



ESG Feature Stories

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First Semiconductor Company to Adopt Energy-Efficient Measures in Advanced Manufacturing Equipment Worldwide

ESG Directions
Green Manufacturing



TSMC is committed to creating a sustainable semiconductor supply chain. Since the power consumption of the process manufacturing equipment accounts for over 50% of the Company's energy use, and the number of advanced manufacturing equipment increases every year, TSMC launched 365 action plans under the Energy Conservation Action Project for Next-generation Fab Tools in 2021. 159 action plans have been verified and applied to 119 advanced manufacturing tool models for 5nm process manufacturing and 3nm process manufacturing in the future. Moreover, the program introduced high-efficiency parts and energy-saving designs in 17 energy-intensive components and successfully saved 400 GWh of electricity in a year.

The New Generation Equipment Energy Conservation Program holds over 100 meetings every year in search of opportunities and innovative mindsets for equipment energy conservation. TSMC is engaged in-depth with the design of energy-conserving modules for advanced manufacturing equipment with the top six power-consuming equipment suppliers and provides implementation guidelines. Also, through regular technical review meetings, TSMC repeatedly validates the green benefits of the solutions. The energy-saving specifications are incorporated in the standards for new equipment purchases as well. As the first semiconductor company to drive the adoption of energy conservation measures in advanced manufacturing equipment among equipment suppliers, we strive towards the sustainability goal of saving energy by 20% on average for each machine by 2030.

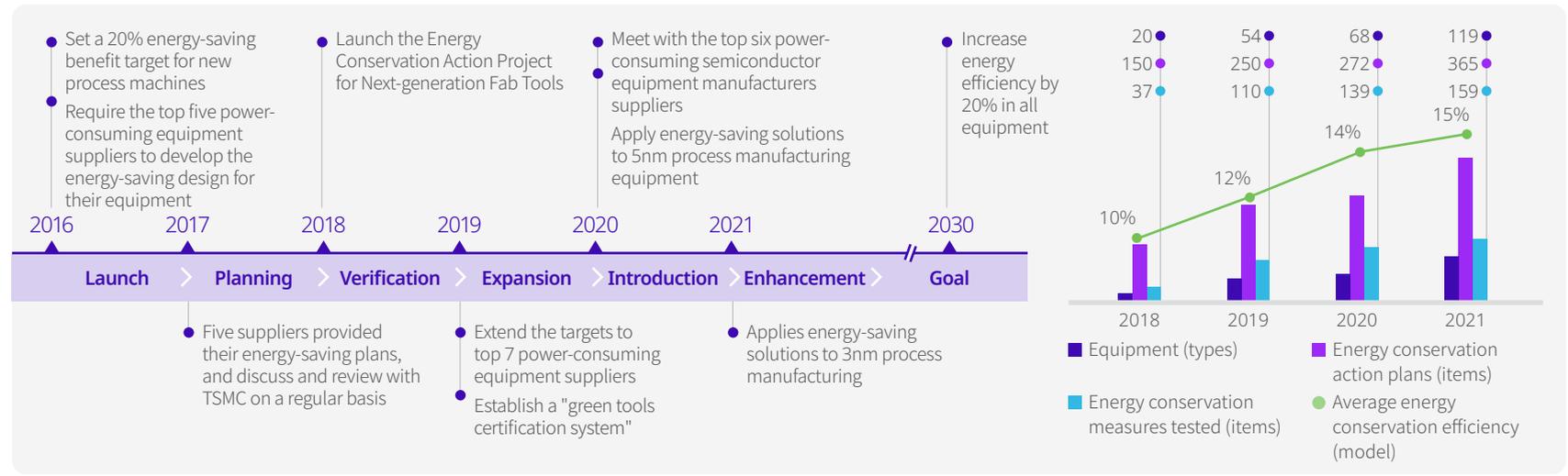


400
400 GWh of electricity is saved

“ TSMC is committed to practicing green manufacturing. We will continue to develop innovative energy-conserving designs in partnership with our equipment suppliers and adopt them in new manufacturing equipment in the future to optimize energy efficiency.

Chen-Bin Lin
Director of Intelligent Engineering Center at TSMC

Milestones and Results of the Energy Conservation Action Project for Next-generation Fab Tools



TSMC collaborates with equipment suppliers in the continuous development of green semiconductor manufacturing equipment and the production of sustainable products under high energy efficiency.

