



# 2012 TSMC Corporate Social Responsibility Report



# TSMC Core Values

**Integrity** – Integrity is our most basic and most important core value. We tell the truth. We believe the record of our accomplishments is the best proof of our merit. Hence, we do not brag. We do not make commitments lightly. Once we make a commitment, we devote ourselves completely to meeting that commitment. We compete to our fullest within the law, but we do not slander our competitors and we respect the intellectual property rights of others. With vendors, we maintain an objective, consistent, and impartial attitude. We do not tolerate any form of corrupt behavior or politicking. When selecting new employees, we place emphasis on the candidates' qualifications and character, not connections or access.

**Commitment** – TSMC is committed to the welfare of customers, suppliers, employees, shareholders, and society. These stakeholders all contribute to TSMC's success, and TSMC is dedicated to serving their best interests. In return, TSMC hopes all these stakeholders will make a mutual commitment to the Company.

**Innovation** – Innovation is the wellspring of TSMC's growth, and is a part of all aspects of our business, from strategic planning, marketing and management, to technology and manufacturing. At TSMC, innovation means more than new ideas, it means putting ideas into practice.

**Customer Trust** – At TSMC, customers come first. Their success is our success, and we value their ability to compete as we value our own. We strive to build deep and enduring relationships with our customers, who trust and rely on us to be part of their success over the long term.



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# Overview

As a good corporate citizen, TSMC is fully committed to its corporate social responsibilities. We believe a company's corporate social responsibility is to uplift society, and also believe that strong employee and supplier relations, corporate governance, business ethics, social contribution, and environmental protection are the cornerstones of TSMC's sustainable growth.

TSMC's decision-making and operations in corporate social responsibility is led by the company's Chief Financial Officer, who was appointed by the Chairman to act as an overall coordinator for the entire company's CSR activities. The Chief Financial Officer coordinates with all CSR-related organizations in the company and has assembled a "Corporate Social Responsibility Committee". This CSR Committee is made up of representatives from Customer

Service, Human Resources, Investor Relations, the Legal Department, Material and Supply Chain Management, Operations, Public Relations, Quality and Reliability, R&D, Risk Management, Corporate ESH, the independent TSMC Education & Culture Foundation and TSMC Volunteer Program, who participate in a quarterly meeting led by CFO and the President of the Volunteer Program. The quarterly CSR meeting systematically and effectively carries out our corporate social responsibilities by following a "Plan-Do-Check-Act" cycle to regularly review interaction with stakeholders and the issues that concern them, as well as discuss progress in CSR activities and set future plans.

Through close cooperation between organizations, CSR is now an integral part of TSMC's daily operations. In 2012, TSMC added CSR to the Board of Directors' official

agenda, and reported the year's plans and progress to the Board, making corporate social responsibility a part of the company's decision-making.

In 2012, TSMC was again selected as a component of the Dow Jones Sustainability Indexes (DJSI) for the 12<sup>th</sup> consecutive year. Furthermore, TSMC was recognized as the DJSI Sector Leader among global semiconductor companies for the second year since 2010, which testifies to TSMC's global reputation in sustainability and investment value over the long run.

Through our 2012 Corporate Social Responsibility (CSR) Report, we would like to share with you our continuing efforts in sustainable development along the economic, environmental and social dimensions.





## Report Scope and Profile

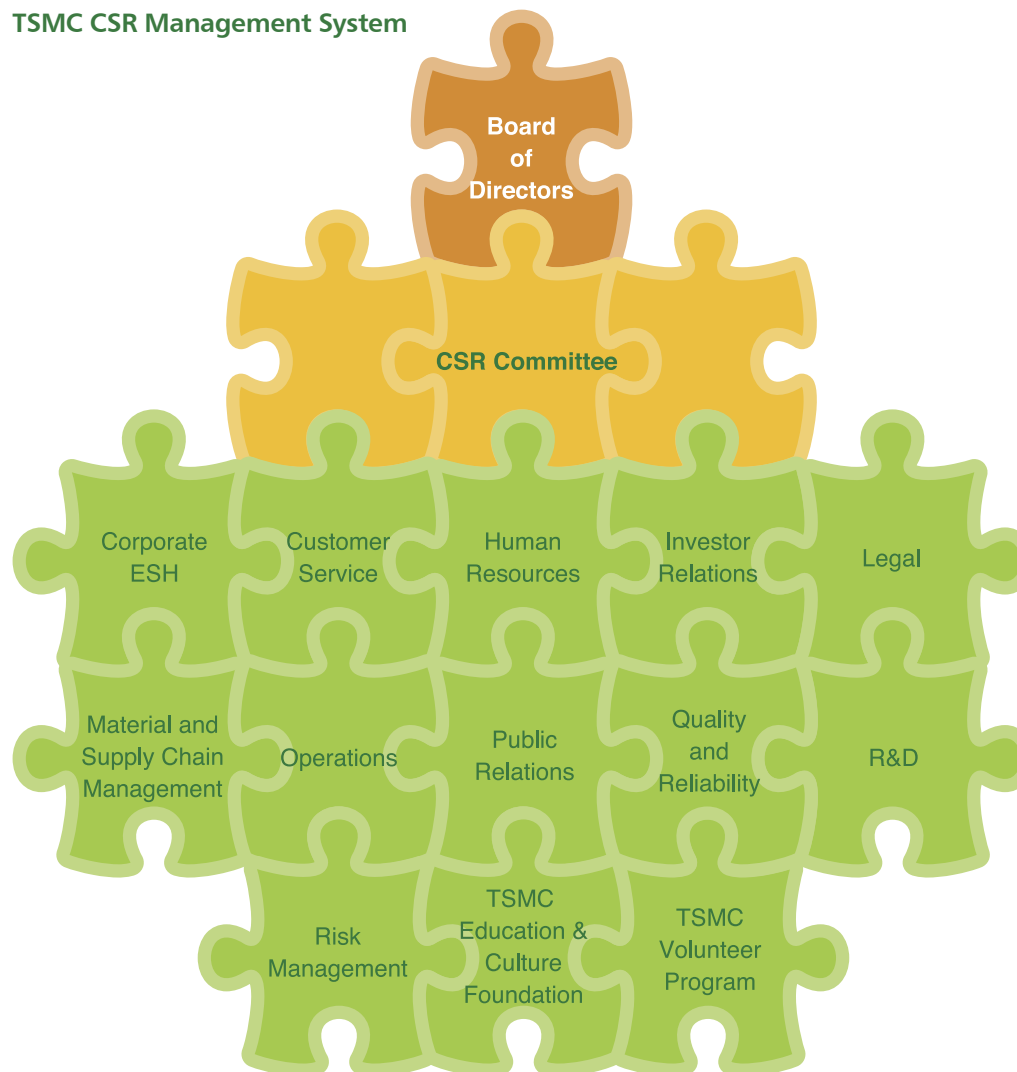
This report outlines our performance in the full 2012 calendar year for the most relevant CSR issues to our stakeholders and our business. A portion of the contents cover our overseas subsidiaries TSMC China, WaferTech in the United States, and overseas offices, as noted. Financial figures in this report are expressed in NT dollars unless otherwise specified. Environmental performance is expressed in commonly accepted benchmarks.

We publish this report annually, and the previous report was published in June 2012. This report is compiled based on the Global Reporting Initiative (GRI) G3.1 framework; a table is attached in appendix for the readers' reference. In addition, we refer to ISO 26000 Guidance on Social Responsibility and United Nations Global Compact, and also provide a table in Appendix. This report is published in both English and Chinese and is available on TSMC's corporate website.

## Report Assurance

The DNV Business Assurance reviewed this report against the AccountAbility AA1000 Assurance Standard and the GRI G3.1 guideline on materiality, inclusivity and responsiveness, and verified this report complies with GRI Application Level A+. The data and information of financial data and Greenhouse Gases (GHG) emission/reduction data has been acquired from the verified financial report and GHG Inventory report. DNV's Report Assurance Statement can be found at the annex of this report.

## TSMC CSR Management System



## The Summary of TSMC CSR Goals and Achievements on Material Topics

CSR Material Topics	Commitments or Goals	Performance Indexes or Guidelines	2012 Achievements	Future Focuses
Shareholder Value Creation	Achieve profitable growth	Financial objectives: (1) Average ROE across cycle greater or equal to 20% (2) 10% profit before tax compounded annual growth rate from 2010 to 2015	- 2012 ROE reached 24.6%, profit before tax increased 25.1% - Dividend-adjusted share price increased 33% during 2012 (vs. TAIEX +9%) and market capitalization reached a record US\$86 billion	- Execute our growth strategies, protect structural profitability and return on investments - Continue to enhance corporate governance and maintain good relationship with investors
Innovation Management	Advanced technology	Extend Moore's Law	Already the first foundry to provide 65nm and 40nm production capacity, TSMC is also the first foundry to offer volume production of 28nm, with the first-to-market 28nm high-k/metal gate (HKMG) technology portfolio	- 16nm next-generation technology for both digital and analog products - 10nm exploratory technology for both digital and analog products - EUV and multiple e-beam to extend Moore's Law
	Spectrum of technology	TSMC continues to conduct research and development on a broad mix of capabilities. The Company enhanced its SoC (System-on-Chip) roadmap, with higher integration and more variants.	- TSMC's HV/Power technologies collectively shipped more than one million wafers to customers - Released the second generation of 0.18 BCD technology - Modular MEMS technology for accelerometer was released	Special SoC technology (including new NVM, MEMS, RF, analog) and 10nm transistors
Customer Satisfaction	Maintain TSMC's position as the most advanced and largest provider of semiconductor manufacturing technologies and foundry services	Customer satisfaction rating on overall technology	99% customers who gave high rating on the survey question of "Overall Technology" (>4)* *Rating scale is from 1 (extremely dissatisfied) to 7 (extremely satisfied)	Maintain TSMC's leadership in the semiconductor industry
Supply Chain Management	Single plant rate reduction	To have multiple supply sources for raw materials	Reached annual goal for single plant reduction	Continuously reduce single plant rate for advanced nodes, particularly for N28 and N20
	Increase local supply	Purchasing amount and ratio from local suppliers	Increased local supply ratio of raw material to 36% in 2012	Decentralize manufacturing sites from the high-risk areas (e.g. frequent natural disaster areas)
	100% conflict-free minerals for raw materials	To comply with GeSI/EICC requirements on smelter information disclosure	Completed disclosure of smelter's information for 15 identified raw material suppliers in 2012	Ensure suppliers' fully compliance (GeSI/EICC will update smelters' list for Tungsten, Tin and Cobalt)
	Green supply chain	Continuously improve supplier's sustainability scoring	90 critical suppliers' sustainability scores reached 2012 target	Ensure supplier's sustainability score reaches annual target
Greenhouse Gas Reduction	Reduce PFC emission intensity to 30% below the year 2010 level by 2020	Tons of CO <sub>2</sub> equivalent/8-inch wafer equivalent	PFC emissions intensity in 2012 were 5% less than 2011	Adoption of best practices recognized by the World Semiconductor Council.
Energy Conservation	Reduce power usage intensity to 2% below the year 2010 level by 2015	Kilowatt-hour per waferout area (Kwh/cm <sup>2</sup> ) Kwh/8-inch wafer equivalent- mask layer	Power consumption (Kwh/cm <sup>2</sup> ) increased by 1.6% from 1.036 in 2011 to 1.053 in 2012 Power consumption (Kwh/8-inch wafer equivalent- mask layer) reduced by 1.3% from 10.7 in 2011 to 10.5 in 2012	- Continuous promotion of ISO 50001 Energy Management System - Continuous promotion of the adoption of green building and green factory standards - Enhancement of daily management to avoid energy waste - Continuous installation of energy saving and recovery systems
Water Conservation	Reduce water usage intensity to 2% below the 2010 level by 2015	Liter per waferout area (L/cm <sup>2</sup> ) Liter/8-inch wafer equivalent- mask layer	Water usage (L/cm <sup>2</sup> ) reduced by 2% from 6.14 in 2011 to 6.02 liters in 2012 Water usage (L/8-inch wafer equivalent- mask layer) reduced by 1.6% from 59.8 in 2011 to 58.9 in 2012	- Continuous promotion of process optimization to reduce water usage - Continuous development and installation of water recycling system

CSR Material Topics	Commitments or Goals	Performance Indexes or Guidelines	2012 Achievements	Future Focuses
Waste Management	Achieve 95% waste recycling rate by 2015	Waste recycling rate (%)	Achieved a waste recycling rate of 93%.	<ul style="list-style-type: none"> <li>- Continuous promotion of waste recycling and waste reduction at the source</li> <li>- Requiring process tool vendors to provide low chemical consumption tools</li> <li>- Collaborating with suppliers to develop new waste recycling technologies</li> </ul>
Talent Acquisition	Expand talent to support business growth and provide job opportunity	Quantity and quality of new hires	<ul style="list-style-type: none"> <li>- In 2012, TSMC recruited over 5,600 employees, not only successfully fulfilling our business needs but also creating more job opportunities for our society</li> <li>- TSMC actively took innovative approaches to create more job opportunities for the disabled. By the end of 2012, the Company hired 319 disabled persons; a 74% increase compared with 2011</li> </ul>	<ul style="list-style-type: none"> <li>- Continuously attract talent locally and worldwide</li> <li>- Continuously strengthen the connections with schools and communities</li> </ul>
Work-Life Balance	Maximize our employees' productivity and promote a balanced life	<ul style="list-style-type: none"> <li>- The growth of revenue per headcount (RPH)</li> <li>- Weekly working hours</li> </ul>	<ul style="list-style-type: none"> <li>- TSMC had over 10% Compound Annual Growth Rate of RPH from 2009 to 2012</li> <li>- In 2012, the weekly working hours were reduced toward our target range with the same high-quality work performance</li> </ul>	Continuously enhance the efficiency and effectiveness of our employees via human resources practices and improvement actions
Talent Retention	Maintain a healthy turnover rate and ensure the growth momentum of the Company	Turnover rate	In 2012, the turnover rate for all employees was 5.7% and the average annual turnover rates of the past five years are all within a healthy range (5%-10%).	Continuously enhance management excellence and downward engagement to make our employees bring all their potential into full play in the right position
Employee Cohesion	Establish a positive employee relationship and a highly engaged work environment	Employees' commitment to the Company	The score for "commitment" rose from 91.8 to 93 points in the 2012 TSMC Core Values Survey which is conducted in two-year base	Continuously reinforce the Company's core values, maintain unobstructed communication channels, and foster a warm work environment
Volunteer Program	Expand volunteer program influence	Volunteer number; Voluntary service hour	<ul style="list-style-type: none"> <li>- 5 major regular volunteer programs (increase "Ecology Volunteer Program")</li> <li>- Volunteer number increased by 65.6% from 948 in 2011 to 1,570 in 2012.</li> <li>- Voluntary service hours increased by 366% from 10,578 hours in 2011 to 38,749 hours in 2012.</li> </ul>	<ul style="list-style-type: none"> <li>- Focus on major 5 volunteer programs</li> <li>- Holiday volunteer project</li> <li>- Integrate each function voluntary events</li> <li>- Discover personal voluntarily activities, build up register platform</li> </ul>
Social Contribution	Nurturing more science talents and promoting arts and culture	The number of the participants of the education and art programs	12,000 students participated in TSMC Aesthetic Tour to visit National Palace Museum and Exhibitions.	Continuous promoting arts and Chinese culture, and inspiring the science potential of talents.

## 2012 Awards and Recognitions

TSMC actively participated in various CSR-related awards to share experience and gain external feedback. Through this participation, we gain a better understanding of external concerns and are able to review internal performance for continuous improvement. TSMC has been honored with many awards over the years, and our awards and recognitions received in 2012 are as follows:

Category	Awards and Recognitions
Overall CSR	<ul style="list-style-type: none"> <li>Dow Jones Sustainability World Index (DJSI)</li> <li>Membership in the Dow Jones Sustainability World Index for a 12<sup>th</sup> consecutive year</li> <li>Second time as the Semiconductor Sector Leader</li> </ul> <ul style="list-style-type: none"> <li>CommonWealth Magazine</li> <li>“Most Admired Company in Taiwan” for the 16<sup>th</sup> consecutive year</li> <li>“Excellence in Corporate Social Responsibility Award” for the 6<sup>th</sup> consecutive year</li> </ul> <ul style="list-style-type: none"> <li>Globalviews Magazine</li> <li>Excellence in Corporate Social Responsibility, Environmental Protection First Prize</li> </ul> <ul style="list-style-type: none"> <li>Taiwan Institute of Sustainable Energy</li> <li>“Gold Award for Taiwan Corporate Sustainability Reports” for a 4<sup>th</sup> consecutive year</li> <li>Climate Change Information Disclosure Award</li> </ul> <ul style="list-style-type: none"> <li>FinanceAsia</li> <li>Best Corporate Social Responsibility in Taiwan</li> </ul>
Economy, Governance	<ul style="list-style-type: none"> <li>Institutional Investor</li> <li>Best CEO in Asia (Buy Side Voted/Technology Sector)</li> <li>Best CEO in Asia (Sell Side Voted/Technology Sector)</li> <li>Best CFO in Asia (Buy Side Voted/Technology Sector)</li> <li>Best IR Company in Asia (Buy Side Voted/Technology Sector)</li> <li>Best IR Company in Asia (Sell Side Voted/Technology Sector)</li> <li>Best IR Professional in Asia (Buy Side Voted/Technology Sector)</li> </ul> <ul style="list-style-type: none"> <li>IR Magazine</li> <li>Best Corporate Literature in Greater China</li> <li>Best Use of Technology in Greater China</li> <li>Best Investment Community Meetings in Greater China</li> <li>Best Investor Relations by a CFO in Taiwan</li> <li>Best Investor Relations in Taiwan</li> <li>“The 25 Top IR Officers of All Time” in the world from the last quarter century</li> </ul> <ul style="list-style-type: none"> <li>Asian Corporate Governance Association (ACGA)</li> <li>Best Corporate Governance in Asia Pacific</li> </ul> <ul style="list-style-type: none"> <li>EUROMONEY</li> <li>Best Managed Company in Asia (IT/Software/Technology Sector)</li> </ul> <ul style="list-style-type: none"> <li>FinanceAsia</li> <li>Best Managed Company in Taiwan</li> <li>Best Corporate Governance Company in Taiwan</li> <li>Best CEO in Taiwan</li> <li>Best CFO in Taiwan</li> <li>One of the Most Committed to a strong Dividend Policy in Taiwan</li> <li>Best Investor Relations in Taiwan</li> </ul> <ul style="list-style-type: none"> <li>Corporate Governance Asia</li> <li>Best Company in Taiwan</li> <li>Best Investor Relations in Taiwan</li> </ul> <ul style="list-style-type: none"> <li>ROC Securities &amp; Futures Institute</li> <li>Information Disclosure of Public Companies Ranking – Ranked A++ (the highest level)</li> </ul>

Category	Awards and Recognitions
Environment	<ul style="list-style-type: none"> <li>U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) certification</li> <li>First LEED-Existing Building: Operation and Maintenance (LEED-EB O&amp;M) “Platinum” Certification in Semiconductor Industry – Fab 12 Phase 1/2 Manufacturing Facility</li> <li>“Gold” certification in LEED – EB O&amp;M – Fab 12 Headquarter Office Building</li> <li>Note: Up to the end of 2012, TSMC received 7 U.S. LEED certifications (1 “Platinum” class, 6 “Gold” class).</li> </ul> <ul style="list-style-type: none"> <li>R.O.C. Ministry of the Interior “Ecology, Energy Saving, Waste Reduction and Health (EEWH)” certification</li> <li>First Diamond class “Intelligent Green Building” in Taiwan and “Green Building” certifications – Fab 12 Phase 4 Office Building</li> <li>Note: Up to the end of 2012, TSMC received 4 Taiwan EEWH Diamond class certifications.</li> </ul> <ul style="list-style-type: none"> <li>R.O.C. Ministry of Economic Affairs Industrial Development Bureau</li> <li>“Green Factory Label” – Fab 12 Phase 4 (first in Taiwan), Fab 14 Phase 3/4</li> </ul> <ul style="list-style-type: none"> <li>ISO 50001 Energy Management System certification – Fab 12 Phase 4/5 and Fab 14 Phase 3/4</li> </ul> <ul style="list-style-type: none"> <li>R.O.C. Environmental Protection Administration</li> <li>“Annual Enterprise Environmental Protection Award” – Fab 5 and Fab 12 Phase 4</li> <li>“Energy Conservation and Carbon Reduction Action Mark” – Fab 12 Phase 1 and Phase 4, Fab 14 and Fab 15</li> <li>“Excellence in Waste Resources Management Award” – Fab 12 Phase 1</li> </ul> <ul style="list-style-type: none"> <li>R.O.C. Ministry of Economic Affairs</li> <li>“Energy Conservation Award” – Fab 14</li> <li>“Excellence in Greenhouse Gas Reduction Award” – Fab 5 and Fab 3</li> <li>“Water Conservation Award” – Fab 3</li> </ul> <ul style="list-style-type: none"> <li>Hsinchu Science Park Administration</li> <li>“Low Carbon Enterprise Award” – Fab 5 and Fab 8</li> </ul> <ul style="list-style-type: none"> <li>Southern Taiwan Science Park Administration</li> <li>“Excellence in Environmental Protection” – Fab 6</li> </ul> <ul style="list-style-type: none"> <li>Hsinchu City Environmental Protection Bureau</li> <li>“National Environmental Education Award” – Fab 8</li> </ul> <ul style="list-style-type: none"> <li>Clark County, Washington State, U.S.A.</li> <li>“Green Business Award” – WaferTech</li> </ul>
Safety, Health and Wellness	<ul style="list-style-type: none"> <li>R.O.C. Bureau of Health Promotion</li> <li>“Health Leading Award” – Fab 14</li> <li>“Annual Special Contribution Award” – Tainan Site (Fab 6, Fab 14 and Advanced Backend Fab 2)</li> <li>“Outstanding Work Place for Weight Loss” – Tainan Site (Fab 6, Fab 14 and Advanced Backend Fab 2)</li> </ul> <ul style="list-style-type: none"> <li>Hsinchu Science Park Administration</li> <li>“Excellence in Labor Safety and Hygiene Award” – Fab 5 and Fab 8</li> </ul>
Employees	<ul style="list-style-type: none"> <li>China Credit Information Service (CCIS)</li> <li>Top-10 Happy Corporations</li> </ul> <ul style="list-style-type: none"> <li>R.O.C. Directorate-General of Budget, Accounting and Statistics, Executive Yuan</li> <li>Excellent Company</li> </ul> <ul style="list-style-type: none"> <li>R.O.C. Bureau of Employment and Vocational Training, Executive Yuan</li> <li>Golden Award of Taiwan TrainQuali System (TTQS)</li> </ul> <ul style="list-style-type: none"> <li>R.O.C. Council of Labor Affairs, Executive Yuan</li> <li>Outstanding Enterprises in Providing Nursery Services</li> </ul>

# 1. Letter from the Chairman and CEO

The year 2012 was the 25th anniversary of TSMC's founding, and even though the semiconductor industry declined over the year due to sluggish global economic growth, TSMC was able to overcome headwinds with the teamwork of our employees and set record highs in both revenue and profit.

At this volatile time for the global economy and the semiconductor industry, these achievements come from our commitment to managing a sustainable business.

TSMC pioneered the dedicated semiconductor foundry business model in 1987, fostering the growth of the global IC design industry and accelerating the adoption of numerous technology applications. Over the past 25 years, TSMC has done more than strive for greater heights in its core business by creating value through outstanding operations. Through our daily operations, we have also built positive relationships with stakeholders such as employees, customers, shareholders, investors, communities, suppliers, and the government. We work with stakeholders in the seven areas of morality, business ethics, economy, rule of law, caring for the earth and the next generation, work/life balance, and philanthropy in order to build a better future for society.

**1** We insist on honesty and integrity. We are honest to our shareholders, employees, customers, and to the public alike.

**2** We provide good job opportunities with a safe, comfortable, and intellectually challenging environment to give our employees both physical comfort and mental stimulation.

**3** We oppose corruption and reject cronyism. We do not bribe, and do not curry favor with the government or any government official.

**4** We provide long-term care to communities and continue to support educational and cultural activities.

**5** We do not engage in politics.

**6** We respect the rule of law and always obey the law.

**7** We contribute our part to controlling global climate change and place great importance on protecting the environment.

**8** We emphasize and reward innovation, and manage the risks that innovation may bring.

**9** We practice good corporate governance, and balance the interests of shareholders, employees, and all stakeholders in the company.

**10** We actively invest in green businesses such as solid state lighting and solar power to contribute to environmental protection and conservation.

To effectively coordinate the sustainability efforts of diverse organizations in the company, we founded a “Corporate Social Responsibility Committee” in 2011 made up of representatives from functions across TSMC. This committee holds regular meetings each quarter under the guidance of TSMC Volunteer Program President Ms. Sophie Chang and Senior Vice President Ms. Lora Ho, and gathers the know-how of departments around the company to brainstorm innovative ways to address CSR issues in the three major dimensions of economy, environment, and society.

In 2012, we were selected as a component of the Dow Jones Sustainability Indexes for a twelfth consecutive year, and named the “semiconductor industry leader” for the second time since 2010, improving our score from the previous year in 19 out of 20 categories. At the same time, the Asian Corporate Governance Association selected us out of 864 corporations as number one in corporate governance among Asia-Pacific companies. These accolades have inspired us to improve even further.

TSMC’s vision for society is one that works together towards sustainable development, equality and justice, and a harmonious environment to live and work. Below are our 10 principles of corporate social responsibility.

1. We insist on honesty and integrity. We are honest to our shareholders, employees, customers, and to the public alike.
2. We respect the rule of law and always obey the law.
3. We oppose corruption and reject cronyism. We do not bribe, and do not curry favor with the government or any government official.
4. We practice good corporate governance, and balance the interests of shareholders, employees, and all stakeholders in the company.
5. We do not engage in politics.

6. We provide good job opportunities with a safe, comfortable, and intellectually challenging environment to give our employees both physical comfort and mental stimulation.
7. We contribute our part to controlling global climate change and place great importance on protecting the environment.
8. We emphasize and reward innovation, and manage the risks that innovation may bring.
9. We actively invest in green businesses such as solid state lighting and solar power to contribute to environmental protection and conservation.
10. We provide long-term care to communities and continue to support educational and cultural activities.

These 10 guiding principles echo Social Accountability International’s SA8000 standard, and the five focus areas of the Electronic Industry Citizenship Coalition (EICC) Code of Conduct adopted by the global electronics industry: Ethics, Management System, Labor, Health and Safety, and Environment.

In the area of Ethics, integrity is TSMC’s most important core value, and the key to our success. We oppose corruption, do not seek favor with government officials, insist on transparent operations, and maintain good corporate governance.

Five members of our nine-member Board of Directors are independent directors, and the Board is concerned with the interests of all stakeholders. We hope to act as an example to raise the level of business ethics in society.

In the area of Management System, we obey the law in spirit as well as in letter. Through innovation in fields including strategy, sales, management, technology, and manufacturing, we continue to reinforce our competitive strengths of Technology Leadership, Manufacturing Excellence, and Customer Trust. This ongoing improvement

allows us to maintain our lead in dedicated IC foundry services, and our growth provides a good return to shareholders, which in turn promotes economic development in society.

In the area of Labor, TSMC provides good jobs with compensation above the industry average. We recruit talent in a fair, open, and just manner, considering an applicant according to his or her qualifications, rather than gender, religion, race, nationality, or political affiliation, and we do not employ child labor under 16 years of age. In January 2013, our employment of disabled people has exceeded government requirements.

In the area of Health and Safety, all TSMC manufacturing facilities have gained OHSAS 18001 certification for occupational health and safety management systems, and provide a healthy and comfortable workplace for employees to work with peace of mind. We actively promote employee work/life balance, and have established comprehensive policies for employee health and occupational disease prevention. We have also set strict standards for hardware facilities, safety and health procedures, emergency response procedures and plans, and have set a goal of “zero incidents” in occupational safety and health management.

In the area of Environment, TSMC actively participates in the environmental activities of the World Semiconductor Council, and all new manufacturing facilities and office buildings are designed and constructed as green buildings. In 2012, TSMC’s Fab 12 Phase 1 and 2 facility became the first semiconductor fab in the world to gain “Platinum” U.S. LEED certification, and the Fab 12 Phase 4 facility was the first to receive Taiwan’s “Green Factory Mark,” the world’s only certification to cover water and power conservation, waste reduction, pollution prevention, green transportation, labor health, and surrounding ecosystems.

As a green manufacturing leader, over the past 10 years we have lowered our electricity consumption per unit wafer area by 47% and our water consumption by 56%, even as our wafer capacity increased 4.8 times over the same period. In addition to caring for the environment in our manufacturing process, TSMC's advanced technologies also effectively reduce the power consumption of electronics products. For example, chips made with our newest 28 nanometer technology consume as little as half the power of the earlier 40 nanometer generation.

TSMC's industry-leading 28nm process technology was an important driver of our significant growth in 2012, and demonstrates that green manufacturing not only conserves the earth's energy resources, it also aids the company's continued growth and profit, a win-win outcome for both enterprises and the environment. Shouldering our responsibility to make society better, we not only strive

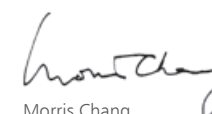
to achieve in our core business, we support a wide variety public service activities in areas including ecology, energy conservation, education, and the arts through our employee volunteers and the TSMC Education and Culture Foundation. Our volunteers act as museum docents, read to schoolchildren, spend time with elderly veterans and disadvantaged children, and share their professional knowledge in power conservation and carbon reduction. The Ecology Volunteers group established in 2012 also extends the care and concern of our Volunteer Society even further. In addition, The TSMC Education and Culture Foundation has for many years actively invested in science and art education, supported diverse cultural activities, and used the arts to build communities.

Based upon our vision for a fair and harmonious society, we opened a new chapter in corporate social responsibility in 2012 and formally added CSR to the agenda of the

Board of Directors. Every year the Board of Directors will receive regular reports on the results of our CSR initiatives and future plans, making CSR an official part of the company's decision-making process. We believe that this is an important step towards firmly establishing TSMC as a sustainable, evergreen company well into the future.

## Corporate Social Responsibility: Uplift Society

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



Morris Chang  
Chairman and Chief Executive Officer



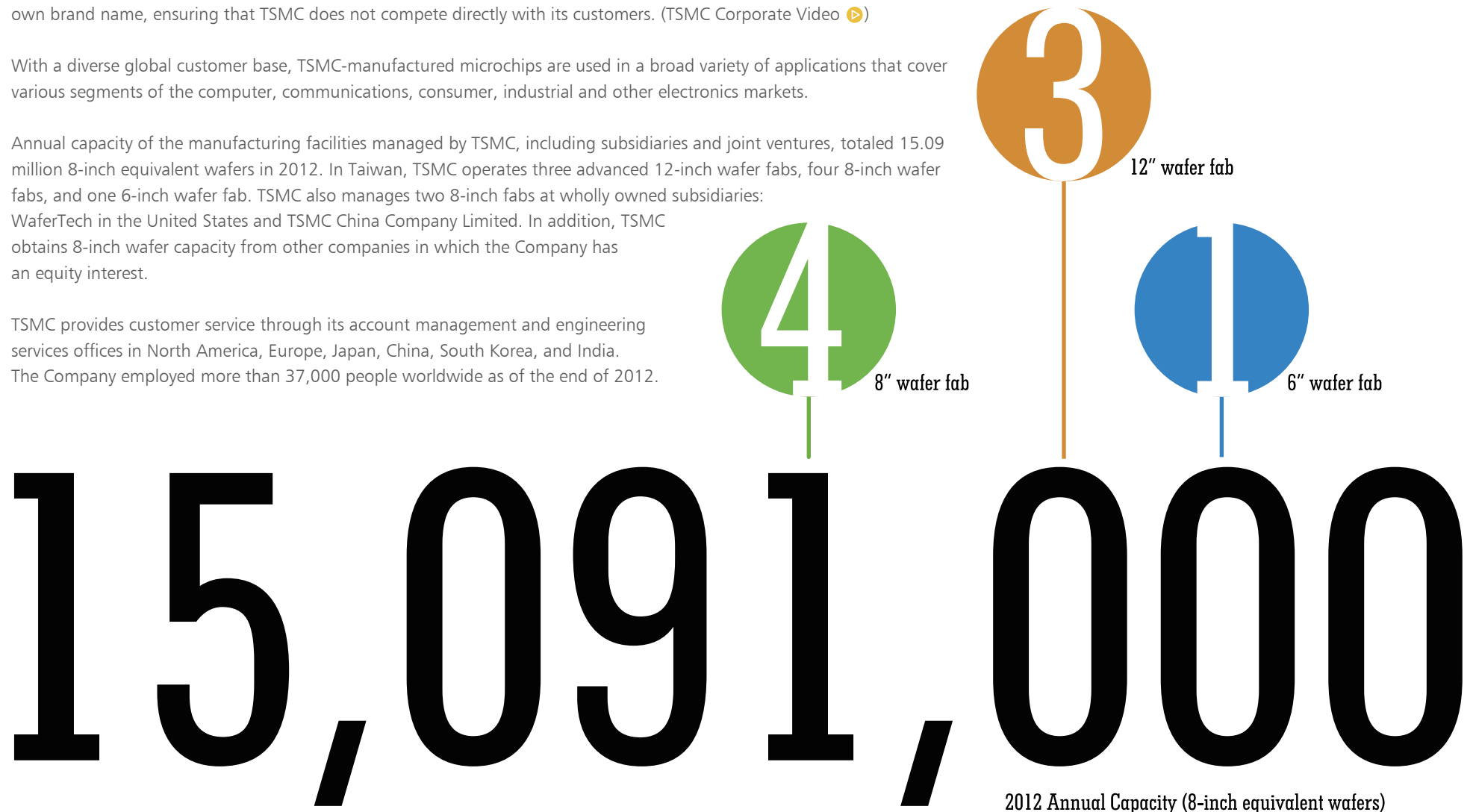
## 2. Company Profile

TSMC is the world's largest pure-play semiconductor foundry. Founded on February 21, 1987 and headquartered in Hsinchu, Taiwan, TSMC pioneered the business model of focusing solely on manufacturing customers' semiconductor designs. As a pure-play semiconductor foundry, the Company does not design, manufacture, or market semiconductor products under its own brand name, ensuring that TSMC does not compete directly with its customers. (TSMC Corporate Video [▶](#))

With a diverse global customer base, TSMC-manufactured microchips are used in a broad variety of applications that cover various segments of the computer, communications, consumer, industrial and other electronics markets.

Annual capacity of the manufacturing facilities managed by TSMC, including subsidiaries and joint ventures, totaled 15.09 million 8-inch equivalent wafers in 2012. In Taiwan, TSMC operates three advanced 12-inch wafer fabs, four 8-inch wafer fabs, and one 6-inch wafer fab. TSMC also manages two 8-inch fabs at wholly owned subsidiaries: WaferTech in the United States and TSMC China Company Limited. In addition, TSMC obtains 8-inch wafer capacity from other companies in which the Company has an equity interest.

TSMC provides customer service through its account management and engineering services offices in North America, Europe, Japan, China, South Korea, and India. The Company employed more than 37,000 people worldwide as of the end of 2012.



TSMC continued to lead the foundry segment of the semiconductor industry in both advanced and “More-than-Moore” process technologies. Already the first foundry to provide 65nm and 40nm production capacity, TSMC in 2012 also reached full volume production of 28nm featuring 28HP & 28HPM for high performance and 28LP & 28HPL for low power, and began the initial customer tape out of 20nm technology. In addition to general-purpose logic process technology, TSMC supports the wide-ranging needs of its customers with embedded non-volatile memory, embedded DRAM, Mixed Signal/RF, high voltage, CMOS image sensor, MEMS, silicon germanium technologies and automotive service packages.

TSMC’s subsidiaries “TSMC Solid State Lighting Ltd.” and “TSMC Solar Ltd.” also respectively engage in the researching, developing, designing, manufacturing and selling of solid state lighting devices as well as related products and systems, and solar-related technologies and products.

The Company is listed on the Taiwan Stock Exchange (TWSE) under ticker number 2330, and its American Depositary Shares trade on the New York Stock Exchange (NYSE) under the symbol “TSM”.

## **2.1 Market/Business Summary**

### **2.1.1 TSMC Achievements**

In 2012, TSMC maintained its leading position in the total foundry segment of the global semiconductor industry, with an estimated market segment share of 45%. TSMC achieved this result amid intense competition from both established players and relatively new entrants to the business.

Leadership in advanced process technologies is a key factor in TSMC’s strong market position. In 2012, 77% of TSMC’s wafer revenue came from manufacturing processes with geometries of 0.13 $\mu$ m and below; 62% of TSMC’s wafer revenue came from 65nm processes and below.

### **2.1.2 Market Overview**

We estimate that the worldwide semiconductor market in 2012 reached US\$308 billion in revenue, a 2% decline compared to 2011. Total foundry, a manufacturing sub-segment of the semiconductor industry, generated total revenues of US\$34 billion in 2012, or 16% YoY growth.

### **2.1.3 Industry Outlook, Opportunities and Threats**

#### **Industry Demand and Supply Outlook**

Following 5% growth in 2011, foundry segment growth accelerated significantly by 16% in 2012, mainly driven by fabless market share gain over IDM and process technology advancement.

We forecast total semiconductor market to grow 3% YoY in 2013. Longer term, increasing semiconductor content in electronics devices, continuing market share gain of fabless, and increasing in-house ASIC from system companies, foundry sales are expected to display much stronger growth than the projected 4% compound annual growth rate (CAGR) for the total semiconductor industry from 2012 through 2017.

As an upstream supplier in the semiconductor supply chain, the condition of the foundry segment is tightly correlated with the market health of the 3Cs: communications, computer and consumer.

#### **• Communications**

The communications sector, particularly the handset segment, posted a modest 5% growth in unit shipments for 2012. Smartphones, which have much higher semiconductor content, have been leading the growth of the sector.

The continuing transition to 4G/LTE handsets will bring positive momentum to the market. Smartphones with increasing performance, lower power and more intelligent features will continue to propel the buying interest of new handsets in 2013. The growing popularity of low-end smartphones in the emerging countries is also a new catalyst driving the growth of the sector.

Low power IC is an essential requirement among handset manufacturers. The System-on-Chip (SoC) design for more optimized cost, power and form-factor (i.e. device footprint), plus the appetite for higher performance to run complicated software, will continue to accelerate the migration to advanced process technologies in which TSMC is already the leader.

#### **• Computer**

The computer sector’s unit shipment growth declined 3% YoY in 2012 after a close to flat year in 2011. Cautious spending in developed countries and budget competition from tablet products were among the factors causing the weak demand.

Moving into 2013, PC market will decline. While pessimism regarding the economic outlook will overhang the sector, new innovative features and form-factors such as detachable keyboard, hybrid notebook and the introduction of the new Windows 8 operating system are expected to stimulate PC demand.

Requirements of lower power, higher performance and integration for key computer components such as CPU, GPU, Chipset, etc., should drive product design demand for leading process technologies.

#### • Consumer

After flat sales in 2011, the consumer sector lost momentum in 2012 with a decline of 2% in aggregated unit shipment growth YoY. Economic uncertainties have stifled buyers' appetite for consumer electronics products, and the growth of mobile computing devices has also impacted the consumer electronics sales.

Moving forward, new product launches such as the introduction of a new generation of game consoles will stimulate new interest in video games. Low-priced, large screen TVs will kindle end-consumer buying interest. And, government subsidy programs in multiple countries should drive the adoption of DTV.

Meanwhile, increasing innovations in the consumer sector have also encouraged new usage models, such as integration of touch sensing, motion recognition, high-resolution and 3D display. Besides the need for advanced technologies, "More-than-Moore" technologies such as CMOS Image Sensor (CIS), High-Voltage (HV) drivers, embedded memory, micro-controller and MEMS are becoming prominent requirements. With its comprehensive technology portfolio, TSMC will be able to capitalize on these trends.

#### Emerging Applications

Emerging new applications such as tablets are increasing contributions to foundry segment revenue. Led by Apple's iPad, around 155 million tablets shipped in 2012 compared with 68 million units in 2011. The strong sales momentum will continue in 2013 as more models are introduced by

other OEMs. We forecast the tablet market will grow with a 23% CAGR from 2012 through 2017, and become a strong growth driver for both the semiconductor industry and foundry segment.

#### Supply Chain

The electronics industry consists of a long and complex supply chain, the elements of which are highly dependent and correlated with each other. At the upstream IC manufacturing level, it is important for IC vendors to have sufficient and flexible supply to support the dynamic market situation. The foundry vendors are playing an important role to ensure the health of the supply chain. As a leader in the foundry segment, TSMC provides leading technologies and large-scale capacity to complement the innovations created along the downstream chain.

### 2.2 Innovation Management

Innovation is the wellspring of TSMC's growth, and is a part of all aspects of our business, from strategic planning, marketing and management, to technology and manufacturing. At TSMC, innovation means more than new ideas, it means putting ideas into practice.

#### 2.2.1 Innovation at TSMC

TSMC further expanded many aspects of Research and Development in 2012 to strengthen technology innovation. In 2012, the total R&D budget was 8.0% of total revenue. This level of R&D investment equals or exceeds that of many leading-edge technology companies. Along with the budget increase, the R&D organization increased staffing by over 27.5%. TSMC has built an innovative working atmosphere to encourage employees to make their innovation ideas come true. The awards from around the world that TSMC has received demonstrate the outstanding performance of our talents.



### 2.2.2 Technology Leadership

TSMC recognizes that the technology challenge required to extend Moore's Law, the business law behind CMOS scaling, is becoming increasingly complex. R&D Vice Presidents bring their rich industry experience to strengthen the R&D team and to navigate the technological and competitive challenges ahead. In 2012, TSMC worked intensively on ramping 28nm technology, which contributed close to 22% of fourth quarter 2012 revenue, and the contribution is expected to further increase in FY2013.

TSMC accelerated the development of advanced transistors, especially 3D transistors using FinFET structure for the 16nm process node, embedded memories, and copper (Cu)/low-K interconnect technologies. During 2012, the R&D organization once again proved its capabilities by developing 20nm technology as well as establishing 16nm transistor leadership capabilities. Furthermore, TSMC broadened the horizon of transistor research by investing R&D in alternative high-speed and low-power channel materials other than silicon, such as germanium and III-V compounds.

TSMC also expanded its external R&D partnerships and alliances with world-class research institutions. For example, TSMC is a core partner of IMEC, a respected European R&D consortium in Belgium. TSMC also has strategic agreements with IP providers to enable the development of reusable IPs for advanced technology nodes. TSMC strengthened its collaboration with key development partners on design-process optimization, and provides funding for nanotechnology research at leading research universities worldwide to promote innovations and the advancement of technology.

These research efforts enable the Company to continuously offer its customers the foundry-leading, first-to-market technologies and design solutions that contribute to their product success in today's complex and challenging market environment.

#### Advance Technology Innovations

As the semiconductor foundry leader pioneer, TSMC continued to provide technology innovations to lead the foundry segment of the semiconductor industry in both advanced and "More-than-Moore" process technologies. Not only was it the first foundry to provide 65nm and 40nm production capacity, TSMC also became the first foundry to offer volume production of 28-nanometer, with our first-to-market 28-nanometer high-k/metal gate (HKMG) technology portfolio.

#### ●28nm Technology

In 2012, TSMC's 28nm technology offering added 28nm High Performance Plus (28HPP) and 28nm High Performance Triple-Gate (28HPT). 28HPP and 28HPT achieved 10% faster speed than that of the previous 28nm High Performance (28HP) and 28nm High Performance Mobile Computing (28HPM) processes offered in 2011. 28HPP was qualified and demonstrated first silicon success in early production. 28HPT received its first customer tape out in December 2012, and is scheduled to deliver first silicon success by April 2013.

#### ●20nm Technology

In 2012, TSMC continued to focus on 20nm technology development, including process baseline setup and yield learning, design rule definition and enhancement, SPICE model generation, and reliability evaluation. To offer a leading-edge technology for both digital and analog applications, the Company adopted an advanced lithography process for smaller feature size. With second generation of high-K metal-gate, more Si strain, and a new device structure, the intrinsic transistor performance continues to improve in line with Moore's Law. Meanwhile, external resistance can be effectively reduced and controlled by a specially designed process technique. The back-end-of-line (BEOL) interconnect process features extreme low-K inter-metal dielectric materials and copper metallization with a novel low-resistance scheme. TSMC's logic transistor and SRAM bit-cell offering using the 20nm process can satisfy high performance System-on-Chip (SoC) applications.

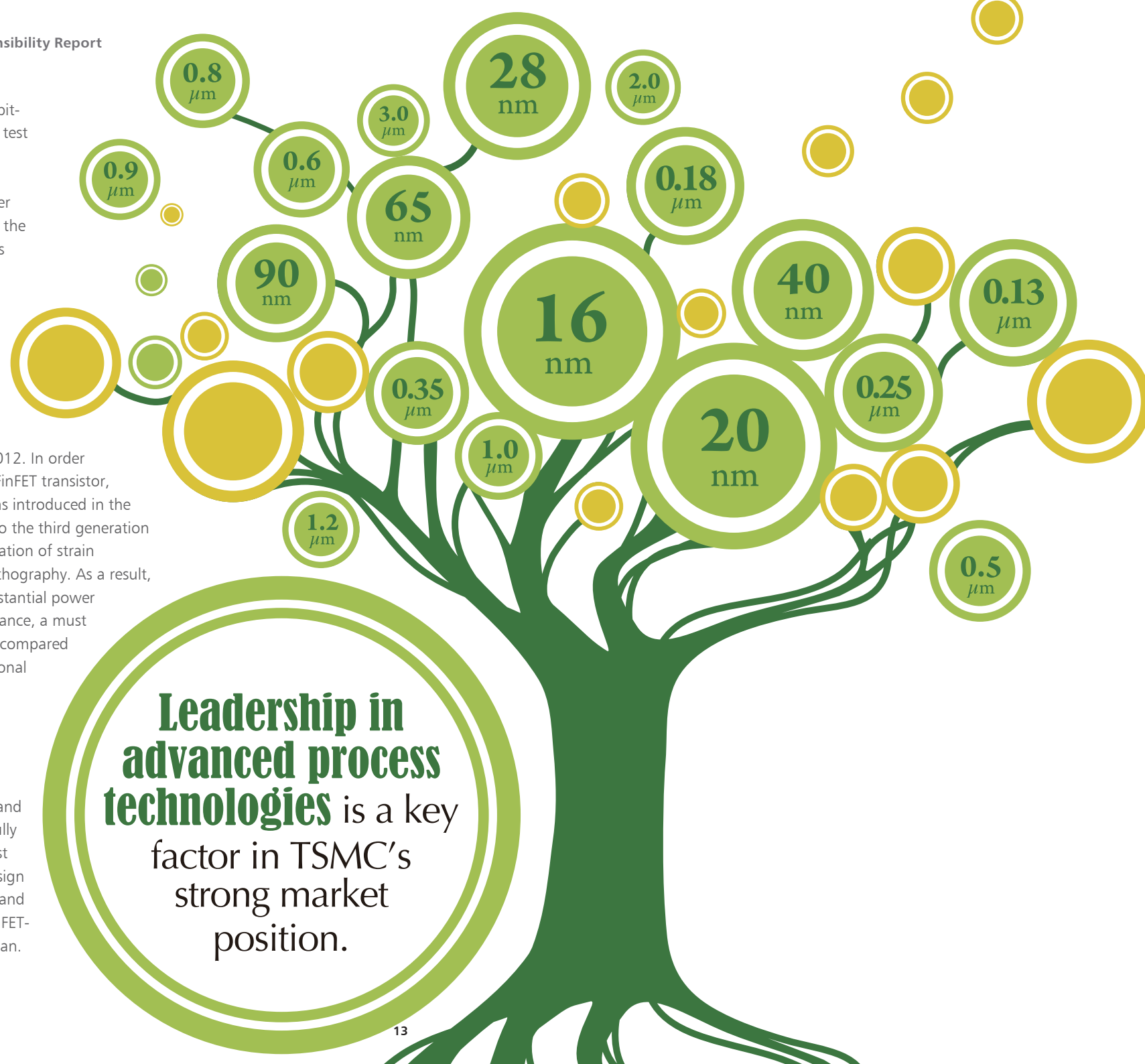
Development of 20nm technology will create superior gate density and chip performance. The cost and complexity of advanced technology will continue to escalate for customers. In 2012, TSMC successfully taped out a process development test vehicle, defect reduction vehicle, and product-like yield learning vehicle, on which an advanced ARM-core block was included. With the vehicle and process development, TSMC provided V1.0 process flow, design kits (design rules, SPICE models, and PDK files) and intellectual property (IP) in 2012 to help reduce foundry-access costs. The Company achieved its demanding transistor performance target and demonstrated the functional and

natural yield of leading-edge SRAM bit-cells as planned. Besides the internal test vehicles, the Company also launched two public cybershuttles, or multi-project wafers, in April and November 2012. More than 10 customers took the shuttles and verified their IPs. TSMC's high performance 20nm process is scheduled to enter risk production in the first quarter of 2013.

#### • 16nm Technology

TSMC completed 16nm technology definition and began 16nm technology development in 2012. In order to further extend Moore's Law, the FinFET transistor, an advanced 3D device structure, was introduced in the 16nm technology node in addition to the third generation of high-K metal gate, the fifth generation of strain technology, and advanced 193nm lithography. As a result, TSMC's 16nm technology offers substantial power reduction for the same chip performance, a must for advanced mobile applications as compared to technologies built with the traditional planar structure.

In 2012, TSMC achieved significant progress on test vehicle generation, process baseline setup, design rule definition, SPICE model generation, and reliability evaluation. TSMC successfully taped out a process development test vehicle, provided customers early design kits (design rules and SPICE models) and demonstrated functional yield on FinFET-based SRAM bit-cells according to plan.



● **Lithography**

20nm lithography progressed steadily in 2012. There has been continuous learning and improvement in material quality, process recipe robustness, and litho-cell maintenance that have resulted in robust patterning solutions. The achieved defect learning and D0 goals enable successful yield learning on SRAM qualification vehicles and several key customer tape-outs.

Lithography for the 16nm node signifies the introduction of novel patterning techniques to achieve 48nm pitch FinFETs, especially to ensure sufficient coverage and planarization of high aspect ratio topography with the 3D device structures. In addition, TSMC has also developed the patterning solution to delineate the tightest single patterning pitch of 80nm for metal layer, enabling further increase of pattern density for customers. Building on our learning in the 20nm node, TSMC has automated the in-line pilot run process and its control that enables fast cycle time for SRAM development and yield learning.

The pathfinding for the 10nm node has been started on immersion scanners. This technology will become more sophisticated and play a key role as the process baseline, based on considerations of cost and next-generation tool availability. Innovative processes are being developed to deal with the process control challenges brought with this technology node. Optical proximity correction has solved the process problem. Both cost and measurement accuracy were greatly improved with this change.

Development of EUV lithography and multiple e-beam direct write is aimed at the 7nm node because of late availability. Nevertheless, the 10nm node will be used to exercise these technologies.

At the forefront of specialty technology, R&D lithography has further extended the limitation of scanners in 8-inch fabs, to shrink the design rules and help customers gain more gross dies per wafer to reduce die cost. R&D has transferred multiple eFlash technologies for manufacturing and delivered eMRAM and eRRAM lithography technologies. For MEMS, R&D has developed and transferred the manufacturing technology for microphones and accelerometers.

