive recruitment policy that promotes diversity and prohibits discrimination against any employee or job applicant on the basis of race, gender, national origin, religion, political affiliation, sexual orientation or age. The company is committed to upholding and respecting human rights through strict compliance with local laws and regulations and the RBA (Responsible Business Alliance) Code of Conduct, and forbids the use of child labor. In 2019, ASEH recruited a total of 617 disabled employees at its facilities around the world, and the company has a higher percentage of employees with disabilities than local regulatory recommendations. For our foreign employees, we help the newly hired ones to adjust to their new work environment and understand the local culture, by providing translators at the workplace and mentors who are often senior employees from their home country. To ease their training, information and instructions are prepared in their native, or simple and easy to understand language. They are also not required to pay any fee or commission to recruitment agencies.

All our foreign employees are entitled to the same benefits as those enjoyed by their local colleagues. As of the end of 2019, ASEH employees hail from over 20 countries. Diversity and inclusion form the backbone of ASEH's workplace culture, and contribute towards employee growth and the creation of a mutually respectful work environment.

ASEH has a total of approximately 89,000 employees[1] working in 25 sites in eight countries. Of these, 97% are full-time employees and 3% are contract employees. The percentage of Taiwanese employees has increased to around 64%, followed by mainland Chinese employees at 26%. ASEH has also achieved an equal gender ratio in its workforce, 37% of which is aged 16 to 30, while 58% is aged 31 to 49. The average cost of recruiting an employee is approximately US$500.

Total Employee

Year	No. of person
2017	68,789
2018	92,762
2019	89,557

Geographic Distribution

Legend: Taiwan, China, Rest of Asia[2], Americas[3], Nationality

New Hires by Gender/Geographic

Legend: Female, Male, Taiwan, Rest of Asia[2], China, Americas[3], Total

[1] The workforce data covers all of our manufacturing facilities, but excludes our sales, administrative and other offices located in U.S.A. and Europe.
[2] Rest of Asia: Japan, Korea, Singapore and Malaysia
[3] Americas: U.S.A. and Mexico

All Employee by Gender

44,180 (49.3%)
45,377 (50.7%)

- Female
- Male

Employee Age Distribution

4,343 (5%)
33,037 (37%)
52,177 (58%)

- Age 50 Above
- Age 31~49
- Age 16~30

Regular/Non-regular Employee

3,016 (3%)
86,541 (97%)

- Non-regular Employee
- Regular Employee

Employee by Job Category

49,769 (55.6%)
5,765 (6.4%)
28,054 (31.3%)
5,969 (6.7%)

- Skill Job Positions
- Administration Positions
- Engineering Positions
- Management Positions

Disabled Employee by Gender

Year	Male	Female	Total
2017	247	160	407
2018	362	241	603
2019	376	241	617

- Male
- Female
- Total

Diversity Indicator

	2017	2018	2019
Female share of total workforce (%)	49.72%	49.95%	49.33%
Females in management positions (% of total management workforce)	28.61%	23.89%	23.56%
Females in junior management positions (% of total junior management positions)	34.29%	34.18%	33.11%
Females in top management positions (% of total top management positions)[1]	11.50%	12.82%	11.6%
Females in management positions in revenue-generating function[2] (% of revenue-generating function managers)	22%	22.27%	21.31%

Remuneration Ratio

	2018	2019
Executive level	0.99	0.99
Management level (base salary only)	0.88	0.83
Management level (base salary + other cash incentives)	0.85	0.82
Engineering position level	1.04	0.97
Administration position level	0.93	0.91
Skill job position level	0.99	0.96

[1] Top management positions: Director and vice presidents level.
[2] Revenue-generating function: e.g. sales function, excluding support functions such as HR, IT Legal, etc.

6.2 Talent Attraction and Retention

ASEH provides a conducive environment for employees to unleash their full potential to create innovative technologies or to demonstrate effective management skills. The growth of the company is strongly dependent on attracting and retaining talent and the following actions outline our strategy:

a
A multi-faceted employee engagement survey

b
Highly competitive compensation and benefits

c
Fair and comprehensive performance review

d
Open communication and a grievance mechanism

e
Interdisciplinary technology platform committee

Employee Engagement Surveys

Employees are a company's most valuable asset and maximizing the potential of our human resources to create value is part of ASEH's sustainable development strategy. Since 2017, ASEH has collaborated with human resource consulting firm, Aon Hewitt, to conduct a comprehensive biennial employee engagement survey, to obtain employee feedback and measure the level of engagement, and serve as a tool for attracting, developing and retaining talent. In 2019, we administered the survey to 67,204 direct and indirect employees at the company's 23 global facilities, accounting for 82.1% of total employees. Fifteen aspects under six major categories (corporate branding and culture, management, training and development, work environment, synergy, and compensation and benefits) were used to assess employee engagement. The results indicated that the company achieved higher employee engagement in 2019 largely due to policy execution in compensation and benefits, synergy, and corporate branding and culture.

The Behaviors of Employee Engagement

Willing to Promote
Often say good things of the company to colleagues and customers

Willing to Stay
Has a strong sense of belonging and eagers to be a one of the organization

Make an All-out Effort
Not only do the best at the work, but also willing to pay extra effort for the success

The work Experience — Performance, Brand, Leadership, The Work, The Basics, Company Practices

Engagement Survey Result & Target

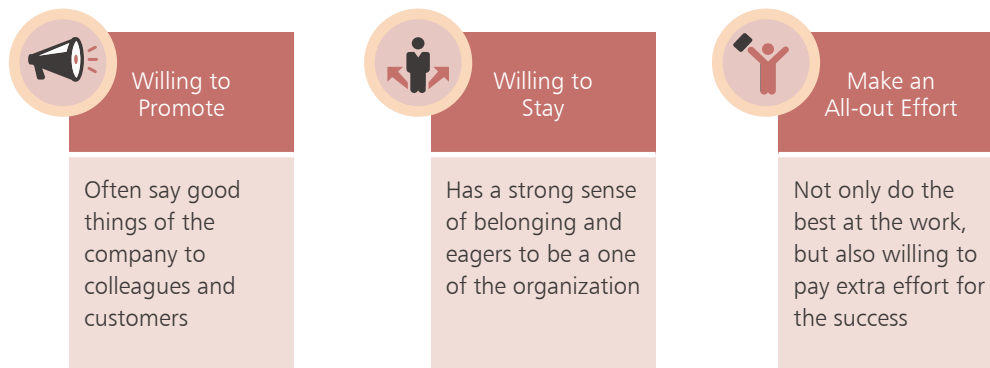| Year	2016	2017	2018	2019	2019 Target
Satisfaction/ Engagement (%)	70.6	75	75	83	>73
Conduct Coverage (%)	64	73.6	73.6	82.1	80

Breakdown of Engagement Survey Result

Survey Item	All Employee	Male	Female
Experience at Work (%)			
Company Practice	76	77	75
The Basics	78	79	78
The Work	78	79	78
Performance	76	77	76
Brand	78	79	78
Leadership	74	76	74
Influence Engagement			
Say	79	79	79
Stay	83	82	83
Strive	82	82	82

Engagement by region

%	All Employee	Male	Female
Taiwan	81	81	81
China	86	85	87
Rest of Asia	81	81	81
Americas	82	83	81

Performance Review, Compensation, and Benefits Policies

ASEH conducts a fair and equal performance appraisal of all employees across the board on a biannual basis. The review involves management by objectives and performance ranking, a multifaceted evaluation, and equipment operator certificate reviews. Employees with poor performance ratings are offered employee counselling on a case-by-case basis by their managers, who are able to make adjustments to their roles and focus on individual performance. Our full-time employees enjoy standard compensation and benefits[1]. ASEH also carries out an annual analysis of local market salary structures to ensure competitive compensation for our employees.

To motivate and recognize employee efforts, we devised monthly bonus incentive and annual profit-sharing schemes to reward employees. Outstanding employees receive monthly cash bonuses based on our business results, and additional annual bonuses are awarded to top performing employees who have met and achieved beyond their goals within the financial year. In 2017, 2018, and 2019, ASEH paid company employees approximately NT$5.51 billion, NT$6.88 billion, and NT$7.6 billion in bonuses respectively. ASEH also has in place, an employee stock option program for retaining valuable employees. Employee stock options are valid for 10 years from the issue date.

Performance Appraisa

Evaluation	Object	Frequency	Approaches
Ranking and Management by Objectives	All Employee	Twice a year	Work project targets and quantifiable performance indicators are presented by employees to their direct supervisors for discussion and confirmation before being set as preliminary targets. In 6 months, employees are required to present their self-evaluation to their supervisors, who shall assess their performance and determine if the performance targets have been reached. A final evaluation is made before all employees in each department are ranked according to their performance.
Multidimensional Performance Appraisal	Management, Engineering, Administration Position Employee	Twice a year	Work project targets and quantifiable performance indicators are presented by employees to their direct supervisors for discussion and confirmation before being set as preliminary targets. In 6 months, employees are required to present their self-evaluation to their supervisors, who shall assess their performance and determine if the performance targets have been reached. A final evaluation is made before all employees in each department are ranked according to their performance.
Qualification Certificate Evaluation	Skill Job Position Employee	Twice a year	According to the various types of machine equipment at each station on the production line and the need to inspect products and resolve anomalies, qualified instructors are assigned to evaluate the performance of production line employees.

Turnover Rate

	2016	2017	2018	2019
Total turnover rate[2]	3.46%	3.62%	3.2%	2.91%
Voluntary turnover rate	3.41%	3.58%	3.15%	2.88%
Preventive measures	• Analyze the root causes of employee turnover and addressing the findings especially in the areas of management issues and measures of central tendency, with the respective department that faces employee turnover. • Enhance company policy in employee recruitment, development, utilization and retention in tandem with refining management leadership. • Create open communication channels for senior executives to communicate directly with frontline employees on the company's plans and developments for the future. • If the reason for an employee's intention to leave stems from an issue that can be resolved by the Company, such as a health-related issue (e.g., inability to stand for long periods), marriage, or family commitment, the manager can make reasonable adjustments to the employee's duties or work environment, or permit a leave of absence in order to retain the employee.

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[1] For more information on our employee benefits and retirement policies, please refer to the annual report (Page,122~128)

[2] Turnover rate is calculated by dividing the number of employees who left the company (either by resignation or termination) by the total number of employees and then dividing by 12 months.

Employee Communication

ASEH listens to the voices of its employees and has created various communication channels for them to receive the latest news about the company or express any opinions or concerns about the workplace. The Human Resources Department provides several two-way communication channels:

Propaganda	Communcation
• Intranet - to publish company's latest news • E-mails Announcements - to announce group-wide updates and messages from top management • Bulletin Boards - to provide information related to labor compliance policy, health and safety, and company • Periodical Issue - to interview employee and let employee to express their opinions • On-Site TV News/Information - to broadcast employees' welfare-related information	• Employee Opinions Box - to collect and respond to employees' grievance and feedback • Employee/Foreign Employee Symposium - to share and discuss work experiences, regular symposium with foreign employee every month • Counseling Room - to provide one-on-one counseling sessions • General Manager/Plant Director Mailbox - to deliver employees' opinions/suggestions to GM/Plant Director directly • Labor Meeting - to have a communication between HR & labor representative quarterly

Labor Unions

We have labor unions that have served our employees for many years, at a number of our facilities including ASE Kaohsiung, Shanghai(A&T), Kunshan, Suzhou, Wuxi, Weihai, Korea, Japan, Singapore and USI Zhangjiang, Kunshan, Mexico, and SPIL Suzhou. At the end of 2019, the total number of union members was 29,840, accounting for around 34% of ASEH total headcount. The unions sign a collective contract[1] with ASEH, and hold bilateral quarterly meetings to discuss and resolve employee welfare issues.

[1] The signed collective contract includes ASEH Kunshan, Suzhou, Wuxi Japan, Korea, SPIL Suzhou, and USI Mexico about 12% of total employees.

Union Statistics

Number of Union Members ● % of Total Employee
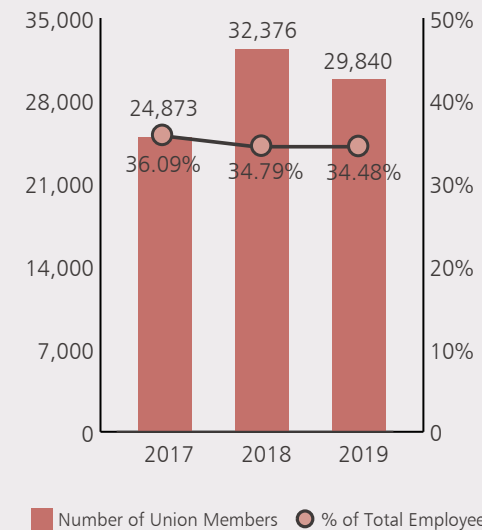
6.3 Talent Cultivation Development

At ASEH, sustainable development is driven by the innovative spirit, expertise, and commitment of our employees. We continuously strive to improve our training and development programs for employees at the management, R&D/technical and manufacturing level. Each year, ASEH invests in human capital through collaboration with management consultants and top universities, to meet organizational growth, accelerate the rate of innovation and maintain our competitive advantage.

In 2019, ASEH invested approximately US$8.7 million into employee development and poured in 11.5 million hours of employee training, at an average cost of US$101 and 133 training hours per employee. ASEH also offered company-sponsored scholarships to 174 employees seeking continuing education and degrees in fields related to their work.

Management Talent	
Leadership Communication Influencing	To cultivate management talent, ASEH has invested heavily in a management development program designed to provide leadership, communication, and influencing skills training for management-level employees and help them achieve personal growth and self-actualization. Through the training process, we hope that the management level employees would in turn encourage their team members to learn and grow with the company, thus building meaningful and valuable careers together.
Technical (R&D) Talent	
Innovation Problem solving Cohesion	To cultivate technical (R&D) talent, ASEH has incorporated technological innovation, problem solving and team cohesion into its corporate culture. To that end, the company has established an interdisciplinary professional technology platform and formulated a smart manufacturing and SiP/heterogeneous integration service blueprint. In parallel, ASEH is closely collaborating with leading universities to design theoretical and practical courses that can be applied to manufacturing automation and provide customers with innovative solutions.
Manufacturing Talent	
Productivity Execution	To cultivate talent at the manufacturing level, raising productivity standards and execution are key to addressing the dichotomy of high volume and high-mix/low-volume manufacturing. Flexibility in the manufacturing line and capacity allocation will allow the operation to maximize utilization rate within space and equipment limitations.

Cultivating Management Talent

To inculcate our corporate DNA, accumulated management expertise and innovation values in our management team, the company continues to promote these 3 key courses on influencing skills: Interdepartmental Project Management, Management Training Program (MTP), and Train the Trainer (TTT) Program. The teaching materials were co-designed by management level employees with extensive experience, and classes are conducted by certified instructors who had undergone the company's instructor training for employees. ASEH's internal training program successfully facilitates the transfer of knowledge and fully leverages on the use of in-house expertise to cultivate the next generation of management personnel. In 2019, ASEH completed the management training of approximately 5,700 employees.

Cultivating R&D and Technical Talent

To meet ever-changing customer needs for increased product functionality and quality, we have established industry-academia programs (Industry 4.0, artificial intelligence, big data) designed to train our employees in manufacturing automation, and AI-powered early warning and emergency response systems. The application of knowledge in these advanced fields enable the company to improve product quality and yield, and maximize production capacity and revenue. In 2019, ASEH trained approximately 28,000 employees.

Cultivating Manufacturing Talent

At the manufacturing level, standard operating procedures and operational analysis are applied to production management, to improve product quality and capacity utilization. Key training courses include; TWI training, production planning and, control and improvement of manufacturing processes. These methods of training enable supervisors to provide localized training to production staff by deconstructing and improving workflow, as well as fostering positive interaction with employees. In 2019, ASEH trained approximately 4,300 employees.

Training Program statistics

	2017	2018	2019
Overall Training Hours	8,315,240	9,619,786	11,549,300
Average training hours - Total Employee (Hours)	121	104	133
Average training hours - Male (Hours)	110	116	145
Average training hours - Female (Hours)	131	92	121
Training Expenses (US$)	2,068,800	4,488,000	8,760,000
Average training expenses per employee (US$)	128	116	101
% of open positions filled by internal candidates[1]	76.9%	69.3%	76%

[1] (Management position promotion employee - New hire manager employee) /Management position promotion employee

Internal Lectureship

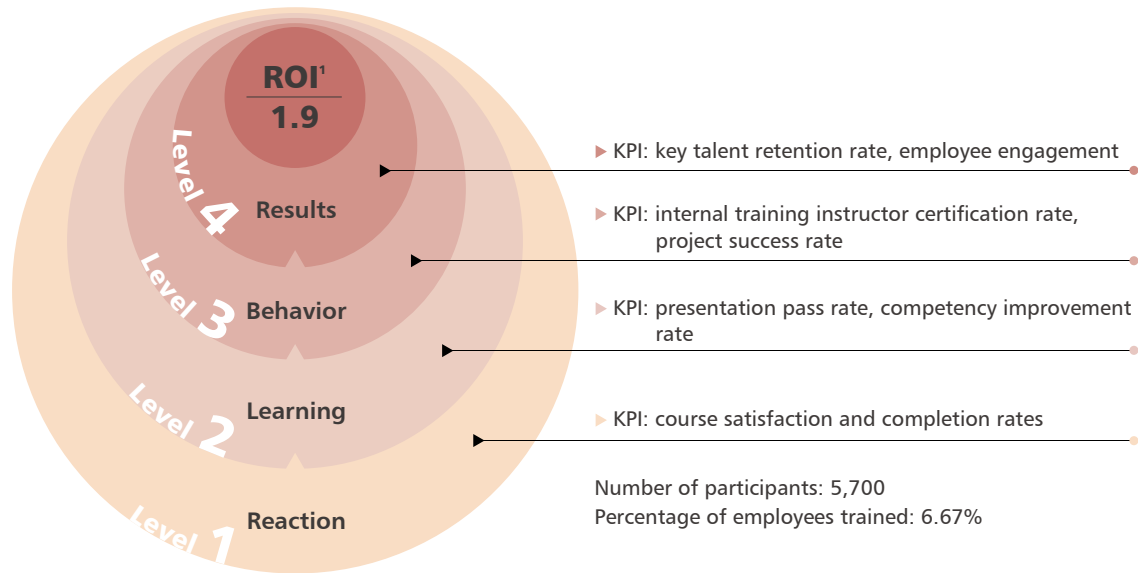|	Taiwan	China	Rest of Asia
	Americas	Total	
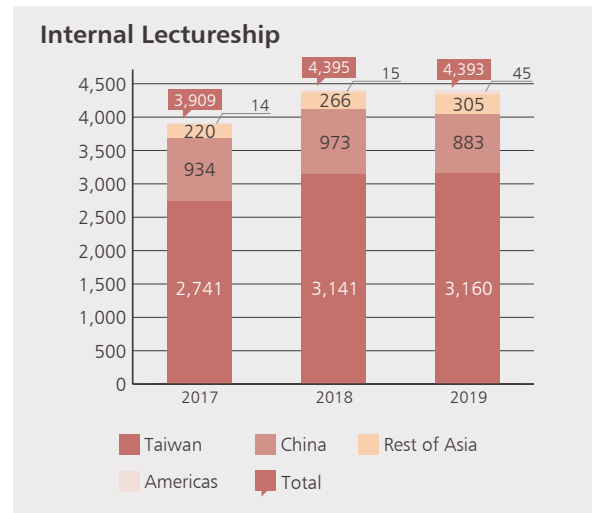
The Kirkpatrick Model for the Evaluation of Training Effectiveness

The Corporate Sustainability Committee's Employee Care and Development Taskforce conducts annual review of performance indicators at each facility and explores improvement measures for employee training and development with each site's HR department. To improve ASEH's overall competitiveness, we have established the Employee Development Dashboard since 2015, and applied the Kirkpatrick Model to assess training effectiveness:

1. Reaction evaluation - to assess course quality; the indicator for this level is the course satisfaction survey score.
2. Learning evaluation - to assess the employee development model; the indicator for this level is the status of the training system.
3. Behavior evaluation - to assess employees' application of what they have learned; the indicator for this level is the competency improvement rate.
4. Results evaluation - to assess the contributions of trained employees to the organization; the indicators for this level are employee engagement and the retention rate of key talent.

