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

<table>
<thead>
<tr>
<th>Sustainability Risk Management</th>
<th>2019 Achievements</th>
<th>2020 Targets</th>
</tr>
</thead>
</table>
| Suppliers comply with TSMC Code of Ethics, taking actions according to the TSMC Supplier Code of Conduct | - Tier 1 suppliers' completion rate for signing the TSMC Supplier Code of Conduct: 100%<sup>Note 1</sup>  
- 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%<sup>Note 2</sup>  
- 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 | - All tier 1 suppliers signed the TSMC Supplier Code of Conduct at the completion rate of 100%  
- All tier 1 suppliers completed the Sustainability Management Self-Assessment Questionnaire at the completion rate of 100%  
- All tier 1 suppliers signed the TSMC Guidance on Supplier Business Conduct and conducted internal training at the completion rate of 100%<sup>Note 3</sup>  
- Completion rate of critical suppliers reporting on the status sustainability management in their critical upstream supply chains: the completion rate is 100%  
- Critical suppliers are required to report on the status of sustainability management in their critical upstream supply chains; the completion rate is 100%<sup>Note 4</sup>  
- Quarterly review on the attendance of supplier employees working at TSMC factory sites  
- Sourcing conflict-free raw materials  
- A total of 46 critical Suppliers completed third-party supplier audits on sustainability risk by RBA-certified institutions  
- Developed 56 multi-source supply solutions | - 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 to assess sustainability risk and encourage critical suppliers to join the Responsible Business Alliance (RBA) | - Continue to diversify production sites and assess new suppliers; develop 125 multi-source supply solutions (Base year: 2018)<sup>Note 5</sup>  
- Tier 1 supplier refers to a supplier trading with TSMC directly with more than two orders per yeasr selected mainly spending-based. In 2019, 1,226 suppliers met the criteria  
- 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  
- 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  
- Supplier due diligence on conflict-free minerals: 100% of the minerals used to comply with conflict-free requirements | - Tier 1 suppliers' completion rate for receiving third-party audits (by RBA-certified auditing institutions) every three years: 100%<sup>Note 6</sup>  
- Critical suppliers completion rate for receiving third-party supplier audits on sustainability management: 100%<sup>Note 7</sup>  
- Supplier due diligence on conflict-free minerals: 100% of the minerals used to comply with conflict-free requirements  
- Continue to diversify production sites and assess new suppliers; develop 64 multi-source supply solutions |  

### 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)  
2. Tier 1 supplier refers to a supplier trading with TSMC directly with more than two orders per yeasr selected mainly spending-based. In 2019, 1,226 suppliers met the criteria  
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  
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  
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 every two years  
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  
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 responses capabilities, benefiting both the suppliers and TSMC  
8. Including the raw materials used by TSMC, such as chemicals and gases
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.

- Provide consultation for the supplier to continue improving
  - A cumulative total of 300 suppliers participate in the Environmental, Safety, and Health (ESH) training program (Base year: 2016)
  - 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)

- Increase local sourcing
  - 64% for indirect raw materials
  - 60% for spare parts
  - 40% for backend equipment

- Provide consultation on power reduction for suppliers and reduce energy consumption by a cumulative total of 1,500 GWh (Base year: 2018)
  - A cumulative total of 411 suppliers participated in the Environmental, Safety, and Health (ESH) training program
  - The average ESH audit score for local suppliers: 78
  - Integrated Responsible Supply Chain Forum into TSMC’s annual Supply Chain Management Forum
  - 22 suppliers attended the observation and learning program of the annual emergency response drill (Cumulative total: 90)
  - 16 suppliers received consultation on process enhancement and quality improvement (Cumulative total: 33)
  - 59% for indirect raw materials
  - 50% for spare parts
  - 34% for backend equipment

- Reduce waste production among major local suppliers by 35% (Base year: 2014)

Note 1: The number of suppliers here is an accumulated total
Note 2: 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 every year; 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.