TSMC continues to work with exposure-tool partner ASML in the development of immersion and EUV lithographic technologies. Faced with delays in the EUV source technology, capabilities of 193nm immersion scanners are being extended with more resolution-enhancement features, tighter specifications, and higher throughput to enable multiple patterning. In the meantime, using the NXE3100 beta-tool in Fab 12, we have been developing single-patterning EUV processes for 10nm and 7nm applications, with associated mask and resist technologies. However, the application of EUV lithography in high-volume manufacturing of these nodes will depend on the success of the EUV source technology to reach over 100 wafers per hour.

The KLA-Tencor REBL multiple-e-beam direct-write tool is being extensively studied for feasibility, performance, and improvements. A TSMC team from the design, COMS, MEMS, and packaging areas is jointly developing and fabricating the dynamic pattern generation chip for the REBL system. Two test stands for qualification of dynamic pattern generation and resist testing are being built and will be delivered to the TSMC Fab 12 GIGAFAB™ facility in 2013. Two scanner companies are performing sizing feasibility for multiple e-beam direct-write lithography. Multiple e-beam direct-write lithography not only has the potential for imaging critical layers, it also offers cost reduction potential for non-critical layers and 450mm wafers.

● **Mask Technology**

Mask technology is an integral part of advanced lithography technology. In 2012, TSMC completed the development of the mask technology for the 20nm node to enable double patterning. TSMC's R&D mask facility received more state-of-the-art mask processing tools to enable engineers to complete the development of mask technologies for the 16nm and 10nm nodes in the coming years. Development of mask technology for EUV lithography has been underway with its unique requirements in e-beam writing, etching, inspection, repair, and verification. As a core member of SEMATECH and a joint-development partner of EIDEC, TSMC is an active participant in the development of key infrastructure pieces for EUV masks such as the actinic repair verification tool and the actinic inspection tool of EUV blanks.

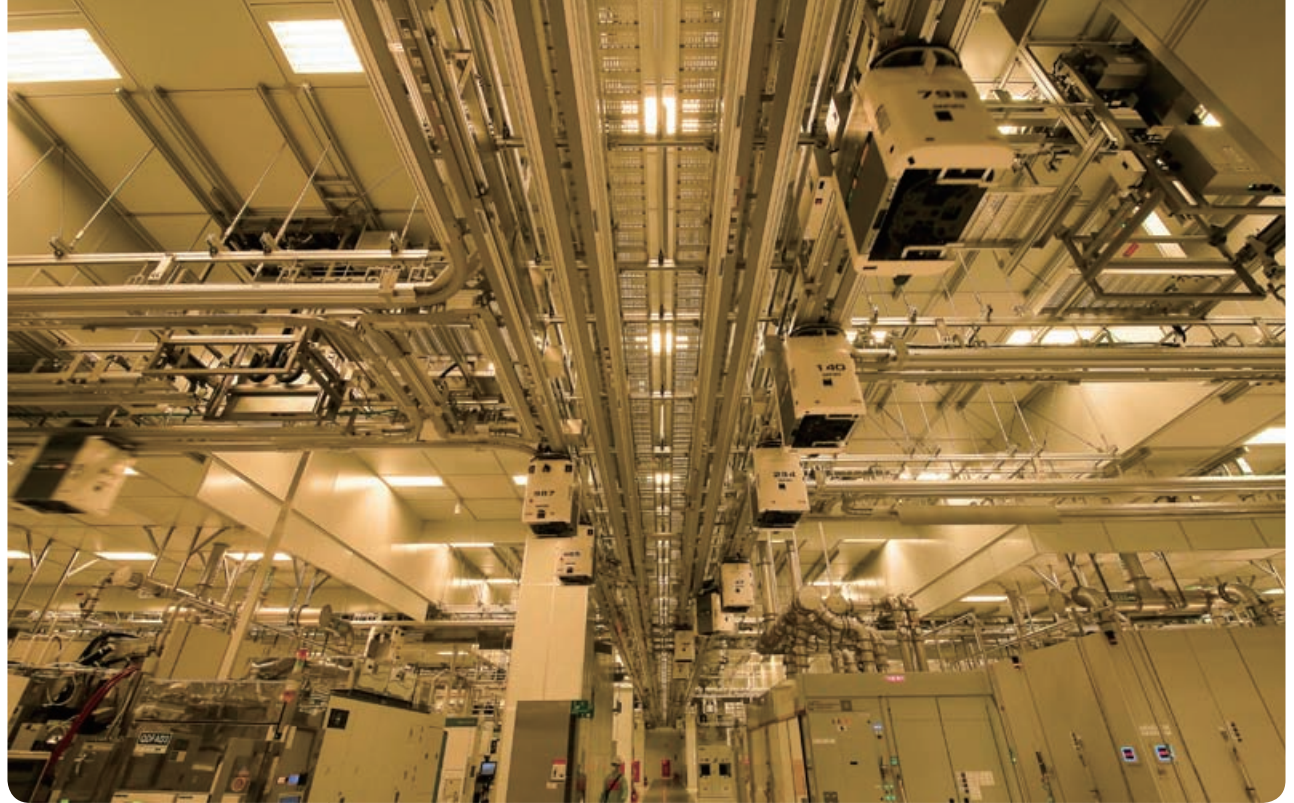
### **Integrated Interconnect and Packaging**

In 2012, TSMC became the world's first foundry to provide full system integration turn-key solutions to customers. The Company developed and delivered backend technologies starting from advanced back-end-of-line (BEOL) interconnect, to the production-ready fine pitch silicon interposer with through silicon via (TSV) and chip stacking, and all the way to advanced wafer-level-chip scale packaging (WLCSP) including fan-in and fan-out, and ultra fine pitch large die lead-free flip chip packaging. TSMC can offer our customers corresponding design tools, technology, and mass production capability. Such options were made available to customers in 2012. Advanced BEOL interconnection is further refined and extended with innovative damascene processes. And the flip chip packaging technology envelope was expanded to larger chip size and finer bump pitches for advanced technology nodes (28nm and 20nm). Efforts are also made to include fan-in and fan-out wafer level packaging technology in our offerings to customers. The solution has been qualified by selective customers.

#### **●Advanced Interconnect**

Advanced interconnects with low resistance/capacitance RC delay continued to be the primary focus of TSMC BEOL technology development in 2012. For 16nm node and beyond, we have developed a new interconnect scheme to achieve minimum pitch and a new metal patterning to minimize resistance/capacitance RC delay.

At the 20nm node, the effective resistivity of our Cu lines is highly competitive and lower than that projected by the International Technology Roadmap for Semiconductors (ITRS).



Technology leadership and manufacturing excellence are the bedrock of TSMC's competitive advantage.

#### **●Advanced Package Development**

To provide innovative and cost competitive lead-free bumping and packaging solutions in 2012, TSMC developed and qualified 28nm technology node Bump-on-Trace packaging technology with ultra-fine pitch array (100 $\mu$ m pitch) Cu-bump for mobile devices. The Company expanded the lead-free packaging technology envelope to the 20nm node and offered a wide variety of lead-free flip chip packaging technologies for both mobile/handheld and high performance applications to enhance customers' competitiveness.

#### **●3D IC**

In 2012, R&D completed CoWoS™ process and package qualifications and transferred the technology for production. TSMC's CoWoS™ solution provides a simple integration process for customers to realize their products with optimized cost and cycle time. We have also developed 3D IC 28HPM through transistor stacking (TTS) technology, that can enable customers for applications requiring small form factor, high performance and low power dissipation. Realizing the critical nature of 3D IC thermal management, TSMC has also developed thermal solutions associated

with the CoWoS™ process and TTS technologies. Overall, TSMC delivers technology solutions to enable SiP design that includes package design, electrical analysis of package extraction, timing, signal integrity, IR drop, and thermal to physical verification of design rule check (DRC) and layout verification of schematic (LVS). Such integrated solution for product realization is available to customers.

#### **Advanced Transistor Research**

Continuous quest for high performance and low power drives innovation and research in transistor architecture in advanced logic technologies across all segments. TSMC invested heavily in alternative high speed and low power channel materials other than silicon, such as germanium and III-V compounds. New concepts of transistor structures employing innovative nanotechnology are also under intensive investigation.

#### **Spectrum of Technology**

In addition to CMOS logic technology, TSMC continues to conduct research and development on a broad mix of capabilities. The Company enhanced its SoC roadmap, with higher integration and more variants.

##### **•Mixed Signal/Radio Frequency (MS/RF) Technology**

TSMC developed full-scope 28nm oxo-nitride and poly-Si based RFCMOS technology for next generation RF transceivers (ex. 4G LTE) with the advantages of low power and low cost. Besides standard-Vt and low-Vt devices, extreme-low-Vt devices were also included for larger design margins and smaller active-power consumption. TSMC delivered a CMOS process compatible technology for enabling cellular RF switch applications on Si to compete

with traditional compound semiconductor-based processes. TSMC enabled production of the IPD (Integrated Passive Device) technology, specifically for the rapidly expanding mobile device.

##### **•Power IC/BCD Technology**

In 2012, TSMC's HV/Power technologies collectively shipped more than 1 million wafers to customers. On top of the production base, R&D team released the second generation of 0.18 BCD technology, and the first product from a partner customer has shipped engineering samples to system customer.

##### **•Panel Driver Technology**

In 2012, 80HV for smartphone display driver chips was released to production. And a customized derivative of the technology has also supported partner a customer's lead product design. Other than small panel for smartphone, we also have been developing a 0.11μm technology specifically for tablet applications.

##### **•Micro-electromechanical Systems (MEMS) Technology**

In 2012, TSMC's modular MEMS technology for accelerometers was released and supported the partner customer production ramping. A microphone project for high-resolution noise cancellation applications was also executed.

##### **•Flash/Embedded Flash Technology**

In 2012, TSMC achieved several milestones in embedded flash technologies at the 65/55nm node. The split-gate cell at the 65nm node was qualified for automotive process and is currently in production. For other NOR-type cells, a

customer is shipping several prototypes for sampling. For hybrid cells, products for 100k chip card applications are in sampling.

At the 40nm node, TSMC has engaged with leading IDMs to develop nitride film storage flash cell and NOR type cell for both automotive and consumer applications.

#### **2.2.3 Open Innovation Platform® (OIP)**

Innovation has long been both an exciting and challenging proposition. Competition among semiconductor companies is becoming more active and intense in the face of increasing customer consolidation and the commoditization of more mature, conventional levels. Companies must find ways to continue innovating in order to prosper further. Companies innovating openly from the "outside in" as well as from the "inside out" accelerate innovation through active collaborations with external partners. This active collaboration of TSMC with external partners is known as Open Innovation. TSMC has adopted this path to innovate via the Open Innovation Platform® (OIP) initiative. (OIP Video ▶)

The TSMC Open Innovation Platform® (OIP) initiative is a comprehensive design technology infrastructure that encompasses all critical IC implementation areas to reduce design barriers and improve first-time silicon success. OIP promotes the speedy implementation of innovation amongst the semiconductor design community and its ecosystem partners with TSMC's IPs, design implementation and DFM capabilities, process technology, and backend services.

A key element of OIP is a set of ecosystem interfaces and collaborative components initiated and supported by TSMC that more efficiently empowers innovation throughout the supply chain and, in turn, drives the creation and sharing of newly-created revenue and profits. TSMC's Active Accuracy Assurance (AAA) initiative is critical to OIP, providing the accuracy and quality required by the ecosystem interfaces and collaborative components.

TSMC's Open Innovation model brings together the innovative thinking of customers and partners under the common goal of shortening design time, minimizing time-to-volume, speeding time-to-market and, ultimately, time-to-revenue:

- The foundry segment's largest, most comprehensive and robust silicon-proven intellectual properties (IPs) and library portfolio;
- Advanced design methodology delivery through reference flows, design for manufacturing (DFM), and process design kits; and
- Comprehensive design ecosystem alliance programs covering market-leading EDA, library, IPs, and design service partners.

TSMC's OIP Alliance consists of 30 electronic design automation (EDA) partners, 41 IP partners, and 26 design service partners. TSMC and its partners proactively work together, and engage much earlier and deeper than before in order to address mounting design challenges at advanced technology nodes. Through this early and intensive collaboration effort, TSMC OIP is able to deliver the needed design infrastructure with timely enhancement of EDA tools, early availability of critical IPs and quality design services when customers need them. This is critical to success for the

customers to take full advantage of the process technologies once they reach production-ready maturity.

In October 2012, TSMC hosted the OIP Ecosystem Forum at San Jose Convention Center in California, with keynote addresses from the executives of TSMC as well as OIP ecosystem partners. The forum was well attended by both customers and ecosystem partners and demonstrated the value of collaboration through OIP to nurture innovations.

TSMC's OIP Partner Management Portal facilitates communication with our ecosystem partners for efficient business productivity. This portal is designed with an intuitive interface and can be linked directly from TSMC-Online.

#### **2.2.4 A Vehicle to Make Ideas Come True—Tsmc University Shuttle Program**

The TSMC University Shuttle Program was established to handle MPW (Multi-Project Wafer) access requests by qualified professors at leading research universities worldwide. To participating professors, TSMC University Shuttle Program provides annual pre-approved access to quality technologies, including 65nm, 40nm process nodes for analog/mixed-signal circuits and RF design, and 0.11 $\mu$ m/0.18 $\mu$ m process nodes for micro-electromechanical system designs. For very advanced logic design and SRAM researches, the 28nm process node is provided to special university projects. To TSMC, the key performance indices are the 3Rs: Recruiting, Research results transfer from universities to TSMC, and Recognition.

Participation in the TSMC University Shuttle Program include the active participation of major university research groups:



in the U.S., M.I.T., Stanford University, UC Berkeley, Harvard University, and UCLA; in Taiwan, National Taiwan University, National Chiao-Tung University, and National Tsing-Hua University; in China, Tsing Hua University in Beijing, and Hong Kong University of Science and Technology, and in Singapore, Nanyang Technological University.

The TSMC University Shuttle Program serves as an effective bridge to link motivated professors and graduate students in leading research universities worldwide with enthusiastic directors and managers at TSMC to contribute to newer level of excellence in advancing technologies and in nurturing new generations of talent in the semiconductor field.

TSMC's University Shuttle Program has been very effective and is praised by professors around the world. They recognize that this Program allows their graduate students to implement exciting designs ranging from low-power memories, analog-to-digital converters and digital designs to advanced radio-frequency and mixed-signal bio-medical systems. This is truly "win-win" collaboration. In 2012, TSMC received specific letters of appreciation from professors at M.I.T., Stanford University, UC Berkeley, Harvard University, UCLA, National Taiwan University and National Chiao-Tung University.

### 2.2.5 Future R&D Plans

In light of the significant accomplishments of TSMC's advanced technologies in 2012, the Company plans to continue to grow its R&D investments. The Company plans to reinforce its exploratory development work on new transistors and technologies, such as 3D structures, strained-layer CMOS, high mobility materials and novel 3D IC devices. These studies of the fundamental physics of nanometer CMOS transistors are core aspects of our efforts to improve the understanding and guide the design of transistors at advanced nodes. The findings of these studies are being applied to ensure our continued industry leadership at the 28nm and 20nm nodes and to extend our leadership to the 10nm and 7nm nodes. One of TSMC's goals is to extend Moore's Law through both innovative in-house work and by collaborating with industry leaders and academia. We seek to push the envelope in finding cost-effective technologies and manufacturing solutions.

TSMC intends to continue working closely with international consortia and lithography equipment suppliers to ensure the timely development of 193nm high-NA scanner technology, EUV lithography, and massively parallel e-beam direct-write technologies. These technologies are increasingly important to TSMC's process development efforts at the 10nm, 7nm, and smaller nodes.

TSMC continues to work with mask writing and inspection equipment suppliers to develop viable mask making technology to help ensure that the Company maintains

its leadership position in mask quality & cycle time and continues to meet aggressive R&D, prototyping and production requirements.

With a highly competent and dedicated R&D team, and its unwavering commitment to innovation, TSMC is confident of its ability to deliver the best and most cost-effective SoC technologies for its customers, thereby supporting the Company's business growth and profitability.

### TSMC R&D Future Major Project Summary

Project Name	Description	Risk Production (Estimated Target Schedule)
16nm logic platform technology and applications	Next-generation technology for both digital and analog products	2013
10nm logic platform technology and applications	Exploratory technology for both digital and analog products	2015
3D IC	Cost-effective solution with better form factor and performance for SIP	2013 - 2014
Next-generation lithography	EUV and multiple e-beam to extend Moore's Law	2014 - 2016
Long-term research	Special SoC technology (including new NVM, MEMS, RF, analog) and 10nm transistors	2013 - 2015
The above plans account for roughly 70% of the total R&D budget in 2013, while total R&D budget is currently estimated to be around 8% of 2013 revenue.		

### 2.2.6 Intellectual Property

A strong portfolio of intellectual property rights strengthens TSMC's technology leadership and protects our advanced and leading edge technologies. In 2012, TSMC received a record breaking 647 U.S. patents, as well as 300+ issued patents in Taiwan and the PRC, and other patents issued in various other countries. In 2012, TSMC achieved a patent milestone: breaking into the "Top 50" U.S. patent grants in 2012. TSMC's patent portfolio is now approximately 20,000 patents worldwide (includes patent applications in queue). We continue to implement a unified strategic plan for TSMC's intellectual capital management. Strategic considerations and close alignment with the business objectives drive the timely creation, management and use of our intellectual property.

At TSMC, we have built a process to extract value from our intellectual property by aligning our intellectual property strategy with our R&D, business objectives, marketing, and corporate development strategies. Intellectual property rights protect our freedom to operate, enhance our competitive position, and give us leverage to participate in many profit-generating activities.

We have worked continuously to improve the quality of our intellectual property portfolio and to reduce the costs of maintaining it. We plan to continue investing in our intellectual property portfolio and intellectual property management system to ensure that we protect our technology leadership and receive maximum business value from our intellectual property rights.

## 2.3 Trade Secret Protection

To protect TSMC's competitive edge and invaluable intellectual property, the Company is dedicated to Proprietary Information Protection (PIP) (e.g. protection of the trade secrets of TSMC and our customers, etc.), to preserve the interests of the Company, customers, employees and shareholders. We established the *TSMC Proprietary Information Protection Policy*, which clearly defines PIP management procedures and guidelines.

Training and promotions are rolled out for every employee in TSMC. The Company reinforces employees' awareness and capability for proprietary information classification and familiarity with handling processes. Regular audits are conducted, as well as annual PIP refresher training for all TSMC employees. In addition, if PIP policy is violated, warnings or punishments will be delivered depending upon severity. Legal action will also be undertaken in certain situations.

TSMC regards vendors as the Company's important partners, and thus provides security training and management to help them fit in with the Company's security culture. Each individual vendor must take PIP and work safety training, sign a nondisclosure agreement, and pass a work safety exam before receiving a working badge. TSMC also hosts a security symposium for vendor companies every quarter. During the gathering, vendor companies not only share successful experiences, but also review improvement plans. The symposium successfully helps vendors follow TSMC regulations.

## 2.4 Membership in Industry Associations

As a semiconductor industry leader, TSMC actively participates in trade and industry associations. TSMC executives have been nominated to and hold senior positions in associations including the Taiwan Semiconductor Industry Association, the Association of Industries in Science Parks, the Chinese National Association of Industry and Commerce, the Taiwan Electrical and Electronic Manufacturers' Association, the Mount Jade Science and Technology Association of Taiwan, and the Taiwan Business Council for Sustainable Development, holding positions such as Chairman or Executive Board Director. In addition, many TSMC employees also contribute to the semiconductor industry and professional associations by serving in industry associations as committee chairman or vice chairman in various committees.

## 2.5 Investor Engagement

TSMC's business strategies and financial policies aim to uphold and increase shareholder value. We align ourselves with international standards that demonstrate our position and reputation as a sustainability champion, and have been



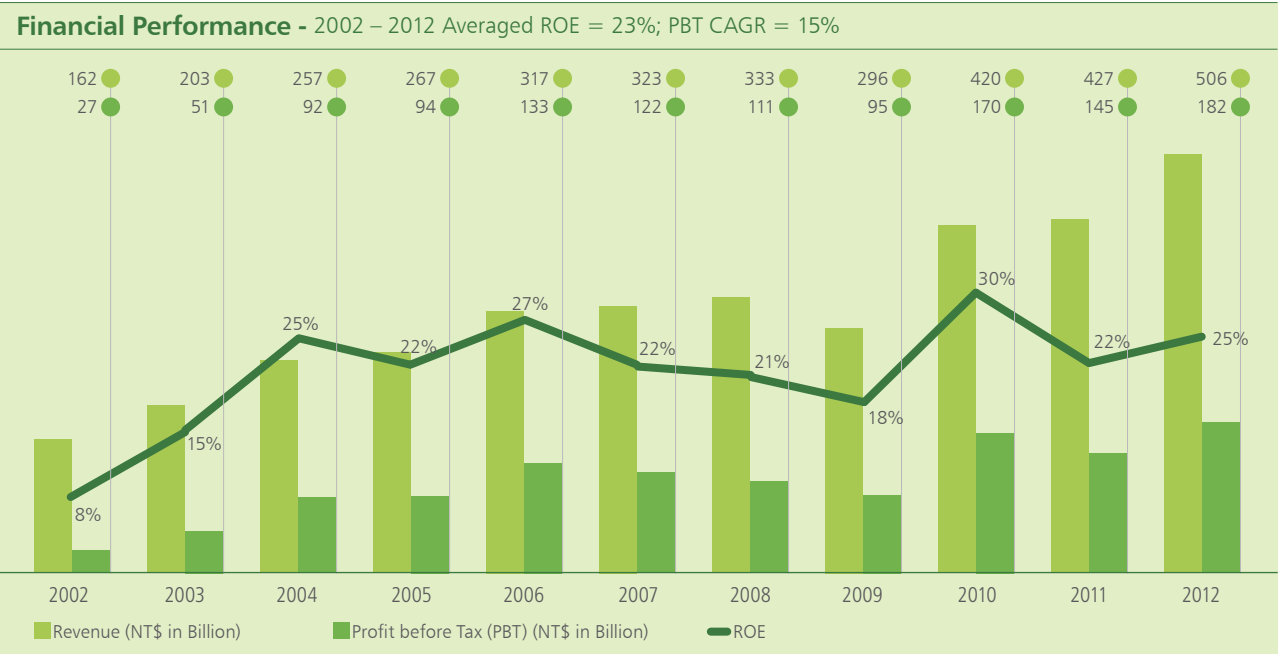
TSMC continued to receive various awards from globally noted institutions

## TSMC Leads Semiconductor Sector at Dow Jones Sustainability Indexes (DJSI)

Total Score: 2012 Semiconductor Sector			
		TSMC	Average
Total Score		87	49
Dimensional Score: 2012			
	Weighting	TSMC	Average
Economic	40%	85	56
Environmental	35%	91	44
Social	25%	84	45

included as a component of the Dow Jones Sustainability Indexes (DJSI) for the 12<sup>th</sup> consecutive year since 2001. Furthermore, in 2012, TSMC was recognized as the DJSI Sector Leader among global Semiconductor companies for the second year since 2010 and received RobecoSAM Gold Class Sustainability Award, which testifies to TSMC's global reputation in sustainability and investment value over the long run.





Since becoming a publicly listed company in 1994, TSMC has consistently delivered value to shareholders through cash dividends and share price appreciation, maintaining a strong balance sheet, and keeping one of the highest credit ratings among global semiconductor companies and Taiwan companies (Standard & Poor's (S&P) Ratings: A+; Moody's Ratings: A1; Taiwan Ratings: twAAA). In our core semiconductor business, we invest in opportunities that will expand our leadership in technology and capacity. In 2012, in addition to a record R&D budget of US\$1.4 billion, TSMC spent an unprecedented US\$8.3 billion on capital expenditures to meet the capacity needs of our customers. Moreover, we actively pursue new revenue opportunities in solid state lighting and thin film solar photovoltaic

technology, which leverage our technological strengths and engineering capabilities. We believe these investments will fuel TSMC's future growth and maximize our shareholder value.

In order to serve investors and the investment community, TSMC has established a highly effective communication system to disseminate information. Each quarter, our CEO and CFO jointly hold a face-to-face earnings conference and audio conference call to report and discuss company performance with investors worldwide. Starting from July 2012, TSMC further combines the earnings conference and conference call to allow broader participation to the live event. Replays and transcripts of these conferences are then made available on the company website for investors' reference. Each year, our Investor Relations team holds hundreds of investor and analyst meetings and conference calls, and actively participates in broker-sponsored investor conferences and non-deal roadshows, extending our reach in Asia, Europe and North America. In 2012, more than 280 such meetings and conference calls were held with investors worldwide. All these efforts are focused on serving worldwide investors with accurate, timely, and transparent information and financial data regarding TSMC business strategy, operations and performance. In addition, E-mail updates covering all business activities and key events are regularly sent to thousands of members of the investment community. Information regarding TSMC's business fundamentals, analysts' recommendation summary, credit ratings, and important filings with regulatory authorities is posted on TSMC's corporate website in a timely manner.

In order to increase shareholders' value, TSMC has set clear strategic financial objectives. These strategic financial objectives include: (1) average return on equity (ROE) across cycle greater or equal to 20%; (2) 10% profit before tax (PBT) compounded annual growth rate (CAGR) from 2010 to 2015. These financial objectives can help investors better understand TSMC's long-term investment value, while our financial track record gives investors higher confidence in TSMC's capability to achieve these financial objectives. For example, during 2002 to 2012, TSMC's averaged ROE was 23% and CAGR for profit before tax was 15%, both of which met our long-term financial objectives. Supported by solid financial performances, TSMC's share performance including cash dividends increased 33% during 2012, and significantly outperformed the Taiwan Stock Exchange Capitalization Weighted Stock Index (TAIEX) performance of 9% over the same period. TSMC's American Depository Receipt performance including cash dividends increased 38%, significantly outperformed the Philadelphia Stock Exchange Semiconductor Index (SOX) performance of 5%. Since the Company went IPO in 1994, TSMC's market capitalization has grown steadily. As of December 31, 2012, TSMC's market capitalization reached above NT\$2.5 trillion, or US\$86 billion.

Starting from 2004, TSMC has distributed cash dividends each year to our shareholders. From 2004 to 2012, TSMC has already paid out more than NT\$580 billion, or US\$18 billion, in cash dividends. Moreover, TSMC commits to our shareholders that our dividend policy is one that will maintain or steadily increase dividend per share (DPS) every year.

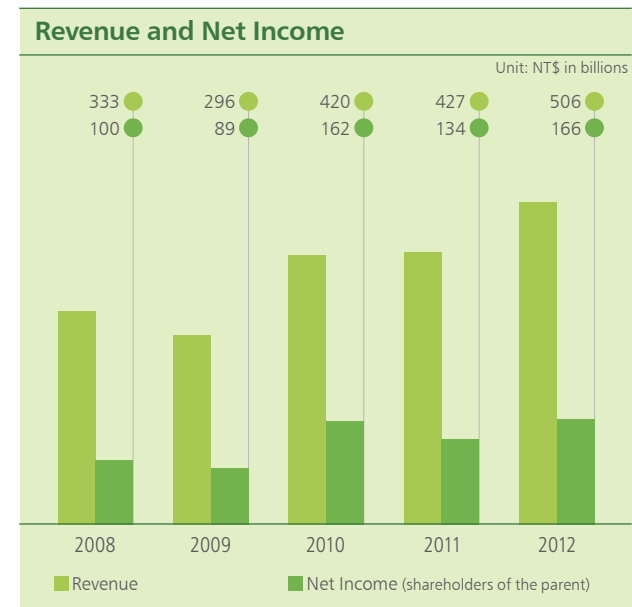
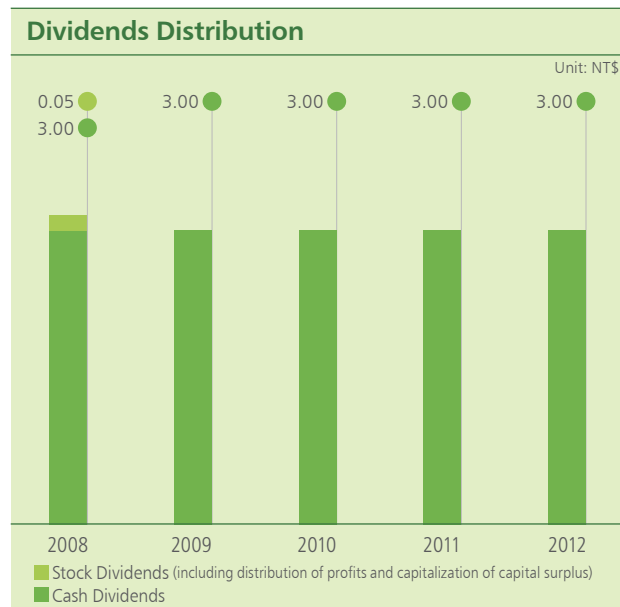
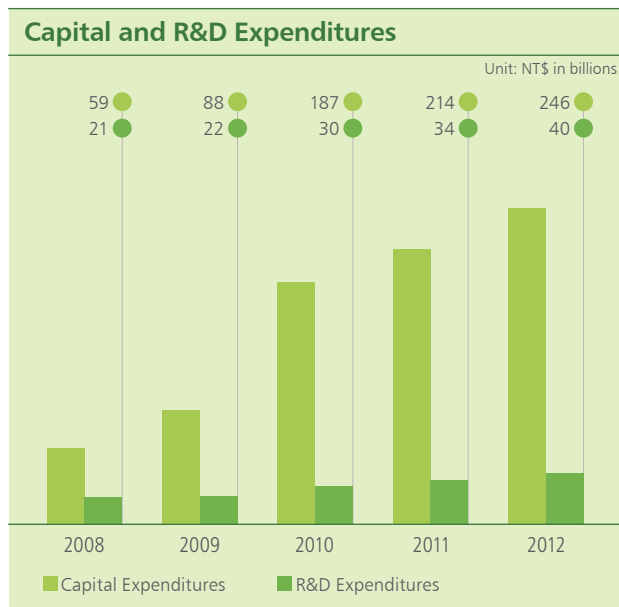
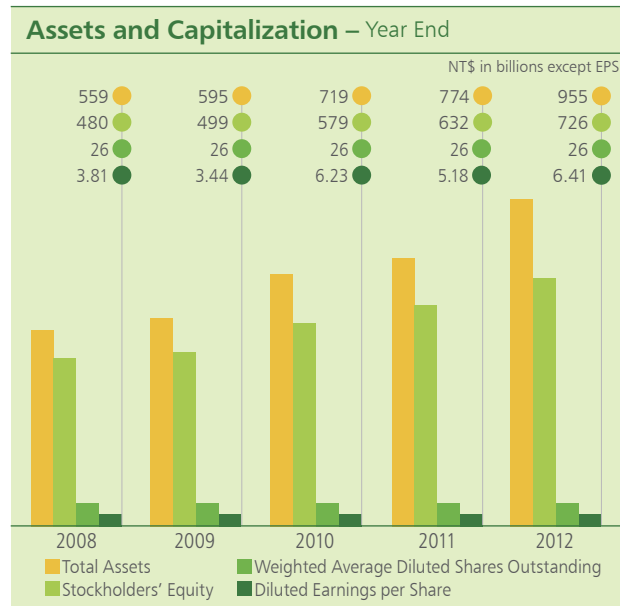
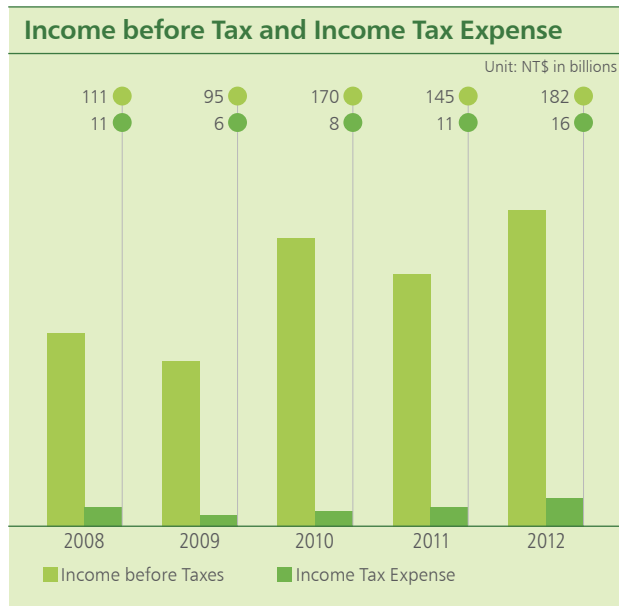
Annual investors surveys conducted by media have recognized the transparency of TSMC's disclosure policies, corporate governance commitment, and equitable treatment of shareholders. Furthermore, in 2012, TSMC continued to receive various awards from globally noted institutions such as *Institutional Investor* and *IR Magazine*. Regarding total awards and recognition in 2012, please refer to "2012 Awards and Recognitions" in page 5.

## 2.6 Financial Highlights

For 2011 earning distribution, TSMC paid dividends of NT\$3.0 in cash per common share in 2012.

Based on increases on previous expansion, the purchase of production equipment and research and development expenditures, TSMC is entitled to tax incentives, such as tax exemption and investment tax credits in 2012 as follows:

Law/Statute	Item	Thousands of NT\$
Article 9 of the Statute for Upgrading Industries	5-year tax exemption	9,830,280
Article 6 of the Statute for Upgrading Industries	Purchase of machinery and equipment	5,586,677
Article 6 of the Statute for Upgrading Industries	R&D and personnel training expenditures	1,173,249
Article 10 of the Statute for Industrial Innovation	R&D expenditures	2,828,300



### 3. Stakeholder Engagement

TSMC pursues sustainable operations and establishes multiple transparent and effective communication channels with stakeholders. These channels help TSMC understand their needs and expectations, which serve as important references for our CSR policy and plans. In 2011, TSMC formed a CSR committee led by Volunteer Program President Ms. Sophie Chang and Senior Vice President Lora Ho. TSMC's CSR committee include representatives from Customer Service, Human Resources, Investor Relations, Legal, Material and Supply Chain Management, Operations, Public Relations, Quality and Reliability, R&D, Risk Management, Corporate ESH, and the independent TSMC Education & Culture Foundation. These representatives participate in our CSR quarterly meeting and compile stakeholders' concerns through various channels, communicate with them, and ensure implementation of appropriate initiatives and programs responsive to those interests and concerns.

In 2012, we included CSR in the Board meeting agenda at the first time. Our annual CSR achievements and projects will be reported in the Board meeting periodically so as to be an importance reference for decision making.

#### Stakeholder Management Objectives

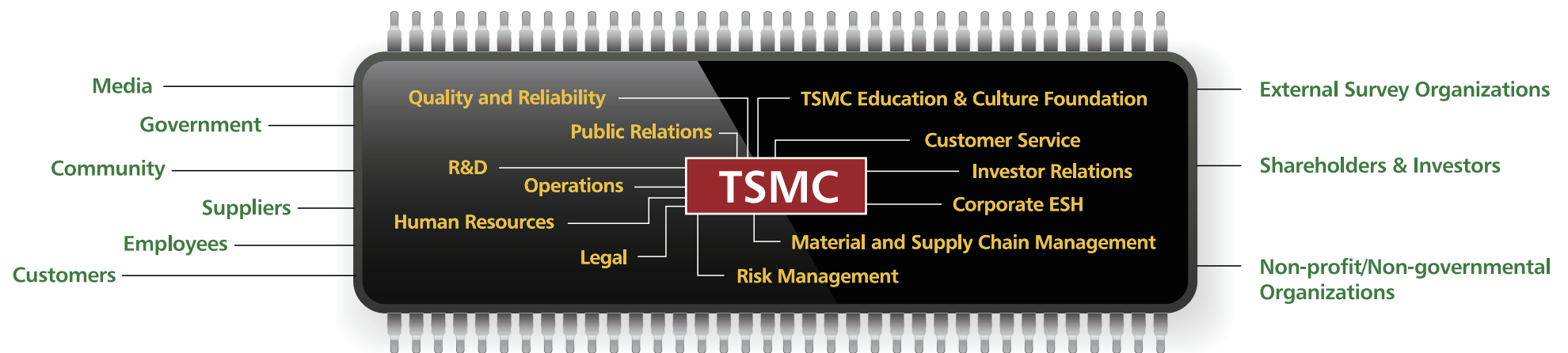
TSMC applies a "Plan-Do-Check-Act" model to improve social responsibility performance through continuous communication with stakeholders and invites them to participate in many of our activities. Our objectives for managing stakeholder concerns are as follows:

- Fully understand stakeholders' concerns and continue to improve CSR-related performance.
- Obtain stakeholders' trust and respect for TSMC.
- Disclose TSMC's efforts and performance to maintain and enhance TSMC's reputation.

#### Stakeholder Management Procedure

TSMC's stakeholder management procedure is divided into four stages: identification, analysis, plan, and engagement.

- **Stakeholder Identification:** TSMC defines stakeholders as the internal or external persons or organizations which can influence TSMC or be influenced by TSMC. According to this definition, we have identified that TSMC's stakeholders include employees, customers, suppliers, shareholders and investors, non-profit and non-governmental organizations, communities, governments, external survey organizations, and media.
- **Stakeholder and Its Concerned Topics Analysis:** After identifying our stakeholders, we establish individual communication channels with each of them according to their influence and issues of concern. We communicate with stakeholders through multiple channels established



by CSR-related units, and compile their economic, social and environmental concerns. We then prioritize concerns according to their impact on the company. Stakeholders' concerns are divided into significant, secondary and general topics to be included in key annual projects.

● **Stakeholder Related Projects:** TSMC's CSR-related units incorporate the results of the analyses described above into their daily work, annual plans, or cross-functional projects as a key reference for the company's sustainable development strategy.

● **Stakeholder Engagement and Measurement:** TSMC and its stakeholders have differing levels of interactions according to priority so as to use company's resource efficiently and to create win-win relationships. In the interaction process with TSMC's stakeholders, we have set up various key performance indexes (KPI) for continuous improvement through periodical review.

TSMC also contacts stakeholders actively to understand their expectations and to help them understand our efforts and performance. In addition to the multiple communication channels mentioned above, all persons or organizations can contact responsible people through the TSMC website [http://www.tsmc.com/english/contact\\_us.htm](http://www.tsmc.com/english/contact_us.htm), or submit questions or recommendations to our CSR taskforce through our CSR mailbox ([csr@tsmc.com](mailto:csr@tsmc.com)).

TSMC believes that maintaining good communication with stakeholders can not only help us understand our economic, social and environmental challenges, but also creates value for our company and society, and allows the company to continue sustainable growth.

## Key Performance Indexes for Stakeholder Engagement

Stakeholder	KPI	Reviewing Frequency
Employees	<ul style="list-style-type: none"> <li>Occupational Injury and Illness Statistics <ul style="list-style-type: none"> <li>Disabling Injury Frequency Rate</li> <li>Disabling Injury Severity Rate</li> </ul> </li> <li>Dining satisfaction</li> <li>Employee training satisfaction</li> </ul>	Monthly  Every meal Every class
Customers	<ul style="list-style-type: none"> <li>Customer satisfaction</li> <li>TSMC environmental performance (Water usage, power usage, waste quantity, greenhouse gas emissions)</li> </ul>	Annually Quarterly
Suppliers	Scoring for supplier quality, delivery and sustainability through audit, questionnaire or periodical meetings	Quarterly
Shareholders & Investors	<ul style="list-style-type: none"> <li>TSMC stock price</li> <li>TSMC revenue and profit</li> </ul>	Daily, Quarterly
External Survey Organizations	TSMC awards, TSMC sustainability score as rated by external survey organizations (includes economic, social and environmental performance)	Annually

## Stakeholder Materiality Analysis



## Summary for TSMC Stakeholders Engagement in 2012

Stakeholder	Communication Channels	Topics of Concern	TSMC Activities and Focus Points in 2012
Employees	<ul style="list-style-type: none"> <li>• Announcements</li> <li>• Human resource representatives</li> <li>• Regular/Ad-hoc communication meetings</li> <li>• Employee suggestion channels, such as immediate response system/ HR employee suggestion box/wellness center/wellness website</li> </ul>	<ul style="list-style-type: none"> <li>• Corporate governance</li> <li>• Legal compliance</li> <li>• Labor relations</li> <li>• Salary and benefits</li> <li>• Occupational health and safety</li> </ul>	<ul style="list-style-type: none"> <li>• Succeeded in creating diverse job opportunities for disabled people. By the end of 2012, TSMC had hired 319 disabled persons, a 74% increase compared with 2011.</li> <li>• Women's care projects to provide a worry-free working environment: In 2012, we rolled out our Women's Care Campaign aimed at pregnant employees. By consolidating internal resources, we have organized a variety of programs and activities, including support groups, healthy meal selections, an online shopping platform, resource kit, and more. We also reinforced communication and education of managers and improved the physical environment to create a more comfortable work environment.</li> </ul>
Customers	<ul style="list-style-type: none"> <li>• Annual customer satisfaction survey</li> <li>• Customer quarterly business review meeting</li> <li>• Customer audits</li> </ul>	<ul style="list-style-type: none"> <li>• Green product</li> <li>• Conflict mineral survey</li> <li>• Proprietary information protection</li> </ul>	<ul style="list-style-type: none"> <li>• Completed annual customer satisfaction survey</li> <li>• Completed 15 supplier surveys for "conflict minerals". All suppliers declared they did not source from conflict areas.</li> </ul>
Suppliers	<ul style="list-style-type: none"> <li>• Supplier quarterly business review meeting</li> <li>• Supplier questionnaire survey</li> <li>• Supplier on-site audit</li> <li>• Annual supply chain management forum</li> </ul>	<ul style="list-style-type: none"> <li>• Supply chain management</li> <li>• Environmental Safety &amp; Health (ESH) management</li> <li>• Legal compliance</li> </ul>	<ul style="list-style-type: none"> <li>• TSMC held the 2012 TSMC Supply Chain Sustainable Development and Risk Management Forum, inviting waste treatment and recycling contractors for first time to show our concern for the sustainable development of our waste management-related suppliers.</li> <li>• Completed 56 supplier sustainability surveys or audits. All were compliant with our sustainability requirements.</li> </ul>
Shareholders & Investors	<ul style="list-style-type: none"> <li>• Annual Shareholder Meeting</li> <li>• Quarterly Institutional Investors' Conference</li> <li>• Participation in conferences held by foreign investment companies, and face-to-face meetings</li> <li>• Responding to analysts' questions through phone calls and email</li> <li>• Publishing annual report, US SEC form 20-F, CSR report, disclosing important news through Taiwan Stock Exchange or company website</li> </ul>	<ul style="list-style-type: none"> <li>• Semiconductor industry outlook</li> <li>• TSMC's competitive advantage</li> <li>• Growth potential</li> <li>• Continued improvement in profitability</li> <li>• Dividend policy</li> </ul>	<ul style="list-style-type: none"> <li>• Combined quarterly investor conference with telephone conference call beginning Jul. 2012, achieving the goal of providing consistent and up-to-date information.</li> <li>• Emphasized the growth momentum and competitive advantage brought by rapid expansion of 28nm capacity.</li> <li>• Emphasized TSMC's niche and growth potential under the mobile computing trend.</li> <li>• Explanation of capital requirements and dividend policy needed for future growth momentum.</li> </ul>
Government	<ul style="list-style-type: none"> <li>• Official documents</li> <li>• Communication meetings or public hearings on regulations</li> <li>• Communication with government authorities through industry organizations, including the Association of Science Park Industries, Taiwan Semiconductor Industry Association, World Semiconductor Council, and Chinese National Federation of Industries</li> </ul>	<ul style="list-style-type: none"> <li>• Greenhouse gas reduction</li> <li>• Water resource management</li> <li>• Green product</li> <li>• Energy and water saving</li> </ul>	<ul style="list-style-type: none"> <li>• Held a "Water Resource Forum" with Water Resources Agency, Ministry of Economic Affairs. Approximately 300 managers, scholars, and people in related fields attended the forum.</li> <li>• After an enthusiastic response in 2011, TSMC collaborated once again with the National Taiwan University College of Public Health to host the second Forum on Workers' Health, inviting more than 300 representatives from government, industry, and academia to join.</li> </ul>
Community /Non-profit/ Governmental Organizations	<ul style="list-style-type: none"> <li>• Promotion of Science Education project in TSMC Education &amp; Culture Foundation (ECF)</li> <li>• Promotion of Appreciation for Arts project in TSMC ECF</li> <li>• TSMC Hsin-Chu Art Festival</li> <li>• Volunteer activities</li> <li>• Corporate website/email</li> <li>• Government-sponsored conferences</li> </ul>	<ul style="list-style-type: none"> <li>• Science talent cultivation</li> <li>• Art and culture promotion</li> <li>• Domestic and community art and culture development</li> <li>• Volunteer services</li> <li>• Global climate change</li> </ul>	<ul style="list-style-type: none"> <li>• Held 9 volunteer training sessions</li> <li>• Held a one-day holiday volunteer activity</li> </ul>
External Survey Organizations	<ul style="list-style-type: none"> <li>• Questionnaire surveys</li> <li>• Corporate website and email</li> <li>• Awards and competitions</li> </ul>	<ul style="list-style-type: none"> <li>• Global climate change</li> <li>• Water resource management</li> <li>• Ecological preservation</li> </ul>	<ul style="list-style-type: none"> <li>• Recognized by the Dow Jones Sustainability Indexes (DJSI) as the semiconductor sector leader for the second year since 2010, and named to the DJSI World and DJSI Asia Pacific indexes for a twelfth consecutive year.</li> </ul>
Media	<ul style="list-style-type: none"> <li>• Press conferences</li> <li>• Interviews</li> <li>• Press releases</li> </ul>	<ul style="list-style-type: none"> <li>• Economic status and operational growth</li> <li>• New fab planning and expansion</li> <li>• Employee recruitment</li> </ul>	<ul style="list-style-type: none"> <li>• Collaborated with Commonwealth Publishing Group to publish two books to share our green building experiences.</li> </ul>

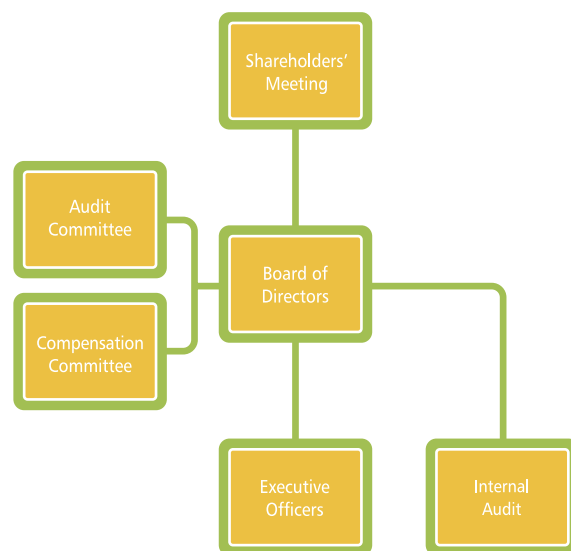
## 4. Corporate Governance

TSMC advocates and acts upon the principles of operational transparency and respect for shareholder rights. We believe that the basis for successful corporate governance is a sound and effective Board of Directors. In line with this principle, the TSMC Board delegates various responsibilities and authority to two Board Committees, Audit Committee and Compensation Committee. Each Committee has a written charter approved by the Board. Each Committee's chairperson regularly reports to the Board on the activities and actions of the relevant committee. The Audit Committee and Compensation Committee consist solely of independent directors.



## 4.1 Governance Structure

TSMC's governance structure is as follows:



## 4.2 Board of Directors

### 4.2.1 Board Structure

TSMC's 12<sup>th</sup> Board of Directors was elected at TSMC's 2012 Annual Shareholders' Meeting. All Directors continue in office. TSMC's Board of Directors consists of nine distinguished members with a great breadth of experience as world-class business leaders or scholars. We rely on them for their diverse knowledge, personal perspectives, and solid business judgment. Five of the nine members are independent directors: former British Telecommunications Chief Executive Officer, Sir Peter Bonfield; former Acer Group Chairman, Mr. Stan Shih; former Texas Instruments Inc. Chairman of the Board, Mr. Thomas J. Engibous; Professor of Princeton University, Gregory C. Chow; and advisor to the Taiwan Executive Yuan and the Taipei City Government, Ms. Kok-Choo Chen. The number of

Independent Directors is more than 50% of the total number of Directors. Chairman Morris Chang is also the Chief Executive Officer of the Company.

### 4.2.2 Board Responsibilities

Under the leadership of Chairman Morris Chang, TSMC's Board of Directors takes a serious and forthright approach to its duties and is a dedicated, competent and independent Board. The Board meets at least once every quarter.

In the spirit of Chairman Chang's approach to corporate governance, a board of directors' primary duty is to supervise. The Board should supervise the Company's: compliance with relevant laws and regulations; financial transparency; timely disclosure of material information, and maintaining of the highest integrity within the Company.

TSMC's Board of Directors strives to perform these responsibilities through the Audit Committee and the Compensation Committee, the hiring of a financial expert for the Audit Committee, and coordination with the Internal Audit department.

The second duty of the Board of Directors is to provide guidance to the management team of the Company. Quarterly, TSMC's management reports to the Board on a variety of subjects which include the management of economic, environmental, and social performance, including relevant risks and opportunities, and adherence or compliance with internationally agreed standards, codes of conduct, and principles. The management also reviews the Company's business strategies with the Board, and updates TSMC's Board on the progress of those strategies, obtaining Board guidance as appropriate.

The third duty of the Board of Directors is to evaluate the management's performance and to dismiss officers of the Company when necessary. TSMC's management has maintained a healthy and functional communication with the Board of Directors, has been devoted in executing guidance of the Board, and is dedicated in running the business operations, all to achieve the best interests for TSMC shareholders.

### 4.2.3 Directors' Compensation

Currently, TSMC Directors' compensation consists exclusively of fixed compensation. TSMC's Articles of Incorporation restricts the amount of compensation payable to its directors that the Company may make from its distributable earnings (defined as net income after required regulatory provisions). Over the years, TSMC directors' compensation declined from 1% of TSMC's distributable earnings to 0.3%, before being capped to no more than 0.3% of its distributable compensation. Because director's compensation is capped at 0.3% of distributable earnings, currently, TSMC Directors' compensation consists exclusively of fixed compensation which is in line with international best practice on board compensation. In 2012, total compensation paid to TSMC's directors only accounted for 0.06% of our 2012 net income. In addition, directors who also serve as executive officers of the Company are not entitled to receive any director compensation.

### 4.2.4 Audit Committee

The Audit Committee assists the Board in fulfilling its oversight of the quality and integrity of the accounting, auditing, reporting, and financial control practices of the Company. The Audit Committee is responsible to review the Company's: financial reports; auditing and accounting policies and procedures; internal control systems; material asset or derivatives transactions; material lending funds,

endorsements or guarantees; offering or issuance of any equity-type securities; legal compliance; related-party transactions and potential conflicts of interests involving executive officers, directors and/or controlling shareholders; Ombudsman reports; corporate risk management; hiring or dismissal of an attesting CPA, or the compensation given thereto; and appointment or discharge of financial, accounting, or internal auditing officers. The Committee meets at least once every quarter.