Leadership Training Program

ROI[1]
1.9

Level 4 — Results
- ▶ KPI: key talent retention rate, employee engagement

Level 3 — Behavior
- ▶ KPI: internal training instructor certification rate, project success rate
- ▶ KPI: presentation pass rate, competency improvement rate

Level 2 — Learning
- ▶ KPI: course satisfaction and completion rates

Level 1 — Reaction

Number of participants: 5,700
Percentage of employees trained: 6.67%

Key focus:

Self-improvement, leadership and motivation skills.

Scope:

Basic management skills such as goal-setting, planning, execution and control. Participants learn about empowerment and motivation skills, how to master effective communication with their superiors, colleagues, and subordinates, manage productive inter-department relations, and build high-performance teams. Through mentoring and nurturing their subordinates, managers learn to hone their leadership skills.

Target groups:

Facility directors/managers and deputy managers/supervisors Impact and benefits: Employees at the manager/deputy manager level are able to apply their management training to build performing teams and leadership skills, manage projects effectively and subsequently, improve overall operational efficiency.

Training Courses in Smart Manufacturing

ROI
2.3

Level 4 — Results
- ▶ KPI: key talent retention rate, employee engagement

Level 3 — Behavior
- ▶ KPI: internal training instructor certification rate, project success rate
- ▶ KPI: presentation pass rate, competency improvement rate

Level 2 — Learning
- ▶ KPI: course satisfaction and completion rates

Level 1 — Reaction

Number of participants: 28,000
Percentage of employees trained: 32.42%

Key focus:

Smart manufacturing is driving the integration of cyber-physical manufacturing infrastructure. IC assembly manufacturing consists of several hundred steps, and the implementation of internet-connected machines is one of the many enablers of smart manufacturing.

Scope:

Interdisciplinary applications involving mechanical engineering, electrical engineering, automatic control, Python, and neural networks and algorithms. Participants learn to apply their knowledge to automatic virtual metrology systems, predictive maintenance systems and intelligent yield management systems. Participants also learn how to utilize AI-powered and big data-driven management to enhance production information data, strengthen cybersecurity for product safety and sensitive machinery data information.

Target groups:

R&D engineers, process engineers, equipment engineers Business impact and benefits: Development of improved automated manufacturing equipment, material handling systems and automated migration models for enhanced manufacturing efficiency and capacity utilization; algorithms to identify significant parameters for yield improvements to greatly reduce product testing time, achieve product inspection goals, and improve product quality and customer satisfaction.

[1] Human capital benefits generated for each dollar invested in employee development.

Training Courses in Manufacturing

ROI
1.4

Level 4 — **Results**
Level 3 — **Behavior**
Level 2 — **Learning**
Level 1 — **Reaction**

▸ KPI: key talent retention rate, employee engagement

▸ KPI: internal training instructor certification rate, project success rate

▸ KPI: presentation pass rate, competency improvement rate

▸ KPI: course satisfaction and completion rates

Number of participants: 4,300
Percentage of employees trained: 5%

Key focus:
Establish standard operating procedures and utilize operational analysis to manage production issues.

Scope:
Training includes key areas in production planning, control and improvement of manufacturing processes, and TWI: job instruction (JI), job methods (JM), and job relations (JR). The training enables supervisors to provide localized training to production staff by deconstructing and improving workflow, as well as fostering positive interaction with employees.

Target groups:
Frontline managers (team leaders or management trainees)

Business impact and benefits:
Quality control training helps frontline managers deconstruct, analyze and optimize tasks, so as to establish standard operating procedures and reduce waste and rejected products. The training also helps in the prevention of accidents, hazards, and equipment damage, leading to improved work quality, product yields and higher employee retention rates.

Assessment Indicators of Employee Training Effectiveness

ROI

Level 4 — **Results**
Level 3 — **Behavior**
Level 2 — **Learning**
Level 1 — **Reaction**

▸ KPI: Key Talent Retention Rate 2019: 91.85%, 2018: 91.82%, 2017: 91.62%

▸ KPI: Internal Certified Trainer (unit: person) 2019: 4,393, 2018: 4,395, 2017: 3,909

▸ KPI: Training System Establishment Rate 2019: 92%, 2018: 84%, 2017: 80%

▸ KPI: Score of Course Satisfaction Survey 2019: 92%, 2018: 91%, 2017: 92%
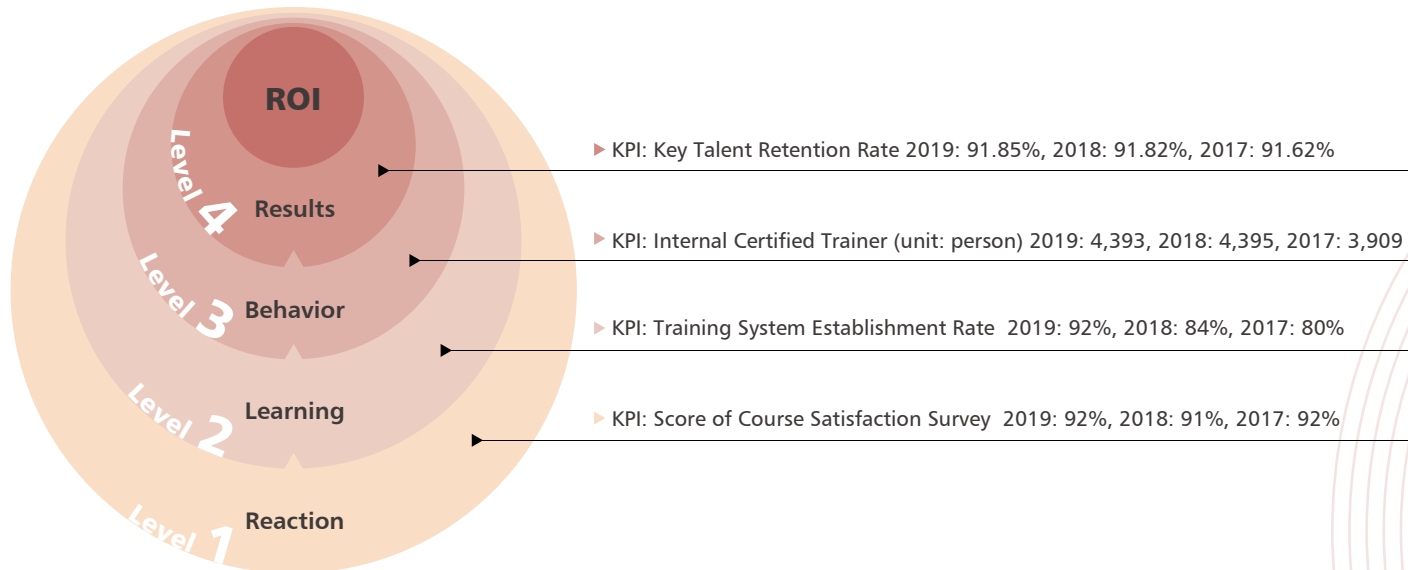
6.4 Occupational Health and Safety

ASEH is committed to providing employees a safe, healthy and conducive work environment, and at the same time, ensuring the safety of contractors and visitors at our premises. We have formulated a set of occupational health and safety (OHS) management standards to effectively prevent occupational disasters and protect workers' health and safety. The key focus of ASEH's OHS management includes OHS management systems and health promotion.

OHS Management System

All ASEH facilities worldwide have established management organizations and formulated management methods and procedures that are in compliance with ISO 45001 (Occupational Health and Safety Management Systems), OHSAS 18001 (Occupational Health and Safety Management Systems), the RBA Code of Conduct, and local regulations. In addition, regular review procedures were set up to effectively prevent accidents so as to achieve the "zero accidents" management objective. ASEH's global facilities conduct regular checks on occupational health and safety management systems and obtain relevant certifications[1]. Such actions facilitate the effective tackling of long-term problems that impact employee health, absenteeism and accidents. Our facilities are also in the process to transition to the new ISO 45001 standard.

ASE's global facilities observe occupational safety, emergency response, work injury and occupational disease prevention, industrial hygiene, physical labor work, machinery protection, public health and accommodation, health and safety information covered under the compliant with local health and safety regulations. On an annual basis, we assess and identify risks for all new or modified manufacturing processes ascertain risks and establish control procedures where needed.

We have identified operating environments in our facilities in which ionizing radiation, noise, hazardous chemical substances, dust, etc. create greater risk. Personnel working in such environments are provided with especially thorough regular physical checkups as well as high-quality protective equipment. Measures are also taken to protect and monitor the health of personnel in these environments while ensuring the privacy of their health information. In case of immediate danger at our facilities (e.g., a fire, earthquake, gas leak, chemical leak, or other emergency), employees may stop work, when doing so does not pose a safety threat to other employees or themselves, and immediately proceed to the designated evacuation area and report to their managers.

OHS Management Aspects

OHS Management Processes

Safety Requirement

Develop OHS management systems in compliance with ISO 45001, OHSAS 18001, RBA Code of Conduct, and local laws and regulations.

Risk Assessment

Develop hazard identification and risk assessment management procedure handbook, implement annual facility safety risk identification regularly, and propose high risk factor improvement measures to reduce it down to low risk. The risk rating determined is based on severity, probability of occurrence and exposure ratio.

Validation

Develop occupational health and safety management inspection regulation and procedure handbook for facility security personnel to follow and inspect facility operations and fire-fighting equipment on a regular basis. Coordinate safety and disaster prevention drills with local government's fire-fighting and disaster prevention units.

Improvement

Organize occupational health and safety education and training in worker' local mother tongue and post and promote health and safety related information in conspicuous workplace areas.

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[1] ISO 45001 certification: ASE Kaohsiung, SPIL Taiwan, USI Taiwan, Zhangjiang, Shenzhen, Kunshan
OHSAS 18001 certification : ASE Chungli, Shanghai_A&T, Shanghai_Material, Kunshan,Suzhou, Weihai, Wuxi, Korea, Singapore, SPIL Suzhou, and USI Mexico

Occupational Injury Management and Preventive Measures

Established procedures for the management of occupational hazards and incident reporting and investigation, are in place at all ASEH facilities worldwide. In the event of an occupational injury, the incident should be managed according to company policies and local regulatory guidelines, and reported to the respective local authority within the stipulated timeline. Injury incidents and preventive measures are reviewed each quarter to move our facilities closer to our goal of zero injuries. There were no deaths due to occupational injury at ASEH facilities in 2019. The year's total number of occupational injuries was 156, the occupational injury rate was 0.165, the lost day rate was 2.502, the occupational disease rate was 0.001, the disabling injury frequency rate[1] was 0.829, and the disabling injury severity rate[2] was 11.486. For more information, please refer to the Statistical Information on Occupational Safety and Health of worker in the appendix.

[1] Disabling injury frequency rate= Disabling injury cases × 1,000,000 / Total actual working hours
[2] Disabling Injury Severity Rate (S.R.) = Disabling injury work loss days × 1,000,000 / Total actual working hours
[3] IR = Total # of injuries / Total hours worked x 200,000, excluding traffic accidents
[4] LDR = Total # of lost days / Total hours worked x 200,000
[5] ODR = Total # of occupational diseases cases / Total hours worked x 200,000

Occupational Injury Statistics

	2017	2018	2019
No. Of Occupational Injury Accidents	73	111	156
Injury Rate[3]	0.098	0.128	0.165
Lost Day Rate[4]	2.163	2.470	2.502
Occupational Disease Rate[5]	0	0	0.001
Injury Frequency Rate	0.496	0.640	0.829
Injury Severity Rate	9.243	11.376	11.486

Occupational Injury/Diseases Improvement

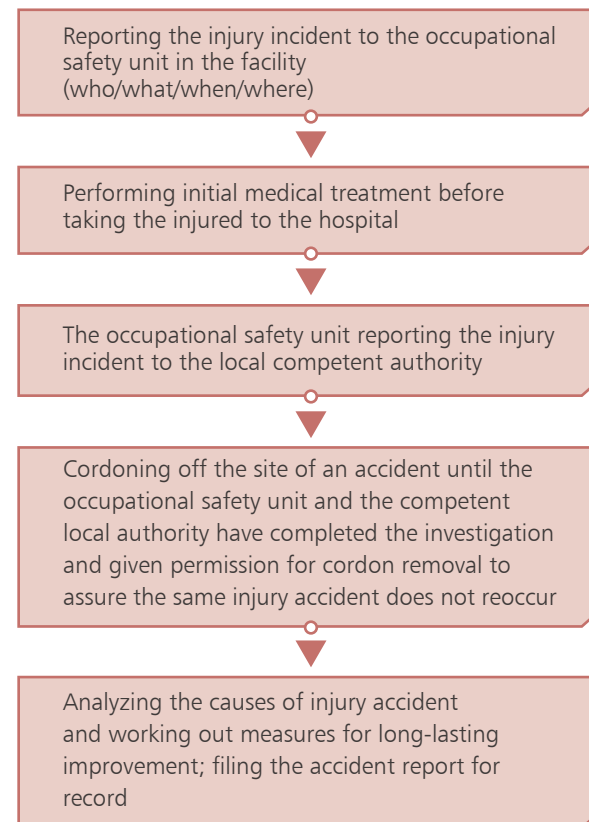| Type of occupational injury	No. of incidents		Main causes of the injury	Improvement plans
	Employees	Contractors		
Physical injuries	138	4	Improper use of dicing instruments, eg. exerting heavy pressure resulting in displaced blades, not wearing cut resistant gloves	Conduct factory-wide safety campaign, provide cut resistant gloves to all employees handling dicing instruments/equipment. Replace manual handling with safe dicing equipment (embedded into the machinery).
Chemical injuries	4	2	During chemical spraying by a contractor, a worker was accidentally splashed and sustained facial burns.	Beef up training on the chemical feeding process and the wearing of protective equipment. Improve and optimize the working conditions for chemical spraying.
Ergonomic injuries	14	0	Poor posture while moving items resulting in muscle strain.	Promote information on proper techniques for transporting items safely and avoiding over-exertion. Retrofit the temporary storage area for better movement of goods.
Occupational diseases	1	0	Finger tendinitis	Due to a temporary increase in workload, the individual suffered from finger tendinitis, which is deemed an occupational disease under Mexican labor law. We monitored the employee's health situation and found no sign of relapse after a 36-day leave. ASEH shall monitor and evaluate the physiological and psychological effects of extra workloads on its employees and make appropriate arrangements for job rotation to prevent similar cases from happening in the future.

Note: Occupational injury also includes biological injuries and psychological injuries. ASEH did not detect any incidents in these two categories in 2019.

Occupational Injury Incident Handling and Reporting System

ASEH facilities have established occupational accident and incident reporting and investigation procedures and management procedures. When an occupational injury incident occurs, the standard handling procedure is carried out and the incident is reported to the competent local authority according to management regulations and local laws and regulations. Injury incidents and improvement of preventive measures are reviewed each quarter to ensure the plant is moving forward to the goal of zero injuries.

Occupational Injury Incident Reporting Procedures

Reporting the injury incident to the occupational safety unit in the facility
(who/what/when/where)

▼

Performing initial medical treatment before taking the injured to the hospital

▼

The occupational safety unit reporting the injury incident to the local competent authority

▼

Cordoning off the site of an accident until the occupational safety unit and the competent local authority have completed the investigation and given permission for cordon removal to assure the same injury accident does not reoccur

▼

Analyzing the causes of injury accident and working out measures for long-lasting improvement; filing the accident report for record

Contractor Operation Safety Management

ASEH facilities have established contractor management plans to assure safety management mechanisms can be carried out when contractors work inside the facilities and the goal of zero occupational injuries for contractors can be achieved. There are eight types of operations entailing high risks in ASEH facilities, including pipeline, hot work, confined space, live-line work, cranes operation, elevated operation, chemical filling work and working on the roof. Guidelines for high-risk operations have been instituted to serve as the basis for construction control. ASEH will continue to request contractors for high-risk operations to present proof that they meet the requirements specified in OHSAS 18001 and ISO 45001.

Contractors in-plant Construction Procedures

Contractors presenting operation safety management proposals

▼

Training personnel who enter the plant and informing them of likely hazards

▼

Performing periodic patrol inspection according to the safety checklists for before, during and after construction

▼

Filing the project closure report for record
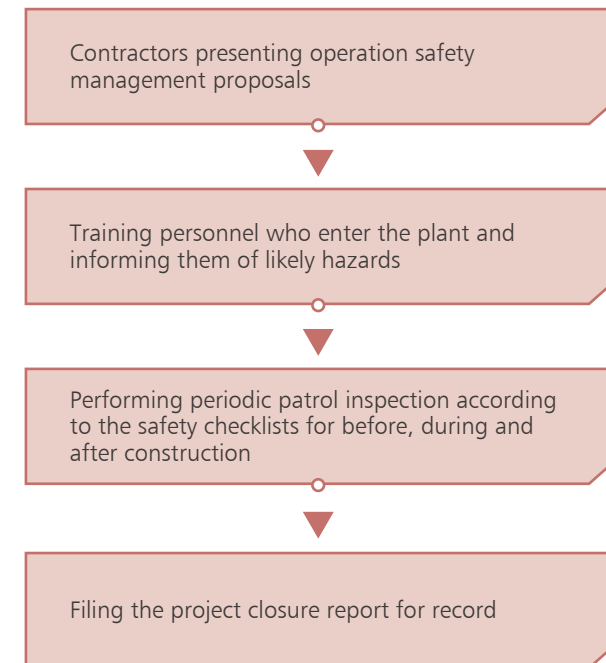
Disaster Response and Emergency Drills

All of our manufacturing facilities develop disaster response and recovery plan and conduct full-scale emergency drills annually in cooperation with the local authorities. Various scenarios are simulated at these drills to improve our disaster response plans. In 2019, we completed 400 drills for earthquakes, fire and chemical disasters. ASEH Chungli Facility apply outstanding fire safety management award in the Workplace.

Outstanding Fire Safety Management in the Workplace

The ASE Chungli Facility was awarded the exemplary workplace for outstanding fire safety management in recognition of its high standards in public fire safety and the establishment of a comprehensive fire safety system based on the American National Fire Protection Association (NFPA) code (the NFPA standards are stricter than Taiwan's regulations). High-tech industries generally use an array of complex equipment and raw materials. To ensure the safety of personnel at our facilities, all disaster- and earthquake-resistant designs are required to follow the relevant standards and regulations, and are subject to annual building inspections and fire safety equipment maintenance by professional consultants/technicians. In 2019, ASEH completed the following fire safety applications online:

① Online fire safety management system

② Electronic workflow management system for fire safety self-management and weekly inspections

③ Electronic workflow management system for drilling operations

Emergency Response to the Novel Coronavirus Disease (COVID-19)

Stringent health control measures were implemented at all ASEH facilities (including employee dormitories), and epidemic preparedness through effective communication and early preventive measures help to mitigate the impacts from the disease.

