Corporate Social Responsibility

7.1 Overview

As the world's largest dedicated semiconductor foundry, TSMC has not only strived for the highest achievements in its core business of dedicated IC foundry services but has also actively sought to fulfill its corporate social responsibility (CSR). In this regard, TSMC focuses on three primary missions: integrity, strengthening environmental protection and caring for the disadvantaged. And in so doing the Company collaborates with all stakeholders – employees, shareholders, customers, suppliers, and community – to drive continuous positive change for society.

Guidance for the Implementation of CSR

Following its vision of uplifting society, TSMC Corporate Social Responsibility Policy is the Company's overall guide for sustainable development. The CSR matrix clearly defines the scope of the Company's responsibilities. The horizontal axis shows the seven areas where TSMC aims to set a benchmark for sustainability: morality, business ethics, economy, rule of law, sustainability, work/life balance and happiness, and philanthropy. On the vertical axis are actions that TSMC has taken to implement its responsibilities.

TSMC CSR Matrix

TSMC \ Society	Morality	Business Ethics	Economy	Rule of Law	Sustainability	Work/Life Balance Happiness	Philanthropy
Integrity	V	V					
Law Compliance				V			
Anti-Corruption Anti-Bribery Anti-Cronyism	V	V		V			
Environmental Protection Climate Control Energy Conservation				V	V		
Corporate Governance		V	V	V			
Provide Well-Paying Jobs			V			V	
Good Shareholder Return			V				
Employees' Work-Life Balance						V	
Encourage Innovation		V	V				
Good Work Environment						V	
TSMC Charity Foundation					V	V	V
TSMC Education and Culture Foundation					V	V	V

CSR Management

In compliance with the vision and missions of TSMC Corporate Social Responsibility Policy, in 2019 TSMC further established the Corporate Social Responsibility Executive Committee as the highest-level CSR decision-making center within the Company to align more closely with international sustainability trends. TSMC's Chairman chairs the CSR Executive Committee, and the Chairperson of the CSR Committee serves as Executive Secretary. Together with senior executives from a wide variety of functions, they survey the Company's core operating capabilities, set the medium- to long-term strategic direction for CSR, and draft the blueprint to link the Company's core competencies with the UN sustainable development goals (SDGs). The existing CSR Committee serves as a cross-departmental communication platform. Through quarterly meetings and issue-based discussions by cross-organizational teams, the committee members jointly set the Company's CSR strategies and key issues for the year, draft CSR-related budgets for their organizations and coordinate resource deployment, as well as plan and carry out annual projects. The Committee achieves sustainability objectives of interest to all stakeholders and ensures CSR strategies are implemented effectively in the Company's daily operations.

The Chairperson of the CSR Committee reports annually to the Board of Directors on implementation results of the prior year and the work planned for the upcoming year. In 2019, TSMC focused on strengthening green manufacturing performance to develop various resource renewal technologies, apply circular economy, and undertake renewable energy adoption. To build a sustainable supply chain, the Company performed supplier risk assessments and implemented a signed supplier code of conduct. To have a positive social impact, the TSMC Education and Culture Foundation and the TSMC Charity Foundation also actively support and promote youth development, culture and art, and care for the disadvantaged.

The Company's CSR plans for 2020 focus on further promotion of green manufacturing by driving circular economics and renewable energy adoption and by building a responsible green supply chain through strengthening human rights, environmental protection and sustainable development among upstream and downstream suppliers. TSMC spares no effort to perform its corporate social responsibility and aspires to be an uplifting force for the society.

Stakeholder Engagement

TSMC respects shareholder rights. In order to understand the level of stakeholder interest in sustainability issues, TSMC uses multiple systematic channels to communicate with stakeholders, including the "Contact Us" section of the corporate website, the CSR website and the CSR mailbox, as well as the Irregular Business Conduct Reporting System. TSMC has conducted three studies focused on identification, prioritization and validation with regard to these issues.

In 2019, the TSMC Corporate Social Responsibility mailbox received 371 valid emails on subjects ranging from corporate governance, innovation and services, to supply chain, green manufacturing, workplace, and social issues. Submissions were primarily regarding requests for visits, inquiries on operations, opinion and feedback from the public, and proposals for donations and collaborations. TSMC responded through direct action from related departments and timely replies from the public relations department, supporting communication with the public as well as positive development in society.

Stakeholders and Communication Channels in 2019

Stakeholders	Communication Channels
Employees	• Communications and working meetings throughout all levels and all units of the Company • Corporate intranet, internal emails and other announcement channels (such as promotion posters at facilities) • Human resources representatives • Employee training and classroom courses • Regular and ad-hoc communication meetings, such as Manager Development Consulting Committee, Operations Engineer Training Committee, Manufacturing Department Technical Committee, etc. • Employee voice channels, such as Immediate Response System, Employee Opinion Box, Wellness Center, wellness website, each function's PIP committee, Employee PIP Opinion Dedicated Line, etc. • Ombudsman System • Audit Committee Whistleblower System • EWC event questionnaire survey • The biennial "Employee Opinion Survey on Company Core Values"
Shareholders/Investors	• Annual general meeting of shareholders • Quarterly earnings conference call • Investor conferences and face-to-face meetings • Telephone calls and emails • Annual reports, CSR reports, 20-F filings to US SEC, material announcements to Taiwan Stock Exchange, and corporate press releases on the Company's website
Customers	• Customer satisfaction survey • Customer meetings • Customer audits • Business and technology assessment • Email responses to the issues that customers are concerned
Suppliers	• Supplier meetings • Supplier onsite audits • Supply Chain Management Forum • Supply Chain ESH Forum • Supplier Ethics and Code of Conduct Promotion • On-site consult and audit • Advanced Process Material Workshop • Supplier self-assessment questionnaire and Supplier Survey on Ethics
Government	• Official correspondence and visits • Industry experience and advice sharing • Meetings (such as communication meetings, public hearings, forums, seminars or social gatherings) • Communication with government authorities through industry organizations, including the Association of Science Park Industries, Taiwan Semiconductor Industry Association, World Semiconductor Council, and Chinese National Federation of Industries
Society	• Arts events in the communities • Sponsorship of youth development events • Sponsorship of charity projects and emergency aid • Sponsorship of non-profit organizations to support educational projects • Professorship endowments and student scholarships at universities • Project collaboration and visits • Support of non-profit organizations and institutions via monetary and in-kind donation, as well as providing necessary manpower for a good cause • Regular visits to National Museum of Science, Hsinchu Veterans Home, St. Teresa Children Center, Jacana Ecology Education Park, remote schools and TSMC ecological parks to provide volunteer services • Annual volunteer activities in collaboration with TSMC fabs and divisions • TSMC corporate social responsibility website, newsletters and mailbox • "Sending Love" charity platform

Responsibilities of TSMC CSR Committee Members

Committee Members	Responsibilities	Stakeholders
Legal	Corporate Governance, Code of Conduct, Legal Compliance (including fair competition, privacy and personal information, and protection for whistle-blowers), Intellectual Property, Protection of Confidential Information	Employees Government Society (Note)
Customer Service	Customer service and satisfaction, customer trust, customer confidentiality, RBA and its code of conduct	Customers
Materials Management	Materials and supply chain risk management, supplier management, conflict minerals, RBA and its code of conduct	Suppliers
Quality and Reliability	Product quality and reliability, product recall mechanism	Customers Suppliers
Research and Development	Innovation management, green products	Employees Customers Suppliers
Risk Management	Risk management, crisis management, emergency response and action plan	Employees Investors Customers Suppliers Government Society
Finance	Financial disclosure, dividend policy, tax strategy	Employees Investors Customers Suppliers Government
Investor Relations	Resolving issues of stakeholder concern, establishing trusting long-term relationships, effective two-way communication, annual report production	Investors
Operations	Operational eco-efficiency, pollution prevention, water resource risk management, green manufacturing	Customers Investors Suppliers
Environment, Safety and Health	Environmental policy and management system, climate change mitigation and adaption, pollution prevention, energy consumption efficiency, carbon emissions and carbon rights management, product environmental responsibility, response mechanism for environmental issues, environmental spending, green supply chain, policy and management systems for occupational health and safety, workplace health and safety, occupational disease prevention and health promotion, communication of ESH regulations	Employees Investors Customers Suppliers Government Society
Human Resources	Talent attraction and retention, proprietary information protection, employees' physical and mental well-being and work-life balance, labor-management relations and employee engagement, labor rights, training and development, mobility, RBA and its code of conduct	Employees
TSMC Education and Culture Foundation, TSMC Charity Foundation	Philanthropy, community relations	Society
Public Relations	Stakeholder engagement, mechanism for reflecting issues of social concern, media relations	Society

Note: Society includes community, non-governmental organizations, non-profit organizations and the public.