Launch Supplier Fire Protection Personnel Project to Improve Supply Chain Resilience

ESG Directions
 Responsible Supply Chain

TSMC strives to improve supply chain resilience. To reduce the risk of supply chain interruption caused by fires, TSMC has created the "Supplier Fire Protection Sustainability Management Mechanism," which advises and inspects supplier fire protection systems by standards exceeding local codes. In 2021, TSMC further activated the Supplier Fire Protection Personnel Project for critical suppliers and suppliers that have shown room for improvement in fire protection audits conducted in previous years. Each supplier plant has one staff dedicated to fire protection management. TSMC offers resources and technologies to all fire protection dedicated personnel, who will receive a capability grading, training, and training result evaluation.

In addition to the fire protection dedicated personnel project, TSMC also consolidated its experience from years of on-site inspections and counseling centered on the "Supplier Fire Protection Sustainability Management Mechanism" into learning materials available in Supply Online 360. Suppliers

can download materials such as the disaster prevention management form and fire protection designs from the platform. By referring to TSMC practices, suppliers can improve their management capabilities more efficiently. TSMC also ensures all fire prevention and fire extinguishing equipment at our suppliers functions properly through in-depth audits, on-site inspections on fire extinguishing equipment and fire prevention management practices.

In 2021, 48 dedicated staffs of suppliers that didn't meet the criteria for Grade 3 in the professional capability grading all completed training. The percentage of trainees in Grade 3 and Grade 4 has increased from 58% to 82%. In 2022, TSMC plans to collaborate with academic partners. By offering teaching materials applicable to all industries, professional instructors, and teaching equipment that supports practical training, the Company will continue to improve supply chain resilience as a globally trusted provider of technologies and manufacturing capacity.

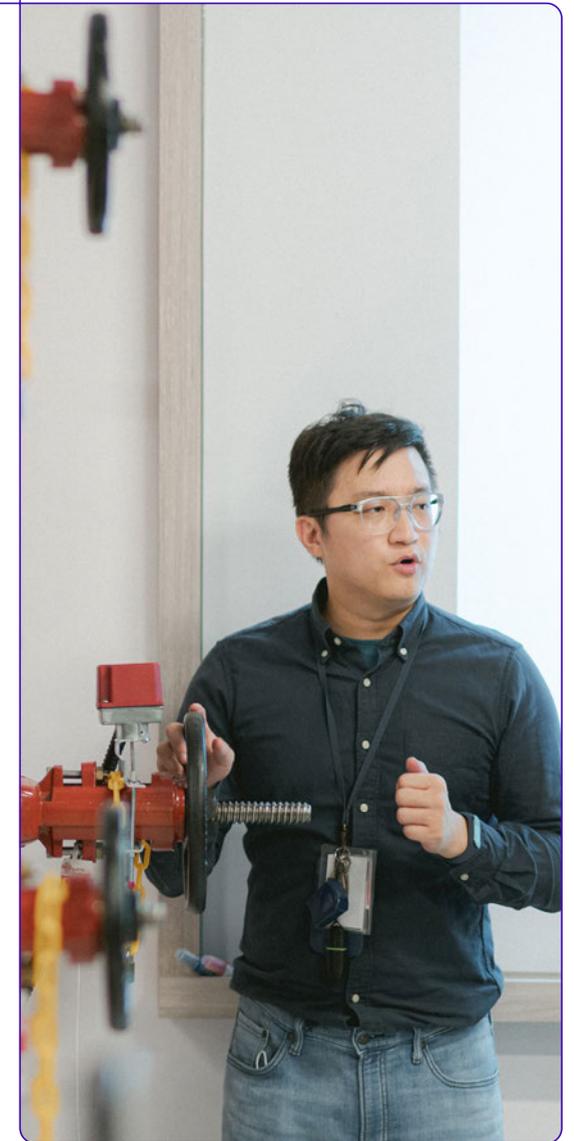
“ I appreciate that TSMC offers counseling and assistance through its expert teams. In addition to sharing risk management experience in high-tech semiconductor foundries, TSMC also held practical training sessions for supplier fire protection dedicated personnel. It helps enhance the overall fire protection of the plant and disaster prevention self-management capabilities and reduces fire risks for the company.

Chao Kuan-Chun
 President of Wonik Quartz Taiwan Co., Ltd.