In compliance with local health regulations and SOPs for epidemic preparedness, we have established an epidemic preparedness task force to curb the spread of COVID-19. The preparedness program include conducting mock scenarios and, activating emergency response and support coordination, to protect our employees, suppliers and customers. The three major aspects of our epidemic preparedness and response plan are as follows:

① Emergency response plan:

○ Compulsory mask-wearing, temperature checks, and hand sanitization at all facilities

○ Employees, suppliers, and customers are required to fill out a health declaration form with their travel history for ASEH to carry out risk management.

○ Provide stable internet connections for remote video conferencing so as to reduce the need for business travel.

○ Mandatory card access for personnel movement around the facility, and the use of data analytics for contact tracing purposes.

② Prevention of infection and transmission:

○ Personnel with fever or other flu symptoms are prohibited from entering the facilities and should self-isolate at home.

○ Employee cafeteria are retrofitted with individually partitioned dining tables.

○ Employees of the same department are separated into groups and work in different areas.

③ Additional support for employees to mitigate impact:

○ Room rate subsidies for employees and their family members undergoing quarantine at designated hotels.

○ Purchase and/or manufacture protective equipment including masks to be distributed for employee use.

ASEH Facial Mask Factory - Sustainable action to protect our employees

In the wake of the COVID-19 pandemic, ASEH has been actively responding to the crisis through the development of a pandemic preparedness framework. Internally, we have established special taskforces at our facilities worldwide and developed an advanced data management system powered by AI.

The use of facial masks plays a key role in mitigating the spread of Covid-19 and has hence been strongly recommended or mandated worldwide by governments and public health authorities. In Taiwan, the use of surgical masks was made mandatory from the very beginning of the coronavirus epidemic and has been proven to be effective in curbing the transmission rates. All our employees are required to wear masks at work, and encouraged to wear one in public places. The strong demand for masks has led to initial shortages, causing a lot of anxiety to our employees and their families.

To protect the health of our employees, ASEH is investing approximately US$0.3 million into the production of high-quality surgical masks by setting up a production line at ASE Kaohsiung. A class 100K clean room that is capable of producing 6,000 surgical masks per hour has been established, and an application was made to acquire a medical device permit from Taiwan's Ministry of Health and Welfare. The surgical masks shall be provided free of charge to ASEH employees in Taiwan, allowing us to provide a safe and comfortable workplace for employees in the midst of the pandemic. Production of surgical masks will remain in ASEH's business operations, as part of the company's holistic approach to strengthen pandemic preparedness and protect our employees from COVID-19 and other dangerous infectious diseases.

Health Promotion

The healthy workplace development principles proposed by the World Health Organization (WHO) stipulate that a healthy workplace must account for the following aspects; "Physical Work Environment," "Psychosocial Work Environment," "Personal Health Resources," and "Enterprise Community Involvement". Moreover, it must strive for continuous improvement by implementing processes of integration, needs assessment, prioritization, planning, execution, evaluation, and improvement. ASEH provides our employees with various medical, health and psychological counseling services, formulates employee health management measures based on the concept of preventive healthcare, emergency infectious disease response procedures, emergency rescue procedures and maternal health. The company identified employees with high health risks and offered them health improvement plans as well as inviting them to participate in health improvement activities.

Key achievements from the healthy workplace promotion in 2019:

Aspects	Key activities	Key achievements
Workplace physiological health	• Ergonomic assessment of workplace environments • Root cause assessment of occupational injuries	• Onsite assessment by ergonomics specialists on the workplace environment of approximately 450 employees • Approximately 235 employees attended courses on ergonomics-related hazards, increasing employee awareness to 98%
Workplace psychosocial health	• Follow through on reports of workplace bullying • Training on health and safety topics • Talks on occupational health and spiritual well-being	• Setting up of an independent counselling center to provide professional counselling to employees • Provided occupational safety and health training to approximately 156,000 employees, accumulating a total of approximately 282,000 training hours • Organized 44 talks for approximately 2,900 employees
Personal health resources	• Regular health screening for general employees and special health screening for employees working in higher-risk environments • Family medical clinics	• Invested approximately US$3 million for the health screening of more than 82,400 employees. • Lifestyle and wellness consultation (eg. quitting smoking, weight loss and psychological); approximately 472 employees participated in weight loss programs and lost a combined total of approximately 485 kg; a total of 41 employees participated in smoking cessation programs.
Community involvement	• Community-based medical and healthcare services • Promotion of community sporting events	• Smart mobile clinic offering medical and healthcare services in rural areas • Long-term care and community event/educational programs for senior citizens

RESPONSIBLE PROCUREMENT

ASEH is committed to partnering with our suppliers to ensure that working conditions in ASEH's supply chain are safe, their workers are treated with respect and dignity, and that business operations are environmentally responsible and conducted ethically.

The supply chain is a critical extension of the ASEH value chain. We are actively involved in the sustainable development of our supply chain to ensure that our tier-1 suppliers and contractors provide high-quality products and services to ASEH in a sustainable, ethical and responsible fashion.

Key Performance

115
Supplier Sustainability Audit

58%
Percentage of Non-tier 1 Suppliers' included for Management (by total procurement amount)
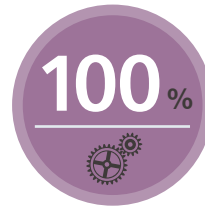
100%
Conflict Minerals Compliant Supplier Ratio
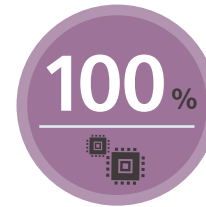
100%
DRC Conflict-Free Products

500↑
Supplier Conflict Minerals Survey

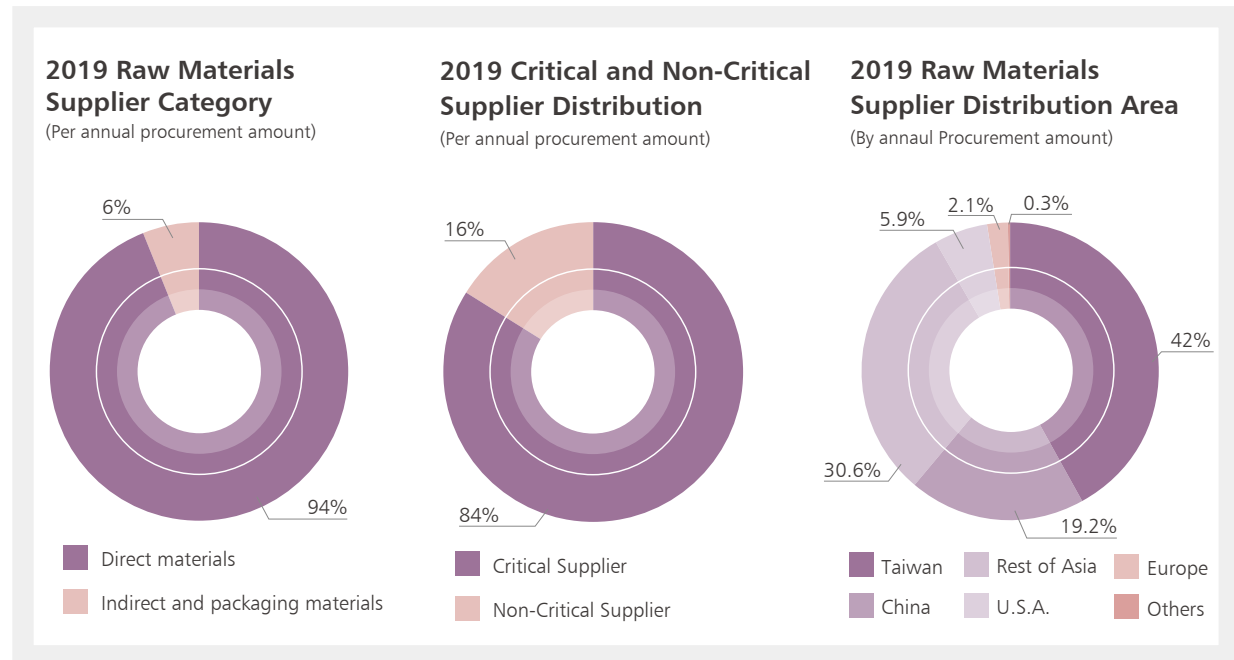| SDGs	Business Actions	2019 Material Aspects	KPI	2019 Target	Status	2019 Performance	2020 Target	2025 Target
4 QUALITY EDUCATION / **8** DECENT WORK AND ECONOMIC GROWTH	Ensure that all employees across the business and supply chain earn a wages that allows them to support the education of their dependents and ensure that there is zero child labor.	Sustainability Supply Chain	% of DRC Conflict-Free product lines of Packaging and material services	100%	Achieved	All products lines (100%) are DRC Conflict-Free	100% of product lines are DRC Conflict-Free	100% of product lines are DRC Conflict-Free
			% of DRC Conflict-Free product lines of Electronic manufacturing services	100%	Achieved	All products lines (100%) are DRC Conflict-Free	100% of product lines are DRC Conflict-Free	100% of product lines are DRC Conflict-Free
			# of supplier sustainability audits for raw materials suppliers	100	Achieved	115 raw materials supplier sustainability audits were completed	100 raw materials suppliers sustainability audits	100 raw materials suppliers sustainability audits
			% of critical direct material suppliers completing RBA SAQ (Self-Assessment Questionnaire)	85%	Not Achieved	70% of critical direct material suppliers completed RBA SAQ	85% of critical direct material suppliers completed RBA SAQ	100% of critical direct material suppliers completed RBA SAQ
			% of purchasing amount of non-tier 1 suppliers that conduct risk assessment	65%	Achieved	79% of critical direct material suppliers of our packaging and material service that complete workers' human rights risk assessment and improvement	70% of critical direct material suppliers of our packaging and material service that complete workers' human rights risk assessment and improvement	100% of critical direct material suppliers of our packaging and material service that complete workers' human rights risk assessment and improvement
			% of purchasing amount of non-tier 1 suppliers that conduct risk assessment	45%	Achieved	Non- tier 1 suppliers conducted risk assessment with 58% of purchasing amount	Non- tier 1 suppliers conducted risk assessment with 50% of purchasing amount	Non- tier 1 suppliers conducted risk assessment with over 50% of purchasing amount
13 CLIMATE ACTION	Substantially reduce emissions from our supply chain and our operations, in alignment with climate science.		% of raw material suppliers with 80% of purchasing amount obtaining Greenhouse Gas verification	60%	Not Achieved	53% of purchasing amount suppliers' obtaining Greenhouse Gas verification	70% of purchasing amount suppliers' obtaining Greenhouse Gas verification	80% of purchasing amount suppliers' obtaining Greenhouse Gas verification

7.1 Supply Chain Overview

As a global leader in semiconductor assembly and testing services as well as a key systems and core technology integrator, ASEH primarily provides assembly, testing and material (ATM) services and electronics manufacturing services (EMS). We work with thousands of suppliers globally to procure raw materials, equipment, facility/engineering services, waste management services, transport, logistics and subcontract services., and are committed to the expansion of our global footprint in Taiwan, China, Japan, South Korea, Malaysia, Singapore, the U.S.A. and Mexico.

The supply of raw materials have the most direct impact on ASEH's day-to-day operations and manufacturing. Raw material suppliers are classified into two categories according to their attributes; direct material suppliers (suppliers of materials directly related to manufacturing) and indirect/packaging material suppliers (suppliers of packaging materials or materials indirectly related to manufacturing). To ensure efficient resource allocation and management of raw material suppliers, we identify tier-1 suppliers based on their annual procurement value and maintain regular management controls with these critical suppliers [1].

To lower overall supply chain risks, ASEH has expanded the scope of sustainability risk management to non-tier-1 suppliers. There are currently over 600 non-tier-1 suppliers which accounted for 58% of our total procurement amount.

We also performed risk assessment on the geographic locations of, and type of materials supplied by non-tier-1 suppliers, from which 154 critical non-tier-1 suppliers[2] were identified. ASEH shall follow up on the risk status of these suppliers and perform further risk control.

Type of Suppliers

- Facility/engineering services
- Waste management services
- Transport and logistics
- Subcontract services
- Raw materials
- Equipment

2019 Raw Materials Supplier Category
(Per annual procurement amount)

- 6%
- 94%
- Direct materials
- Indirect and packaging materials

2019 Critical and Non-Critical Supplier Distribution
(Per annual procurement amount)

- 16%
- 84%
- Critical Supplier
- Non-Critical Supplier

2019 Raw Materials Supplier Distribution Area
(By annaul Procurement amount)

- 5.9%
- 2.1%
- 0.3%
- 42%
- 30.6%
- 19.2%
- Taiwan
- China
- Rest of Asia
- U.S.A.
- Europe
- Others

[1] The definition of critical raw material supplier as follow : (1) Top 85% of direct material purchasing amount, (2) Indirect material suppliers refer to those with a purchasing spending over 2 million USD with ATM; purchasing spending over 1 million USD with EMS, (3) Single source or non-substitutable suppliers

[2] The definition of critical non-tier 1 suppliers as follow : (1) Supply to critical tier 1 suppliers, (2) Supply to tier 1 direct materials suppliers who ASE spend over 10 million USD/year, (3) Supply to more than two tier 1 suppliers

Supporting Local Suppliers

ASEH endeavors to boost local development through its procurement efforts, and is thus working closely with local suppliers[1], and helping them develop technological capabilities. Such efforts benefit the environment by reducing carbon emissions within the supply chain, and the community by creating local job opportunities. In 2019, procurement from local suppliers accounted for approximately 40% of the total procurement amount.

2019 Raw Material Local Purchasing Spends

Legend:
- Local Purchase
- Non-Local Purchase
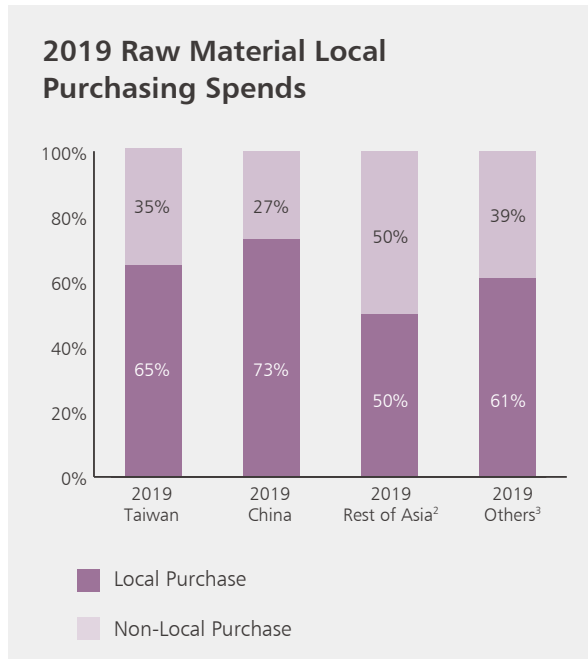
[1] Local supplier refers to the supplier's register location is located at the same country where our manufacturing facility is located
[2] Rest of Asia: Japan, Korea, Malaysia and Singapore
[3] Others: America and Mexico

7.2 Supply Chain Management Framework

Purchasing and Supply Chain Development Policy

The ASEH Purchasing and Supply Chain Development Policy is published on the company website to communicate ASEH's supplier sustainability expectations. We hope to make a positive impact on the global electronic industry supply chain and establish sustainable supply chains with its suppliers.

ASEH is also devoted to socially responsible procurement and innovation throughout the supply chain, on top of providing responsible and quality services to our customers. Please visit: http://www.aseglobal.com/en/csr_supplier_coc.html

Supplier Code of Conduct

The supply chain is a major extension of ASEH's business operations and we actively foster sustainability throughout our supply chain. ASEH's suppliers are expected to comply with our Supplier Code of Conduct which requires them to comply with local laws and regulations where they operate, and conduct business in a manner that meets labor, health and safety, environment, business ethics and management and various corporate compliance standards. The suppliers are also required to drive their suppliers to meet such standards and oversee their compliance status. Please visit: http://www.aseglobal.com/en/csr_supplier_coc.html

Supply Chain Management Strategy

Through stable partnerships with its suppliers, ASEH hopes to improve the overall supply chain resilience and implement socially responsible procurement. Supply chain sustainability is a key factor influencing our day-to-day procurement besides cost and quality, and enables our long term growth with suppliers. From an overall supply chain management perspective, and using a risk and opportunity assessment to analyses our current supply chain status, we developed various programs in recent years focusing on responsible procurement, supply chain diversification and mitigation of supply chain disruption to attain win-win collaboration with our suppliers.
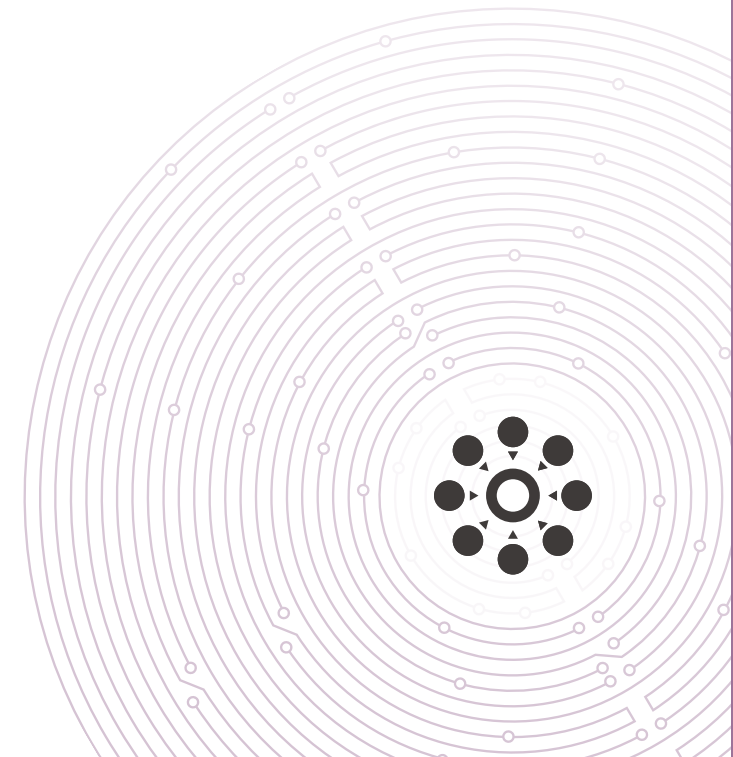
ASEH Supply Chain Management Strategy

Value Oriented
To obtain a competitive overall value in the supply chain

Strategic Cooperation
To integrate suppliers' resources and capabilities for greater innovation

Diversified Sources
To maintain at least two suppliers for the same material to ensure continuous supply

Sustainable Sourcing
To raise suppliers' economic, environmental and social performance in sustainability

Quality First
To obtain the best quality products and services from suppliers

Responsible Minerals Sourcing
To ensure that suppliers are using only responsibly sourced, conflict-free minerals in their products

Program

Target: Sourcing of Minerals from Conflict-Free Countries

Program: Conflict Minerals Management

We have identified and survey the source of smelters and minerals in the supply chain annually. According to our supplier survey, we believe that the identified SoRs used for all of our packaging and materials services products are DRC Conflict-Free . For detailed information, please refer to the "Conflict Minerals Compliance."

Target: Improve Supply Chain Coordination and Resilience

Program 1: e-Hub Supply Risk Assessment

ASE established the supplier e-Hub platform in 2010 for ASE and its suppliers to exchange real time supply chain information that helps maintain the resilience of supply chain management as well as to eliminate the bullwhip effect.

We have closely examined the following elements to improve supply chain efficiency: (1) referencing past supply chain practices, and adopting flexible supply chain management to improve resilience across the supply chain; (2) viewing supplier work-in-process (WIP) status at-a-glance, and uploading WIP information onto the shared e-Hub platform; (3) supporting material requirements planning (MRP) through business-to-business (B2B) info-sharing to accurately determine customer demand.

