

# Connect Sustainability with Innovation

Innovation is the foundation that keeps TSMC growing.

High-performance computing propels humanity to a future with AI  
Smartphones breaks the limitation of time and space and bridge us  
with the cloud and to freedom

Advanced automotive electronics carry our imagination to the infinite  
world of mobility

IoT ushers in the era of smart cities and industrial 4.0

ESG is in the DNA of every TSMC employee

TSMC uses concrete action to connect people with people and with  
nature to welcome beautiful change

With an infinite stream of innovative technology solutions,  
TSMC strives to achieve sustainability and connect to a future of  
common good



## Letter from the ESG Steering Committee Chairperson

Over the past two years, COVID-19 has continued to impact our world while the threat of extreme climate conditions has steadily increased. As a key player in the global semiconductor supply chain, TSMC has the responsibility of working with industry partners to take continuous action with regard to ESG (Environmental, Social and Governance) issues.

Our vision is to uplift society and we link TSMC's core advantages with the United Nations' Sustainable Development Goals (SDG), integrating five ESG development focal points including "Drive Green Manufacturing," "Build a Responsible Supply Chain," "Create a Diverse and Inclusive Workplace," "Develop Talent," and "Care for the Disadvantaged." Since 2019, the ESG Steering Committee has integrated cross-organizational resources and strengths, formulated long-term goals, and reviewed the implementation of these goals. In 2021, in addition to focusing on improving the industry's core capabilities, we also continued to implement corresponding sustainable practices. We now integrate sustainability target results into the compensation structure for senior executives, integrate SDGs into both the organizational culture and employees' daily tasks, and actively respond to concerns raised by stakeholders both inside and outside the company.

We firmly believe that corporate growth and the natural environment can coexist prosperously, and we implement green practices to ensure this. In 2021 TSMC further committed to actively implement emission reduction measures and optimize related sustainable actions. The Company set a short-term goal of achieving zero emission growth by 2025, a medium-term goal of returning to 2020 emissions level by 2030 and a long-term goal of reaching net zero emissions by 2050. In 2021, we also released our first Taskforce on Climate-Related Financial Disclosures (TCFD) Report, promoting climate adaptation and mitigation management through governance, strategies, risk management, metrics and targets, becoming an industry pioneer in disclosing information in related fields. We hope that by expanding our green influence, we will drive the industry to move towards low-carbon sustainability.

Over the past two years COVID-19 has continued to threaten our lives. Throughout this time, TSMC has not only remained resilient in protecting employee health and

safety and maintaining normal operations, we have also extended our expertise and resources to support global pandemic prevention efforts. In 2021, during a period when the epidemic situation in Taiwan was deteriorating, we happily did our part to support the country by successfully purchasing 5 million doses of BNT (BioNTech) 162b2 vaccine and donating them to the Center for Disease Control (CDC) of the Ministry of Health and Welfare with the support of the government. At the same time, we also continued to offer support overseas, including India, helping them deal with overburdened local medical facilities.

At TSMC respect for human rights is regarded as a universal value. In 2021, in order to provide migrant workers with a decent work environment and to create a responsible supply chain, we issued the statement [Supply Chain Partners Should Ensure Protection of Human Rights During the COVID-19 Pandemic](#) so that our subsidiaries and supply chain partners carry out anti-pandemic measures in an appropriate fashion. The statement addresses four major areas: personal freedoms, how migrant workers are informed of anti-pandemic measures, handling of accidents and casualties, and dormitory management.

At TSMC, ESG means driving positive environmental and societal change. We work diligently to integrate the ESG ethos into our daily operations with the aim of sustainable development, formulating systematic management strategies, implementing related measures and reviewing action plans. We also rely on all our employees to champion their work while having the courage to posit innovative ideas. On our road to sustainability, TSMC not only strives to fulfill its role as a responsible corporate citizen, we also look forward to working with partners and stakeholders from all walks of life to create a sustainable future.