TSMC believes that technological progress and corporate growth are only meaningful in a sustainable society and environment. As the only semiconductor company chosen for the Dow Jones Sustainability World Indices over the past 19 consecutive years, TSMC is clearly committed to "responsible operations," and actively creates sustainable values in the economy, the environment and society for its stakeholders.

As the world's largest dedicated IC foundry, TSMC is aware that customer trust is enhanced if the Company follows the law and values corporate governance. Investors will be more willing to invest in the Company over the long-term if the Company maintains solid financial performance and a sustainable dividend policy. Through a reciprocal commitment between the Company and its employees, TSMC carries out its core values -Integrity, Commitment, Innovation, and Customer Trust, and exerts its influence as an industry leader in encouraging suppliers to devote more resources to better operations, greener factories and a more responsible supply chain. TSMC combines the strengths that drive society forward and hopes to build a future of common good together with the engagement of all stakeholders.

2019 CSR Awards, Recognitions and Ratings

Category	Organization	Awards and Recognitions
Overall CSR	Dow Jones Sustainability Indices (DJSI)	• Dow Jones Sustainability World Index for the 19th consecutive year • Dow Jones Sustainability Emerging Markets Index
	MSCI ESG Indexes	• MSCI ACWI ESG Leaders Index component • MSCI ESG Research – AA Ratings • MSCI ACWI SRI Index component
	ISS ESG	• "Prime" rated by ISS ESG Corporate Rating
	Corporate Knights	• Global 100 Most Sustainable Corporations
	CommonWealth Magazine	• Corporate Social Responsibility Award – Large cap –1st Place
	Taiwan Institute of Sustainable Energy	• The Most Prestigious Sustainability Awards – Top Ten Domestic Corporates • Taiwan Top 50 Corporate Responsibility Report Awards – IT & IC Manufacturing – Platinum Award • Industry Sustainable Water Management Awards • Climate Leadership Awards • Circular Economy Leadership Award
Economy, Governance	Institutional Investor Magazine	• Most Honored Company (Technology/Semiconductors) – All-Asia • Best ESG/SRI Metrics (Technology/Semiconductor) – 1st Place (buy-side and sell-side) – All-Asia • Best Corporate Governance (Technology/Semiconductor) – 1st Place (buy-side and sell-side) – All-Asia • Best CEO (Technology/Semiconductor) – 1st Place (buy-side and sell-side) – All-Asia • Best CEO (Technology/Semiconductor) – 1st Place (buy-side) – All-Asia • Best CFO (Technology/Semiconductor) – 1st Place (buy-side and sell-side) – All-Asia • Best CFO (Technology/Semiconductor) – 1st Place (buy-side) – All-Asia • Best Investor Relations Program (Technology/Semiconductor) – 1st Place (buy-side and sell-side) – All-Asia • Best Investor Relations Program (Technology/Semiconductor) – 1st Place (buy-side) – All-Asia • Best Investor Relations Professional (Technology/Semiconductor) – 1st Place (buy-side and sell-side) – All-Asia
	IFI Claims	• 2019 Top 50 US Patent Assignees
	Forbes	• Top Regarded Companies • Asia's Best over a Billion • Top 100 Digital Companies • Global 2000
	FORTUNE	• Fortune Global 500
	Nikkei Asian Review	• Asia 300 Power Performers
	Germany Federal Office for Information Security	• Common Criteria, ISO/IEC 15408- EAL6 Site Certification – Fab 14B
	Business Today	• Top 1,000 Enterprises in Taiwan, Hong Kong and Mainland China
	Taiwan Stock Exchange	• Top 5% in Corporate Governance Evaluation of Listed Companies for the 5th consecutive year
	R.O.C. Ministry of Economic Affairs Intellectual Property Office	• Ranked No. 1 in Top 100 Patent Applicants in Taiwan for the 4th consecutive year
	PricewaterhouseCoopers	• Global Top 100 Companies by market capitalization for the 7th consecutive year
	Ministry of Finance	• Outstanding Business Entity Award
	Corporate Synergy Development Center	• Taiwan Continuous Improvement Award – Gold Tower Award – Advanced Packaging Technology and Service, Intelligent Manufacturing Center, Fab 14A, Fab 10 Fab 8 • Taiwan Continuous Improvement Award – Silver Tower Award – Fab12A • Taiwan Continuous Improvement Award – Best Improvement Innovation Award – Fab 14A, Fab 10
Environment, Safety and Health	U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) certification	• "Gold" class certification – Fab 16 P1 Manufacturing Facility
	R.O.C. Ministry of the Interior "Ecology, Energy Saving, Waste Reduction and Health (EEWH)" certification	• "Diamond" class of green building certification – Fab 15 P6 Manufacturing Facility
	R.O.C. Ministry of Economic Affairs	• Excellence in Carbon Reduction Award – Fab 5, Fab 15A
	R.O.C. Sports Administration, Ministry of Education	• Taiwan iSports – Certificate of Corporate Wellness
Society	FORTUNE	• 2019 World's Most Admired Companies
	Cheers	• Top 10 Most Admired Companies to Young Generations
	Forbes	• World's Best Employers
	R.O.C. Ministry of Culture	• The 14th Arts and Business Awards – Gold Award

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7.2 Environmental, Safety and Health (ESH) Management

TSMC believes its environmental, safety and health practices must not only meet legal requirements, but should also align to internationally recognized practices. TSMC's ESH policies aim to achieve "zero incident" and "environmental sustainability", and to make TSMC a world-class company in environmental, safety and health management. The Company's strategies for attaining these goals are to comply with regulations, promote safety and health, strengthen recycling and pollution prevention, manage ESH risks, instill an ESH culture, establish a green supply chain, and fulfill its related corporate social responsibilities.

All TSMC manufacturing facilities have received ISO 14001: 2015 certification for environmental management systems and OHSAS 18001: 2007 certification for occupational safety and health management systems. All fabs in Taiwan have been TOSHMS (Taiwan Occupational Safety and Health Management System) certified since 2009. The International Organization for Standardization (ISO) released the final version of ISO 45001:2018 to replace OHSAS 18001 in March 2018. All TSMC fabs in Taiwan received ISO 45001: 2018 certification in August 2019. All TSMC subsidiaries plan to obtain certification in 2020.

TSMC strives for continuous improvement and actively seeks to enhance climate-change management, pollution prevention and control, power and resource conservation, waste reduction and recycling, safety and health management, fire and explosion prevention as well as to minimize the impact of earthquake damage, so as to reduce overall environmental, safety and health risks.

In order to meet regulatory and customer requirements for the management of hazardous materials, TSMC has adopted the IECQ QC 080000 Hazardous Substance Process Management (HSPM) System. All TSMC manufacturing facilities have been QC 080000 certified since 2007. By practicing QC 080000, TSMC ensures that its products comply with International regulatory and customer requirements, including the European Union's "Restriction of Hazardous Substances (RoHS) Directive," the EU's "Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)," the "Montreal Protocol on Substances that Deplete the Ozone Layer" (the "halogen-free in electronic products" initiative), Perfluorooctane Sulfonates (PFOS), Perfluorooctanoic Acid (PFOA) and its related substances restriction standards. In addition, TSMC has started a project for reducing usage of hazardous substance N-methylpyrrolidinone (NMP) since 2016. In 2019, the project reduced NMP usage by 38%, and we will keep promoting further reduction.

Since 2011, TSMC has adopted the ISO 50001 Energy Management System for the continuous improvement in energy conservation. In 2019, all TSMC fabs in Taiwan received ISO 50001 Energy Management System certification, and we expect TSMC overseas subsidiaries to receive the certification by 2020.

Aiming to establish the healthiest workplace, in 2017 TSMC formed a corporate-level health promotion committee led by managers with vice president level. The committee members include site directors, managers of safety and health department, and representatives from wellness, HR and legal affairs divisions. We also have invited external experts to discuss the potential risks of occupational diseases in the semiconductor manufacturing process, and have developed prevention plans for such diseases. To mitigate health risks to employees, suppliers and contractors in the workplace, TSMC has adopted rigorous safety and health control measures to prevent occupational injuries and diseases and promote employee safety, physical and mental health.

To mitigate the supply chain risk and fulfill corporate social responsibility, TSMC not only follows ESH best practices internally but also strives to improve ESH performance of the Company's suppliers and contractors through audits and counselling.

TSMC uses priority work management and self-management to govern works performed by contractors. The Company requires contractors performing level-one high-risk operations to complete certification for technicians and to establish their own ISO 45001 or OHSAS 18001 safety and health management system. The promotion of self-management aims at improving sense of responsibility of TSMC's contractors, with the goal of promoting safety awareness and technical improvement for all contractors in the industry. For onsite contractor personnel, TSMC standardizes the training courses for safety and health, while increasing the frequency of such courses, to improve training effectiveness and safety awareness. To ensure our safety protocols are accurately delivered to our contractors on a timely manner, TSMC has established a digital platform for mutual communications, so that on-site operational risks can be mitigated.