91 Suppliers took part in the project

2021 Supplier Fire Protection Personnel Project Implementation Results

Item	Project Details	Results
Dedicated personnel to fire protection management	<ul style="list-style-type: none"> Requested 91 suppliers to designate a dedicated single-point liaison for plant fire protection management and participate in professional capability grading and training. 	<ul style="list-style-type: none"> 91 suppliers have designated 106 dedicated personnel for a total of 106 plants.
Course planning and evaluation	<ul style="list-style-type: none"> Training courses for the fire protection personnel planned by TSMC <ul style="list-style-type: none"> - On-site lessons on fire extinguishing equipment and operational training - Fire extinguishing equipment maintenance - Fire protection management system - Explosion-proof electrical equipment and fire stopping 	<ul style="list-style-type: none"> Supplier fire protection dedicated personnel is equipped with professional capabilities as follows: <ul style="list-style-type: none"> - The person is familiar with the function and operation of the fire extinguishing equipment in the plant - The person is capable of planning for fire extinguishing equipment maintenance - The person is familiar with fire compartmentation and fire stopping techniques - The person is familiar with explosion-proof electrical equipment and construction
Effectiveness	<ul style="list-style-type: none"> Held two sessions of "Fire Protection Personnel Operational Training" 	<ul style="list-style-type: none"> Conducted a test to evaluate the learning effectiveness of the trainees by the criterion of 90 points. The percentage of trainees in Grade 3 and Grade 4 increased from 58% to 82%.



TSMC enhances supply chain resilience by sharing its experience in fire protection management through the "Supplier Fire Protection Sustainability Management Mechanism."

Build a Diverse and Inclusive Workplace

ESG Directions

Diverse and Inclusive Workplace



To fulfill our commitment to our Diversity and Inclusion Statement, the Company treats its workforce as the most important asset and is committed to empowering more than 60,000 employees globally to unleash their full potential in the right roles. In supporting employees to balance family life and career development, TSMC offers a welfare system that is better than legal requirements and has established four preschool for fabs in Taiwan. In 2021, TSMC launched the TSMC Child Care Benefit Program, extending maternity

leave from 8 weeks to 12 weeks and paternity leave from 5 days to 10 days. It also increased maternity subsidy from NT\$1,000 to NT\$10,000 per child and organized Holiday STEAM camps to support the growth of TSMC babies. In 2021, the number of TSMC newborns accounts for 1.7% of newborns nationally in Taiwan, setting a new record exceeding the 1.5% from the previous year.

In support of female employees, TSMC established the Women@tsmc Employee Resource Group (ERG).

The association aspires to connect female colleagues and enable them to realize their full potential in the pursuit of personal growth and achievements.



1.7%

TSMC babies account for 1.7% of the newborns nationally in Taiwan



Employees are important assets to TSMC. They are also the driving force of industrial upgrading and social development. We strive to foster a diverse and inclusive work environment that integrates people from different backgrounds. By strengthening collaboration through mutual understanding, acceptance and respect, we will create a better and brighter future for TSMC together.

Connie Ma
Vice President of Human Resources, TSMC



It is a huge challenge for first-time moms as they bring home their newborns from the postpartum nursing center. The adapting and learning process requires considerable time and energy. The "TSMC Child Care Benefit Program" has extended maternity leave to 12 weeks. It gives me time to properly adjust my life, physical and mental well-being, and make childcare arrangements when I return to work. I hope that the Company can develop more flexible work schedules so that employees can more easily achieve work-life balance.

Catherine Chang
TSMC Employee



The childcare benefits the Company offers help dual-income families a lot especially during the adaptation period after the newborn was brought home from the postpartum nursing center. The paternity leave allows me to fulfill my responsibilities caring for the family. In the meantime, my wife and I look forward to participating in the Company's Holiday STEAM Camp with our children. We also hope that the Company can plan activities for children of all ages, and we can accompany our children along the way.

Kevin Chu
TSMC Employee



Dedicated to supporting employees to attain work-life balance, TSMC has established kindergartens for four fabs in Taiwan.

Cultivate New-Generation STEAM Talent

ESG Directions
 Develop Talent



To enhance the quality of talent in Taiwan, TSMC is dedicated to youth incubation, the potential realization of diversified education, and caring for the disadvantaged communities lacking educational resources. The Company strives to achieve SDG4 of ensuring quality education by providing students in all educational stages development opportunities within and outside the scope of formal education, as well as learning resources linked to industry practices.

For university and graduate students and teachers, TSMC collaborates with schools in Taiwan and overseas in launching university programs primarily focused on "industry-academia collaboration," "course collaboration," and "career guidance." We are committed to the cultivation of next-generation semiconductor talent through the support of teacher recruitment, mentoring programs, lectures,

competitions, scholarships, and groundbreaking industry-academia collaborative research programs. TSMC also offers its production capacity to top university students and teachers worldwide for them to turn their IC designs into actual chips.