**Mark Liu**  
Chairman and ESG Steering Committee Chairperson





# Letter from the ESG Committee Chairperson

The year 2021 was a year of global upheaval as the world faced the COVID-19 pandemic, war, and political instability. As a global citizen, we have shared the impact of these changes.

The year 2021 was also a year of growth for TSMC. Benefitting from the strong demand for advanced process technologies from 5G mobile networks and high-performance computing, TSMC was able to achieve record high revenue for the 12th consecutive year. As COVID-19 continued to ravage the world, TSMC launched the [COVID-19 global epidemic prevention program](#) to protect colleagues, suppliers and contractors [working in TSMC fabs](#) and ensure normal operations at our global wafer fabs. In 2021, TSMC shipped 14.2 million 12-inch equivalent wafers and realized 12,302 product innovations for our customers, providing humanity a safer and more convenient lifestyle. TSMC also supported the Sustainable Development Goals proposed by the United Nations with tangible actions and has remained steadfast to our [five ESG directions](#).

In terms of "Green Manufacturing", in 2021, TSMC updated our [Climate Change Statement](#) to include [a commitment to Net Zero Emissions by 2050](#), invested NT\$28.9731 billion into environmental protection, and successfully promoted 780 innovative programs for [energy conservation](#), [water conservation](#), and [waste reduction](#). TSMC also achieved the target of net zero emissions from energy consumption at all overseas subsidiaries for the fourth consecutive year and responded to Taiwan's drought in the first half of 2021 with outstanding water management capabilities, ensuring that our production capacity was unaffected. In addition, we are currently building a Zero Waste Manufacturing Center to realize a low-carbon business model and circular economy.

As for "Build A Responsible Supply Chain," in 2021, TSMC continued to strengthen supplier sustainability through the [Supply Online 360](#) global responsible supply chain management platform and the [TSMC Supplier Sustainability Academy](#), promoting [EP&L across the supply chain](#) and uncovering opportunities to lower our impact on the environment. In 2021, TSMC also became the first semiconductor company in Taiwan to release the [Supplier Transportation Management White Paper](#). Our efforts in the supply chain also included safety and health support and training to all critical high-risk suppliers and helping suppliers establish [long-term sustainability targets](#). To increase climate resiliency across the supply chain, TSMC also joined the CDP Supply Chain Program.

In terms of "Create a Diverse & Inclusive Workplace," in 2021, TSMC introduced 8,536 job opportunities across the world and drew on our [Human Rights Policy](#) and [Diversity and Inclusion Statement](#) to develop Women@tsmc, an employee resource group aimed at achieving equality in the workplace. Looking ahead, TSMC will continue to make timely responses to employee needs and suggestions through the [Engagement Survey](#) and other diverse reporting channels to support employee work-life balance. For "Develop Talent," TSMC adopted the 70-20-10 rule to [empower employees](#) and cultivate talents for the future. TSMC also continued to expand [university programs](#) such as the Semiconductor Programs, Advanced IC Design Program, and University Research Center as well as the [TSMC Journeys of Female Scientists Lectures](#) for female high school students in an effort to [cultivate the next generation of STEAM professionals](#). In terms of "Care for the Disadvantaged," the TSMC Education and Culture Foundation and TSMC Charity Foundation have long been investing in this area by tapping into the power of our employees' volunteer services. We consulted the impact principles of the London Benchmark group and evaluated the impact of all social participation programs along the two dimensions of "depth" and "type" to create a strong foundation of common good for social progress.

As the Chairperson of the ESG Committee, I look forward to strengthening and expanding our sustainable actions to bring about innovative breakthroughs. The Sustainability Report that we compile each year keeps pace with global sustainability trends and has become a guide for organizations to continue advancing their ESG efforts. We expanded our information disclosure and external communications and continued to accumulate our ESG intellectual property. In addition to the existing [EP&L Report](#) and [TCFD Report](#), TSMC also released, for the first time this year, [Materiality Analysis Report](#) and the [UN SDGs Action Report](#).