TSMC collaborates with suppliers to improve the sustainability of the Company's supply chain regarding ESH-related issues, such as environmental protection, compliance of safety and hygiene codes, hazardous substance management, fire protection, and mitigation of natural disaster. The Company not only performs ESH audits at its suppliers' manufacturing sites, but also proactively assists them to improve ESH performance.

In addition, TSMC also monitors potential climate-change related risks in the supply chain. The Company requests that suppliers conduct carbon emissions inventory and encourages them to implement measures to save energy, reduce carbon emissions, conserve water and reduce waste.

In recent years, TSMC suppliers' performances in pollution control and safety management have made good progress in procedure establishment and implementation. To take a step further, the Company gives greater attention to occupational hygiene issues directly related to labor health. Since 2017, TSMC and the Ministry of Labor Occupational Safety and Health Administration (OHSA) have jointly launched the "Semiconductor Supply Chain Safety and Health Promotion Project." TSMC invited suppliers to participate in the project. As engaged by OSHA, a professional team has taken on the responsibility of providing consultation through document review and onsite inspection to participating suppliers on management procedures and hardware setup in order to improve the working environment and labor health management.

7.2.1 Environmental Protection

Climate Change and Energy Management

- **Task Force on Climate-related Financial Disclosures (TCFD)**

  Given that climate change could potentially affect operations and pose financial risk, in 2018 TSMC began adopting the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) released by the Financial Stability Board (FSB) to identify risk and opportunities, and we established metrics and target management based on the identification results.

Management structure of TSMC climate-related risk and opportunity

Category	Management Actions
Governance	• Board of Directors periodically reviews climate change risk, opportunity and green manufacturing - The senior vice president of materials management and risk management makes annual reports to the Board of Directors on corporate risk and control measures including climate change risks - Corporate Social Responsibility (CSR) Executive Committee briefs the Board of Directors on green manufacturing targets and status of achievement semi-annually
	• CSR Executive Committee led by Chairman is the Company's top organization that deals with climate change management. The committee oversees TSMC climate change strategy and targets every half year and responds the Sustainable Development Goals through aggressive actions • The CSR committee follows the strategy and targets to review mitigation of climate change quarterly and briefs to the Board of Directors on results of climate change-related measures directly
	• The Energy and Carbon Reduction Committee is the organization for the implement and management on climate change risk and opportunity in TSMC. It is co-led by the senior vice presidents of Fab operations and senior vice presidents of materials management and risk management. This committee develops management plans, reviews the execution status and discusses future plans on a quarterly basis
Strategy	• Adopting Recommendations of the Task Force on Climate related Financial Disclosures to discuss and identify Climate risk and opportunity, which is divided into short term (less than 3 years), medium term (3 to 5 years), and long term (greater than 5 years) based on internal target management periods
	• Focusing the identified major risks and opportunities to evaluate potentials impact of Company operation, strategy and finance
	• Adopting the 2°C scenario defined by Intergovernmental Panel on Climate Change (IPCC) to analyze climate resilience of production lines • Adopting the scenario of Science Based Targets (SBT) to evaluate the financial impact to company and develop responding countermeasures in response to international carbon reduction trend
Risk Management	• Using the TCFD framework to identify climate change risks and hosting workshops to reach a consensus approved by senior management, also bring into mechanism of climate change management
	• Following the risk identification and ranking on climate change to develop relevant responding projects
	• Bringing identification and evaluation result of climate-related risk into enterprise risk management (ERM) for integration and creating action plans
Metrics and targets	• Defining the performance index of unit product of total greenhouse gas emissions, procurement amount of renewable energy and accumulated energy consumption and production interruption time and managing the responding actions of climate change
	• Conducting inventory of scope 1, 2 and 3 emission data annually according to ISO 14064-1 and evaluating the risks of scope 1, 2 and 3 and risk reduction strategies after passing external verification
	• TSMC sets up the targets of risk and opportunity in the year of 2030 according to the performance index on climate change. CSR committee and Energy and Carbon Reduction Committee review implementation actions and performance of climate change targets

Financial Impact Analysis of Climate Risks and Opportunities

Climate Risks	Potential Financial Impact	Climate Opportunities	Potential Financial Impact	2019 Actions
GHG emissions cap and carbon trading system	Restriction on capacity expansion, increase in operation costs	Participation in renewable energy plans Participation in carbon trading market	Early purchases of renewable energy, successfully increasing production capacity	• Look for and purchase more renewable energy in Taiwan continuously • Purchased 910 GWh in renewable energy, renewable energy certificates (REC), and carbon credit
GHG voluntary reduction commitments	Increased cost of installation for carbon reduction facilities and operating costs	Win public recognition / cooperation	Accumulate carbon credits in preparation for future production expansion	• Applied for Fluorinated-Greenhouse Gas and Dinitrogen Monoxide reduction offset project reward
Unstable utility supply	Impact on production, increase in operating costs	Construct green buildings	Lower utility costs	• Applied and received 4 green building certifications
		Increase efficiency of water consumption and water recycling	Strengthen climate resilience, lower the impact of disasters on production	• Built new fabs (Fab 18 Pahse 2, Fab 15 Phase 7B, and Fab 6 Phase 2) while maintaining a water recycling rate higher than 85% design
Cost of developing low carbon energy saving products	Increased cost of developing low-carbon energy saving products	Develop or increase energy-saving products or services	Satisfy customer demands for energy saving products, increase in revenue	• Invest in the development of energy-saving products
Impact on the Company's image	Unable to satisfy the expectations of stakeholders, impacting the Company's reputation or image	Increase investors' willingness to make long-term investments	Stabilize stakeholder structure, lower the risk of substantial fluctuations in stock prices	• Boost green production
Typhoon, Flood	Production is affected, causing financial losses and a decrease in revenue	Increase resilience against natural disasters	Strengthen climate resilience, lower risk of operations disruption, and reduce potential losses	• Raised the building base of Fab 18 Phase2 two meters higher
Drought				• Fab 18 Phase2 is committed to using and developing renewable water • Established a comprehensive water monitoring system
Rising Temperatures	Increase in energy consumption, cost, and carbon emissions	Driving low-carbon green manufacturing	Save energy and cut cost	• Conserved 300 GWh of electricity through energy-saving projects

Greenhouse Gas (GHG) Emission Reduction and Energy Management

TSMC actively participates in the World Semiconductor Council (WSC) in its efforts to establish a global voluntary PFC (perfluorinated compounds) emissions reduction goal for the decade of 2011 to 2020, and has incorporated past experience to develop best practices. The implementation of best practices has been adopted by the WSC as a major element of the 2020 goal. In 2013, in accordance with the "EPA Early Actions for Carbon Credit of Greenhouse Gases Reduction" regulation, TSMC applied for the recognition of greenhouse gas reduction from 2005 to 2011, and received 5.28 million tons of carbon dioxide credits in 2015. Those carbon credits can be used to offset greenhouse gas emissions of new manufacturing facilities regulated by Environmental Impact Assessment (EIA) Act, which can support the Company's sustainable operations and mitigate climate-change risk.

Since 2005, TSMC has completed the GHG (Greenhouse Gas) inventory program and taken a complete inventory of its GHG emissions to gain ISO 14064 certification. The inventory shows that the major direct GHG emissions are PFCs, which are widely used in the semiconductor manufacturing process. The primary indirect GHG emission is electricity consumption. The analysis of the inventory data is not only to meet domestic regulatory reporting requirements but also to serve as a baseline reference for TSMC's strategy to reduce GHG emissions.

In response to the commitment of global climate summit "Paris Agreement" and the Republic of China's "Greenhouse Gas Reduction and Management Act" promulgated in 2015, TSMC initiated a cross-functional platform for corporate carbon management in 2016. The three areas of focus of this platform are legal compliance, carbon emission reduction, and carbon credit acquisition. In addition to participating in official regulatory consultation and communications meetings, TSMC also sets short, medium and long-term reduction targets through the energy and carbon reduction committee led by vice presidents which are carried out by energy and carbon reduction teams of individual fabs, as the Company continues to strengthen climate mitigation and adaption. Because more than 75% of TSMC's GHG emissions come from electricity consumption, TSMC always emphasizes energy conservation and carbon reduction initiatives. TSMC has not only implemented energy-conserving designs in its manufacturing fabs and offices but has also continuously improved the energy efficiency of its facilities during operation. These efforts simultaneously reduce both carbon dioxide gas emissions and costs. TSMC has accumulated 1.2 billion kilowatt hours (kWh) power conservation since 2016.