Under R.O.C. law, the membership of Audit Committee shall consist of all independent Directors. TSMC's Audit Committee satisfies this statutory requirement. The Committee also engaged a financial expert consultant in accordance with the rules of the U.S. Securities and Exchange Commission. The Audit Committee annually conducts self-evaluation to assess the Committee's performance and identify areas for further attention.

TSMC's Audit Committee is empowered by its Charter to conduct any study or investigation it deems appropriate to fulfill its responsibilities. It has direct access to TSMC's internal auditors, the Company's independent auditors, and all employees of the Company. The Committee is authorized to retain and oversee special legal, accounting, or other consultants as it deems appropriate to fulfill its mandate. The Audit Committee Charter is available on TSMC's corporate website.

#### **4.2.5 Compensation Committee**

The Compensation Committee assists the Board in discharging its responsibilities related to TSMC's compensation and benefits policies, plans and programs, and in the evaluation and compensation of TSMC's directors of the Board and executives. The Committee meets at least once every quarter.

The members of the Compensation Committee are appointed by the Board as required by R.O.C. law. According to TSMC's Compensation Committee Charter, the Committee shall consist of no fewer than three independent directors of the Board. Currently, the Compensation Committee is comprised of all five independent directors; the Chairman of the Board, Dr. Morris Chang, is invited by the Committee to attend all meetings and is excused from the Committee's discussion of his own compensation.

TSMC's Compensation Committee is authorized by its Charter to retain an independent consultant to assist in the evaluation of CEO, or executive officer compensation. The Compensation Committee Charter is available on TSMC's corporate website.

#### **4.2.6 Directors and Committees Members' Attendance**

Each director is expected to attend every Board meeting and the committees meeting on which he or she serves. In 2012, the average Board Meeting attendance rate was 83% and the attendance rate for the Audit Committee and Compensation Committee's Meetings were 100%.

#### **4.3 Political Contributions**

TSMC has consistently remained politically neutral, but encourages employees to fulfill their duties as citizens and actively participate in politics and vote for the candidates the employees believe to be the best public servants. TSMC executives have also expressed concerns from time to time and have made public comments on certain matters affecting industry, the economy and our employees livelihood. In the past, TSMC made legally proper political donations to local political parties between 2000 and 2004 to support the development of democracy in Taiwan. Due to a recent Taiwan legislation, TSMC is now prevented from making political contributions because it is over 50 percent

owned by foreign investors. TSMC has fully complied with this newly enacted law.

### **4.4 Code of Ethics and Business Conduct**

#### **4.4.1 Ethics Values**

Integrity is the most important core value of TSMC's culture. TSMC is committed to acting ethically in all aspects of our business; constantly and vigilantly promoting integrity, honesty, fairness, accuracy, and transparency in all that we say and do.

At the heart of our corporate governance culture is TSMC's Code of Ethics and Business Conduct (the "Code") that applies to TSMC and its subsidiaries, and this Code requires that each employee bears a heavy personal responsibility to preserve and to protect TSMC's ethical values and reputation and to comply with various applicable laws and regulations.

In so doing, each of us:

- must not advance our personal interests at the expense of, or in conflict with the Company;
- must refrain from corruption, unfair competition, fraud, waste and abuse;
- must not undertake any practices detrimental to TSMC, the environment and to society;
- must procure all of our raw materials from socially responsible sources;
- must abide by both the spirit and letter of all applicable laws, rules and regulations; and
- must avoid any efforts improperly to influence the decisions of anyone, including government officials, agencies, and courts, as well as our customers, suppliers, and vendors.

In order to continue to build an environment of innovation, technology leadership, and sustainable profitable growth, the Code requires that we must promote business

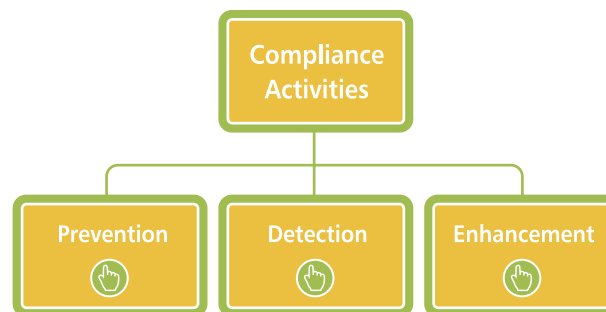
relationships founded upon an unwavering respect for the intellectual property rights, proprietary information and trade secrets of TSMC, our customers, and others; and the proper use of the Company's assets, not for personal use, but for achieving TSMC's vision for many years to come.

All employees, officers and Board members must wholeheartedly embrace and practice the Code. TSMC's management must set the best example of integrity and ethical conduct. TSMC's officers, especially our CEO, CFO, and General Counsel, with oversight from our Board, are responsible for the full, fair, accurate, timely, and understandable financial accounting and financial disclosure in reports and documents filed by the Company with securities authorities and in all TSMC public communications and disclosures.

#### **4.4.2 Code Administration and Disciplinary Action**

All employees, officers and managers must comply with the Code and other policies and procedures. TSMC expects our customers, suppliers, vendors, advisors and others with which we come into contact to understand and respect the Company's ethics standards and culture.

As part of our ethics compliance program, all employees must disclose any matters that have or may have the appearance of undermining the Code, such as any actual or potential conflict of interest. Key employees and senior officers must periodically declare their compliance status with the Code. To encourage an open culture of ethics compliance, we also have implemented several related policies that allow employees or any whistleblowers with relevant evidence to report any financial, legal, or ethical irregularities through the "Complaint Policy and Procedures for Certain Accounting



and Legal Matters" or "Procedures for Ombudsman System". When an employee finds or suspects a breach of this Code, he/she should report it immediately to any of the following persons: their supervisor; the Function Head of Human Resources; the Company's Ombudsman; or to the Chairman of the Company's Audit Committee, depending on the nature of the suspected breach.

In order to promote a culture of awareness, we have made all of our various policies available through easy access on our intranet and require all employees to be trained on our core values and compliance regime. Our compliance program for all employees includes regular live seminars and online training on various topics on ethics, including the requirements to prevent bribery and to protect our intellectual property. Our intranet website posts various guidelines and informative articles on ethics and honorable business conduct. We also require our stakeholders such as our suppliers, vendors and other partners to accept and abide by the same high ethical standard to which we hold all of our officers and employees. For example, we require all of our suppliers, vendors and partners to declare in writing that they will not engage in any fraud or any unethical conduct

when dealing with us or our officers and employees; we also promote our ethical culture to our business partners through regular live seminars to prevent any unethical conduct. We have established an online "hotline" that any relevant person may use to report any ethical irregularities to be investigated personally by designated senior management of TSMC.

The internal auditors of TSMC regularly audit the compliance by the Company, our vendors, suppliers, and customers, of relevant rules and regulations.

TSMC Internal Audit assists the Board of Directors and Management in inspecting and reviewing whether TSMC's internal control system is adequate in design and effective in operation to ensure:

- Financial, managerial, and operating information is accurate, reliable, and timely.
- Legislative or regulatory issues impacting the organization are recognized and addressed properly.
- Employee's actions are in compliance with policies, standards, procedures, and applicable laws and regulations.
- Resources are acquired economically, used efficiently, and adequately protected.

To achieve the above objectives, Internal Audit submits an annual audit plan incorporating the regulatory compliance audit projects to the Board of Directors for approval. Subsequent to the audits, Internal Audit reports the audit findings along with issue follow-up to the Board and Management on a regular basis.

We have a "zero tolerance" rule for any violation of any ethics rule. Simply put, any officer or employee regardless of their seniority will be severely punished

(including immediate dismissal and judicial prosecution as appropriate) to the full extent of our policies and the law, for any violation of our ethical standards. For example, the Company prosecuted one legal action against former employees for misappropriation of the Company's intellectual property in 2012. Additionally, TSMC terminated 4 employees during 2012 for violating our Proprietary Information Protection ("PIP") and other ethics rules.

#### 4.5 Regulatory Compliance

TSMC operates in many countries; in order to achieve compliance with governing legislation, applicable laws, regulations and regulatory expectations, we closely monitor domestic and foreign government policies and regulatory developments that could have a material impact on TSMC's business and financial operations.

In addition to TSMC's Code of Ethics and Business Conduct, TSMC has also established policies, guidelines and procedures in other policy areas, including: Anti-bribery/corruption, Anti-harassment/discrimination, Antitrust (unfair competition), Environment, Export Control, Financial Reporting/Internal Controls, Insider Trading, Intellectual Property, Proprietary Information Protection ("PIP"), Privacy, Record Retention and Disposal, as well as procuring of raw materials from socially responsible sources and so forth. With respect to PIP, it is one of the six key strategies of TSMC as announced in June 2010.

TSMC and our employees are expected to comply with all laws and regulations that govern our business. Training is a major component of our compliance program and is conducted throughout the year to refresh employees' commitment to ethical conduct, and to get updated information on any changes to the law. Highlights of our compliance training program include the following:

- A wide range of on-line learning programs are designed to provide employees with an understanding of the law and key compliance issues. Topics available via on-line learning including competition law (antitrust), environmental protection, insider trading, export control management, PIP and more.
- Live seminars are offered for topics related to Anti-bribery/corruption, Anti-harassment and discrimination, Antitrust, PIP, Insider Trading, Export Control, Financial Reporting, Contract Management, Intellectual Property, and Privacy Law. The Privacy Protection course has been updated and reworked to reflect the newly adoption of Taiwan's Personal Information Protection Act. These courses are mandatory to managers and certain employees because of the nature of the business activities they perform.
- Members of our legal team regularly attend outside training in Taiwan and abroad to receive legal updates and new developments in compliance and other areas.
- Inviting legal professionals and industry experts to lecture on new areas of knowledge and the latest developments on industry-specific compliance matters.
- To enhance compliance and risk management to our subsidiaries and affiliates, we regularly hold compliance meetings with them to ensure that all of our subsidiaries and affiliates (as appropriate) are aligned with the compliance standards at TSMC headquarters.

To increase awareness of all employees in relation to the various compliance topics, various trainings and resources are available through our intranet, including Company's latest internal policies. Furthermore, compliance education and articles are published regularly on TSMC's Legal Organization website. Actively promoting the right behavior is our key focus. For example, through various promotion campaigns, we have raised awareness of behavior associated with anti-bribery in 2012.



## Compliance in Figures

	FY 2012
Incidents submitted to the Ombudsman System <sup>1</sup>	20
Incidents submitted to the Audit Committee Whistleblower System	0
Incidents reported to the "hotline"	8
which were treated as plausible	3
PIP violations	108
which resulted in warnings <sup>2</sup>	104
which resulted in dismissals	4

1. There is no case for ethics, finance and accounting matters.

2. More than one-third of the cases reported were for minor errors or noncompliance with our PIP Policy.

In 2012, the competent authorities fined a minor fine totaling NT\$109,200 for very few isolated incidents of administrative errors and noncompliance with relevant rules concerning employee attendance. After communicating with the authorities, TSMC has been implementing relevant remedial measures.

### 4.5.1 Major Accomplishments

In 2012, TSMC's excellence in regulatory compliance achieved several major accomplishments. For example:

- In addition to rigorously fulfilling our obligations to regulatory compliance matters, TSMC has discharged its civic duties as a responsible corporate citizen by advising the local government on law and policy reform. TSMC regularly urged the Government to amend any outdated laws and regulations, which may be inconsistent with global practice to improve our investment environment and economic development. For example, TSMC proactively provided the Government with advice on expanding criminal punishments for trade secret violations in the face of ever increasing incidents of intellectual property misappropriations. The Government accepted our suggestions, and our proposed amendments to the Trade Secrets Act were enacted into law in 2012.

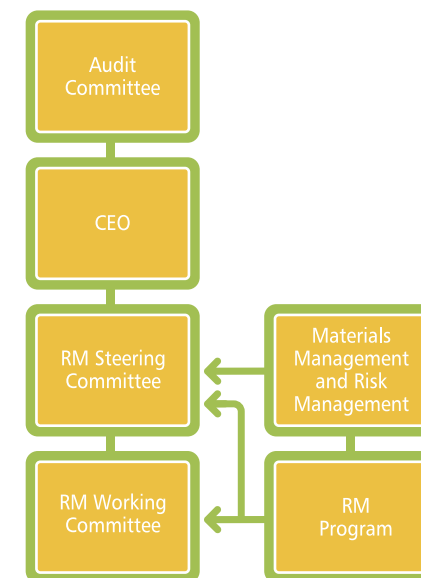
- In order to prevent any unauthorized export of controlled items, a formal Export Management System ("EMS") has been established and sustained to reinforce TSMC's internal compliance measures taken to ensure compliance with all applicable regulations covering the export of information, technologies, products, materials and equipment. TSMC's EMS passed strict governmental compliance audit and was certified by the Bureau of Foreign Trade, the Taiwan regulator, as a qualified ICP (Internal Control Program) exporter in September 2012. This certification allows TSMC to streamline its complicated SHTC (Strategic High-Tech Commodities) export process and thus create efficiency benefits for both TSMC and its customers.

## 4.6 Risk Management

TSMC and its subsidiaries are committed to proactively and cost-effectively integrating and managing strategic, operational, financial and hazardous risks together with potential consequences to operations and revenue. TSMC established its Enterprise Risk Management (ERM) program based on both its corporate vision and its long-term sustainability and responsibility to both industry and society. ERM seeks to provide for the appropriate management of risks by TSMC on behalf of all stakeholders.

To reduce TSMC's supply chain risks, a cross-function taskforce comprised of members from fab operations, material management, risk management and quality system management worked with TSMC's primary suppliers to develop business continuity plans, and effectively manage the risks faced by our suppliers. As a result of those efforts, there was no interruption in TSMC's supply line in 2012. As TSMC continued to expand production in 2012, risk treatment practices and green factory projects were initiated and implemented, beginning in the design phase for all new fabs.

## Risk Management Organization Chart Illustrated



### RM Steering Committee

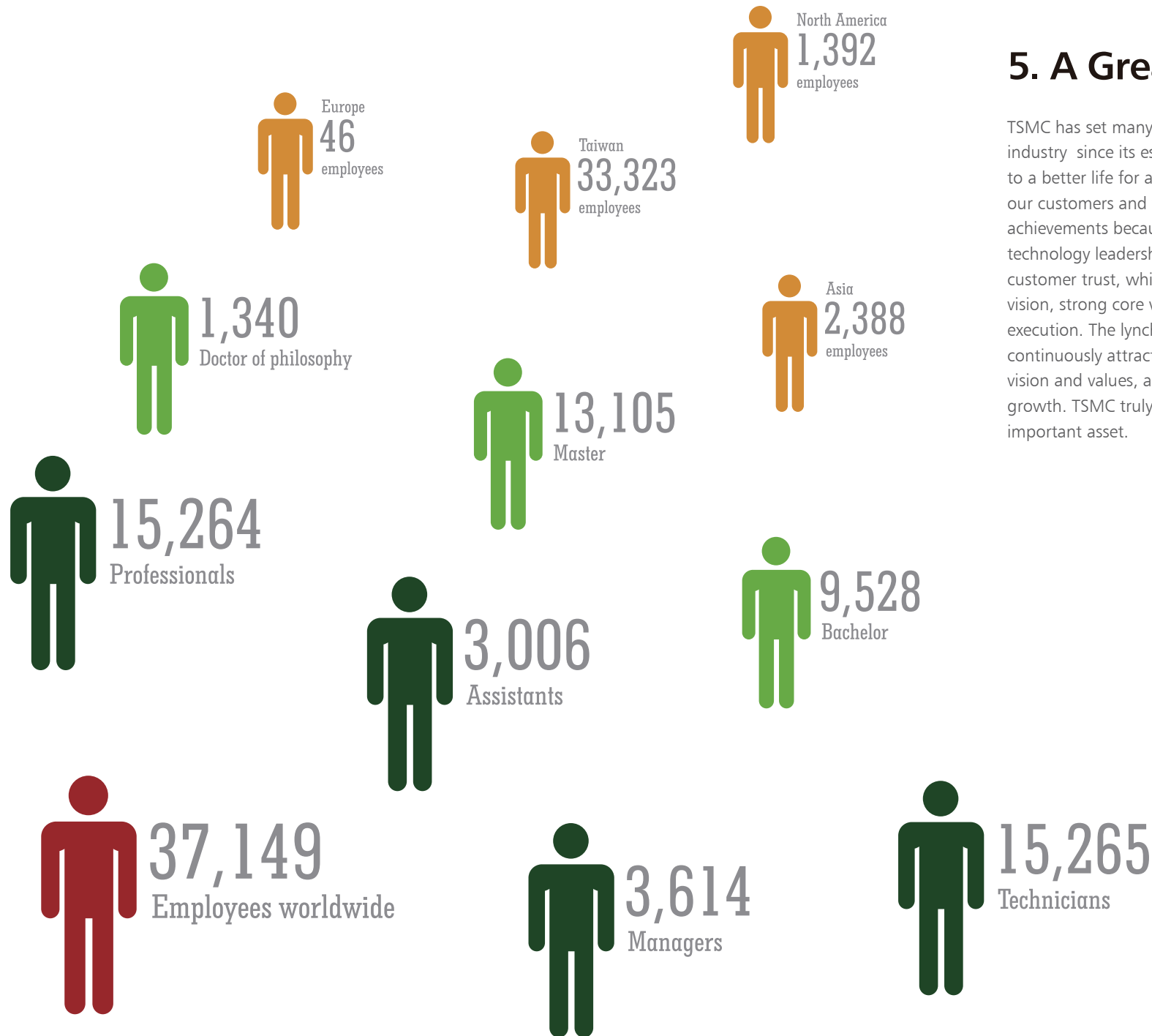
Reports to Audit Committee;  
Is composed of functional heads;  
Reviews risk control progress; and  
Identifies and approves the prioritized risk lists.

### RM Working Committee

Is composed of representatives from each function;  
Aligns functional ERM activities; and  
Follows up the risk control action plan.

### RM Program

Coordinates the RM Working Committee activities;  
Facilitates functional risk management activities; and  
Consolidates ERM reports into the RM Steering Committee.



## 5. A Great Place to Work

TSMC has set many key milestones in semiconductor industry since its establishment in 1987, and we contribute to a better life for all of society in collaboration with our customers and vendors. We are able to reach these achievements because of our competitive advantages of technology leadership, manufacturing excellence, and customer trust, which spring from the Company's clear vision, strong core values, effective strategies and powerful execution. The lynchpin of our success is our ability to continuously attract and develop talent who recognize our vision and values, and work together for our sustainable growth. TSMC truly believes that talent is our most important asset.

Our core values are integrity, commitment, innovation and customer trust, and our principles for human resources originate from these core values. For example:

- The first thing we consider when hiring is the candidate's character and capabilities, because integrity is our fundamental belief.
- TSMC believes that all employees should be treated with dignity and respect. TSMC respects and is committed to upholding local labor regulations and internationally proclaimed human rights, namely the United Nations Universal Declaration on Human Rights and the International Labor Organization's fundamental conventions on core labor standards. In addition, we are also devoted to providing career opportunities that offer above-average compensation because we are highly committed to our employees. At the same time, we hope our employees will commit themselves to the Company as well, and do their best to contribute to the Company.
- We encourage our employees to make valuable innovations because innovation is the wellspring of the Company's growth.

Based on these principles, all our human resources policies and practices have only one goal: to enhance the Company's overall productivity and effectiveness. Therefore, our employees can not only excel at their jobs, but can also balance their work and life, enjoying a fulfilling lifestyle.

In 2012, TSMC was awarded Taiwan's prestigious *CommonWealth Magazine's* "Most Admired Company in Taiwan" award for a 16<sup>th</sup> consecutive year and also won the "Corporate Citizenship Award," recognizing our achievements in corporate governance, commitment, and employee development. Furthermore, we placed first in the prestigious ranking of "Top-10 Happy Corporations" conducted by China Credit Information Service (CCIS), affirming our commitment to caring for employees and our unceasing efforts as an advocator of employees' work-life balance.

## 5.1 Right People with Shared Vision and Values

To attract, retain and develop the right people has always been the focus of our efforts in recruiting, staffing, compensation, performance management, and also our training and development. By right people, we mean people who share the same vision and values with the Company. "People with shared vision" means people aimed in the same direction as the Company, while "people with shared values" means people who do things based on the same principles. Through various human resources practices, our

employees can bring all their potential into full play in the right position, which contributes to a win-win situation for both TSMC and our employees.

### 5.1.1 Stable and Healthy Workforce

At the end of 2012, TSMC and its wholly-owned subsidiaries had 37,149 employees, including 3,614 managers and 15,264 professionals, 3,006 assistants, and 15,265 technicians. When adding non-wholly-owned subsidiaries, the number of total employees was over 39,000.

## TSMC Workforce Structure

Categories	Groups	Male		Female		Subtotal and Percentage by Groups	
		Number	Percentage of Group	Number	Percentage of Group	Number	Percentage of Total Employees
Employee Category	Managers	3,203	88.6%	411	11.4%	3,614	9.7%
	Professionals	12,580	82.4%	2,684	17.6%	15,264	41.1%
	Assistant Engineer/Clerical	2,355	78.3%	651	21.7%	3,006	8.1%
	Technician	2,729	17.9%	12,536	82.1%	15,265	41.1%
Location	Taiwan	18,889	56.7%	14,434	43.3%	33,323	89.7%
	Asia*	984	41.2%	1,404	58.8%	2,388	6.4%
	North America	962	69.1%	430	30.9%	1,392	3.8%
	Europe	32	69.6%	14	30.4%	46	0.1%
Age	16~20	45	12.9%	303	87.1%	348	0.9%
	21~30	7,240	56.0%	5,685	44.0%	12,925	34.8%
	31~40	9,810	54.9%	8,062	45.1%	17,872	48.1%
	41~50	3,215	62.5%	1,929	37.5%	5,144	13.9%
	51~60	494	63.5%	284	36.5%	778	2.1%
	60+	63	76.8%	19	23.2%	82	0.2%
Education	Ph.D.	1,244	92.8%	96	7.2%	1,340	3.6%
	Master's	10,675	81.5%	2,430	18.5%	13,105	35.3%
	Bachelor's	6,173	64.8%	3,355	35.2%	9,528	25.7%
	Other Higher Education	1,171	24.6%	3,598	75.4%	4,769	12.8%
	High School	1604	19.1%	6,803	80.9%	8,407	22.6%
Employment Type	Regular	20,827	56.3%	16,176	43.7%	37,003	99.6%
	Temp	40	27.4%	106	72.6%	146	0.4%
Subtotal by Genders		20,867	56.2%	16,282	43.8%	--	
Total		37,149					

\*Asia Region includes China, Japan and Korea.

In 2012, females comprised nearly 44% of all employees. In TSMC's primary operation site, Taiwan, more men choose to major in semiconductor-related studies in universities and graduate schools compared with women. Therefore, males comprised almost 84% of all managers and professionals in the Company.

In terms of the distribution of work locations, about 90% of our employees are located in Taiwan. In addition, we have overseas subsidiaries in many countries such as China, the United States, Europe, Japan, and Korea. Among these, China and the United States provide manufacturing, business and technical service, while Europe, Japan and Korea provide only business and technical support.

Taiwan's Labor Standards Act states that no workers under the age of 15 should be employed, and that children between the age of 15 and 16 are not permitted to perform

### Turnover Rate by Gender

Gender/Year	2008	2009	2010	2011	2012
Male in Avg.	9.5%	10.2%	7.4%	6.0%	5.2%
Female in Avg.	8.2%	9.8%	9.0%	5.8%	6.3%
Total in Avg.	8.9%	10.0%	8.2%	5.9%	5.7%

Note: The total of the annual turnover rate is the sum of monthly turnover rates.

### Turnover Rate by Location

Location/Year	2008	2009	2010	2011	2012
Taiwan Avg.	7.2%	9.2%	7.4%	5.3%	4.8%
Asia Region Avg.	30.8%	25.5%	20.4%	11.4%	15.0%
North America Avg.	10.3%	7.5%	10.9%	10.0%	11.4%
Europe Avg.	14.4%	6.3%	7.0%	10.7%	20.4%
Total Avg.	8.9%	10.0%	8.2%	5.9%	5.7%

\*Asia Region includes China, Japan and Korea.

heavy or hazardous work. TSMC complies with all local labor laws and has never hired and will not hire employees under 16 years old. In terms of age, employees aged 20 to 40 comprised 83% of total employees in TSMC.

The semiconductor industry is a knowledge-intensive industry, and our leading position comes from the innovation and contribution of our employees. Among these, about 76% of our managers and professionals hold masters' degrees or above.

Considering the vitality of the Company as well as the external economic environment, we believe a healthy turnover rate should be around 5% to 10% and our average annual turnover rates of the past five years are all within this range. In 2012, the turnover rate for all employees was 5.7%. By gender, the turnover rate for males was 5.2% and 6.3% for females. By geography, the turnover rate in Taiwan was the lowest (4.8%). By age group, employees under 30 comprised 54% of all turnover; employees between 30 to 50 comprised 43% and 3% was from employees above 50.

### 5.1.2 Recruiting the Right People

We recruit talent in a fair and open way, considering an applicant according to his or her qualifications for the position, rather than race, gender, age, religion, nationality, or political affiliation. Although we faced slow global economic growth in 2012, TSMC's continuous growth outperformed our counterparts and recruited over 5,600 new employees to support our business for future challenges, creating job opportunities for our society at the same time.

Moreover, TSMC values the diversity of our employees. In addition to hiring talent locally, we also proactively recruit talent around the world. Focus points for our recruitment

### The Distribution of New Hires' Age and Location in 2012

Categories	Groups	Male	Female
Age	Under 30	2,796	1,494
	31~50	853	458
	Above 50	21	7
Location	Taiwan	3,324	1,488
	Asia*	201	405
	North America	139	64
	Europe	6	2
Total		3,670	1,959

\*Asia Region includes China, Japan and Korea.

include the United States, India, and Singapore, where semiconductor talent is more abundant. The Company participated in "HiRecruit," an annual event organized by the Taiwan government for recruiting overseas technological talent. Furthermore, we also organized campus career fairs in top universities in the United States, India, Singapore and other regions. In 2012, TSMC hosted nearly 20 career talk sessions in top overseas universities, where TSMC executives engaged with talented people firsthand in order to cultivate future talent supply.



A campus career talk session in the University of Michigan (one of the sessions in top US universities)

## Attracting Talent Early and Building a Platform for Innovation

To ensure a sustainable talent pipeline for semiconductor industry, TSMC facilitates long-term talent supply and the investment of research resources via strategic university relationship programs. These programs focus on the following two primary objectives.

### a. Inspiring and Attracting New Talent to Pursue a Career with TSMC

TSMC endeavors to continuously inspire young students to pursue advanced education and career opportunities in the semiconductor field through a variety of activities. Major activities are described as below:

#### • Summer Internship

TSMC provides summer internships for almost two hundred of top domestic and overseas university students each year. The ratio between domestic and overseas students is six to one. During the internship, each student is assigned to work on a project that is closely associated with his or her

major. Each intern is also assigned a designated buddy who helps him or her to learn and blend into TSMC's workplace and culture quickly.

The program is designed to provide opportunities for interns to apply what they have learned from their studies, to experience the industry environment, and to make an early connection with TSMC teams so these young students can be prepared for future careers and enhance their competitiveness.

#### • Semi Elite Camp

In cooperation with top domestic universities, TSMC hosted the Semi Elite Camp, which was aimed at inspiring top undergraduates to devote themselves to solid-state-related research in their advanced studies. The camp invited top TSMC executives as well as distinguished and highly-regarded professionals to share their vision and prospects for the semiconductor industry. The Camp demonstrates

how TSMC partners with academia and industry to increase students' interest in key technology areas.

#### • On-Site Visits

These visits give top domestic and overseas university students an early understanding of the work environment of the semiconductor industry, and promotes interaction between schools and industry.

#### • Career Talks in Campus

Top TSMC executives and esteemed professionals share their vision and career experiences with undergraduates, inspiring them to devote themselves in related research areas.

#### • Overseas Campus Ambassador

Students among overseas summer interns are selected to promote TSMC on target campuses and to cultivate relations with students and faculty.



To provide a sharing platform for interns across functions, a final competition program is designed to strengthen interns' learning at TSMC. In 2012, the program was taken place in new Fab, Fab 15 in Taichung.



Encouraging and supporting research—the Outstanding Student Research Award Ceremony

#### b. Collaboration to Establish a Platform for Innovation

TSMC is dedicated to developing leading-edge technologies that provide the foundation for semiconductor innovation. We continuously support and partner with academia and research institutions to encourage advanced research and innovations in the areas. Major activities are described as below:

##### •University Shuttle Program

This program provides multi-project wafer access and state-of-the-art equipment capacity support to top domestic and overseas universities. This allows them to test new research models without having to purchase costly equipment and enables them to turn their innovative research into real results for the industry.

##### •Joint Development Program

This program provides funding to larger-scale university research labs for nearly 100 research projects, totaling around NT\$100 to \$200 million every year.

The Joint Development Program enables continuous novel or innovative academic semiconductor research, and in turn, has attracted more students to join these research labs for their advanced studies. About 80% of participating students joined TSMC after their graduation.

##### •Outstanding Student Research Award

This award aims to inspire and recognize outstanding semiconductor research by graduate students. Their research papers are evaluated by highly-regarded TSMC Academicians and Fellows. In 2012, 160 students from more than 10 countries including the United Kingdom, the United States, Australia, Asia and other regions participated in the contest. Twenty-four finalists were invited to visit Taiwan and to attend the award ceremony.

#### Successfully Creating Diversified Job Opportunities for Disabled Persons

74%

By the end of 2012, TSMC had hired 319 disabled persons; a 74% increase compared with 2011.

TSMC complies with government regulations mandating the number of disabled persons the Company is required to hire, although this has always been a challenge due to the limited pool of disabled persons. However, in 2012, TSMC proactively took innovative approaches to create more diversified and high-quality job opportunities for disabled persons. By the end of 2012, TSMC had hired 319 disabled persons; a 74% increase compared with 2011.

In addition to existing job positions, the Company actively integrated external resources to develop suitable jobs for disabled persons, such as “Recruiting Service Ambassador” and “Community Service Ambassador”.

TSMC is committed to building a workplace where disabled people can make contributions and gain a sense of achievement. At the same time, the Company can strengthen its connections with schools and communities, building win-win relationships. Moreover, TSMC acts as a benchmark for other companies, creating more opportunities for disabled persons.

#### 5.1.3 Compensation and Rewarding People for Long-term Growth

Based on our belief that “employees are the Company’s most important asset” and “maintaining balance between the interests of employees and shareholders,” TSMC provides competitive compensation packages to attract and retain the best talent. Our operational performance has excelled year by year and our shareholders have gained above-average returns. The total compensation of our employees is better than the average of our peer companies in the semiconductor industry and other Taiwanese companies as well. In 2012, we participated in a compensation survey conducted by the R.O.C Directorate-General of Budget, Accounting and Statistics, Executive Yuan, and received recognition as an “Excellent Company”.

Our total compensation includes base salary, cash bonus and profit sharing, which is based on individual expertise, job responsibility, performance, commitment, and the Company’s operational achievement, rather than gender, religion, race, nationality or political affiliation. As a global company, the Company provides employees of overseas subsidiaries with a competitive localized salary plan in accordance with local regulations, industry practices and labor market status. At the same time, we design bonus programs as part of our compensation package based on the operational performance of each overseas subsidiary to encourage overseas employees’ continuous contribution in the future growth of the Company.

In order to maintain the competitiveness of our total compensation, TSMC appropriately adjusts employees' salaries annually, taking the results of global salary surveys, market salary scales, and economic indices into consideration. Salary adjustment, cash bonus and profit sharing for our employees is reviewed by the Board of Directors' Compensation Committee and is connected to the Company's financial, operational performance and future growth. The cash bonus is distributed quarterly, as we believe this balances our employees' cash flow and provides a timely reward, and the profit sharing is distributed in the following year to encourage our employees' continuous contribution.

In 2012, despite slow recovery in the global economy, TSMC increased all employees' salaries in April based on our record-high operational performance and profit. In addition, the total amount of cash bonus and profit sharing in 2012 is expected to exceed NT\$20 billion. The total compensation of a newly hired engineer in TSMC would be equal to 24 months' salary, and reach more than one million Taiwan dollars, outperforming our industry peers.

#### 5.1.4 The Engine of Employee Growth

TSMC is in a competitive industry and environment, and our employees' capabilities and knowledge have to be continuously enhanced to successfully respond to our business challenges. The Company combines performance management and employee development, providing diversified and rich learning resources to enhance our employees' capability. In 2012, the Company was awarded the Golden Award of Taiwan TrainQuali System (TTQS) conducted by Bureau of Employment and Vocational Training, Executive Yuan, affirming the completeness and systematicness of our development mechanism.

#### Comprehensive Performance Management and Development

TSMC's performance management and development system aims to fully develop employees to their maximum potential. It provides an environment for employee development, and facilitates ongoing engagement and communication between supervisors and employees. We approach performance management along the dimensions of strategy, integration and development. The five principles of our performance management are showcased in the figure to the right.

Through goal-setting and execution by the organizations and the employee, as well as mid-year and year-end performance evaluations, we assess the status of goal achievement and set each employee's development focus.

#### Rich and Diverse Learning Resources

Based on the nature of individual jobs, work performance, and career development track, a tailor-made Individual Development Plan (IDP) is established for our employees. We organize the Company's training plan for the next year based on IDP. In 2012, the Company's total training

#### Five Principles of Our Performance Management



costs reached around NT\$60 million. We provided almost 780,000 training hours and a total of 520,000 attendees participated in training sessions; employees attended 21 hours of training on average.

	2008	2009	2010	2011	2012
(A) Headcount as of 12/31	22,843	24,466	33,232	33,669	37,149
(B) Training Hours	641,939	561,403	968,457	795,448	779,442
(C=B/A) Average Training Hours per Employee	28.10	22.95	29.14	23.63	20.98

Note 1: Includes data for Taiwan and overseas subsidiaries, and includes data for WaferTech beginning from 2009

Note 2: Includes a mix of training methods, such as classroom training, e-learning, external training, but does not include hours of mentoring, coaching, job rotations and other training.

	Manager	Indirect Labor	Direct Labor	Total
(A) Headcount as of 12/31	3,614	18,270	15,265	37,149
(B) Training Hours	75,448	566,596	137,398	779,442
(C=B/A) Average Training Hours per Employee	20.88	31.01	9.00	20.98

Note 1: Includes data of Taiwan and overseas subsidiaries, and includes the data of WaferTech beginning from 2009

Note 2: Includes a mix of training methods, such as classroom training, e-learning, external training; but did not include the hours of mentoring, coaching, job rotations and others.

TSMC Provides Diversified Training and Development Programs



At the end of 2012, TSMC’s e-learning system offered 2,034 courses, covering Engineering and Technical courses, Functional and Professional courses, Management courses, and others. In 2012, e-learning training hours comprised 27% of total training hours.

We encourage employees to attend external training programs as well. In 2012, a total of 1,201 employees took short-term courses totaling 18,545 training hours; 179 employees took credit courses and degrees totaling 27,021 training hours; and 301 employees took language courses totaling 8,909 training hours. The training hours for external training comprised 7% of total training hours.

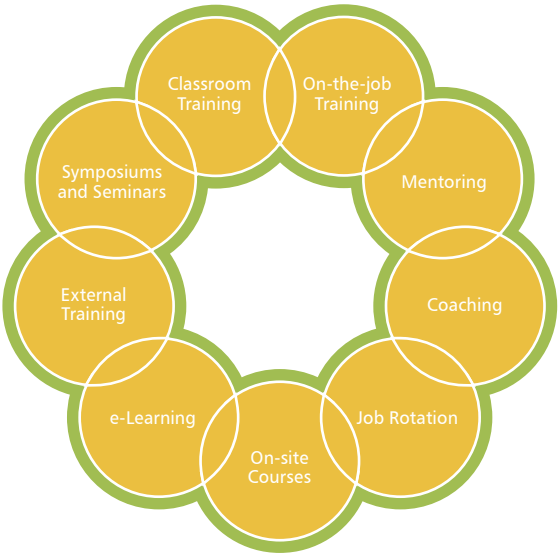
A Cradle for TSMC Teachers—the Internal Instructor Program

To facilitate knowledge sharing and leverage internal know-how, TSMC cultivates internal instructors through a well-established internal instructor development system. In 2012, 107 internal instructors completed their required training, which contributed a total of 634 qualified internal instructors by the end of 2012.



Technology forums are held in TSMC to provide our employees with more diversified and state-of-the-art knowledge of semiconductor and technology industry.

Every TSMC Employee can Access Appropriate Training via a Variety of Approaches



The Company has established a TSMC Excellent Instructor Award and a series of activities to show our appreciation for internal instructors and to enhance our learning culture since 2001.

Pursuing Better Learning Effectiveness

To ensure training quality, TSMC evaluates training effectiveness via questionnaires and pre- and post-course assessment, and the results become the foundation of our future enhancement. The Company sets an evaluation standard for all programs conducted by our Learning and Development Division and reviews those that do not deliver the desired outcomes. When training programs fail to meet their objectives, they are carefully reviewed and corrective actions are taken immediately. In 2012, overall participants’ feedback on course quality was satisfactory and met our goal, with the average evaluation score reaching almost 92 out of a possible 100. The percentage of training program failing to meet the objectives was also kept under 2%.



Chairman Morris Chang: Working hard is necessary; however, work is only a part of our life. We hope that employees can enjoy time with their family, exercise, social activities, and cultivate personal interests and hobbies.

## 5.2 Encourage a Balanced Life

To ensure a balanced life for our employees, TSMC provides a work environment with a variety of social and cultural activities as well as services and benefits, which promote employee productivity, morale, and healthy family life. This underscores our commitment to continuous care for our employees, and our efforts were reflected in the 2012 TSMC Core Values Survey, where the score for “commitment” rose from 91.8 to 93 points.

Echoing our commitment, Morris Chang, TSMC Chairman and Chief Executive Officer (CEO), made a speech via video to employees at the end of 2012, encouraging employees to work effectively while enjoying a healthy and balanced lifestyle apart from work. This voice has been heard and recognized by the society. Following the goal of “maximum 50 working hours per week,” the Company took actions in the systems, work processes and employees’ cognition with regular and specific tracking indices and mechanism. Through aforementioned efforts, we simplified the work

processes, enhancing the efficiency and effectiveness of our employees which enable them to spend more time with their family.

### 5.2.1 Expanding Interpersonal Relationships

TSMC considers each employee as an individual as well as a part of a social network. Our employees obtain support from their work environment, which acts as a positive influence. The Company has established an Employee Welfare Committee and provides a platform for employees who have similar interests to form or attend clubs. Through this channel, our employees can cultivate interests after work, and gain opportunities to develop relationships with one another. In 2012, TSMC assisted employees in forming and operating 70 clubs, such as running, cycling, extreme sports, dance, aikido, calligraphy, cooking, Chinese music and others. More than 10,190 employees have attended activities held by these clubs.

Family is also part of our interpersonal network. We regularly hold many parent-child activities and encourage our employees to participate in. Employees can balance



TSMC employees enjoy a more colorful life by participating in clubs. (Calligraphy Club)



Family Day—TSMC proactively facilitates family interaction.

their family life and expand their social networks through these activities, and more than 31,000 employees and family members have attended and enjoyed these activities.

### 5.2.2 Arts and Culture

TSMC promotes arts and culture events in the company, and encourages employees to attend. In 2012, we held concerts, speeches, plays for children, and movie screenings. In addition to enjoying performances by popular artists, employees also enjoyed speeches on diverse topics such as current events, relationships, legal matters in daily life, and inspirational stories.

In addition, company galleries display works such as traditional Chinese painting, oil painting, block prints, calligraphy, ceramics, and photography. These works of art not only beautify our work environment, but also make the Company a relaxing environment for employees. In 2012, almost 2,000 pieces of art were displayed.

### 5.2.3 A Convenient and High-quality Work Environment

#### Dining Service

TSMC has cafeterias which provide a great diversity of dining options and comfortable environments. Our food court provides Taiwanese, Southeast Asian, and Japanese cuisine as well as fruit. We also provide healthy vegetarian and non-vegetarian buffets, totaling around 100 dishes for our employees to choose from. To enhance the concepts of nutritional balance, we launched a “Nutrition Class” program, including a “Calorie Diary” to provide guidance on healthy eating, and “Dietetic Therapy Classes,” featuring pregnancy and postnatal care, liver care, massage, and menstrual and menopause care. Through these activities, we successfully promoted correct dietetic habits, and raised employees’ awareness of their own health, building a healthy workplace.

In order to ensure and enhance employee dining satisfaction, an electronic dining satisfaction survey system was established in 2009. With this system, we can easily understand employees’ preferences and satisfaction levels and make timely enhancements on food quality and service based on the results. In 2012, the satisfaction rate was 95.6%, 4% higher than the previous year.



TSMC adopted electric cars as company vehicles

#### Convenient Services

The Company provides permanent services such as fitness centers, bookstores, coffee shops, 24 hours convenience stores, juice bars, barbershops, dental clinic, and health centers. In addition, weekly on-site services include laundry, banking, telecommunications, insurance, household appliances and others.

#### Preschool Service

TSMC provides a healthy and safe environment for the preschool education of our employees’ children. Our kindergartens were built with green construction materials and are fireproofed. To provide a safe environment, there are no sharp angles in the interior designs. We also minimize the threat of influenza with separated air conditioning in every room. Through various channels and mechanisms, we not only give our employees’ children a great place to learn, but also help employees to be better and happier parents. In 2012, TSMC was recognized as one of the “Outstanding Enterprises in Providing Nursery Services” by the Council of Labor Affairs, Executive Yuan. In addition, the Company has shared our experiences in helping other companies to build a more family-friendly workplace.

#### Transportation Service

To save energy, reduce carbon emissions and provide better service, the Company provides regular shuttle bus service between fabs. All shuttle buses are installed with GPS systems to ensure safety and monitor driving status. In 2012, TSMC became the first company in Taiwan to adopt electric cars as company vehicles, supporting carbon reduction.

#### Accommodation Service

Accommodation service is provided for employees who are on a business trip between different sites and for employees who live far from the Company in consideration of their safety and convenience. In addition to providing



TSMC Preschool emphasizes happy learning, providing a safe and fun learning environment.

a comfortable living environment, a “Dormitory Caring System” was established to ensure safe access to dormitories and to respond to potential emergencies.

### 5.2.4 Benefits – Safeguarding Employees’ Rights

#### A Comprehensive Insurance Plan

In addition to the statutory Labor Insurance and National Health Insurance, TSMC provides comprehensive insurance plans to employees. All employees are covered by our group insurance plans from the first day they are on board. Coverage includes life insurance, accident insurance, hospital insurance, cancer insurance, and business travel insurance. Employees also have the flexibility to participate in self-pay insurance plans for their family with lower prices to obtain better protection.

#### Pension Plan

TSMC’s employee pension plan is set according to the Taiwan Labor Standards Act and Labor Pension Act. With the Company’s sound financial system, we ensure

employees a solid contribution and regular pension payments. In addition to statutory contribution, we also invite professional accountants and consultants to conduct precise calculations of the Company's pension fund, so as to assure sufficient funding for employee pension payments in the future.

### Flexible Leave Programs

TSMC provides flexible leave programs which exceed the requirements of Taiwan's Labor Standards Act. Our employees are eligible for annual leave after completing three months of service at TSMC. Furthermore, they are granted 120 hours fully-paid and 120 hours half-paid sick leave per year. In addition to affairs leave and homecare leave, granted based on the Labor Standards Acts, employees are entitled to 90 days of special personal leave with approval by an authorized supervisor. Our employees can also apply for leaves of absence for reasons such as childcare, military service, and medical treatment for serious illness or injury. They can also apply to return to the Company before the end date of his or her leave of absence. Taking parental leave as an example, in 2012, 368 employees took parental leave, and the average return-to-work rate was 70% with a retention rate of 81%.

Number of Employees That Took Parental Leave in 2012	Total	Male	Female
	368	49	319
Number of employees that should return to work in 2012 (A)	297	32	265
Number of employees that returned to work in 2012 (B)	209	20	189
Return to Work Rate (B/A)	70%	63%	71%
Number of employees that returned to work in 2011 (C)	125	16	109
Number of employees that returned to work in 2011 and are still employed at least 12 months (D)	101	12	89
Retention Rate (D/C)	81%	75%	82%

### Active Compliance with Regulations and Protecting Employees' Rights: Promotion Activities for 2<sup>nd</sup> Generation National Health Insurance in Taiwan



Carefully carrying out government regulations and informing employees of their rights in a timely way is an important part of TSMC's responsibility to employees. The Taiwan government announced the second generation of national health insurance, effective January 1<sup>st</sup>, 2012. The income categories, premium rates, and deduction standards of the new national health insurance are all different from the original.

In order to help employees understand the purpose of the new requirements and their impact on individual rights and interests, the Company used a number of channels to inform employees before the new regulations took effect. These include links on our internal website to the Bureau of National Health Insurance website for employees to access the most updated and immediate information, over 60 training sessions held for employees located in Hsinchu, Taichung, and Tainan City respectively, and a customized spreadsheet for employees to calculate their personal premium.

These promotion activities have not only won satisfaction from employees, but also successfully assisted the Company and employees in smoothly adopting the government's new regulations. TSMC was also honored by the Bureau of National Health Insurance, Executive Yuan, in recognition of our performance in employee training and our positive support for 2<sup>nd</sup> generation national health insurance.



The poster of communication sessions of 2<sup>nd</sup> Generation Health Insurance in Taiwan

### "Carefree" Women's Care Campaign

Traditionally speaking, female workers are usually given different social expectations in Eastern culture compared with their male counterparts. Currently, 44% of TSMC's workforce is composed of female employees, and TSMC is dedicated to providing a worry-free work environment that supports them in excelling at their jobs and in their family life. With a series of comprehensive programs, we aim to foster a friendlier work environment for female employees, which in turn fulfills our commitment to serve as an uplifting influence for the continuous improvement of the society.

In 2012, we rolled out our Women's Care Campaign dedicated to pregnant employees. With our efforts in



TSMC aims in fostering a gender friendlier work environment – our female employees actively participated in the Women's Care Campaign.

putting internal resources into more effective use, we have organized a variety of programs and activities, including support groups, healthy meal selections, an online shopping platform, resource kit, and more. We also reinforced the communication and education of managers. By improving the physical environment, as well as providing customized programs to a targeted group of employee, we continue to live up to our aim in fostering a friendlier work environment for our employees.

### Other Welfare Benefits

TSMC Employee Welfare Committee also provides other subsidiary benefits including:

- Financial assistance to help employees who encounter difficult circumstances.
- Subsidies for marriage, childbirth, and funerals
- Cash gifts for birthdays and major festivals
- Travel subsidies
- Discounts provided by over 4,000 designated vendors
- Online platform for shopping and exchanging information

### Benefits of Overseas Subsidiaries

The insurance plan, pension plan, leave programs and other welfare benefits for the employees of our overseas subsidiaries all comply with or exceed local regulations to ensure a secure and carefree life for our employees worldwide.

## 5.3 Employee Engagement

TSMC is committed to establishing positive employee relationships and creating a highly engaged work environment, and our employees are highly committed to the Company as well. These positive factors all generate productivity and higher performance.

Our commitment to caring for employees and our unceasing efforts as an advocator of employees' work-life balance has earned us the prestigious first place in the ranking of "Top-

### Novice Father and Mother Welfare Package

To establish a great place to work, TSMC unceasingly provides high quality welfare programs to employees, especially for employees with children. Employees taking maternity leave and the paternity leave have increased year by year, and over 2,000 employees greeted a newborn baby's arrival in 2012. "The Novice Father and Mother Welfare Package" is an integrated one-stop service for these employees. Through an e-book published on the Company's web page, brochures distributed from on-site wellness centers, and TSMC Family Day activities, these employees can conveniently obtain all the necessary information and application forms for benefits and payments provided to pregnant women, and families with newborn babies and small children provided by the Company and local governments or institutions.

"The Novice Father and Mother Welfare Package" was launched in 2012 and immediately acquired positive feedback from our employees. This practical and exclusive information service not only assists employees in making arrangements for their new baby, it also comprehensively informs employees of their rights and interests.

In addition, we were invited by the Council of Labor Affairs to participate in a series of promotion activities to introduce our practices and the achievements of this program, and share our experience in establishing a friendly workplace with other enterprises.



The promotion campaign of the "Novice Father and Mother Welfare Package"

10 Happy Corporations" conducted by the China Credit Information Service (CCIS), under its 2012 survey.

### 5.3.1 Reinforcing Employees' Sense of Belonging

Our employees share a common vision and values, and thus can work toward the same direction. TSMC holds "Sports Day" every year to raise employees' cohesion and reinforce the spirit of teamwork. Through various sports competitions, our employees interact and cooperate with one another. More than 36,000 TSMC employees and family members attended Sports Day in 2012.

The year 2012 marked the 25<sup>th</sup> anniversary of TSMC, and we initiated a series of programs under the theme of "Pride

25: Showing your pride as a TSMCer," with this campaign, we aimed to reinforce a shared sense of pride among TSMCers.

One of the highlights of Sports Day was the moment when Chairman Morris Chang announced that a special bonus of NT\$12,000 for non-management employees during his opening speech. Apart from the monetary encouragement provided to the employees, this gesture strengthened the connection between the Company and employees, and reinforced our commitment to being a supporting hand behind our employees. Related celebration programs include:



**TSMC 25<sup>th</sup> Celebration Series, a quarter century of togetherness**

### Group Marriage Ceremony at Family Day

This was the first-ever group marriage ceremony held by TSMC. 25 pairs of soon-to-be-married couples with at least one TSMC employee out of each pair registered to join the ceremony at Family Day. The couples were blessed by Chairman Morris Chang and his wife Sophie Chang, as well as the three Co-COOs. Over ten thousand employees and family members who attended the Family Day activities also gave the couples their best wishes.



Three couples out of the 25 pairs were both TSMC employees.

### Proud Faces of TSMC

We collected "Words of Pride" from over 2,800 employees, and from this pool 250 employees with outstanding "Words" were selected to have their portraits photographed and made into artistic pieces, displayed along with their statements. These portraits and statements were showcased in TSMC Fabs in Hsinchu, Taichung and Tainan. Also, we made these artworks into an online exhibition available on TSMC.com for external viewers. This initiative has boosted the morale of our employees, and it also supported us in attracting the right people who shared our values to join the Company. (Video ▶)



"Proud Faces of TSMC" was showcased around TSMC Fabs and is available online.

### The Return of First-ever Cheerleading Squad

Employees who joined the first-ever cheerleading performance at Sports Day 20 years ago returned to the stage once more. Still filled with youthful energy after decades of service with TSMC, they "wowed" the audience by the unity of their teamwork and their exciting performance.



"Our love for TSMC was the driving force behind our performance," said the cheerleaders who thought the efforts spent were worthwhile in bringing out the best performance.



### Lighting up the Sports Day Flame

F.C. Tseng, Vice Chairman of TSMC, led 25 employees with years of service ranging from one to 25 to light the Sports Day Flame. The gesture symbolized TSMC's 25 years of excellence and our aim to continue bringing out the best.



Employees are our most valuable assets and we are dedicated to providing the most appropriate path of development for our employees. To cope with the different needs of our diverse employee groups, we offers customized caring programs that cater to their necessities. With more and more international talent joining TSMC, we have rolled out a customized communication and caring program that aims to reduce the stress of moving to a foreign country, as well as to shorten the time needed in adjusting to a new environment. In turn, these efforts encourage them to stay at TSMC for a lengthy career.