Sustainability is a journey without end. TSMC is the only semiconductor company in the world to be selected for the Dow Jones Sustainability Index (DJSI) for 21 consecutive years. As the company continues to grow, we find ourselves with growing responsibilities as well. We will continue to hold true to our ESG vision to uplift society as we strive on forward with steadfast resolve.

**Lora Ho**  
Senior Vice President  
and ESG Committee  
Chairperson





# About TSMC



Headquarters  
Hsinchu Science Park

Founded in  
1987

Number of Employees  
over 65,152

Facing global turmoil brought by the COVID-19 pandemic as well as developments in the semiconductor industry, TSMC continues to strengthen services, R&D, and capacity while staying true to our four core values of Integrity, Commitment, Innovation, and Customer Trust. As a trusted technology and capacity provider to the global logic IC industry, TSMC also continues to invest in customer growth; in 2021, we increased capital expenditure to US\$30 billion. At the same time, strong customer demand for industry-leading advanced processes and specialty process technologies helped TSMC achieve a consolidated income of NT\$1,587.42 billion, a 18.5% increase from 2020. TSMC also remains committed to business philosophy and collaborates with employees, shareholders/investors, customers, suppliers/contractors, the government, and society to create sustainable value for the economy, environment, and society.

30 billion

Capital expenditure, up from US\$17 billion in 2020 (US\$)

12 Years

Record high revenues for 12 consecutive years

535 Customers

Used 291 distinct process technologies and manufactured 12,302 different products for 535 customers

\$596.54 billion

Net income; 15.2% increase from 2021 (NT\$)

26%

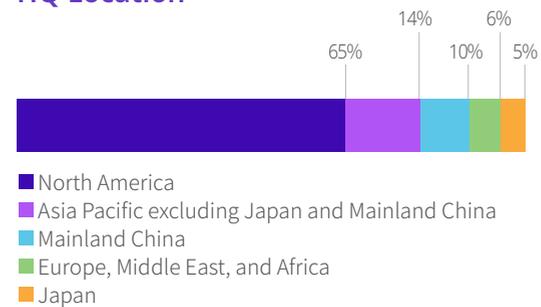
Accounting for 26% of the worldwide semiconductor market excluding memory, up 2 percentage points from 2020

50%

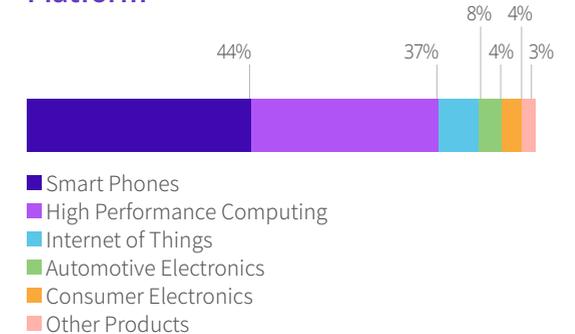
50% of TSMC's wafer revenue came from advanced manufacturing processes – defined as geometries of 7nm and smaller, up 9 percentage points from 2020

TSMC has fabs, subsidiaries or offices throughout Taiwan, North America, Europe, Japan, Mainland China, South Korea, and other countries to offer real-time services and technical support to customers around the world.

## Revenue Percentage by Customer HQ Location



## Revenue Percentage by Product Platform



# Innovation Value

## Innovations for Sustainability

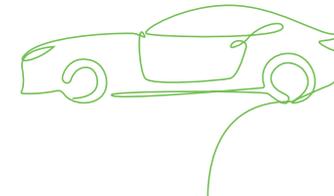
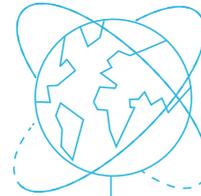
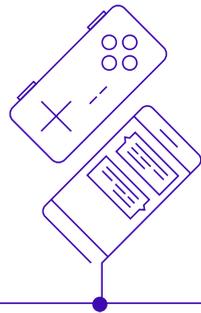
TSMC continues to advance semiconductor manufacturing technologies and services to enable our customers to unleash more than 12,300 chip innovations in 2021. These innovations make products more advanced, capable, intelligent, energy-efficient, and safer, allowing us to greatly increase quality of life and move towards a sustainable well-being society.