From 2015 to 2017, TSMC actively participated in the Republic of China Ministry of Economic Affairs' voluntary green power purchasing program for three consecutive years and became the largest purchaser in Taiwan, purchasing 400 million kilowatt hours (kWh) of green power. Although the Taiwan Power Company has stopped selling green power since 2018, TSMC still aggressively negotiates the purchase of renewable energy with renewable energy suppliers in Taiwan. Targeting a long-term commitment of 100% renewable energy for the Company, TSMC is first committed to achieving a target of 25% renewable energy for fabs and 100% renewable energy for non-fab facilities by 2030. Since 2018, the overseas manufacturing fabs and offices have purchased renewable energy, REC and carbon credits to offset all carbon emissions caused by power consumption. All TSMC overseas sites achieved zero carbon emission of electricity consumption in 2019 again. Although development of renewable energy in Taiwan is at budding stage, TSMC established a renewable energy task force and continued to communicate with government closely through Association of Science Park Industries and Taiwan Semiconductor Industry Association. We gave some recommendations to government and hoped that the collaboration could speed up renewable energy development in Taiwan for instance, our recommendations included expanding the development of offshore wind power and increasing supply of renewable energy trading platform. TSMC also continued to find renewable energy. There are around 700MW of renewable energy under business negotiation currently. The renewable energy will be provided to TSMC gradually after related business process being completed. This is a clear manifestation of the Company's active support of the United Nations Sustainable Development Goals (SDGs).

Air and Water Pollution Control

The Company has installed effective air and water pollution control equipment in each wafer fab to meet regulatory emissions standards. In addition, TSMC maintains backup pollution control systems, including emergency power supplies, to lower the risk of pollutant emissions in the event of equipment failure. The Company centrally monitors the operations of its air and water pollution control equipment around the clock and treats system effectiveness as an important tracking item to ensure the quality of emitted air and discharged water.

To make the most effective use of Taiwan's limited water resources, all TSMC fabs strive to increase water reclamation rates by adjusting the water usage of manufacturing equipment and improving wastewater reclamation systems. All fabs meet or exceed the process water reclamation rate standard of the Science Park Administration. Some fabs are able to reclaim more than 90% of process water, outperforming most semiconductor fabs around the world. TSMC also makes every effort to reduce non-manufacturing-related water consumption, including water used in air conditioning systems, sanitary facilities, cleaning and landscaping activities and kitchens. TSMC uses an intranet website to collect and measure water recycling volumes company-wide.

Since water resources are inherently local, TSMC shares its water saving experiences with other semiconductor companies through the Association of Science-Based Industrial Park to promote water conservation in order to achieve the Science Park's goals and ensure a long-term balance of supply and demand. In addition, TSMC has committed to using partially reclaimed water in newly constructed fabs in the future in order to further reuse water resource and support the government policy and promotion for reclaimed water.

To continue enhancing water resource management, TSMC has adopted and followed the AWS Standard, the world's only sustainable water management standard. Early in 2019, Fab 6 and Fab 14 Phase 5/6/7 served as demonstration factories receiving AWS certification in December 2019 and making TSMC the first semiconductor enterprise to receive AWS platinum level certification in the world.

Waste Management and Recycling

The Company has a designated unit responsible for waste recycling and disposal. To meet the goal of sustainable resource utilization, TSMC's priorities are: process waste reduction, onsite regeneration and reuse, and offsite recycling. The last option consists of treatment or disposal. To achieve raw material reduction, resource recycling and the goal of zero waste, for example, the Company built an in-house waste sulfuric acid pre-treatment system, as electronic grade sulfuric acid can be used as a waste water treatment agent after the wafer fabrication process. In order to track waste flow and ensure that all waste is treated or recycled legally and properly, TSMC carefully selects waste disposal and recycling contractors. All recycling contractors must report their recycled product sales monthly. The Company performs regular onsite audits to check factory status and review the reported data with actual reuse and recycling data to assure that the recycled product is flowing downstream properly. TSMC checks their licenses and on-site operational statuses, and also takes proactive steps to strengthen vendor auditing effectiveness. For example, all waste transportation contractors have been asked and agreed to join the GPS Satellite Fleet so that the cleanup transportation routes and abnormal stays for all trucks can be traced. In addition, all waste recycling and treatment vendors have installed closed-circuit TV systems at operating sites to monitor and audit waste handling. Meanwhile, TSMC also conducts an ongoing survey of recycled product tracking, actions taken to ensure lawful and proper waste recycling and treatment.

In 2019, TSMC's fabs in Taiwan achieved a 95% waste recycling rate for the tenth consecutive year, with a landfill rate below 1%, also for the tenth consecutive year. In 2017, TSMC amended its articles of incorporation to add four business items for chemical materials to ensure waste flow and reduce risks of improper waste disposal by commissioned agencies. TSMC also set up onsite resource activation facilities to convert waste resources produced from processing activities into products to be used onsite or to sell to other factories. As a result, TSMC has become a leader in waste resources regeneration. In 2019, the Company extended its capacity to regenerate used copper sulfate into copper tubes and took the further step of collaborating with raw material suppliers to produce electronic grade copper anodes using copper tubes regenerated in the TSMC manufacturing process. In addition, in order to achieve the target of reclaiming all ammonia, TSMC built the first ammonium sulfate drying system, which converted biologically toxic ammonia wastewater into industrial grade ammonium sulfate as valuable recycled products for sale.

Environmental Accounting

The purpose of TSMC's environmental accounting system is to identify and calculate environmental costs for internal management. At the same time, the Company can also evaluate the savings or economic benefits of environmental protection programs so as to promote economically-effective programs. While environmental expenses are expected to continue growing, environmental accounting can help TSMC manage these costs more effectively. TSMC's environmental accounting measures various environmental costs, establishes independent environmental account codes, and provides the data to all units for use in annual budgeting. The Company's economic benefit evaluation calculates cost savings for reduction of energy, water or waste and benefits from waste recycling in accordance with its environmental protection programs.

The environmental benefits disclosed in this report include real income from projects such as waste recycling and savings from major environmental projects. In 2019, the total benefits of environmental protection programs of TSMC fabs including waste recycling were more than NT$1,496 million.

2019 Environmental Cost of TSMC Fabs in Taiwan

Unit: NT$ thousands

Classification	Description	Expense	Investment
1. Direct Costs for Reducing Environmental Impact			
(1) Pollution Control	Fees for air pollution control, water pollution control, and others	5,592,000	9,810,000
(2) Resource Conservation	Costs for resource (e.g. water) conservation	-	1,653,000
(3) Industrial Waste Disposal and Recycling	Costs for waste treatment (including recycling, incineration and landfill)	1,994,000	-
2. Indirect Cost for Reducing Environmental Impact (Environmental Managerial Costs)	(1) Cost of training (2) Environmental management system and certification expenditures (3) Environmental impact measurement and monitoring fees (4) Environmental protection product costs (5) Environmental protection organization fees	285,000	323,000
3. Other Environmental Costs	(1) Costs for soil decontamination and natural environment remediation (2) Environmental damage insurance fees and environmental taxes and expenses (3) Costs related to environmental settlement, compensations, penalties and lawsuits	-	-
Total		7,871,000	11,786,000

2019 Environmental Efficiency of TSMC Fabs in Taiwan

Unit: NT$ thousands

Category	Description	Efficiency
1. Cost Savings of Environmental Protection Projects	Energy savings	752,500
	Water savings	40,875
	Waste reduction	309,000
2. Real Income from Industrial Waste Recycling	Recycling of used chemicals, wafers, sputter targets, batteries, lamps, packaging materials, paper cardboard, metals, plastics, and other waste	394,600
Total		1,496,975

Green Building and Green Factory

Since 2006, TSMC has adopted standards from both the Taiwan Green Building and the evaluation of the U.S. Green Building Council – Leadership in Energy and Environmental Design (LEED) for new fab and office building designs to achieve better energy and resource efficiency than conventional designs. TSMC has also continued to upgrade existing office buildings to comply with the LEED standard each year. From 2008 to 2019, 32 of TSMC's fabs and office buildings have achieved LEED certifications – three platinum and 29 gold. Meanwhile, TSMC also received five Taiwan Intelligent Building diamond-class certifications and 23 Taiwan EEWH (ecology, energy saving, waste reduction and health) certifications – 20 diamond, two gold and one silver.

TSMC believes that more manufacturing companies should convert their facilities into green factories to improve the environment and lower construction costs. Therefore, the Company shares its practical experience with industry for free, government and academia. As of the end of 2019, 14,557 visitors from more than 353 different industrial, government, academic and general community groups had contacted TSMC to have communication for the Company's green building technology and practical experience. Since 2009, TSMC has led the industry in support of the Taiwan government's Green Factory Label standard, which includes the Clean Production evaluation system and Factory Green Building evaluation system. TSMC received Taiwan's first Green Factory Label and 12 labels in total as of the end of 2019, and was the most awarded company in Taiwan.

Environmental Audit Results in Violation of Environmental Regulations

In 2019 and as of the date of this annual report, the Company has had no violations of environmental regulations recorded by governmental authorities.