- The IIT-ian Caring program was established in 2012 for employees hired from the Indian Institute of Technology (IIT). As part of the program, we have supported these employees since their recruitment by offering them language and cross-cultural training, as well as assisting them in obtaining necessary documents for working



Our foreign employees delightedly participated in the Global Happy Day.

overseas in Taiwan. In addition, we have provided communication training sessions for their supervisors and colleagues as well.

- By leveraging internal resources, we have launched the "H.U.G." program that caters to the daily necessities of these employees. Moreover, we have used innovative ways to facilitate interaction between Taiwanese and international employees; related programs included Global Happy Day, Friendship Ambassador, and more.

### 5.3.2 Open Communication Channels, Unobstructed Employee Participation, Harmonious Labor Relations

TSMC values two-way communication and is committed to maintaining open and transparent communication channels between the management level and their subordinates, as well as among peers, which in turn fosters harmonious labor relations and creates a win-win situation for the Company and the employees.

We actively establish a positive communication environment and a host of channels are provided to maintain the unobstructed flow of information between the Company and the employees, including:

- Regular communication meetings held for various levels of managers and employees.
- Various employees' voice channels, periodic employee satisfaction surveys and follow-up actions base on survey findings.
- Website posts: Corporate messages, Executive interviews, employee activities, and so on are posted on the Company's intranet for employees' timely reference.
- Webcast: Important talks from the Chairman are broadcasted via the Company's intranet.

- eSilicon Garden: A website hosting TSMC's internal publication is available in both Chinese and English, with its content ranging from work to fun updated on a bi-weekly basis.

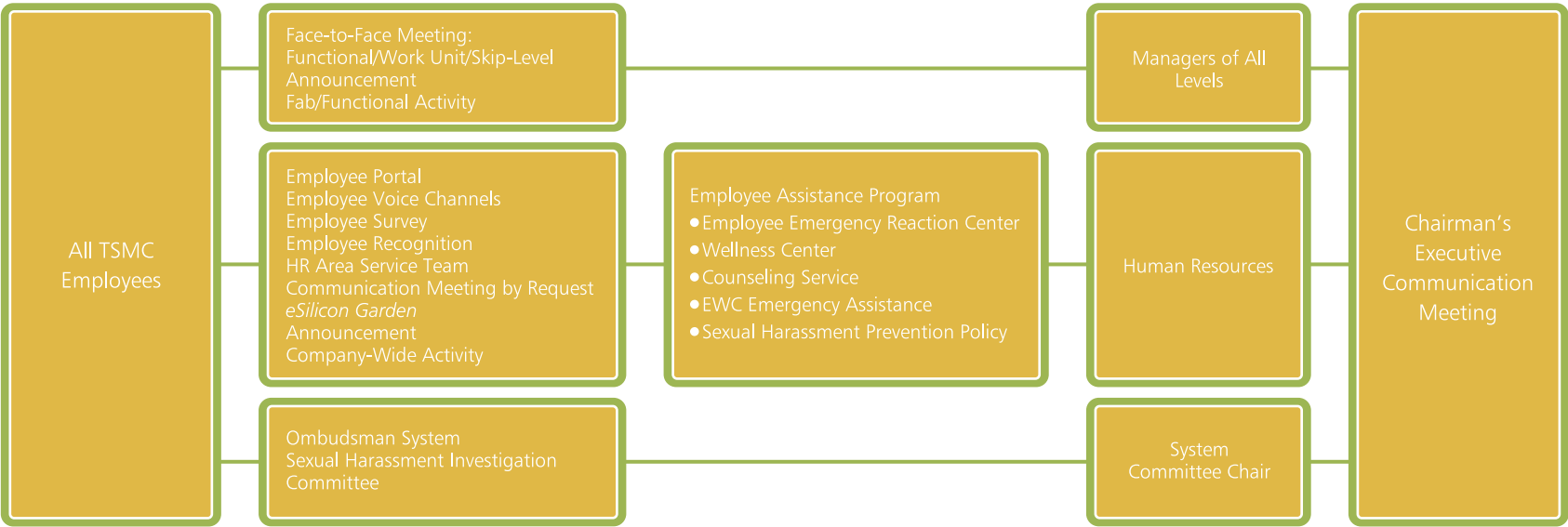
Our employees can honestly and promptly voice their opinions and suggestions via above-mentioned channels, and related owners are responsible to reply and take actions. For instance, there is a voice channel dedicated to our technicians who comprised 40% of all employees. Their suggestions cover from daily convenience in our work environment to enhancement opportunities of work processes or systems. A total of over 10,000 questions and suggestions were issued and solved in 2012. In addition, we extended the effectiveness of this channel by connecting it to our Suggestion System for quality improvement. In 2012, a total of 160 enhancement actions were taken and brought the Company benefit over NT\$100 million.

The labor-management meetings are held every quarter to ensure that employees' opinions and voices are heard, and their issues are addressed and solved. The relationship between the Company and our employees has been harmonious over the years. Hence, though employees possess the right to establish a labor union, so far, no employees have issued a request to form a union.

The Company also sets and promotes policies and measures and provides related training to ensure gender equity in accordance with employment laws and sexual harassment prevention policies to foster a fair work environment for employees of both genders.

All in all, the comprehensive communication channels provided by TSMC are showcased in the following chart:

Internal Communication Structure



5.3.3 Recognizing Employees' Dedication, Fostering a Warm Work Environment

TSMC sponsors various award programs to recognize employees' outstanding achievements, both as a team or on the individual level. Through these award programs, TSMC aims to encourage sustainable development of employees that in turn adds to the Company's competitive edge.

In addition to day-to-day recognition of the employees' contribution from managers, various award programs sponsored by TSMC include:

- TSMC Medal of Honor, presented exclusively by the Chairman for those who contribute significantly to the Company's business performance.
- TSMC Academy Election to recognize outstanding TSMC

scientists and engineers whose individual technical capabilities contribute greatly to the Company.

- Outstanding Engineer Award for each Fab, and Total Quality Excellence Conference Award to recognize employees' continuous efforts in creating value for the Company.
- Service Award and Retirement Appreciation to deliver our gratitude to senior employees' devotion and commitment to the Company.
- Excellent Instructor Award praises the outstanding performance and contribution of the Company's internal instructors in training courses.

It is our unceasing endeavor to recognize our employees' outstanding performances through prestigious external awards; in 2012, TSMC employees continued to be

recognized through a host of national awards, including Top 10 National Outstanding Managers Award, Outstanding Engineer Award, Outstanding Young Engineer Award, and the first National Industrial Innovation Award.

Continuing our efforts in fostering a warm work environment that values open appreciation, we rolled out the global campaign of "TSMC Smile Week" for the second year in 2012. The campaign encompassed the theme of "Smile, easy and touching" and featured sub-programs including "smile balloons," as well as "smile and share your coffee" in TSMC Fabs across Taiwan, as well as in our regional offices worldwide. The campaign attracted the participation of over 11,000 employees, expanding our influence to the global scope.

## 5.4 Employees' Physical and Mental Wellbeing

Employees' physical and mental well-being is the cornerstone of productivity. The Company works proactively to build a healthy work environment via health promotion activities, assistance programs, and multi-dimensional practices.

### 5.4.1 A Multi-Dimensional Caring System – Safeguarding Employees' Health

The TSMC Wellness center at each Fab operates 24 hours a day and employs nurse specialists and contract doctors above the number required by law to ensure our employees receive appropriate care. The multi-dimensional services and their usage are as below.

TSMC offers on-site health examinations as well as specialized examinations to help employees who work on general and special tasks to manage their health status every year. The examination items and frequencies are both above regulatory requirements. The examination items for employees working in general tasks include complete blood count, liver (SGPT, AFP) & renal function (BUN, Creatinine, Uric acid), blood lipid (Total cholesterol, Low-density lipoprotein, Triglycerides), and chest X-ray. The participation rates of the last three years are all above 96%, showing that employees consider the health examination a useful way to manage their health.

Every citizen in Taiwan receives medical coverage through National Health Insurance. Beyond this, the Company proactively follows up our employees' health examinations result based on hyperlipidemia, hepatitis B & C, metabolic syndrome and other health issues. We continue to develop our employees' self-management capabilities in personal

health. The Company actively follows up and conducts related promotions based on the examination results for our overseas employees as well.

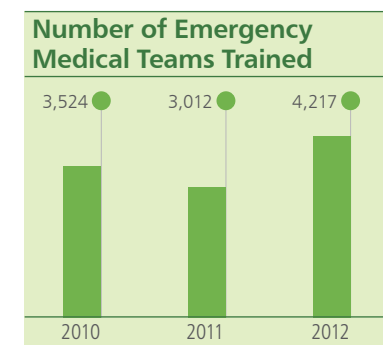
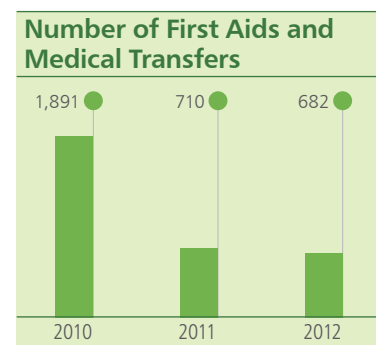
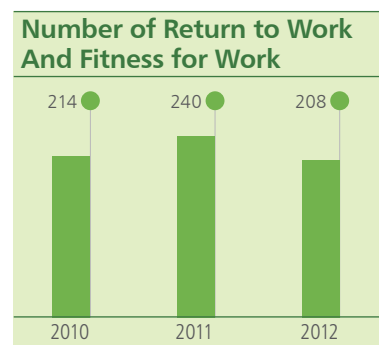
### 5.4.2 Promoting a Healthy Lifestyle

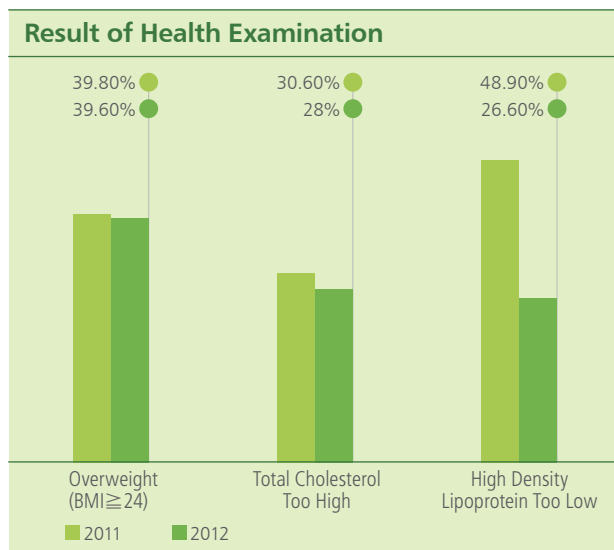
TSMC Wellness Center organizes various programs to promote a healthier lifestyle and uses "Health Age" as the key index to evaluate our health service performance. The analysis showed that our health age is 2.3 years younger than the real age in 2012, and the difference is higher than the previous year, indicating the positive progress of our health promotion activities.

### 2011 – 2012 Health Age

	Real Age	Health Age	Difference
2011	33.45	32.09	-1.36
2012	34.45	32.32	-2.13

We analyze the health issues which concern our employees the most and the popularization rates gained by health examination results. According to these result, we build an organizational culture which puts emphasis on health and build up a supporting environment to encourage and reinforce healthy behavior by our employees.





Furthermore, in 2012, we launched the “Healthy Life Declaration” campaign and our first “Infuse Lohas into Your Life” campaign to encourage our employees to conduct a healthier lifestyle. We integrated internal and external courses, and our managers led by example. The program got positive feedback from all employees as well as media. A total of 2,048 employees used the “e-health booklet” to manage their health status and over 5,500 employees participated in walking, climbing stairs and healthy diet. These programs will continue to be the key events for promoting healthier lifestyle in the coming year as well.

Other health promotion activities include aerobics camp, women’s health care, acupressure massage service, liver disease prevention, blood donation, flu vaccination, as well as lectures on physical and mental health. The total number of participants reached 19,702 in 2012.

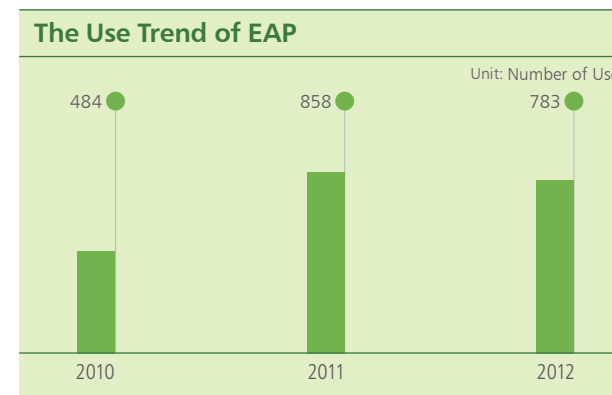
Among these activities, the “Weight Control Program” obtained the most outstanding results, earning three national awards from the Bureau of Health Promotion, Department of Health, and was reported in *GlobalViews Monthly* and *Harvard Business Review*.

To encourage a culture of regular exercise, the Company regularly holds intramural sports competitions. In 2012, TSMC held 658 games, including basketball, table tennis, badminton, billiards, and swimming, and more than 27,000 participants attended.

Moreover, the Company provides sports centers, swimming pool and fitness centers with over 75 sessions of fitness courses, such as aerobics, yoga and cycling. In 2012, around 10,000 employees and their family members enjoyed these activities per month.



TSMC provides comprehensive facilities and holds activities to encourage a culture of regular exercise. (The picture shows the swimming competition in the TSMC sports centers.)



### 5.4.3 Employee Assistance Program

The Company organizes diversified employee assistance programs to enhance our employees’ physical and psychological health through a well-developed service network of systems, work, life and health. The Company has cooperated with the Hsinchu Lifeline since 2001. We work together to provide professional consultations which cover issues of family, relationship, marriage. Consultations on other issues including legal and financial matters were also provided in 2012. Moreover, we organized speakers and provided on-line platforms to encourage employee to make use of the services when they need.

The usage trend for these services in recent years indicates that we have created an atmosphere where our employees are willing to ask for help when they need it, and care for the people around them. In addition, we also established employee assistance teams to provide a mechanism to help employees in need.

## 5.5 Safety and Health

One of TSMC Chairman Dr. Morris Chang's 10 principles of corporate social responsibility is to not only provide good job opportunities, but also to provide good remuneration and work environments. TSMC revised its safety and health policy in 2010 and set zero accidents as a new safety and health goal. To meet this goal, TSMC practices strict safety and health management procedures, maintains stringent standards for facility and hardware operations, and promotes continuous improvement programs. Based on this principle, TSMC seeks to improve the safety and health management performance of the semiconductor industry and supply chain through active social engagement.

### Selection of Material Safety and Health Topics

TSMC has a long record of assisting the government in establishing regulations and promoting health and safety projects, and pays close attention to the views of academia, media, customers, and employees concerning occupational safety and health to understand the topics of greatest concern our stakeholders. We have concluded that the most material occupational safety and health topics are occupational safety and health management, emergency response and corporate infectious disease prevention, which are issues that TSMC has addressed for a long time. Workplace stress and employee health have recently become new topics of concern for the government, society, employers, and employees, and an area that requires further attention. Detailed measures are as follows.

#### 5.5.1 Safety and Health Management

TSMC believes that good safety and health management is an important part of the company's commitment to take care of employees and their families, and a way of giving back to society and the community. In practice, TSMC's safety and health management is based on the framework of the OHSAS 18001 management system, and

uses information technology to continually improve our goals of preventing accidents, improving employee safety and health, and protecting company assets. All TSMC fabs passed the 2007 version of OHSAS 18001 certification, and all fabs in Taiwan are also TOSHMS (Taiwan Occupational Safety and Health Management System) certified.

TSMC's current safety and health management operations can be divided into several dimensions as below:

#### Hardware Safety and Health Management

The effectiveness of a facility's hardware safety and health performance is largely determined in the design phase. TSMC follows local regulations, international codes, and internal standards when planning, designing, and building new facilities or rebuilding existing facilities for production, IT, general services, or other purposes. A designated team takes responsibility for safety and health management using the procedures below:

##### •New Tool and Chemical ESH Management Procedure

TSMC's New Tool and Chemical Committee (NTCC) ensures that all new tools and chemicals meet international codes such as SEMI-S2 as well as local regulations and TSMC standards. In order to reduce risks before operation, the committee not only reviews tool safety, but also evaluates the related safety issues of location, accessory equipment, safety interlock, and facility system connections. To comprehensively evaluate the safety of new tools and chemicals, the NTCC includes experts in a broad variety of fields, including process, equipment, facility and safety specialists.

##### •Safety Management of Change (SMOC)

All new TSMC fab designs, as well as changes in design or operation procedure in existing TSMC fabs that could alter safety or fire prevention conditions, are required to follow

SMOC procedure. SMOC cases undergo strict review by facilities, equipment, ISEP, and ESHP departments before implementation. TSMC completed 1,692 SMOC reviews in 2012.

##### •New Equipment Safety Sign-off Procedure

All production-related tools and new facility systems must follow a three-phase safety sign-off procedure before operation.

Phase 1: The tool sponsor must confirm interfaces between facility systems and the new tool are under safe conditions before turning on non-HPM (Hazardous Production Materials) related utilities.

Phase 2: The tool sponsor must verify hazardous gases and chemical supply systems, fire protection, toxic gas monitoring, tool safety interlocks, laser and radiation protection, the tool's local gas or chemical delivery system, and exhaust abatement before turning on the tool.

Phase 3: The tool sponsor must remedy any shortcomings found in phase 1 and phase 2, execute IR scans for electrical utilities, and put all safety requirements into the new tool's regular maintenance procedures.

##### •Used Tool Safety Control

In addition to new tool safety controls, TSMC has also set up a procedure for secondhand tool safety management. All used tools purchased by TSMC are required to go through this safety control procedure, which uses tool configuration inspection data and a safety interlock verification checklist to confirm that tool settings and safety interlocks are functioning correctly. After these basic checks, the tool must also go through tool installation safety signoff procedures to ensure it is safe for use after release.

## Operation Safety and Health Control

In TSMC's daily operations, we not only prevent accidents through strict controls on high-risk work, contractor management, chemical safety controls, and routine audits, but also maintain emergency response plans and hold regular drills to minimize the impact of potential accidents on the environment, society, employees and property.

### •High-risk Work Control

TSMC's high-risk work management procedure classifies any work that may cause serious injuries, casualties or major property damage as level-1 high-risk operations and assigns such work for priority management. Please refer to "6.2 Managing Contractors' ESH" for details.

### •High-risk Area Control

TSMC has defined fab high-risk areas and developed related management procedures to prevent accidents.

## Safety and Health Committee

Each TSMC fab has a safety and health committee chaired by the fab director, which meets each month to discuss ESH-related matters. Labor representatives, chosen by employees in accordance with the law, account for more than one-third of all the committee members, providing a forum for managers and employees to discuss safety issues face-to-face. In addition, in response to the increasing scale of our new fabs, we have set up departmental-level safety and health committees chaired by department managers to discuss safety and health-related matters within the department each month to implement safety and health management.

## Safety Management Programs in 2012

- Enhanced new tool/new chemical and used tool safety review: Established an Equipment and Material Safety Project unit to implement early stage review management.
- Enhanced Safety Management of Change system: added "environmental protection" check item to improve effectiveness.
- Introduced facility safety assessment procedures for high-risk work to prevent accidents.
- Enhancement of the safety management procedure for secondhand tools through integration of move-in safety check and test procedures.
- Established preventive maintenance safety guidelines for point-of-use air abatement equipment to ensure personnel safety.
- Revised Environmental, Safety and Health procedures to enhance safety management and training procedures.
- Improvement of contractor safety management: improved contractor work safety and discipline.

## Safety and Health Management External Experience Sharing

TSMC's ESH team dedicates itself to minimizing risks to TSMC, and shares its rich management experience with the semiconductor industry, suppliers and society.

- Supply Chain:** TSMC reduces accidents and improves contractor ESH management through audit and assistance programs. Our close cooperation with companies in our supply chain over the past several years has begun to yield results as some suppliers have started to embed ESH management models into their own systems, providing additional protection to laborers.
- High-tech Industries:** We believe safety and health are universal values in society. TSMC openly shares its safety

and health experience through the Safety and Health Committee of the Allied Association for Science Park Industries.

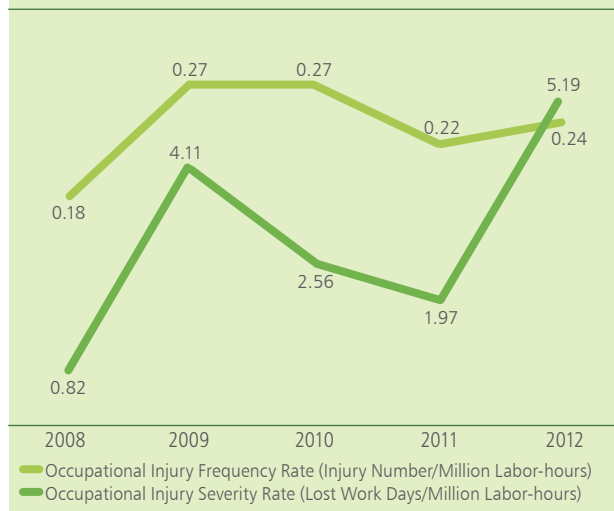
## Occupational Injury and Illness Statistics

TSMC uses the Disabling Injury Frequency Rate (FR, cases of disabling injuries and illness per million labor-hours) and Severity Rate (SR, lost workdays caused by disabling injuries and illness per million labor-hours) defined by Taiwan's Council of Labor Affairs (CLA) to evaluate the effectiveness of the Company's occupational health and safety programs. Taiwan's FR and SR are five times that of the ILO's (International Labor Organization) definition of disabling injuries and illness per two hundred thousand labor-hours. TSMC's FR and SR have consistently been significantly lower than Taiwan's semiconductor industry average.

TSMC endeavors to maintain a safety culture that ensures a safe and healthy workplace. The causes of all occupational injuries are analyzed and improvement programs are implemented based on the data. Our program further requires us to regularly collect and analyze data on types of high-frequency occupational injuries and departments with higher incident rates. These reviews focus as a first priority on incidents that are relatively serious, affect multiple departments, or happen more frequently.

The FR and SR of TSMC fabs in Taiwan were 0.24 (men: 0.11 and women: 0.41) and 5.19 (men: 5.69 and women: 4.51) respectively in 2012 – much lower than the Taiwan semiconductor industry average FR of 0.51 and SR of 8 in 2012. However, the 2012 SR rose from the previous year mainly due to more accidental falls, most stemming from unsafe behavior. TSMC has strengthened employees' safety awareness to prevent further occupational accidents.

### Occupational Injury and Illness Statistics of TSMC Fabs in Taiwan



#### 5.5.2 Emergency Response – Reduce the Impact of Accidents

The first priority of TSMC's disaster response policy is to ensure the safety of personnel and neighboring residents, followed by avoiding pollution of the environment, and finally to reduce property losses and maintain normal production. We believe that when natural disasters or accidents occur, proper treatment in the incipient stage of the event not only minimizes the probability of personnel injury and environmental pollution, but also significantly reduces losses and lowers the difficulty of resuming production. TSMC therefore pays considerable attention to emergency response. From emergency equipment setup, creation of emergency procedures, training, drills, and other preparations, TSMC follows the process of "planning, implementation, evaluation and improvement".

In 2012, to ensure the quality of annual emergency response drills, TSMC drew on past experience to compile a standard exercise to serve as a reference for units with different equipment and facilities to hold drills for earthquakes, fires, gas leaks, chemical spills, power dips, and other accidents. These standard exercises help each facility put key response procedures in place. Fab 14 enhanced unannounced drills to check employees' emergency response skills and familiarity with procedures. In addition, we also completed a business continuity drill and training program, which can effectively reduce the impact accidents may have on operations.

#### Permanent Emergency Response Center, Hardware Standardization

All TSMC fabs maintain an emergency response center, or ERC. Two full-time ERC staff are on duty around the clock. If any accident or abnormal event occurs, ERC staff on duty will be informed immediately through monitoring systems. An emergency response team will be promptly and effectively assembled by staff on duty to handle the event. The following systems are equipped at each ERC:

- Rescue procedures and information: includes plant layout, tool maps, and emergency response flowcharts;
- Fire, Safety, and Monitoring Systems: includes fire and gas monitoring systems, emergency ventilation systems, CCTV systems, gas and chemicals shutdown emergency off (EMO), and paging systems;
- Emergency response equipment: includes various types of protective clothing, personal protective equipment, self-contained breathing apparatus, portable detectors, and leak handling equipment. In addition, each factory has designated a second ERC outside of the fab equipped with appropriate emergency response equipment to continue emergency response if the ERC is affected by disasters, and to facilitate the rapid establishment of a command

post. Monitoring systems in the first ERC can be accessed through wireless networks while ERC on-duty staff evacuate to the second ERC.

#### Standardization of Emergency Response Procedure and Enhancement of Personnel Training

TSMC has detailed emergency response organizations, handling procedures, and business continuity plans for a variety of unexpected situations such as earthquakes, fires, chemical spills, toxic gas leaks, natural disasters and sudden interruption of utilities. Each fab also designates emergency response commanders and team duty officers each day to respond with unexpected situations at any time.

Emergency response team members are trained in communications, disaster relief operation, factory systems, on-site control, rescue, and logistic support. Types of training include the following:

- ERT training: includes basic and advanced ERT training, and incident commander training;
- Fire-fighting training: Professional fire fighting skill training at the Hsinchu Fire Bureau training base;
- Annual full evacuation drill: Chiefly focused on responding to an earthquake of intensity 5 or higher;
- Quarterly ERT drill: A quarterly drill is requested for each production-related department to build familiarity with emergency response skills, equipment and factory surroundings.

#### Collaboration with Public Emergency Response Resources and Drills with Contractors

Each TSMC factory performs annual emergency response and evacuation drills for different situations to train TSMC employees as well as contractors and vendors. We invite



**Talent is our most important asset.**

the regional fire brigade to join the drill, or experts to be our advisors, according to the size and type of drill. Participants include employees and contractors to enhance collaboration in real accidents and rapidly establish control over the disaster. These measures are compliant with international occupational health and safety management systems, which state that the organization's safety activities should be extended to employees, contractors and nearby stakeholders. Areas and situations covered by drills include clean room, facility, mechanical rooms, lab, kitchen, dormitory and shuttle bus.

In 2012, TSMC's U.S. subsidiary WaferTech sponsored a two-hour familiarization tour with the new Camas Fire Department Chief and Fire Marshal, showing them WaferTech's capabilities and discussing how each can mutually assist each other in the event of an emergency. These face-to-face meetings help to solidify cooperation at a high level so that WaferTech's Emergency Response Team

(ERT) and public responders can work effectively together. Additionally, WaferTech conducted its first-ever response exercise for a major earthquake, which included an evacuation, ERT response, mass casualty drill and building evaluations.

### **5.5.3 Moving Beyond Traditional Occupational Health Practices to Promote Physical and Mental Health**

#### **New Occupational Health Management Programs in the Semiconductor Industry**

Taking Care of Employees' Physical and Mental Health is a Corporate Responsibility. TSMC believes that taking care of employees' physical and mental health is fundamental to maintaining normal business operations and also part of a corporation's social responsibility.

#### **•Stress-Resilient Traits Assessment Program**

Job stress and workers' health have recently become

new topics of concern for the government, society, employers, and employees as areas that require further attention and occupational health efforts. Since 2011, the government has been advocating amendment of the Labor Safety and Health Act to incorporate the idea of the employer's responsibility to protect the mental health of workers. TSMC has prioritized workers' stress as one of the Company's major occupational health subjects. Since 2011, TSMC has collaborated with academics on a long term project to enhance this research. The short to mid term (2011 to 2015) plans for this project are to understand stress-resilient traits and make use of the existing Employee Assistance Program (EAP) to assist specific cases. The mid to long term (2016 to 2020) plans emphasize promotion of mental health to all employees to improve their physical and mental wellness. See Chapter 5.4.3 for more on our EAP services.

● **Building Workers' Resilience and Ability to Cope with Stress**

Employees' mental health problems may impact their performance, their physical health, and the safety of other employees. TSMC believes that physically and mentally healthier workers have better work performance and contribute to the company's success. TSMC provides free individual counseling services and holds workshops and lectures on workplace mental health issues to improve employee health and wellbeing. See Chapter 5.4.3 for more on our mental health promotion activities.

● **Reducing Ergonomic Risk in Clean Rooms**

TSMC requires that all new tools meet SEMI-S8 requirements and that appropriate supplementary control measures be taken to reduce ergonomic risk. As the semiconductor industry transitioned to 300mm (12-inch) wafers from 200mm (8-inch) wafers, TSMC's initiative to automate 300mm front-opening unified pod (FOUP) transportation improved productivity and also prevented accumulative damage caused by long-term manual handling of 300mm FOUPs.

● **U.S. Subsidiary WaferTech Ergonomic Injury Reduction**

WaferTech has worked continuously to improve the ergonomics of its operations. For the last three years, the onsite physical therapy program called "The Body Shop" has served over 400 employees. The therapist has expert knowledge of the site and clearly understands the work that employees perform. He has developed specific stretching equipment the employees can utilize to decrease work and non-work related aches and pains. As a result, soft-tissue related injuries have decreased over 34% since the program's inception. In addition, it has significantly decreased the number of days employees are away from their job or otherwise restricted from fulfilling their duties.

**Corporate New Infectious Disease Prevention Program**

● **Taking Care of Employees' Physical and Mental Health is a Corporate Responsibility**

In response to increasing human infections with novel influenza viruses, TSMC Corporate ESH has always been monitoring emerging infectious diseases around the world, assessing potential impact on TSMC workplaces, and providing strategic preparedness and response plans.

● **TSMC Novel Influenza Response & Prevention Plan**

The "TSMC Novel Influenza Response & Prevention Plan" is based on our experience in the SARS epidemic in 2003 and H1N1 influenza epidemic in 2009. We refer to the plans and suggestions from the World Health Organization, U.S. Centers for Disease Control (CDC), Taiwan CDC, Singapore CDC, epidemiologists, and medical doctors.

If a major outbreak of novel influenza occurs, TSMC's Senior VP of Materials Management and Risk Management will convene a disease prevention committee and hold regular response and prevention meetings. The committee is in charge of monitoring global epidemics of the novel influenza and coordinating preparation and response actions. Actions include promoting of personnel hygiene, stockpiling of disease prevention materials, enhancing kitchen sanitation, controlling business-travel, managing sick-leave, notification and medical assistance for infected cases, trigger mask wearing and hand washing procedure, controlling supplier/contractor and visitor meeting or visit, measuring body temperature, triggering work-at-home plans, enhancing work environment disinfection, reducing internal face-to-face meeting frequency, strengthening medical waste treatment, etc. Once confirmed novel influenza cases reported in Taiwan, TSMC will follow our procedures to mitigate the risk of employee infection and operation interruption.

● **Collaboration with Subsidiaries and Suppliers on Novel Influenza Prevention**

To reduce the impact of H1N1 on overseas subsidiaries such as TSMC China, WaferTech, and TSMC North America, TSMC also convened overseas coordinators to immediately initiate prevention procedures and announce appropriate responses based on changes in the pandemic. TSMC also requires its suppliers to set disease prevention policies and establish contingency plans for major labor shortages in response to pandemic outbreak.

● **Continuous Monitoring of Seasonal Influenza Threat**

Seasonal influenza (such as H1N1, H3N2, type A or type B flu) and other infectious diseases (e.g. tuberculosis, typhoid fever) may become a high risk of infection for employees. TSMC has always been preventing infections and controlling epidemics for a variety of infectious diseases at the workplace by enhancing employees' knowledge of flu epidemic prevention, improving personnel hygiene and hygiene behavior, and also encouraging employees to share the knowledge to their families and practice at home.

**Promoting Workers' Health**

● **Special Health Examinations**

TSMC offers regular health examinations for employees and special health examinations for employees managing tasks such as ionizing radiation, solvent operations, or operations with average daily sound pressure level above 85 decibels for 8 working hours. Workers with higher risk of adverse health outcomes are subject to grade 1 or 2 health control by the TSMC Wellness Center. TSMC provides health examination records and workplace hazard monitoring information to occupational physicians for causal assessment. In 2012, health examinations found no reports of abnormal findings caused by occupational exposure. (See Chapter 5.4.1 for more information on TSMC's health care system.)

#### 5.5.4 Strengthening Industry-University Partnership in Improving Workers' Health

##### TSMC and National Taiwan University Collaborate to Advance Occupational Health Management

In 2012, TSMC strengthened its cooperation with academia to enhance our capabilities in occupational health management. TSMC and the National Taiwan University (NTU) College of Public Health signed a memorandum of understanding (MOU) to collaborate on occupational health enhancement. This MOU marks an important step in long-term industry-university cooperation in the field of occupational health.

Under this MOU, TSMC collaborates with NTU to develop occupational management tools tailored for TSMC, including the promotion of personnel stress management programs and the measurement of radio frequency (RF) exposure to wireless network antennas and mobile phones in the office. Moreover, TSMC and NTU held the 2012 Workplace Health Improvement Forum to not only share



TSMC and the National Taiwan University (NTU) College of Public Health signed a memorandum of understanding (MOU) to collaborate on occupational health enhancement



knowledge on occupational health management, but also put that knowledge to use in industry.

##### Hosting a Collaborative Forum Between TSMC and National Taiwan University College of Public Health the second Forum on Workers' Health

TSMC collaborated once again with the National Taiwan University (NTU) College of Public Health to host the second Forum on Workers' Health on October 12, 2012, inviting representatives from government, industry, and academia to join an in-depth discussion on improving occupational health. The purpose of this forum is to improve the level of occupational health management across many industries. Initially (2011 to 2012), it is focused on speeches from government, industry, and scholars, and held in northern Taiwan. In the mid and long term (starting from 2013) the forum will introduce added interactions between government, industry, and academia, and will also be also in central and southern Taiwan. In addition, the forum will invite more industries to share their experiences.

TSMC initiated the first forum in 2011, receiving an enthusiastic response from the Council of Labor Affairs and other participants to the forum's efforts in improving employee health and building a happy work environment. The forum has become an important platform for dialog. The theme of this year's forum was "New Labor Health Policies and Prevention of Occupational Illness" as well

as "Promoting Work/Life Balance," focusing industry and academic attention on a timely issue of public concern in the fields of human resources and employee health and safety. It was attended by nearly 300 managers, experts, scholars, and professionals from government agencies, universities, and business.

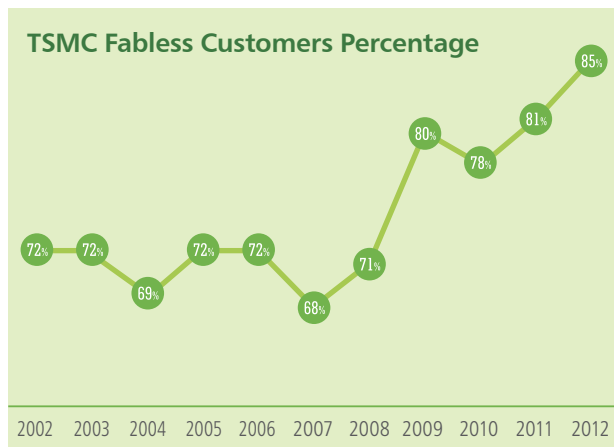
TSMC believes that employees are a company's most important assets, and promoting the physical and mental health of workers as well as creating a happy workforce is a company's responsibility. TSMC has worked over the long term to build a friendly workplace, protect its employees' safety and health, promote gender equality, and raise worker effectiveness. At the same time, TSMC's employees have also shown their dedication to the company, and improved TSMC's competitiveness by doing so. This mutual support truly exemplifies TSMC's core value of "commitment". By creating an opportunity for experience sharing and dialogue between industry, government, and scholars, TSMC aims to improve our health management and provide a healthier working environmental for all workers.



The second Forum on Workers' Health was attended by nearly 300 managers, experts, scholars, and professionals from government agencies, universities, and business.

## 6. Customer Service and Supplier Management

Customer trust has always been one of TSMC's core values. At TSMC, customers come first. Their success is our success, and we value their ability to compete as we value our own. TSMC has a lengthy track record of advancing our technology and expanding our capacity in order to fulfill customers' needs. Based on the trust of our customers, TSMC has also helped to refocus many customers' priorities from maintaining their own fabs to concentrating on design. We strive to build deep and enduring relationships with our customers, who trust and rely on us to be part of their success over the long term. (Customer Testimony Video ▶)



Note: The growth of fabless customers is due to their trust to TSMC.



TSMC has always treated suppliers as partners, and works together with them over the long term to build a stable and sustainable semiconductor supply chain. In addition to taking into account supply chain product quality, delivery, and cost, TSMC also works with our suppliers to protect the environment. We pay attention to the human rights, safety and health issues of our suppliers as well as business continuity and risk management, so that we can fulfill our corporate social responsibilities together. In 2012, TSMC was recognized by the Dow Jones Sustainability Indexes (DJSI) as the semiconductor sector leader for the second year since 2010. TSMC also achieved the highest score in the semiconductor sector in categories including Supply Chain Management, Risk and Crisis Management, Environmental Policy/Management System, Water-Related Risk, Labor Practice Indicators and Human Rights.

TSMC has moved to localize raw materials, facility, production equipment and spare parts in recent years. In addition to reducing carbon generation, reducing transportation cost, TSMC also hopes to enhance supply chain agility and ensure service to customers. For raw materials, TSMC's sourcing percentage from local Taiwan suppliers gradually increased to 36% in 2012.

To create a win-win situation for TSMC and suppliers, TSMC will continue supporting local companies and encourage localization by foreign suppliers. TSMC has set localization targets for purchases of each category for the next several years to drive for even lower production cost and supply risk as well as greater competitive advantage and supply chain sustainability.

## **6.1. Customer Service and Satisfaction**

### **6.1.1 Customer Service**

TSMC is committed to providing the best service to our customers and believes that customer service is critical to enhancing customer loyalty. In turn, customer loyalty leads to higher levels of customer retention and to expansion of business relationships. TSMC's goal is to maintain its position as the most advanced and largest provider of semiconductor manufacturing technologies and foundry services. TSMC believes that achieving this goal will help retain existing customers, attract new customers, and further strengthen customer trust.

To shorten time-to-market and speed up design enablement for customers, TSMC has built a brand-new ecosystem called the Open Innovation Platform. It integrates suppliers with the semiconductor design community, TSMC ecosystem partners, and with IP & Library vendors for design implementation and design for manufacturing (DFM) capabilities.

### **6.1.2 Customer Satisfaction**

TSMC regularly conducts surveys and reviews to ensure that customers' needs and wants are adequately understood and addressed. Continual improvement plans supplemented by customer feedback are an integral part of our business processes. The channels we use include an annual customer satisfaction survey, quarterly business reviews, and customer audits.

TSMC's Annual Customer Satisfaction Survey is carried out by an independent third party consulting firm. Our goals are to understand customers' specific needs and expectations from TSMC, and to obtain formal and direct feedback from our customers to measure TSMC's performance and identify

TSMC's weaknesses for development of improvement strategies.

The findings and analysis of customers' feedback are presented to TSMC's board members and executive team. Appropriate details are shared with relevant teams in TSMC. In addition, the Chairman assigns a management team to draw up corresponding improvement actions and policies, which are executed by all the related functional teams and monitored closely.

## **6.2 Supplier Management**

### **6.2.1 Ensuring Supply Chain Sustainability**

#### **Green Procurement: Developing Suppliers' Green Standards**

TSMC is committed to building a "green supply chain," attending to global environmental issues, and exerting its influence to encourage supply chain partners to follow. Our assessment of suppliers' green performance includes:

- **Energy saving and carbon reduction management:** suppliers are required to collect carbon inventory data in their manufacturing plants, develop a product-based carbon footprint, and provide carbon reduction performance data.
- **Water resources and water management:** suppliers are required to collect water inventory data in their manufacturing plants to establish a water footprint, and to provide a specific water resource management plan.
- **Green products and hazardous substances control specification:** in response to global hazardous substance controls and eco-friendly product specifications, we ask suppliers to comply with PFOS/PFOA/Conflict Minerals/RoHS/REACH and other global chemical control standards.

### Energy Saving and Carbon Reduction

Suppliers are required to conduct carbon inventory, provide carbon reduction data and develop product-carbon footprint.



### EMS and Environmental Objectives

Suppliers must have

**ISO 14001**  
**RC 14001**

or other relevant certification

### Water Resources Conservation

Suppliers are required to conduct water inventory, and to provide a specific water resource management plan.



### Other Environmental Protection Standards

This includes green procurement, green building designs, promotion of environmental education.



### Green Products and Hazardous Substances Control Specification

In response to global hazardous substance controls and eco-friendly product specifications, TSMC collaborates with suppliers to comply with **PFOS/PFOA/**

**Conflict Mineral Management/ RoHS/ REACH** and other global chemical control standards.

### Waste Management

Suppliers need to continuously improve waste reduction performance and raise recycling and reuse ratios.



### Tier-2 Suppliers' Green Supply Chain

Suppliers must work with their upstream suppliers on environmental protection, reduction of carbon emissions, and water conservation-related measures.



• **Waste management:** suppliers need to continuously improve waste reduction performance and raise recycling and reuse ratios in their manufacturing facilities.

• **Tier-2 suppliers' green supply chain:** suppliers must work with their upstream suppliers on environmental protection, reduction of carbon emissions, and water conservation-related measures.

• **Environmental management system and the establishment of environmental objectives:** suppliers must have ISO 14001, RC 14001, or other relevant environmental management system certification.

• **Other environmental protection standards:** this includes the use of green procurement, adoption of green building designs, promotion of environmental education and others.

### Requiring Raw Materials Suppliers to Eliminate Hazardous Substances

TSMC promotes "green procurement," and requires raw materials suppliers to provide a statement to ensure that their products do not contain internationally banned hazardous substances harmful to the environment, to ensure that products meet customer requirements such as the EU RoHS Directive. If significant deficiencies are found in supplier environmental audits, the supplier will be reviewed and asked to improve at a quarterly meeting chaired by a purchasing group manager.

### Green Requirement for Process Tool Vendors

TSMC requires equipment vendors to consider water, power, and material conservation when designing new generations of equipment, and also requires a long-term blueprint for carbon reduction and future environmental strategy. TSMC also verifies that the energy performance of each tool meets or exceeds conditions set in the procurement contract after tool installation is completed.

### Developing Supply Chain Standards in Fire Protection, Earthquake Response, Safety, Health, and Risk Management

TSMC views supply chain risk management as part of the company's competitive advantage. In a globalized world, any major natural disaster or accident can have an impact on TSMC. Therefore we pay close attention to any risk to our supply chain partners, and take the initiative to provide assistance when necessary. Our concerns include:

• **Business continuity plan:** TSMC requires our suppliers to establish their own business continuity plans for a variety of potential natural or man-made threats. Appropriate plans, procedures, actions and periodic drills are required to ensure continuous operations and reduce the impact of accidents on TSMC.

• **Geographical risk:** TSMC analyses the geographic location of manufacturers in our global supply chain using mapping tools. When a major accident or natural disaster occurs around the world, we can immediately begin business continuity plans and take the initiative to provide our supply business partners with the resources needed to resume production.

• **Earthquake risk management:** TSMC proactively helps companies that need assistance by teaching them how to strengthen their anti-earthquake engineering.

• **Climate change risk management:** Due to the increased risk of water shortage and flooding in recent years resulting from global climate change, we require our suppliers to prepare contingency plans, such as support from overseas production, to reduce the impact of such an event.

• **Fire risk management:** We believe that fires can be prevented, and share our own loss prevention and fire protection management experience with our suppliers.

- **General environmental, safety and health management:** TSMC requires major suppliers to obtain OHSAS 18001 certification or other health and safety management system certification.

- **New influenza pandemic response and prevention:** TSMC shares its experience in corporate pandemic response and prevention with our major suppliers.

- **Transportation risk:** Suppliers must manage the quality of their transportation or logistic service and vehicles, in particular, appropriate training and contingency plans are required in the transport of dangerous or hazardous chemicals.

- **Suppliers' supply chain risk management:** In addition to requiring suppliers to manage their supply chain risk, we also require suppliers to have the ability to review their suppliers' risk management and to enhance the reliability of the supply chain.

- **Interruption of information systems risk management:** Some suppliers are highly dependent on IT systems in their production. TSMC asks that they have mechanisms for remote backup of information systems. Computer server rooms are also required to have fire and earthquake protection to reduce the impact of accidents.

### Managing Contractors' ESH

TSMC endeavors to be a good corporate citizen and meet its social responsibilities. We believe in going beyond providing a safe workspace for employees to establish a higher ESH standard with our partners in all industries. TSMC is committed to communicating with suppliers and contractors on environmental, safety, and health issues and encouraging them to improve their ESH performance. TSMC treats contractors like our employees and works together with

them to adopt good safety protection, and leads members of our supply chain to reduce their environmental impact.

### Identifying High-risk Work for Priority Management

TSMC has established standards for high-risk work to strengthen contractor safety management. TSMC began adopting high-risk work management and self-management to govern work performed by contractors in 2005. TSMC's high-risk work management classifies work that may cause injuries, casualties or major property damage as level-1 high-risk operations. These include work in confined spaces, work with electrical shock risk, hot work, or disconnection of gas or chemical piping. Work that may result in system shutdowns or production interruptions are classified as level-2 high-risk operations. TSMC explicitly defines safety precautions and control procedures to be taken by personnel according to different operations.

### Contractor OHSAS 18001 Requirement and Worker Skill Certification

In terms of self-management, TSMC requires that contractors performing level-1 high-risk work must complete worker certification and establish their own OHSAS 18001 safety and health management system before they are eligible to bid on contracts. This self-management is aimed at increasing contractors' sense of ownership and responsibility with the goal of promoting safety awareness and technical improvement for all contractors in the industry. Workplace accidents have decreased by half since these requirements were implemented in 2005.

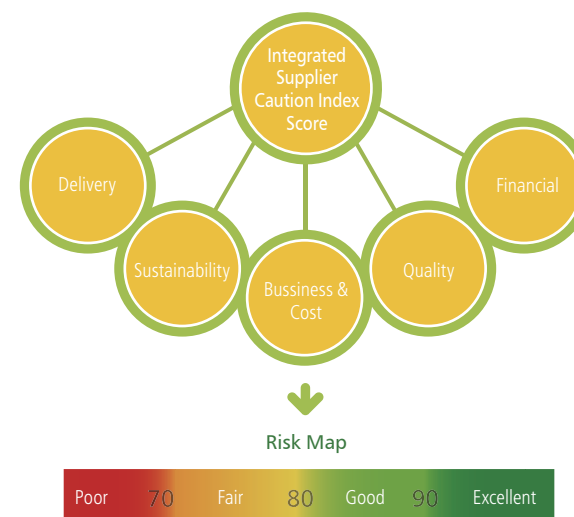
In addition to routine audits by third party certification agencies, TSMC has also conducted audits of OHSAS 18001-certified contractors since 2008. If an audit finds that a contractor is not qualified, the contractor's level-1 high-risk work qualification may be revoked.

TSMC believes that we can help the community and the environment by leading our contractors to reach higher standards of environmental, safety, and health protection and create a better workplace.

### Developing a Supply Chain Sustainability Risk Map

TSMC's efforts in sustainable supply chain management in the past several years have answered our customers increased concerns in this area. Despite the difficult and forward-looking nature of some of our measures, we are dedicated to continuing our efforts. In 2009, TSMC developed a Sustainability Evaluation Score to assess suppliers' supply chain risk and sustainability. We use this score, combined with delivery, quality, financial, operational, and other risks, to form a supply chain risk map. TSMC refers to these maps as an important basis for procurement strategy.

### Supply Chain Risk Management



### Supply Chain Risk Management Committee

TSMC has brought together fab operations, materials management, risk management, and quality system management in an internal committee dedicated to managing our supply chain. This committee is focused on risk mitigation and enhancing supply chain agility. The steering team directs annual goals and reviews progress each quarter. The committee's working team tracks the effectiveness of continuous improvement projects and assists suppliers to improve green procurement, environmental protection, regulatory compliance, certification acquisition, and industrial safety assurance. At the same time, we monitor changes in demand and supply through regular communication with suppliers or public information, monitor supply chain inventory, and draft backup plans. The working team periodically holds meetings to monitor progress. Furthermore, we actively address supply chain issues and manage potential supply chain risks.

### Management, audit and Assistance

#### •Quarterly Business Review

TSMC conducts quarterly meetings with our suppliers' senior managers to review performance, including quality, delivery and sustainability performance. We ensure suppliers comply with TSMC requirements through semi-annual or quarterly monitoring of key indicators through a scorecard and checklist.

#### •Certification for Management Systems

TSMC encourages its suppliers to be certificated for ISO 14001, OHSAS 18001 or other environmental and ESH management systems.

#### •Site Audit and Assistance

TSMC visits our suppliers and performs audits according to an annual plan. When special concerns arise from these audits, we work with suppliers to develop appropriate solutions and provide support to meet our expectations. These solutions are executed by specified sponsors with a clear goal and time frame.

