



**PSMC** Powerchip Semiconductor Manufacturing Corp.

# 2021 SUSTAINABILITY REPORT



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# About This Report

"Powerchip Semiconductor Manufacturing Corp. Corporate Social Responsibility Report 2021" is Powerchip Semiconductor Manufacturing Corp.'s (hereinafter referred to as "Powerchip Semiconductor Corp." or the "Company") 4th report. The contents of this report were provided and composed by various departments within our Company by referring to the Global Reporting Initiative (GRI). The compliances with the core of the GRI Standards were released through the reporting and disclosing of the relevant information. The annual sustainability report is published to respond to the issues focused on by the stakeholders, and to disclose Powerchip Semiconductor Corp.'s sustainable plan, implementation history, and performances in a transparent manner; as the expectation of our Company to drive more positive improvement for our society.

## The Report's Scope and Coverage

The reporting period covers January 1st, 2021 to December 31st, 2021. This report is issued in June 2022, the coverage of the report includes the 12" and 8" production plants, each plant is located within the jurisdiction of the Hsinchu Science Park Administration, under the Ministry of Science and Technology. The content of the report covers the practices of Powerchip Semiconductor Manufacturing Corp. on major economical, environmental, and social issues that are our stakeholders' focuses. In comparison to the previous edition of the report, some information was re-edited and will be noted in tables.

Note : P1/2 and P3 are in the disclosure boundary of the 12" production site. 8A (8AD included) and 8B are in the disclosure boundary of the 8" production site.

## References and Guidelines for Drafting

The content of this report follows the GRI principles and the AA1000 accountability principles. A practical analysis was made to determine which perspectives and sequences the stakeholders focus on. The results of the analysis will disclose environmental protection issues, related strategies, goals and measures, labor activities, human rights, and social impact. This is the premise for the drafting of this report on each disclosed item (details included in Appendix 2). Our Company has established practical guides for sustainable development, the report's content is provided and composed by various departments within the company. This report is also composed and audited based on the Sustainable Development Best Practice Principles. It is reviewed internally by Powerchip Semiconductor Corp. before being released to the public. Please refer to the following relevant guidelines and advocacy :

- Global Reporting Initiative (GRI) Standards
- Sustainable Development Best Practice Principles for TWSE/TPEX Listed Companies
- The United Nation Sustainable Development Goals (SDGs)
- AA1000 AccountAbility Principles
- ISO 26000 Social Responsibility Guidance Standard
- The United Nations Global Compact (UNGC)
- Sustainability Accounting Standards Board SASB Accounting Standards

## Reporting Cycle

- Date of last issuance : September 2021
- Date of current issuance : June 2022
- Date of next issuance : June 2023

## Audit of the Report

To increase the integrity of the Report, the Company engaged British Standards Institution (BSI) to audit the Report based on GRI Standards and AA1000 Assurance Standard 2008 (AA1000 AS), as well as Type II High Level Assurance Report in the Appendix of the 2018 Report. The audit conducted by BSI certifies that the Report has fulfilled the aforementioned framework and assurance level, thus increases the transparency and reliability of the organization of the Report. The assurance statement is attached as Appendix 1 of the Report, whereas the GRI content index is attached as Appendix 2 for the reference of readers.

## Contact Information

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## Words from the decision makers

## 2021 Sustainable Results and Performances

## About PSMC

## Realizing Sustainable Development

# Words from the Decision Makers

After operational transformation, organizational restructuring and other changes in the past few years, Powerchip Semiconductor Manufacturing Corporation ("PSMC") has fulfilled its promise to more than 320,000 shareholders by completing its stock listing in December 2021. PSMC currently ranks in the top three in Taiwan's semiconductor manufacturing industry; the Company's influence among the industry and capital market is increasing as well. We understand that the larger the enterprise is, the deeper the influence it has in the industry and society. In addition to balancing the relationship among stakeholders, society and the enterprise, PSMC hopes to extend our corporate culture of integrity, service, quality, and innovation, as well as our operating experience to establish a model of sustainable development. Further, to implement the model into the society to create a virtuous circle of sharing and common prosperity.

Other than pursuing profitable growth in operations and taking care of the rights and interests of employees and shareholders, PSMC also endeavors to respond to climate change and mitigate climate impact to protect our shared global environment. We put efforts into energy conservation, carbon reduction, and environmental protection whilst optimizing operations. At present, PSMC's high-standard factory facilities built have achieved a water recovery rate of more than 86%, with each drop of water being used more than 3.3 times. In the past 6 years, we have successively invested NT\$240 million in energy-saving equipment, achieving a total carbon reduction of 43 million kilograms and a saving of 80 million kWh of electricity. In addition, we have continued our efforts in reducing the use of paper consumption and increasing the recycling rate of waste, so as to create a positive symbiotic relationship between the company and the environment.