For students currently in the nine-year compulsory education system, TSMC Education and Culture Foundation and TSMC Charity Foundation jointly allocate educational resources to encourage them to explore their potential. Striving to achieve equal access to education and empower children with STEAM capabilities, we have held Chemistry Camps for high school students, occupational training, science tours specifically for female students, and learning companion programs and tours for elementary and junior high school students.



In addition to training students to exert creativity and complete IC designs independently, the University Shuttle Program effectively bridges students with the industry and further introduces our efforts to the world.

Shen-Iuan Liu
 Distinguished Professor at the Department of Electrical Engineering, National Taiwan University

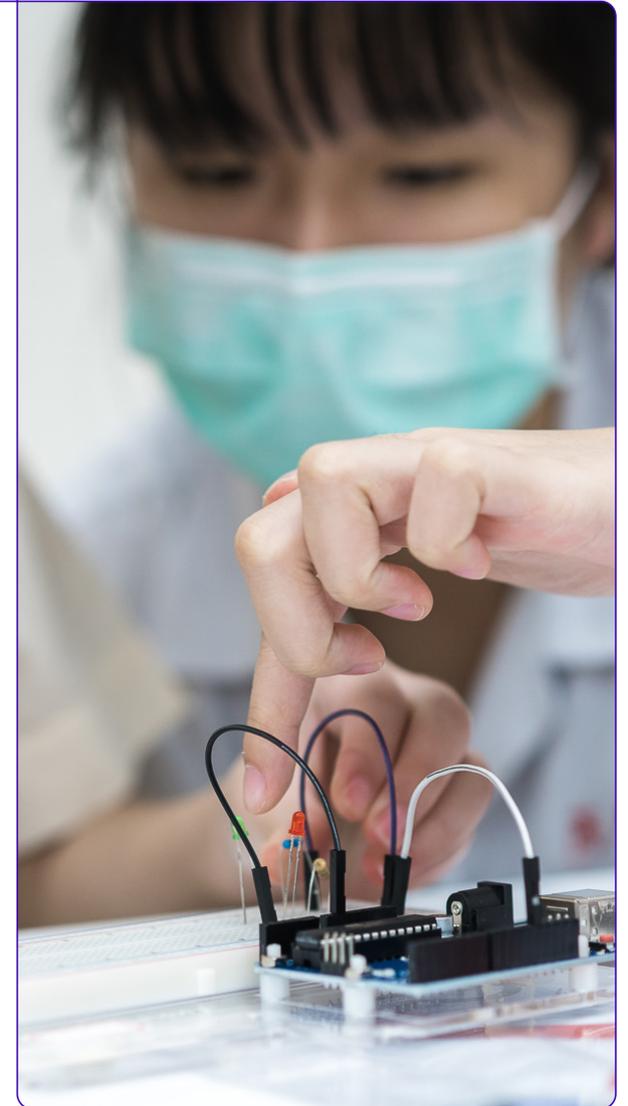


572 million
 An annual expenditure of NT\$ 572 million is dedicated to talent cultivation

TSMC Dedicates Educational Resources for Students in All Educational Stages to Cultivate New-Generation STEAM Talent

 Junior High School and Elementary Schools	 High Schools	 University Students	 Graduate Students	 Academic Research
<ul style="list-style-type: none"> • Volunteer Services • Teach and Learn Program — Teachers Training in Reading • Sponsor the Exhibition Hall "The World of Semiconductors" to the National Museum of Natural Science • Support the Teach for Taiwan organization through regular employee donations • TSMC Little Baseball Hero Support Program • Sponsor Emei Junior High School KIST Education • TSMC Science and Aesthetics Tours 	<ul style="list-style-type: none"> • TSMC Youth Theater Project • TSMC Journeys of Female Scientist Lectures • Vocational Training Program • Support the Junyi Academy through regular employee donations^{Note} • TSMC Cup- Competition of Scientific Short Talk • Sponsorship of Science Camps • TSMC Youth Calligraphy and Literature Competitions 	<ul style="list-style-type: none"> • Scholarships for outstanding yet economically disadvantaged students • TSMC Semiconductor Programs • Hsien-Yung Pai Literature Lectures • Big Data and Cloud Technology • TSMC X Microsoft Careerhack Competition • TSMC Youth Dream Building Project 	<ul style="list-style-type: none"> • TSMC Ph.D. Scholarship • University Research Center • National Academy for Key Fields of Research 	<ul style="list-style-type: none"> • Industry-Academia Joint Development Project • University Shuttle Program

Note: Junyi Academy Foundation offers free online learning materials for elementary school, junior high school, and high school students.



TSMC doubles down on holding Journeys of Female Scientist Lectures, offering female students diverse learning opportunities in technology.