We have proceeded to analyze material demand and supply risks based on inventory status and customer demand. We have further conducted comprehensive analysis for material requirements, based on country of origin and customs location to support ASEH's expansion of its global footprint.

In the past two years, we have reduced inventory costs by 8.29% (approx. US$11.9 million). As of 2019, we have reduced inventory turnover to 23.4 days, 7.7 days more than projected.

Program 2: e-Hub Supplier Risk Assessment And Reporting System

At ASEH, we recognize that supply chain management has gradually shifted from the mere pursuit of cost reductions and efficiency, to strengthening supply chain resilience.

We created a supplier risk survey system to address any potential threat to the supply chain by incorporating the concept of sustainable procurement and integrating materials management, inventory and risk monitoring, as well as real-time supplier interaction onto the ASE e-Hub platform.

In addition to having a clear insight of the supplier risk system, we are better able to assess the level of supply chain disruptions and determine the recovery timeframe, so that we can make early and rapid adjustments to materials, inventory, product and customer demand and mitigate operational risks.

Going forward, we aim to expand the system's coverage by extending it to the customers' portal to provide them with a complete overview of supply chain risks. As a global leader in the semiconductor assembly and testing industry, and a systems and core technology integrator, ASEH is dedicated not only to building greater customer trust but also a more resilient and agile supply chain.

Target: Build a Circular Supply Chain

Program 1: Developing DMSO-free Alternatives

In order to reduce the environmental impact of hazardous chemicals, ASE Kaohsiung has worked jointly with its chemical suppliers to develop alternatives to Dimethyl Sulfoxide (DMSO). DMSO is a major component used in 70% of our photoresist stripping processes and is the most polar aprotic solvent. Its ingredients include sulfur, which when released during waste incineration and mixed with water, forms sulfuric acid that leads to equipment corrosion. In addition, gaseous emissions of sulfur oxides into the atmosphere react with other substances to form acid rain.

ASE Kaohsiung's engineering team and its suppliers have collaborated to develop DMSO-free alternatives that meet the needs of our manufacturing processes. The successful implementation of the DMSO-free stripper has reduced the sulfur concentration in our liquid waste to under 2%. In addition to the environmental benefits, the reduced concentration has also reduced the cost of waste treatment.

Program 2：Taking Actions Towards a Circular Economy

In 2019, ASE Kaohsiung therefore initiated a barrel reuse project which involved regulatory analysis, recycling label design, inter-departmental coordination and vendor communication, and they successfully improved the reuse rate from 20% to 80%.

They are extending the experience from this project to other areas such as packing and shock-absorbing materials. We have initiated a packing material reuse project with suppliers at the end of 2019 that focuses on three key aspects - optimizing, reusing and recycling, and is supplemented by sharing success stories and organizing circular economy conferences. Through these efforts, we hope to encourage our supply partners to take concrete actions on recycling and reuse, so as to achieve a circular supply chain.

Target: Reduce the Risk of the Supply Interruption

Program 1: Supplier Financial Risk Monitoring

To manage our suppliers' financial risk, USI's Procurement Department works closely with the Finance Department to monitor a supplier company's financial health so as to prevent any disruption resulting from the company's financial problems. Through preliminary risk analysis, suppliers with potential risks are identified and monitored. For the suppliers that are identified to be high-risk, the Procurement.

Department immediately looks for a second source supplier, and continues to monitor the high-risk suppliers' financial condition regularly every six months, to ensure effective control and to reduce the supply interruption.

Program 2: End of Life Components Active Pre-Monitoring

To prevent risk of supply interruptions due to discontinued materials, USI has carried out material procurement source controls based on product life cycles and future market trends since 2015, as well as front-end risk analyses and product exit strategies for supply materials to prevent impacts on customers due to end-of-life (EOL) supply parts. USI's procurement department, in collaboration with the R&D, manufacturing, engineering and other departments, negotiates with customers in advance about introducing alternative materials for parts that may be discontinued or not sold in the future and recommends materials for new products. The project's advance evaluations and follow-ups reduce the risk of supply chain disruptions from future product discontinuations.

7.3 Supply Chain Sustainability Management

ASEH has suppliers around the world, all of which are important partners. Beyond value creation, we also hope to be able to address labor rights and environmental protection issues by joining the Responsible Business Alliance (RBA) and actively participating in its annual conference. ASEH adopts the RBA Code of Conduct in the management of labor, environment and ethics. ASEH also applies the code to its supply chain management to ensure the provision of a safe work environment, respect for workers, environmental protection and ethical conduct. ASEH forbids the use of child labor or forced labor by its suppliers, and shall terminate its relationship with suppliers involved in serious violations although no such instances were found in 2019.

Supplier Sustainability Management Approach

As part of the ASEH Procurement and Supply Chain Development Policy and Commitment, we established a four-stage sustainability supply management process that is run repeatedly to ensure supplier compliance and enhance their sustainability performance.

Supplier Sustainability Requirement

ASEH's raw material suppliers are required to sign the "ASEH Supplier Code of Conduct Commitment Letter". The suppliers are also required to complete a sustainability risk assessment questionnaire that covers regulatory compliance, sustainable management, supplier management, conflict mineral management, environmental protection, health and safety, labor rights, human rights, etc. The purpose of the questionnaire is to assess each supplier's sustainability risk and conduct an on-site audit where necessary to ensure conformity to ASEH's supplier sustainability standards. In parallel, we encourage suppliers to seek continuous improvement by acquiring internationally recognized certifications such as ISO 9001, IATF 16949, ISO 14001, OHSAS 18001/ISO 45001 and ISO 14064-1.

Supplier Sustainability Management Approach

Sustainability Requirement ▶ **Risk Assessment** ▶ **Validation** ▶ **Improvement**

- Supplier Code of Conduct Commitment Letter
- Sustainability Risk Assessment Questionnaire

- Risk Assessment 1: Active Risk Assessment
- Risk Assessment 2: Sustainability Risk Assessment Questionnaire
- Risk Assessment 3: High-Risk Supplier Risk Assessment/Audit

- On-site/Off-site Audits
- Corrective Action Verification

- Trainings

Supplier Sustainability Risk Assessment

To assess the current status of supply chain sustainability development and risk management status, ASEH conducts an annual three-step supplier sustainability risk evaluation and analysis. This allows ASEH to identify the suppliers that exhibit potentially high social, economic, and environmental risks. Deficient suppliers will have to undergo audits and follow ASEH's corrective guidelines to ensure effective mitigation and control of risk.

Risk Assessment 1 (RA 1): Active Risk Assessment

We conduct a preliminary assessment and analysis of potential risks to suppliers based on location, procurement amount, type of product supplied and manufacturing process.

Risk Assessment 2 (RA 2): Sustainability Risk Assessment Questionnaire (SAQ)

To ensure effectiveness in the assessment and protection of small and medium suppliers, we have established various standards and requirements for critical and non-critical suppliers that help ASEH develop a more resilient and sustainable supply chain. In 2019, we conducted sustainability risk assessments on over 600 tier-1 suppliers that achieved a response rate of more than 70%.

- Critical suppliers : the implementation of a management system is a basic requirement, with the sustainability management practices and performance included as assessment criteria; or the completion of a RBA SAQ.
- Non-critical suppliers : the focus is on management system requirements.

Risk Assessment 3 (RA 3): On-site audit/RBA VAP/RBA SAQ

From the review and analysis of the questionnaire results, we were able to identify potential high-risk suppliers and take appropriate action to ascertain their risk status and reduce the risks.

- Critical suppliers : implement on-site audits or request for completion of RBA Validated Audit Process (VAP)
- Non-critical suppliers : request for completion of the RBA SAQ

Supplier Sustainability Risk Assessment Targets and Procedures

1 — **RA 1**

Active risk assessment
Targets: All suppliers

- We conduct an initial risk assessment of suppliers based on the manufacturing location, manufacturing processes, and procurement amount.

2 — **RA 2**

SAQ Targets: All tier-1 suppliers

- Critical suppliers: ASEH SAQ/RBA SAQ
- Non-critical suppliers: ASEH SAQ

3 — **RA 3**

On-site audit/ RBA VAP/ RBA SAQ
Target: High-risk suppliers

- High-risk critical suppliers: On-site audit/ RBA VAP
- High-risk non-critical suppliers: RBA SAQ

Sustainability Risk Assessment Factors

Economic

- Flexibility, Quality, Cost, Service and Technology
- Sustainability Management Policies and Organization
- Risk Management
- Business Ethics
- Information Security
- Conflict Minerals Management
- Supply Chain Management

Environmental

- Environmental Management System
- Carbon Management
- Water Management
- Waste Management

Social

- Occupational Health and Safety Management System
- Emergency Preparedness
- Labor Rights
- Labor Management System
- Human Rights
- Social Involvement

Supplier Major Sustainability Risk Factors in 2019

Category	Risk Factors	Risk Description
Economic	Risk Management and Continuous Operation Management	An emergency preparedness/improvement plan for business continuity risks has yet to be established
		An identification procedures for regulatory risks associated with continuous operation have yet to be established
	Supplier Sustainability Management	A system for sustainable supply chain management has yet to be established
Environmental	Environmental Management	An evaluation procedures for risks and impacts associated with climate change have yet to be established
		A GHG inventory mechanisms have yet to be established
		A system and targets for water use reduction in water resource and water recycling management has yet to be established
Social	Occupational Health & Safety (OHS)	A system for the identification of OHS regulations have yet to be established
	Labor Rights	An anonymous complaint mechanism has yet to be established.
		A system for the assessment of labor-related risks and impacts has yet to be established
		A mechanisms for managing employment agencies have yet to be established

Supplier Sustainability Audit Mechanism

ASEH established a supplier sustainability audit system to carry out routine and ad hoc audits on-site, through document submissions, and through appointing third-party agencies or the RBA VAP. Deficient suppliers are required to draw up corrective action plans and rectify them within a given time frame. We will then review the results of their corrective action plans, followed by another assessment on the status the following year.

In 2019, we conducted on-site audits/RBA VAP on 115 raw material suppliers, including high-risk critical suppliers. All audited suppliers completed the corrective actions within the given time frame; and after evaluation, no supplier was terminated for non-compliance.

To further reduce supply chain risks, we also conduct risk assessment questionnaires and audits for non-tier-1 suppliers. In 2019, 26% of our non-tier-1 suppliers completed sustainability questionnaires, and 4% of the non-tier-1 suppliers completed on-site audits/RBA VAP. We shall continue to perform sustainability risk assessment on non-tier 1 suppliers to better manage risks to our supply chain.

Type of Raw Material Suppliers Audits in 2019

Number
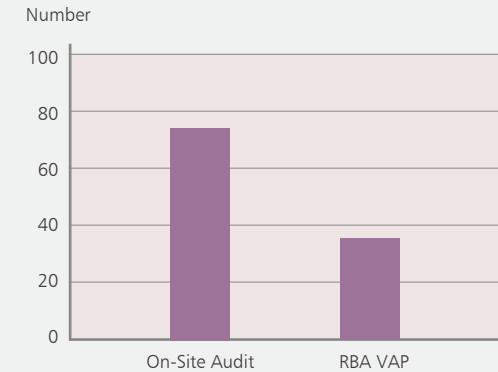
2019 Supplier Sustainability Audit Findings by Category

- 22%
- 26%
- 1%
- 9%
- 42%

- Labor
- Health and Safety
- Environmental
- Ethics
- Management System
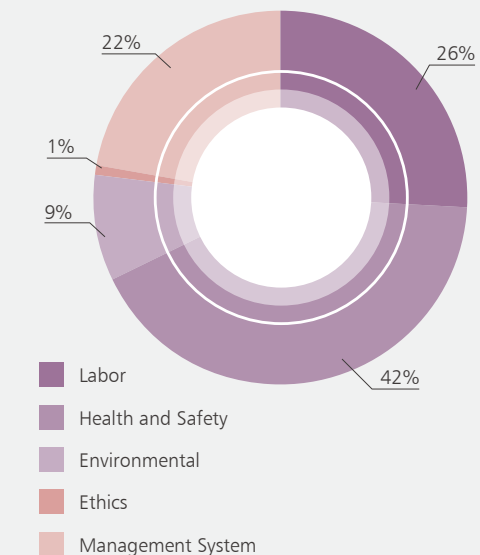
Supplier Audit Results and Corrective Actions in 2019

Category	RBA lassification	Major Nonconformance Finding	Corrective Action
Labor	Freely Chosen Employment	• Access controls in foreign employee dormitories	• As specified in our Recruitment Contract and Regulations for Dormitory Management, foreign employee dormitories allow 24-hour access.
	Wages and Benefits	• Deductions from wages as a disciplinary measure	• Stipulations in company regulations forbidding the use of wage deductions as a disciplinary measure
	Working Hours	• Working hours exceeding 60 hours a week • Working seven days consecutively	• Recruiting enough employees in accordance with production needs to prevent excessive overtime work from manpower shortages • To establish an overtime request system to achieve real-time management of employee working hours • Establishing regulations and tracking mechanisms to assure workers have one day off every seven days and implementing overtime work controls
Health and Safety	Emergency Preparedness	• Obstruction of fire safety equipment and emergency exits • Unclear escape routes and lack of information on signage	• Regular inspections to ensure effective fire safety equipment and unobstructed egress • Regular review and revision of emergency evacuation plans in facilities • To increase the number of night-shift workers and the frequency of fire safety drills in employee dormitories.
	Occupational Safety	• Employees not equipped with proper protective equipment in hazardous working environments	• Enhancing training and management mechanisms to improve employees' safety awareness
	Occupational Injury and Illness	• Lack of first aid kit inspection	• To establish spot check frequency and inspection form
Environmental	Hazardous Substances	• Insufficient classification and management of hazardous substances	• Regular inspections to ensure proper classification and storage of hazardous substances
Ethics	Responsible Sourcing of Minerals	• Lack of public disclosure of corporate management policies	• To publicly disclose its management policy regarding the sourcing of conflict minerals.
Management System	Supplier Responsibility	• Supplier risk assessment and auditing procedures not established • Continuous working days in excess of seven days for supplier employees	• To identify its major suppliers and establish a risk assessment process and audit system • To require its suppliers to establish a system to manage employee working hours
	Communication	• Lack of communication of work notices and the content of labor-management meetings to foreign employees in clear, understandable terms	• To adopt procedures to communicate information to employees clearly

Sustainable Supply Chain Development Program

ASEH continues to support its suppliers by providing education and training, organizing seminars, forums and counseling sessions. These efforts help ASEH stay responsive to an ever changing business landscape and to foster sustainability values throughout the supply chain.

Supply Chain Greenhouse Gas Inventory Guidance Program

To counter impacts and risks arising from climate change, ASEH has invested significant resources to assist suppliers in establishing greenhouse gas management systems that are compliant with regulatory requirements. We commissioned a consulting company in Taiwan to launch a two-year (2018-2019) Supplier Guidance Project for the Implementation of ISO 14064-1 Greenhouse Gas Inventory Social Return on Investment (SROI). As of the end of 2019, we have provided on-site support for over 20 suppliers in ensuring ISO 14064-1 compliance for their greenhouse gas management systems. The project has allowed them to control their greenhouse gas emissions, acquire external verification for ISO 14064-1 compliance, develop capacity for supply chain carbon disclosure, and increase their level of competitiveness.

We have adopted the social return on investment (SROI[1]) analysis in 2018 to monetize the social influence of our supplier guidance project. We seek to understand, from a stakeholder's perspective, the changes in suppliers and participants before and after implementing the project. Last year, we submitted the project to Social Value International for certification and published the project report.

1 Social return on investment (SROI) is a method for measuring social, environmental, and economic values created by corporations in CSR activities. The concept is to identify the cost-and-effect relationship between the resources invested and the values created, ie, the social value created with every dollar invested. Externally, this information allows stakeholders to understand clearly the level of contribution of an enterprise to society. Internally, it helps the enterprise understand whether the projects implemented have achieved the expected results. The experience can be used to modify subsequent projects and maximize the influence of investment.

Risk of Foreign Forced/Bonded Labor in Supply Chain Corrective Action Project

ASEH is committed to the protection of the dignity and the rights of workers. In 2018, we collaborated with suppliers to review and conduct due diligence on the hiring process of foreign workers, and explore ways to improve the process. The aim is to eliminate any practice of forced or indentured labor, and to make up for the inadequacy in local labor law protection and/or complex hiring procedures within our supply chain.

Supplier Sustainability Education and Trainin

ASEH continues to invest resources enhance the sustainability performance of its supply chain risks. We have organized various sustainability education and training, and conducted guidance outreach at multiple facilities to communicate our supply chain management requirements. In 2019, we conducted 7 seminars/consulting globally, with 575 people attendees from more than 350 suppliers attended.

ASE - Sustainability Seminar	USI - Sustainability Seminar	SPIL - Supplier Day
○ We organized 3 supplier sustainability seminars at our facilities in Chungli, Shanghai and Suzhou. A total of 68 people from 26 suppliers attended the seminar ○ Through the seminars, we strengthened suppliers' sustainability management through the communication of ASEH's supply chain sustainability management standards and RBA requirements, as well as our boundaries on regulating conflict minerals	○ We organized 3 supplier sustainability seminars in Taiwan, Shanghai and Shenzhen. A total of 222 people from 179 suppliers participated in the seminars ○ We discussed the USI Administrative Strategies for Sustainable Development Goals, the implementation of the RBA Code of Conduct and VAP, conflict minerals management and the latest updates to international environmental regulations (e.g., RoHS and REACH) and regulatory trends. This ensures that suppliers understand USI's sustainability management requirements and helps them gain a deeper insight into USI's sustainable development policies and system	○ We organized a Supplier Day in Taiwan. A total of 285 people from 151 suppliers participated in the seminars ○ At our annual Suppliers Day, besides the sharing of developing trends in the semiconductor assembly and testing industry to our suppliers, we have also included an overview of ASEH member company, SPIL's sustainable procurement requirements. In recognition and appreciation of our suppliers for their outstanding contributions, we have also presented them with our annual supplier awards

ASE Supplier Sustainability Awards[1]

ASE is a socially responsible company that is fully committed to building a more sustainable supply chain. In 2017, the company established the supplier sustainability award to recognize outstanding sustainability performance among its suppliers. Last year, we evaluated a group of suppliers who have worked closely with ASE on sustainability over the past three years, and narrowed the list to 9 suppliers for the prestigious. Three suppliers receive the 'Sustainability Excellence Award' and six for 'Sustainability Partnership Award'. We presented three of them with the Sustainability Excellence Award, and six with the Sustainability Partnership Award. Recognizing the efforts of our suppliers in sustainability through the awards will encourage them to increase their commitment to sustainable corporate development and encourage more suppliers to be proactive in advancing a sustainable future for the semiconductor industry. Going forward, we plan to establish a corporate level ASEH supplier sustainability award program by combining the resources of all the three subsidiary companies.

[1] Due to the preventive measures in place for COVID-19, ASE cancelled the 2019 Best Supplier Award ceremony but continued to publicly recognize the outstanding suppliers by issuing a press release and announcing the winners on social media.

7.4 Conflict Minerals Compliance

To communicate ASEH's conflict minerals management requirements, the ASE Technology Holding Co., Ltd. Corporate Policy for Sourcing Conflict Minerals is posted on our company website, please visit: http://www.aseglobal.com/en/csr_conflict_minerals_compliance.html

Conflict Minerals Compliance

To prevent the unintentional use of any conflict mineral such as tantalum, tin, tungsten and gold (3TG for short) from the Democratic Republic of the Congo and its neighboring countries, we have established the ASEH Conflict Minerals Policy, joined the Responsible Minerals Initiative (RMI)[2], and participated in the group's effort to use the RMI Conflict Minerals Reporting Template (CMRT) and Due Diligence (DD) to resolve conflict minerals issues in the supply chain and support responsible sourcing.