7.2.2 Sustainable Products

TSMC collaborates with its upstream material and equipment suppliers, design ecosystem partners and downstream assembly and testing service providers to minimize environmental impact. Reducing the resources and energy consumed for each unit of production allows the Company to provide customers with more advanced, power efficient and ecologically sound products, such as ultra-low power chips for narrowband IoT, low Vdd (low operating voltage) chips for wearables and IoT devices, low-power chips for mobile devices, high-efficiency LED driver chips for flat panel display backlighting, indoor/outdoor solid state LED lighting, Energy Star certified low standby AC-DC adaptors chips, high-efficiency DC brushless motor chips, electric vehicle chips and low-power server chips. By leveraging TSMC's superior energy-efficient technologies, these chips support sustainable city infrastructure, greener vehicles, smart grids, more energy efficient servers and data centers and other applications. In addition to helping customers design low-power, high performance products to reduce resource consumption over the product's life cycle, TSMC's green manufacturing practices provide further green value to customers and other stakeholders.

TSMC-manufactured ICs are used in a broad variety of applications in various segments of the computer, communications, consumer, industrial, electric vehicle, server and data center, and other electronics markets. Through TSMC's manufacturing technologies, customers' designs are realized and their products are incorporated into people's lives. These chips, therefore, make significant contributions to the progress of modern society. TSMC works hard to achieve profitable growth while providing products that add environmental and social value. Listed below are several examples of how TSMC-manufactured products make significant contributions to the environment and society.

Environmental Contribution by TSMC Foundry Services

1. Continue to Drive Technology to Lower Power Consumption and Save Resources

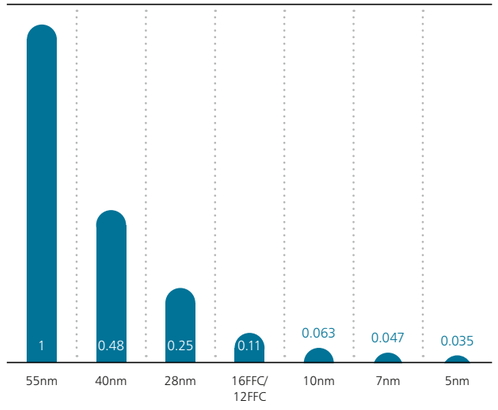
- To improve sustainability, TSMC continues to drive the development of advanced semiconductor process technologies to support customer designs that result in the most advanced, energy-saving and environmentally friendly products. In each new technology generation, circuitry line widths shrink, making transistors smaller and reducing product power consumption for completing the same tasks or achieving the same level of performance.
- As TSMC quickly ramped up its 16nm and newer generation technologies, combined wafer revenue contribution grew significantly from 4% in 2015 to 50% in 2019. TSMC's objective is to continue R&D investment and to increase wafer revenue contribution in 16nm and beyond technologies, helping the Company achieve both profitable growth and sustainability.

TSMC Wafer Revenue Contribution from 16nm and Beyond Technologies

2015	2016	2017	2018	2019
4%	21%	31%	41%	50%

Chip Die Size Cross-Technology Comparison

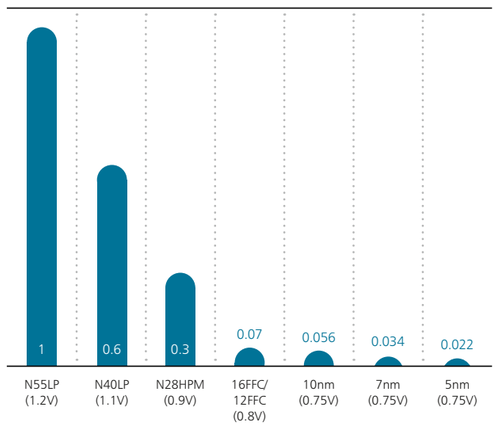
Die size shrinks as line width shrinks



Note: The logic chip/SRAM/IO (input/output) ratio, which affects die size and power consumption, was re-aligned.

Chip Total Power Consumption Cross-Technology Comparison

More power saved as line width shrinks



Note: The logic chip/SRAM/IO (input/output) ratio, which affects die size and power consumption, was re-aligned.

2. Provide Customers Leading Power Management IC Process with the Highest Efficiency

- TSMC's leading manufacturing technology helps customers design and produce green products. Power management ICs, the key components that supply and regulate power to all other IC components within electronic devices, are the most notable green IC products. TSMC helps customers produce industry-leading power management chips with more stable and efficient power supplies and lower energy consumption.
- In 2019, more than 2.9 million 8-inch equivalent wafers using TSMC's HV/Power technologies were shipped to customers. Power management ICs manufactured by TSMC are widely used in computer, communication, consumer, electric vehicle, server and data center, and other systems around the globe.

HV/Power Technologies Shipments

Unit: 8-inch equivalent wafer

2015	2016	2017	2018	2019
>2,000K	>2,100K	>2,500K	>2,600K	>2,900K

3. Drive Industry-leading, Comprehensive Ultra-low Power (ULP) Technology Platform

- To meet low-power consumption requirements for the wearable and IoT markets, TSMC continues to invest in expanding and enhancing its ultra-low power processes. TSMC provides industry's leading and most comprehensive ultra-low power (ULP) technology platform to support innovations for a wide range of IoT applications that demand increased computing in smart edge devices, including smart speakers, smart cameras, wearables, and various smart appliances. TSMC's industry-leading offerings, including 55nm ULP, 40nm ULP, 28nm ULP, 22nm ULP/ULL (ultra-low leakage), have been widely adopted by various IoT customers. TSMC further extends its low Vdd (low operating voltage) offerings for extremely low power applications. In 2019, TSMC continued to develop 12nm ULL technology to enable more advanced IoT products, including IoT WiFi and BLE (Bluetooth low energy) connectivity products.

4. Develop Greener Manufacturing to Lower Energy Consumption

- TSMC continues to develop more advanced and efficient technologies to reduce energy/resource consumption and pollution per unit during the manufacturing process, as well as power consumption and pollution during product use. In each new technology generation, circuitry line widths shrink, making chips smaller for the same circuit designs and lowering the energy and raw materials consumed for per chip in manufacturing. In addition, the Company continuously provides process simplification and new design methodology based on its manufacturing excellence to help customers reduce design and process waste so as to produce more advanced, energy-saving and environmentally-friendly products. For total energy savings and benefits realized in 2019 through TSMC's green manufacturing, see Environmental Accounting on page 122 in this annual report.

Social Contribution by TSMC Foundry Services

1. Unleash Customers' Mobile and Wireless Chip Innovations that Enhance Mobility and Convenience

- The rapid growth of smartphones and tablets in recent years reflects strong demand for mobile devices, which accelerates innovations for IC products such as baseband, RF transceivers, application processors (AP), wireless local area networks (WLAN), CMOS image sensors, near field communication (NFC), Bluetooth, and global positioning systems (GPS) among others. While these mobile devices offer remarkable convenience to human lives, TSMC contributes significant value to these devices in the following ways: (1) new TSMC process technologies help chips achieve faster computing speed in smaller sizes, leading to smaller form factors for these electronic devices. In addition, TSMC SoC technology integrates more functions into one chip, reducing the total number of chips in electronic devices, again resulting in a smaller system form factor; (2) new TSMC process technologies also help chips reduce power consumption, allowing mobile devices to be used for a longer period of time; and (3) TSMC helps spread the growth of more convenient wireless connectivity such as 3G/4G/5G and WLAN/Bluetooth, meaning people can communicate more efficiently and "work anytime and anywhere," significantly increasing the mobility of modern society. In 2019, smartphone products represented about 49% of TSMC wafer revenue.

TSMC Wafer Revenue Contribution from Smartphone Products

2017	2018	2019
52%	45%	49%

2. Unleash Customers' CIS and MEMS (micro-electromechanical systems) Innovations that Enhance Human Health and Safety

- To make all machines smarter, safer and more user and environmentally friendly, sensors are a must. Optical, acoustic, motion, and environment sensors are mostly made with either CIS or MEMS technologies. TSMC continues to put substantial effort into developing new CIS and MEMS technologies to enable customers to innovate new products for new applications. For CIS, TSMC and customers have extended applications from traditional RGB (red, green, blue) sensing to 3D depth sensing, optical fingerprint, and NIR machine vision, etc. For MEMS, TSMC and customers have extended applications from traditional motion sensing to microphone, bio-sensing, medical ultrasound actuators and more. TSMC CIS and MEMS technologies have made consumer electronics, mobile communication, automotive electronics, industrial, and medical devices smaller, faster, and more energy efficient, greatly enhancing human convenience, health and safety. For instance, TSMC customers' CIS and MEMS products are used in a number of advanced medical treatments as well as in preventative health care applications. Examples include early warning systems to minimize the injury from falls for the elderly, systems to detect physiological changes, car safety systems and other applications that significantly improve human health and safety.