<table>
<thead>
<tr>
<th>Rules of Implementation</th>
<th>Management Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suppliers must comply with the TSMC Supplier Code of Conduct while extending the scope of management to their upstream suppliers</td>
<td>All suppliers are required to follow the TSMC Supplier Code of Conduct, ensuring that all suppliers adopt a consistent standard in management</td>
</tr>
<tr>
<td>Determining the level of compliance according to the TSMC Supplier Code of Conduct via Sustainability Self-Assessment Questionnaire or Risk Assessment by the TSMC experts</td>
<td>Tier 1 suppliers are required to sign the Supplier Code of Conduct</td>
</tr>
<tr>
<td>Critical Suppliers are required to conduct third-party audits by RBA-certified auditing institutions or on-site audits by the TSMC experts</td>
<td>Critical Suppliers are required to ask their upstream suppliers, contractors, and service providers to commit and adhere to the TSMC Supplier Code of Conduct</td>
</tr>
<tr>
<td>Requiring suppliers to improve according to the TSMC Supplier Code of Conduct as well as the audit results</td>
<td>Determining the level of Code compliance of Tier 1 suppliers via Sustainability Self-Assessment Questionnaire to assess risks</td>
</tr>
<tr>
<td>Requiring suppliers to improve according to the TSMC Supplier Code of Conduct as well as the audit results</td>
<td>Assessment by the TSMC experts, identifying serious violations and prioritizing management tasks</td>
</tr>
<tr>
<td>Critical suppliers are required to conduct third-party audits; TSMC monitors audit results and require improvement</td>
<td>Monitor suppliers with serious violations, following their continuous improvement to reduce future risks</td>
</tr>
<tr>
<td>TSMC experts conduct on-site audits and require improvement</td>
<td>Requiring suppliers to assess and mitigate climate change risks</td>
</tr>
<tr>
<td>TSMC provides consultation or assistance and arranges for follow-up inspections for improvement</td>
<td>TSMC may reduce the trade volume or terminate trade with suppliers that fail to meet the requirements</td>
</tr>
</tbody>
</table>

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.
**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 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 ensures that suppliers understand TSMC’s sustainability requirements, comply with 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 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 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

TSUMC Experts
- Suppliers Audited[^1^]
- Audit Methods
- Audit Results and Actions

57 Raw Materials, Spare Parts, and Packaging/Testing Suppliers
59 On-site Audits

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

Priority Violations[^2^]
- Major Violations: 33.6%
- Minor Violations: 66.2%

Third-Party Auditing Institutions
- Suppliers Audited[^3^]
- Audit Methods
- Audit Results and Actions

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

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
- Labor: 21%
- Ethics: 24%
- Management System: 2%
- Minor Violations: 48%
- Priority Violations: 5%
- Major Violations: 47%

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

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.
TSMC set two strategies—Sustainability Risk Management and Local Supply 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.

Action Plans

**Strengthen Supply Chain Resilience**
- The Supply Chain 360 system integrates communication channels with suppliers, increasing the precision and timeliness of information.
- Continue to develop multi-source supply solutions.

**Safeguard Labor Rights**
- 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.

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. TSMC has stressed the importance of work hour management.

<table>
<thead>
<tr>
<th>Action Plans</th>
<th>Tactics / Actions</th>
<th>Number of Suppliers</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Supply Chain 360 system integrates communication channels with suppliers, increasing the precision and timeliness of information</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Continue to develop multi-source supply solutions</td>
<td>-</td>
<td></td>
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<tr>
<td></td>
<td>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</td>
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<tr>
<td></td>
<td>The supply chain must continue improving code compliance, labor rights, and ESH measures</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Invite suppliers to attend TSMC observation and learning program of annual emergency response drills</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Require critical suppliers to receive third-party audits by RBA-certified auditing institutions</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TSMC (Nanjing) underwent RBA VAP certification</td>
<td>-</td>
<td></td>
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<tr>
<td></td>
<td>Quarterly reminder on the attendance of supplier employees working at TSMC factory sites</td>
<td>-</td>
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<tr>
<td></td>
<td>Specify violation penalties in the order form. Once suppliers accept the order, they are considered to have accepted the violation penalties Note</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In 2019, United Integrated Services and Fu Tsu Construction received TSMC Outstanding Supplier Awards</td>
<td>-</td>
<td></td>
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<tr>
<td></td>
<td>Require Tier 1 contractors to enclose proof of payment to subcontractors upon requesting payment from TSMC, which is a necessary condition</td>
<td>-</td>
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<tr>
<td></td>
<td>Tier 1 suppliers signed the statement at the completion rate of 100%</td>
<td>1,226 (Tier 1 suppliers)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Completed 100% due diligence on conflict-free minerals sourcing for the supply chain and took the initiative to monitor cobalt sources</td>
<td>37</td>
<td></td>
</tr>
</tbody>
</table>

Note: 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. 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.

Conflict-free Minerals Management Process

TSMC Conflict-free Minerals Due Diligence

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Suppliers</th>
<th>Percentage of Conflict-free Minerals Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>173</td>
<td>100%</td>
</tr>
<tr>
<td>2017</td>
<td>235</td>
<td>100%</td>
</tr>
<tr>
<td>2018</td>
<td>259</td>
<td>100%</td>
</tr>
<tr>
<td>2019</td>
<td>256</td>
<td>100%</td>
</tr>
</tbody>
</table>

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.

