



Focus 3

Responsible Supply Chain

A Responsible Purchaser

As the world's largest dedicated IC foundry, TSMC is committed to remaining a responsible purchaser by encouraging upstream and downstream suppliers to seek advancements in technology, quality, delivery, environmental protection, human rights, health and safety. We will strive vigorously to support the development of a sustainable supply chain.

100%

Tier 1 suppliers signed the Supplier Code of Conduct and Self-Assessment Questionnaire on Sustainable Management, with 100% completion rate

100%

100% raw materials purchased were DRC conflict-free

28.5%

Reduced waste output by major local waste-producing suppliers by 28.5%





Supplier Sustainability Management

Strategies & 2030 Goals

2019 Achievements

2020 Targets

Sustainability Risk Management

All suppliers are required to comply with the Code of Ethics and Business Conduct, and to follow human rights and conflict-free mineral guidelines. TSMC continues to assess sustainability risk and encourages critical suppliers to join the [Responsible Business Alliance \(RBA\)](#).

Suppliers comply with TSMC Code of Ethics, taking actions according to the TSMC Supplier Code of Conduct^{Note 1}

- Tier 1 suppliers' completion rate for signing the TSMC Supplier Code of Conduct: 100%^{Note 2}
- Tier 1 suppliers' completion rate of the Sustainability Management Self-Assessment Questionnaire: 100%
- Tier 1 suppliers completion rate for signing the TSMC Guidance on Supplier Business Conduct and conducting internal training every two years: 100%
- Completion rate of critical suppliers reporting on the status of sustainability management in their critical upstream supply chains: 100%^{Note 3, Note 4}
- TSMC continues to monitor supplier employees working at TSMC facilities
- Supplier due diligence on conflict-free minerals: 100% of the minerals used to comply with conflict-free requirements

Continue to assess sustainability risk and encourage critical suppliers to join the Responsible Business Alliance (RBA)

- Critical suppliers completion rate for receiving third-party audits (by RBA-certified auditing institutions) every three years: 100%^{Note 6}

Improve supply chain emergency preparedness, which benefits both the suppliers and TSMC^{Note 7}

- Continue to diversify production sites and assess new suppliers; develop 125 multi-source supply solutions (Base year: 2018)^{Note 7}

All tier 1 suppliers signed the TSMC Supplier Code of Conduct at the completion rate of 100%

Target: 100%

All tier 1 suppliers completed the Sustainability Management Self-Assessment Questionnaire at the completion rate of 100%

Target: 100%

All tier 1 suppliers signed the TSMC Guidance on Supplier Business Conduct and conducted internal training at the completion rate of 100%^{Note 5}

Target: 100%

Critical suppliers are required to report on the status of sustainability management in their critical upstream supply chains: the completion rate is 100%

Target: **NEW**

Quarterly review on the attendance of supplier employees working at TSMC factory sites

Target: Continuously require critical suppliers to accept professional audits

Sourcing conflict-free raw materials

Target: 100%

A total of 46 critical Suppliers completed third-party supplier audits on sustainability risk by RBA-certified institutions

Target: 45 critical suppliers

Developed 56 multi-source supply solutions

Target: **NEW**

● Exceeded ● Achieved ● Missed Target

All tier 1 suppliers sign TSMC Supplier Code of Conduct and Sustainability Management Self-Assessment Questionnaire; completion rate: 100%

Critical suppliers report on the status of sustainability management in their critical upstream supply chains; completion rate: 100%

TSMC continues to monitor the supplier employees attendance who working at TSMC factory sites

Supplier due diligence on conflict-free minerals: 100% of minerals used comply with conflict-free requirements

Continue to require critical suppliers to receive third-party audits by RBA-certified auditing institutions. The target is requiring 60 critical suppliers to complete third-party audits

The target for improving supply chain emergency preparedness: develop 64 multi-source supply solutions

(Continue on next page)

Note 1: Since 2018, suppliers are required to re-sign and commit every year; in 2019, the requirement expanded to Tier 1 suppliers of TSMC (China) and TSMC (Nanjing)

Note 2: Tier 1 supplier refers to a supplier trading with TSMC directly with more than two orders per year and selected mainly spending-based. In 2019, 1,226 suppliers met the criteria

Note 3: Critical Suppliers: In 2019, 110 suppliers met the criteria - a supplier which either (1) accounts for 85% of the purchasing expenses, or (2) is a single source of purchase

Note 4: Status of sustainability management: Critical Suppliers are required to ask critical upstream companies in their supply chain to comply with the Code of Ethics and follow TSMC Supplier Code of Conduct requirements

Note 5: TSMC Guidance on Supplier Business Conduct is the training material for the TSMC Supplier Code of Conduct. If its content doesn't change significantly, the suppliers are required to re-sign and commit in every two years

Note 6: TSMC requires critical suppliers to complete third-party audits every three years. Since the first batch of suppliers (177 suppliers that met the criteria) conducted third-party audits in 2018, TSMC expects that by 2021 100% of the suppliers will complete third-party audits

Note 7: Using the TSMC Business Continuity Management Policy as guidelines, TSMC aims to reduce disruption risk to the flow of raw materials and continues to improve supply chain emergency response capabilities, benefiting both the suppliers and TSMC

Note 8: Including the raw materials used by TSMC, such as chemicals and gases



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Strategies & 2030 Goals

2019 Achievements

2020 Targets

Local Supply Chain Optimization

Improve the core capability of local suppliers, safeguard the rights of local entry-level labor, increase local sourcing, and collaborate with suppliers on power, water, and waste reduction