7.2.3 Safety and Health

Safety and Health Management

TSMC's safety and health management is compliant with local and international standards and adheres to the management approach of "Plan, Do, Check, Act" to prevent accidents, promote employee safety and health, and protect Company assets. All TSMC fabs in Taiwan have also received TOSHMS (Taiwan Occupational Safety and Health Management System) certification since 2009. In 2018, the International Organization for Standardization released ISO 45001:2018, replacing OHSAS 18001, with major changes in the expansion of the scope, support and participation of the leadership, collection and planning of internal and external issues, expectation and demand of stakeholders, evaluation of risk inspection, communication and consultation of non-managers, application of performance indicator, and evaluation of corrective and preventive action. Meanwhile, ISO 45001 ensures the spirit of the system can

be effectively implemented at the management level through internal audit, automatic check, and security patrol. All fabs in Taiwan received ISO 45001 certification for occupational health and safety in 2019 and subsidiaries will begin the certification process in 2020.

Besides accident prevention, TSMC has established emergency response procedures to protect employees and contractors if a disaster should occur, as well as to prevent and/or reduce the negative impact on the community and the environment. TSMC communicates regularly with suppliers to ensure that potential risk in the operation of production equipment is minimized and that safety control procedures are followed rigorously during installation. The Company places stringent controls on high-risk operations and also evaluates the seismic tolerance of its facilities and equipment to reduce the risk of earthquake damage.

For epidemics, TSMC has established corporate-level prevention committees and procedures for emergency response to outbreaks of infectious diseases.

Working Environment and Employee Safety and Health Protection

The Company's ESH policy is focused on establishing a safe working environment, preventing occupational injury and illness, keeping employees healthy, enhancing every employee's awareness and sense of accountability to ESH, and building an ESH culture. TSMC safety and health management operations apply to the following:

• Equipment Safety and Health Management

In addition to meeting regulatory requirements and internal standards, as well as mitigating ESH-related risks when building or upgrading facilities, TSMC also maintains procedures governing new equipment and raw materials, requires safety approvals for bringing new tools online, updates safety rules, and implements seismic protection and other safety measures.

TSMC requires that all new tools meet SEMI-S8 requirements and that appropriate supplementary control measures be taken to reduce ergonomic risk. Moreover, the Company endeavors to automate 300mm front-opening unified pod (FOUP) transportation to prevent accumulative physical damage caused by repetitive manual handling of 300mm FOUPs. TSMC 300mm fabs have completed automatic transportation control.

• Environmental, Safety and Health Evaluation of New Tools and New Chemical Substances

As a technology leader in the global semiconductor industry, TSMC operates increasingly diversified process tools and introduces new chemicals in the R&D stage. Before using new tools or new chemicals, they are reviewed carefully by the new tools and new chemical review committee. The purpose is to ensure that new tools are compliant with the semiconductor industry's safety standards (such as SEMI S2) and that new chemicals' environmental, safety and health concerns can be well controlled, including engineering controls, application of personal protection equipment, and operational safety training during storage, transportation, usage and disposal.

• General Safety Management, Training and Audit

All TSMC manufacturing facilities hold environmental, safety and health committee meetings on a monthly basis. TSMC has adopted multiple preventive measures such as controls on high-risk work, contractor management, chemical safety management, personal protective equipment requirements, and safety audit management. In addition, the Company maintains detailed disaster response procedures and performs regular drills designed to minimize damage to employees and property, as well as the impact on society and the environment in the event of a disaster.

• Working Environment Hazardous Factors Management

TSMC conducts workplace hazard assessments to provide a comfortable and safe workplace to employees. The Company also educates and requires employees to use personal protective equipment (PPE) to prevent hazardous exposures.

The Company performs semi-annual workplace environment assessments of physical and chemical hazards, including CO_2 concentration, illumination, noise, and hazardous chemical substances regulated by local laws. In addition, TSMC has performed exposure assessments and has used hierarchy management control for chemicals with potential health hazards. If abnormal measurements occur, events happen, or an exposure assessment indicates there is an adverse health effect for employees, ESH professionals immediately conduct onsite observation and interventions to reduce the exposure to acceptable levels.

• Health Promotion Program

In order to establish the healthiest possible workplace and prevent from occurrence of occupational disease, TSMC formed a corporate-level committee to execute health promotion programs covering three scopes:

(1) Exposure and health risk assessment: develop an exposure assessment system to identify high health risk employees.
(2) Hazardous training and notification: use standardized training materials for employees and contractors in all TSMC fabs. Inform them of the health risks and prevention measures at the workplace before working or providing any services there.
(3) Strengthen management of high health concerned chemicals: inform suppliers that all materials they provide to TSMC must comply with applicable laws including clear disclosure of any hazardous substances. Sampling raw materials used in the manufacturing process to confirm that they do not contain any carcinogenic, mutagenic or toxic-reproductive materials as claimed in supplier's safety data sheet (SDS).

• Emergency Response

The planning and execution of an effective emergency response should identify potential high-risk events via risk assessment and be prepared for various scenarios. It should focus on continuous improvement and practice drills covering all potentially serious events. TSMC's emergency response plans include procedures for rapid-response crisis management and disaster recovery to potential incidents.

All TSMC fabs conduct major annual emergency response exercises and evacuation drills. TSMC's onsite service contractors are also required to participate in emergency response planning and exercises to ensure cooperation in handling accidents and to effectively minimize any damage caused by disasters. At least every two years, each fab director invites fab management and support functions to participate in crisis management drills for potentially high-risk events such as earthquake, fire and flood (Tainan site). Since 2018, TSMC has conducted complex accident emergency response drills, which include simultaneous scenarios for earthquake, fire and chemical spill. In 2019, we completed 108 scenarios to ensure rapid response to emergencies so that losses can be minimized in occasions of real disasters.

In addition to the regular emergency response drills held by engineering and facilities departments each quarter, the Company's laboratory, canteen, dormitory, and shuttle bus personnel also hold emergency response drills to prepare for events such as earthquakes, chemical spills, ammonia release, fires and traffic accidents.

• Emerging Infectious Disease Response

TSMC has a dedicated corporate ESH organization to monitor emerging infectious diseases around the world, to assess any potential impact on the workplace, and to provide an appropriate strategic response plan. In previous outbreaks (such as SARS in 2003, the H1N1 influenza outbreak in 2009, MERS in 2015) and the current threat, COVID-19. TSMC abided by CDC's (Taiwan Centers for Disease Control) rules and convened the corporate influenza response committee to develop the Company's strategies. These strategies included educating employees in prevention and response, publishing guidelines for managers, establishing guidelines for employee sick leave due to flu, and installing alcohol-based hand sanitizers at appropriate locations. The Committee also monitors the status of employee leave due to illness and, at the same time, develops a continuity plan to address manpower shortages and minimize business impact.

• Employee Physical and Mental Health Enhancement

TSMC believes that employees' physical and mental health is not only fundamental to maintaining normal business operations but is also part of a corporation's responsibility. To protect and promote employee physical and mental health, TSMC fosters collaboration among the onsite industrial safety and environmental protection department, onsite medical personnel of the health center, and physicians of occupational medicine. TSMC strives to reduce cerebral and cardiovascular disease that might be induced or aggravated by overwork, night work or shift work. The Company conducts maternal health protection programs and prevention of cumulative trauma disorders as well. TSMC devotes significant resources to mental health awareness and related activities, which not only protect employees from hazards at work but also proactively promote employee health in general. In 2019, through planned personal health management, (1) 617 female employees participated in the maternal health program, the completion rate was 100%. 615 of them were at the first degree risk (there was no harm to the mother, infant, and baby). Two employees were classified as second degree risk (possible harm to the mother, infant, and baby) at the first assessment; after proper adjustments to their works, they were reclassified as the first degree after doctor's re-assessment. (2) By analyzing historical cerebral and cardiovascular cases of our employees, we modified disease assessment criteria with contracted doctors, and, combining internal annual health examination reports, as well as working hour's information, we were able to identify 1,330 employees that have middle to high risk for cerebral and cardiovascular diseases. These employees were provided with health education and medical assistance. Also, alone with their managers, they would receive suggested working hours

information in order to reduce disease risk. (3) 116 employees were in a high risk group for cumulative trauma disorders. Among them, one could have job-related risks. The Company has adjusted their job conditions to avoid possible risks. (4) As obesity has been considered as a precursor of diabetes, hyperlipidemia and hypertension, for seven consecutive years, TSMC has held weight-control program, which has been extended to 6 months from 3 months in 2019 in order to assist employees to cultivate their habits. A total of 1,250 employees have joined the program, and 450 of them stayed until the end, with total weight loss of 3,028 kilograms. Employees who had joined the program showed improvements in weight, waist circumference, cholesterol levels, blood sugar, blood pressure, and liver function. (5) We also conducted a lecture of "Medication Safety of Chinese Medicine" with total 112 participants.