## Technology Development Focuses

- Continue to drive semiconductor scaling for both logic and specialty technologies
- Continue to expand specialty technology offerings
- Continue to advance and expand TSMC 3DFabric™ technology offerings

## Benefits to Customer Product Innovation

- Boost product computing power
- Increase product energy efficiency
- Enable smaller form factor
- Provide greater chip design flexibility



Customer Product/ Applications

### Make communication more effective and work, play, and learn anytime and anywhere

- Application Processors (AP),
- Baseband
- RF Transceivers
- Wireless Local Area Networks (WLAN)
- CMOS Image Sensor (CIS)
- Near Field Communication (NFC)
- Bluetooth
- Global Positioning Systems (GPS), etc.

### Enable 5G, Artificial Intelligence (AI), cloud, and data centers for transferring and processing vast amounts of data anywhere and anytime

- Central Processing Unit (CPU)
- Graphics Processor Unit (GPU)
- Field Programmable Gate Array (FPGA)
- Server CPU
- Artificial Intelligence/Machine Learning (AI/ML) Accelerator
- Network Processing Unit (NPU)
- High-speed Networking Chip, etc.

### Empower innovations for artificial intelligence of things (AIoT) and accelerate digital transformation to make a more convenient and greener living, and improve health care quality

- Microcontroller Unit (MCU)
- Application Processors (AP)
- Baseband
- RF Transceivers
- Wireless Local Area Networks (WLAN)
- CMOS Image Sensors (CIS)
- Near Field Communication (NFC)
- Bluetooth
- Embedded Flash Memory
- Radio Frequency Identification, (RFID) etc.

### Make vehicles, including hybrid/ electrical cars, safer, smarter, and greener

- Microcontroller Unit (MCU)
- Baseband
- RF Transceivers
- Wireless Local Area Networks (WLAN)
- CMOS Image Sensor (CIS)
- Near Field Communication (NFC)
- Radar
- Ethernet Switches
- Power Management ICs, etc.

### Enable AI-powered smart devices

- Microcontroller Unit (MCU)
- Baseband
- RF Transceivers
- Wireless Local Area Networks (WLAN)
- CMOS Image Sensor (CIS)
- Near Field Communication (NFC)
- Bluetooth
- Embedded Flash Memory
- Power Management ICs
- Timing Controllers (T-CON) for Smart 8K/4K Digital TV (DTV)
- 4K Streaming Set-top Box (STB) / Over-the-top (OTT)
- Digital Single-lens Reflex (DSLR) Devices, and so on.