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> ● Provide consultation for the supplier to continue improving <ul style="list-style-type: none"> - A cumulative total of 1,500 local suppliers participate in the Environmental, Safety, and Health (ESH) training program (Base year: 2016)^{Note 1} - A cumulative total of 300 suppliers observe annual emergency response drills (Base year: 2016) - A cumulative total of 145 local raw materials suppliers receive consultation on process enhancement and quality improvement (Base year: 2016)^{Note 2} ● Increase local sourcing^{Note 6} <ul style="list-style-type: none"> - 64% for indirect raw materials - 60% for spare parts - 40% for backend equipment^{Note 7} ● Provide consultation on power reduction for suppliers and reduce energy consumption by a cumulative total of 1,500 GWh (Base year: 2018) ● Reduce waste production among major local suppliers by 35% (Base year: 2014)^{Note 9} | <ul style="list-style-type: none"> ● A cumulative total of 411 suppliers participated in the Environmental, Safety, and Health (ESH) training program^{Note 3}
Target: NEW ● The average ESH audit score for local suppliers: 78^{Note 4, Note 5}
Target: 80 ● Integrated Responsible Supply Chain Forum into TSMC's annual Supply Chain Management Forum
Target: holding the Responsible Supply Chain Forum ● 22 suppliers attended the observation and learning program of the annual emergency response drill (Cumulative total: 90)
Target: 20 suppliers this year, 88 in total ● 16 suppliers received consultation on process enhancement and quality improvement (Cumulative total: 33)
Target: 7 suppliers this year, 33 in total ● 59% for indirect raw materials
Target: 57.5% ● 50% for spare parts
Target: 50% ● 34% for backend equipment^{Note 8}
Target: 36% ● Provided consultation on power reduction for 12 suppliers, and reduced energy consumption by a cumulative total of 97 GWh, accounting for 1.3% of the total energy consumption
Target: 0.5% (Base year: 2018) ● Waste production among major local suppliers reduced by 28.5%
Target: 28% <p>● Exceeded ● Achieved ● Missed Target</p> | <ul style="list-style-type: none"> ● A cumulative total of 500 suppliers participate in the Environmental, Safety, and Health (ESH) training program ● Hold the annual Responsible Supply Chain Forum ● A cumulative total of 110 suppliers observe annual emergency response drills ● 12 suppliers receive consultation on process enhancement and quality improvement (Cumulative total: 45) ● 60% for indirect raw materials ● 50% for spare parts ● 36% for backend equipment ● Provide consultation on power reduction for suppliers, and reduce energy consumption by a cumulative total of 200 GWh (Base year: 2018) ● Reduce waste production among major local suppliers by 29.1% |
|---|---|--|

Note 1: The number of suppliers here is an accumulated total

Note 2: In the first stage, TSMC plans to provide consultation for 38 suppliers on process enhancement and quality improvement by 2020; starting in 2021 in the second stage, TSMC plans to provide consultation for ten suppliers every year

Note 3: In 2019, TSMC increased the frequency of ESH training programs for the suppliers from twice a year to every quarter. The training program consists of experience sharing, which is popular among the suppliers. Therefore, TSMC met the target of 2025 in advance. TSMC plans to provide consultation for 38 suppliers on process advancement and quality improvement by 2020; starting in 2021 in the second stage, TSMC plans to provide consultation for ten suppliers every year

Note 4: The scoring scale of ESH audit for local suppliers ranges from 1 to 100; 60 is the minimum passing score, 70 to 80 is intermediate, 80 to 90 is excellent, 90 and above is outstanding

Note 5: TSMC increased audit items and raised the scoring standard in 2019; therefore the supplier annual audit score failed to meet the target

Note 6: Increase local sourcing in TSMC's main region of operation - Taiwan

Note 7: The percentage of local sourcing in backend equipment excluded machinery requested by customers

Note 8: For backend equipment, due to the increased proportion of advanced packaging and elevated quality requirements, packaging equipment suppliers in Taiwan are currently unable to meet TSMC production requirements

Note 9: Referring to suppliers producing 80% of the local waste in raw materials. Calculation formula: A/(A+B)(%); A: waste reduced by the factory in the underlying month (metric tons); B: waste produced by the factory in the underlying month (metric tons).

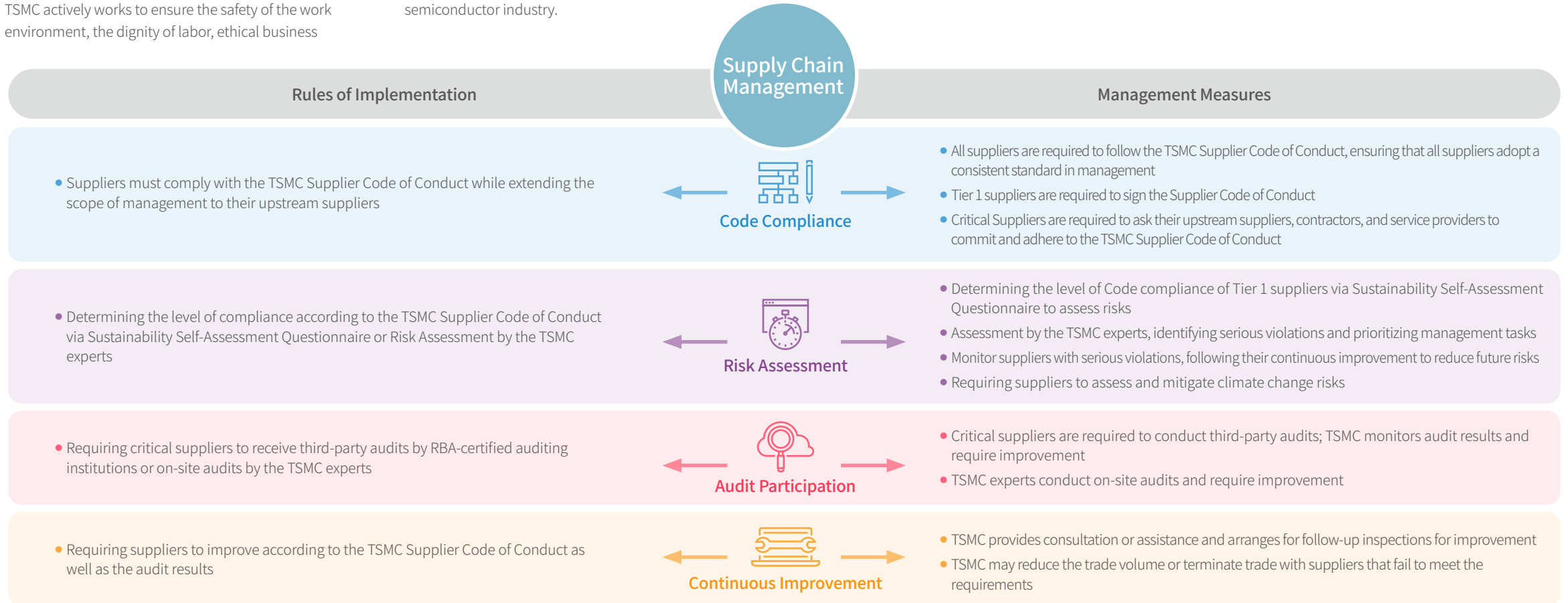
As a leader of the global semiconductor industry, TSMC continues to drive improvement of the supply chain, and is committed to an environmentally and socially responsible business model. In 2019, TSMC continued to deepen its two policies of "Sustainability Risk Management" and "Local Supply Chain Optimization" anchoring supply chain development to the core value of sustainability. Working closely with suppliers, TSMC actively works to ensure the safety of the work environment, the dignity of labor, ethical business

conduct, and environmental protection. By implementing the 4 guiding principles of Code Compliance, Risk Assessment, Audit Participation, and Continuous Improvement, TSMC encourages supplier partners to continue improving, commit to essential values, and take the initiative to promote sustainable practices to their upstream suppliers. Together, TSMC and the suppliers are joining hands to build a responsible supply chain in the semiconductor industry.