Problems / Challenges

- Reduce environmental impact, energy consumption, and resource depletion caused by localized manufacturing
- Challenges in improving measurement technology, enhancing quality, and expanding output capacity for advanced processes
- The performance of occupational health safety and health management of several local suppliers have not met TSMC requirements
- Challenges in improving measurement technology, enhancing quality, and expanding output capacity for advanced processes
- The performance of occupational health safety and health management of several local suppliers have not met TSMC requirements

Consultation Tactics / Actions

- Hold two 2019 Advanced Process Materials Forums
- Provide consultation for suppliers on capacity deployment, improving advanced measurement technology, and enhancing manufacturing quality
- Continue to work with third-party consultants to provide on-site consultation for suppliers to improve suppliers’ occupational safety and health performance
- Hold Responsible Supply Chain Forum and Environmental, Safety, and Health Experience-sharing Workshops to provide on-site consultation for suppliers, offering advice on environmental protection and occupational safety and health, and requiring tangible actions for improvement
- Increase the proportion of local sourcing, set sourcing targets for indirect raw materials, spare parts, and backend equipment
- Require top ten waste-producing suppliers 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

Number of Suppliers

- 33 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
- 21 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 Environmental, Safety, and Health Experience-sharing Workshops, 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

2019 Performance

- 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 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
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 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), 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.

<table>
<thead>
<tr>
<th>Percentage of Local Sourcing in Taiwan</th>
<th>Unit: %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>2018</td>
</tr>
<tr>
<td>Indirect raw materials</td>
<td>66</td>
</tr>
<tr>
<td>Backend equipment</td>
<td>33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentage of Local Sourcing in China</th>
<th>Unit: %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>2018</td>
</tr>
<tr>
<td>Direct raw materials</td>
<td>33</td>
</tr>
<tr>
<td>Indirect raw materials</td>
<td>11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentage of Local Sourcing in United States</th>
<th>Unit: %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>2018</td>
</tr>
<tr>
<td>Direct raw materials</td>
<td>92</td>
</tr>
<tr>
<td>Indirect raw materials</td>
<td>77</td>
</tr>
<tr>
<td>Equipment</td>
<td>34</td>
</tr>
<tr>
<td>Spare parts</td>
<td>12</td>
</tr>
</tbody>
</table>

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 includes that of TSMC (China) and TSMC (Nanjing). 100% of the equipment purchased 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

<table>
<thead>
<tr>
<th>Scope of Consultation</th>
<th>Categories / Number of Suppliers</th>
<th>Problems</th>
<th>Improvement Methods</th>
<th>Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consult on Spent Part Development for Advanced Processes</td>
<td>2 Spare parts maintenance suppliers, 1 Spare parts coating supplier, 1 Spare parts machining supplier</td>
<td>The percentage of imported, high-level spare parts for several advanced processes is still too high, as local suppliers lack critical processing technology</td>
<td>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</td>
<td>There are 381 items planned, 51 items have been completed</td>
</tr>
<tr>
<td>Capacity Deployment</td>
<td>3 Chemicals suppliers, 2 Photoresists suppliers, 1 Gases supplier</td>
<td>Capacity insufficient to meet advanced process requirements</td>
<td>Production line expansion</td>
<td>Capacity increase</td>
</tr>
<tr>
<td>Improve Advanced Measurement Technology</td>
<td>5 Chemicals suppliers, 1 Photoresists supplier, 8 Gases suppliers</td>
<td>Measurement technology insufficient to meet advanced process requirements</td>
<td>Add analytical instruments and methods</td>
<td>Zero rejects, Detection threshold increased by 10%, Capability for IC material analysis</td>
</tr>
<tr>
<td>Improve Environment, Safety, and Health Performance</td>
<td>1 Backend supplier</td>
<td>Failed to establish an Environment, Safety, and Health Management system, Failed to identify or reduce fire risks</td>
<td>Establish an Environment, Safety, and Health Management system and receive ISO45001 third-party certification, Identify fire risks, and improve measures to reduce fire risks</td>
<td>Improved audit scores by 25%, From Failed to Intermediate</td>
</tr>
</tbody>
</table>
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.

Invitation to International Spare Parts Giant, EBARA, for Establishing Facilities 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.

Case Study

Collaboration Process of TSMC and Local Raw Materials Supply Chain

Factory audit  Technological consultation  Quality confirmation  Production initiation

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.

Inviting International Companies to Produce in Taiwan

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Five Stages of Supplier Setting Up Factories in Taiwan

Formulate the production plan in Taiwan  Establish an assembly line for finished products  Localization of non-critical spare parts  Localization of critical spare parts  Sell spare parts back to Japan

Forging an Advanced Local Supply Chain