Technology Platforms

Smartphone

High Performance Computing

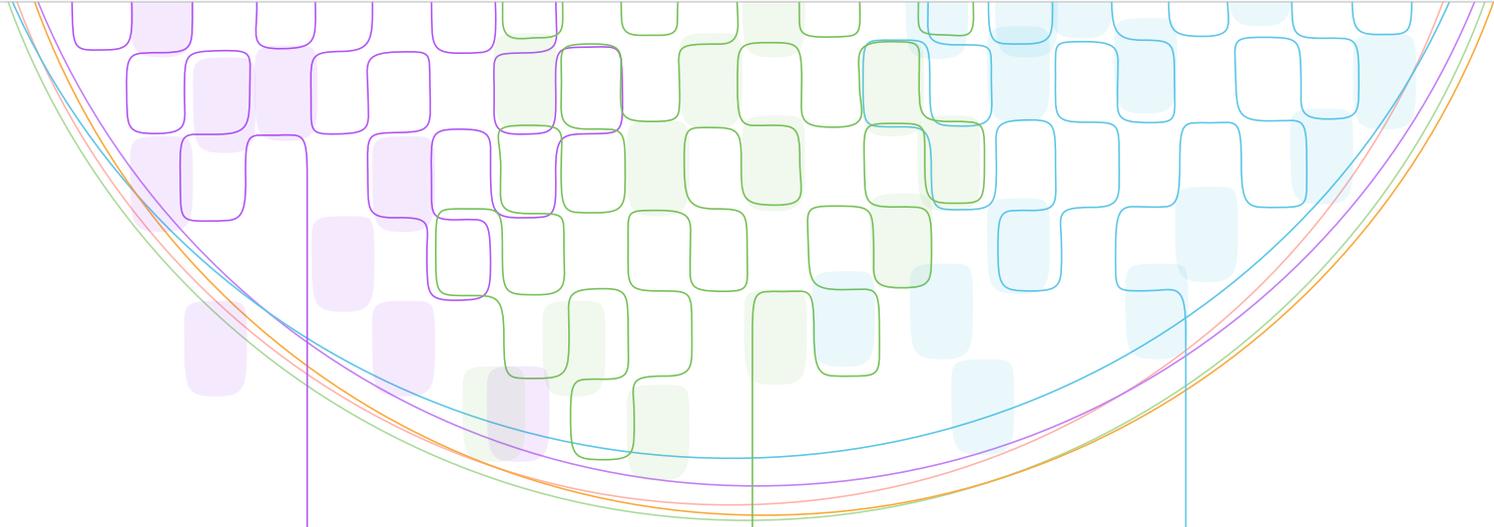
Internet of Things (IoT)

Automotive

Digital Consumer Electronics



# Sustainability at TSMC



## Economic

## Environmental

## Social

**\$1.3 trillion**

Generated NT\$1.3 trillion in output value and 224,000 jobs in Taiwan (NT\$)

**100%**

100% patent approval rate in the U.S., better than any other top 10 patent holder

**0**

Announced to reach Net Zero Emissions by 2050

**98.4%**

98.4% reduction rate of volatile organic gases

**\$164.9 billion**

Total compensation and welfare handed out to TSMC employees around the world, a 17% increase from 2020 (NT\$)

**\$5.09 billion**

Invested into social engagement (NT\$)

**1**

Leading the world in 3nm process risk production to empower the next-generation technology products

**\$16.2 trillion**

Market capitalization (NT\$)

**1**

Number 1 in the global semiconductor industry as well as in Taiwan with the largest LEED-certified building area

**14.9%**

Reduced unit water consumption by 14.9% (Base year: 2010)

**2.24 million**

Number of certificates awarded to employees for completing TSMC training programs

**891,962**

Beneficiaries of social engagement programs

**20%**

Driving innovation by investing US\$4,465,000,000 in R&D, a 20% increase from 2020

**1**

Received the highest UL 2799 platinum rating for zero waste to landfill

**>6,500**

Over 6,500 students from top universities and graduate institutes around the world that participated in TSMC's diverse industry-academia cooperation programs