Implementing the Four Guiding Principles of Supply Chain Management

TSMC values sustainable supply chain development and requires suppliers to comply with the TSMC Supplier Code of Conduct, in which suppliers must follow the 4 guiding principles, and take responsibility for implementing the principles

in practice. The Four Guiding Principles are the embodiment of TSMC's core belief in establishing a responsible supply chain. These measures benefit all parties and guides the semiconductor supply chain to a virtuous cycle.

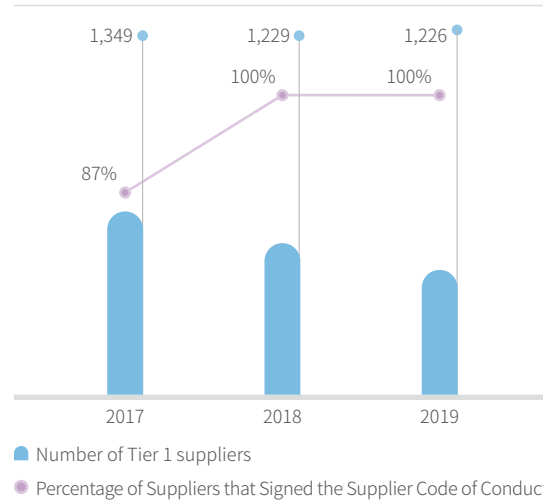




Code Compliance

The TSMC Supplier Code of Conduct is based on [the Code of Conduct](#) by Responsible Business Alliance (RBA). It requires suppliers to comply with the Code of Conduct while encouraging them to ask their upstream suppliers, contractors, and service providers to approve and adopt the same code in practices and management as well. New suppliers must sign the TSMC Supplier Code of Conduct to be eligible for partnership. This is to ensure that the suppliers understand TSMC's sustainability requirements, comply with

Compliance & Management Summary of Supplier Code of Conduct



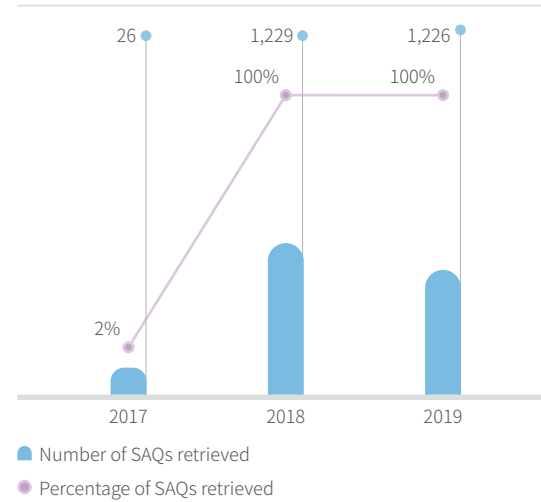
Note: Since 2018, TSMC formally defines Tier 1 suppliers as suppliers trading with TSMC directly with more than two orders per year, which are mainly fee-based

the commitment, and undergo risk assessments and audits in future collaborations. In 2019, the scope of the TSMC Supplier Code of Conduct extended to Tier 1 suppliers of TSMC subsidiaries, such as TSMC (Shanghai) and TSMC (Nanjing), to cover TSMC supply chains worldwide.

Risk Assessment

To better understand the status of the supplier, TSMC evaluates supplier performance via the Sustainability Self-Assessment Questionnaire (SAQ), On-site Audit, Records of Serious

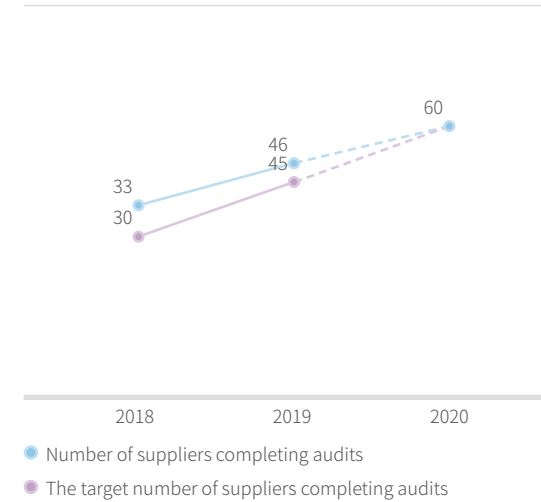
Overview of Self-Assessment Questionnaire Results



Violations, and TSMC experts, to identify the high-risk suppliers of the year. In 2019, TSMC identified 109 high-risk suppliers across four categories, which are raw materials, spare parts, packaging/testing, and waste processing. This way, TSMC effectively evaluates the sustainability risk of the entire supply chain.

In 2019, Tier 1 suppliers in Taiwan, where the TSMC headquarters is located, completed 908 Self-Assessment Questionnaires at the completion rate of 100%. The SAQ this year contains five major categories specified in

Overview of Third-Party Supplier Audits



the TSMC Supplier Code of Conduct - Labor, Health and Safety, Environmental requirements, Ethics, and Management. The SAQ results show the suppliers' awareness of sustainability management and allows TSMC to identify supplier risks. The SAQ results showed that compliance with the TSMC Supplier Code of Conduct by suppliers in Taiwan exceeded 96 on average. Among the items in the [five categories](#), compliance with labor policies, especially work hours regulations, require the most improvement.

TSMC is working with suppliers to mitigate climate change risks; we will continue to require suppliers with high energy [consumption](#) to conserve energy, reduce carbon emissions, and receive ISO14064-1 greenhouse gas certifications.

Audit Participation and Continuous Improvement

Among Tier 1 suppliers, TSMC requires all critical suppliers to undergo third-party audits on sustainability risk by RBA-certified auditing institutions. Forty-six critical suppliers completed supplier audits in 2019, and TSMC expects all critical suppliers to complete third-party audit by 2021, at the completion rate of 100%. The audit allows TSMC to evaluate actual risks and enhance the overall performance of the suppliers. For high-risk suppliers, the TSMC experts conducted on-site audits and required improvements. The completion rate was 100%.