Conflict Minerals Management Approach

Conflict Minerals Requirements	Reasonable Country of Origin Inquiry (RCOI)	Due Diligence (DD)	Independent Private-Sector Audit (IPSA)	Public Disclosure (CM Report)
Comply with ASEH Conflict Mineral Policy	Conflict Minerals Reporting Template (CMRT)	Comply with the OECD Guidance	Conduct IPSA	Public Conflict Minerals Report on company website
	Conflict Minerals Representation Letters			
	On-site/paper audit			

Conflict Mineral Requirement

ASEH communicates conflict mineral policies to our suppliers through our website. The suppliers are required to comply with ASEH conflict minerals policy and establish their own conflict minerals policies and to their own suppliers. We also require our suppliers to actively assess and validate their supply chain, and encourage them to source minerals from Smelters or Refiners (SoRs) that have received "conflict-free" designations by the Responsible Minerals Assurance Process (RMAP), or other independent third party audit program.

[2] ASE took the initiative to join the RMI in 2015 and has continued its participation as ASEH to this day.

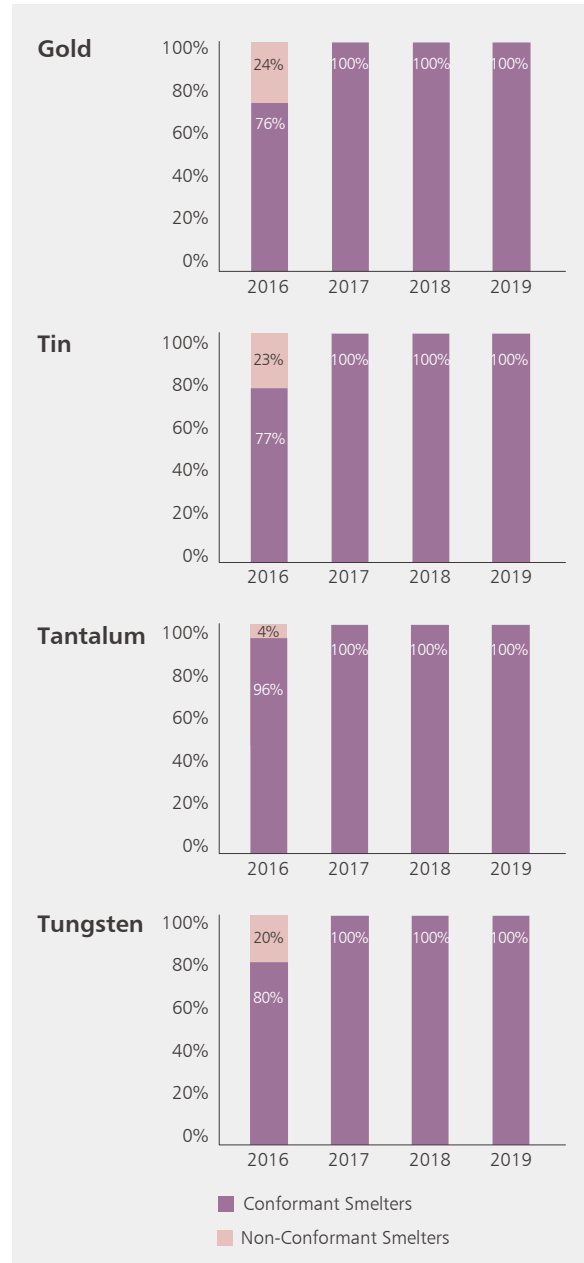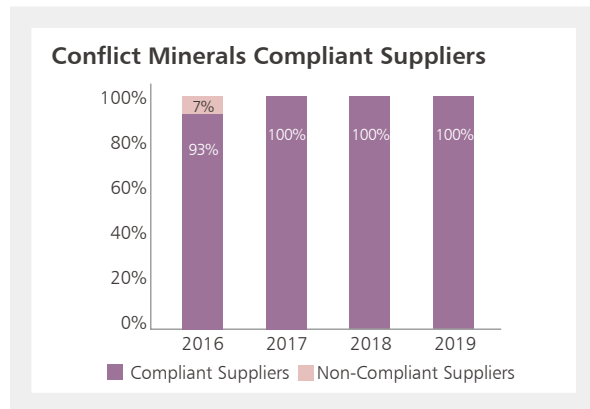## Reasonable Country of Origin Inquiry (RCOI)

Each year, ASEH performs RCOI to identify and validate the sources of 3TG in our packaging and material services and electronic manufacturing services and products, and whether they come from conflict-affected regions.

Our RCOI includes two steps:
1. Identify sources of 3TG SoRs through CMRT by conducting supplier survey.
2. Suppliers are asked to sign the Representation Letters of compliance with ASEH Conflict Minerals Policy and to fully reveal the source of the SoRs they sourced from.

Since 2011[1], we have conducted the supply chain survey to identify the source of SoRs that are used in the processes of our packaging and material services, electronic manufacturing services and products. We identified the minerals and the source of smelters through CMRT. In addition to 3TG, we have conducted proactively the supply chain survey for Cobalt since 2018, and disclosed the source of Cobalt smelters to our customers.

In 2019, we have extended the scope of 3TG supplier survey and identified 271 SoRs from more than 500 suppliers. According to the supplier survey we conducted in 2019, 100% of our suppliers are compliant with ASEH's requirement for sourcing DRC conflict-Free minerals.

Conflict Minerals Compliant Suppliers

Legend:
- Compliant Suppliers
- Non-Compliant Suppliers

Gold / Tin / Tantalum / Tungsten charts

- Conformant Smelters
- Non-Conformant Smelters

Due Diligence (DD)

ASEH designed its DD measures to conform to the Organization for Economic Co-operation and Development Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas (the "OECD Guidance") and we also adopted the OECD Guidance to not only identify/assess supplier risks and mitigate these identified risks, but also to design a conflict minerals audit form for ASEH's suppliers. We were therefore able to provide guidance through both on-site/off-site audits to help suppliers set up management mechanisms that complied with OECD Guidance.

Independent Private Sector Audit (IPSA) and Public Disclosure

We undertake an IPSA[2] on our Conflict Minerals Report and DD procedure to ensure they are in compliance with the requirements set forth by the U.S. Securities and Exchange Commission (SEC). Each year, the Conflict Minerals Report is also disclosed publicly. Based on our RCOI analysis and DD measures in 2019, we reasonably believe that the identified SoRs used for all of our packaging and materials services products are DRC Conflict-Free. Given the large number of suppliers for our electronic manufacturing services, we developed a sampling program to select material suppliers for the purpose of identifying SoRs. We believe that our due diligence performed based on the sampling program is sufficient and appropriate to provide a reasonable basis for our determination. Therefore, we reasonably believe that such SoRs used for all of our electronic manufacturing services products are DRC Conflict-Free.

ASEH SEC Conflict Minerals Filing

We disclose the Conflict Minerals report on our company website annually. For complete file of ASEH SEC Conflict Minerals Filing, please visit: http://www.aseglobal.com/en/csr_conflict_minerals_compliance.html

1 Since 2011, ASE and USI have performed annual investigations on the smelters' sources of 3TG necessary to the manufacturing processes or products of the assembly and material manufacturing services and electronics manufacturing services. The CMRT is further used to identify the sources and minerals used by suppliers and smelters.

2 Since 2015, ASE and USI have conducted an IPSA annually.

CORPORATE CITIZENSHIP

ASEH is committed to devote ourselves to the community through charity, education and social work which optimize resource allocation and maximize social influences.

ASEH continuously engages with local communities, NGOs, government, industry, academic and other stakeholders in strategic ways to establish trust and obtain direct input to support social development, while achieving corporate and societal value. At the same time, we strive to facilitate public advocacy related to our core business and sustainable development to promote a positive corporate image and create a meaningful influence to society.

Key Performance

NT$ 600 Million
2014~2019
Environment Conservation Fund (ECF) Programs

NT$ 32 Million
2019
Community Engagement

76,000 units
2014~2019
LED Lamps Installation

NT$ 46 Million
2019
Industry-Academia Collaboration

134 hectares
2014~2019
Tree Planting

SDGs	Business Actions	2019 Material Aspects	KPI	2019 Target	Status	2019 Performance	2020 Target	2025 Target
13 CLIMATE ACTION	Promote climate conscious behavior and build capacity for climate action	Social Involvement	• Number of industry-academia collaboration projects on environmental technology • Number of energy-saving LED tube lights installed and number of schools with LED tube lights installed • Total area planted with trees (global)	• Over 10 industry-academia collaboration projects on environmental technology • 12,000 LED light tubes installed at 10 schools • Ten hectares planted with trees	Achieved	• 11 industry-academia collaboration projects on environmental technology • 14,000 LED light tubes installed at 17 schools • 13 hectares planted with trees	• 10 industry-academia collaboration projects on environmental technology • 10,000 LED light tubes installed at 10 schools • 10 hectares planted with trees	• Over 100 industry-academia collaboration projects on environmental technology • LED light tubes installed at 100 schools • 150 hectares planted with trees
4 QUALITY EDUCATION	Implement programmes to support higher education and access to free, equitable, and inclusive primary and secondary education		• Number of students attending semiconductor course • Number of disadvantaged students attending after school program	• 100 students attending semiconductor course • 100 disadvantaged students in the community attending after school program	Achieved	• 123 students attended semiconductor courses • 150 disadvantaged students in the community attended after school program	• 100 students attending semiconductor courses • 100 disadvantaged students in the community attending after school program	• 500 students attending semiconductor courses • 1,000 disadvantaged students in the community attending after school program
8 DECENT WORK AND ECONOMIC GROWTH	Drive economic growth and productivity by investing in R&D, upgrading skills, and supporting growing businesses, in a way that is compatible with sustainable development		• Number of innovative industry-academia collaboration projects • Number of legislative or sustainability initiatives	• 30 innovative industry-academia collaboration projects • One legislative initiative for issues related to the semiconductor industry	Achieved	• 38 innovative industry-academia collaboration projects • 4 legislative initiatives for issues related to the semiconductor industry	• 30 innovative industry-academia collaboration projects • 2 legal initiatives for issues related to the semiconductor industry	• 150 innovative industry-academia collaboration projects • 15 legal initiatives for issues related to the semiconductor industry

Corporate social involvement focus, benefits, and KPIs

Focus	SDGs Alignment	Business Drivers	Business Benefits & KPIs	Social/Environmental Benefits & KPIs	Impacts
Environmental Conservation	**13 CLIMATE ACTION**	ASE is raising awareness in climate change mitigation and adaptation, impact reduction and early warnings through education, and intensifying R&D in environmental technologies and improvements in production efficiency to reduce environmental impacts. The primary factors driving the company's core operations are: • Increasing production efficiency; changing volatile organic compound treatment methods; reducing treatment costs; ensuring competitive pricing • Promotion of green products and services and implementation of community environmental education programs to encourage green consumer behavior 2025 Targets: • Over 100 collaborative academic research projects on environmental technology • US$ 5 million reduction in outsourced waste management costs	Improvements to environmental technology R&D and production efficiency in 2019: • 11 research projects on environmental technology in collaboration with academic or research institutes • 20% reduction in the use of polyaluminium chloride (PAC) and sodium hydroxide (NaOH) flocculants; 180-ton reduction in liquid waste outsourced to external companies for processing; approximately US$200,000 million reduction in annual outsourced waste management costs • Approximately US$77,000 cost reduction in outsourced processing of nickel-containing liquid wastes • Optimization of biological treatment of air pollutants and wastewater; 440 ton reduction in annual scrubber water use; 5% reduction in use of chemical agents; approximately US$70,000 reduction in annual outsourced waste management costs. 2015~2019 • 52 research projects on environmental technology in collaboration with academic or research institutes; resulted in a total cost reduction of US$3.1 million * More information refer to appendix (Social Data - G. Social Involvement Key Performance)	Reduced environmental impact and enhanced living environment for local communities in 2019 : • 14,050 LED light tubes installed at 17 schools reduced energy use by approximately 562,000 kWh and carbon emissions by approximately 297 tons CO_2e • Implemented 24 environmental education courses; 2,500 students participated; 13 promotional videos on environmental education were produced 2015~2019 • 76,270 LED light tubes installed at 67 schools reduced energy use by approximately 3,107,000 kWh and carbon emissions by approximately 1,637 tons CO_2e * More information refer to 8.2 Environmental Conservation	• Raising environmental awareness: Increased awareness of employees and supply chains in environmental protection and carbon reduction; prioritized the procurement of raw materials that are eco-friendly and recyclable, and adoption of green manufacturing in the development of new products • Green Technology Development: 7 OSAT (outsourced semiconductor assembly and test) industry peers have improved their manufacturing eco-efficiency by drawing upon the success of our industry-academia collaboration on environmental research projects.
Industry-Academia Collaboration	**8 DECENT WORK AND ECONOMIC GROWTH** **4 QUALITY EDUCATION**	The semiconductor industry is a high-tech industry that requires a large pool of talent in technological research and interdisciplinary R&D. We should leverage on the multiple professional and recruitment opportunities to attract talent and increase youth employability, by nurturing and equipping future employees with the relevant knowledge and professional skills to enhance the value of our human capital. The primary factors driving the company's core operations are: • Training potential talent (employees) for the future so as to enhance the value of the company's human capital. • Developing next-generation semiconductor technologies and materials 2025 Target • Participate in over 300 collaborative academic projects on semiconductor materials and advanced technologies • Recruit over 5,000 interns	Cultivating human capital and promoting technology innovation and development in the semiconductor industry in 2019 • Participated in 38 industry-academia collaboration projects, including the development of the Smart Yield Management System, use of Artificial Intelligence for Substrate Layout Automation, Smart Predictive Maintenance, Virtual Metrology System, Material Characterization Database, and Risk Prediction System for Neural Network Manufacturing Processes • 230 students participated in the semiconductor courses 2015~2019 • Participated in 121 industry-academia projects involving semiconductor assembly, advanced materials, manufacturing automation technologies, etc. • 845 students participated in the semiconductor courses * More information refer to appendix (Social Data - G. Social Involvement Key Performance)	Talent development via cooperative education, internship, and technological collaborations in 2019: • Recruited 1,183 interns • 120 students participated in collaborative academic research projects • Awarded scholarships to 94 students • Collaborated with over 50 schools 2015~2019 • Recruited 3,532 interns * More information refer to appendix (Social Data - G. Social Involvement Key Performance)	• Innovative semiconductor technologies: In response to developments in Heterogeneous Integration (HI) technology, we have established the ASE Industry Academy in collaboration with leading universities. The 3 fields covered at the academy are semiconductor assembly and testing, smart automated manufacturing and artificial intelligence. • Improving employability: Improved youth employability and competitiveness, allocation of resources to education, and expand the supply of talent across the supply chain.

Focus	SDGs Alignment	Business Drivers	Business Benefits & KPIs	Social/Environmental Benefits & KPIs	Impacts
Community Engagement	**1** NO POVERTY	ASEH is committed to bridge the economic, social and environmental development gaps between urban and rural areas in the communities where we operate. We are fostering stronger community bonds at each location through high levels of engagement in community development and caring for the disadvantaged. The primary factors driving the company's core operations are: • Ability to operate in a stable social environment • Enhanced corporate image and employee engagement 2025 Targets • Reach 20,000 volunteers • Afterschool care for over 1,000 students from disadvantaged households	Improvements to the quality of life and strengthening of emergency care and disaster response in local communities in 2019: • 9,200 volunteer service hours • 2,300 volunteers 2015-2019 • 35,200 volunteer service hours • 9,360 volunteers * More information refer to appendix (Social Data - G.Social Involvement Key Performance)	Corporate citizenship programs to improve mutual development with the local community in 2019: • Participated in afterschool care for 143 students from disadvantaged households • Provided support for 50 charities • Provided financial aid for 788 students from disadvantaged households 2015-2019 • Participated in afterschool care for 676 students from disadvantaged households • Provided financial aid for 3,620 students from disadvantaged households * More information refer to 8.4 Community Engagement	• Improving quality of life for the elderly: Established an elderly care center to provide health educational programs, to senior members from the local community and the employees' families. • Launched a smart mobile clinic, developed smart cloud-based healthcare and a 'hospital without borders' that brings medical care and health screening to rural communities. • Improved employee cohesion and engagement: The survey results showed 78% in the company brand and culture category, which was an increase of 3% compared to the previous survey.
Public Advocacy	**17** PARTNERSHIPS FOR THE GOALS	Sustainable development goals are achieved through the sharing of knowledge, expertise, technologies and financial resources. To that end, ASEH is promoting global partnerships in sustainable development, exchanging knowledge, expertise and technology knowhow with stakeholders, and expanding its sphere of influence through active involvement in industry organizations. The primary factors driving the company's core operations are: • Developing and formulating the next generation semiconductor technology blueprint and standards with the industry supply chain • Co-developing policy white papers with industry associations to serve as references for the establishment of policies and regulatory standards 2025 Targets • 15 sustainability initiatives	Driving innovation and development in semiconductor and electronic technologies and improving ASEH's leadership status in sustainable development • Collaborated with 40 external organizations in areas related to core business 2019 • Active member of SEMI (Semiconductor Equipment and Materials International) and the Workforce Development Council • Organized the Semiconductor Industry Risk Management and Cybersecurity Technology Forum	Advancement of sustainability topics to help formulate CSR initiatives for the semiconductor industry • Collaborated with 80 external organizations in sustainable development 2019 • Two legislative initiatives related to air pollution and greenhouse gas control, and business waste disposal • Participate in the Science Based Targets(SBT) initiative 2016-2019 • 9 sustainability and legislative initiatives	• Semiconductor Industry Development: Formulated a blueprint for the development of SiP (system-in-package) heterogeneous integration to develop next generation semiconductor manufacturing technologies • Boosting sustainability transformation in the industry: Founded the 15T[1] Circular Economy Alliance to jointly formulate circular economy standards, promote sustainable supply chains, and build a EHS information platform with OSAT industry peers.