# Awards, Recognitions, and Ratings

<p>Member of <b>Dow Jones Sustainability Indices</b> <small>Powered by the S&amp;P Global CSA</small></p> <p><b>Dow Jones Sustainability Indices (DJSI)</b></p> <ul style="list-style-type: none"> <li>• Dow Jones Sustainability World Index for the 21<sup>st</sup> consecutive year</li> <li>• Dow Jones Sustainability Emerging Markets Index</li> </ul>	<p><b>2021 MSCI ESG Leaders Indexes Constituent</b></p> <p><b>MSCI ESG Indexes</b></p> <ul style="list-style-type: none"> <li>• MSCI ACWI ESG Leaders Index component</li> <li>• MSCI ESG Research – AAA Ratings</li> <li>• MSCI ACWI SRI Index component</li> <li>• MSCI ACWI Islamic Index component</li> <li>• MSCI Emerging Markets ESG Leaders Index</li> </ul>	<p><b>Corporate ESG Performance</b> <small>RATED BY ISS ESG</small></p> <p><b>Prime</b></p> <p><b>ISS ESG</b></p> <ul style="list-style-type: none"> <li>• "Prime" Rated by ISS ESG Corporate Rating</li> </ul>	<p><b>TERRA CARTA</b></p> <p><b>Terra Carta Seal</b></p> <ul style="list-style-type: none"> <li>• The Sustainable Markets Initiative</li> </ul>	<p><b>FTSE4Good</b></p> <p><b>FTSE4Good Index</b></p> <ul style="list-style-type: none"> <li>• FTSE4Good Emerging Index component</li> <li>• FTSE4Good All-World Index component</li> <li>• FTSE4Good TIP Taiwan ESG Index component</li> </ul>	<p><b>World Benchmarking Alliance</b></p> <p><b>World Benchmarking Alliance (WBA)</b></p> <ul style="list-style-type: none"> <li>• SDG 2000 – The 2,000 Most Influential Companies</li> </ul>	<p><b>CommonWealth Magazine</b></p> <ul style="list-style-type: none"> <li>• Excellence in Corporate Social Responsibility Award – Large cap – First Place</li> </ul>	<p><b>CDP A LIST 2021 WATER</b></p> <p><b>Carbon Disclosure Project (CDP)</b></p> <ul style="list-style-type: none"> <li>• 2021 CDP Supplier Engagement Leaderboard</li> <li>• Water Security A Ratings</li> <li>• Climate Change B Ratings</li> </ul>	<p><b>ALLIANCE FOR WATER STEWARDSHIP</b></p> <p><b>Alliance for Water Stewardship (AWS)</b></p> <ul style="list-style-type: none"> <li>• "Platinum" class certification – Fab 5, Fab 12A, Fab 12B, Advanced Backend Fab 3</li> </ul>
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Sustainalytics	<ul style="list-style-type: none"> <li>• Company ESG Risk Ratings: Low ESG Risk – Semiconductor Industry</li> </ul>
TIME Magazine	<ul style="list-style-type: none"> <li>• TIME100 Most Influential Companies 2021</li> </ul>
Corporate Knights	<ul style="list-style-type: none"> <li>• Global 100 Most Sustainable Corporations</li> </ul>
Taiwan Institute of Sustainable Energy	<ul style="list-style-type: none"> <li>• The Most Prestigious Sustainability Awards – Top Ten Domestic Corporates – for six consecutive years</li> <li>• Sustainability Action Awards – Gold Award</li> <li>• Best Sustainability Report Award</li> <li>• English Report – Gold Award</li> <li>• Circular Economy Leadership Award</li> <li>• Information Security Leadership Award</li> <li>• Supply Chain Leadership Award</li> </ul>
Institutional Investor Magazine	<ul style="list-style-type: none"> <li>• Most Honored Company (Technology/Semiconductors) – All-Asia</li> <li>• Best Overall ESG (Technology/Semiconductors) – First Place (buy-side and sell-side) – All-Asia</li> </ul>

Taiwan Stock Exchange	<ul style="list-style-type: none"> <li>• Top 5% in Corporate Governance Evaluation of Listed Companies for seven consecutive years</li> </ul>
Corporate Knights & As You Sow	<ul style="list-style-type: none"> <li>• 2021 Carbon Clean 200™ List</li> </ul>
Environmental Protection Administration, Executive Yuan, R.O.C.	<ul style="list-style-type: none"> <li>• National Enterprise Environmental Protection Award</li> </ul>
FORTUNE	<ul style="list-style-type: none"> <li>• 2021 World's Most Admired Companies</li> </ul>
Cheers	<ul style="list-style-type: none"> <li>• Ranked Number One in Top 10 Most Admired Companies to Young Generations for five consecutive years</li> </ul>
Forbes	<ul style="list-style-type: none"> <li>• World's Best Employers 2021</li> </ul>