2019 Supplier Audit Results



TSMC Experts

Suppliers Audited^{Note 1}

57 Raw Materials, Spare Parts, and Packaging/ Testing Suppliers

Audit Methods

59 On-site Audits

Audit Results and Actions

Violations

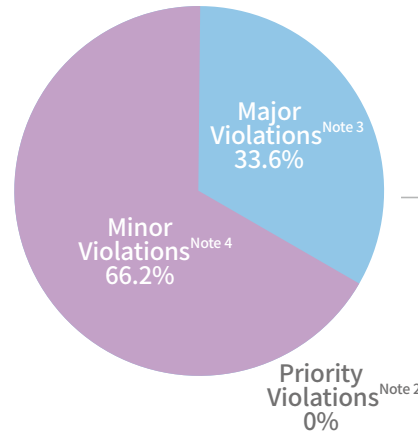
- Insufficient maintenance of fire protection, and lack of awareness and knowledge in occupational safety and health

Follow-up Actions

- Require suppliers to appoint a person in charge of fire protection, and enhance fire protection training
- Continue to hold experience-sharing workshops; emphasizing audit violations and improvement in 2020
- Compile the TSMC Supplier Sustainability Standard, which encompasses the major audit violations, and require suppliers to sign and comply with the Standard

Distribution of Audit Violations

4.3%	Organization and System of Environmental, Safety, and Health Management
7.5%	Pollution Prevention
2.1%	Climate Change ^{Note 5}
1.1%	Hazardous Substance Management
7.7%	Safety Management
17.1%	Occupational Safety and Health
15.7%	Fire Protection Management and Fire Prevention
5.6%	Earthquake Protection
5.1%	Emergency Response



4.5%	Organization and System of Environmental, Safety, and Health Management
7.2%	Pollution Prevention
0.3%	Climate Change ^{Note 5}
5.3%	Safety Management
6.1%	Occupational Safety and Health
7.2%	Fire Protection Management and Fire Prevention
1.9%	Earthquake Protection
1.1%	Emergency Response

Note 1: For the auditing results, please refer to the [Waste Management](#) section. Two companies serve both as raw materials suppliers and waste disposal partners, and were audited by two separate Teams of Experts

Note 2: Priority violations are the most severe violations of the TSMC Supplier Code of Conduct, including environmental pollution, severe legal violations, hiring child labor or forced labor

Note 3: Major violations refer to the lack of systematic management, legal violations that could be corrected immediately, and significant discrepancies between implementation and proper ESH procedures, such as daily operations not adhering to ESH procedures, legal violations that could be rectified quickly and have no ESH impact or the lack of necessary ESH procedures



Third-Party Auditing Institutions

Suppliers Audited^{Note 1}

46 Critical Suppliers

Audit Methods

46 Third-party Supplier Audits on Sustainability Risk by RBA-certified Auditing Institutions

Audit Results and Actions

Violations

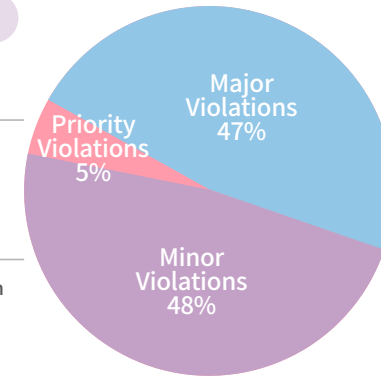
- Enhancing compliance on work hours for supply chain workers
- Establishing a transparent management system

Follow-up Actions

- Require the suppliers to establish a more comprehensive policy on human rights, examine the timeliness of labor human rights regulations, and enhance internal education and implementation
- Continues to ask the suppliers to improve and eliminate violations

Distribution of Audit Violations

5%	Labor
20%	Labor
7%	Ethics
21%	Management System



21%	Labor
2%	Ethics
24%	Management System

Note 4: Minor violations refer to deviations from ESH procedures in practice and implementations or lack of documentation, such as incomplete training records, not fully conforming to ESH procedures or incomplete ESH procedures

Note 5: Climate change audits focus on greenhouse gas emissions and responding measures for natural disasters caused by climate change



Supplier Risk Assessment Process and Results



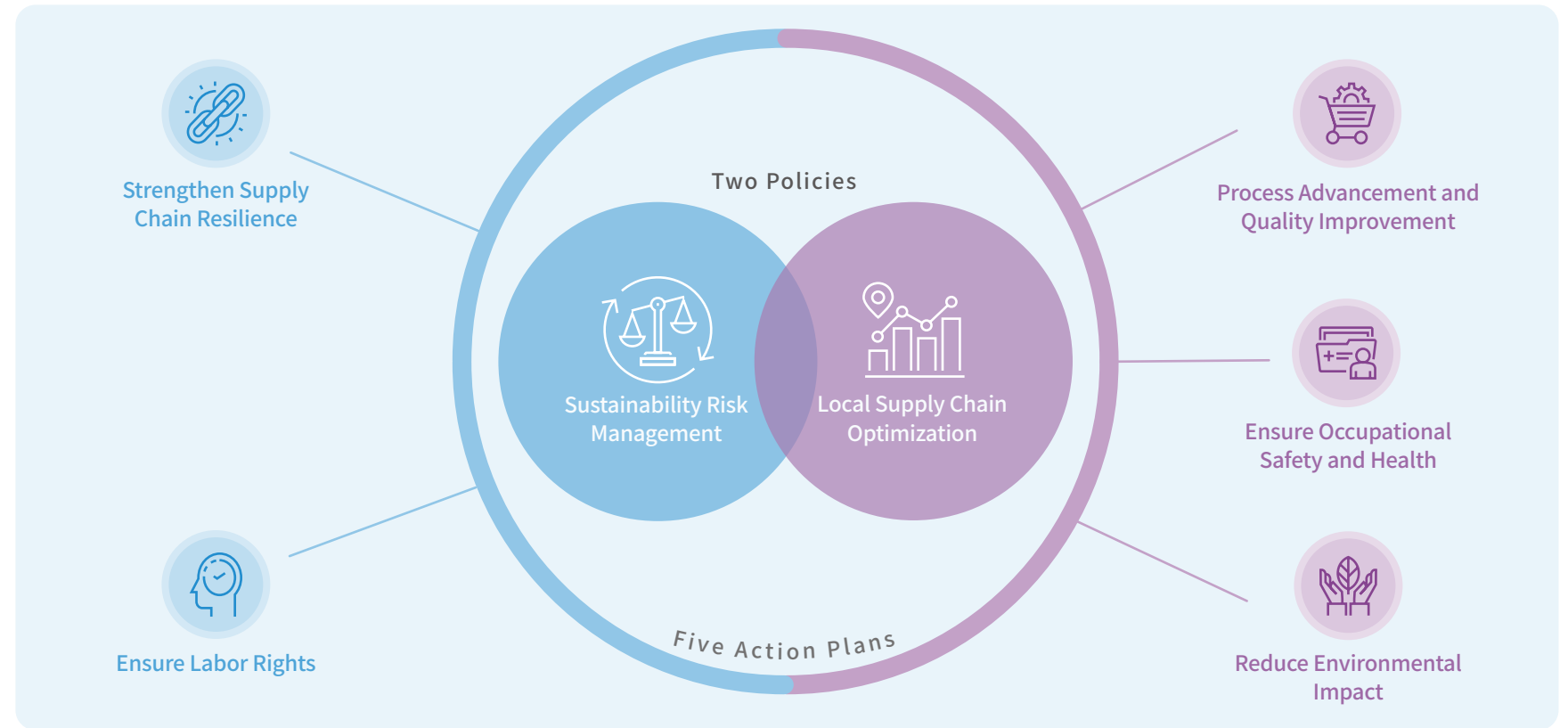
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High-risk Suppliers