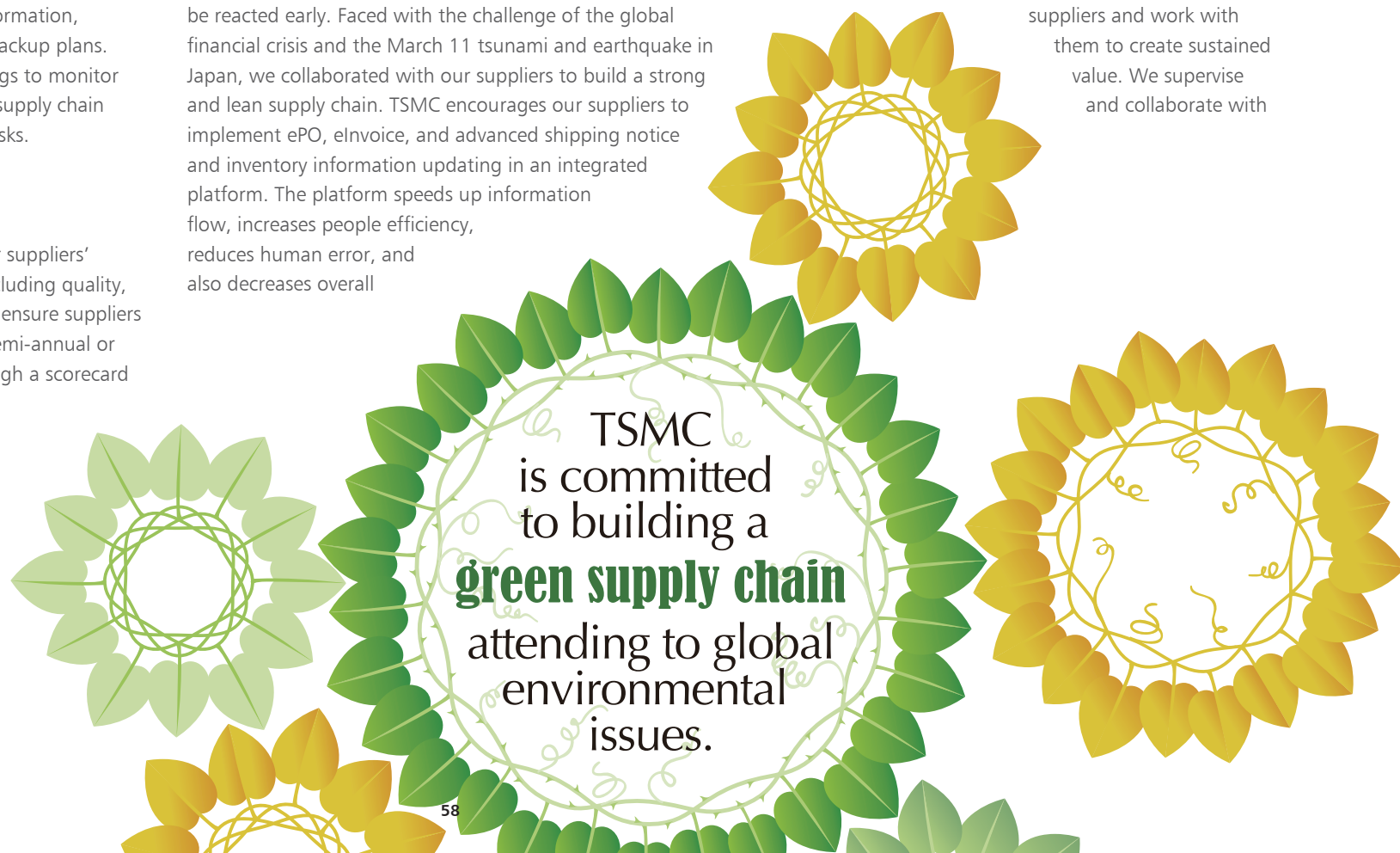
### Intelligent Information

TSMC has worked closely with raw material suppliers to build a business-to-business connection to exchange inventory information, so that in-bound supply chain inventories are transparent and demand fluctuations can be reacted early. Faced with the challenge of the global financial crisis and the March 11 tsunami and earthquake in Japan, we collaborated with our suppliers to build a strong and lean supply chain. TSMC encourages our suppliers to implement ePO, elnvoice, and advanced shipping notice and inventory information updating in an integrated platform. The platform speeds up information flow, increases people efficiency, reduces human error, and also decreases overall

supply chain cost. A total of 3,029 suppliers use TSMC's Supply online system for data exchange, covering 90% of total purchasing value. All these efforts mitigate the risk of supply interruption and prevent manufacturing of surplus materials.

### 6.2.2 Supply Chain Sustainability Management Achievements

In recent years, global consumers increasingly feel that corporations have a responsibility to supervise their suppliers. As a global leader in the semiconductor industry, TSMC has an ongoing commitment to improve the sustainability performance of suppliers and work with them to create sustained value. We supervise and collaborate with



our suppliers in a number of sustainability fields, including the Restriction of Hazardous Substances, climate risk management, earthquake risk response, fire prevention, occupational safety and health management, and business continuity plans. These efforts can reduce the risk of interruption to our supply chain, and are also part of our corporate social responsibility.

### **Supply Chain Sustainability and Risk Management Forum**

TSMC believes that by helping suppliers to develop sustainably, protect the environment, and improve their fire prevention as well as safety and health management standards, not only reduces the risk of supply chain disruptions, but also helps us to meet consumers' expectations and fulfill our corporate social responsibility. TSMC held a supply chain Sustainable Development and Risk Management Forum in 2012 to raise the standards of our supply chain through experience-sharing. In the 2012 forum, we invited waste disposal and recycling contractors to join the forum for the first time because we believe that disposing of waste materials is just as important as obtaining raw materials. Improper disposal of waste may not only cause pollution but also affect business risk and operations.

Therefore, TSMC has changed its waste management concept from the traditional concept of clean-up and disposal into integrated resource management, which is the responsibility of dedicated waste resource management units that approach waste as a valuable resource to recycle as much as possible. That is why TSMC collaborates with waste disposal and recycling vendors to jointly develop new waste recycling technology to enhance recovery and reduce the amount of waste sent to landfills.

### **Supply Chain Sustainability Management**

The establishment of a sustainable supply chain is a win-win strategy, which enhances the safety of our suppliers, their employees, and their property, and indirectly enhances the competitiveness of TSMC. The company will continue its efforts to reduce supply chain risk and contribute to customers, investors, and society.

TSMC focuses on supply chain sustainability management by setting ongoing targets and scoring suppliers on quality, cost, delivery, service and sustainability. TSMC periodically audits suppliers and encourages them to comply with TSMC purchasing strategies. In 2012, TSMC's survey of silicon wafer, gas, chemicals, quartz parts, masks, parts cleaning and other raw materials suppliers, as well as transport companies and logistics services suppliers, increased to 90 suppliers from 56 critical suppliers in 2011, covering more than 90% of our total raw material purchase value. TSMC also encourage suppliers who collaborate with TSMC to diversify risk factors. We welcome all qualified suppliers to join and strengthen the TSMC supply chain.

#### **•Supplier ESH Audit and Assistance**

Over the past year, TSMC continued to audit major suppliers through questionnaires or on-site audits. If major shortfalls in environmental protection, safety, or health are discovered, we require that senior management commit to improvement. For suppliers lacking resources for self-improvement, we organize experience-sharing seminars or perform on-site counseling to improve performance.

#### **•Supplier Quality Improvement and Auditing**

TSMC performs annual on-site audits of major and critical suppliers. If particular shortfalls are discovered we provide specific goals and clear timetables to meet TSMC's

expectations. To improve material quality and to strengthen statistic processing, TSMC held a Supplier Quality System seminar in 2012, and required all related suppliers to begin internal training for their employees to improve quality, in order to establish a more reliable and sustainable raw materials supply chain for TSMC.

### **Promoting Green Label Office Supplies**

TSMC encourages the use of office equipment and supplies with green labels, including computers and peripherals,

**95%**

TSMC's purchasing percentage of office supplies and equipment with eco-labels reached 95% in 2012.

recycled printer paper, recycled paper towels, and environmentally friendly cleaning supplies. The purchasing percentage of office supplies and equipment with eco-labels reached 95% in 2012, a 38% increase compared to 2011. If computer servers and network equipment for non-office areas are included, the purchasing

percentage of supplies and equipment with eco-labels is above 50%, reaching a purchasing value of more than NT\$2 billion.

### **Concern for Supply Chain Labor Standards**

Over the past several years, the Electronics Industry Citizenship Coalition (EICC) has continuously expressed concern for labor rights and working conditions. As a member of the electronics industry supply chain, TSMC has adopted EICC standards for protection of labor rights and taking care of the working conditions of employees, requiring its own supply chain manufacturers to comply with environmental, health and safety, labor rights and working conditions standards.

### Suppliers Responsibilities: sourcing conflict-free materials

TSMC is subject to the new U.S. SEC disclosure rule on conflict minerals released under Rule 13p-1 of the U.S. Securities Exchange Act of 1934. As a recognized global leader in the hi-tech supply-chain, we at TSMC acknowledge our corporate social responsibility to procure our minerals from conflict-free areas.

TSMC is one of the strongest supporters of the Electronic Industry Citizenship Coalition (EICC) and the Global e-Sustainability Initiative (GeSI), which will help our suppliers source conflict-free materials. TSMC in general supports the humanitarian and ethical principles contained in the OECD's Model Supply Chain Policy for a Responsible Global Supply Chain of Minerals from Conflict-Affected and High Risk Areas issued in 2011. We encourage our suppliers to source from facilities or smelters that have received a "conflict-free" designation by a recognized industry group (such as the EICC), and also required suppliers to disclose information on smelters and mines since 2011. We will continue to renew our supplier survey annually and require our suppliers to improve and expand their disclosure to fulfill regulatory and customer requirements.

### TSMC Supply Chain Management Forum and Excellent Supplier Award

TSMC held its 12th annual Supply Chain Management forum on Dec. 14, 2012, and the theme of the forum was "Innovate and Win Together". To show appreciation for the support and contributions of its suppliers during the past year, TSMC recognized and awarded 8 outstanding equipment and materials suppliers. Over 450 suppliers around the world in the fields of equipment, materials, packaging, testing, facilities, IT systems and services, export/import services, and environmental and waste management services participated in the forum.

"TSMC's mission is to be the trusted technology and capacity provider of the global logic IC industry for years to come, and our supplier partners play a key role in helping us fulfill this mission," said TSMC Chairman Dr. Morris Chang. "We believe that by joining with our supplier partners to find innovative new modes of collaboration, we will reap even greater rewards together as we continue to drive Moore's Law forward".

"TSMC is proud of its ability to rapidly ramp capacity in response to customer demand, and this year's drive to provide 28nm process is an excellent example of our commitment to customers," said Dr. Steve Tso, TSMC's Senior Vice President of Materials Management and Risk Management. "We are deeply grateful to the supplier partners that made this achievement possible, and we look forward to even greater success together in the future".

### Summary of Achievements of TSMC's Supply Chain Sustainability Management in 2012

Item	Goal	Result Summary
Green supply chain – product carbon footprint	Collaborate with 15 major suppliers to develop a product carbon footprint for 300mm (Fab 12) and 200mm (Fab 5) wafers and gain PAS2050 certification	Achieved
Green supply chain – product carbon footprint	Complete carbon inventory and carbon resource management survey for 56 major suppliers in Japan, the United States, and Taiwan to encourage energy saving and carbon reduction	Achieved
Green supply chain – water resource and water saving	Complete water management survey for 56 major suppliers in Japan, the United States, and Taiwan to encourage water saving	Achieved
Green supply chain – Product water footprint	Collaborate with 20 major suppliers to develop a product supply chain water footprint for 300mm fabs (Fab 12) based on "The Water Footprint Assessment Manual (2011), wafer Footprint Network, as well as obtain IC PCR for EPD (2009, ver. 01)" 3rd party certification before 2012	Achieved
Green supply chain – Product water footprint	Collaborate with 20 major suppliers to develop a product supply chain water footprint for 200mm fabs (Fab 3) based on "The Water Footprint Assessment Manual (2011), wafer Footprint Network, as well as obtain IC PCR for EPD (2009, ver. 01)" 3rd party certification before 2013	On-going
Green supply chain – PFOS hazardous substance management	Complete verification of replacements for products containing PFOS photoresist before the end of 2011	Achieved - PFOS has been completely phased out
Green supply chain – PFOA hazardous substance management	Complete verification of replacements for products containing PFOA photoresist before the end of 2012	Ongoing
EICC compliance on labor, environment protection, safety and health, human right and social standard	Verify that major suppliers are compliant with EICC standards	Confirmed through questionnaires, on-site audits, and quarterly business reviews that 56 major suppliers are in line with EICC requirements in labor, environmental protection, health and safety, human rights and social standards
Supply chain risk – business continuity plan	Confirm that 56 major suppliers maintain basic business continuity plans (as per the BS25999 standard and customer requests)	Achieved

## 7. Social Participation

Caring for the earth and future generations is an important and undisputable part of TSMC's corporate social responsibility. In 2012, in addition to continuing its existing plans and projects, TSMC has combined the company's resources with its employees' love and wisdom to work together and build a sustainable society, care for the earth, show compassion for the underprivileged, and eliminate urban/rural disparities. Starting with the idea of "sharing brings strength," TSMC published the books "TSMC's Green Power" and "TSMC's Green Action" to communicate the actions we have taken to protect the environment and maintain a sustainable society over the years, as well as share our experience in applying for domestic and international green building certifications. We have donated copies of the book to public and university libraries around Taiwan in the hopes that it will attract more resources to the cause of sustainability.

In 2012, The TSMC Volunteer Society, TSMC Education and Culture Foundation, and colleagues from many different fabs travelled throughout Hsinchu, Taichung, Tainan and Taitung to bring warmth and care to elderly veterans, children in halfway houses, elementary school students in rural areas, university students from low-income families, children with type-1 diabetes, and elderly people living alone. We provide moral support by spending time with them, and also by providing economic assistance at appropriate times. Among these, several children in Taitung with severe cases of diabetes have diligently controlled their blood sugar levels and shown rapid improvement, rekindling hope in their lives after a year of encouragement and reminders from our volunteers.



### TSMC Volunteer Program

The TSMC Volunteer Program was founded in 2004, and volunteers have served a total of more than 111,400 hours as of the end of 2012.

111,400

hours

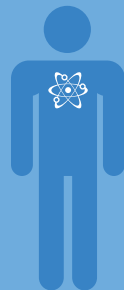


### TSMC Volunteer Seeds of Love

TSMC volunteers serve across north, central, south and east Taiwan with more than 28 schools or organizations. The seeds of love they have planted flourish all around the island.

28

schools or organizations



### Science Teachers Training

The TSMC Foundation continues to sponsor the "Raising the Level of High School Physics Experiments" project, providing 159 science teachers with professional development training and reaching more than 30,000 high school students nationwide.

159

science teachers



### TSMC Aesthetic Tour

Since launching the TSMC Aesthetic Tour in 2002, the TSMC Foundation has brought more than 78,000 students from remote townships to museums and exhibitions to cultivate their appreciation for art.

78,000

students



### TSMC Hsin-Chu Arts Festival

The Foundation has held the annual TSMC Hsin-Chu Arts Festival since 2003 to encourage a greater appreciation for the arts. More than 230,000 participants have enjoyed the Festival's performances over the last ten years.

230,000

participants

In addition, we have continued to promote science and art education. Besides inviting children from rural areas to visit museums, galleries, and science centers, TSMC has funded the Taipei Fine Arts Museum's "TSMC Children's Art Education Center," which will become an important base for childhood aesthetic education once it is completed. At the same time, we have invested funding and gathered public and private resources to improve high school physics experiments and trained a group of teachers to develop outstanding science talent. For the first time, TSMC also held the "High School Academic Express," sponsoring Tsinghua University Professors to speak on cutting-edge technology and everyday science to high school students in north, central, and southern Taiwan as well as outlying islands, receiving a enthusiastic response.

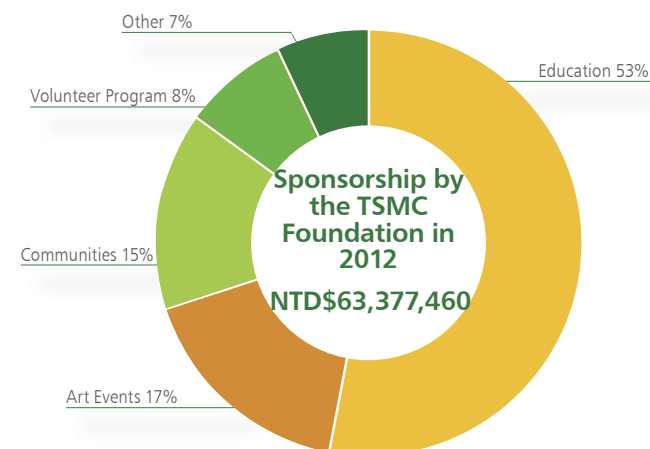
In sustainability, we are committed to selfless sharing of our knowledge. In 2012, TSMC officially assembled its Ecology Volunteers, who guide visitors through TSMC's green campus in Taichung and the Pheasant-tailed Jacana Ecology Educational Park in Taichung. We also continued the previous year's Industrial Water Conservation Class. In addition, we extended our experience-sharing with an Industrial Power Conservation class this year. TSMC also held the first Corporate Volunteer Forum, creating a platform for dialogue between industry, government, and academia to discuss volunteerism from different perspectives, including theory and practice.

Thanks to the passion and commitment of our colleagues, TSMC won the highest score out of all semiconductor companies in the "Social Dimension" of the Dow Jones Sustainability Index 2012 survey.

We hope that these efforts can act as a force for uplifting society, and that all parts of society can grow in love, happiness, health, and prosperity with the resources that we commit. We also hope that the example we provide can encourage society to join us in cherishing the earth's precious resources.

## 7.1 TSMC Education and Culture Foundation

TSMC continued to promote science and art in 2012, when the TSMC Foundation contributed over NT\$60 Million to long-term projects in promoting education and culture. In science education, the TSMC Foundation cooperated with the Wu Chien-shiung Education Foundation and the Ministry of Education for a project in "Raising the Ability of High School Physics Experiments," and this public/private partnership gained broad recognition from the educational community. The Foundation also supported National Tsinghua University's "Senior High School Academic Express" an academic lecture series in senior high schools. In art education, TSMC brought 10,000 students to visit the exhibition "King Wu Ding and Lady Hao: Art and Culture of



the Late Shang Dynasty" in the National Palace Museum. The Foundation also continued its support of the Taipei Fine Arts Museum to establish the "TSMC Children's Art Education Center," which will begin operating at the end of 2013. Aside from financial sponsorships, the TSMC Foundation also supports the TSMC Volunteer Society, organizing employees to devote themselves to the caring of the underprivileged in our communities.

### Four Commitments of TSMC Education and Culture Foundation

TSMC is dedicated to being a leading Taiwan corporate citizen and is an active sponsor of education and cultural activities. To maximize the impact of our contributions, TSMC established the TSMC Education and Culture Foundation (the TSMC Foundation) in 1998. Currently, F. C. Tseng, TSMC Vice Chairman, serves as the Chairman of the Foundation, which has been pioneering various projects to fulfill our long-term commitment to education and culture. The four principles of TSMC Foundation are: "Commitment to Education"; "Contribution to TSMC Site Communities"; "Sponsorship of Arts"; and "Support for the Employee Volunteer Program". If you would like to learn more about the Foundation, please access the official site of the TSMC Foundation ([www.tsmc-foundation.org](http://www.tsmc-foundation.org)).

## 7.2 Commitment to Education: Promotion of Appreciation for Arts & Cultivating Science Talent

A pool of talented people is essential to the development of our economy. As a leader in Taiwan's knowledge-based industry, we regard cultivating talent for society as a core responsibility of TSMC. The Foundation tailors various programs to target a whole range of education at different age levels. At the primary school level, the Foundation donates books to the primary schools in remote townships to bridge the gap between urban and rural areas. We also take students from remote townships to visit science museums and arts centers to inspire their interest in arts and science. For secondary schools, we support a science camp for teachers and students to cultivate science talent. At the same time, we also hold literary activities to show our concern for education in the humanities. At the college level, the Foundation continues to donate scholarships and professorships to raise the level of academic research.

### The Primary-School Level – Inspiring Children's Interests for Science and Aesthetic Education

At the primary-school level, the Foundation's focus is on aesthetic education. In 2002, the TSMC Foundation launched the "TSMC Aesthetic Tour" program to take children from remote townships to visit exhibitions in the National Palace Museum and the Taipei Fine Arts Museum. The Foundation hopes that these tours can offer underprivileged children a chance to inspire their interest in art. As part of TSMC's aesthetic education plan, the TSMC Foundation continued to support the Taipei Fine Arts Museum to expand the "TSMC Children's Art Education Center," which will be an important base for promoting children's art education in Taiwan.

### •TSMC Aesthetic and Science Tour/TSMC Children's Art Education Center

The TSMC Foundation always places equal emphasis on inspiring children's interest in arts and science. The Foundation launched the TSMC Aesthetic Tour in 2002, and the TSMC Science Tour in 2010. Through these two tours, the Foundation takes students from remote townships around Taiwan to visit museums, art sites, and science centers to cultivate their interest in both arts and science.

In art education, in 2012 the TSMC Foundation sponsored 12,000 students to participate in the "TSMC Aesthetic Tour". This year, in addition to the annual visiting schedule, we took more than 10,000 students from junior high schools and primary schools to visit the exhibition "King Wu Ding and Lady Hao: Art and Culture of the Late Shang Dynasty" to increase their understanding of Ancient Chinese Art and Culture. Over the last 10 years, over 78,000 students have participated in this series of tours to cultivate their appreciation of art.

### King Wu Ding and Lady Hao: Art and Culture of the Late Shang Dynasty

King Wu Ding and Lady Hao of the late Shang dynasty (ca. 13th-11th c. BCE) serve nowadays as an exemplary couple in the history of Chinese rulers. Their story, however, did not come to light until the twentieth century, more than three millennia after they lived.

Wu Ding was the 23rd king of the Shang dynasty and lived around 1200 BCE. Textual records indicate his uncle, King Pan Geng, had moved the Shang capital to Yin (modern Anyang, Henan). After the reigns of King Xiao Xin and Xiao Yi, Wu Ding finally came to the throne. Ruling for 59 years, he demonstrated concern for the people while respecting and recruiting virtuous and capable people for his administration, paving the way for the heyday of the Shang dynasty. As a result, he was later posthumously entitled "Gaozong," meaning "Lofty Ancestor," and praised in history as a leader of dynastic revival. Lady Hao was a favored consort of King Wu Ding. Although not recorded in later historical texts, records of Lady Hao found on oracle bones had already made a name for her by the end of the Qing dynasty. In oracle bone inscriptions, Lady Hao appears as a mother, a priestess, and even a battle leader.

This exhibition gathers together the essence of cultural objects excavated from the ruins of Yin by the Institute of History and Philology at Academia Sinica and the Institute of Archaeology at the Chinese Academy of Social Sciences along with treasured bronzes from the Henan Museum. In addition, the Royal Ontario Museum in Canada and the National Museums Scotland have generously loaned two precious oracle bones. There were 363 precious exhibits in total.

TSMC Foundation sponsored 10,000 students from primary and high schools to visit this exhibition to cultivate their understanding of Chinese history and culture and appreciation of traditional art.



In addition to sponsoring museum visits, the TSMC Foundation also supported the establishment of a facility for promoting children's art education. The Foundation cooperated with the Taipei Fine Arts Museum to establish a "Children's Art Education Center," the most substantial alteration of the museum's space since its opening. The upcoming "Children's Art Education Center" consists of a gallery, workshops, and a courtyard to serve as a dedicated art education space to serve children nationwide. This project is scheduled to be completed and inaugurated in 2013.

In Science, this year the "TSMC Science Tour" continued to take more than 2,000 children from remote school districts to the National Taiwan Science Education Center, National Museum of Natural Science, and National Science and Technology Museum. Assisted by professional guides, children interacted with various exhibits firsthand to experience the charm of science.

#### • Hope Reading Program

Since 2004, TSMC has sponsored the Hope Reading Program initiated by the CommonWealth Educational Foundation. This program is a campaign to narrow the gap in educational resources between rural and urban areas caused by disparities in wealth. By providing books to children in remote and underprivileged areas of Taiwan, TSMC hopes to promote literacy and inspire interest in reading among these children so that they will have good books to read and the opportunity to one day leave poverty behind through education. From 2004 to 2012, the Foundation has provided two hundred rural schools with 150,000 books and supported 25,000 children.

#### **The High-School Level – Nurturing Science and Humanities**

At the high school level, TSMC emphasizes the need for a balanced education in both science and the humanities. In

science, collaborating with the Ministry of Education and the Wu Chien-Shiung Foundation, the TSMC Foundation continued the project "Lifting the Ability of High School Physics Experiments" for the third consecutive year. In addition to teachers' training, the Foundation supported National Tsing-hua University in launching the "Senior High School Academic Express" to bring science knowledge to secondary school campuses. At the same time, the Foundation continued to sponsor science camps for talented science students to meet with world-class scholars and inspire their scientific potential.

#### • "Raising the Level of High School Physics Experiments" Program

Since 2010, in collaboration with the Ministry of Education, the TSMC Foundation has continued to sponsor Wu Chien-Shiung Foundation to carry on the project "Raising the Level of High School Physics Experiments".

159

The "Raising the Level of High School Physics Experiments" Program has provided 159 science teachers one week's training for developing their profession.

"Raising the Level of High School Physics Experiments" is comprised of two major parts. The first is to establish a full series of high school physics experimental kits, which are legal copies based on the training material of the International Physics Olympiad. These experimental kits will serve as an important database for high school physics education.

The second part is to hold a camp for science teachers. With the assistance of the Ministry of Education, we will recruit science teachers to participate in the science camp during summer and winter vacations. One week's training offered science teachers a chance to enhance their teaching skills and experimental abilities. As of the end of 2012, the program has provided professional development for 159

science teachers, reaching over 30,000 high school students nationwide.

#### • Tsing-Hua University "Senior High School Academic Express"

The TSMC Foundation also supported National Tsing-hua University in holding the "Senior High School Academic Express" to promote lecture courses in scientific knowledge at 12 senior high schools. Tsing-hua University is one of the most important academic bases in Taiwan, and through the "Senior High School Academic Express," the results of Tsinghua's research can be showcased and shared with the public and students. The project arranges for Tsinghua University professors to hold lively and easy-to-understand lectures on technology and everyday science. The lectures are held in twelve senior high schools across Taiwan and in the outlying island of Kinmen, and has gained an overwhelmingly positive response. Through this project, we look forward to inspiring student interest in academic research

#### • Science Talent Camp

To cultivate talented young scientists, the Foundation continued to sponsor the Wu Chien-Shiung Science Camp, as well as the Wu Ta-Yu Science Camp, and sponsored the Madame Curie Chemistry Camp for the first time in 2011. These camps provide talented students with the opportunity to hold discussions with world-class scientists with the goal of inspiring students and helping them realize their potential.

2012 was the fifteenth anniversary of the Wu Chien-Shiung Science Camp, and was also Dr. Wu Chien-Shiung's 100<sup>th</sup> Birthday Anniversary. To celebrate the anniversary, the camp especially invited Dr. Richard Ernst, Dr. Shu Chien, Dr. Frank Hsia-San Shu, and Dr. Norden E. Huang, 4 world-class scientists in the fields of chemistry, biology, astronomy

## Responses from Participants in the Madame Curie Chemistry Camp

"All the professors and professionals who talked to us brought new meaning to this saying: There are two types of people in the world—those who aspire to become great and those who create greatness."

--- Hsinchu Experimental High School, Fan-sheng Don

"To my surprise, the Chemistry Camp does not only talk about chemistry. The founder invited a lot of professors and professionals in various fields, such as biology, physics, and even humanities. The topics of lectures introduced us to industries, environmental protection, and daily life, and how theories of chemistry apply to these fields. All of the lectures made me understand we can see chemistry everywhere in our life."

--- Taichung Hisao-ming High School, Yun-ya Chu



and physics to speak to 143 gifted youths and 35 science teachers for one week. The theme of the 11<sup>th</sup> Wu Ta-Yu Science Camp was "The Future World of Innovative Materials: From Basics to Application" and 12 world-class scientists in related fields were invited to present their studies and new trends in their fields to 88 outstanding students from China, Hong Kong and Taiwan. This year we also continued to sponsor the Madame Curie Chemistry Camp. A total of 142 students from senior and junior high schools gathered to listen to speeches by top-notch masters to inspire their interest in chemistry.

### ●TSMC Youth Calligraphy Contest

The art of calligraphy is a distinguished legacy of Chinese culture. To preserve this art in the modern era of technology, the TSMC Foundation encourages young people to learn calligraphy and continue this artistic tradition. In addition to the contest, the Foundation also organized various campaigns in 2011 to cultivate student and public appreciation of calligraphy.

In addition to the calligraphy competition, we also held a program in which young calligraphers experienced the art of writing on bamboo scrolls, gathering over 100 students from Taipei First Girl's High School and Jianguo High School to write calligraphy at the century-old heritage site "Taipei Story House". Under the guidance the famous pop-lyrics writer-Vicent Fang and the poet Yilin Yan, through writing calligraphy on bamboo scrolls, the students not only expressed their creativeness but also realized the beauty of calligraphy. In addition, the Foundation continued to bring educational resources in calligraphy to campuses, holding 3 workshops to showcase the history and modern application of this traditional art. The TSMC Foundation hopes to encourage younger generations to appreciate traditional Chinese art through calligraphy.

### ●TSMC Youth Literature Award

The Foundation has held the "TSMC Youth Literature Award" for 9 years, and works entered in the competition have become more sophisticated and diverse each year. Numerous former winners continue to submit new works

to newspapers and magazines. Since last year, we have been inviting noted writers and poets to get together with former winners. Through close communication, young writers are encouraged to have the confidence to create more. Our annual literature gathering has also become an important feature of this literature award.

## Thoughts from a Judges of the TSMC Calligraphy Competition

"It is not easy for high school students to create such beautiful works, especially since it takes a lot of practice time from their preparations for college exams. However, I would point out that imitating the ancient masters' work is not only way to learn calligraphy. Maybe art teachers at schools can encourage our younger generations to write calligraphy in more creative and modern angles so they can easily access this traditional art."

--- The Renowned Art Educator, Mr. Han Bo-teh

"The competition really encourages students and youth who enjoy writing calligraphy and engraving chops. In my memory, early chop-engraving styles were not as diverse as the ones presented in the competition. From this we can see the young artists' hard work and creativity. An enterprise like TSMC has the resources to cultivate public appreciation for traditional art, which is great. I hope this competition can last for a long time."

--- Renowned Chinese Painter, Mr. Chao Tseng



### The College Level – TSMC Mentor Scholarship and Chair Professorship

In 2012, the TSMC Foundation continued to sponsor the “TSMC Mentor Scholarship” to support underprivileged students attending National Tsing Hua University and National Central University. In addition to providing financial support, the Foundation recruited senior TSMC employees to mentor the students regularly. We hope that the rich experience of TSMC employees can provide insightful advice for students both in school and in their future career paths. At the same time, the Foundation continued to endow chair professorships to strengthen academic research.

### 7.3 Promotion of Arts and Culture

The TSMC Education and Culture Foundation is devoted to the promotion of arts and culture. Over the years, the Foundation pioneered several innovative approaches and our positive feedback from the public has prompted many companies to join our efforts. In addition to inviting international performance groups to Taiwan, we also aspire to raise the quality of domestic performing arts through exchanges, and to give society deeper knowledge and appreciation of the arts.

#### Sponsorship of the Opera “Madama Butterfly”

“Madama Butterfly,” “Tosca” and “La Bohème” are Puccini’s three major operas, and the first brings together the best elements of his operas: the cultural differences between the East and the West, international love, divisions in social class, and the contrast between old traditions and modern culture. These elements make it a constant hit in major opera houses.

In 2012, the National Symphony Orchestra and its music director Shao-Chia Lü invited Opera Australia and Taiwan vocalists to present this classic opera. The Producer and director of the production, Moffatt Oxenbould, a

former artistic director of Opera Australia, spent three years on this work. A delicate Japanese stage featuring tatami (Japanese mats), a Zen pond, Japanese sliding doors, cherry blossom petals and flower arrangements, is combined with a modern, minimalist style and a 19th century American flavor. Music director Shao-Chia Lü conducted the premiere of the work in the Sydney Opera House in 1997, setting a record of multiple engagements and earning accolades as the best interpreter of Puccini’s operas. The TSMC Foundation was honored to sponsor this exquisite production, showcasing not only Taiwan artists’ phenomenal performance ability but also setting an example for Sino-western art and culture exchange.

#### “Chuang-tzu’s in Hsin’s View” – A Radio Program

The TSMC Foundation has long been devoted to reviving Chinese traditional culture. Since 2008, the Foundation has worked with Hsinchu radio station IC Radio to present a series of broadcasts by Professor Hsin Yih-yun on the Analects of Confucius. We hope that Professor Hsin’s simple but inspiring lessons help more people understand the wisdom of the Analects.

After the Analects of Confucius, the Foundation continued to promote another Chinese Classic, Chuang-tzu. We again invited Professor Hsin Yih-yun to produce a Radio program “Chuang-tzu’s in Hsin’s View”. Through Professor Hsin Yih-



The opera “Madama Butterfly,” presented by the National Symphony Orchestra (NSO), showcased not only Taiwan Artists’ phenomenal performance ability but also set an example for Sino-western art and culture exchange.

yun's rich knowledge and vivid examples, we hope that more people can understand Chuang-tzu's philosophy, and gain wisdom from it.

### The Literature Salon at the Taipei Story House

The TSMC Education and Culture Foundation firmly believes that the protection of cultural assets not only involves structural maintenance but also spiritual replenishment through continual rejuvenation of cultural heritage sites. Acting on this conviction, the foundation in 2007 provided funding for the monthly Literature Salon at Taipei Story House. Through regularly-held book readings by the authors, the spirit of the humanities has been instilled in the physical structure of heritage sites. These events allow artists and writers to come together in old homes filled with history. They have also given the edifice itself a new lease on life.

## 7.4 Community Building – the TSMC Hsin-chu Festival

The Foundation continues to promote arts and cultural activities in our site communities. Every year we organize the TSMC Hsin-Chu Art Festival to bring cultural activities to these high-tech cities and encourage a greater appreciation for the arts in these communities. In past years, through the Foundation's invitation, numerous masters such as Chinese Opera performers Pai Hsien-yung, Wu Hsing-kuo, Wei Hai-ming, and Li Bao-chun as well as the great classical music masters Lin Cho-liang, Li Yun-di, Ann-Sophie Mutter, James Galway, and Kun Woo Paik brought these communities marvelous performances and concerts. Over the last ten years, more than 230,000 participants have enjoyed the programs presented by the TSMC Hsin-chu Festival.

This year, following the in the footsteps of TSMC's newest manufacturing facility, the Hsin-chu Art Festival was held not only in Hsinchu and Tainan, but also in Taichung.

For Chinese opera fans, the Foundation hosted "One Hundred Years on Stage" performed by the Guoguang Opera Company. Gathering together Taiwan's most fantastic performers, the play led the audience to look at the history of Chinese opera through a web of love, lust and hatred among operatic performers and characters on and off the stage. Two Taiwan major orchestras gathered at the festival for the first time. The National Symphony Orchestra performed H. Berlioz's masterpiece "Symphonie Fantastique" in Hsinchu, and the National Taiwan Symphony Orchestra performed E. Grieg's piano concerto in A minor. In addition to the theater performances, the Foundation also organized two activities with French Pianist Jean-Yves Thibaudet in the public spaces of our communities, held a children's concert "The Animal Festival" at the Hsinchu Zoo, and the children's drama "Visiting Little Confucius" held at the Confucius Temples in both Hsinchu and Tainan. TSMC hopes to reinvigorate the public spaces of our communities by infusing them with the energy of art. More than 40 performances of the 2012 Hsin-Chu Festival attracted over 15,000 inhabitants of Hsinchu, Taichung and Tainan.

## 7.5 TSMC Volunteer Program – "Long-term Commitment to Chosen Service Themes"

Social responsibility has always been part of the TSMC corporate culture. In addition to developing semiconductors, solar energy, and solid-state lighting, making contributions to Taiwanese society is also an essential part of the company's role. At the same time, the company offers employees volunteer activities outside working hours to provide them with a focus outside of their professional life. The TSMC Volunteer Program, under the leadership of Ms. Sophie Chang (Su-feng Chang), persists in the objective of, "long-term commitment to chosen service themes," and encourages our colleagues to participate in volunteer activities with joy and wisdom. This objective corresponds with TSMC Chairman and Chief Executive Officer Morris Chang's expectations for the Volunteer Program, and our hope is that through volunteer activities, our colleagues can strike a fulfilling balance between their work and life. (TSMC Employee Volunteer Program Video ▶)

### Encouraging Arts Appreciation in Communities – TSMC Hsin-chu Art Festival

Since 2003, the TSMC Foundation has been organizing art festivals to encourage a greater appreciation for the arts in our site communities. The tenth Hsin-chu Art Festival, following the footsteps of TSMC's newest manufacturing facility, the Hsin-chu Art Festival was held not only in Hsinchu and Tainan, but also in Taichung. More than 40 performances of the 2012 Hsin-Chu Festival attracted over 15,000 inhabitants' participation.



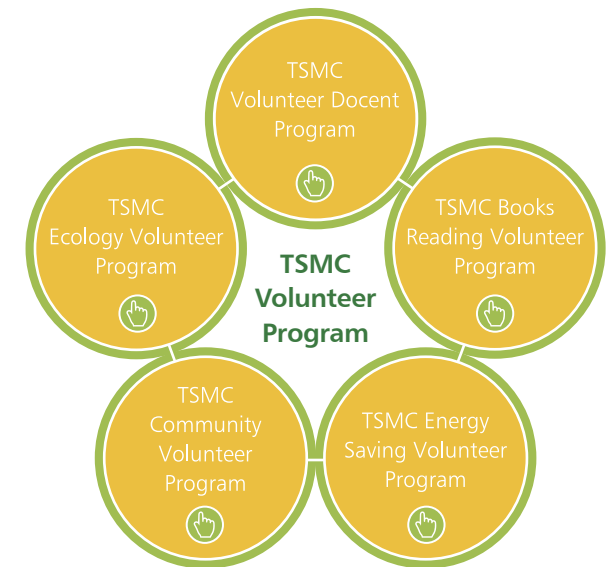
The TSMC Volunteer Program coordinates many forms of volunteer services. Employees of TSMC and TSMC associates, as well as their family members, are invited, to participate in this Program. It now includes the TSMC Volunteer Docent Program, the TSMC Reading Volunteer Program, TSMC Energy Saving Volunteer Program, TSMC Community Volunteer Program, and the TSMC Ecology Volunteer Program. The following are brief descriptions of these programs:

- The TSMC Volunteer Docent Program recruits employee volunteers to serve as docents on weekends and holidays at the “World of Semiconductors” exhibition hall in the National Museum of Natural Science, Taichung. They introduce semiconductor science and technology to museum visitors in a way that is easy to understand. Up to now, a total of 3,578 volunteers have participated, and volunteer docents have served more than 47,400 hours.
- The Volunteers of TSMC Reading Volunteer Program travel long distances to read stories to students in remote elementary schools in Hsinchu, Taichung and Tainan. Stories and books are supplements for limited educational resources in these rural areas, expanding the children’s mind, ideas, and thoughts. Since 2004, the program has recruited 1,351 volunteers, total reading hours have exceeded 23,800, and more than 12,000 students have participated.
- The TSMC Energy Saving Volunteer Program was formed in 2008, mainly by TSMC employees with expertise in energy conservation. The team helps to assess energy saving solutions for senior high schools and to suggest possible improvements. The Program initially served two high schools in Hsinchu. In 2012, the service was extended to schools in Hsinchu, Taichung, and Tainan. Presently, the team consists of more than 50 energy saving experts, who are all striving to preserve the natural environment of Taiwan and the earth.

- The TSMC Community Volunteer Program was founded in 2010. Volunteers regularly visit the elderly at the Hsinchu Veterans Home and the children at the St. Teresa Children’s Center. When Typhoon Morakot struck southern Taiwan in 2009, TSMC employees established the Typhoon Morakot Project Team to provide assistance and relief measures to typhoon victims. The team later became the Community Volunteer Program, aiming to reach out to those most in need. In March 2012, our efforts were expanded to serve underprivileged children with type 1 diabetes in Taitung. Volunteers visit these children or talk to them online to ensure they receive regular insulin injections and to give warm and timely care. The program has recruited more than 770 volunteers, and the total service hours have exceeded 10,000.
- The TSMC Ecology Volunteer Program was established in Taichung and Tainan in 2012. After a three-phase training course on the ecosystem around the fab site, the Taichung volunteers serve as eco-tour guides for neighboring elementary and junior high schools. Members of the Tainan team serve as guides on weekends and holidays at the Tainan Jacana Ecology Educational Park, educating visitors on the jacanas’ behavior and ecology.

In 2012, when TSMC Volunteer Program was preparing to enter its first decade, President Ms. Sophie Chang (Su-feng Chang) contemplated on how to lead TSMC volunteers to make good use of their abilities and experiences to step forward into the future in a more meaningful way. With the belief that “sharing creates power,” President Chang proposed holding an interdisciplinary “Corporate Volunteer Forum” planned and executed by colleagues in the related departments of TSMC. The forum invited representatives from the government, academia and industries to share volunteer experiences from different perspectives. Through a conversation between theory and practice, the forum has

## Scope of TSMC Volunteer Program Services



inspired more possibilities for the roles of volunteers and enriched the meaning of corporate social responsibility.

The first Corporate Volunteer Forum was hosted by President Chang in 2012. More than two hundred representatives from the government, academia and industries participated in the event. Among them, representatives from industries accounted for 90% of the participants. TSMC Senior VP, Chief Financial Officer and Spokesperson, Ms. Lora Ho and Vice President of Human Resources, Mr. L.C. Tu both attended the forum.

The concrete and practical volunteer experiences shared by the guests in the forum helps to save the time and cost that industries must spend to learn how to carry out volunteer activities. After the forum, TSMC continued to receive invitations and requests for sharing corporate volunteer



experiences from many industries in Taiwan. It shows that the accumulated volunteer experience of TSMC not only helps to extend our corporate values, but can also make a broad impact on society.

### TSMC Volunteer Docent Program: Promoting Science Education

Sharing knowledge is one important way for a corporation to serve and respond to its communities. The spread of knowledge furthers people's understanding of their environment and may inspire future generations and bring forth change in society. Based on this principle, as well as to promote science education and improve people's understanding of the semiconductor industry, TSMC made a donation to the National Museum of Natural Science

(Taichung) in 1997 to set up an exhibition hall – "The World of Integrated Circuits". In 2003, TSMC sponsored the renovation of the hall, and renovations were completed in 2011 with additional exhibits on LED lighting and solar energy. Renamed "The World of Semiconductors," this exhibit aims to offer visitors an interactive and entertaining way to understand the principles and the development of semiconductors as well as the links between the semiconductor industry and daily life.

Since 2004, TSMC Education and Culture Foundation has recruited employees and their family members to serve as volunteer docents at the exhibition hall on weekends and holidays to promote science education.

In 2006, youth volunteers were also recruited. Employees were encouraged to invite their high school-aged children to join the Volunteer Docent Program. The volunteer experience not only strengthens their parent-children relationships, it also educates their children to make contributions to society. In 2007, the Program was expanded to recruit new volunteers from TSMC-affiliated companies, including Vanguard, VisEra, Xintec, and Global Unichip. In 2012, employees of TSMC SSL (TSMC Solid State Lighting) and TSMC Solar also joined the Program, adding new blood to the volunteer team and further expanding TSMC's social service and contribution.

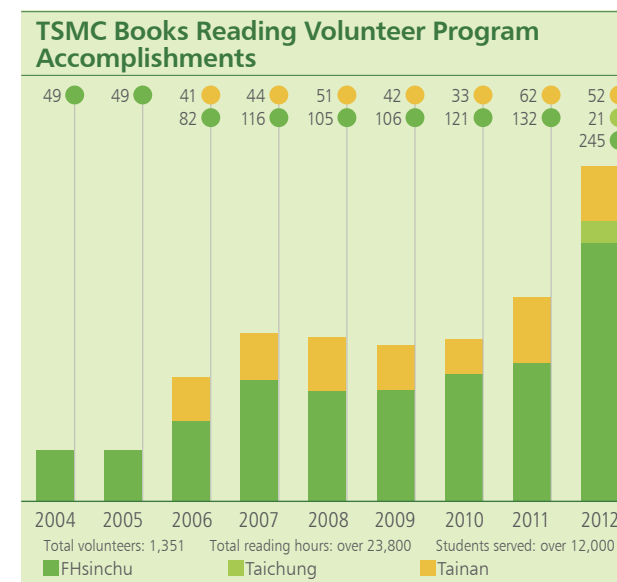
The enthusiasm and professionalism of TSMC volunteer docents have been highly appreciated by visitors, and each year the team is recognized as an "Outstanding Volunteer Team" by the National Museum of Natural Science.

### TSMC Books Reading Volunteer Program: Spreading Seeds of Knowledge

While globalization has helped to spread technology around the world, economic inequality has also increased.

The knowledge disparity between rich and poor is now depriving numerous children of opportunities to choose their path in life. To help narrow the rural-urban gap in educational resources, the TSMC Education and Culture Foundation has been sponsoring the Hope Reading Program of CommonWealth Magazine since 2004, donating around 20,000 books annually to 200 elementary schools in remote areas of Taiwan. In this way, the Foundation hopes to build a bridge to the world for underprivileged children.

In the same year, the Foundation recruited employees and members of their families to form a volunteer team, aiming to strengthen reading interest among young children in remote areas. The volunteers read books provided by the Hope Reading Program to students of elementary schools allied with CommonWealth, encouraging them to make the most of the learning resources available.



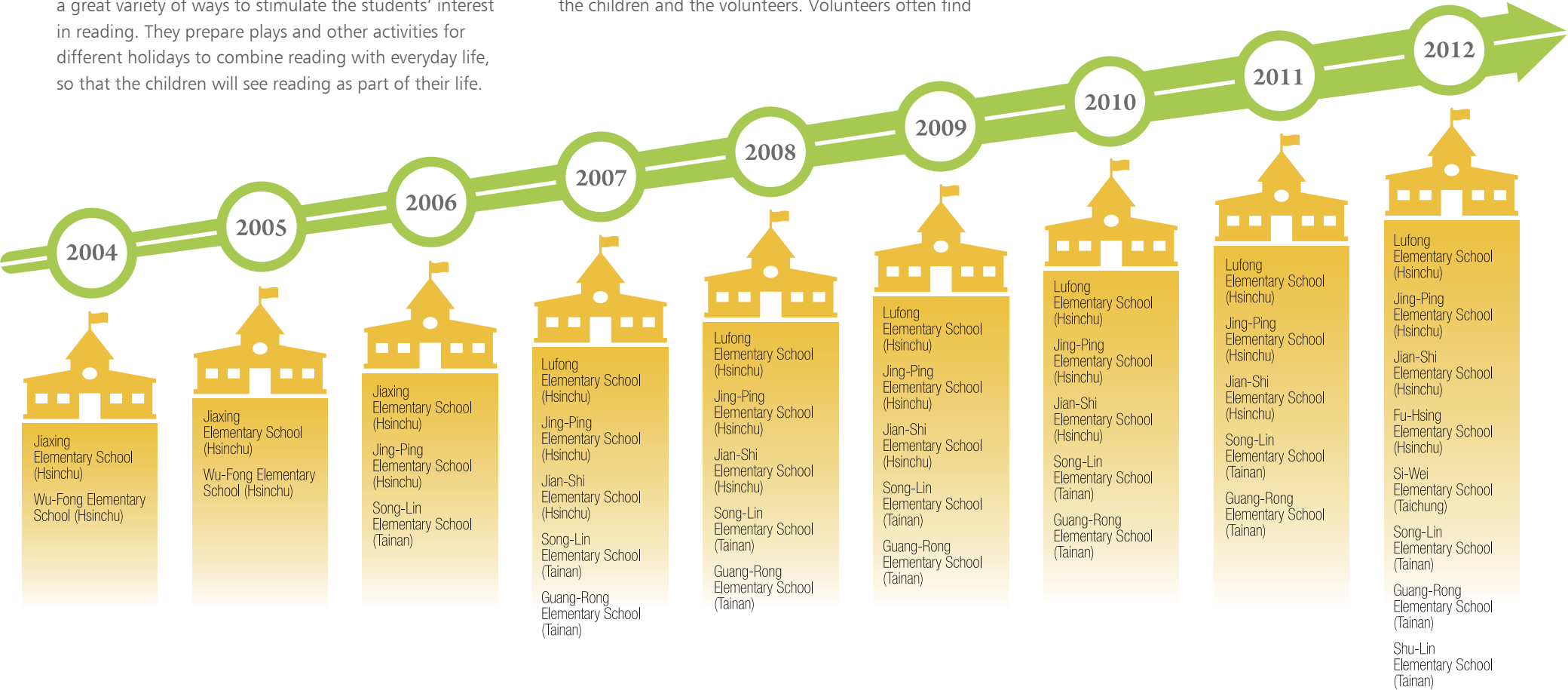
During the first year, 49 volunteers joined the Program and served in two elementary schools located in remote townships in Hsinchu. Over the years, the children’s eager looks and enthusiastic responses have drawn more and more volunteers to join the Program. The volunteers use their personal time to travel long distances and read stories to those children, hoping to show the world to the students through books and to develop a reading culture in their communities.

Besides reading stories, the volunteers have come up with a great variety of ways to stimulate the students’ interest in reading. They prepare plays and other activities for different holidays to combine reading with everyday life, so that the children will see reading as part of their life.

Foreign employees were recruited in 2009 to volunteer in the English Reading Program at Lu-Fong Elementary School. Their goal is to improve the children’s confidence in speaking English and their overall English proficiency. Working regularly with the children over the long term, the volunteers have developed profound friendships with them. What these children enjoy is not only the pleasure of reading, but also a heartwarming friendship with the TSMC volunteers.

The Books Reading Volunteer Program benefits both the children and the volunteers. Volunteers often find

themselves gaining a great deal by giving. Since its initiation, the Program has recruited 1,351 volunteers, total reading hours have exceeded 23,800, and more than 12,000 students have participated. The volunteers’ selfless work is greatly appreciated by the schools and the children. This Program has been sharing its experiences with other reading volunteer groups, and has been featured in media reports. TSMC hopes that the spirit of the Program will spread in society and inspire more reading programs.



### TSMC Energy Saving Volunteer Program: Loving and Preserving the Earth

With accelerated global warming, the depletion of limited natural resources and the energy crisis, public environmental awareness is rising, and saving energy has become a common goal for everyone. TSMC recruited employees with expertise in energy conservation to start the Energy-Saving Volunteer Program and has provided schools in the Hsinchu, Taichung, and Tainan areas with professional consulting services. Through inspection and communication, the team helps to develop energy-saving plans for schools to improve energy efficiency.

The Energy Saving Volunteer Program was founded in 2008 by 25 professional volunteers consisting of TSMC employees. Initially, the Program served schools in the communities near TSMC headquarters. Two high schools in Hsinchu were chosen, and a team was sent to each school to assist in lowering water, electricity and telecommunication bills, as well as saving energy consumed by air-conditioning and improving environmental safety. After assessing the facilities, collecting data, and evaluating energy efficiency, the teams propose energy-saving plans and methods to the schools.

The team's professional service has been much appreciated by these schools. In 2009, the service was extended to schools in Tainan. In 2010, the team began to accept requests from schools. In addition to offering energy-saving assessments, the Energy-Saving Volunteer



To teach correctly electric power using knowledge, volunteers played with children in elementary school via simply equipments.

Program promotes education on energy conservation, and Jin-ping Elementary School in Hsinchu County is our pilot school for this education program. In 2011, the service was further extended to the Taichung area, and the Program succeeded in helping Taichung First Boys' High School and Taichung First Girls' High School save a great deal of energy. It truly realizes the promise that "where there is TSMC, there is a Volunteer Program". In 2012, the volunteers devoted over 950 hours to serving schools in Hsinchu, Taichung and Tainan.

The Energy Saving Volunteers not only endeavor to save energy for the company but also contribute their expertise and passion, and do the best they can to preserve the earth and Taiwan.



### **TSMC Community Volunteer Program: Caring for the Disadvantaged**

In 2009, Typhoon Morakot struck southern Taiwan, and TSMC employees were deeply saddened by the suffering caused by this disaster. Led by Ms. Sophie Chang (Su-feng Chang), the president of the TSMC Volunteer Program, TSMC employees immediately established the Typhoon Morakot Project Team and provided timely assistance and relief measures to typhoon victims. After this experience, realizing that there were still many neglected disadvantaged people in society, President Chang hoped to recruit more TSMC employees to devote themselves to community service. Consequently, the Project Team became the Community Volunteer Program in 2010, aiming to reach out to those most in need.

The elderly and the young are the focus of the TSMC Community Volunteer Program. Taiwan has become an aging society in recent years; the population aged 65 and above is more than two million, and one-fifth of them need help with day-to-day tasks. On the other hand, for young people living in an unstable environment, positive influences at the critical stage of their personality development and good parent-child interactions are more crucial than ever. Youth in children's homes who lack the warmth of family love certainly need companionship and support even more.