[1] 15T refers to the 15 industry associations that participate in the alliance, such as the Taiwan Printed Circuit Association (TPCA), Taiwan Institute for Sustainable Energy (TAISE), Taiwan Academy of Banking and Finance (TABF), Taiwan Electrical and Electronic Manufacturers' Association (TEEMA), Taiwan Chemical Industry Association (TCIA), etc.
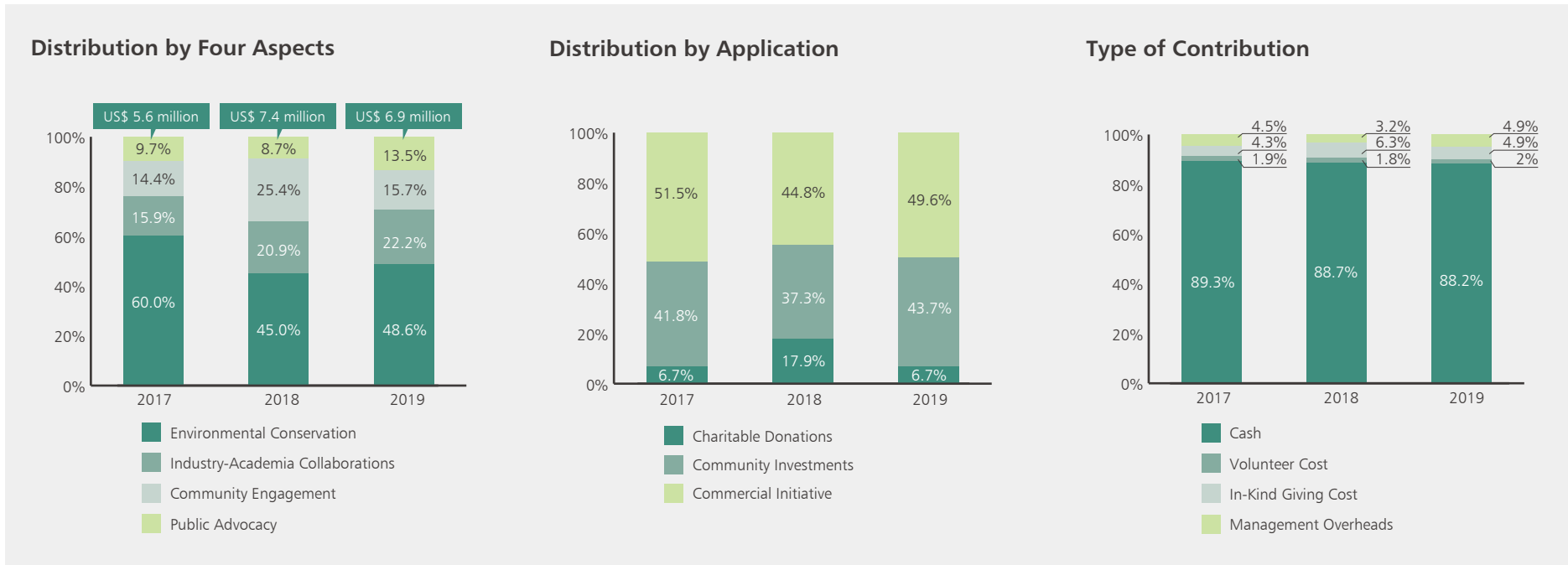
8.1 Social Involvement Overview

ASEH believes that social involvement should include financial contributions as well as social reconstruction. The Corporate Sustainability Committee (CSC) is ASEH's highest level of organization for social involvement and is responsible for the planning, formulation and implementation of social involvement policies and regulations within the group. ASEH's "Public Affairs Engagement Policy" [1] is a set of principles formulated to provide responsible policy directions for all its subsidiaries, and guidance in the selection of organizations to support. An audit mechanism is also in place to evaluate the level of social impact resulting from the support given to those foundations and social organizations.

ASEH conducts annual reviews to evaluate its campaigns and performance based on four development strategies-environmental conservation, industry-academia collaboration, community engagement and public advocacy. The CSC Social Involvement Taskforce is responsible for implementing social involvement policies at company facilities worldwide, evaluating the risks and opportunities, planning and organizing activities in public engagement. Each facility is responsible for the creation of local organization teams to plan and execute the programs in compliance with corporate policies and development goals.

ASEH adopts the LBG (London Benchmarking Group) framework and SROI (Social Return on Investment) model to measure the input, output and impact of social involvement activities, and conducts biannual performance reviews and reporting.

In 2019, we spent US$6.9 million on social involvement activities, accounting for 0.89[2] percent of the group's pre-tax net profit. We have invested more resources into industry-academia collaborations and public advocacy than we did in 2018 to strengthen ties with our partners and technological collaboration with universities. Over 2,300 employees served as volunteers, providing over 9,200 volunteer service hours.
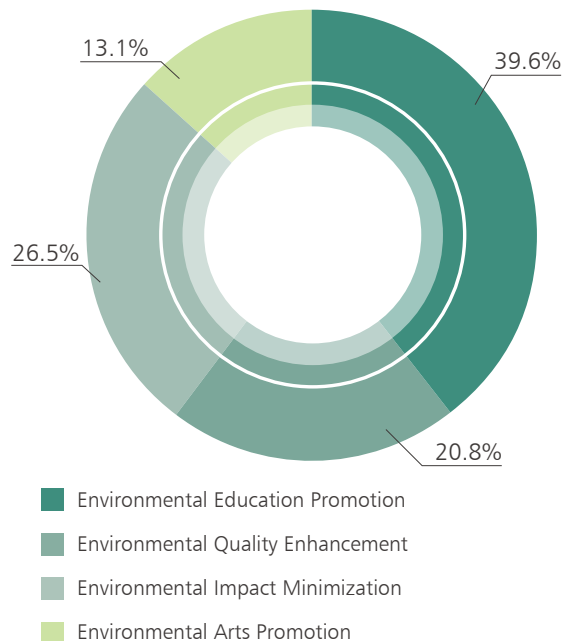
Distribution by Four Aspects

US$ 5.6 million | US$ 7.4 million | US$ 6.9 million

	2017	2018	2019
Public Advocacy	9.7%	8.7%	13.5%
Community Engagement	14.4%	25.4%	15.7%
Industry-Academia Collaborations	15.9%	20.9%	22.2%
Environmental Conservation	60.0%	45.0%	48.6%

- Environmental Conservation
- Industry-Academia Collaborations
- Community Engagement
- Public Advocacy

Distribution by Application

	2017	2018	2019
Commercial Initiative	51.5%	44.8%	49.6%
Community Investments	41.8%	37.3%	43.7%
Charitable Donations	6.7%	17.9%	6.7%

- Charitable Donations
- Community Investments
- Commercial Initiative

Type of Contribution

	2017	2018	2019
Management Overheads	4.5%	3.2%	4.9%
In-Kind Giving Cost	4.3%	6.3%	4.9%
Volunteer Cost	1.9%	1.8%	2%
Cash	89.3%	88.7%	88.2%

- Cash
- Volunteer Cost
- In-Kind Giving Cost
- Management Overheads

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[1] ASEH Public Affairs Engagement Policy (www.aseglobal.com/en/pdf/aseh_public_affairs_policy.pdf)

[2] The 2019 pre-tax net profit was NT$23,279,811 thousand (for more information, please refer to ASEH Form 20-F).

8.2. Environmental Conservation

In 2014, ASEH committed to a 30-year contribution of at least NT$100 million per year, for environmental conservation efforts in Taiwan. For the year 2019, NT$ 100 million was disbursed through the ASE Cultural and Educational Foundation, to support key environmental programs including environmental education, environmental improvements, climate change mitigation and environmental arts. ASEH has also been collaborating with the Chang Yao Hong-Ying Social Welfare & Charity Foundation on social and environmental programs in Taiwan, and reports its achievements annually through a media conference. We carried out 74 charity projects in 2019. For more information on our major achievements, please refer to the ASE Everywhere section (www. asefund.org.tw).

Distribution by 2019 ECF Programs

- 39.6%
- 13.1%
- 26.5%
- 20.8%

- ■ Environmental Education Promotion
- ■ Environmental Quality Enhancement
- ■ Environmental Impact Minimization
- ■ Environmental Arts Promotion

Campus LED Project

The ASE Cultural & Educational Foundation has been implementing its energy-saving, carbon-reducing Campus LED Project since 2014. The project provides resources to install energy saving LED tube lights and light bulbs, that also improve lighting conditions, for elementary and junior high schools in rural areas and nearby communities. The foundation has currently installed approximately 76,000 LED tube lights at 67 schools in Nantou and Kaohsiung, and is expected to complete installation at over 100 schools by 2025.

	2015	2016	2017	2018	2019
School	13	9	13	4	17
LED Lamps	16,400	13,500	14,500	8,900	14,050
Energy Saving (kWh)	656,656	540,540	580,580	356,356	562,562

2019 Accomplishments of ECF Programs

Programs	Major Projects	Programs	Major Projects
Environmental Education Promotion	• Environmental Thesis/Dissertation Awards • Environmental Technology Research Projects • Southern Taiwan Environmental Education Projects • "CommonWealth" Magazine in Taiwan -Creative Teaching Material Competition • Environmental Education Films Projects	Environmental Impact Minimization	• Campus LED Donation Projects • Cuora Flavomarginata (yellow-margined box turtle) Conservation and Restoration • Green Supply Chain Projects • Sustainable Circular Economy Forum • Smart Grid
Environmental Quality Enhancement	• Afforestation Projects • Water environment patrol • Marine environment protection awareness campaign • Taoyuan coastal plant smart identification project	Environmental Arts Promotion	• Rice-themed installation art exhibition • Dengue fever awareness campaign • Kaohsiung Spring Arts Festival sponsorship • Public Social Welfare Sponsorships

8.3. Industry-Academia Collaborations

The technology needs of the IC packaging industry are becoming more sophisticated, and technological innovation is critical to ASE's corporate sustainability. Over the years, ASEH has invested heavily in resources and research funding to maintain our semiconductor technology leadership. We collaborate with top universities on various research and development projects that help strengthen semiconductor technologies through the synergistic relationship between industry and academia. The talent cultivation and the rising academic capabilities through the collaboration have enabled the entire semiconductor industry to thrive.

ASEH has created key programs like "academia cooperation and corporate internship", "academic research collaboration", and "scholarships" to leverage on the expertise from these academic resources. In 2019, ASEH continued its collaborations with local schools, contributing over US$1.53million, including US$1.23 million towards 38 technology research collaborations and US$0.13 million for scholarships. We also recruited 1,183 interns and enrolled 230 students in the semiconductor master's degree program. Nearly 50 schools and research institutions in Taiwan, China, Singapore, Malaysia, South Korea, Japan, etc. were involved in these collaborations.

2019 Accomplishments of Industry-Academia Collaboration Programs

Programs	Projects	Stakeholders	Achievements
• Cooperative education and internships • Academic research collaborations • Scholarships	• ASE Industry-Academia Career Development Project/ Employment Orientation Project • Semiconductor Assembly and Manufacturing Education Program • ASE Internship and Company Visits • Artificial Intelligence Colleges • Semiconductor Assembly Technology Research Projects • Manufacturing Automation Research Projects • Advanced Semiconductor Materials R&D Projects	• University Students • Academic Institutions and Research Institutes • Semiconductor Industry	• Improving Career Prospects and Competitiveness of Students • Improving Academic R&D Capabilities • Cultivating Talented Personnel for the Semiconductor Industry

Industry 4.0-Smart, Automated Manufacturing

Smart manufacturing is a vital part of ASEH's operation roadmap, and since 2015 its Kaohsiung facility has collaborated with southern Taiwan universities on automation technology research.

To date, 29 projects focusing on four key aspects were developed; smart manufacturing, intelligent classification of equipment failure, manufacturing yield improvements, and IT security asset identification. To optimize manufacturing efficiency, ASEH's Intelligent Classification Algorithm for Failure Diagnosis in Semiconductor Equipment applies supervised and unsupervised machine learning, to accurately identify reasons for equipment failure and carry out predictive maintenance. The Virtual Metrology System predicts the properties of a wafer at different steps of the manufacturing process, allowing for full instant quality inspection across the production lines. AI technology is extensively used in areas such as manual secondary inspections, eg. automatic image analysis through scanning acoustic tomography (SAT) and AI image recognition to detect defects, to greatly reduce the inspection time and manpower needed.

We have also drawn up a comprehensive career path framework to drive the training of expertise for smart manufacturing. Since 2016, we have invested NT 26 million on AI industry-academia collaborations and designing a training module for grooming AI talents. To inject momentum into AI innovation and boost talent development, ASEH is actively training employees to prepare for digital transformation, while at the same time, connecting students with the industry so that they have opportunities to apply what they learn in school.

Semiconductor Packaging Technology Research

14 research papers were presented at the 7th ASE Packaging Technology Industry-Academia Conference, with research on advanced manufacturing processes and material analysis showing promising results. Using moldflow analysis optimized with a neural network, ASEH's engineers are now able to predict the risk of wire sweep in the molding process, which helps to shorten the time-to-market for new products. Research in molding materials has also led to the development of a new type of molding material that optimizes Micro-LED packaging, raising the value-add of manufacturing processes and driving futher innovation in IC packaging. For high-end products that require large bandwidth and high power performance, signal integrity analysis is performed on the molding structure to optimize circuit design and mitigate crosstalk, thereby boosting the quality of high-speed digital signal transmissions.

Driven by future advanced manufacturing needs, our R&D industry-academia team has co-developed the 'high optical attenuation slim protection material', a novel high performance protective material that is ultra thin and increases the reflection/refraction of light to achieve a shielding rate of over 99%, making it highly suitable for compact optical IC applications.

Assembly Technology Forum

Factory Visit

Factory Visit

Factory Visit

8.4 Community Engagement

ASEH seeks not only to create economic value but also to develop alongside local communities in the global locations we operate in. We hope community engagement activities will lead to value system and idea exchanges with the people in the local communities, allowing them to better understand ASEH's philosophy in sustainable operations and for ASEH to maximize positive benefits for our operations. As part of our effort to continuously create economic value and simultaneously cultivate corporate values, we are committed to incorporating community resources and grow together with local communities. Through the ASE Charitable Foundation, we focused resources on "Community Development", "Charitable Care", and "Emergency Care and Assistance" programs. In 2019, we contributed over US$1.1 million for community engagement activities. We provided afterschool care for 143 students and financial assistance to 788 students from disadvantaged families, and made donations to 55 charities.
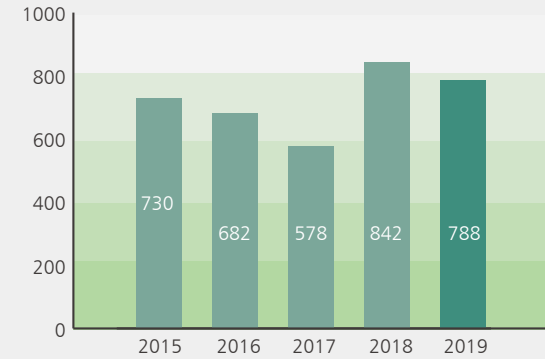
Senior Citizens Learning

In view of a rapidly aging population in Taiwan, ASEH, together with the Chang Yao Hong-Ying Social Welfare & Charity Foundation, the ASE Cultural & Educational Foundation and Fo Guang University, has jointly initiated a charity program to look after the welfare of the elderly. The program includes a professional course offered by the Fo Guang University Department of Future Studies and LOHAS Industry that incorporates Chunghwa Telecom's Personal Health Record cloud platform. It was designed with a focus on providing a range of intelligent senior care services to ensure a happy and active lifestyle. In 2019, two classes were offered to 180 senior citizens at ASE's Chungli Facility and USI's Taiwan Facility.

Afterschool care for disadvantaged household students

2015	2016	2017	2018	2019
159	129	122	123	143
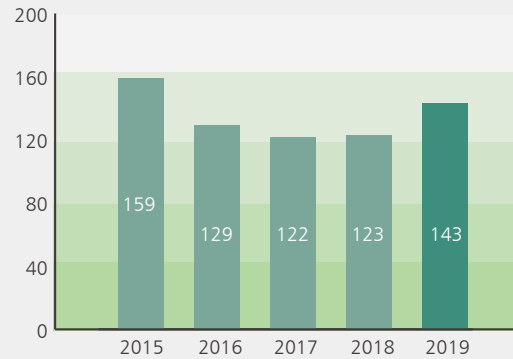
Financial aid for disadvantaged households students

2015	2016	2017	2018	2019
730	682	578	842	788

Elderly Care Charity

Inner Mingolia Plants


Community Sports Development

House Repair

8.5 Public Advocacy

As a global leader in semiconductor assembly and test, we recognize the need to play a more visible role advocating key issues affecting the industry. Aligning with United Nations' goal of improving the wellbeing of mankind, ASEH is fully committed to initiatives related to our core business and sustainable development (environmental, social and economic aspects). We support initiatives in corporate sustainability and economic development; technological innovation and development; environmental projects; climate change; human rights; and supply chains etc.

In 2019, ASEH contributed US$0.93 million and was active in over 120 external organizations, allowing ASEH to share our value system with industry peers and supply chain partners, and extend a broader social impact.
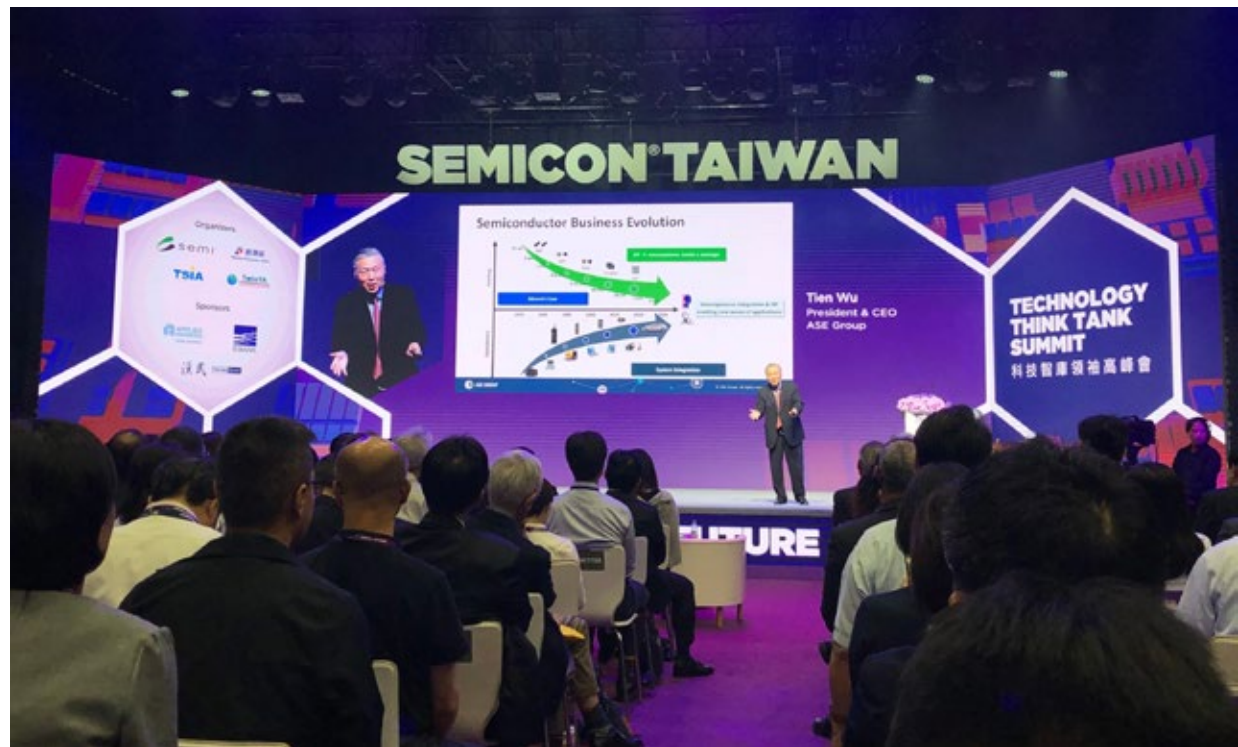
Semicon Taiwan Forum

Smart Manufacturing Forum

15T Alliance

Participation in Major Industry Associations in 2019:

Association	Major Activities	Resources invested (in USD)
Semiconductor Equipment and Materials International (SEMI)	SEMI is a global electronic manufacturing supply chain industry association. ASEH is actively involved in public policy initiatives and highly supportive of international SEMI events, the promotion of collective interests, and the focus on education, business, technology and sustainable development. Our participation in SEMI allows us to exchange information about market trends, system-in-package ecosystems, heterogeneous integration and advanced IC packaging technology. In 2019, ASEH joined the newly formed Workforce Development Council that supports education and career awareness in the high tech industry. We also participated in the Industry Risk Management and Cybersecurity Technology Forum to promote cybersecurity awareness and risk management. Our executives also serves in many committees including the SEMI Board of Directors, the Advanced Assembly Committee, chair of the SEMI-FlexTech Flexible Hybrid Electronics Committee, and deputy chair of both the Materials Committee and the Semiconductor Smart Manufacturing Committee.	133,000
Taiwan Semiconductor Industry Association (TSIA)	ASEH initiated the forming of the Environmental Health & Safety (EHS) Committee together with OSAT industry peers to work on issues involving industrial safety and environmental protection in Taiwan's semiconductor industry and propose solutions. The committee provides government agencies with points of reference for the establishment of policies, regulations and standards governing the semiconductor assembly and testing industry. ASEH also built an exchange platform for sharing EHS experiences amongst industry peers. In 2019, the committee discussed three major legislative initiatives to amend regulations: 1. Legislative initiatives related to air pollution and greenhouse gas control - amendment of Air Pollution Control and Emissions Standards for the Semiconductor Industry, adoption of the Continuous Emissions Monitoring System that Transfer Data to the Authorities for Stationary Sources of Public-Private Access, and the Semiconductor Assembly and Testing Industry Greenhouse Gas Emissions Control Action Plan. 2. Legislative initiatives related to industrial waste disposal - pushed for audits of waste generators and waste management companies and the establishment of waste recovery and processing systems in the semiconductor assembly and testing industry. 3. Sustainable supply and circular economy collaboration platform - training course for the adoption of the ISO 20400 Sustainable Procurement Standard.	120,000

Association	Major Activities	Resources invested (in USD)
Taiwan Alliance for Sustainable Supply (TASS)	ASEH is a founding member of the Taiwan Alliance for Sustainable Supply (TASS). TASS was founded in 2017 to establish a sustainable development platform and standard that incorporates supply management, logistical processes and information sharing. In 2019, through its continuous organization and promotion of events/initiatives related to sustainable supply and circular economy, the alliance achieved the following: 1. Founded the 15T Circular Economy Alliance to establish and promote a cross-industry exchange platform and share information and resources so as to expand its influence and reach an industry consensus 2. Sustainable Supply Certification Program - development of interdisciplinary expertise on risk management, legal compliance, procurement and supply 3. Organized the Green Circular Sustainable Supply Innovative Technology Research Competition and invited universities and colleges to participate and explore the circular economic needs of the industry, and propose creative and feasible solutions via innovative collaborations	70,000
CALCE Electronic Products and Systems Consortium (EPSC)	CALCE EPSC provides a forum for defining fundamental needs in the electronics industry, conducting research, and sharing research findings among participating organizations. The research focuses include risk assessment, mitigation and management for electronic products and systems. CALCE EPSC continues to develop tools and methodologies to help engineers perform electronic product risk assessment, mitigation and management. CALCE EPSC works with companies from across the electronics industry chain, including the entire supply chain for the telecommunications, automotive and aviation industries.	65,000
Responsible Business Alliance (RBA)	Founded in 2004 by a group of leading electronics companies, the Responsible Business Alliance (RBA) is a nonprofit organization comprised of electronics, retail, auto and toy companies committed to supporting the rights and well-being of workers and communities worldwide affected by the global electronics supply chain. RBA members commit to and are held accountable to a common Code of Conduct, and utilize a range of RBA training and assessment tools to support the continued improvement of the social, environmental, and ethical responsibility of their supply chains. RBA regularly engages in dialogue and collaborations with workers, governments, civil society, investors and academia to gather the necessary range of perspectives and expertise to support its members in achieving the RBA mission of a responsible global electronics supply chain. ASEH joined the RBA in 2015 and has since administered annual self-assessment questionnaires (SAQs) at its facilities worldwide in order to identify labor, environmental and ethical risks.	35,000

APPENDIX

Sustainability Data - Environmental Data

A. The environmental data (waste, water, energy, GHG & air emission) of our manufacturing facilities around the world over the past four years are presented in the table below

Category	Environmental Performance Index	Unit	2016	2017	2018	2019
Waste	Total general and hazardous waste	metric ton	54,464	53,638	67,004	69,795
	General waste production	metric ton	27,962	28,366	40,839	41,841
	Recycled and reused	metric ton	23,862	24,655	36,770	38,744
	Non-recycled and reused	metric ton	4,100	3,711	4,069	3,098
	Non-recycled and reused[1]	metric ton	4,592	4,173	4,141	3,098
	Recycled and reused rate	%	85	87	90	93
	Hazardous waste production	metric ton	26,502	25,272	26,164	27,954
	Hazardous waste production[2]	metric ton	30,862	28,983	27,838	27,954
	Recycled and reused	metric ton	14,380	13,460	13,240	16,104
	Non-recycled and reused	metric ton	12,122	11,812	12,924	11,850
	Recycled and reused rate	%	54	53	51	58
	Total recycled and reused	metric ton	38,243	38,115	50,011	54,847
	Total non-recycled and reused	metric ton	16,221	15,523	16,993	14,948
	Total recycled and reused rate	%	70	71	75	79
Water	Water withdrawal	metric ton	15,147,097	16,034,472	21,571,571	24,177,331
	Water withdrawal intensity	metric ton/thousand USD revenue	1.811	1.639	1.784	1.751
	Ultra-pure water usage[3]	metric ton	22,624,234	27,300,190	26,148,689	25,113,761
	Water recycled and reuse	metric ton	15,096,545	15,175,519	22,934,123	28,158,345

Category	Environmental Performance Index	Unit	2016	2017	2018	2019
Water	Recycle rate	%	100	95	106	116
	Wastewater discharge	metric ton	12,615,460	11,742,595	17, 303,186	18,778,265
	Total fresh water consumption[4]	Million metric ton	22.46	23.65	24.02	24.08
Energy	Electricity consumption	MWh	2,229,426	2,300,523	3,130,150	3,588,895
	Renewable electricity	MWh	5,658	195,595	397,766	512,067
	Non-renewable electricity	MWh	2,223,768	2,104,928	2,732,384	3,079,829
	Electricity intensity	MWh/ thousand USD revenue	0.267	0.235	0.259	0.260
	Liquefied Petroleum Gas (LPG)	GJ	11,407	8,374	2,802	3,094
	Liquefied Natural Gas (LNG)	GJ	332,126	381,022	354,857	255,582
	Motor gasoline	GJ	10,196	8,843	9,141	8,956
	Diesel	GJ	78,824	16,637	15,653	18,892
	Heavy oil	GJ	50,595	36,089	29,325	31,906
	Total non-renewable energy consumption[5]	MWh	3,369,827	3,310,931	3,207,383	3,208,516
Greenhouse Gas	SCOPE 1	tCO_2e	56,764	60,675	85,279	98,880
	SCOPE 1[6]	tCO_2e	76,821	82,996	99,504	98,880
	SCOPE 2	tCO_2e	1,328,044	1,215,698	1,544,880	1,695,223
	SCOPE 2[7]	tCO_2e	1,880,305	1,806,806	1,735,097	1,695,223
	SCOPE 1 + SCOPE 2	tCO_2e	1,384,808	1,276,373	1,630,159	1,794,103
	GHG intensity	tCO_2e/thousand USD revenue	0.166	0.130	0.135	0.130
	PFC emissions / number package output [8]	$kgCO_2e$/kPCs	0.00078	0.00065	0.00081	0.00086
Air Emission	VOC (Volatile organic compounds)	metric ton	269	281	204	208
	VOC (Volatile organic compounds[9]	metric ton	276	288	207	208

[1] This table includes ASE, SPIL and USI data for 2016-2019.

[2] This table includes ASE, SPIL and USI data for 2016-2019.

[3] This table includes ASE, SPIL and USI data for 2016-2018. The 2016-2019 data has been updated due to a reassessment of the water data by SPIL.

[4] This table includes ASE, SPIL and USI data for 2016-2019. The 2016-2018 data has been updated due to a reassessment of the water data by SPIL.

[5] The includes all the data from ASE, SPIL and USI for 2016-2019.

[6] The includes all the data from ASE, SPIL and USI for 2016-2019.

[7] The includes all the data from ASE, SPIL and USI for 2016-2019.

[8] The includes all the data from ASE, SPIL and USI for 2016-2019.

[9] The includes all the data from ASE, SPIL and USI for 2016-2019. VOC emissions data in 2018 has been revised due to revisions made to the VOC emissions data of USI.

B. The amount of water withdrawals and discharge in water-stressed regions

Water withdrawals			
		Water withdrawals at ASEH facilities (ML)	Water withdrawals in water-stressed regions[1] (ML)
Total water withdrawals	Surface water (total) + groundwater (total) + third-party water (total)	24,177	4,245
Water withdrawals[2] by source of water	Freshwater (TDS ≤ 1,000 mg/L)	16,576	728
	Other sources of water (TDS > 1,000 mg/L)	0	0

Water discharge			
		Water discharge at ASEH facilities (ML)	Water discharge in water-stressed regions (ML)
Water discharge by discharge destination	Surface water	10,458	0
	Groundwater	0	0
	Marine water	1,367	0
	Third-party water	6,953	3,329
Total water discharge	Surface water + groundwater + marine water + third-party water	18,778	3,329
Water discharge by source of water	Freshwater (TDS ≤ 1,000 mg/L)	3,396	0
	Other sources of water (TDS > 1,000 mg/L)	3,181	0

[1] Water-stressed regions: (1) ASE: Shanghai Assembly & Testing, Shanghai Materials, Kunshan, Suzhou, Weihai, Wuxi; (2) USI: Kunshan
[2] Facilities that measure TDS in the water: ASE (Kaohsiung, Shanghai Assembly & Testing, Wuxi, Japan, Malaysia, Singapore), USI (Zhangjiang, Jinqiao, Kunshan, Shenzhen, Taiwan), SPIL (Da Fong, Chung Shan, Zhong Ke, Hsinchu, Changhua, Suzhou); TDS is not measured at other facilities.

C. Effluent quality of our facilities with on-site wastewater treatment[1]

Item	Unit	Taiwan_to land		Taiwan_to ocean		China		Japan			Korea		Malaysia	
		Effluent standard	Min.~Max.	Effluent standard	Min.~Max.	Effluent standard	Min.~Max.	Effluent standard (Nantion)	Effluent standard (Yamagata)	Min.~Max.	Effluent standard	Min.~Max.	Effluent standard	Min.~Max.
pH	pH	6~9	7.3~8.1	6~9	7~7.7	6~9	6.6~8.9	5.8~8.6	5.8~8.6	-	5.8~8.6	7~8	5.5~9.0	6.4~8.06
COD concentration[2]	mg/L	<100	19~84.9	<300	5.2~84.9	500	50~402	160	-	-	90	2~32	200	3~193
BOD concentration	mg/L	-	3.8~140	<150	23.9~48.7	300	19.3~126	160	25	0.5~2.5	80	2~49	50	2~48
Suspended Solid(SS) concentration[3]	mg/L	<30	5~23.2	<50	1.0~8.1	400	23~168	200	60	1~31	80	0~3	100	<1~17
Cu^{2+} concentration	mg/L	<3	0~0.389	<2	0.1~0.01	1	0~0.719	3	1	0.01~0.2	3	0~0	1	<0.01~0.08
Ni^{2+} concentration	mg/L	<1	0~0.06	<1	<0.006~0.04	0.5	0~0.071	-	-	-	-	-	1	<0.02~0.3

[1] ISE Labs, ASE Singapore and three electronic manufacturing service facilities (Kunshan, Shenzhen and Mexico) do not have on-site wastewater treatment, thus not included in the statistics.
[2] Waste water discharge from the SPIL Hsinchu facility is diverted into the park's sewer system and waste water treatment plant in accordance with the Hsinchu Science Park Effluent Standards, and is therefore not included.
[3] Waste water discharge of the SPIL Zhong Ke facility is diverted into the park's sewer system and waste water treatment plant in accordance with the Central Taiwan Science Park Effluent Standards, and is therefore not included.

Sustainability Data - Social Data

A. Global Workforce Structure

Global Workforce Structure			Taiwan	China	Rest of Asia	Americas	Total/Ratio		Total
Overall Employee Gender		Male	28,086	13,871	2,454	966	45,377		89,557
		Female	28,841	9,652	4,064	1,623	44,180		
Disabled Employee		Male	294	54	18	10	376		617
		Female	197	23	16	5	241		
Regular/ Non-Regular Employee	Regular Employee	Male	28,015	12,026	2,424	963	43,428		86,541
		Female	28,805	8,633	4,054	1,621	43,113		
	Non-Regular Employee	Male	71	1,845	30	3	1,949		3,016
		Female	36	1,019	10	2	1,067		
Employee Category	Management	Male	2,734	1,388	200	87	4,409		5,765
		Female	813	464	51	28	1,356		
	Engineering	Male	17,568	4,492	1,670	151	23,881		28,054
		Female	2,894	923	331	25	4,173		
	Administration	Male	879	540	285	98	1,802		5,969
		Female	2,184	1,278	553	152	4,167		
	Skill Job	Male	6,905	7,451	299	630	15,294		49,769
		Female	22,950	6,987	3,129	1,418	34,488		
Employee Age Distribution		16~30	14,975	14,437	2,297	1,328	33,037		89,557
		31~49	38,791	8,945	3,450	991	52,177		
		Above 50	3,161	141	771	270	4,343		
New Employee Age Distribution		16~30	5,775	14,339	324	1,515	21,983	77%	28,490
		31~49	3,276	2,266	90	705	6,337	22%	
		Above 50	62	10	24	74	170	1%	

B. Turnover Rate

	Taiwan		China		Rest of Asia		Americas	
Male	3,662	50.1%	12,214	58.0%	468	41.1%	673	37.6%
Female	3,641	49.9%	8,861	42.0%	672	58.9%	1,119	62.4%
Management Positions	191	3%	200	1%	41	4%	9	1%
Engineering Positions	2,080	28%	1,633	8%	320	28%	56	3%
Administration Positions	363	5%	415	2%	78	7%	64	3%
Skill Job Positions	4,669	64%	18,820	89%	701	61%	1,663	93%
16~30	3,104	43%	17,469	82.9%	681	60%	1,202	67%
31~49	3,975	54%	3,578	17%	386	34%	528	30%
Above 50	224	3%	22	0.1%	73	6%	62	3%

C. Full-time employees in non-executive positions

	2018	2019	Difference
No. of Employee[1]	46,885	46,493	-392
Average Compensation(NT$)	744,918	759,968	15,050
Median Compensation(NT$)	N/A	627,111	N/A[2]

[1] "Employees" here refers to those under the employment of ASEH, ASE (ASE Kaohsiung and ASE Chungli; excluding ASE Test Inc. and ASE Electronics Inc.), SPIL and USI facilities in Taiwan.

[2] The median compensation of full-time non-executive in 2018 was no disclosure.

D. Statistics Regarding Parental Leave

2019 [1]		Taiwan	Rest of Asia	Total
Item	Gender	No. of Employee/Ratio	No. of Employee/Ratio	No. of Employee/Ratio
No. of Employee Entitled to Parental Leave	Male	2,652	835	3,487
	Female	1,577	613	2,190
No. of Employee Applying for Parental Leave	Male	199	95	294
	Female	685	112	797
No. of Reinstatement of Employee's Parental Leave	Male	101	96	197
	Female	464	106	570
Rate of Reinstatement of Employee's Parental Leave	Male	81%	100%	92%
	Female	87%	100%	92%
No. of Retention of Employee's Parental Leave	Male	97	83	180
	Female	397	100	497
Rate of Retention of Employee's Parental Leave	Male	96%	86%	91%
	Female	86%	94%	87%

E. 2019 Average Hours of Training per person (By Type)

Employee Category	Average Training Hours
Management Positions	89
Engineering Positions	108
Administration Positions	69
Skill Job Positions	152

[1] In China, no regulation of parental leave and ASE has maternity leave & paternity leave.

F. Workers[1] Occupational Health and Safety Statistics

		Employee	Contractor
Category of Occupational Injury	No. of Physical Injury	138	4
	No. of Chemical Injury	4	2
	No. of Ergonomic Injury	14	0
	No. of Biological Injury	0	0
	No. of Psychosocial Injury	0	0
Occupational Injury Ratio	Rate of recordable work-related injuries[2]	0.83	0.05
	Rate of high-consequence work-related injuries[3]	0	0
	Rate of fatalities as a result of work-related injury	0	0
Occupational Diseases	No. of case	1	0
	Rate of fatalities as a result of occupational diseases	0	0
Total hours worked		188,182,718	126,901,556
No. of worker(or No. of into the factory)		89,557	1,531,822

[1] The Workers include employee and contractor(exclude visitors)
[2] No. of recordable work-related injuries/No. of hours worked * 1,000,000
[3] No. of fatalities as a result of work-related injury/Number of hours worked * 1,000,000

G. Social Involvement Key Performance

Environmental Technology Research Projects

	2015	2016	2017	2018	2019
No. of project	10	11	11	9	11
Cost-saving of outsourced waste management	N/A	N/A	US$558,000	US$2,140,000	US$348,000

Industry-Academia Collaboration Programs

	2015	2016	2017	2018	2019
No. of Interns	800	793	390	366	1,183
No. of semiconductor master's degree students	230	105	122	158	230
No. of semiconductor assembly technology research projects	8	17	16	42	38

Afforestation Projects

	2015	2016	2017	2018	2019
No. of planting area (hectares)	6.3	88.65	9.85	13.18	13

Volunteer

	2015	2016	2017	2018	2019
No. of volunteers participating in the event	900	1,650	2,380	2,130	2,300
No. of volunteer hours	7,800	6,600	8,800	12,000	9,200

Environmental Education Program

	2015	2016	2017	2018	2019
No. of courses	17	18	18	20	24
No. of participation	3,000	2,500	2,700	2,100	2,500
No. of seed teachers	N/A	70	120	170	120
No. of training materials/films	N/A	N/A	4	2	10

Critical Supplier List

ASEH Critical Supplier List (ATM) in 2019

3M	ADVANTEK	Air Liquide Far Eastern Ltd.	ATOTECH	Chang Wah Electromaterials Inc.
Chemleader Corporation	DAEWON-PEAK	Dai Nippon Printing Co., Ltd	DISCO Corporation	Dou Yee
FUJIFILM Electronic Materials Co., Ltd.	Furukawa Electric Co., Ltd.	Fusheng Electronics Corporation	Haesung DS Co., Ltd.	Henkel Corp.
Heraeus	Hitachi Chemical	Hon Hai Precision Ind. Co., Ltd.	Hwa Shu Enterprise Co., Ltd.	Jentech Precision Industrial Co.,Ltd
Kinsus Interconnect Technology Corporation	Kostat, Inc.	Kulicke and Soffa Industries, Inc.	Kyocera	KYZEN Corp.
LG Innotek Co., Ltd.	Lintec Corporation	LT Matal Co., Ltd.	MEC Co., Ltd.	Merck Oerformance Materials Ltd.
Mitsui Chemicals Inc.	Mitsui High-tec	MK ELECTRON Co., Ltd.	Multiformity Technology Innovation Co., Ltd.	Murata Manufacturing Co., Ltd.
NAMICS Corp.	Nan Ya PCB Co., Ltd.	Nanya Technology Corporation	Nippon Micrometal Corporation	NXP Semiconductors
Peak International	Peco Tek Co., Ltd.	Resound Technology Inc.	ROHM Semiconductor	Samsung Electro-Mechanics Co., Ltd.
San Fu Chemical Co., Ltd	Sekisui Chemical	Senju Metal Industry Co., Ltd.	Shennan Circuits Co., Ltd	Shin-Etsu Electronics Materials Singapore Pte. Ltd.
Shinko Electronics Co.,Ltd.	SHINON LIMITED	Simmtech Co., Ltd.	Skyworks Solutions,Inc.	Small Precision Tools, Inc.
SOLEO CO., LTD.	Sumitomo Bakelite Co., Ltd.	Sun Surface Technology Co., Ltd.	Sunbright Applied Materials Corp.	Sunrise Plastics Industry Co Ltd.
Taihong Circuit Ind. Co. Ltd.	Taiwan Refind Co., Ltd	TAIXING YONGZHI ELECTRONIC DEvICE CO.,LTD	Taiyo Yuden Co.,Ltd.	TANAKA Holdings Co., Ltd.
TOK Taiwan Co., Ltd	Tokuyama Corp.	Tokyo Ohka Kogyo Co., Ltd.	TOPPAN Printing Co., Ltd.	UBoT Incorporated Limited.
Umate Electronic Co., Ltd.	Unimicron Technology Corporation	Yantai Zhaojin Kanfort Precious Metals Co., Ltd.		