Continuously Improving Supply Chain Sustainability

TSMC cares about the sustainability of the environment, the society, and the economy, aiming to improve supply chain management and influence the industry towards sustainability by building a responsible supply chain. Therefore,

TSMC set two strategies – Sustainability Risk Management and Local Supply Chain Optimization – based on the five core categories stated in the TSMC Supplier Code of Conduct: Labor, Health and Safety, Environmental Requirements, Ethics, and

Management, to ensure continuous improvement. Five Action Plans have been created based on these core values, propelling TSMC's path towards sustainability into a positive cycle.





Responsible Supply Chain Action Plan



2019

- 100% of Tier 1 suppliers signed the TSMC Supplier Code of Conduct and Sustainability Management Self-Assessment Questionnaire
- 100% of the high-risk suppliers underwent TSMC on-site audits
- Required critical suppliers to conduct annual self-assessment for their upstream suppliers
- Procured 100% of the raw materials from smelters approved by Responsible Minerals Assurance Process (RMAP)
- Initiated Supply Chain Environmental Profit and Loss (E P&L) Assessment Project
- Launched the project of Supply Chain 360 System

2020

- Goals for increasing local sourcing:
 - 60% for indirect raw materials
 - 50% for spare parts
 - 36% for backend equipment
- Reduce waste production among major local suppliers by 29.1%
- A total of 38 local raw materials suppliers receive consultation on process advancement and quality improvement
- Work with suppliers to develop Electronic-grade Materials Recycling Mechanisms
- Low carbon emission process and sourcing: New fabs adopt water electrolysis method for bulk gas

2021

- 100% of the critical suppliers receive third-party audits by RBA-certified auditing institutions
- Complete the Supply Chain Environmental Profit and Loss (E P&L) Assessment Project

2022

- Goals for increasing local sourcing:
 - 64% for indirect raw materials
 - 60% for spare parts
 - 46% for backend equipment
- Reduce waste production among major local suppliers by 35%
- A total of 145 local raw materials suppliers receive consultation on process advancement and quality improvement
- Provide consultation on power reduction for supplier and reduce energy consumption by a total of 1,500 GWh



Sustainability Risk Management

TSMC aspires to grow along with suppliers and create a work environment that guarantees the dignity of the workers and ethical business conduct. To this end, TSMC is committed to auditing and consultation for suppliers to ensure continuous improvement in terms of compliance, labor rights, ESH practices, and emergency response. In 2019, TSMC continued to deepen its efforts to strengthen supply chain resilience

and labor rights, formulate emergency response measures, and reduce risks via auditing. TSMC, along with suppliers, are committed to the sustainable business growth. TSMC began establishing the Supply Chain 360 system in 2019, integrating communication channels with suppliers to exchange information swiftly, effectively, and seamlessly.

Problems / Challenges	Tactics / Actions	Number of Suppliers	Performance
<p>Action Plans Strengthen Supply Chain Resilience</p> <ul style="list-style-type: none"> Since TSMC's supply chain is mainly located in areas with frequent earthquakes, inadequate emergency response capacity would result in a higher risk of supply disruption due to the disaster The supply chain must continue improving code compliance, labor rights, and ESH measures 	<ul style="list-style-type: none"> The Supply Chain 360 system integrates communication channels with suppliers, increasing the precision and timeliness of information Continue to develop multi-source supply solutions Invite suppliers to attend TSMC observation and learning program of annual emergency response drills Require critical suppliers to receive third-party audits by RBA-certified auditing institutions TSMC (Nanjing) underwent RBA VAP certification 	<ul style="list-style-type: none"> - - 22 46 - 	<ul style="list-style-type: none"> ✓ The procurement department works with the IT, quality control, ESH, and risk management divisions to establish the Supply Chain 360 system ✓ TSMC R&D, quality control, and manufacturing departments work together to formulate annual multi-source supply solutions, requiring suppliers to diversify production bases and evaluate new suppliers to reduce the disruption risk of supply from single sources. In 2019, TSMC completed the multi-source supply solutions for 56 items, including chemicals and gases ✓ In 2019, 22 suppliers attended the observation and learning program of <u>emergency response drills and participated in emergency response center tours and response equipment training programs</u> ✓ In 2019, 46 critical suppliers received third-party audits by RBA-certified auditing institutions ✓ TSMC (Nanjing) received RBA VAP certification
<p>Action Plans Safeguard Labor Rights</p> <ul style="list-style-type: none"> Employees working consecutively for seven days Insufficient workplace safety rules for contractors and subcontractors at TSMC factory sites Contractors do not pay downstream subcontractors on time Contractors do not sign the TSMC Code of Ethics or Supplier Code of Conduct Contractor compliance with regulations on sourcing conflict-free mineral raw materials 	<ul style="list-style-type: none"> Quarterly review on supplier employees working for seven consecutive days at TSMC factory sites: occurrence decreased by 50% in 2019 Strengthen workplace safety management for contractors, especially on-site operational subcontractors and downstream subcontractors, and specify penalties and fines for workplace safety violations Strengthen workplace safety management for contractors, including workplace safety management in the comprehensive supplier evaluation Require contractors and subcontractors at all levels to sign the Contract Labor Payment Implementation Measures statement provided by TSMC Require Tier 1 suppliers to sign and comply with the TSMC Code of Ethics and Supplier Code of Conduct Continue due diligence to ensure sourcing of 100% conflict-free minerals 	<ul style="list-style-type: none"> - - - - 1,226 (Tier 1 suppliers) 37 	<ul style="list-style-type: none"> ✓ Quarterly reminder on the attendance of supplier employees working at TSMC factory sites ✓ Specify violation penalties in the order form. Once suppliers accept the order, they are considered to have accepted the violation penalties Note ✓ In 2019, United Integrated Services and Fu Tsu Construction received TSMC Outstanding Supplier Awards ✓ Require Tier 1 contractors to enclose proof of payment to subcontractors upon requesting payment from TSMC, which is a necessary condition ✓ Tier 1 suppliers signed the statement at the completion rate of 100% ✓ Completed 100% of due diligence on conflict-free minerals sourcing for the supply chain and took the initiative to monitor cobalt sources