Being a responsible

Chairman  
*Frank Huang*

corporate citizen is PSMC's long-term belief. In the knowledge that the semiconductor industry is not only an important backbone of Taiwan economy but also a strong backing for Taiwan to stand in the international community, PSMC is concerned about the long-term competitiveness of the overall industry. Therefore, PSMC has proposed the integration of the resources among industry, government and academy to set up semiconductor colleges in universities. Together with industry peers, PSMC has lobbied government executive and legislature ministries, and at the end of 2021, the Taiwanese government has successfully passed the legislation to establish the semiconductor colleges in National Taiwan University, National Yang Ming Chiao Tung University, National Tsing Hua University and National Cheng Kung University. Meanwhile, PSMC took the lead by committing to donate NT\$100 million each year for ten consecutive years to promote academic affairs among these schools. It is estimated that more than 800 high-level master and doctoral talents will be trained for related industries in Taiwan every year.

Over the year, PSMC has held its vision of uplifting society. PSMC took practical actions to practice the concept of common good and common prosperity among the communities. In 2021, the Company sponsored eight concerts, a stage play, and a symposium on art and culture through the Powerchip Cultural Foundation, attempting to share social and cultural taste with and bring positive energy to the communities. In addition, we have also formally set up a Public Welfare Committee to integrate public welfare activities in the Company. PSMC draws up budgets every year, and together with employees, shares the love and care systematically and continuously via public welfare activities, such as donations to educational expenses of disadvantaged children in remote villages, support to the neighborhood communities in poverty, all the while working on the environmental protection as well.

For a long time, PSMC has been engaged in the conservation of old trees and urban greening through the Powerchip Environmental Protection Foundation. In 2021, we sponsored the Taiwan Care Association's children's environmental education drama performance, the Tsou culture and environmental protection drama propaganda of Taiwan Aboriginal Culture Promotion Association and the environmental education drama propaganda and other activities which were hosted by China Cultural and Creative Arts Association. Being a responsible corporate citizenship, PSMC actively promotes the social education of environmental protection in different aspects, and hopes to utilize our influence and resources to awaken the environmental awareness of energy saving and waste reduction in the society and further make contributions in environment protection.

In response to world trend, PSMC has also formally established the ESG Guidance and Executive Committee. The management team directly serves as a committee member to supervise various functional departments, and reports directly to the board of directors, which consists more than half of independent directors. Employees have continued putting efforts into fulfilling the Company culture of caring for the environment, achieving social co-prosperity and practicing a regulatory policy in relation to corporate governance. From the 419 questionnaires we collected last year from employees, job applicants, customers, investors (shareholders), suppliers, competent authorities, and contractors and neighboring factories/neighbors pertaining to seven major issues that the stakeholders of the Company are concerned with, and the 71 questionnaires on the impact of topics we collected from division heads of the Company, we endeavored to gain a better understanding in the different stakeholders' views and their expectations of us, in hopes of deepening the communication with them, thereby making a concerted effort for PSMC's sustainable development.

Moving forward, we will continue to face challenges with a cautious and perseverant attitude. We believe that in order to maximize profit and for enterprises to create growth momentum, it is important to share their prosperity with employees, shareholders, partners, and society. The growth and expansion of PSMC will be a driving force in creating a beautiful and sustainable environment. By being positive and honest in facing, communicating, and responding to oncoming problems and challenges, in addition to sharing with others, we are confident in our commitment to becoming an excellent and sustainable corporate citizen.

The President  
*Brian shieh*





Words from the decision makers

2021 Sustainable Results and Performances

About PSMC

Realizing Sustainable Development

# 2021 Sustainable Results and Performances

 Smooth Communication on Sustainable Development



**419 copies**

Number of questionnaires collected that covered 8 issues concerning stakeholders.

**71 copies**

Number of questionnaires collected that covered the impact of issues from all division heads.

**20 issues**

Number of major sustainability issues identified.



**Integrity  
Governance  
and Avid  
Innovation**



<b>None</b>	Occurrence of corruption.
<b>None</b>	Anticompetitive practices
<b>None</b>	Violation of Regulations
<b>Completed</b>	Plant 1/2 RBA Validated Assessment Program (VAP) Certification
<b>43.6%</b>	Revenue growth compared to the previous year.
<b>150.9%</b>	Net income growth compared to the previous year.
<b>300%</b>	Earnings growth per share compared to the previous year.
<b>None</b>	Major information security accidents

<b>Met target</b>	Internal 6S competition results
<b>None</b>	Major deficiencies in customers' FAB audits
<b>100%</b>	Passing rate of vendor evaluation.
<b>100%</b>	Achieving rate of creating and auditing selection forms of new suppliers
<b>91 points</b>	Customer satisfaction rate
<b>100%</b>	Rate of agreement on not using conflict minerals ratio
<b>131 patents</b>	Patent certificates obtained.
<b>Mass Production</b>	48nm NOR Flash、28nm NAND Flash、25nm DRAM



Words from the decision makers

2021 Sustainable Results and Performances

About PSMC

Realizing Sustainable Development

## Energy Optimization and Environmental Concern

### Met target

Greenhouse gas reduction of 1%

### Completed

Implement Foundry-wide ISO50001 Energy Management System

### Over 86%

Recycling rate of process water at all plants.