TSMC Community Volunteers focuses on serving the elderly at the Hsinchu Veterans Home and the children at the St. Teresa Children Center. Initially, in 2010, 156 volunteers

joined the Program and held regular activities that closely connect the elderly veterans, children and volunteers. In March 2012, new volunteers were recruited to expand the service to underprivileged children with type 1 diabetes in the Taitung area. Later in April 2012, 36 volunteers went to Taitung to visit the children for the first time. So far, a total of more than 770 volunteers have participated, and they have served more than 10,000 hours.

**Volunteers at Hsinchu Veterans Home:** In 2012, there were 308 TSMC Community Volunteers regularly visiting the elderly at the Hsinchu Veterans Home. The volunteers were mainly divided into three groups:

- **Go Sports:** The volunteers invited the elderly to play sports together. They played croquet with the elderly in the morning every two weeks, and other games were held from time to time, offering seniors opportunities to stretch their bodies and also enjoy the stimulation of competition.
- **Glee Club:** The volunteers designed more static activities for the elderly with disabilities in the health care center of the Veterans Home. They sang for the elderly veterans, interacted with them through games, or invited them to sing karaoke together and let the joy spread through cheerful melodies.
- **Art Workshop:** In the art workshops, the volunteers and the elderly veterans participated in interesting art projects such as rock painting. During the creative process, these seniors can enjoy the beauty of art. At the same time, the

volunteers and the elderly grew to know each other while doing the projects and chatting.

On December 8, 2012, the TSMC Community Volunteers held holiday activities at the Hsinchu Veterans Home. A round table banquet was held for the elderly to celebrate an early Chinese New Year. The volunteers also invited one of Taiwan's most famous symphony orchestras to perform for the elderly. They had a truly joyful weekend together.

**Volunteers at St. Teresa Children Center:** A team of 62 volunteers visited the Children Center and gave the children timely care and companionship, and they participated in the activities as below:

- **One-on-one Care:** On the monthly "St. Teresa's Family Day," volunteers spent the weekend with the children. Sometimes they had a weekend tour, while other times they stayed at the Children Center and studied together.
- **Summer Camp:** It was a three-day camp held in Kaohsiung for the children to get some real life experiences outside the Children Center. While traveling in Kaohsiung, the volunteers designed many real-life scenarios to train the children to solve daily problems on their own, helping them establish the abilities to adapt to the society. It is hoped that the children can lead their lives independently after leaving the Children Center.

- **Happy Hours in Tom's World:** The volunteers took the children to Tom's World, an amusement arcade in Hsinchu Big City shopping mall and had lunch at McDonald's. The volunteers and the children spent a wonderful afternoon together.

**Taitung Project:** In 2012, TSMC Community Volunteer Program recruited 36 volunteers to visit the children with type 1 diabetes in the Taitung area. We have participated in the following activities with the children:

- **Warm-up:** TSMC Community Volunteers first visited the children in April 2012. The warm-up activities helped the volunteers and the children become familiar with each



One-on-one Care: TSMC Community Volunteers spent the weekend with the children every month. Sometimes they had a weekend tour, sometimes they did art activities, while other times they stayed at the Children Center and studied together.

other. Later, the children were divided into five groups as five little "families" to maintain a long-distance friendship with the volunteers.

- **Summer Gatherings:** To establish intimate friendship with the children and eliminate the sense of unfamiliarity, the volunteers interact with them through online network and express their care by sending them postcards from time to time. Besides, the volunteers also seized the days of summer vacation and planned "family trips" for the children, making their relationship much closer through activities.
- **Dream Trip:** To reward the children who had been working hard on blood sugar control and had made great progress, the volunteers planned a two-day Dream Trip to take the children to travel around in Taipei City.

#### **TSMC Ecology Volunteer Program: Prompting Environmental Preservation**

In 2012, the TSMC Volunteer Program established the new Ecology Volunteer Program, which represents TSMC's devotion to environmental protection and conservation. The team recruits employees who are highly concerned about ecological and environmental issues, and trains them as eco-tour guides for visitors and students from nearby elementary schools. The following are the guided tours of the Program:

**TSMC Fab 15, Taichung:** The team recruited 47 ecology volunteers from Fab 15 in Taichung Science Park. The volunteers must first complete a three-phase training course on native plants in the area to be fully equipped



Volunteers planted vegetation to afforest Fab 15 site.

with knowledge that ecology guides require. The guided tours started on December 27, 2012, introducing students of Ruu-Liou Elementary School to the ecosystem around the fab site.

**Pheasant-tailed Jacana Ecology Educational Park, Tainan:** The team has recruited 91 colleagues and their family members. They serve as guides on weekends and holidays in the Tainan Pheasant-tailed Jacana Ecology Educational Park, promoting conservation of the endangered Pheasant-tailed Jacana.

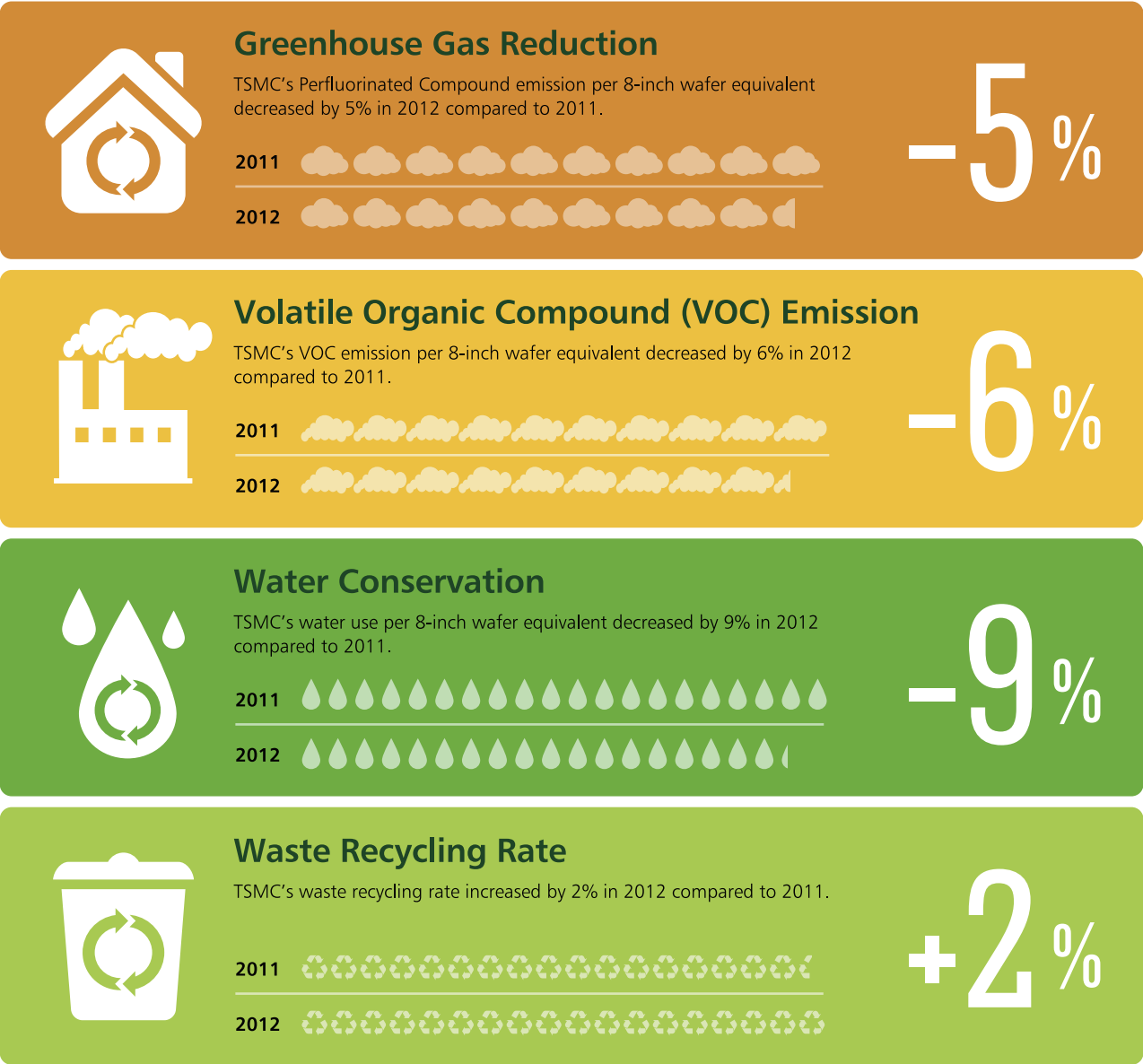
# 8. Environmental Protection

TSMC’s environmental policy, as set down by Chairman Dr. Morris Chang, is to do our utmost to achieve environmental sustainability and to be a world-class company in environmental protection. TSMC’s strategies to achieve our environmental goals are to comply with regulations, strengthen recycling and pollution prevention, manage environmental risks, instill an environmental culture, build a green supply chain, and fulfill our corporate social responsibilities.

TSMC acknowledges responsibility for environmental protection. We not only comply with the environmental regulations of the locations where we operate, but also track new developments in global environmental issues, and take the lead in adopting new environmentally friendly measures. In addition to protecting the environment of our manufacturing sites in Taiwan and around the world, we lead our suppliers to establish a green supply chain. At the same time, TSMC also shares environmental protection knowledge and offers recommendations to government to face a variety of new challenges together. A summary of TSMC’s environmental protection approaches follows:

**Green Management**

- **Establish Environmental Management System:** All TSMC fabs adopted the ISO 14001 Environmental Management System in early stages of their operation. We implement a P-D-C-A (Plan, Do, Check, Action) model together with annual audits and a “Green Award” in our Total Quality Excellence (TQE) activities to promote continuous improvement for environmental protection.



## Green Manufacturing

- **Promote “Green Building” certification:** All newly-constructed facility and office buildings are designed and constructed according to U.S. LEED (Leadership in Energy and Environmental Design) and Taiwan EEWH (Ecology, Energy Saving, Waste Reduction and Health) standards. We also adopt green building concepts to improve environmental performance for existing facilities.
- **Promote “Green Factory” certification:** We integrate green facility buildings and clean production mechanisms to comply with green factory standards for operational fabs.
- **Actions on climate change:** We continue to promote company-wide greenhouse gas inventory and reduction. At the same time, we also collaborate with industry, government and academia on climate change adaptation, which includes flooding and drought risk assessment and prevention.

## Green Product

- **Green product manufacturing:** We take the entire product life cycle into consideration in order to reduce environmental impact at each stage. At the same time, we established a QC 080000 product hazardous substance management system to ensure wafers and backend assembly products are compliant with international laws and customers’ requirements on hazardous substances.

## Green Promotion

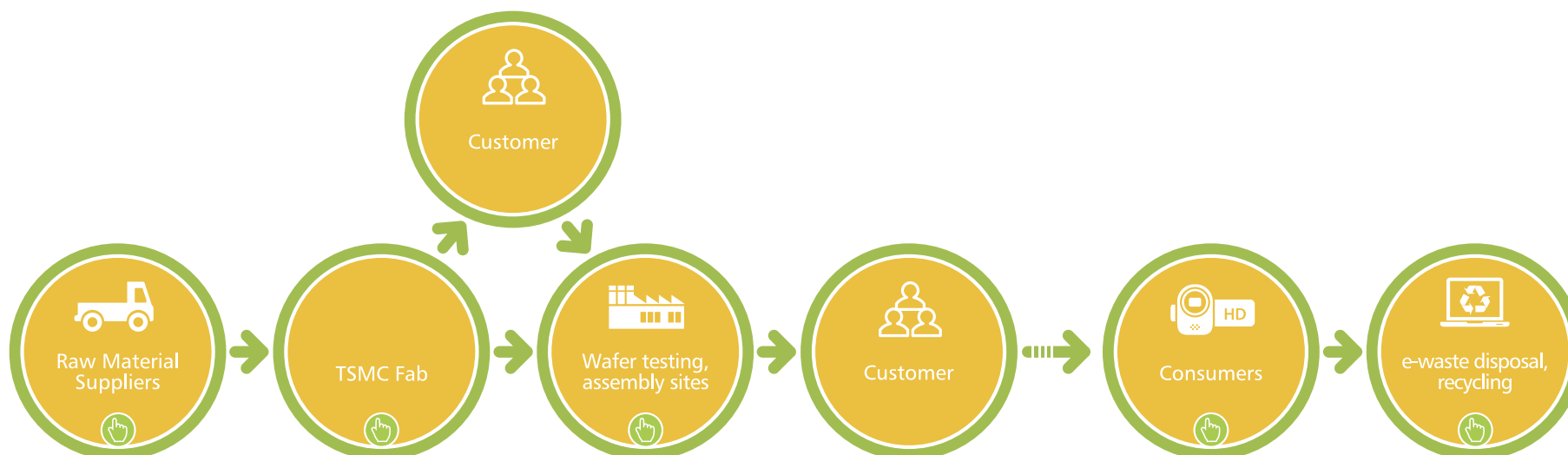
- **Enhance internal and external environmental education:** TSMC not only instills environmental protection concepts in employees through classes and promotions, but also assists the local Environmental Protection Bureau to establish and maintain environmental education facilities. We also share our experiences on water and energy conservation with the industrial community.
- **Establish green supply chain:** TSMC established a sustainability scoring system for upstream raw material

suppliers and downstream testing and assembly sub-contractors to require and encourage them to protect the environment, improve safety and hygiene, and protect human rights as well as manage risk and business continuity, so that we may fulfill our corporate social responsibility together.

## Selection of Material Environmental Topics

TSMC has a long-term record of assisting the government in establishing regulations and promoting projects, and pays close attention to the views of academia, media, customers, and employees concerning the environment. We also participate in non-governmental organizations’ environmental activities to understand the issues of greatest concern to our stakeholders. We have concluded that the most material environmental topics are global climate change, water management, green product, and pollution prevention. (Please refer to “3. Stakeholder Engagement” in this report) TSMC continues to study and respond to the environmental topics that concern stakeholders.

## TSMC’s Effort to Mitigate Value Chain Environmental Impact



## 8.1 Environmental Protection Major Activities in 2012

### TSMC Internal

#### •Continuous expansion of our green building project for new fabs

TSMC's Fab 12 Phase 1 and 2 manufacturing facility earned the semiconductor industry's first "Platinum" certification under the U.S. Green Building Council's "Leadership in Energy and Environmental Design – Existing Building: Operation and Maintenance" (LEED – EB O&M) rating system. In addition, the Fab 12 headquarters office building also earned a "Gold" certification in LEED – EB O&M; Furthermore, TSMC's Fab 12, Phase 4 office building has also become Taiwan's first Diamond class "Intelligent Green Building" after gaining dual Diamond certifications both as a Green Building and an Intelligent Building from the R.O.C. Ministry of the Interior. (TSMC Green Building Video ▶)

Note: TSMC has gained 7 U.S. LEED and 4 Taiwan Ecology, Energy Saving, Waste Reduction, and Health (EEWH) green building certifications as of December 2012.

#### •Leadership in "Green Factory Label"

In August 2012, the TSMC Fab 12 Phase 4 facility earned certification from the R.O.C. Ministry of Economic Affairs Industrial Development Bureau (IDB) to gain Taiwan's first "Green Factory Label". Shortly thereafter, the Fab 14 Phase 3 and Phase 4 facility also earned the same certification in November 2012.

#### •Continuous promotion of ISO 50001 Energy Management System certification

After the Fab 12 Phase 4 data center earned ISO 50001 Energy Management System certification in November 2011, the Fab 12 Phase 4/5 and the Fab 14 Phase 3/4 facilities and office buildings also adopted the ISO 50001 system and earned certification.

#### •First internal "Green Award" competition

In 2012, TSMC added an Environmental, Safety & Health (ESH) Award to its ongoing "Total Quality Excellence (TQE)" campaign to encourage employees to continuously improve ESH performance. The ESH award competition was also presented in annual TQE Forum for sharing. There were a total of 229 ESH improvement cases submitted in 2012, 27 cases were selected after initial review, and 7 out of these 27 cases were selected for final competition in the Forum. The habits and methods of continuous ESH improvement are embedded in the daily tasks of employees in each facility through the ESH award competition and experience sharing.

### TSMC's Suppliers

•Because the safe storage, cleaning, and treatment of waste chemicals is just as important as that of raw material chemicals, the "TSMC 2012 Supply Chain Sustainability and Risk Management Forum" invited both raw material suppliers and waste treatment contractors to participate. We hope that we can improve the ESH performance together through this activity. In addition to promoting TSMC's sustainable efforts and requirements to our partners, we also invited experts from TSMC, consulting companies, academia and TSMC's partners to share their experiences, and gained enthusiastic responses from participants. The forum was attended by 115 participants



TSMC implements a wide variety of measures to strengthen sustainability, and has the most certified green buildings of any company in Taiwan.

from TSMC's suppliers and waste cleaning, treatment and recycling contractors.

### Collaboration and Sharing with External Parties

#### •Holding free courses to share TSMC's water conservation and power saving experience

After receiving enthusiastic responses to its free water conservation courses from manufacturers and government agencies across Taiwan in 2011, TSMC extended this model to free power conservation classes. In December 2012, TSMC held classes in Hsinchu, Taichung, and Tainan for a total of 270 executives and technical personnel from companies across a variety of industries.

#### •Water Resource Forum jointly held by TSMC and the R.O.C. Ministry of Economic Affairs Water Resource Agency

TSMC, the R.O.C. Ministry of Economic Affairs Water Resource Agency, and the Taiwan Water Environment Association (TWEA) jointly held a Water Resource Forum, a new industry-led initiative for adapting to global climate change and lowering water resource risk. Approximately 300 managers, scholars, and people in related fields attended the forum. At the meeting, TSMC, China Steel Corp., and other experts in the field shared their experience in water resource recycling as well as developing and allocating water resources, aiming to build consensus and collaborate to lower Taiwan's water resource risk.

### The achievement status of our 2012 quantitative environmental goals is as follows

TSMC continued to improve our energy saving, water conservation and waste reduction technology, and implemented this technology in our newly-constructed fabs.

#### •Greenhouse gas - perfluorinated compound (PFC) emissions reduction: After we achieved our PFC total

emissions reduction goal in 2010, we continue to move forward on emissions reduction. PFC emissions per 8-inch wafer equivalent in 2012 were 5% less than 2011 due to our continuing reduction efforts.

#### •Energy conservation: TSMC reduced power consumption per 8-inch wafer equivalent per mask layer by 1.3% from 10.7 kwh in 2011 to 10.5 kwh in 2012.

#### •Energy conservation: TSMC reduced natural gas consumption per 8-inch wafer equivalent per mask layer by 7.6% from 0.066 cubic meter in 2011 to 0.061 cubic meter in 2012.

#### •Water conservation: TSMC's water use per 8-inch wafer equivalent per mask layer in 2012 decreased by 1.6% compared to 2011 from 59.8 liters to 58.9 liters.

#### •Waste reduction: Achieved a waste recycling rate of 93%, in 2012, exceeding 90% for the fifth consecutive year, while our landfill rate was below 1% for the fifth consecutive year.

TSMC will continue expanding production capacity to fulfill global semiconductor demand. Although we have achieved the highest level of energy intensity performance in the global semiconductor industry and met an extremely challenging PFC emissions reduction goal over the past 10 years, we will continue improving our productive efficiency to reduce energy and resource consumption as well as our environmental impact.

#### •Greenhouse gas PFC reduction: Reduce by 2020 PFC emission intensity to 30% below the year 2010 level through adoption of best practices recognized by the World Semiconductor Council.

#### •Energy saving: Reduce by 2015 power usage intensity to 2% below the year 2010 level.

#### •Water saving: Reduce by 2015 water usage intensity to 2% below the 2010 level.

#### •Waste reduction: Achieve 95% waste recycling rate by 2015.

## 8.2 Building Green Fabs, Green Campus, and Assisting the Government to Establish Green Factory Guidelines

### Moving beyond Green Fabs to Green Campus

Starting in 2006, TSMC committed to a policy of constructing all new manufacturing facilities and office buildings according to the most up-to-date green building

11

TSMC has gained 7 U.S. LEED and 4 Taiwan EEWH green building certifications as of December 2012.

standards. The standards are the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) standard, and Taiwan's Ecology, Energy Saving, Waste Reduction, and Health (EEWH) standard. The intention of this program is to achieve certification under national and international green building

standards for all new fabs. From 2008 to 2012, seven of TSMC's fab and office buildings achieved LEED certifications including Fab 12 Phase 1/2 fab, the Headquarters building in Hsinchu, Fab 14 Phase 3 fab, Fab 12 Phase 4 fab, Fab 14 Phase 4 fab, Fab 12 Phase 4 office and Fab 14 Phase 3 office. Among these, Fab 12 Phase 1/2 received the first U.S. LEED Platinum certification in the global semiconductor industry. Meanwhile, four buildings were certificated under the Taiwan EEWH standard at "Diamond" class (Fab 12 Phase 4 fab, Fab 12 Phase 4 office, Fab 14 Phase 3 fab and Fab 14 Phase 4 fab). The Fab 12 Phase 4 office building

also become Taiwan’s first Diamond class “Intelligent Green Building”. As Taiwan’s leader in certified green buildings, TSMC will continue its commitment to this policy.

TSMC initiated Taiwan’s first green campus project in 2010, a plan to transform Fab 12 in Hsinchu, Fab 15 in Taichung, and Fab 14 in Tainan into green campuses. These green campuses emphasize sharing of energy and resources, efficient conservation of energy and water, as well as improved waste reduction and recycling to reduce cost. They also emphasize comprehensive site planning to integrate green fields, enliven natural landscapes, and restore local ecology so that the natural environment prospers along with industrial growth.

TSMC’s Hsinchu Site focuses on friendliness, and combines green facilities, green technology and green lifestyle to create a campus for green education. The Taichung Site is






designed for a sustainable environment, and through the work of ecology volunteers and preservation, has become a green ecology campus. The Tainan site has been designed to combine manufacturing with the surrounding ecology to create a comfortable environment as a “green life” campus.

Providing a Comfortable “Green Life”

We introduced green concepts to office lobbies to provide a calming work environment and to inspire innovation. The use of green materials, low-organic paint and adhesives in indoor decoration controls indoor air quality strictly and reduces the risk of “sick building syndrome”. Office buildings are installed with intelligent control system such as lighting controllers, nighttime air-conditioning switches, and carbon dioxide detector to significantly reduce energy waste.

TSMC completed its first green factory in 2012 and its Fab 12 Phase 4 facility located in the Hsinchu Science Park has earned certification from the R.O.C. Ministry of Economic Affairs Industrial Development Bureau (IDB) to gain Taiwan’s first “Green Factory Label”. Fab 14 Phase 3 Fab and Fab 14 Phase 4 Fab were also certified in the same year. (Taiwan’s “Green Factory Label” is the world’s first green certification system designed for factories, and examines both “green building construction” and “clean production”) In addition, Fab 14 Phase 3/4 was the first facility to gain the IDB’s “clean production” certification. This recognition once again highlights TSMC’s commitment to mitigating climate change and

TSMC Green Building Certifications

TSMC	Hsinchu				Tainan		
	F12P1/2	F12P4	F12	F12P4	F14P3	F14P4	F14P3
	Fab	Fab	Headquarters	Office	Fab	Fab	Office
USGBC Rating System	 LEED-EB O&M	 LEED-NC	 LEED-EB O&M	 LEED-NC	 LEED-NC	 LEED-NC	 LEED-NC
Taiwan EEWH							
Taiwan Green Factory		 綠色工廠 GREEN FACTORY			 綠色工廠 GREEN FACTORY	 綠色工廠 GREEN FACTORY	
Taiwan Intelligent Building							

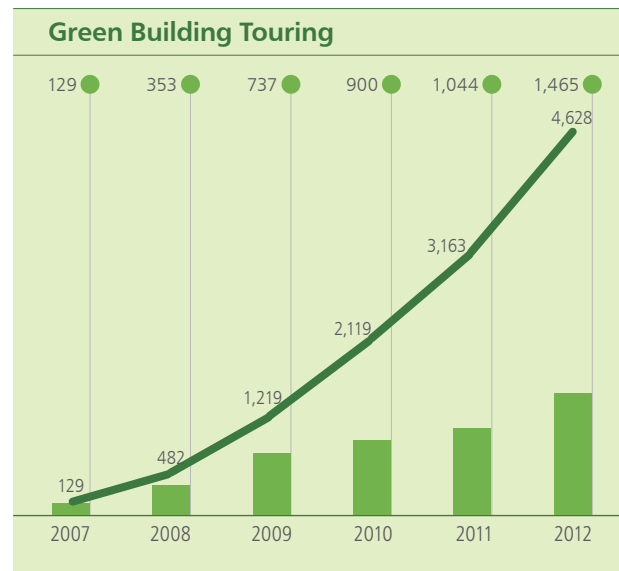


Tainan Site Indoor Vegetated Wall

protecting the environment, and sets a new milestone for Taiwan's green manufacturing.

### Promotion of Green Building Experiences – External Visits

TSMC proactively shares its green building experiences and helps interested parties to shorten their learning curve. More than 4,628 people have visited TSMC to learn about our green buildings up to December 2012.



### Assisting the Government to Establish a “Green Factory” Standard

In 2010, TSMC proposed draft guidelines for green industrial buildings in Taiwan. The Architecture and Building Research Institute (ABRI) gave its support to TSMC, AU Optronics, Chimei Optoelectronics, United Microelectronics Corp, Delta Electronics and the Southern Taiwan Science Park Administration for a joint initiative to establish a “Green Factory Certification Standard” under the assistance of National Cheng Kung University. This

initiative was completed in 2010, and is now applied to factory green building certification. We also extended this program to work with the Ministry of Economic Affairs Industrial Development Bureau (IDB), the Chinese Institute of Environmental Engineering, the Foundation of Taiwan Industry Service and the Taiwan Semiconductor Industry Association to establish a “Green Factory Clean Development Mechanism (CDM) Certification Standard”. We completed this second initiative in 2011 to provide a standard to identify environmental performance in factory processes. These two standards were integrated into a “Green Factory Standard” by the Taiwan Ministry of Economic Affairs, and issued on January 2012 to take effect in April 2012. These two certification standards are flexible and highly applicable due to the voluntary actions of industries, establishing an excellent model for collaboration between industry, government and academia. TSMC expects these standards will be adopted by various industries in Taiwan and raise the environmental performance of Taiwan businesses.

### Publishing Books to Share Green Experiences

TSMC collaborated with Commonwealth Publishing Company to publish two books on our green building experiences: “TSMC’s Green Power – 21 Critical Actions to Create Sustainable Competition” and “TSMC’s Green Action for High-Efficiency Green Facility Applications”.

TSMC’s Green Power describes TSMC’s green building initiative to help readers to understand the meaning of green buildings and their infrastructure, which starts from individuals, and extends to families, schools and companies, then further connect companies and industries. TSMC has not only created its own green supply chain but also influences next-tier suppliers to be green, creating a ripple effect through the industry.

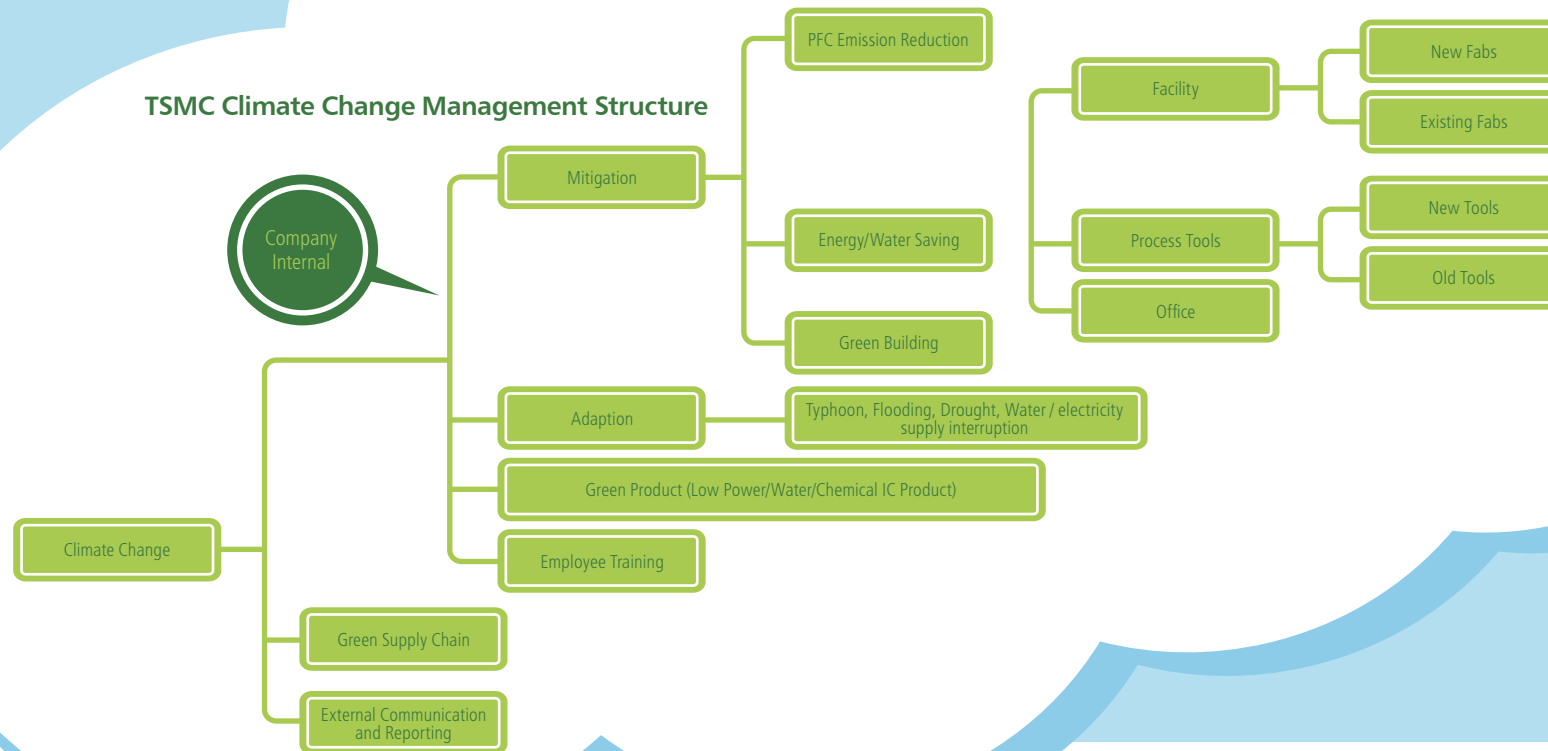
The second book, TSMC’s Green Action, aims to share TSMC’s green building experience, including green building planning, as well as the application procedure and methodology for certification. It helps companies developing their green strategy to understand how to build a green facility, and the steps and methodology for applying for international certifications. We hope that we can provide a reference to Taiwan’s companies to improve Taiwan’s green competitiveness and industrial economy. To continue spreading our green vision, TSMC donated the books to university and public libraries across Taiwan.



“TSMC’s Green Power – 21 Critical Actions to Create Sustainable Competition” and “TSMC’s Green Action for High-Efficiency Green Facility Applications”

TSMC collaborated with Commonwealth Publishing Company to publish two books on our green building experiences





### 8.3 Climate Change

#### TSMC is Highly Concerned about Climate Change

Global climate change is a major environmental concern for the United Nations and governments around the world, as well as for TSMC. We continuously monitor global climate change and international response trends as one of our enterprise risk management items to be evaluated and controlled, with regular reviews by senior executives, and reports are made to the Board of Directors when special issues are encountered.

#### 8.3.1 TSMC's Climate Change Response Strategy Climate Change Strategy

TSMC's strategies for responding to climate change are to:

- Consider both climate change mitigation and adaptation.
- Consider both green manufacturing and green products.
- Consider both TSMC and its supply chain.
- Integrate industry, government and academia to solve climate change issues.

TSMC not only continues to inventory and reduce its own greenhouse gas (GHG) emissions, but also takes actions on climate change adaption in cooperation with industry,

government and academia, including risk assessment and measures such as flood and drought control. These measures have grown to gradually cover TSMC's supply chain in recent years, and we monitor our progress in mitigation through product carbon footprints and water footprints. These measures also reduce operational risk for the company caused by climate change, and help to fulfill the company's social responsibility.

#### Monitoring Climate Change Risks in Three Dimensions

TSMC believes that climate change should be regarded as an important corporate risk, which must be controlled to improve our competitiveness. Climate change risks include legal risk, physical risk and other risks. Our control measures are as follows:

- **Climate legal risk control:** The greenhouse gas control regulations and agreements of country around the world are becoming more and more stringent. Enterprises are legally required to regularly disclose GHG-related information, and also limit GHG emissions. The cost of production, including materials and energy, may also grow along with future legal requirements such as carbon or energy taxes. TSMC continues to monitor legislative trends and communicate with various governments through industrial organizations and associations to set reasonable and feasible legal requirements. We also recommended the Taiwan government to acknowledge industries' voluntary reduction achievements through 3rd party verification before related legislation comes into effect.

- **Climate disaster risk control:** Abnormal climate caused by the greenhouse effect has increased the frequency of climate disasters each year. Storms, floods, drought, and water shortages are occurring more frequently, causing considerable impact on business operations and supply chains. TSMC believes that climate change control should take into account both mitigation and adaption, and this requires cooperation between industry and government to reduce risk. Therefore, in addition to water-saving measures at our own facilities and those of our upstream and downstream partners, TSMC is also leading the industry to collaborate with central government agencies and conduct a project to assess and mitigate climate natural disaster risk in three Taiwan Science Parks. This project also aims to establish a response and reporting system which can be effectively integrated with disaster relief resources. In order to ensure electricity and raw

water supplies, TSMC participates in the Taiwan Science Park Industrial Union Experts Committee platform, and is actively involved in regular meetings with Taipower Company and the Taiwan Water Corporation to discuss supply and allocation for response issues.

- **Other climate risk controls:** Climate change is an issue of concern to the global supply chain, necessitating energy conservation, carbon reduction, and disaster prevention. For example, Wal-Mart, the world's largest retailer, announced in 2009 it would require all suppliers to place eco-labels on their products within 5 years. The Electronic Industry Citizenship Coalition (EICC) has also required members' suppliers to disclose GHG emissions information. TSMC not only discloses our own GHG emissions information each year, we also assist and require our suppliers to establish a GHG inventory system and conduct reduction programs. TSMC's suppliers are required by TSMC to submit GHG emissions and reduction information as an important index of sustainability scoring in our procurement strategy.

### **Climate Change Opportunities**

TSMC believes that a company can increase its competitiveness and create opportunities through good climate change risk control. Therefore, TSMC continues to conduct energy saving and carbon reduction related projects to create opportunities as follows:

- **Regulatory opportunities:** The Taiwan Environmental Protection Administration (EPA) has set up a Greenhouse Gas (GHG) Early Reduction Project to encourage enterprises that have conducted voluntary GHG reduction before the GHG Reduction Act becomes effective to gain

carbon credits through application. The enterprises can use their approved carbon credits for future GHG emission off-sets or trading. TSMC began voluntary GHG emission reduction in 2000, and has reduced millions of tons of carbon dioxide equivalents over more than a decade. Currently, TSMC is applying for early GHG reduction credits with the EPA, and we expect that we can use the credits for future expansion or carbon trading to benefit our company.

- **Product opportunity:** Climate change has caused energy saving and carbon reduction to become a major issue for electric and electronic products, and also a major requirement of TSMC's customers. TSMC continues to develop advanced semiconductor technology in line with Moore's Law, lowering the energy and raw materials consumed per unit area in manufacturing stage, and also lowering the power consumption in product use stage, which has continued to reduce product carbon, water and other environmental impact carbon footprints. Based on this, we expect our customers will be more satisfied with TSMC's products and services.

- **Green energy business opportunity:** There is growing global demand for green energy business due to climate change. Since 2009, TSMC has engaged in researching, developing, designing, manufacturing and selling of solid state lighting devices as well as related products and systems, and solar-related technologies and products. In 2011, TSMC established two subsidiaries, "TSMC Solid State Lighting Ltd." and "TSMC Solar Ltd.," to continue to engage green energy business.

### 8.3.2 Climate Change Mitigation

#### Greenhouse Gas Inventory

TSMC believes reducing GHG emissions is a key method for mitigating global warming and climate change, and conducting an inventory provides supporting data for reduction. An accurate inventory allows us to set priorities and reduction goals, raise the efficiency of the reduction process, and confirm reduction results. Therefore, we believe it is better to inventory greenhouse gases as early as possible.

TSMC believes that a company must know its actual GHG emissions as the first step toward energy conservation and carbon reduction, and had made this reduction an important part of its green supply chain since 2008. In addition to organization-level inventory, TSMC has also extended carbon inventories to our supply chain. In doing this, TSMC can establish a capability for product-level carbon footprint inventory and carbon management, thus increasing the competitive advantage of the products we manufacture. These efforts have won recognition from government, domestic and international environmental groups, major investors, and customers.

TSMC's GHG emissions can be categorized into Scope 1, 2 and 3 sources. Scope 1 emissions are the direct emissions of TSMC fabs including process gases (PFCs, HFC, N<sub>2</sub>O, CH<sub>4</sub> and CO<sub>2</sub>), fuel such as natural gas, gasoline and diesel, and fugitive emissions from septic tanks and fire fighting equipment. Scope 2 emissions are mainly indirect emissions such as purchased electricity and steam.

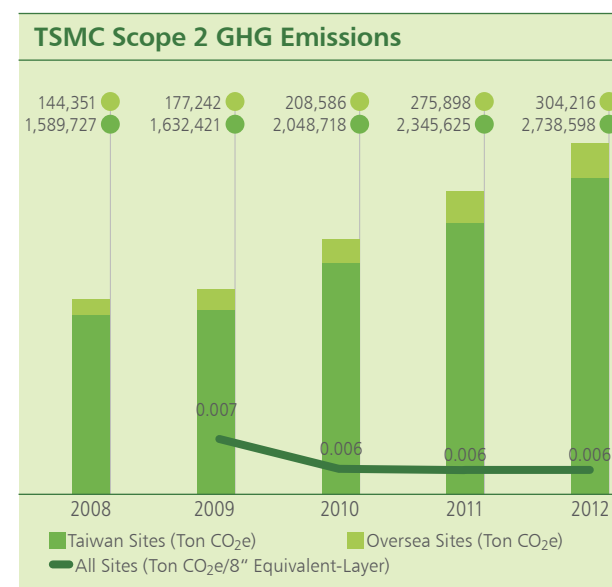
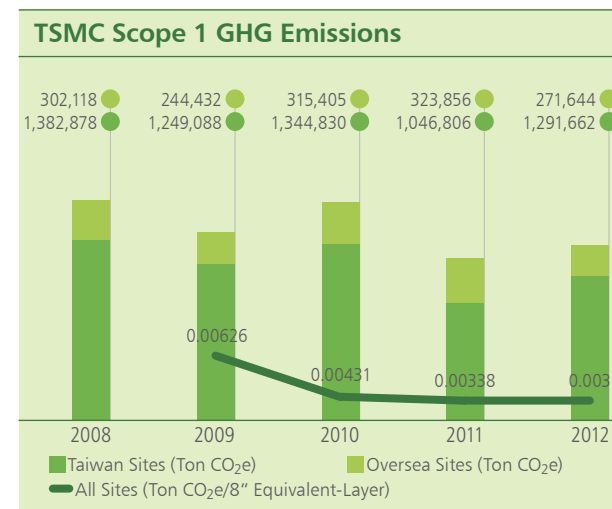
TSMC does not purchase steam. Therefore, our scope 2 emissions are primarily from purchased electricity. Scope 3 emissions are mainly indirect emissions including employee business travel, product and raw material transportation, suppliers' manufacturing, and waste disposal. Scope 1 and 2 emissions are calculated according to our annual inventory data; Scope 3 emissions are estimated by: (1) Statistical data: employees' business travel distances, and fuel consumed by shuttle buses and product shipping. (2) Carbon footprint database: raw materials production and transportation, waste disposal and transportation.

In 2005, TSMC became the first Taiwan company to complete a thorough inventory of GHG emissions and to receive official ISO 14064-1 certification issued by an external verification party. TSMC also set up a dedicated internal ESH information system for each fab to register GHG inventory data regularly.

TSMC China and WaferTech have also adopted ISO 14064-1 standard for their GHG inventory, and submit their inventory results to TSMC headquarters annually.

TSMC's U.S. subsidiary WaferTech continues to conduct GHG reduction to achieve a GHG reduction goal of 20% by 2017. WaferTech is actively engaged in Semiconductor Industry Association activities related to GHG measurement and reduction.

TSMC annual Scope 1&2 GHG inventories are as below.



Note: TSMC Taiwan sites' scope 2 GHG emissions have been revised according to the newest electricity emission factor announced by the Bureau of Energy, Ministry of Economic Affairs, R.O.C. WaferTech also revised its data according to US EPA eGRID GHG power mix numbers.

## GHG Information Disclosure

TSMC takes a pro-active attitude towards carbon disclosure, and publicly discloses climate change information through various channels. We constantly review ourselves and obtain recommendations from external parties through continuous information disclosure. The related disclosure channels are as follows:

- In 2006, the Taiwan Semiconductor Industry Association (TSIA) began a GHG inventory project for all members, including TSMC. This project followed the ISO 14064-1 standard to conduct a GHG inventory and acquire verification by an accreditation agency. TSMC voluntarily reports GHG inventory data to the Taiwan Environmental Protection Administration (EPA) and TSIA.
- Since 2005, TSMC has been participating in an annual survey held by the nonprofit Carbon Disclosure Project (CDP), which includes GHG emission and reduction information for all TSMC fabs, subsidiaries, joint ventures, and overseas offices. TSMC also takes further action to review the regulatory, natural disaster, financial, and operational risks and opportunities created by global climate change. The related information is disclosed on the CDP website (<https://www.cdproject.net/en-US/Pages/HomePage.aspx>).
- TSMC has disclosed GHG emissions and reduction-related information for evaluation by the Dow Jones Sustainability Index every year since 2001.
- Our GHG-related information has been disclosed in this CSR report on our company website annually since 2008. TSMC also provides information to customers and investors upon request.

## GHG Emission Reduction

### • Achievement of Our Ten-Year PFC Emission Reduction Commitment

**-5%**

PFC emissions intensity in 2012 was 5% less than 2011.

The semiconductor manufacturing process generally uses perfluorinated compounds (PFCs) such as CF<sub>4</sub>, C<sub>2</sub>F<sub>6</sub>, SF<sub>6</sub>, NF<sub>3</sub>, CHF<sub>3</sub>, C<sub>3</sub>F<sub>8</sub>, and C<sub>4</sub>F<sub>8</sub>, which are the major greenhouse gas emissions from the manufacturing process. After many years' effort, TSMC

has achieved its goal of reducing perfluorinated compound emissions to 10% below the average emission level of 1997 and 1999. This emission target remains fixed as TSMC continues to grow and construct new fabs, and has been a great challenge to us.

TSMC continues to actively participate in the World Semiconductor Council's establishment of a global voluntary reduction goal for the next ten years. TSMC integrated past experience to develop best practices, which have been recommended by the Taiwan Semiconductor Industry Association and adopted by the World Semiconductor Council member companies as major measures to achieve these organizations' 2020 reduction goals.

### • Extending our Green Building and Energy Conservation Projects

Since TSMC's Scope 2 GHG emissions are from primarily from purchased electricity, continued promotion of green building and energy conservation projects can continue to reduce our Scope 2 GHG emissions. Please refer to green building and energy conservation sections in this report for details.

## Energy Conservation Measures

### • Energy Conservation in Taiwan

TSMC's primary source of energy is electric power, followed by natural gas. Consumption of other types of energy is negligible. As Taiwan's land area is small, and the development of renewable energy is limited, electric power currently comes primarily from coal and gas-fired generators, which emit large amounts of CO<sub>2</sub> despite efforts by the power company to improve efficiency. In response to this, the Taiwan government is conducting a renewable energy project focusing on expansion of wind and solar power, and TSMC is pleased to see this development. Before the completion of this government project, energy conservation is an important part of CO<sub>2</sub> emission reduction for industries in Taiwan. TSMC has consistently promoted energy conservation at all its facilities, reducing CO<sub>2</sub> emissions while saving costs at the same time.

### • TSMC Green Fab Committee

At the end of 2010, TSMC set up a dedicated cross-department committee for energy conservation, which consists of the technical board, facility, equipment and environmental and safety personnel. The committee will define energy conservation indices and propose five-year action plans to reduce energy consumption efficiently and achieve a better level of unit energy consumption. Technical boards will focus on improving energy efficiency of the facility and process tools in existing fabs, and transfer their experience to adopt as standards for new fabs and new process tools; the new fab planning department will adopt the best-known energy-conserving designs for new fab construction. At the same time, TSMC will also try to purchase energy-efficient equipment by adjusting procurement specifications and encourage and promote suppliers' green certification.

## •Major Energy Saving Activities in 2012

In 2012, TSMC successfully completed a number of energy conservation programs in existing fabs with outstanding results. Some of them have become standard designs for new Fab projects. The major activities are listed as below.



### 1. Management System

- ◆ Introduced ISO 50001 at all advanced fabs as an energy evaluation and conservation system.



### 2. Power Conservation

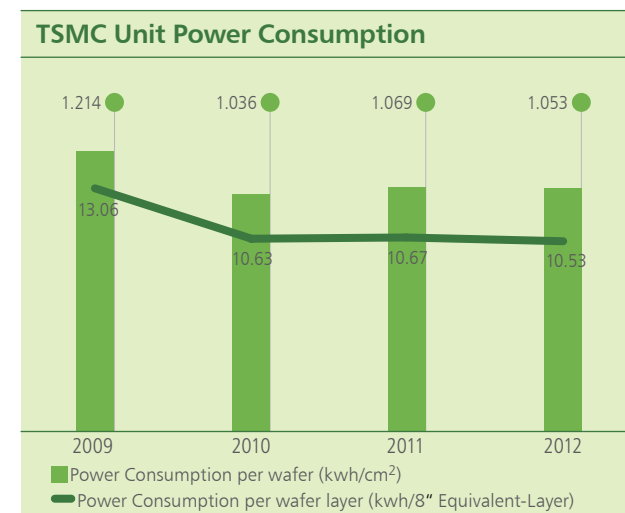
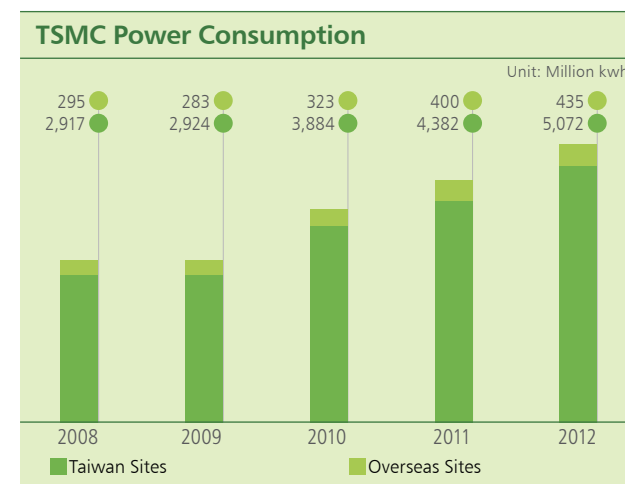
- ◆ Retrofitted chilling pumps' flow control to be frequency adjustable from original constant and full flow design.
- ◆ Installed Automatic Tube Cleaning Systems and added Polarized Refrigerant Oil additive to enhance chillers' heat exchange efficiency.
- ◆ Installed inverters to optimize cooling tower fan speed for weather conditions.
- ◆ Installed cooling tower ventilation trunks to reduce spatter loss.
- ◆ Optimized bafflers and utilized low pressure lost filters in Makeup Air Units to lower.
- ◆ Makeup Air Units' air washing pumps changed to control-by-air-quality mode.
- ◆ Shut down or minimized the utility requirements of standby local scrubbers.
- ◆ Improved sealing of gas boxes to reduce exhaust energy.
- ◆ Introduced Green Data Center concept into MIS server rooms.
- ◆ Used heat pumps to replace boilers as heating source for ultra pure water.
- ◆ Reduced or eliminated cooling water in point-of-use air abatement equipment to reduce power consumption.
- ◆ Shut off water pumps in high elevation areas to make use of gravity for water flow.
- ◆ Replaced low-efficiency water pumps with high efficiency pumps.



### 3. Energy Recovery

- ◆ Installed heat recovery equipment in chillers to heat raw water in winter and reduce natural gas consumption.
- ◆ Reused waste heat from Compressed Dry Air production process to heat ultra pure water.
- ◆ TSMC (China) installed a raw water preheating system in the ultra pure water production process to increase raw water temperature by recycling waste heat from refrigeration unit cooling water and reduce or replace natural gas consumed to heat raw water. This energy-saving program, which can save 934,234 cubic meters of natural gas per year (equal to 1,135 ton of standard coal) and has applied for recognition from the Shanghai government as a "Shanghai energy saving reconstruction technology".
- ◆ U.S. Subsidiary WaferTech installed a new process cooling water (PCW) Free Cooling system, utilizing pumps, heat exchangers and cooling towers to cool PCW during cooler months, reducing annual energy consumption by more than 64 million kilowatt-hours.

## •Power Consumption Records



Note 1: TSMC's annual power consumption includes all production factories and supporting organizations, including WaferTech, TSMC China, bumping, testing, EBO, R&D, offices, and landscaping.

Note 2: The statistical data for unit power density is for mass-production wafer fabs in Taiwan and overseas. Beginning in 2009, this index was rationalized by introducing a layer index due to product complexity.

TSMC continuously promotes energy saving and primarily focuses on facilities systems. In the past two years, we have increased our efforts in reducing consumption by manufacturing equipment. The power consumption density as calculated by wafer area is highly dependent on photo mask layers and production ramp-up in new fabs. In general, the complexity of logic ICs (foundry's major product) is higher than standard memory such as DRAM, and results in more layers as well as higher power consumption. TSMC is nonetheless one of the semiconductor industry's most energy-efficient companies, and continues to implement additional power-saving measures. TSMC reduced its power consumption index per 8-inch wafer equivalent per mask layer of wafer output (kwh/8" Equivalent-Layer) by 1.3% from 10.7 kwh in 2011 to 10.5 kwh in 2012.

#### •Direct Energy Use Status

TSMC's direct energy consumption includes natural gas and diesel fuels. In TSMC, natural gas is used only for boilers and Volatile Organic Compounds (VOC) adsorption and incineration treatment systems, and its usage is optimized effectively. VOC treatment systems consume most of the natural gas, and we optimized natural gas use through the following measures: (1) Optimizing desorption volume by using rotor Variable Frequency Drivers for VOC treatment systems. (2) Optimizing VOC burning temperature. (3) VOC burning heat recycled by heat exchanger. TSMC reduced average natural gas consumption per 8-inch wafer from 0.066m<sup>3</sup> in 2011 to 0.061m<sup>3</sup> in 2012, a remarkable reduction of approximately 7.6%, and continues to work towards further reduction.

Diesel is primarily used in emergency power generators and fire pumps, which are only engaged during power supply disruptions, emergencies, and scheduled tests. Diesel is not a direct energy source for production and we used about 247,000 liters in 2012.