Note 1: In 2019, there were still instances of supplier employees working at TSMC factory sites working for seven consecutive days. TSMC has stressed the importance of work hour management

Note 2: Added violation penalties to the order form in 2018, and the practice continued in 2019

Case Study

Sourcing Conflict-free Minerals

As a leader in the global high-tech industry supply chain, TSMC supports sourcing conflict-free raw materials as a practice of humanitarianism and compliance with the ethical code of society. Therefore, TSMC adopted a series of compliance measures based on industry best practices, including the due diligence framework set by the Organization for Economic Cooperation and Development (OECD) Model Supply

Chain Policy for a Responsible Global Supply Chain of Mineral from Conflict-Affected and High-Risk Areas. TSMC is also a firm supporter of the Responsible Business Alliance (RBA) and Global e-Sustainability Initiative (GeSI), requiring suppliers to source conflict-free raw materials according to the Responsible Minerals Assurance Process (RMAP). TSMC requires suppliers to comply with its conflict-free minerals

sourcing policy and sign a statement on conflict-free minerals for products containing tantalum, tin, gold, and tungsten; Starting from 2019, TSMC has also begun disclosing the source smelters for the cobalt used in TSMC products to customers.

Number of suppliers certified by 2019 TSMC Conflict-free Minerals Due Diligence



37

Tier 1 suppliers



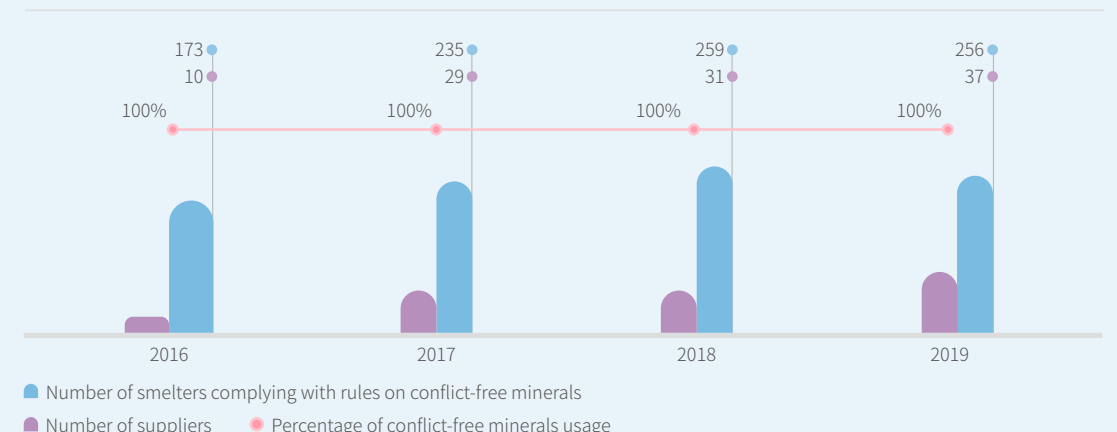
256

Smelters

Conflict-free Minerals Management Process



TSMC Conflict-free Minerals Due Diligence



Note: Disclosed information stated herein included direct suppliers of TSMC factory sites in Taiwan and TSMC subsidiaries, WaferTech, TSMC (China), TSMC (Nanjing), and VisEra



Local Supply Chain Optimization

Local supply chain optimization is a critical TSMC procurement strategy, which aims to ensure corporate sustainability by providing consultation and diverse resources for suppliers and by sharing TSMC experience, for strengthening suppliers' capabilities for emergency response, process advancement, and quality improvement. By working together, TSMC and suppliers can solve environmental issues effectively with reduced processing costs and counter the rising costs caused by climate change and resource depletion. TSMC also requires suppliers to comply with the Code of Conduct, reduce energy consumption and waste in the supply chain, recycle resources, and propel the progress of the supply chain.



TSMC's sharing of its practical experience and know-how with us is extremely helpful for improving ESH professionalism and capabilities in our factory.