Third Party Assurance Statement

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INDEPENDENT AUDITORS' LIMITED ASSURANCE REPORT

The Board of Directors and Stockholders
ASE Technology Holding Co., Ltd.

We have performed a limited assurance engagement on the Corporate Social Responsibility Report ("the Report") of ASE Technology Holding Co., Ltd. ("the Company") for the year ended December 31, 2019.

Responsibilities of Management for the Report

Management is responsible for the preparation of the Report in accordance with Taiwan Stock Exchange Corporation Rules Governing the Preparation and Filing of Corporate Social Responsibility Reports by TWSE Listed Companies and GRI Standards for core option and other applicable rules according to its sector features, and for such internal control as management determines is necessary to enable the preparation of the Report that are free from material misstatement.

Auditors' Responsibilities for the Limited Assurance Engagement Performed on the Report

Except as stated in the following paragraph, we conducted our work on the Report in accordance with the International Standard on Assurance Engagements 3000 (Revised) (ISAE 3000 (Revised)) to express our conclusion on whether the information in the Report was stated fairly, in all material respects, in accordance with the abovementioned reporting criteria. The nature, timing and extent of procedures performed in a limited assurance engagement are different from and more limited than a reasonable assurance engagement and, therefore, a lower assurance level is obtained than a reasonable assurance.

The information on greenhouse gas emission (scope 1, scope 2 and scope 3) and related energy and electricity consumption that is disclosed in the Report has been verified by other third party verification organization. Thus, the scope of this Independent Auditor's Limited Assurance Report does not include conclusion on the disclosure of information on greenhouse gas emission (scope 1, scope 2 and scope 3) and related energy and electricity consumption.

We applied professional judgment in the planning and conduct of our work to obtain evidence supporting the limited assurance. Because of the inherent limitations of any internal control, there is an unavoidable risk that even some material misstatements may remain undetected. The procedures we performed include, but not limited to:

- Obtaining and reading the Report.

- Inquiring management and personnel involved in the preparation of the Report to understand the policies and procedures for the preparation of the Report.

- 1 -

- Inquiring the personnel responsible for the preparation of the Report to understand the process, controls, and information systems in the preparation of the Report.

- Analyzing and examining, on a test basis, the documents and records supporting the Report.

Independence and Quality Controls

We have complied with the independence and other ethical requirements of The Norm of Professional Ethics for Certified Public Accountant in the Republic of China, which contains integrity, objectivity, professional competence and due care, confidentiality and professional behavior as the fundamental principles. In addition, the firm applies Statement of Auditing Standard No. 46 "Quality Control for Public Accounting Firms" issued by the Accounting Research and Development Foundation of the Republic of China and, accordingly, maintains a comprehensive system of quality controls, including documented policies and procedures regarding compliance with ethical requirements, professional standards, and applicable legal and regulatory requirements.

Conclusion

Based on the procedures performed and evidence obtained, nothing has come to our attention that causes us to believe that the information in the Report is not stated fairly, in all material respects, in accordance with the abovementioned reporting criteria.

Deloitte & Touche
Taipei, Taiwan
Republic of China

July 30, 2020

Notice to Readers

For the convenience of readers, the independent auditors' limited assurance report has been translated into English from the original Chinese version prepared and used in the Republic of China. If there is any conflict between the English version and the original Chinese version or any difference in the interpretation of the two versions, the Chinese-language independent auditors' limited assurance report shall prevail.

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102-18	Governance structure	2.1 Organization and Structure 3.1 Board of Directors	13 33

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102-19	Delegating authority	2.1 Organization and Structure	13
102-20	Executive-level responsibility for economic, environmental, and social topics	2.1 Organization and Structure	13
102-22	Composition of the highest governance body and its committees	3.1 Board of Directors	33
102-23	Chair of the highest governance body	3.1 Board of Directors	33
102-25	Conflicts of interest	3.1 Board of Directors	33
102-26	Role of highest governance body in setting purpose, values, and strategy	2.1 Organization and Structure 3.1 Board of Directors	13 33
102-27	Collective knowledge of highest governance body	3.1 Board of Directors	33-34
102-28	Evaluating the highest governance body's performance	3.1 Board of Directors	34
102-29	Identifying and managing economic, environmental, and social impacts	2.1 Organization and Structure 3.1 Board of Directors	13 33-34
102-32	Highest governance body's role in sustainability reporting	This report was approved and authorized by the Chairman of Corporate Sustainability Committee.	-
102-33	Communicating critical concerns	2.1 Organization and Structure 3.1 Board of Directors	13 33-34
102-40	List of stakeholder groups	2.4 Materiality Assessment and Stakeholder Communication	27-30
102-41	Collective bargaining agreements	6.2 Talent Attraction and Retention	93
102-42	Identifying and selecting stakeholders	2.4 Materiality Assessment and Stakeholder Communication	27-30
102-43	Approach to stakeholder engagement	2.4 Materiality Assessment and Stakeholder Communication	27-30
102-44	Key topics and concerns raised	2.4 Materiality Assessment and Stakeholder Communication	27-30

GRI Standard	Disclosure	Related Section / Explanatory Notes	Page No.
102-45	Entities included in the consolidated financial statements	ABOUT OUR REPORTING The scope of the Report encompasses our principal manufacturing subsidiaries but excluding wholly owned intermediate holding companies, internal trading companies, companies in their first post-merger year and companies with less than a year operation.	-
102-46	Defining report content and topic Boundaries	2.4 Materiality Assessment and Stakeholder Communication	27-30
102-47	List of material topics	2.4 Materiality Assessment and Stakeholder Communication	27-30
102-48	Restatements of information	There is no restatement of information from previous report.	-
102-49	Changes in reporting	No changes to material topics and their boundaries in the previous year.	-
102-50	Reporting period	2019.01.01 ~ 2019.12.31	-
102-51	Date of most recent report	The previous report was published in July 2019.	-
102-52	Reporting cycle	We publish CSR Report annually.	-
102-53	Contact point for questions regarding the report	ABOUT OUR REPORTING	3
102-54	Claims of reporting in accordance with the GRI Standards	ABOUT OUR REPORTING	3
102-55	GRI content index	Appendix: GRI Content Index	138-143
102-56	External assurance	ABOUT OUR REPORTING Third Party Assurance Statement	3 137

GRI 201: Economic Performance 2016 (GRI 103: Management Approach 2016)

GRI Standard	Disclosure	Related Section / Explanatory Notes	Page No.
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	LETTER FROM THE CHAIRMAN 1.3 Financial Performance	7-8 12
103-3	Evaluation of the management approach	LETTER FROM THE CHAIRMAN 1.3 Financial Performance	7-8 12
201-1	Direct economic value generated and distributed	1.3 Financial Performance 2.3 UN Sustainable Development Goals and Sustainable Value Assessment	12 22

GRI Standard	Disclosure	Related Section / Explanatory Notes	Page No.
201-2	Financial implications and other risks and opportunities due to climate change	5.1 Climate Leadership	65-70
201-4	Financial assistance received from government	ASEH is entitled to tax incentive. Please refer to page 90 of our English Annual Report or page 85 of our Chinese Annual Report.	-

GRI 204: Procurement Practices 2016 (GRI 103: Management Approach 2016)

GRI Standard	Disclosure	Related Section / Explanatory Notes	Page No.
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	7.3 Supply Chain Sustainability Management	108
103-3	Evaluation of the management approach	7 Responsible Procurement - 2019 Key Performance	104
204-1	Proportion of spending on local suppliers	7.1 Supply Chain Overview	105-106

GRI 205: Anti-corruption 2016 (GRI 103: Management Approach 2016)

GRI Standard	Disclosure	Related Section / Explanatory Notes	Page No.
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	3.3 Business Ethics	37-38
205-2	Communication and training about anti-corruption policies and procedures	3.3 Business Ethics 7.2 Supply Chain Management Framework	37-38 106
205-3	Confirmed incidents of corruption and actions taken	3.3 Business Ethics In 2019, ASEH did not engage in any political contributions.	37-38

GRI 206: Anti-competitive Behavior 2016 (GRI 103: Management Approach 2016)

GRI Standard	Disclosure	Related Section / Explanatory Notes	Page No.
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	3.3 Business Ethics	37-38
103-3	Evaluation of the management approach	3.3 Business Ethics	37-38
206-1	Legal actions for anticompetitive behavior, antitrust, and monopoly practices	In 2019, ASEH was not subjected to any legal actions regarding anti-competitive behavior and violations of anti-trust and monopoly legislation.	

GRI Standard	Disclosure	Related Section / Explanatory Notes	Page No.
GRI 302: Energy 2016 (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	5.1 Climate Leadership	65-70
103-3	Evaluation of the management approach	5.1 Climate Leadership	65-70
302-1	Energy consumption within the organization	5.1 Climate leadership - Fossil (non-renewable) fuel, Power usage	72
302-3	Energy intensity	5.1 Climate leadership - Power usage	72
302-4	Reduction of energy consumption	5.1 Climate leadership - Energy conservation and carbon footprint reduction	73-74
GRI 303: Water and Effluents 2018 (GRI 103: Management Approach 2016)			
103-1 2016	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2 2016	The management approach and its components	5.2 Water Resource	76-78
103-3 2016	Evaluation of the management approach	5.2 Water Resource	76-78
303-1	Interactions with water as a shared resource	5.2 Water resource - Three-stage risk assessment	76
303-2	Management of water discharge related impacts	5.2 Water resource - Waste water management and control	78
303-3	Water withdrawal	5.2 Water resource- Water withdrawal and reuse	77
303-4	Water discharge	5.2 Water resource - Waste water management and control	78
303-5	Water consumption	5.2 Water resource- Water withdrawal and reuse	77
GRI 305: Emissions 2016 (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	5.1 Climate Leadership	65
103-3	Evaluation of the management approach	5.1 Climate Leadership	65

GRI Standard	Disclosure	Related Section / Explanatory Notes	Page No.
305-1	Direct (Scope 1) GHG emissions	5.1 Climate leadership - Greenhouse gas emissions management	71
305-2	Energy indirect (Scope 2) GHG emissions	5.1 Climate leadership - Greenhouse gas emissions management	71
305-3	Other indirect (Scope 3) GHG emissions	5.1 Climate leadership - Greenhouse gas emissions management	71
305-4	GHG emissions intensity	5.1 Climate leadership - Greenhouse gas emissions management	71
305-5	Reduction of GHG emissions	5.1 Climate leadership - Greenhouse gas emissions management	71
305-6	Emissions of ozone-depleting substances (ODS)	5.4 Green Facility- Air Emissions Control	82
305-7	Nitrogen oxides, sulfur oxides, and other significant air emissions	5.4 Green Facility- Air Emissions Control	82
GRI 306: Effluents and Waste 2016 (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	5.2 Water Resource / 5.3 Waste	76 / 79
103-3	Evaluation of the management approach	5.2 Water Resource / 5.3 Waste	76 / 79
306-1	Water discharge by quality and destination	Appendix: Sustainability Data - Environmental Data	127-130
306-2	Waste by type and disposal method	5.3 Waste	79
306-3	Significant spills	No significant spill in 2019	-
GRI 307: Environmental Compliance 2016 (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	3.6 Regulatory Compliance	49
103-3	Evaluation of the management approach	2.2 Sustainability Strategies – Sustainability Vision / 3.6 Regulatory Compliance	19 / 49
307-1	Non-compliance with environmental laws and regulations	5.5 Environmental Expenditures and Investments	84

GRI Standard	Disclosure	Related Section / Explanatory Notes	Page No.
GRI 308: Supplier Environmental Assessment 2016 (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	7.3 Supply Chain Sustainability Management - Supplier Sustainability Risk Assessment	109-110
103-3	Evaluation of the management approach	7 Responsible Procurement - 2019 Key Performance	104
308-1	New suppliers that were screened using environmental criteria	7.3 Supply Chain Sustainability Management - Supplier Sustainability Requirement/ Supplier Sustainability Risk Assessment	108-110
308-2	Negative environmental impacts in the supply chain and actions taken	7.3 Supply Chain Sustainability Management - Supplier Sustainability Requirement/ Supplier Sustainability Risk Assessment	108-110
GRI 401: Employment 2016 (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	6.1 Global Recruitment and Diversity	89-90
103-3	Evaluation of the management approach	6.1 Global Recruitment and Diversity	89-90
401-1	New employee hires and employee turnover	6.1 Global Recruitment and Diversity Appendix: Social Data – A. Global Workforce Structure	89 131
401-2	Benefits provided to fulltime employees that are not provided to temporary or part-time employees	ASEH has provided all full-time employees with comprehensive insurance / parental leave / retirement schemes.	-
401-3	Parental leave	Appendix: Social Data – D. Statistics Regarding Parental Leave	133
GRI 402: Labor/Management Relations 2016 (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	6.2 Talent Attraction and Retention	91-93
103-3	Evaluation of the management approach	6.2 Talent Attraction and Retention - Employee Communication	93

GRI Standard	Disclosure	Related Section / Explanatory Notes	Page No.
402-1	Minimum notice periods regarding operational changes	Regarding employee discharges and layoffs, all ASEH sites notify their employees of significant changes to collective agreements in advance pursuant to local laws and regulations. Any labor-management dispute regarding collective agreements is submitted to the employee representatives in writing for further negotiation.	-
GRI 403: Occupational Health and Safety 2018 (GRI 103: Management Approach 2016)			
103-1 2016	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2 2016	The management approach and its components	6.4 Occupational Health and Safety	97-102
103-3 2016	Evaluation of the management approach	6.4 Occupational Health and Safety	97-102
403-1	Occupational health and safety management system	6.4 Occupational Health and Safety	97
403-2	Hazard identification, risk assessment, and incident investigation	6.4 Occupational Health and Safety	97-99
403-3	Occupational health services	6.4 Occupational Health and Safety	97-102
403-4	Worker participation, consultation, and communication on occupational health and safety	6.4 Occupational Health and Safety	97-102
403-5	Worker training on occupational health and safety	6.4 Occupational Health and Safety	97-102
403-6	Promotion of worker health	6.4 Occupational Health and Safety	97-102
403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	6.4 Occupational Health and Safety	97-102
403-8	Workers covered by an occupational health and safety management system	6.4 Occupational Health and Safety Appendix: Social Data – F. Workers Occupational Health and Safety Statistics	97-102 134
403-9	Work-related injuries	6.4 Occupational Health and Safety Appendix: Social Data – F. Workers Occupational Health and Safety Statistics	97-102 134

GRI Standard	Disclosure	Related Section / Explanatory Notes	Page No.
403-10	Work-related ill health	6.4 Occupational Health and Safety Appendix: Social Data - F. Workers Occupational Health and Safety Statistics	97-102 134
GRI 404: Training and Education 2016 (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	6.3 Talent Cultivation and Development	93-96
103-3	Evaluation of the management approach	6.3 Talent Cultivation and Development	93-96
404-1	Average hours of training per year per employee	6.3 Talent Cultivation and Development Appendix: Social Data - E. 2019 Average Hours of Training per person	93-96 133
404-2	Programs for upgrading employee skills and transition assistance programs	6.3 Talent Cultivation and Development ASEH does not provide terminated employees with any continued employability or career transition assistance.	93-96
404-3	Percentage of employees receiving regular performance and career development reviews	6.2 Talent Attraction and Retention	91-93
GRI 408: Child Labor 2016 (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	3.5 Human Rights Management 7.3 Supply Chain Sustainability Management	45-48 108
103-3	Evaluation of the management approach	3.5 Human Rights Management 7.3 Supply Chain Sustainability Management	45-48 108
408-1	Operations and suppliers at significant risk for incidents of child labor	3.5 Human Rights Management 7.3 Supply Chain Sustainability Management No significant risk of hire child labor and young workers exposed to hazardous work.	45-48 108

GRI Standard	Disclosure	Related Section / Explanatory Notes	Page No.
GRI 409: Forced or Compulsory Labor 2016 (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	3.5 Human Rights Management 7.3 Supply Chain Sustainability Management	45-48 108
103-3	Evaluation of the management approach	3.5 Human Rights Management 7.3 Supply Chain Sustainability Management	45-48 108
409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	3.5 Human Rights Management 7.3 Supply Chain Sustainability Management Non-significant risk for incidents of forced or compulsory labor either.	45-48 108
GRI 412: Human Rights Assessment 2016 (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	3.5 Human Rights Management	45-48
103-3	Evaluation of the management approach	3.5 Human Rights Management	45-48
412-2	Employee training on human rights policies or procedures	3.5 Human Rights Management All employees trained in human rights policies procedures concerning.	45-48
GRI 414: Supplier Social Assessment 2016 (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	7.3 Supply Chain Sustainability Management - Supplier Sustainability Requirement/ Supplier Sustainability Risk Assessment	108-110
103-3	Evaluation of the management approach	7. Responsible Procurement - 2019 Key Performance	104
414-1	New suppliers that were screened using social criteria	7.3 Supply Chain Sustainability Management - Supplier Sustainability Requirement/ Supplier Sustainability Risk Assessment	108-110

GRI Standard	Disclosure	Related Section / Explanatory Notes	Page No.
414-2	Negative social impacts in the supply chain and actions taken	7.3 Supply Chain Sustainability Management - Supplier Sustainability Requirement/ Supplier Sustainability Risk Assessment	108-110
GRI 418: Customer Privacy 2016 (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	3.7 Information Security Management	50-52
103-3	Evaluation of the management approach	3.7 Information Security Management	50-52
418-1	Substantiated complaints concerning breaches of customer privacy and losses of customer data	We don't have any substantiated complaints regarding breaches of customer privacy and losses of customer data in 2019.	-
GRI 419: Socioeconomic Compliance 2016 (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	3.6 Regulatory Compliance	49
103-3	Evaluation of the management approach	3.6 Regulatory Compliance	49
419-1	Non-compliance with laws and regulations in the social and economic area	ASEH did not receive significant fines or non-monetary sanctions for non-compliance with laws and/or regulations in the social and economic area in 2019. (By "significant violations", we mean the fine/penalty individually costs more than $10,000 USD)	-
Customer Relationship Management (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	4.3 Products and Services - Customer Service	62
103-3	Evaluation of the management approach	4.3 Products and Services - Customer Service	62

GRI Standard	Disclosure	Related Section / Explanatory Notes	Page No.
Innovation Management (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	4.1 R&D and Innovation	54-58
103-3	Evaluation of the management approach	4.1 R&D and Innovation	54-58
Green Solutions (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	4.2 Sustainable Manufacturing	59-61
103-3	Evaluation of the management approach	4.2 Sustainable Manufacturing	59-61
Social Involvement (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	8. Corporate Citizenship	115
103-3	Evaluation of the management approach	8. Corporate Citizenship - 2019 Key Performance	116
Local Communities (GRI 103: Management Approach 2016)			
103-1	Explanation of the material topic and its Boundary	2.4 Materiality Assessment and Stakeholder Communication	27-30
103-2	The management approach and its components	8.1 Social Involvement Overview	119
103-3	Evaluation of the management approach	8.1 Social Involvement Overview	119

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