### 8.3.3 Climate Change Adaption

#### Collaborating with the Central Government to Evaluate and Control Climate Change Risk in Science Parks

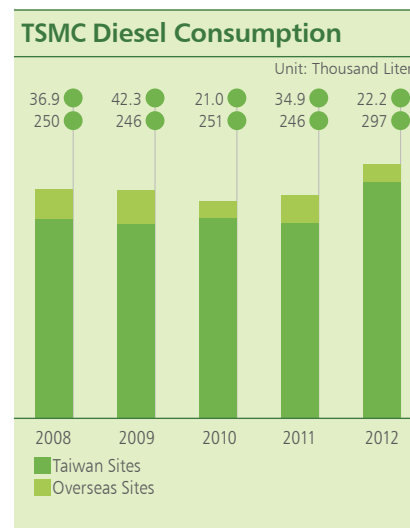
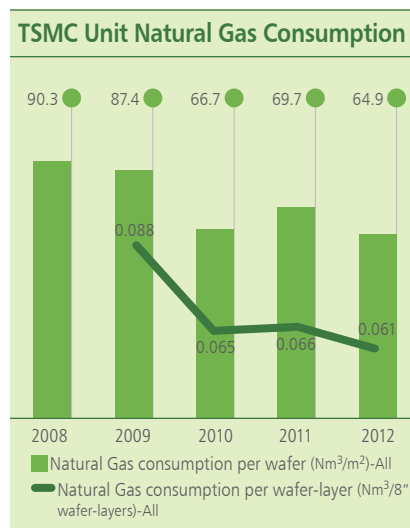
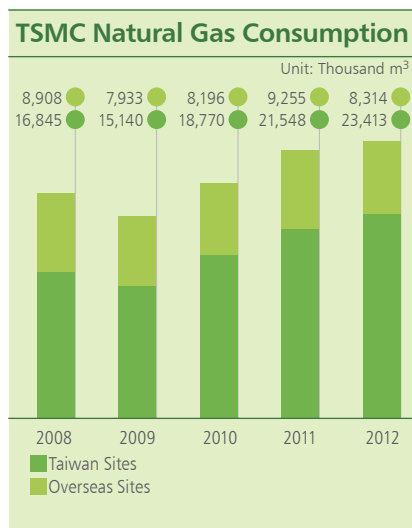
TSMC and other semiconductor companies gained the support of the Science Park Industrial Association, Science Park Administration, National Science Council, Water Resources Agency, Taipower, and Taiwan Water Corporation to reevaluate risks caused by climate change and extreme weather, including: interruptions to water supply, power supply, gas supply, transportation and communication, flood damage, wind damage, and drought. These re-evaluations will be used to develop response and improvement programs for implementation in the Hsinchu, Taichung and Tainan Science Parks.

The core considerations of the climate change risk assessment project for the Hsinchu, Central, and Southern Taiwan Science Parks are:

- The risks of typhoons and flooding.
- Long-term drought risks.
- Climate change risks that may lead to the restriction of industrial development.

Climate change risk control strategy:

- Mid-term and long-term risk control.
- Disaster emergency response.
- Establishing related reference standards for future new construction.



Note 1: The statistical data for natural gas consumption includes all fabs in Taiwan, as well as all overseas fabs, packaging and testing facilities, bumping, EBO, R&D, and others.

Note 2: Prior to 2009, natural gas consumption was calculated by total natural gas consumption divided by total wafer out. After 2009, this index was calculated by photomask layers to incorporate considerations of product complexity.

### 8.3.4 Supply Chain Climate Change Management

TSMC not only engages in climate change management but also requests and assists suppliers to follow. Our measures are as below:

- **Energy saving and carbon reduction management:**  
TSMC's major raw material suppliers are required to collect carbon inventory data in their manufacturing plants, develop a product-based carbon footprint and provide carbon reduction performance data.
- **Water resources and water management:** TSMC's major raw material suppliers are required to collect water inventory data in their manufacturing plants to establish a water footprint, and to provide a specific water resource management plan.
- **Climate change risk management:** Due to the increased risk of storms, water shortage, flooding and transportation and communication disruption in recent years resulting from global climate change, we require our major raw material suppliers to prepare contingency plans, such as support from overseas production, to reduce the impact of such an event. Our first-tier suppliers are also required to manage their suppliers.

Note: our major raw material suppliers account for 80% of total raw materials purchased by TSMC.

### 8.4 Water Resource Management

Water resource management and allocation has become an important issue in many countries due to the impact of global climate change. The changes in rainfall in between dry and rainy seasons in Taiwan have become increasingly

extreme since 2009, and the risk of droughts and floods has become increasing apparent. These developments have highlighted the importance of water resource management, water saving and water shortage emergency response programs. TSMC is aware that extreme rainfall is the result of global warming and climate change. These issues may require decades to resolve, and during that time, water resource management is a necessary part of TSMC's corporate climate change risk management and disaster adaptation. In addition, TSMC also acknowledges that water resource management requires greater collaboration with the government when compared to other climate change response measures. The combination of these factors has led TSMC to establish its water resource management policy and strategy.

### TSMC Water Resource Management Policy and Strategy

TSMC's goal is to be a leading global company in water resource management. Our water resource management policy is to promote water savings to reduce water usage per unit of production, and to promote collaboration between industries, government and academia to ensure that water shortages do not occur. Our strategy for reaching this goal is both to save water in daily operations and to adapt to water shortages, and implement these measures both internally and in our supply chain. TSMC's daily water management is first to save water in the production process, followed by water reclamation and recycling measure. In addition, an effective real-time online water resource management platform helps TSMC significantly reduce water consumption.



TSMC's core water resource management activities are focused on:

- Collaborating with the central government to evaluate the climate change risk of Taiwan's Science Parks, and to adopt measures reducing the impact of extreme climate disasters, beginning with basic infrastructure.
- Collaborating with the local government, public utilities, and other companies to coordinate local water resource allocation, set up water saving goals, and share experience.
- Sharing TSMC's water saving experience to help other industries understand the importance of water resource risk and conduct water conservation together.
- Promoting internal and supply chain water inventories, conserving water, and establishing a water footprint.

#### **Collaboration with Local Authorities in Water Allocation and Conservation**

Since water resources are inherently local, TSMC shares its water-saving experiences with other semiconductor companies through the Association of Science Park Industries to promote water conservation. At the same time, TSMC collaborates with the Science Park Administration to discuss raw water allocation and emergency response plans for water shortages. TSMC has also successfully resolved many water quality issues, including wastewater ammonia nitrogen reduction. In addition, we continue to hold technical forums to discuss water reclamation and assist small facilities in the Science Park to perform good water resource management in order to achieve the Science Park's goals and ensure long-term balance of supply and demand.

#### **Actively Sharing Experience with External Parties**

In June 29, 2012, TSMC, the R.O.C. Ministry of Economic Affairs Water Resource Agency, and the Taiwan Water Environment Association (TWEA) jointly held a Water

Resource Forum, a new industry-led initiative for adapting to global climate change. The forum was led by Minister of Economic Affairs Dr. Yen-Shiang Shih and TSMC Vice Chairman Dr. F.C. Tseng, who invited government officials and business leaders to discuss water resource development. In addition, Minister of the Interior Lee Hong-Yuan also spoke on clean production and strategies to respond to water resource risk.

The forum was attended by approximately 300 managers, scholars, and people in related fields. At the meeting, TSMC, China Steel Corp., and other experts in the field shared their experience in water resource recycling as well as developing and allocating water resources, aiming to build consensus and collaborate to lower Taiwan's water resource risk.

#### **Proactively Identifying and Responding to Water Resource Risk**

TSMC understands that climate change can cause flooding and drought. We took the following actions to respond to water resource risks:

- Identified short-term and long-term water resource risks of the science parks in northern, central and southern Taiwan, where our fabs are located.
- Developed and executed short-term and long-term water resource risk mitigation projects such as wastewater recycling.
- Continuing to conserve water consumption in each fab.

#### **Water Conservation – Reduction and Recycling**

TSMC's facilities collect process water discharges through independent drainages, and reuse the water for the manufacturing process or secondary uses after treatment. These secondary uses, which do not come into human contact, include make-up water of cooling towers and wet

scrubbers, cleaning water for sludge dewatering filters in wastewater treatment systems, and toilet water. Secondary uses of water are also optimized to reduce make-up water quantity. In order to fully utilize water drainage from the manufacturing process, TSMC separates drain pipes into more than 20 categories based on their characteristics and more than 15 categories of treatment systems.

**86.5%**

TSMC's process water recycling rate reached 86.5% in 2012.

TSMC is a fast-growing company, and in addition to adopting a minimum process water recycling rate of 85%, we also select low water consumption process tools, implement process water drainage segregation, set up process water reclamation systems in new

factory construction, and continue promoting water-saving measures after mass production. The purpose of these measures is to reduce our raw water demand.

TSMC also cooperates with industry experts to implement new technology for water reuse, such as reclaiming oxide slurry and reusing wastewater from refined oxide slurry.

#### **Major Water Saving Measures in 2012**

Since 2008, a number of TSMC fabs have achieved a process water recycling rate of higher than 90%, leading the global semiconductor industry. Our total process water recycling rate reached 86.5% in 2012, which met or exceeded the criteria set by the Science Park Administration and also exceeded the worldwide semiconductor industry standard. TSMC's major water saving measures are as follows:

##### **Water Use Reduction**

- Recycle Makeup Air Units' air washing water through a circulation-and-treatment system.
- Optimization of water usage for process tools, air pollution control wet scrubbers, and cooling towers.

- Change dosing chemical system for cooling towers, which greatly improves water quality and lowers water makeup frequency to reduce the quantity of makeup water.
- Use of water-saving faucets for employee hand-washing.
- 100% use of recycled water for toilet flushing.
- Control water use for external wall cleaning, landscaping and irrigation to avoid unnecessary consumption.

### Water Recycling

- Recycle electroplating rinse water for secondary water use.
- Reclaim Backside Grinding wastewater through an immersion ultra filter system, a chemical-free process.
- Reclaim Chemical Mechanical Polish wastewater via chemical-free ultra filter. Both water and solid wastes are recycled in a zero emission system.
- Recycle backwash wastewater from active carbon tower and sand filter tower by filtration for secondary water use.
- Installation of ozone wastewater recycling system for secondary water use.
- Installation of organic/acid water recycling systems, separated collection according to water quality, recycling water to ultrapure water systems or secondary uses such as cooling towers.
- Installation of general and copper-containing CMP wastewater recycling systems, recycling wastewater for ultra-pure water systems or secondary water use.
- Installation of wet scrubber water recycling systems to recycle wet scrubber effluent after treatment.
- Installation of treatment system to treat caustic wastewater with ammonia, recycling wastewater for ultra-pure water systems or secondary water use.
- Recycling of air conditioning condensation for cooling tower use.
- Establishment of rainwater storage system on roofs to supply plant irrigation systems, toilets, and wet scrubber water use.

### Water Saving Achievements and Process Recycling

In 2012, we saved a total of 53,370,000 cubic meters of water, which can provide a town with population of 500,000 with 1 year of water, or 1.7 times the volume of Hsinchu's Baoshan Reservoir II.

### TSMC Water Conservation Performance

Item	2008	2009	2010	2011	2012
Average process water recycling rate (%) <sup>1</sup>	80.4%	83.4%	84.1%	84.6%	86.5%
Process water saved (Million m <sup>3</sup> )	26.37	27.05	34.66	37.73	53.37
Water saved, measured by standard swimming pools <sup>2</sup>	10,548	10,822	13,866	15,094	21,347
Water saved, measured by the full capacity of Baoshan Reservoir II <sup>3</sup>	0.82	0.84	1.08	1.17	1.66

Note:

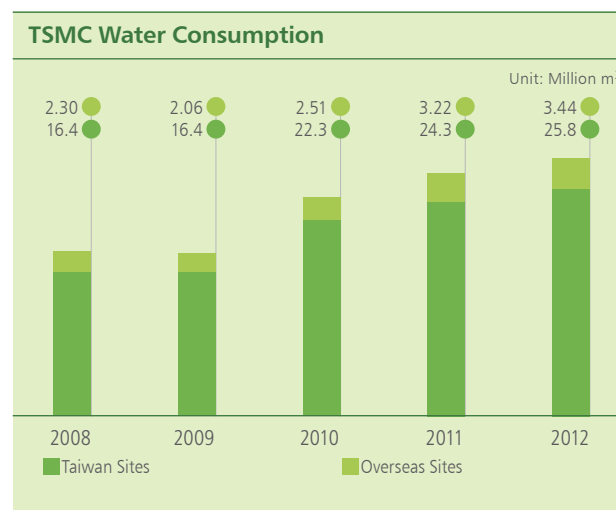
1. Average process water recycling rate is defined by the Science Park Administration.

2. A standard 50x25x2m swimming pool contains up to 2,500 cubic meter of water.

3. Baoshan Reservoir II is the major reservoir serving Hsinchu Science Park and the full capacity is 32.18 million tons.

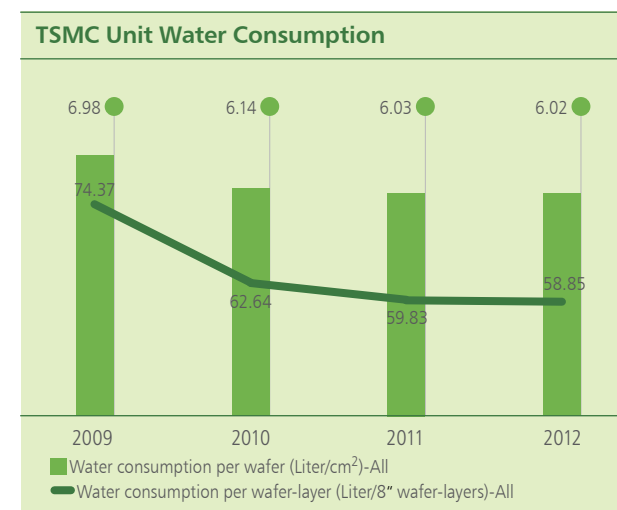
### Utility Water Usage

TSMC's water use per 8-inch wafer equivalent per mask layer (Note 2) in 2012 decreased by 1.6% compared to 2011 from 59.8 liters to 58.9 liters.



Note 1: The statistical data for water consumption includes all fabs in Taiwan, as well as all overseas fabs, packing and testing facilities, bumping, EBO, R&D, and water consumed by non-production activities.

Note 2: The statistical data for unit water consumption density is for the water usage of mass-production wafer fabs in Taiwan and overseas. Beginning in 2009, this index was rationalized by introducing a layer index due to product complexity.



8.5 Green Product

TSMC collaborates with upstream materials suppliers and downstream assembly and testing service providers to reduce product environmental impacts. We reduce the resources and energy consumed for each unit of production to provide our customers with more advanced, efficient, and ecological products. In addition to helping customers design low-power, high-performance products to reduce resource consumption over the product’s life cycle, TSMC practices clean manufacturing to provide additional green value for our customers.

TSMC-manufactured ICs are used in a broad variety of applications that cover various segments of the computer, communications, consumer, industrial and other electronics markets. Through our manufacturing, our customers’ designs are realized and applied to peoples’ lives. These chips make significant contributions to the progress of modern society. TSMC is honored that we can achieve profitable growth while providing products that increase environmental and social value. Below we list several examples of TSMC-manufactured products with significant contributions to society and the environment.

Environmental Contribution by TSMC Products  
Providing New Process Technology to Achieve Much Lower Power Consumption

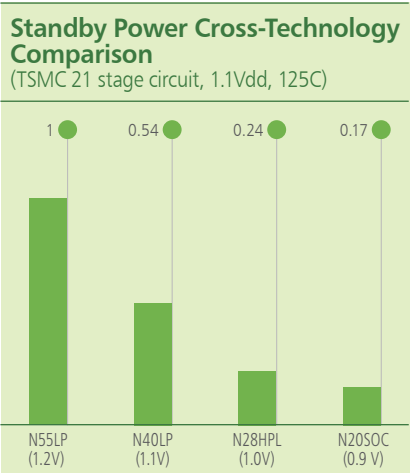
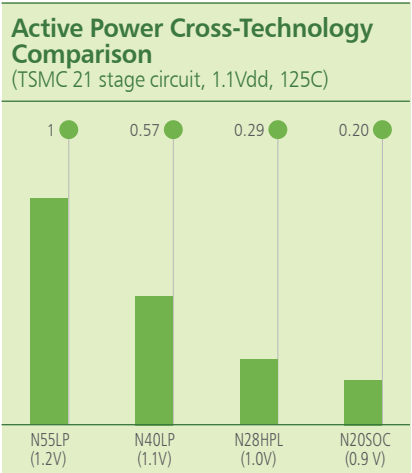
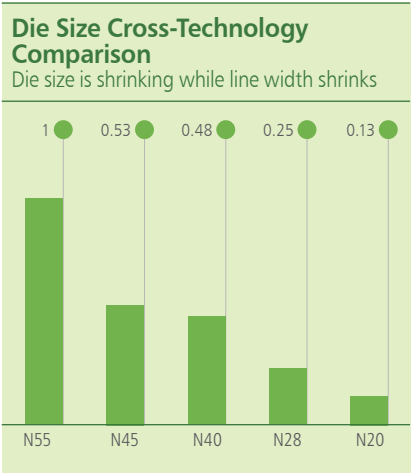
•The continuous development of TSMC’s advanced semiconductor process technologies realizes Moore’s law, which holds that process technology moves forward by one generation every 24 months. Each generation the line width of circuitry shrinks, making the circuits smaller and lowering the energy and raw materials consumed per unit area. At the same time, the smaller die size of the

IC also means that it consumes less power. For example, our 28nm technology can accommodate approximately 4 times the number of electronic components as 55nm technology. ICs made with 28nm technology in active or standby mode consume roughly one fourth the power of 55nm products, based on our internal test results.

•TSMC continues to lead the foundry segment in technology, having achieved volume production at 28nm. Our 28nm process offering includes 28nm High Performance (28HP), 28nm High Performance Low Power (28HPL), 28nm Low Power (28LP), and 28nm High Performance Mobile Computing (28HPM). Among these technology offerings, 28HP, 28HPL, 28LP, and 28HPM have all been qualified and demonstrated first Silicon success in FPGAs, GPUs, CPUs, and mobile SOCs products. The number of customer 28nm production tape-outs has more than doubled compared with that of 40nm.

The TSMC 28nm process has surpassed the previous generation’s production ramp and product yield at the same point in time due to closer and earlier collaboration with customers. TSMC will continue to work towards providing our customers with more advanced, energy-saving, and environmentally friendly products.

•28nm was the primary growth driver of TSMC in 2012. TSMC’s shipment of 28nm wafers increased thirty-fold in 2012 from its 2011 level, and 28nm annual contribution grew significantly from 1% to 12% of revenue, representing approximately NT\$60 billion or US\$2 billion in 2012. This reflects that TSMC’s advanced manufacturing process technology can help the company achieve profitable growth and save energy for the earth at the same time contributing to both TSMC and the global environment.



### Manufacturing Power Management ICs with the Best Efficiency for Customers

- TSMC's world-leading manufacturing technology helps customers design and manufacture green products. The most notable green IC products are power management ICs. Power management ICs are the key component for all electronic devices' power consumption, determining how electronic devices use power efficiently. TSMC's analog power technology research and development team uses 6-inch and 8-inch wafer fabs to develop leading performance Bipolar-CMOS-DMOS and Ultra-High Voltage technology, producing industry-leading power management chips with more stable and efficient power supply as well as lower energy consumption for broad-based applications in the consumer, communication, and computer markets.
- In addition to manufacturing service, TSMC also provides power-efficient design platforms to its customers. Using such design platforms, customers can develop energy-saving products to be manufactured by TSMC. For example, TSMC collaborates with a third-party IP partner to integrate their patented energy-saving technology and TSMC's advanced manufacturing technology to provide a "Power Trim Service" to our customers.
- Power management IC generates material revenue contribution to TSMC's industrial market segment. In 2012, TSMC's HV/Power technologies collectively shipped more than 1 million wafers to customers.

### Green Manufacturing with Lower Energy Consumption

- TSMC continues to develop manufacturing technology to provide more advanced and efficient manufacturing services. These improvements aim to reduce per-unit energy and resource consumption and pollutant generation, and also lower energy consumption and

pollution in the product use stage. Our clean production provides great economic benefit for us by cost reduction through lower energy consumption. Regarding the total benefit realized through our green manufacturing in 2012, please refer to page 99, "Environmental Accounting".

### Social Contribution by TSMC Products

#### Providing Mobile and Wireless Chips to Enhance Mobility & Convenience

- The rapid growth of smartphones and tablets in recent years reflects strong demand for mobile devices. Mobile devices offer remarkable convenience for people, and TSMC contributes significant value to these devices. For example, (1) New process technology helps chips provide faster computing speed in a smaller die area, leading to smaller form factors for these electronic devices. In addition, SoC (System on Chip) technology can integrate more functions in one chip, reducing the total chip volume in electronic devices, which also leads to a smaller form factor. (2) New process technology helps chips consume lower energy. People can therefore use mobile devices for a longer time, increasing its convenience. (3) With wireless connectivity chips, people can use wireless connections such as internet and GPS to communicate with each other and work anytime and anywhere, significantly improving the mobility of modern society.
- Mobile-related products, such as Baseband, RF Transceiver, AP (Application Processors), WLAN (Wireless Local Area network), NFC (Near Field Communication), Bluetooth, GPS (Global Positioning System) and others represent more than 30% of TSMC annual revenue, reaching more than NT\$150 billion or US\$5 billion in revenue this year. TSMC's growth in recent years was largely driven by the growing global demand for these mobile IC products.

### Enhancing Human Health and Safety with MEMS (Micro Electro Mechanical Systems)

TSMC-manufactured ICs are widely used in medical treatment and health care. Through our advanced manufacturing



technology, more and more medical IC products have emerged in the market, providing major contribution to modern medical development. Our MEMS products are already used in practical advanced medical treatments. Moreover, MEMS can be widely

used in personal health care, such as early warning systems to prevent the elderly from being injured by falls, systems for detecting changes in personal physiology, car safety system, and others, enhancing human health and safety from many aspects.

### TSMC Collaborates with Suppliers to Reduce Product Environmental Impact Footprints

TSMC's products take both quality and environmental impact into account. We believe that green products need to consider the entire product life cycle, including raw material mining, transportation, product manufacturing, use, and waste disposal to thoroughly evaluate environmental impact. The product carbon footprint, water footprint, or other environmental impact footprints are important indicators in the environmental performance of products.

Therefore, we require good hazardous substance management, pollution prevention, energy saving, waste reduction and other clean production measures in our own factories. We also require and assist suppliers to do so, and even require suppliers to require their suppliers to do so, in order to establish a green supply chain.

**Standards Compliant with or Surpassing International Product Environmental Laws**

• **Product Hazardous Substance Management**

By practicing QC 080000, TSMC ensures that products comply with regulatory and customer requirements, including:

**The EU Restriction of Hazardous Substance (RoHS):**

Restriction of hazardous substances in electric products including Lead (<1,000ppm), Cd (<100ppm), Hg (<1,000ppm), Cr6+ (<1,000ppm), PBB (<1,000ppm) and PBDE (<1,000ppm). In 2011, the new RoHS 2.0, 2011/65/EU has not changed restricted substances and Lead is exempted for the semiconductor bumping process. All TSMC products are compliant with EU RoHS. The bumping process still requires lead due to technology constraints. TSMC continues to develop “Lead-free” bumping to fulfill customers’ needs.

**Halogen-free electronic products:** In general, our customers request the concentration of Bromine and Chlorine in products to be less than 900ppm each, and

less than 1,500ppm in total. All TSMC products are in compliance.

**Perfluorooctane Sulfonates (PFOS) restriction standards:** TSMC has completely phased out PFOS from its process since 2010.

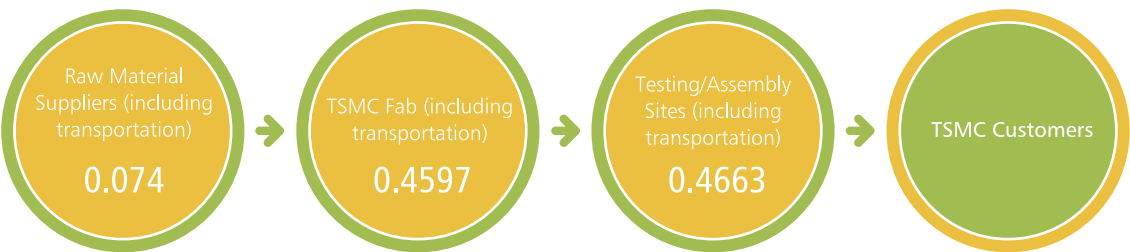
**EU REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) directive:** All TSMC products are compliant with the REACH dangerous chemicals and SVHC (Substance of Very High Concern) limits.

**EU Waste Electrical and Electronic Equipment (WEEE) Directive:** This regulation requires the recycling of electronic final products. TSMC’s chips are recycled along with electronic final products after use by consumers.

In addition to current global regulations and customer requirements, TSMC continues to monitor international regulation trends to prepare for response.

**Integrated Circuit Product Carbon Footprint Example – BGA Chip**

Product carbon footprint normalized at 1



BGA: ball grid arra

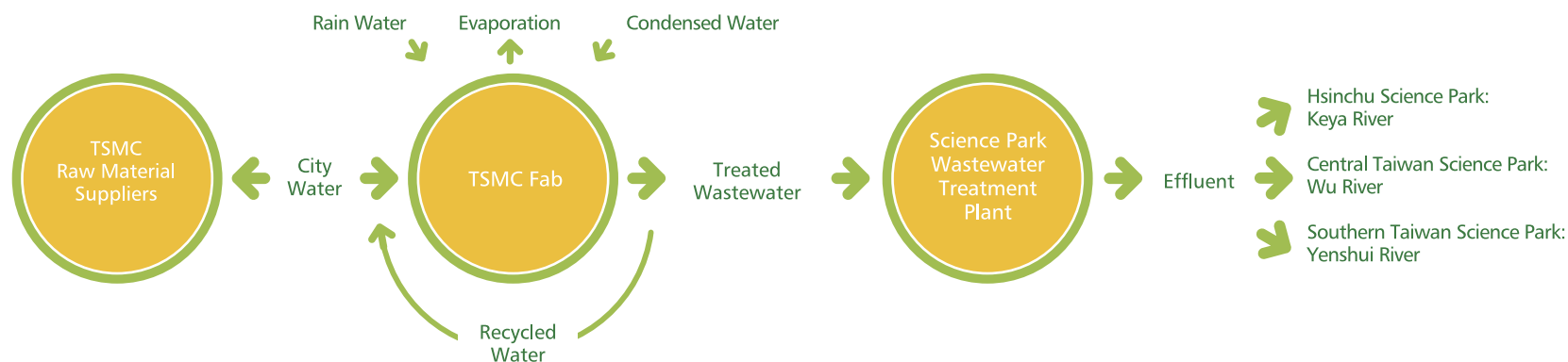
**Leading Upstream and Downstream Partners to Complete a Supply Chain Product Carbon Footprint**

TSMC continues to require that suppliers set up greenhouse gas (GHG) inventory procedures, and assists them in doing so. First, we led suppliers to complete the industry’s first IC Product Category Rule and Environmental Product Declaration in 2009, then led upstream and downstream partners to complete 12-inch wafer and packaged integrated circuit product carbon footprints, which passed third-party certification based on the British PAS2050 product carbon footprint standard in February 2011. In November 2011, our 8-inch wafer also passed PAS2050 carbon footprint certification. We completed 6-inch wafer carbon footprint certification in 2012, and can fulfill all customers’ requirements.

**Monitoring Semiconductor Product Water Footprint**

There has been much global discussion of water risk management and product water footprints, and these issues have been included in surveys by the Dow Jones Sustainability Indexes and the Carbon Disclosure Project. However, there are currently no international standards for product water footprints. TSMC has always viewed water as a precious resource, and has for many years required our own plants and those of our suppliers to conserve water. In addition to including a water footprint as well as other environmental impact footprints in the 2009 integrated circuits Type III Environmental Product Declaration, TSMC also includes water footprint calculation data in our supplier questionnaire. We will continue tracking international water footprint standards and prepare for new developments. In 2012, TSMC Fab 12 collaborated with 5 major suppliers and completed a 12-inch wafer product water footprint and received external certification.

## TSMC and Supplier Water Footprint



### Product Packing Materials Management and Reduction

TSMC uses recyclable plastic and paper as packing materials for shipping products. These packing materials comply with EU regulations requiring lead, cadmium, mercury and chromium (IV) concentration of less than 100ppm, and also contain no polyvinylchloride (PVC).

We reuse packing materials as much as possible to control usage. TSMC recycles packing materials from products shipped to customers and testing and assembly facilities for reuse after cleaning. Packing materials from raw wafers are also reused in product shipping. Our wafer shipping boxes are completely made from reused sources. These measures have reduced both packing material consumption and waste generation.

### 8.6 Pollution Prevention

TSMC believes that pollution prevention is one of a corporation's most important responsibilities. TSMC's pollution prevention is based on the ISO 14001 environmental management system, and uses the "Plan-Do-Check-Act" management model to promote continuous improvement. We believe that conserving raw materials, energy, and resources as well as reducing waste and pollutants both saves production costs and protects the environment.

#### Pollution Prevention is the Bottom Line

Taiwan has very limited land, large population, and high density of industrial factories. Therefore, some of its environmental regulations may be among the strictest in the world. To address increasingly stringent environmental

standards, TSMC has established good communication channels with the government, and participates in discussions in the early stages of legislation to facilitate reasonable and feasible standards. Each plant also performs assessments to evaluate conformity to new standards, and improvement and preventive measures are taken immediately if nonconformance is discovered.

TSMC has established comprehensive management and operations procedures for pipe-end treatments such as air and water pollution controls, and ensures these procedures are carried out precisely. TSMC has also installed monitoring systems on the discharging sides of pollution control facilities for online monitoring. Facility personnel follow emergency response and reporting procedures to take proper actions if operating conditions diverge from preset limits.

Assisting Non-semiconductor Subsidiaries in Early Pollution Control

TSMC assists its non-semiconductor subsidiaries, TSMC Solid State Lighting and TSMC Solar, in assessing risk for their specific wastewater, air emissions, wastes, and chemicals to reduce their environmental impacts.

Resource Recycling is Our Consensus

For waste management, TSMC has transitioned from traditional “treatment and disposal” to a concept of effective resource management, and implements this concept in daily operations. We manage waste as a resource, categorize and collect waste at the source, raise waste recyclability, and also collaborate with waste

treatment and recycling facilities to search for or develop possible recycling measures to reduce the amount of waste sent to incinerators and landfills. In addition, TSMC actively collaborates with raw material suppliers to reduce chemical usage and waste chemicals. We also study the feasibility of waste recycling by raw materials suppliers to reach our goal of sustainable resource recycling.

With this waste resource management model, TSMC has successfully raised its waste recycling rate each year, reduced its incineration and landfill rate, and cut waste disposal cost by generating waste recycling income. In 2012, TSMC’s waste recycling rate reached more than 93% and the landfill rate was less than 1%.

8.6.1 Source Reduction – Raw Materials Usage Reduction

TSMC seeks to optimize processes to minimize raw material use and waste production, protecting the environment while reducing costs at the same time. TSMC has a designated unit that periodically reviews raw materials reduction performance. Internally, we optimize our process recipe for raw material usage, which can not only reduce production cost but also reduce the generation of pollutants and wastes. Externally, we require our process tool suppliers to review and minimize their chemical usage step by step. We are now discussing with our process tool suppliers to adopt the SEMI-S23 guideline to optimize the consumption of energy, resource and chemicals. We have

TSMC Material Input and Output – Example of TSMC Fabs in Taiwan



also included SEMI-S23 as a process tool procurement specification.

TSMC uses raw wafers as a major direct material in its manufacturing process. Raw wafers are composed of very high purity silicon, and cannot be recycled for wafer manufacturing processes. However, control wafers used for monitoring process conditions are reclaimed for reuse. We estimate one control wafer can be reused 10 times, which reduces both cost and waste.

### **8.6.2 Water Pollution Control**

#### **Strategy of Segregated Treatment, Strict Monitoring, and Environmental Protection before Production**

TSMC's water pollution control strategy is first to reduce pollutants in process wastewater, followed by water recycling and treatment of pollutants in water. Effluent water quality must be better than or compliant with governmental standards.

TSMC's major water-using process is an ultra-pure water system which turns raw water into ultra-pure water, mainly used in process tools for cleaning chemical residue on wafer surfaces. To reduce total water usage, TSMC's effluent water from ultrapure water systems and process tools are graded by purity. The cleanest is reused in the manufacturing process; the second grade taken from the recycling treatment is employed in secondary uses such as cooling-tower water. Wastewater that cannot be recycled is discharged to treatment facilities for final wastewater treatment.

TSMC adopts a strict front-end wastewater categorization strategy to improve treatment efficiency. Wafer fabs' wastewater can be divided into fluoride, copper, general acid, and various polishing wastewaters. All types of

wastewater are strictly categorized at process tools, and collected to wastewater treatment facilities through separated piping. In order to manage these drains strictly, there are more than 20 categories of drainage types, carefully operated and maintained by professional teams to comply with the standards of the Science Park Administration (SPA). The water is then discharged to the SPA wastewater treatment plant for further treatment after professional teams ensure the discharge complies with SPA standards. The treated wastewater is discharged to rivers from the SPA's wastewater treatment plants in compliance with river discharge standards. The SPA also conducts random measurement of the discharges of each company in Science Park.

TSMC operates only after ensuring that the environment will not be polluted. Each fab is equipped with effective wastewater treatment systems, including complete backup systems such as emergency power supplies, to reduce the likelihood of abnormal discharge. Operating status of all of TSMC wastewater treatment systems are monitored 24 hours a day by shift personnel. If operating conditions diverge from the preset limits, a warning signal is sent and wastewater discharge is halted. Data gathered for monitoring system effectiveness have been designated an important tracking item to ensure effluent quality.

#### **Developing New Technologies to Response to New Regulations**

In addition to complying with SPA standards, TSMC continually works with industries and universities to improve discharge quality in areas such as COD (Chemical Oxygen Demand), TMAH (Tetra-methyl ammonium hydroxide) and NH<sub>3</sub>-N to reduce hazards to water bodies. For example, we reduced COD discharge for 12-inch fabs by 62.5%.

In addition, TSMC continues to explore new wastewater treatment and chemical recycling technologies. For example, TSMC led the industry in performing a series of experiments to obtain the optimal processing technology for NH<sub>3</sub>-N-containing backside grinding wastewater, high-concentration fluoride and phosphorus acid wastewater and TMAH recycled by external contractors, which attests to our dedication to protecting the environment.

#### **Wastewater Discharge Quality Improvement in 2012**

TSMC's major wastewater pollution control measures are as follows:

- Establishment of waste Tetramethyl Ammonium Hydroxide recycling system to reduce nitrogen-containing pollutants.
- Reuse of high concentration acid or base wastewater through resin regeneration or reverse-osmosis membrane for use as wastewater neutralization chemicals to reduce wastewater conductivity.
- Replacement of sodium hydrosulfite by Catalase to reduce wastewater conductivity.
- Use of chemical-free immersion ultra filter to treat backside grinding wastewater to reduce suspended solids in wastewater.
- Use of chemical-free immersion ultra filter to treat chemical mechanical polish wastewater to reduce suspended solids in wastewater.
- Reuse of waste phosphoric acid to reduce phosphoric acid in wastewater
- Installation of ammonia-biological wastewater treatment system in TSMC (China) to reduce ammonia in wastewater discharges.
- Installation of sewer biological treatment system in TSMC (China) to reduce chemical oxygen demand (COD) in wastewater discharges.

### Wastewater Discharge Quantity

TSMC's wastewater quantity per 8-inch wafer equivalent per mask layer (Note 2) in 2012 decreased by 8.0% compared to 2011 from 40.0 liters to 36.8 liters.

### Wastewater Effluent Monitoring

All TSMC fabs are equipped with continuous monitoring equipment to monitor and record changes in water quantity and quality, such as acidity and fluoride ion concentration, in order to take appropriate responses when abnormal situations occur. We also conduct offsite sampling and analyze wastewater effluent quality at least four times a year, which provides a calibration reference for online analyzers, ensuring that TSMC complies with water quality standards.

In 2012, TSMC wastewater effluent quality was close to 2011 levels, indicating good stability in all fabs. The wastewater effluent quality data includes: pH between 5 to 9 (SPA standard is 5 to 10), suspended solids were controlled from 4.3 to 250 mg/L (SPA standard is below 300), and COD was controlled from 11.1 to 343 mg/L (SPA standard is below 500).

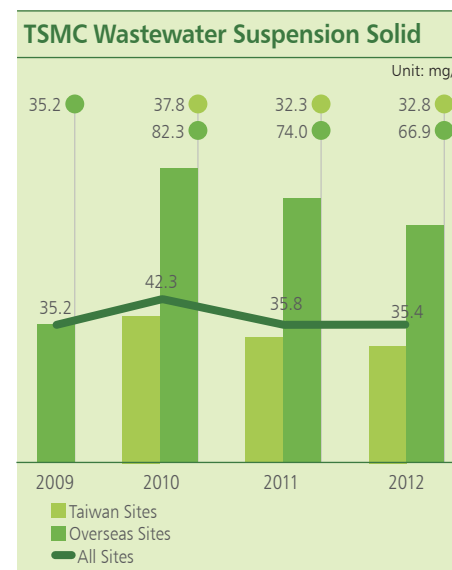
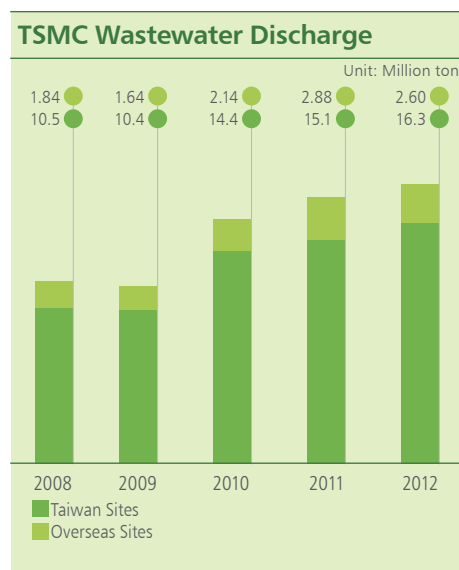
### 8.6.3 Air Pollution Control

#### Effective Treatment Based on Waste Air Specification

TSMC's air pollution control strategy is to optimize process to reduce pollutants in air exhaust, and then to abate pollutants in air exhaust through high-efficiency equipment to comply with or surpass legal requirements. Air pollutant concentrations in TSMC's exhaust are far below the

standards required by Taiwan's EPA, according to actual measurements performed over the years.

Wafer fabs emit three major types of exhaust: acid exhaust, base exhaust, and volatile organic compounds. Heat exhaust emitted by process equipment does not cause air pollution. Air pollution control systems depend on various categories and characteristics of pollutants. TSMC installs local scrubbers behind process tools in order to treat toxic, flammable and PFC gases. First, high temperatures or other physical and chemical measures are used to significantly reduce the concentration of pollutants in tool exhaust. The gas is then inducted to central waste gas treatment equipment for endpoint treatment. Endpoint treatment includes zeolite-rotary-wheel absorbing equipment for



Note 1: TSMC's annual wastewater quantity includes all fabs in Taiwan, as well as all overseas fabs, packing and testing facilities, bumping, EBO, R&D, and water consumed by non-production activities.

Note 2: Statistical data for unit wastewater quantity density is for wafer fabs in Taiwan and overseas. Beginning in 2009, this index was rationalized by introducing a layer index due to product complexity.



Advanced Operation Monitoring System

volatile organic compounds (VOC) treatment and wet scrubber equipment for acid or base gases.

### Stable Operation, Continuous Monitoring

The performance of all TSMC fabs, including overseas

facilities, is fully compliant or exceeds the air pollutant emissions standards in the areas where they operate. TSMC has deployed high performance air pollution control equipment with at least N+1 backup systems so that all pollution control equipment can continue waste gas control 24 hours a day, 365 days a year in case of equipment breakdown. Operational status of all of TSMC air pollution control systems is monitored 24 hours a day by shift personnel. Data collected by system efficiency monitoring have been classified as an important tracking item in order to ensure air exhaust quality. In 2009, we added an electronic quarterly air pollution report system that can automatically confirm the accuracy of declarations.

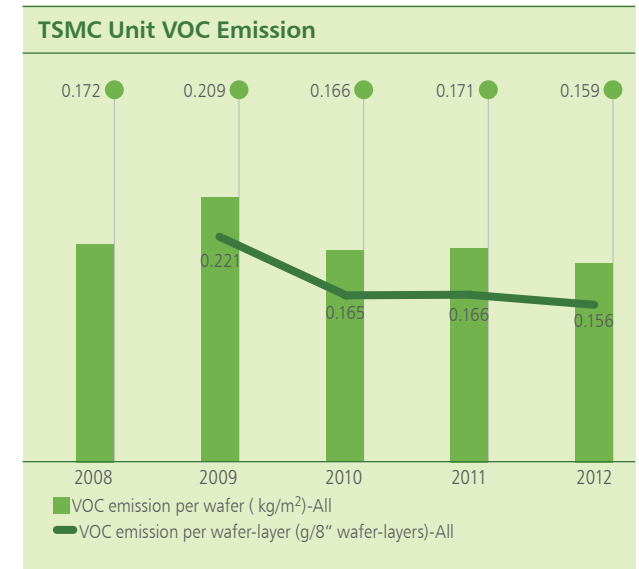
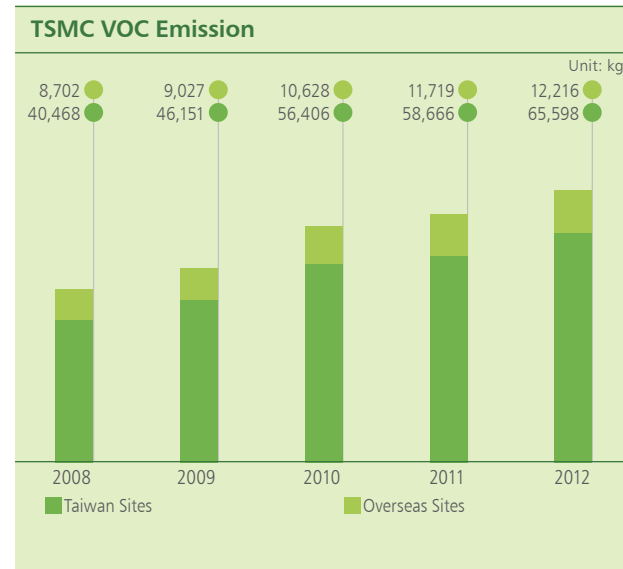
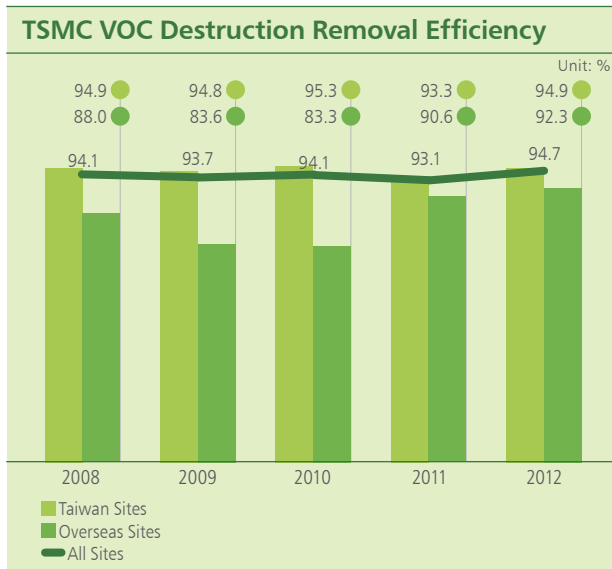
To ensure normal equipment operations and reduce abnormal pollutant emissions, TSMC has installed backup systems, including power generation, to back up malfunctions of operation equipment. TSMC has also

installed backup fuel supply systems for VOC pollution control equipment that will engage if the original fuel supply systems experience difficulties.

### Air Emissions Record

In 2012, the average removal efficiency of VOC exhaust remained at a relatively high level of 94.9% in TSMC's Taiwan fabs and 92.3% in overseas fabs, well above the standard for local regulations.

TSMC's VOC volume per 8-inch wafer equivalent per mask layer (Note 2) in 2012 decreased by 6% compared to 2011 from 0.166g to 0.156g. In addition, based on the Taiwan EPA's formula for calculating SOx and NOx emissions, TSMC estimates that our NOx emission was 85 tons and SOx emission was 42 tons in 2012.



Note 1: The statistical data for VOC emission includes all fabs in Taiwan, as well as all overseas fabs, packing and testing facilities, bumping, EBO, and R&D.

Note 2: Prior to 2009, VOC emission density was defined by total VOC emission quantity divided by total wafer out. Beginning in 2009, this index was rationalized by introducing a layer index due to product complexity.

### 8.6.4 Waste Reduction and Resource Recycling

TSMC has transitioned from traditional waste cleaning and disposal to integrated resource management, and has a designated waste resources management unit to treat waste as valuable resources to be recycled as much as possible. In order to sustainably use our resources, the first priority of our waste management is reduction; the second is recycling, followed by energy recovery, and finally disposal through incineration and landfill.

TSMC has made great efforts in reducing raw materials usage with significant achievements on waste reduction and recycling over the past decade. Although the categories of waste are growing more complex, TSMC continues to develop new waste recycling technology with suppliers to raise its recycling rate and reduce waste disposed in landfills. TSMC's Taiwan sites continued to carry out reduction and recycling programs in 2012, and our waste recycling rate reached 93%, exceeding 90% for the fifth consecutive year, while our landfill rate was below 1% for

the fifth consecutive year. Our overseas subsidiaries are also endeavoring to improve their waste recycling rates.

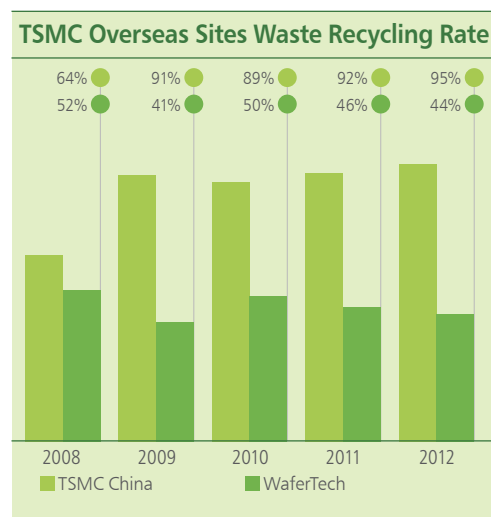
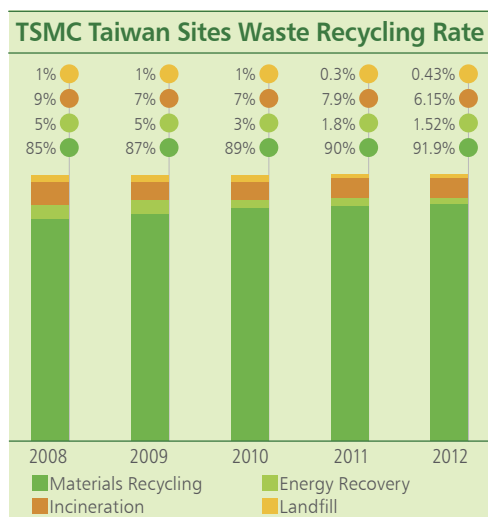
#### Innovative 3R Waste Projects

In 2012, TSMC initiated several environmental programs which focused on selected less-hazardous chemicals for reduction, recycling and reuse. For example:

- Process chemical replacement: Replaced copper etching chemicals with heavy metal-free chemicals to reduce environmental impact, reducing waste by 52%, or 5,300 tons.
- Chemical waste recycling technology development: Worked with supplier to develop a method to re-use developer fluid in other industrial processes to conserve natural resources and reduce ammonia waste; recycled 3,100 tons of developer fluid in 2012.
- Sulfuric acid reduction: We collaborated with process equipment vendors to reduce sulfuric acid usage and waste generation.

- Calcium fluoride sludge reduction: Installation of drying equipment to reduce weight and volume of calcium fluoride sludge.

TSMC's U.S. wafer fab, WaferTech, has successfully reduced hazardous waste by more than 77% since 2003 by actively seeking & implementing reuse opportunities for a number of fab waste materials. In 2012 WaferTech established a Green Team with the goal of reducing waste to landfill and increase recycling. The team has identified and started recycling several materials which were previously disposed of directly. One corrosive waste was changed from landfill to "waste to energy". This will eliminate approximately 25,000 lbs annually from disposal by landfill. In 2012 WaferTech was approached by the local state agency to submit an article on their waste reduction projects. WaferTech was showcased on the agency's web site in early 2013. <http://www.ecy.wa.gov/programs/hwtr/P2/success/WaferTech.html>



Note: The hazardous wastes are defined by local governments.

### Computer Reuse and Recycling Campaign

TSMC fully supported ASUSTek Computer Inc.'s "Computer Reuse and Recycling Campaign" project, which has also received support from the Ministry of Economic Affairs. TSMC has donated more than 37,495 used personal computers, notebook computers, and LCD monitors since 2007, making up one third of the total amount received in this project to become the largest donor.

**37,495**

TSMC has donated 37,495 used computers and LCD monitors since 2007.

Our purpose in participating in this campaign is to promote the concept of material recycling. Through this recycling campaign, refurbished computers are donated to students in rural elementary and junior high schools and to disadvantaged minorities to narrow the digital divide, caring for society and protecting the environment at the same time.

## 8.7 Environmental Management System

### 8.7.1 Environmental Management System Establishment

#### Establishing A Pro-Active Environmental Management Vision

TSMC aims to be a world-class company in environmental protection. Our environmental performance complies with legal requirements and also measures up to recognized international practices.

#### A Comprehensive Internal Environmental Management Organization

TSMC's environmental management organization consists of: the central Environmental, Safety & Health Planning unit; the Industrial Safety and Environmental Protection Technical Board; and designated Industrial Safety and Environmental Protection departments in each manufacturing facility.

These organizations work together collaboratively with clearly defined responsibilities. We use ISO 14001 and QC 080000 standards to manage environmental performance at all our manufacturing facilities. It is mandatory for all new manufacturing facilities to receive these certifications within 18 months of installing their first manufacturing equipment.

#### TSMC Leadership in Data Center and Wafer Fab ISO 50001 Certification

TSMC adopted the ISO 50001 Energy Management System in 2011 to extend its energy conservation efforts. The Fab 12 Phase 4 data center completed ISO 50001 Energy Management System certification in 2011, becoming Taiwan's first company to earn this certification for a high-density computing data center. TSMC believes ISO 50001 supports energy saving and carbon reduction, and continues to apply the ISO 50001 Energy Management System to additional manufacturing facilities. In 2012, the Fab 12 Phase 4/5 and Fab 14 Phase 3/4 facilities and offices also adopted the ISO 50001 system and earned certifications.