Chen Yun-Yu EHS Vice President of Air Products San Fu- TSMC Supplier

Problems / Challenges	Consultation Tactics / Actions	Number of Suppliers	2019 Performance
<p>Action Plans Process Advancement and Quality Improvement</p> <ul style="list-style-type: none"> Challenges in improving measurement technology, enhancing quality, and expanding output capacity for advanced processes 	<ul style="list-style-type: none"> Hold two 2019 Advanced Process Materials Forums ^{Note 1} Provide consultation for suppliers on capacity deployment, improving advanced measurement technology, and enhancing manufacturing quality 	<p>33</p>	<ul style="list-style-type: none"> Invited 33 material suppliers for advanced processes to the event; a total of 150 people participated in discussions on the future road map for the quality of advanced processes, driving synchronized growth for suppliers and TSMC Completed 77 quality improvements for materials of advanced processes; 28 suppliers completed 100% of capacity deployment according to the mass production needs for 7 nm and 5 nm processes
<p>Action Plans Ensure Occupational Safety and Health</p> <ul style="list-style-type: none"> The performance of occupational health safety and health management of several local suppliers have not met TSMC requirements 	<ul style="list-style-type: none"> Continue to work with third-party consultants to provide on-site consultation for suppliers to improve suppliers' occupational safety and health performance ^{Note 2} Hold Responsible Supply Chain Forum and <u>Environmental, Safety, and Health Experience-sharing Workshops</u> to provide on-site consultation for suppliers, offering advice on environmental protection and occupational safety and health, and requiring tangible actions for improvement 	<p>21</p>	<ul style="list-style-type: none"> TSMC invited suppliers exposed to occupational safety and health risks to participate in the Supply Chain Occupational Safety and Health Improvement Program; 21 suppliers joined in 2019. TSMC and consultants visited the factory sites, requesting improvements on noise and ventilation for environments where chemicals are used Held a Responsible Supply Chain Forum, in which representatives from 150 suppliers participated, to elaborate on TSMC requirements and audit violations, and to propose relevant responses and measures to counter such risks Held four <u>Environmental, Safety, and Health Experience-sharing Workshops</u>, offering TSMC on-site experience accumulated in the past years. Approximately 500 representatives from suppliers participated Presented the Environmental, Safety, and Health Award to Chang Chun Petrochemical Company
<p>Action Plans Reduce Environmental Impact</p> <ul style="list-style-type: none"> Reduce environment impact, energy consumption, and resource depletion caused by localized manufacturing 	<ul style="list-style-type: none"> Increase the proportion of local sourcing, set sourcing targets for indirect raw materials, spare parts, and backend equipment Require <u>top ten waste-producing suppliers</u> to continuously reduce waste and report on the progress made each year Formulate Electronic-grade Materials Recycling Mechanisms, and assemble implementation teams Procure raw materials made with environmentally friendly processes Require local suppliers with higher energy consumption to reduce power usage 	<p>10</p>	<ul style="list-style-type: none"> 59% for indirect raw materials, 50% for spare parts, 34% for backend equipment Waste production of supplier business units reduced by 28.5% (Target: 28.5%) Evaluated the technology of current electronic-grade chemicals suppliers and electronic-grade materials recycling vendors Procured bulk gas made with environmentally friendly processes: using the electrolysis method to produce hydrogen to reduce carbon emissions Asked 12 local suppliers that consume 5 GWh and above per year to reduce power consumption by 97 GWh

Note 1:TSMC held 2019 Advanced Process Materials Forums in May and September 2019, and the theme was Analysis on Organic Pollutants in Semiconductor Materials

Note 2:In 2019, TSMC worked with Occupational Safety and Health Administration, Ministry of Labor, and Professor Lin Yu-Wen from Fu Jen Catholic University for the third consecutive year, inviting twenty-one suppliers in spare parts washing, pump maintenance, and filtration material maintenance for washing towers to participate in the Supply Chain Occupational Safety and Health Promotion Project. Through document review and on-site inspections, TSMC offered advice on improving management procedures and workplace environment, hardware construction, and promoting labor health



First Integration of Responsible Supply Chain Forum and TSMC Supply Chain Management Forum

In 2019, TSMC integrated its Responsible Supply Chain Forum with the TSMC Supply Chain Management Forum for the first time, resulting in an increase in the attendance of high-level managers from supplier companies by 71%. It shows the determination of TSMC and suppliers for sustainability; by elevating the level of communication, the suppliers gain a better understanding of TSMC standards and requirements on environmental protection, occupational safety and health, and disaster management. In the forum, TSMC

reiterated its expectations for the suppliers to pursue the UN SDGs12 - to ensure sustainable consumption and production patterns, and to work with TSMC to fulfill corporate social responsibility. Suppliers and TSMC will continue to implement environmental protection policies, focus on reducing energy consumption, carbon emissions, and water usage, prevent pollution, and facilitate a circular economy.

Also, in the Supply Chain Management Forum, TSMC conducted its first questionnaire surveying the suppliers' awareness on sustainability strategies and future directions, quality control mechanisms, auditing, compliance, and implementation of the code of business

ethics. Over 84% of the suppliers responded that sustainability strategies require the most emphasis; the survey shows that TSMC's dedication to a sustainable supply chain and the continuous requirement for suppliers to be responsible for their upstream supply chain have borne fruitful results.

Continue to Promote the Upgrade of Local Supply Chain

TSMC's main production site is located in Taiwan. Its procurement can be divided into six categories: equipment, spare parts, raw materials, facility services, IT, and goods. The Company's headquarters is responsible for all procurement. To build a sustainable supply chain,

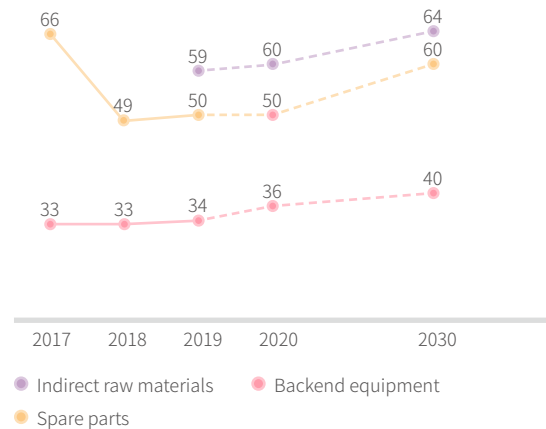
TSMC considers improving the sustainability of the local semiconductor industry to be a critical goal and views the continuous upgrade of the local supply chain as an essential strategy. In 2019, TSMC devoted to the following management measures:

- Set targets for local sourcing^{Note1} to increase or maintain the percentage of local sourcing
- Proactively improve the technological levels and quality of suppliers of critical equipment, spare parts, and raw materials to increase local sourcing
- Invite international companies to set up factories in Taiwan, elevating the entire supply chain

Localizing the supply chain increases supply flexibility, shortens development time for new products, and cuts unnecessary costs while reducing carbon emissions of the supply chain and ensures the quality and efficiency of customer service. For many years, TSMC has set local sourcing targets and has continued to promote local procurement. Although subsidiaries including TSMC (China)^{Note2}, TSMC (Nanjing), WaferTech in the US and others each have independent procurement units, as a part of the TSMC global supply chain, these subsidiaries also push for supply chain localization since enhancing the capabilities of local suppliers would benefit both the suppliers as well as TSMC.