7.2.4 Supplier Management

Management Aspect

As a means of enhancing supply chain management, TSMC is committed to communicating with and encouraging its suppliers (including contractors) to improve their quality, cost effectiveness, delivery performance, and continuous improvement on environmental protection, safety and health. Through regular communication with senior managers, site audits and experience sharing, the Company collaborates with major suppliers and contractors to enhance partnerships and ensure continual improvement for better performance and increased joint contributions to society. As noted above, contractors performing high-risk activities must lay out clearly-defined safety precautions and preventative measures. In addition, contractors working on high-risk engineering projects must establish ISO 45001 or OHSAS 18001 systems and the workers must successfully complete work-related skill training. All contractors performing high-risk activities must get the certification of ISO 45001 before the end of 2021.

Supply Chain Sustainability

TSMC works with suppliers in several fields of sustainable development, such as greening the supply chain, carbon management for climate change, mitigation of fire risk, ESH management and business continuity plans in the event of a natural disaster.

Since becoming a full member of the Responsible Business Alliance (RBA) in 2015, TSMC has completed implementation of the RBA code of conduct throughout the Company by performing self-assessments at its facilities worldwide and reviewing policies and procedures in the areas of labor, health and safety, environment, ethics and management systems.

To enhance supply chain sustainability and streamline risk management, the Company is committed to collaborating with its suppliers to maintain full compliance with Taiwan's environment, safety, health and fire protection regulations. TSMC developed a supplier's code of conduct, which affirmed basic labor rights and standards for health, safety, environment, ethics and management systems. TSMC works with suppliers to inspect the risk and impact on the economy, the environment, and society and to make continuous improvement. The Company has lifted suppliers' performance of sustainability through experience sharing and training and hopes to establish a world-class semiconductor supply chain that exceeds international standards and serves as a global benchmark.

TSMC is subject to the U.S. Securities & Exchange Commission (SEC) disclosure rule on conflict minerals released under Rule 13p-1 of the U.S. Securities Exchange Act of 1934. As a recognized global leader in the high-tech supply chain, the Company acknowledges its corporate social responsibility to strive to procure conflict-free minerals in an effort to recognize humanitarian and ethical social principles that protect the dignity of all people. To this end, TSMC has implemented a series of compliance safeguards in accordance with leading industry practices such as adopting the due diligence framework in the OECD's Model Supply Chain Policy for a Responsible Global Supply Chain of Minerals from Conflict-Affected and High Risk Areas issued in 2011.

TSMC is one of the strongest supporters of the Responsible Business Alliance and the Global e-Sustainability Initiative (GeSI), which will help the Company's suppliers source conflict-free minerals through their jointly developed Responsible Minerals Initiative (RMI). Since 2011, TSMC has asked its suppliers to disclose information and make timely updates on smelters and mines. The Company encourages suppliers to source minerals from facilities or smelters that have received a "conflict-free" designation by a recognized industry group (such as the RBA) and also requires those who have not received such designation to become compliant with Responsible Minerals Initiative or an equivalent third party audit program. TSMC requires the use of tantalum, tin, tungsten and gold in its products that are conflict-free.

TSMC will continue to conduct the supplier survey annually and require suppliers to improve and expand their disclosure to fulfill regulatory and customer requirements. For further information, see the Company's Form SD filed with the U.S. SEC. (https://www.tsmc.com/english/investorRelations/sec_filings.htm)

7.3 TSMC Education and Culture Foundation

The TSMC Education and Culture Foundation believes in that education cultivates talents of the future while the talents determine the future of a nation. Therefore, in 2019 the Foundation provided more than NTD 96 million for multiple educational projects to help people develop various talents. Such projects will empower youth, create an educational platform and promote fine arts and literature. The Foundation aims to nurture and cultivate more talents of the future and provide motivational power for the common good of society.

Supporting the Younger Generation, Creating Sustainable Built Environments

The TSMC Education and Culture Foundation has long supported young people in the community. Since 2016, the Foundation has organized "TSMC Youth Dream Building Project," which helps young people realize their dreams and provides various resources such as professional skills training and publicity. With these efforts, the Foundation hopes to guide the young to explore their own potentials and boldly pursue their dreams. At the same time, having set up the "topical project," "TSMC Youth Dream Building Project" encourages young students to push the envelope, broaden the horizons of their dreams, and become more aware of social issues. The topic for 2019 "TSMC Youth Dream Building Project" is "Formulating a Waste-less City," guiding students to focus on environmental issues such as wasted resources. Nearly 100 teams from universities and colleges in the Taoyuan, Hsinchu and Maoli area and in the greater Tainan area enrolled in the competition, contending for the NTD 3 million prize money. In the competition, a great number of the teams proposed solutions to the environmental issues with innovation, energy and courage.

Apart from "TSMC Youth Dream Building Project," the Foundation also participated in the ATCC Case Competition for the first time. In 2019 competition attracted 540 teams from various colleges, whose innovative proposals encompassed solutions to social issues at all levels. Throughout the three months of the entire ATCC Case Competition process, the Foundation accompanied the youth each step of the way by offering opportunities for the students to visit TSMC corporate headquarters, organizing workshops, and introducing business mentors to the students – all to inspire creativity through a concerted effort. One of the Foundation's sponsored teams, Team Package Plus, led by Allen Yeh from the graduate school of the Department of International Business, National Chengchi University, won second place in the national competition for innovative, environmentally-friendly packaging and unique business model to reduce the environmental impact made by the online shopping trend. Allen Yeh went even further to found a social enterprise to drive further positive social change by implementing their innovation and ideals.

Paying Attention to the Development in Education and Building an Education Platform

In response to the implementation of the new 12-year Curriculum for Basic Education (2019 National Curriculum Guidance) in Taiwan, the Foundation initiated a "New Curriculum: Safeguards to Protect Technology" report on the topic in collaboration with the United Daily News Group. This new series of reports investigates the impact brought on by the new curriculum. At the same time, the company offered an industrial perspective, thereby stimulating a dialogue between the educational system and the tech industries. Such a dialogue draws the public's attention and generates more discussions on this issue.

In addition to its emphasis on the development of educational system, the Foundation organizes events in the humanities and the sciences, builds a platform for exchanging ideas and provides students extracurricular opportunities to develop diverse interests, thereby broadening their horizons and exploring their potential. For the humanities, the Foundation has been holding TSMC Youth Literature Award since 2004 and TSMC Youth Calligraphy and Seal-Carving Competition since 2008 respectively. The two awards continue to encourage young people to demonstrate creativity in both literature and calligraphy and have become important cradles for nurturing domestic arts and literary talents. The number of applicants competing in the novella category of the year's TSMC Literature Award, with its global reach on the Chinese-writing scene, has hit a record high in 2019 as a total of 150 pieces of manuscripts were submitted in competition for the NTD one million prize money.

When it comes to science education, the Foundation has long funded the three major science camps for gifted and talented students in Taiwan: Wu Chien-Shiung Science Camp, Wu Ta-You Science Camp, and Madame Curie Chemistry Camp. These science camps have long nurtured talented youth in basic sciences for the nation. In 2019 "TSMC Cup – Competition of Scientific Short Talk" set the agenda on "gene editing". The competition hopes to trigger high school students' interests in sciences through media such as popular science books and films. It also encourages cross-disciplinary collaboration, publicizes and deepens the understanding of sciences among the public.

Furthermore, the Foundation has long cared for the educationally underprivileged. In 2019 the Foundation increased the number of low income student scholarships, as grants for National Cheng Kung University, National Sun Yat-sen University and National Chung Cheng University were added to the original National Tsing Hua University and National Central University grants. The scholarships open doors to the higher education for more students from low-income families. At the same time, the Foundation continues to work on the "Hope Reading Project" with CommonWealth Foundation. The cooperation with Junyi Academy, Teach for Taiwan Foundation (TFT) and BoYo Social Welfare Foundation works to eliminate the educational discrepancy between cities and rural areas through book donation, online courses and increased good teaching resources.

Host Fine-Art Events, Promote a Beautiful and Good Society

The Foundation is dedicated to promoting arts and culture and continues to host beautiful artistic and cultural events, create a stage for outstanding Taiwanese arts groups, and elevate the spiritual life of community residents. The Foundation cherishes the sophistication and beauty of traditional performing arts, thereby sponsoring the tour of Pai Hsien-yung's new Kunqu Classic series, performing pieces such as *The Story of Golden Lotus* and *The Jade Hairpin*. The Foundation has even brought the traditional art form of Kunqu to the campuses, inviting 150 National Hsinchu Senior High School students and 300 college students in the greater Taichung area to the performance. In doing so, the traditional theater can reach out to more young students and a wider public. More people can begin to appreciate the beauty of traditional theater.