Relief Efforts for Global Pandemic Prevention against COVID-19

ESG Directions
 Care for the Disadvantaged 

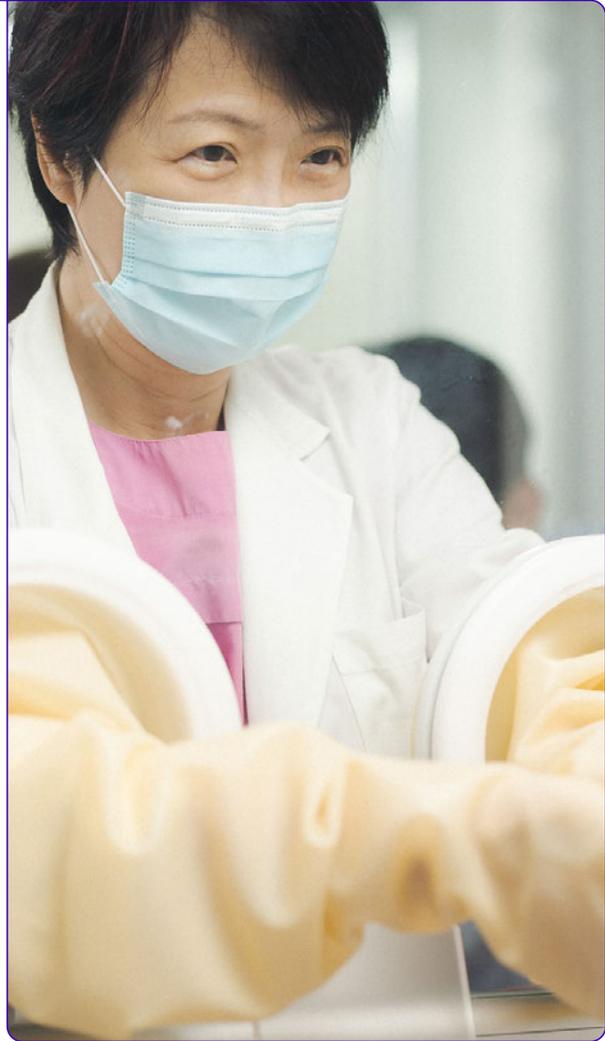
In 2021, TSMC allocated NT\$ 4.26 billion to support global efforts against COVID-19 pandemic. Our endeavors include vaccine donations, sponsoring university medical research on pandemic prevention and control, and providing relief through TSMC Charity Foundation in healthcare, rural education, and care for the disadvantaged.

“ Adequate testing capacity is the key to COVID-19 pandemic control and prevention. We're grateful for TSMC Charity Foundation's timely donation of contactless testing stations to the NTUH medical team when most needed.

Ming-Shiang Wu
 Superintendent of National Taiwan University Hospital

 **4.26 billion**
 An annual expenditure of NT\$4.26 billion was dedicated to global pandemic prevention

 Comprehensive Medical Resources	<h3>Vaccines</h3> <p>Donated five million doses of BNT (BioNTech) 162b2 vaccine to the Taiwan Centers for Disease Control to distribute to vaccination facilities across Taiwan for public use.</p> <h3>Oxygen generators</h3> <p>Donated 1,400 oxygen generators to the Taiwan Centers for Disease Control and county/city governments to distribute to hospitals and hotels that are used as respite centers, as well as some oversea countries such as India at the peak of the pandemic.</p>	<h3>Medical kits</h3> <p>Offered 25,000 <u>medical kits</u> that include PPEs to unions and associations for nurses and social welfare institutions.</p> <h3>Contactless testing stations</h3> <p>Donated ten contactless testing stations that effectively prevent workers from contact with the virus and reduce the risk of infection. The testing efficiency has been accelerated by 119%, further contributing to the national testing capacity.</p>
 Undisrupted Education in Rural Areas	<h3>Remote learning equipment</h3> <p>1,680 laptops and tablets 1,000 IP sharers and wireless Internet equipment</p>	<h3>Online learning resources for teachers and students</h3> <p>2,000 remote learning material packages for popular science 400 annual subscriptions to the online learning platform "Class One," offering teachers access to online training during the pandemic.</p>
 Caring for the Disadvantaged	<h3>Food packages</h3> <p>Delivered 2,000 prepared meals to elders at 12 social welfare institutes in collaboration with 1919 Food Bank. Offered 3,000 boxes of food to rural locations caring for disadvantaged children.</p>	



TSMC Charity Foundation donated contactless testing stations to protect medical staff and enhance testing capacity.