#### Continuous Improvement according to the Spirit of Our Management System

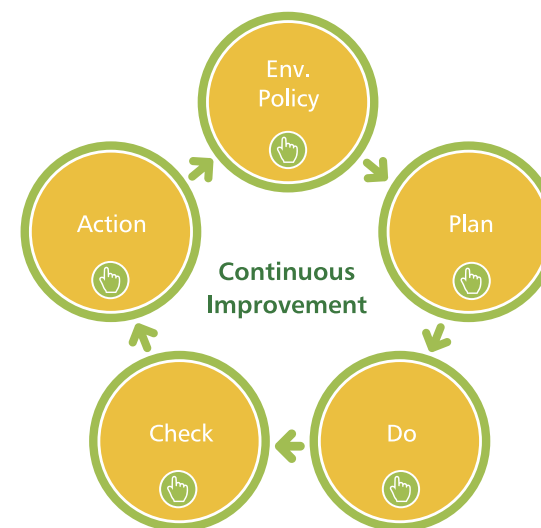
To sustainably mitigate enterprise risks and to fulfill our corporate social responsibilities, we focus on:

- Air and water pollution prevention and control
- Waste reduction and recycling
- Greenhouse gas reduction (energy efficiency and perfluorinated compound emission reduction)
- Resource conservation (water savings and chemical substance use reduction)
- Energy-saving products and restriction of hazardous substances

In addition to annual internal audits conducted by designated Industrial Safety and Environmental Protection

departments in each manufacturing facility on the operational status of environmental management systems, we also invite external verification parties to conduct audits and provide recommendations for improvement. The central Environmental, Safety & Health Planning unit also selects topics for annual audits on legal compliance and environmental risk control to enhance the whole company's ESH management.

#### TSMC Environmental Management System



#### Collaborating with Suppliers to Expand Sustainability Performance

TSMC also collaborates with our suppliers proactively on managing global ESH risks and working towards supply chain sustainability. Our efforts include:

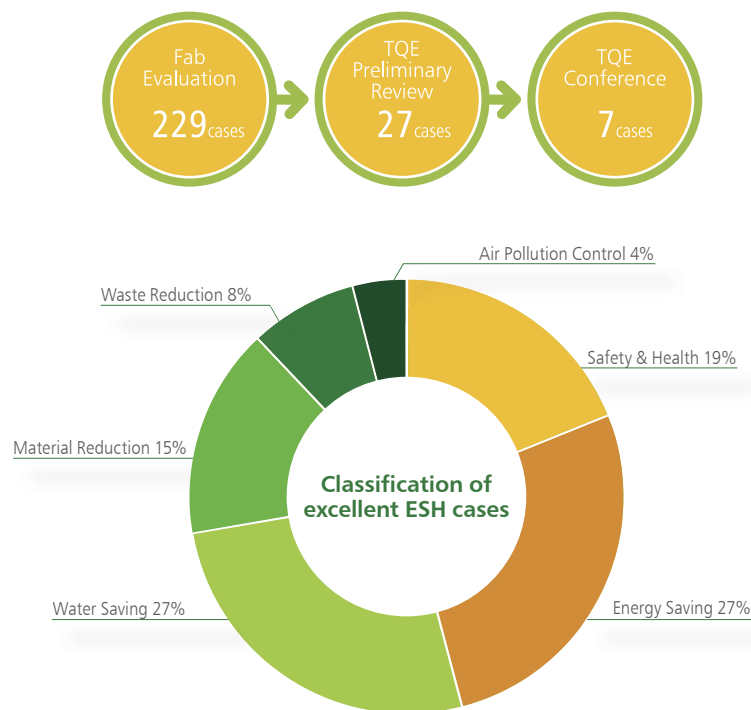
- Carbon footprinting
- Water footprinting
- Conflict minerals management
- Hazardous substance restriction management

Information on TSMC's supply chain sustainability management can found in Chapter 6.2 of this report.

### Setting up a new internal ESH incentive program

In order to encourage employees to continuously improve environmental, safety and health (ESH) performance, we added ESH as a new category of our annual Total Quality Excellence (TQE) program, which encourages units from across TSMC to learn from each other through competitions. Winning cases were published in the 2012 TQE Forum.

### 2012 TQE Conference – ESH Continuous Improvement



Note: TSMC has held its TQE Conference since 1993. The purpose is to encourage our colleagues to actively carry out continuous improvement, and develop a company culture of innovation and improvement. We hope that by learning from and comparing with colleagues from different units, we can improve our ability to innovate and solve problems, and further expand these abilities to improve the company's performance.

### 2012 TQE Conference Keynote Speech by Taiwan Minister of Environmental Protection

TSMC's TQE conference celebrated its 20<sup>th</sup> anniversary in 2012, and set environmental protection as its theme. We invited Taiwan's Minister of Environmental Protection, Stephen Shen to give a speech on "National strategy to promote low-carbon sustainable homes". TSMC also responded to the government's sustainable home policy with its ongoing commitment to corporate carbon reduction.

### Environmental Accounting

The purpose of TSMC's environmental accounting system is to identify and calculate environmental costs for internal management. At the same time, we can also evaluate the cost reduction or economic benefits of environmental protection programs to promote economically efficient programs. With environmental costs expected to continue growing, environmental accounting can help us manage more effectively. In practice, TSMC's environmental accounting measures define the various environmental

### 2012 Environmental Cost for TSMC Fabs in Taiwan

Unit: NT\$ thousands

Classification	Description	Investment	Expense
1. Direct cost for reducing environmental impact			
(1) Pollution Control	Fees for air pollution control, water pollution control, and others.	3,799,276	2,579,410
(2) Resource Conservation	Costs for resource (e.g. water) conservation.	1,420,032	85,522
(3) Waste Disposal and Recycling	Costs for waste treatment (including recycling, incineration and landfill)	0	411,730
2. Indirect cost for reducing environmental impact (managerial cost)	(1) Cost of training (2) Environmental management system and certification expenditures (3) Environmental measurement and monitoring fees (4) Environmental protection product costs (5) Environmental protection organization fees	217,302	170,893
3. Other environment-related costs	(1) Costs for decontamination and remediation (2) Environmental damage insurance and environmental taxes (3) Costs related to environmental settlement, compensations, penalties and lawsuits	0	0
Total		5,436,610	3,247,555

### 2012 Environmental Efficiency of TSMC Fabs in Taiwan

Category	Description	Efficiency (NT\$ thousands)
1. Cost saving of environmental protection projects	Energy saving: completed 37 projects	607,300
	Water saving: completed 6 projects	70,400
	Waste reduction: completed 8 projects	26,900
	Material reduction: completed 50 projects	467,700
2. Real income of industrial waste recycling	Recycling of used chemicals, wafers, targets, batteries, lamps, packaging materials, paper cardboard, metals, plastics, and other wastes	195,722
Total		1,368,022

costs and set up independent environmental account codes, then provide these to all units for use in annual budgeting. This online system can output data for environmental cost statistics.

Our economic benefit evaluation calculates cost savings for reduction of energy, water or wastes as well as benefits from waste recycling according to our environmental protection programs.

The environmental benefits disclosed in this report include real income from projects such as waste recycling and savings from major environmental protection projects. In 2012, we completed 101 environmental protection projects, and these benefits, in addition to benefits from waste recycling, totaled more than NT\$1,368 million.

#### Environmental Management in TSMC Subsidiaries

TSMC requires our manufacturing subsidiaries, including TSMC China, WaferTech, TSMC Solid State Lighting and TSMC Solar to have the same environmental management measures as TSMC. Subsidiaries are required to be consistent with our environmental policy and work standards.

Our manufacturing subsidiaries have actively set up environmental management systems, and they conform with our practice of requiring facilities to obtain ISO 14001 certification within 18 months of mass production.

TSMC assists its non-semiconductor subsidiaries TSMC SSL and TSMC Solar to assess risk for their specific wastewater, air emissions, wastes, and chemicals to ensure legal compliance. TSMC and its subsidiaries register various environmental performance indices in TSMC's e-platform regularly for monitoring and management to pursue continuous improvement.

#### 8.7.2 Environmental Compliance Record

TSMC had no significant chemical leaks, environmental penalties, or fines in 2012.

#### 8.8 Green Promotion and Ecological Preservation

TSMC continues to raise employees' environmental awareness through education programs, including new employee training, family day, and the annual "Loving the Earth Begins with Me" program. These convey environmental ideas that are reflected in our employees' actions, and lead many departments to seek opportunities to conserve energy, save water, and reduce waste. External promotion activities not only include green supply chain management, but also active collaboration with academia, industries and local governments in our operation sites around the world. We aim to use our influence as a corporation to protect the environment and to meet our corporate social responsibilities.

#### Enhancement of Employee Environmental Awareness

TSMC holds the environmental protection program "Loving the Earth Begins with Me" each year. In addition to professional environmental education courses, TSMC makes use of designated environmental bulletin boards in each fab as well as promotional materials in elevators, restrooms, and employee publications to embed environmental concepts in employees' everyday work and life.

In order to give employees easy access to up-to-date environmental knowledge, we maintain an internal environmental protection website which files related

information and maintains links to global environmental protection-related websites.

#### Hosting the "Low Carbon-LOHAS-Green Earth" Forum

As public awareness of climate change and environmental protection issues continues to grow, TSMC has actively worked to conserve energy and reduce carbon over the past several years. In 2012, World Environment Day (June 5) celebrated its 40th anniversary with the theme "Green Economy: Does it include you?" TSMC contributed by holding a "Low Carbon-LOHAS-Green Earth" forum inviting experts and scholars to help businesses and colleagues how to adopt a low-carbon lifestyle. Meteorology expert Dr. Peng Qi-ming spoke on "Climate Change and Adaptation," Zhang Yang-qian, Executive VP of the Delta Electronics Culture Foundation lectured on "Low-carbon Life and Corporate Social Responsibility," and low-carbon tourism expert Yo Zhi-Wei spoke on "Traveling with Environmental Sustainability in Mind".



Green Life Promotion Posters in TSMC Fabs

## Participate External Environmental Protection Activities Actively

### •“Low Carbon Green Earth” Earth Day Activities

In response to the “Mobilize the Earth” Earth Day activities of the Environmental Protection Administration (EPA), TSMC worked with the EPA to organize a green fair in Taipei’s Da-an Forest Park. Using “carbon reduction, LOHAS, and green earth” as our theme, TSMC engaged the public on issues such as global warming and climate change to teach low-carbon lifestyle concepts. TSMC also gave away potted plants that can reduce carbon, detoxify the air, and beautify the environment to participating members of the public to get them started on creating their own low-carbon sustainable homes.

### •Supporting the EPA’s “Low Carbon Green Market” Earth Day Activity

To promote the 2012 World Environment Day theme of “Green Economy: Does it include you?” and to promote green consumption as well as encourage the public to change their consumption ideas and habits, the EPA held a “Low Carbon Green Market” in the Taipei Train Station suitable for all ages. TSMC collaborated with the Huashan Social Welfare Foundation, allowing the public to trade recyclables or purchase receipts in exchange for potted plants, giving people an easy way to take action and begin to adopt a low-carbon mindset.

### •Low-carbon community counseling program in Hsinchu County

TSMC’s Fab 5 was the demonstration model for the EPA’s “Action mark for energy saving and carbon reduction” for northern Taiwan in 2011. In addition to our internal environmental processes, we also interact closely with the local government and community of Hsinchu County to

500

TSMC worked with the Hsinchu County EPB to train 500 environmental volunteers for the County.

completed 8 cycles of training for communities around Hsinchu County, adding 500 environmental volunteers for the EPB.

### •Cooperation with the Hsinchu County Environmental Protection Bureau to Promote the “Sustainable Campus Program”

TSMC’s Fab 5 was actively engaged in assisting the Hsinchu County EPB to guide Hsinchu County high schools and middle schools in joining the Ministry of Education’s “Sustainable Campus Program”. The Fab 5 “Low Carbon Green Earth” team brought together facility power and water conservation experts and environmental education staff to join this project and completed low-carbon facility assistance for 6 schools. The team also aided them in applying to the Ministry of Education for budget to complete stage 1 of the “Sustainable Campus Program”.

### •Counseling for certification of Environmental Education Facilities Place in Hsinchu County

TSMC cooperated with the Hsinchu County government to apply for EPA Environmental Education Facilities Certification for the Chutung ecological park, providing Hsinchu communities, schools, and public agencies with a convenient and diversified location to teach environmental

counsel low-carbon communities to participate in the “Action mark for energy saving and carbon reduction”. In addition, we cooperate with the Hsinchu County Environmental Protection Bureau (EPB) to complete environmental education training material in subjects such as water saving or carbon reduction. We

education. TSMC’s counseling included making use of the park’s vacant red-brick buildings for use as environmental teaching stations, and assistance in seven environmental education zones, including wetlands as well as areas for birdwatching and plant observation.

### •Cooperating with the government to train environmental volunteers

In 2012, TSMC cooperated with the Hsinchu County government for the first time to provide environmental protection volunteer and environmental education volunteer training for TSMC employees. A total of 65 people have completed stage 1 and stage 2 of the training, officially becoming Hsinchu County Environmental Protection Volunteers. An additional 16 have completed stage 3, official becoming Hsinchu County Environmental Education Volunteers. These TSMC volunteers will serve as environmental protection & education trainers for communities, schools, and public agencies in Hsinchu County.

## Environmental Protection Promotion Activities in TSMC Subsidiaries

TSMC China Ltd. maintains good relationships with local government through academic exchanges and related experience sharing. In addition, TSMC China also provides resources to help the China Semiconductor Industry Association prepare for participation in World Semiconductor Association activities. In 2012, TSMC China held a fluoride sludge dangerous characteristic identification expert discussion meeting with the Shanghai environmental protection bureau, Shanghai solid waste management center, Shanghai environmental monitoring corps, Shanghai chemical industry research institute, and Shanghai Jiaotong University. After testing, TSMC China’s calcium fluoride

sludge was found to contain no dangerous characteristics such as reactivity, corrosiveness, flammability, acute, toxicity.

TSMC's U.S. subsidiary WaferTech actively recycles, conserves energy and reduces waste. WaferTech successfully transferred 80 tons of hazardous waste from incineration to recycling. In addition, more than 150 tons of solid waste were transferred from landfill to recycling, and 630 tons of liquid waste chemicals were also recycled. In 2012, WaferTech held its eleventh annual Earthweek event, which seeks to raise employee's environmental awareness through recycling activities, displays and promoting alternative transportation.

Although TSMC's green industry subsidiaries TSMC SSL and TSMC Solar are in the start-up stage, they have already established an ESH management system and have stepped on track in a very short time. TSMC SSL adopted green

construction materials, and also was recognized by the Hsinchu City Government for excellent green procurement.

### **Ecological Preservation**

All TSMC wafer fabs in Taiwan and China are located in industrial parks, which conducted environmental impact assessment (EIA) on local communities before development, and continue to meet EIA commitments for environmental protection after development. Therefore, all TSMC wafer fabs in Taiwan and China are operating under the industrial parks' or their own EIA commitments, and do not have a significant environmental impact on their local ecological environments.

TSMC continues to promote the construction of green buildings, and incorporates the concept of ecological preservation in site planning. Facilities constructed in the

past three years not only comply with green building standards for energy saving, water conservation, and waste reduction, but also preserve native Taiwan plants and provide ecological ponds as habitats for birds and insects. We have observed birds nesting in the trees around our fabs, as well as butterflies and dragonflies in the air. The results of our efforts have gradually become evident.

Although TSMC's U.S. subsidiary fab, WaferTech, is not located in an industrial park, it maintains a designated department to take responsibility for monitoring and maintaining on-site ecological preservation. WaferTech has successfully completed a 10-year wetlands mitigation project, where 29 acres of wetlands are in a permanent preservation area, including 8 acres of enhanced wetlands. This project preserves valuable habitat for local wildlife and is home to beavers, deer, rabbits, coyotes and a variety of birds.



# Appendix

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## TSMC CSR Performance Summary

Key Indicators	2008	2009	2010	2011	2012
Economic					
Revenue (Billion NT\$)	333	296	420	427	506
Net Income (Billion NT\$)	100	89	162	134	166
Provision for Taxes (Billion NT\$)	11	6	8	11	16
R&D Expenditures (Billion NT\$)	21	22	30	34	40
Capital Expenditures (Billion NT\$)	59	88	187	214	246
Environmental					
Greenhouse Gas Emission (Tons CO <sub>2</sub> equivalent/8" Equivalent-Layer)	-	0.012	0.009	0.009	0.009
Greenhouse Gas Emission (Tons CO <sub>2</sub> equivalent)	3,241,243	3,140,436	3,748,333	3,996,631	4,606,119
Scope 1	1,507,165	1,330,773	1,491,030	1,375,110	1,563,306
Taiwan Sites	1,205,047	1,086,341	1,175,625	1,051,254	1,291,662
Overseas Sites	302,118	244,432	315,405	323,856	271,644
Scope 2	1,734,078	1,772,147	2,217,794	2,580,521	3,042,814
Taiwan Sites	1,589,727	1,632,421	2,048,718	2,345,625	2,738,598
Overseas Sites	144,351	177,242	208,586	275,898	304,216
Energy Consumption (TJ – including electricity, nature gas and diesel)	12,554	12,437	16,188	18,407	21,052
Direct Energy Consumption (TJ – including nature gas and diesel)	981	880	1,028	1,177	1,208
Indirect Energy Consumption (TJ – electricity)	11,573	11,556	15,160	17,230	19,844
Water Consumption (Million m <sup>3</sup> )	18.70	18.46	24.81	27.52	29.21
Taiwan Sites	16.40	16.40	22.30	24.30	25.77
Overseas Sites	2.30	2.06	2.51	3.22	3.44
Process Water Recycling Rate (Taiwan Sites) (%)	80.40	83.40	82.87	84.60	86.5
Process Water Saving (Taiwan Sites) (Million m <sup>3</sup> )	26.37	27.05	34.66	37.73	53.37

Key Indicators	2008	2009	2010	2011	2012
Waste Generated (Metric Tons)	40,793	50,199	89,536	97,981	129,921
General Waste Generated (Metric Tons)	20,876	19,080	27,453	29,270	37,459
Taiwan Sites	17,844	17,278	24,690	25,523	33,158
Overseas Sites	3,032	1,802	2,763	3,747	4,301
Hazardous Waste Generated (Metric Tons)	19,917	31,119	62,083	68,711	92,462
Taiwan Sites	19,020	30,491	61,242	67,589	90,596
Overseas Sites	897	628	841	1,122	1,866
Waste Recycling Rate (%)	86.43	89.55	90.88	90.47	92.47
Taiwan Sites	89.57	91.17	91.88	91.37	93.42
Overseas Sites	56.97	57.59	67.03	73.24	79
Social					
Numbers of Employee	22,843	24,466	33,232	33,669	37,149
Employee Training Hours	641,939	561,403	968,457	795,448	779,442
Safety - Injury Frequency Rate (Injury Number/Million Labor-hours) (Taiwan Sites)	0.18	0.27	0.27	0.22	0.24
Safety - Injury Severity Rate (Lost Work Days/Million Labor-hours) (Taiwan Sites)	0.82	4.11	2.56	1.97	5.19
Charity Donation (Million NT\$)	144	270	190	152	76.4

# ASSURANCE STATEMENT



## Introduction

DNV Business Assurance Co. Ltd. Taiwan ('DNV') has been commissioned by the management of Taiwan Semiconductor Manufacturing Company Ltd. ('TSMC' or 'the Company') to carry out an assurance engagement on the Company's 2012 Corporate Social Responsibility Report ('the Report') against the AA1000 Assurance Standard (2008) ('AA1000AS 2008') and the Global Reporting Initiative 2011 Sustainability Reporting Guidelines Version 3.1 ('GRI G3.1').

The management of TSMC is responsible for the collection, analysis, aggregation and presentation of information within the Report. Our responsibility in performing this work is to the management of TSMC only and in accordance with terms of reference agreed with the Company. The management of TSMC are the intended users of this statement. The assurance engagement is based on the assumption that the data and information provided to us is complete and true.

## Scope of Assurance

The scope of work agreed upon with TSMC included the following:

- The social, environmental and economic indicators presented in the Report, for the period of 12 months ending on 31 December 2012 and covering data on the company's head-office as well as the manufacturing sites in Taiwan, China and the United States.
  - Evaluation of the reporting principles for defining the sustainability report content and the quality as expressed in the Sustainability Reporting Guidelines GRI G3.1.
  - Evaluation of Accountability Principles and Performance Information (**Type 2**) with a **High level of assurance**, according to AA 1000 Accountability Principles Standard 2008 and AA1000 AS 2008.
- Evaluation of **specific sustainability performance information**:
- reported progress against the company's 2012 environmental commitments;
  - the core indicators set forth in the GRI G3.1.

Our verification has not covered data and information related to the financial and Green House Gases data. The data and information of financial data and Green House Gases emission/reduction data has been acquired from the certified balance sheet and GHG Inventory report.

## Verification Methodology

The verification was conducted by DNV on March 2013, by suitably qualified and experienced professionals, and in accordance with the DNV Protocol for Verification of Sustainability Reporting. The verification was conducted based only on the Chinese version Report.

The Report has been evaluated against the following criteria:

- Adherence to the principles of Inclusivity, Materiality and Responsiveness, as well as reliability of the specified sustainability performance information mentioned above, as set out in the AA1000AS 2008,
- Adherence to additional principles of Completeness and Neutrality, as set out in DNV's Protocol,
- Adherence to principles and requirements of the GRI G3.1 for an application level A+.

As part of the verification, DNV has challenged the statements and claims made in the Report and assessed the robustness of the underlying data management system, information flow and controls. For example, we have:

- Examined and reviewed documents, data and other information made available to DNV by TSMC;
- Visited the head-office and 5 production sites located in Taiwan;
- Conducted interviews with 50 company representatives, including senior managers, line manager and employees of various functions of the company, as well as NGOs involved in TSMC philanthropic activities;
- Consulted with external stakeholders, Taiwan Semiconductor Industry Association (TSIA);
- Performed sample-based reviews of the mechanisms for implementing the Company's own corporate responsibility-related policies, as described in the Report;
- Performed sample-based checks of the processes for generating, gathering and managing the quantitative and qualitative data included in the Report.

## Conclusions

In our opinion, the TSMC 2012 Corporate Social Responsibility Report meets the content requirements of the GRI Application Level A+, and provides an accurate and fair representation of the level of implementation of related Corporate Social Responsibility (CSR) policies. We have evaluated the Report's adherence to the following principles on a scale of 'Good', 'Acceptable' and 'Needs Improvement':

AA1000 AS 2008 principles:

**Inclusivity:** Acceptable. The Company has identified the expectations of stakeholders through internal mechanisms in dialogue with different groups of stakeholders. The key CSR issues identified through this process are reflected in the Report.

**Materiality:** Acceptable. The process developed internally has not missed out any significant, known material issues, and these issues are fairly covered in the Report. The Company has continued to adopt the materiality review process over the past year to identify more specific CSR issues. And a risk matrix has been developed to evaluate the priority of these issues.

**Responsiveness:** Good. The Company has adequately responded to stakeholder concerns through its policies, CSR Committee, and management systems, and this is reflected in the Report.

Additional principles:

**Completeness:** Good. The Report covers performance against the GRI G3.1 core indicators that are material within the Company's reporting boundary. The information in the Report includes the company's most significant initiatives or events that occurred in the reporting period.

**Neutrality:** Good. DNV considers that the information contained in the Report is balanced. The emphasis on various topics in the Report is proportionate to their relative materiality.

Finally, in accordance with Type 2, high level assurance requirements, we conclude that the specified CSR data and information presented in the Report is reliable. The Company has developed its own data management system for capturing and reporting its CSR performance. No systematic errors were detected.

#### Limitations

This statement is based upon the application of sample principles and professional judgment to certain facts, with resulting subjective interpretations. Professional judgments expressed herein are based upon the facts currently available within the limits of the existing data, scope of work, the budget and time schedule. Therefore we cannot provide guarantees that further relevant aspects may not arise in the future which were not known to us during the investigation.

#### Opportunities for Improvement

The following is an excerpt from the observations and opportunities reported back to the management of TSMC. However, these do not affect our conclusions on the Report, and they are indeed generally consistent with the management objectives already in place.

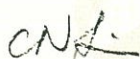
- For the identified material CSR issues of Corporate Governance, Human Resources and Social Involvement, it is recommended to develop qualitative Key Performance Indicators and middle-term targets to ensure comparability and facilitate the assessment of performance.
- It is suggested to enhance the consistency of data collection among different operation sites.
- We see this is an opportunity to incorporate the environmental, social and economic performance indicators, which are reported in CSR report, into management processes where they can be routinely reported, monitored and optimized.

#### DNV's Competence and Independence

DNV is a global provider of sustainability services, with environmental and social assurance specialists working in over 100 countries. DNV was not involved in the preparation of any statements or data included in the Report except for this Assurance Statement. DNV expressly disclaims any liability or co-responsibility for any decision a person or entity would make based on this Assurance Statement.

For DNV Business Assurance Co. Ltd. Taiwan,

Signed:



Name of Lead Verifier: Chun-Nan Lin

DNV Business Assurance Co. Ltd.,  
Taiwan, R.O.C., 26 April 2013  
Statement Number: 00001-2013-ACSR-TWN

Signed:



Name of Reviewer: David Hsieh  
District Manager



AA1000  
Licensed Assurance Provider  
000-10

## GRI G3.1 Index

● Fully disclosed    ● Partially disclosed

Profile Disclosure	Description	Extent of Reporting	Related TSMC CSR Report Section	Page(s)	Explanatory Notes
1. Strategy and Analysis					
1.1	Statement from the most senior decision-maker of the organization.	●	1. Letter from the Chairman and CEO	1	
1.2	Description of key impacts, risks, and opportunities.	●	1. Letter from the Chairman and CEO 4.6 Risk Management	1, 31	
2. Organizational Profile					
2.1	Name of the organization.	●	2. Company Profile	9	
2.2	Primary brands, products, and/or services.	●	2. Company Profile	9	
2.3	Operational structure of the organization, including main divisions, operating companies, subsidiaries, and joint ventures.	●	2. Company Profile	9	
2.4	Location of organization's headquarters.	●	Contact Information	119	
2.5	Number of countries where the organization operates, and names of countries with either major operations or that are specifically relevant to the sustainability issues covered in the report.	●	2. Company Profile	9	
2.6	Nature of ownership and legal form.	●	2. Company Profile	9	
2.7	Markets served (including geographic breakdown, sectors served, and types of customers/beneficiaries).	●	2.1 Market/Business Summary	10	
2.8	Scale of the reporting organization.	●	2.6 Financial Highlights 5.1.4 The Engine of Employee Growth	21, 37	
2.9	Significant changes during the reporting period regarding size, structure, or ownership.	●	2. Company Profile 2.1 Market/Business Summary	9, 10	No significant changes
2.10	Awards received in the reporting period.	●	2012 Awards and Recognitions	5	
3. Report Parameters					
3.1	Reporting period (e.g., fiscal/calendar year) for information provided.	●	Overview	1	
3.2	Date of most recent previous report (if any).	●	Overview	1	
3.3	Reporting cycle (annual, biennial, etc.)	●	Overview	1	
3.4	Contact point for questions regarding the report or its contents.	●	Contact Information	119	
3.5	Process for defining report content including: Determining materiality; Prioritizing topics within the report; and Identifying stakeholders the organization expects to use the report.	●	3. Stakeholder Engagement	23	
3.6	Boundary of the report (e.g., countries, divisions, subsidiaries, leased facilities, joint ventures, suppliers). See GRI Boundary Protocol for further guidance.	●	Overview	1	

Profile Disclosure	Description	Extent of Reporting	Related TSMC CSR Report Section	Page(s)	Explanatory Notes
3.7	State any specific limitations on the scope or boundary of the report (see completeness principle for explanation of scope).	●	Overview	1	
3.8	Basis for reporting on joint ventures, subsidiaries, leased facilities, outsourced operations, and other entities that can significantly affect comparability from period to period and/or between organizations.	●	Overview 2. Company Profile	1, 9	
3.9	Data measurement techniques and the bases of calculations, including assumptions and techniques underlying estimations applied to the compilation of the Indicators and other information in the report. Explain any decisions not to apply, or to substantially diverge from, the GRI Indicator Protocols.	●	Overview	1	
3.10	Explanation of the effect of any re-statements of information provided in earlier reports, and the reasons for such re-statement (e.g., mergers/acquisitions, change of base years/periods, nature of business, measurement methods).	●	Overview	1	
3.11	Significant changes from previous reporting periods in the scope, boundary, or measurement methods applied in the report.	●	Overview	1	
3.12	Table identifying the location of the Standard Disclosures in the report.	●	GRI G3.1 Index	108	
3.13	Policy and current practice with regard to seeking external assurance for the report.	●	Overview Assurance Statement	1, 106	
<b>4. Governance, Commitments, and Engagement</b>					
4.1	Governance structure of the organization, including committees under the highest governance body responsible for specific tasks, such as setting strategy or organizational oversight.	●	4.2 Board of Directors	27	
4.2	Indicate whether the Chair of the highest governance body is also an executive officer.	●	4.2 Board of Directors	27	
4.3	For organizations that have a unitary board structure, state the number of members of the highest governance body that are independent and/or non-executive members.	●	4.2 Board of Directors	27	
4.4	Mechanisms for shareholders and employees to provide recommendations or direction to the highest governance body.	●	3. Stakeholder Engagement	23	
4.5	Linkage between compensation for members of the highest governance body, senior managers, and executives (including departure arrangements), and the organization's performance (including social and environmental performance).	●	4.2 Board of Directors	27	
4.6	Processes in place for the highest governance body to ensure conflicts of interest are avoided.	●	4.4.2 Code Administration and Disciplinary Action	29	
4.7	Process for determining the composition, qualifications, and expertise of the members of the highest governance body and its committees, including any consideration of gender and other indicators of diversity.	●	4.2 Board of Directors 4.2.4 Audit Committee 4.2.5 Compensation Committee	27, 28	
4.8	Internally developed statements of mission or values, codes of conduct, and principles relevant to economic, environmental, and social performance and the status of their implementation.	●	4.4.1 Ethics Values	28	

Profile Disclosure	Description	Extent of Reporting	Related TSMC CSR Report Section	Page(s)	Explanatory Notes
4.9	Procedures of the highest governance body for overseeing the organization's identification and management of economic, environmental, and social performance, including relevant risks and opportunities, and adherence or compliance with internationally agreed standards, codes of conduct, and principles.	●	4.2.4 Audit Committee	27	
4.10	Processes for evaluating the highest governance body's own performance, particularly with respect to economic, environmental, and social performance.	●	4.2.2 Board Responsibilities	27	
4.11	Explanation of whether and how the precautionary approach or principle is addressed by the organization.	●	4.2.2 Board Responsibilities 4.6 Risk Management	27, 31	
4.12	Externally developed economic, environmental, and social charters, principles, or other initiatives to which the organization subscribes or endorses.	●	8.3.2 Climate Change Mitigation	82	
4.13	Memberships in associations (such as industry associations) and/or national/international advocacy organizations in which the organization: * Has positions in governance bodies; * Participates in projects or committees; * Provides substantive funding beyond routine membership dues; or * Views membership as strategic.	●	2.4 Membership in Industry Associations	19	
4.14	List of stakeholder groups engaged by the organization.	●	3. Stakeholder Engagement	23	
4.15	Basis for identification and selection of stakeholders with whom to engage.	●	3. Stakeholder Engagement	23	
4.16	Approaches to stakeholder engagement, including frequency of engagement by type and by stakeholder group.	●	3. Stakeholder Engagement	23	
4.17	Key topics and concerns that have been raised through stakeholder engagement, and how the organization has responded to those key topics and concerns, including through its reporting.	●	3. Stakeholder Engagement	23	
<b>5. MANAGEMENT APPROACH AND PERFORMANCE INDICATORS</b>					
<b>Economic</b>					
DMA	Disclosures on Management Approach	●	2. Company Profile	9	
EC1	Direct economic value generated and distributed, including revenues, operating costs, employee compensation, donations and other community investments, retained earnings, and payments to capital providers and governments.	●	2.6 Financial Highlights	21	
EC2	Financial implications and other risks and opportunities for the organization's activities due to climate change.	●	8.3 Climate Change	80	
EC3	Coverage of the organization's defined benefit plan obligations.	●	5.2.4 Benefits – Safeguarding Employees' Rights	40	
EC4	Significant financial assistance received from government.	●	2.6 Financial Highlights	21	
EC5	Range of ratios of standard entry level wage by gender compared to local minimum wage at significant locations of operation.	●	5.1.3 Compensation and Rewarding People for Long-term Growth	36	

Profile Disclosure	Description	Extent of Reporting	Related TSMC CSR Report Section	Page(s)	Explanatory Notes
EC6	Policy, practices, and proportion of spending on locally-based suppliers at significant locations of operation.		6.2 Supplier Management	55	
EC7	Procedures for local hiring and proportion of senior management hired from the local community at significant locations of operation		5.1.1 Stable and Healthy Workforce	33	
EC8	Development and impact of infrastructure investments and services provided primarily for public benefit through commercial, in-kind, or pro bono engagement.				No related investments and services
EC9	Understanding and describing significant indirect economic impacts, including the extent of impacts.		6.1 Customer Service and Satisfaction 6.2 Supplier Management	55	
Environmental					
DMA	Disclosures on Management Approach		8. Environmental Protection	74	
EN1	Materials used by weight or volume.		8.3.2 Climate Change Mitigation 8.4 Water Resource Management 8.6.1 Source Reduction – Raw Materials Usage Reduction	82, 86, 93	
EN2	Percentage of materials used that are recycled input materials.				We use some recycled slurry in our Chemical Mechanic Polishing process.
EN3	Direct energy consumption by primary energy source.		8.3.2 Climate Change Mitigation	82	
EN4	Indirect energy consumption by primary source.		8.3.2 Climate Change Mitigation	82	
EN5	Energy saved due to conservation and efficiency improvements.		8.2 Build Green Fabs, Green Campus, and Assisting the Government to Establish Green Factory Guidelines 8.3.2 Climate Change Mitigation	77, 82	
EN6	Initiatives to provide energy-efficient or renewable energy based products and services, and reductions in energy requirements as a result of these initiatives.		8.5 Green Product	89	
EN7	Initiatives to reduce indirect energy consumption and reductions achieved.		8.2 Build Green Fabs, Green Campus, and Assisting the Government to Establish Green Factory Guidelines 8.3.2 Climate Change Mitigation	77, 82	
EN8	Total water withdrawal by source.		8.4 Water Resource Management	86	Our water source is 100% from city water.
EN9	Water sources significantly affected by withdrawal of water.		8.4 Water Resource Management	86	
EN10	Percentage and total volume of water recycled and reused.		8.5 Green Product (Water Footprint)	92	
EN11	Location and size of land owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas.		8.8 Green Promotion and Ecological Preservation	100	
EN12	Description of significant impacts of activities, products, and services on biodiversity in protected areas and areas of high biodiversity value outside protected areas.		8.2 Build Green Fabs, Green Campus, and Assisting the Government to Establish Green Factory Guidelines 8.8 Green Promotion and Ecological Preservation	77, 100	
EN13	Habitats protected or restored.		8.8 Green Promotion and Ecological Preservation	100	

Profile Disclosure	Description	Extent of Reporting	Related TSMC CSR Report Section	Page(s)	Explanatory Notes
EN14	Strategies, current actions, and future plans for managing impacts on biodiversity.		8.2 Build Green Fabs, Green Campus, and Assisting the Government to Establish Green Factory Guidelines 8.8 Green Promotion and Ecological Preservation	77, 100	
EN15	Number of IUCN Red List species and national conservation list species with habitats in areas affected by operations, by level of extinction risk.				TSMC's operational areas have no IUCN Red List species and national conservation list species.
EN16	Total direct and indirect greenhouse gas emissions by weight.		8.3.2 Climate Change Mitigation (Greenhouse Gas Inventory)	82	
EN17	Other relevant indirect greenhouse gas emissions by weight.		8.5 Green Product (Carbon Footprint)	91	
EN18	Initiatives to reduce greenhouse gas emissions and reductions achieved.		8.3.2 Climate Change Mitigation (GHG Emission Reduction)	83	
EN19	Emissions of ozone-depleting substances by weight.				TSMC does not use class 1 or 2 ozone-depleting substances.
EN20	NOx, SOx, and other significant air emissions by type and weight.		8.6.3 Air Pollution Control	95	
EN21	Total water discharge by quality and destination.		8.5 Green Product (Water Footprint) 8.6.2 Water Pollution Control	91, 94	
EN22	Total weight of waste by type and disposal method.		8.6.4 Waste Reduction and Resource Recycling	97	
EN23	Total number and volume of significant spills.		8.7.2 Environmental Compliance Record	100	
EN24	Weight of transported, imported, exported, or treated waste deemed hazardous under the terms of the Basel Convention Annex I, II, III, and VIII, and percentage of transported waste shipped internationally		8.6.4 Waste Reduction and Resource Recycling	97	TSMC is compliant with environmental laws for hazardous waste disposal.
EN25	Identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the reporting organization's discharges of water and runoff.		8.2 Build Green Fabs, Green Campus, and Assisting the Government to Establish Green Factory Guidelines 8.6.4 Waste Reduction and Resource Recycling	77, 97	TSMC's treated wastewater is discharged to the Science Park wastewater treatment plant, there is no significant environmental impact.
EN26	Initiatives to mitigate environmental impacts of products and services, and extent of impact mitigation.		8.5 Green Product	89	
EN27	Percentage of products sold and their packaging materials that are reclaimed by category.		8.5 Green Product	89	
EN28	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations.		8.7.2 Environmental Compliance Record	100	
EN29	Significant environmental impacts of transporting products and other goods and materials used for the organization's operations, and transporting members of the workforce.		8.3.2 Climate Change Mitigation (Greenhouse Gas Inventory) 8.5 Green Product	82, 89	There is no significant environmental impacts of transporting products and other goods and materials used for the organization's operations, and transporting members of the workforce.
EN30	Total environmental protection expenditures and investments by type.		8.7 Environmental Management System	98	
<b>Social: Labor Practices and Decent Work</b>					
DMA	Disclosures on Management Approach		5. A Great Place to Work	32	
LA1	Total workforce by employment type, employment contract, and region broken down by gender.		5.1.1 Stable and Healthy Workforce	33	

Profile Disclosure	Description	Extent of Reporting	Related TSMC CSR Report Section	Page(s)	Explanatory Notes
LA2	Total number and rate of new employee hires and employee turnover by age group, gender, and region.	●	5.1.1 Stable and Healthy Workforce	33	
LA3	Benefits provided to full-time employees that are not provided to temporary or part-time employees, by significant locations of operation.	●	5.1.3 Compensation and Rewarding People for Long-term Growth	36	
LA4	Percentage of employees covered by collective bargaining agreements.	●	5.3.2 Open Communication Channels, Unobstructed Employee Participation, Harmonious Labor Relations	44	TSMC has no union, no employees covered by collective bargaining agreements.
LA5	Minimum notice period(s) regarding significant operational changes, including whether it is specified in collective agreements.	●			TSMC complies with notification process regulations. If an employee has been employed continuously between three months and one year, 10 days advance notice will be given. For those employed continuously between one year and three years, 20 days advance notice will be given. For those employed continuously for at least three years, 30 days advance notice will be given.
LA6	Percentage of total workforce represented in formal joint management-worker health and safety committees that help monitor and advise on occupational health and safety programs.	●	5.5 Safety and Health Management (Safety and Health Committee)	49	
LA7	Rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities by region and by gender.	●	5.5 Safety and Health Management (Occupational Injury and Illness Statistics)	49	
LA8	Education, training, counseling, prevention, and risk-control programs in place to assist workforce members, their families, or community members regarding serious diseases.	●	5.5 Safety and Health Management (Corporate New Infectious Disease Prevention Program)	52	
LA9	Health and safety topics covered in formal agreements with trade unions.	●			TSMC has no union, no related agreements.
LA10	Average hours of training per year per employee by gender and by employee category.	●	5.1.4 The Engine of Employee Growth	37	
LA11	Programs for skills management and lifelong learning that support the continued employability of employees and assist them in managing career endings.	●	5.1.4 The Engine of Employee Growth	37	
LA12	Percentage of employees receiving regular performance and career development reviews by gender.	●	5.1.4 The Engine of Employee Growth	37	
LA13	Composition of governance bodies and breakdown of employees per category according to gender, age group, minority group membership, and other indicators of diversity.	●	5.1.1 Stable and Healthy Workforce	33	
LA14	Ratio of basic salary of women to men by employee category, by significant locations of operation.	●	5.1.3 Compensation and Rewarding People for Long-term Growth	36	
LA15	Return to work and retention rates after parental leave, by gender.	●	5.1.3 Compensation and Rewarding People for Long-term Growth	36	
Social: Human Rights					
DMA	Disclosures on Management Approach	●	5. A Great Place to Work	32	

Profile Disclosure	Description	Extent of Reporting	Related TSMC CSR Report Section	Page(s)	Explanatory Notes
HR1	Percentage and total number of significant investment agreements and contracts that include clauses incorporating human rights concerns or that have undergone human rights screening.	●			We don't have related clause in investment agreements and contracts.
HR2	Percentage of significant suppliers, contractors and other business partners that have undergone screening on human rights and actions taken.	●	6.2 Supplier Management (Concern for Supply Chain Labor Standards)	59	We don't apply the requirements to our contractors in our contract.
HR3	Total hours of employee training on policies and procedures concerning aspects of human rights that are relevant to operations, including the percentage of employees trained.	●	5.3.2 Open Communication Channels, Unobstructed Employee Participation, Harmonious Labor Relations	44	
HR4	Total number of incidents of discrimination and corrective actions taken.	●	5.3.2 Open Communication Channels, Unobstructed Employee Participation, Harmonious Labor Relations	44	There were no discrimination case in 2012.
HR5	Operations and significant suppliers identified in which the right to exercise freedom of association and collective bargaining may be violated or at significant risk, and actions taken to support these rights.	●	6.2 Supplier Management (Concern for Supply Chain Labor Standards, Supply Chain Sustainability Management Achievement)	59, 60	No significant risk according to our supplier sustainability questionnaire survey.
HR6	Operations and significant suppliers identified as having significant risk for incidents of child labor, and measures taken to contribute to the elimination of child labor.	●	6.2 Supplier Management (Concern for Supply Chain Labor Standards, Supply Chain Sustainability Management Achievement)	59, 60	No significant risk according to our supplier sustainability questionnaire survey.
HR7	Operations and significant suppliers identified as having significant risk for incidents of forced or compulsory labor, and measures to contribute to the elimination of all forms of forced or compulsory labor.	●	6.2 Supplier Management (Concern for Supply Chain Labor Standards, Supply Chain Sustainability Management Achievement)	59, 60	No significant risk according to our supplier sustainability questionnaire survey.
HR8	Percentage of security personnel trained in the organization's policies or procedures concerning aspects of human rights that are relevant to operations.	●			All security personnel of tsmc are required to complete training regarding legal awareness, working guideline and reception courtesy.
HR9	Total number of incidents of violations involving rights of indigenous people and actions taken.	●			There were no violations involving rights of indigenous people in 2012.
HR10	Percentage and total number of operations that have been subject to human rights reviews and/or impact assessments.	●			We don't have related assessment. However, our new sites are in Science Park and compliant with Science Park's Environmental Impact Assessment commitments and legal requirements.
HR11	Number of grievances related to human rights filed, addressed, and resolved through formal grievance mechanisms.	●	5.3.2 Open Communication Channels, Unobstructed Employee Participation, Harmonious Labor Relations	44	There were no grievances related to human rights filed in 2012.
Social: Society					
DMA	Disclosures on Management Approach	●	4. Corporate Governance	26	
SO1	Percentage of operations with implemented local community engagement, impact assessments, and development programs.	●	7. Social Participation	61	
SO2	Percentage and total number of business units analyzed for risks related to corruption.	●			Business units of risks related to corruption are defined, and 100% of them have completed 2012 annual declaration of conflicts of interest.
SO3	Percentage of employees trained in organization's anti-corruption policies and procedures.	●	4.4 Code of Ethics and Business Conduct	28	

Profile Disclosure	Description	Extent of Reporting	Related TSMC CSR Report Section	Page(s)	Explanatory Notes
SO4	Actions taken in response to incidents of corruption.	●	4.4.2 Code Administration and Disciplinary Action	29	
SO5	Public policy positions and participation in public policy development and lobbying.	●	8.3.1 TSMC's Strategy in Response to Climate Change 8.4 Water Resource Management	80, 86	
SO6	Total value of financial and in-kind contributions to political parties, politicians, and related institutions by country.	●	4.3 Political Contributions	28	
SO7	Total number of legal actions for anti-competitive behavior, anti-trust, and monopoly practices and their outcomes.	●	4.4 Code of Ethics and Business Conduct	28	
SO8	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with laws and regulations.	●	4.5 Regulatory Compliance	30	
SO9	Operations with significant potential or actual negative impacts on local communities.	●			No significant impact.
SO10	Prevention and mitigation measures implemented in operations with significant potential or actual negative impacts on local communities.	●			No significant impact.
Social: Product Responsibility					
DMA	Disclosures on Management Approach	●	8.5 Green Product	89	
PR1	Life cycle stages in which health and safety impacts of products and services are assessed for improvement, and percentage of significant products and services categories subject to such procedures.	●			Not applicable due to we are not end-product manufacturer.
PR2	Total number of incidents of non-compliance with regulations and voluntary codes concerning health and safety impacts of products and services during their life cycle, by type of outcomes.	●			Not applicable due to we are not end-product manufacturer.
PR3	Type of product and service information required by procedures, and percentage of significant products and services subject to such information requirements.	●			Not applicable due to we are not end-product manufacturer.
PR4	Total number of incidents of non-compliance with regulations and voluntary codes concerning product and service information and labeling, by type of outcomes.	●			There were no non-compliance cases with regulations and voluntary codes concerning product and service information and labeling in 2012.
PR5	Practices related to customer satisfaction, including results of surveys measuring customer satisfaction.	●	6.1 Customer Service and Satisfaction	55	
PR6	Programs for adherence to laws, standards, and voluntary codes related to marketing communications, including advertising, promotion, and sponsorship.	●	4.5 Regulatory Compliance 8.5 Green Product	30, 89	
PR7	Total number of incidents of non-compliance with regulations and voluntary codes concerning marketing communications, including advertising, promotion, and sponsorship by type of outcomes.	●			There were no non-compliance cases with regulations and voluntary codes concerning marketing communications, including advertising, promotion, and sponsorship in 2012.
PR8	Total number of substantiated complaints regarding breaches of customer privacy and losses of customer data.	●			There were no substantiated complaints regarding breaches of customer privacy and losses of customer data in 2012.
PR9	Monetary value of significant fines for non-compliance with laws and regulations concerning the provision and use of products and services.	●	4.5 Regulatory Compliance	30	

## ISO 26000 Index

Core Subjects and Issues		Related CSR Report Section	Page(s)	Explanatory Notes
Organizational governance	Decision-making processes and structures	3. Stakeholder Engagement 4. Corporate Governance	23, 26	
Human rights	Due diligence			Our new sites are in Science Park and compliant with Science Park's Environmental Impact Assessment commitments and legal requirements.
	Human rights risk situations			TSMC complies with law and respects each employee's human rights.
	Avoidance of complicity	4.4 Code of Ethics and Business Conduct	28	
	Resolving grievances	5.3.2 Open Communication Channels, Unobstructed Employee Participation, Harmonious Labor Relations	44	
	Discrimination and vulnerable groups			TSMC carries out its human resources policy and practice without the consideration of race, gender, age, religion, nationality, or political affiliation.
	Civil and political rights	4.3 Political Contributions 5.3.2 Open Communication Channels, Unobstructed Employee Participation, Harmonious Labor Relations	28, 44	
	Economic, social and cultural rights	5.2 Encourage a Balanced Life	39	
	Fundamental principles and rights at work	5.2.4 Benefits – Safeguarding Employees' Rights	40	
Labor practices	Employment and employment relationships	5.1.2 Recruit the Right People	34	
	Conditions of work and social protection	5.2 Encourage a Balanced Life 5.3 Employee Engagement	39, 42	
	Social dialogue	3. Stakeholder Engagement	23	
	Health and safety at work	5.4 Employees' Physical and Mental Wellbeing 5.5 Safety and Health	46, 48	
	Human development and training in the workplace	5.1.4 The Engine of Employee Growth	37	
The environment	Prevention of pollution	8.6 Pollution Prevention	92	
	Sustainable resource use	8.4 Water Resource Management	86	
	Climate change mitigation and adaptation	8.3 Climate Change	80	
	Protection of the environment, biodiversity and restoration of natural habitats	8.2 Build Green Fabs, Green Campus, and Assisting the Government to Establish Green Factory Guidelines 8.8 Green Promotion and Ecological Preservation	77, 100	

Core Subjects and Issues		Related CSR Report Section	Page(s)	Explanatory Notes
Fair operating practices	Anti-corruption	4.4 Code of Ethics and Business Conduct	28	
	Responsible political involvement	4.3 Political Contributions	28	
	Fair competition	4.4 Code of Ethics and Business Conduct	28	
	Promoting social responsibility in the value chain	6. Customer Service and Supplier Management	54	
	Respect for property rights	2.3 Trade Secret Protection	19	
Consumer issues	Fair marketing, factual and unbiased information and fair contractual practices	4.4 Code of Ethics and Business Conduct	28	
	Protecting consumers' Health and safety			TSMC is a wafer foundry. We don't provide final products to consumers.
	Sustainable consumption	6.2.1 Ensuring Supply Chain Sustainability	55	
	Consumer service, support, and complaint and dispute resolution	6.1 Customer Service and Satisfaction	55	
	Consumer data protection and privacy	2.3 Trade Secret Protection	19	
	Access to essential services	6.1 Customer Service and Satisfaction	55	
	Education and awareness	6.1 Customer Service and Satisfaction	55	
Community involvement and development	Community involvement	7. Social Participation	61	
	Education and culture	7.1 TSMC Education and Culture Foundation	62	
	Employment creation and skills development	5.1.2 Recruit the Right People	34	
	Technology development and access	2.2 Innovation Management	11	
	Wealth and income creation	2.5 Investor Engagement	19	
	Health	5.5 Safety and Health	48	
	Social investment			We don't have related investment.

## United Nation Global Compact Comparison Table

Category	10 Principles	Related CSR Report Section	Page(s)	Explanatory Notes
Human Rights	Businesses should support and respect the protection of internationally proclaimed human rights;			TSMC complies with law and respects each employee's human rights.
	Make sure that they are not complicit in human rights abuses.	4.4 Code of Ethics and Business Conduct 6.2.1 Ensuring Supply Chain Sustainability	28, 55	
Labor	Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;	5.3.2 Open Communication Channels, Unobstructed Employee Participation, Harmonious Labor Relations	44	
	The elimination of all forms of forced and compulsory labor;	5.3.2 Open Communication Channels, Unobstructed Employee Participation, Harmonious Labor Relations	44	
	The effective abolition of child labor; and	5.1.2 Recruit the Right People	34	
	The elimination of discrimination in respect of employment and occupation.	5.1.2 Recruit the Right People	34	
Environment	Businesses should support a precautionary approach to environmental challenges;	8. Environmental Protection 8.7 Environmental Management System	74, 98	
	Undertake initiatives to promote greater environmental responsibility; and	8.7 Environmental Management System	98	
	Encourage the development and diffusion of environmentally friendly technologies.	8.5 Green Product	89	
Anti-Corruption	Businesses should work against corruption in all its forms, including extortion and bribery.	4.4 Code of Ethics and Business Conduct	28	

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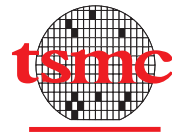
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