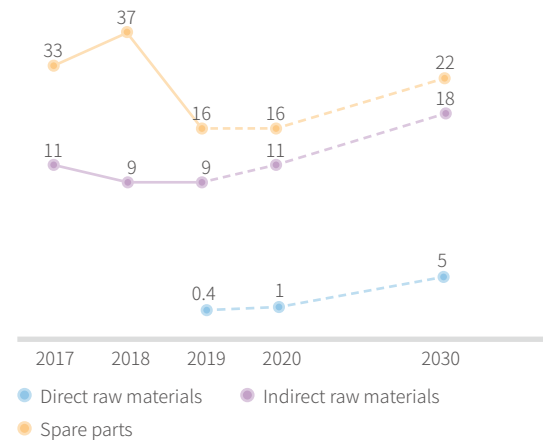
Percentage of Local Sourcing in Taiwan

Unit: %



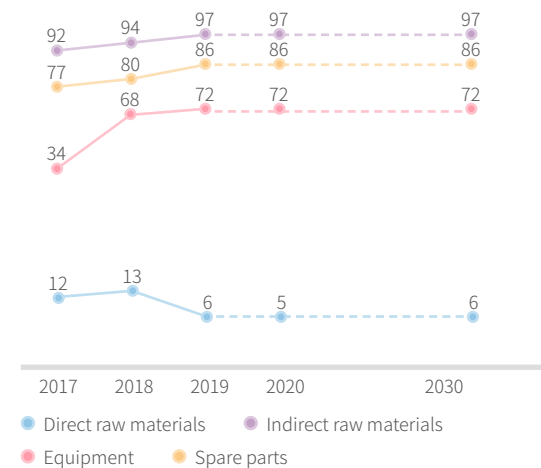
Percentage of Local Sourcing in China

Unit: %



Percentage of Local Sourcing in United States

Unit: %



Note 1: Local sourcing refers to the suppliers that manufacture or process in the local area

Note 2: Starting in 2019, the volume of local sourcing in China include that of TSMC (China) and TSMC (Nanjing). 100% of the equipment procured is currently 100% imported, while the percentage of local sourcing for spare parts is lower because TSMC (Nanjing) uses imported spare parts

2019 Results of Consultation for Local Raw Materials Suppliers on Process Advancement and Quality Improvement

Scope of Consultation	Categories / Number of Suppliers	Problems	Improvement Methods	Achievements
<p>Consult on Spare Part Development for Advanced Processes</p>	<ul style="list-style-type: none"> 2 Spare parts maintenance suppliers 1 Spare parts coating supplier 1 Spare parts machining supplier 	<ul style="list-style-type: none"> • The percentage of imported, high-level spare parts for several advanced processes is still too high, as local suppliers lack critical processing technology 	<ul style="list-style-type: none"> • Assemble experts to provide consultation for local suppliers, specify areas for development, offer technological training, and assist in certification, benefitting both the suppliers and TSMC 	<ul style="list-style-type: none"> ✓ There are 381 items planned ✓ 51 items have been completed
<p>Capacity Deployment</p>	<ul style="list-style-type: none"> 3 Chemicals suppliers 2 Photoresists suppliers 1 Gases supplier 	<ul style="list-style-type: none"> • Capacity insufficient to meet advanced process requirements 	<ul style="list-style-type: none"> • Production line expansion 	<ul style="list-style-type: none"> ✓ Capacity increase
<p>Improve Advanced Measurement Technology</p>	<ul style="list-style-type: none"> 5 Chemicals suppliers 1 Photoresists supplier 8 Gases suppliers 	<ul style="list-style-type: none"> • Measurement technology insufficient to meet advanced process requirements 	<ul style="list-style-type: none"> • Add analytical instruments and methods 	<ul style="list-style-type: none"> ✓ Zero rejects ✓ Detection threshold increased by 10% ✓ Capability for IC material analysis
<p>Improve Environment, Safety, and Health Performance</p>	<ul style="list-style-type: none"> 1 Backend supplier 	<ul style="list-style-type: none"> • Failed to establish an Environment, Safety, and Health Management system • Failed to identify or reduce fire risks 	<ul style="list-style-type: none"> • Establish an Environment, Safety, and Health management system and receive ISO45001 third-party certification • Identify fire risks, and improve measures to reduce fire risks 	<ul style="list-style-type: none"> ✓ Improved audit scores by 25% ✓ From Failed to Intermediate



Case Study

Collaboration with Taiwan Specialty Chemicals Corporation - TSMC 2019 Outstanding Supplier Award Winner for Breakthrough in Quality

Supply chain localization not only ensures source and quality stability for TSMC materials; working with local raw materials suppliers allows TSMC to improve the production quality of critical raw materials, expand capacity, reduce the carbon footprint for the supply chain, and strengthen supply chain sustainability.

Localization Maximizes Production Benefit of Critical Raw Materials

TSMC products require a specialty gas - Disilane (Si₂H₆). Due to the high purity and precision necessary for semiconductor production, the technological barrier led TSMC to procure this gas from overseas suppliers. In 2017, TSMC assembled an inter-departmental project team consisting of experts in supply chain material management, quality and reliability, and facility services, to provide consultation for a local semiconductor raw materials supplier, Taiwan Specialty Chemicals Corporation, on Disilane production. After multiple on-site audits and technology exchanges, the Disilane produced by the Taiwan Specialty Chemicals Corporation now meets advanced processes requirements from TSMC.

In 2019, Taiwan Specialty Chemicals Corporation received a TSMC Outstanding Supplier Award, which is the evidence of synchronized growth for both local suppliers and TSMC.

Collaboration Process of TSMC and Local Raw Materials Supply Chain



< Forging an Advanced Local Supply Chain >

Invitation to International Spare Parts Giant, EBARA, for Establishing Facilities in Taiwan

TSMC took the initiative to establish a more effective supply chain, systematically inviting foreign companies to set up factories in Taiwan. By doing so, TSMC firstly reduces supply chain procurement risk, and secondly, offers the local region employment and business opportunities, further strengthening supply chain sustainability.

Invite International Companies to Produce in Taiwan

Japanese manufacturer EBARA is the second largest supplier of semiconductor vacuum pumps worldwide. Responding to TSMC's dedication to localization and sustainability, EBARA set up factories in Taiwan upon TSMC's invitation. This venture allows EBARA to keep in step with customer demands, as well as improve company competitiveness relying on TSMC's influence in the global semiconductor industry.



Provide Consultation for Manufacturing Processes, Benefiting Both the Suppliers and TSMC

EBARA has manufactured spare parts in Taiwan since 2011, while TSMC assists in product quality certification. TSMC has been closely involved in product enhancement as well as design improvement for spare parts, offering timely assistance. As a result, EBARA managed to reduce overall manufacturing cost, improve output capacity and efficiency, and become more competitive in the global market. Meanwhile, EBARA's marginal effect on the supply chain helped to elevate Taiwan's manufacturing capabilities for pump-related spare parts, benefiting the entire supply chain.

As of 2019, EBARA has fully supported TSMC's expansion in capacity for advanced processes, and the products manufactured in Taiwan, in return, were sold by the parent company in Japan to customers worldwide. EBARA's capacity in Taiwan has surpassed 80%, making Taiwan a critical source for vacuum pump spare parts in the world.

Five Stages of Supplier Setting Up Factories in Taiwan