The theme of 2019 TSMC Hsin-Chu Arts Festival, the annual high point of arts and cultural event in the Hsinchu community, is "Listening to the Muse." For the exhibition, the Foundation organized an exquisite and special exhibition on the legacy of the three past poet masters: Yu Kwang-chung, Luo Fu and Chou Meng-tieh. In this exhibition, manuscripts and items bequeathed by the poets demonstrate the joy of poetic beauty to the public. In addition, the TSMC Hsin-Chu Arts Festival features 61 first-class programs, such as a piano recital by the maestro Krystian Zimerman, a recital by Japanese virtuoso pianist Nobuyuki Tsujii, who is blind from birth, a tour of children's plays tailored-made for children in rural area, GuoGuang Opera Company' masterpiece, *The Painting of 18 Lohans*, a celebration for the company's 20th anniversary. The TSMC Hsin-Chu Arts Festival opens the door for more than 42,000 people in the community to experience the arts.

7.4 TSMC Charity Foundation

Since its establishment in 2017, the TMSC Charity Foundation has continually focused on extending the charitable programs and projects of its four main pillars of charity: disadvantaged care, solitary elderly care, filial piety promotion, and environmental protection. Under the leadership of its chairperson, Ms. Sophie Chang, the Foundation stands at the front lines, is attentive to social issues and events, and strives to close the wealth disparity in society through enhancement of educational energies in rural areas and provision of emergency assistance, thereby giving disadvantaged families and children from rural areas more opportunities to turn their lives around. The Foundation has also established a social welfare platform that gathers love from all corners of society, powers social revolution through charitable works, and works collaboratively to improve society.

The TMSC Charity Foundation continued to expand its scope of service in a variety of charitable endeavors in 2019 and initiated many new projects related to social welfare including the following:

- **Disadvantaged Care:** The Foundation focused on the two main care initiatives of "rural education" and "support for the disadvantaged," provided all types of assistance (including volunteer services, building repairs, online educational materials, off-grade foods, and other resources) to educational institutions and children in rural areas, worked to ensure that disadvantaged groups had equal opportunities to obtain education, and continued to visit and provide financial aid and daily supplies to high-risk disadvantaged families.

  In 2019, the Foundation supplied tablets and educational courses to 21 locations and organized 11 teacher empowerment training sessions to increase the energy of different educational institutions, hoping to enhance the way disadvantaged children are educated, improve the quality of the education they receive, and also provide resources such as building repairs and off-grade food. The Foundation's "Sending Love" program continued to be active, and Foundation staff conducted on-site visits to identify disadvantaged cases in the most need of financial support. The living conditions of these disadvantaged families were improved through charitable donations from both inside and outside TSMC. As of 2019, the Foundation has assisted a total of 128 families.

- **Solitary Elderly Care:** The Foundation enhanced the health and welfare of elderly people living on their own by collaborating with its Networking of Love partners to connect social welfare groups and medical institutions providing care to lonely seniors. In 2019, the Foundation helped to launch new intelligent medical systems at the Chiu Lin Yuan senior daycare center and the Zhubei Nursing Home to enhance medical quality and efficacy. Current Networking of Love partners include Taipei Veterans General Hospital, Miaoli General Hospital, Old Five Old Foundation, Feng Yuan Hospital, China Medical University Hospital, Lin Tseng Lien Welfare and Charity Foundation, Taiwan Puli Care Association, Sin-Lau Hospital, Tainan Hospital, Jianan Psychiatric Center, Mennonite Christian Hospital and the Mennonite Social Welfare Foundation, and Fooyin University.

- **Filial Piety Promotion:** The Foundation promotes and spreads the Eastern cultural value of filial piety as part of its efforts to reduce social risks and problems arising from ageing societies by raising generational awareness of filial piety. In 2019, the Foundation's filiality volunteers continued to visit elementary schools and spread concepts relating to filial piety. The TSMC Charity Foundation participated in the hosting of six parent-child filiality workshops, where parents and their children were brought closer together through interactive activities, which in turn helped to initiate cross-generational dialogue and embedded the spirit of filial piety in the hearts of participants.

- **Environmental Protection:** The Foundation promoted environmental education and knowledge in order to nurture the abilities of its employees to predict, prevent, and adapt to climate change. The Foundation continued its "Cherish Food Program" in 2019 and worked with many food companies to donate off-grade foods to institutes who collaborated with the TSMC Charity Foundation in providing care for the disadvantaged, thus achieving its food waste reduction and environmental conservation goals. The Foundation has previously collaborated with food companies such as Chi Mei Frozen Food, Hunya Foods, Laurel Corporation, Lian Hwa Foods Corporation, Hsin Tung Yang Corporation, and Shih Chen Foods. TSMC's ecology volunteers continued to provide ecology tours at the Hsinchu 12B fab plant, the Taichung 15 fab plant, the Tainan 14 fab plant, and the Tainan Jacana Ecology Education Park, while TSMC's professional energy-saving volunteers assisted schools of all levels in conducting energy-saving assessments and improvements, with service locations covering Taipei, Hsinchu, Taichung, Tainan and Kaohsiung.

7.5 TSMC i-Charity

Launched in 2014, the TSMC i-Charity platform is an internal interactive website that TSMC employees can use to propose care programs, share program results, provide responses and suggestions, and take advantage of timely online funding activities to give back to society.

In 2019, charitable contributions surpassed NTD 20 million, and a total of 18,000 people participated in the "Junyi Academy", "Teach for Taiwan"," Music education development program for the Taoshan Primary School Choir",,and "Sending Love initiative for the St. Camillus Center for Intellectual Disability" programs.

The TSMC i-Charity platform accumulated more than NTD 110 million in charitable donations from 2014 to 2019. TSMC will continue to fulfill its commitments to society and encourage its employees to care for and contribute to society in different ways.

7.6 Social Responsibility Implementation Status as Required by the Taiwan Financial Supervisory Commission

Assessment Item	Implementation Status			Non-implementation and Its Reason(s)
	Yes	No	Summary	
1. Does the Company follow materiality principle to conduct risk assessment for environmental, social and corporate governance topics related to company operation, and establish risk management related policy or strategy?	V		Please refer to "7. Corporate Social Responsibility" on pages 113-133 of this annual report.	None
2. Does the Company have a dedicated (or ad-hoc) CSR organization with Board of Directors authorization for senior management, which reports to the Board of Directors?	V		Please refer to "7. Corporate Social Responsibility" on pages 113-133 of this annual report.	None
3. Environmental Topic (1) Has the Company set an environmental management system designed to industry characteristics? (2) Is the Company committed to improving resource efficiency and to the use of renewable materials with low environmental impact? (3) Does the Company evaluate current and future climate change potential risks and opportunities and take measures related to climate related topics? (4) Does the Company collect data for greenhouse gas emissions, water usage and waste quantity in the past two years, and set energy conservation, greenhouse gas emissions reduction, water usage reduction and other waste management policies?	V		Please refer to "7.2.1 Environmental Protection" on pages 119-123 of this annual report.	None
4. Social Topic (1) Does the Company set policies and procedures in compliance with regulations and internationally recognized human rights principles? (2) Has the Company established appropriately managed employee welfare measures (include salary and compensation, leave and others), and link operational performance or achievements with employee salary and compensation? (3) Does the Company provide employees with a safe and healthy working environment, with regular safety and health training? (4) Has the Company established effective career development training plans? (5) Does the Company's product and service comply with related regulations and international rules for customers' health and safety, privacy, sales, labelling and set polices to protect consumers' rights and consumer appeal procedures? (6) Does the Company set supplier management policy and request suppliers to comply with related standards on the topics of environmental, occupational safety and health or labor right, and their implementation status?	V		(1) Please refer to "5.5 Human Capital" on pages 82-87 of this Annual Report. (2) Please refer to "5.5 Human Capital" on pages 82-87 of this Annual Report. (3) Please refer to "7.2.3 Safety and Health" on pages 125-128 of this Annual Report. (4) Please refer to "5.5 Human Capital" on pages 82-87 of this Annual Report. (5) Not applicable as TSMC is not an end product manufacturer. (6) Please refer to "Supplier Management" on page 128 of this annual report.	None
5. Does the Company refer to international reporting rules or guidelines to publish CSR Report to disclose non-financial information of the Company? Has the said Report acquire 3rd certification party verification or statement of assurance?	V		TSMC has published a "Corporate Social Responsibility Report" since 2008, and acquired 3rd certification party verification or statement of assurance, and discloses this on the Company's website (https://www.tsmc.com/english/csr/index.htm).	None
6. If the company has established its corporate social responsibility code of practice according to "Listed Companies Corporate Social Responsibility Code of Practice," please describe the operational status and differences. TSMC follows the Corporate Social Responsibility Policy set by the Chairman, Dr. Mark Liu. For corporate social responsibility operational status, please refer to "7. Corporate Social Responsibility" on pages 113-133 of this annual report and corporate social responsibility related information in our website: https://www.tsmc.com/english/csr/index.htm				
7. Other important information to facilitate better understanding of the company's implementation of corporate social responsibility: Please refer to TSMC's website for its corporate social responsibility implementation status: https://www.tsmc.com/english/csr/index.htm				