### Under 67%

Wastewater discharge rate of all plants

### None

Administrative sanction by Environmental Protection authorities

### Over 95%

Efficiency of facilities in processing volatile organic compounds (VOC) of all plants.

### Over 91%

Company-wide waste reuse rate.

## Social Caring and Interest Sharing

**96.4%**

The actual achievement rate of training programs (including the E-Learning system).

**None**

Forced or compulsory labor incidents, resulting in fines by the competent authority.

**100%**

The response rate of employee communication platform, "Feedback Corner".

**96%**

The satisfaction rate for annual training courses.

**100%**

The rate of all employees at the Company receiving performance evaluation on a regular basis.

**100%**

Rate of employees that received the training for human rights protection related policies.

**0.01**

Index of Frequency-Severity Indicator (FSI) was one-third lower than that of all semiconductor industries.

**2,769 Persons**

The number of employees that participated in health promotion activities.

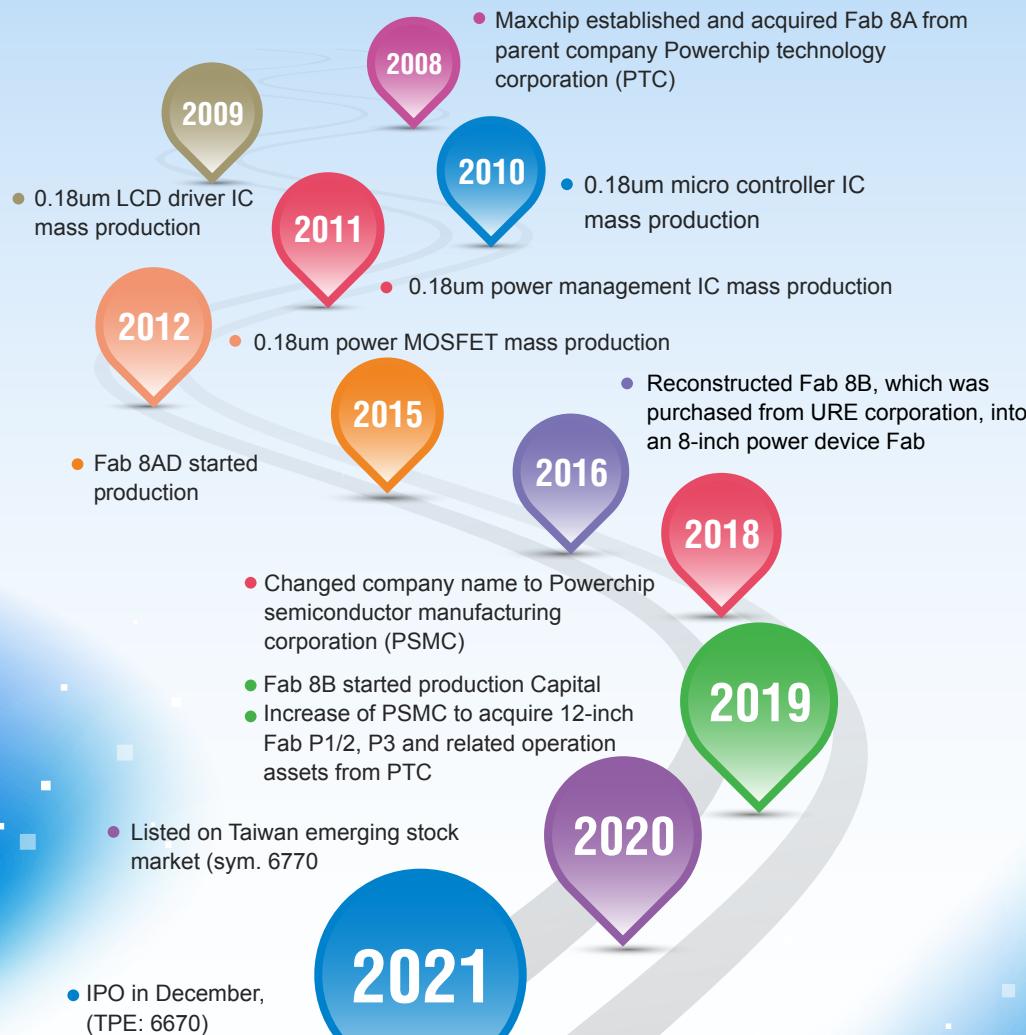
**37 Sessions**

Artistic and cultural events hosted or organized.



## Company's Growth Path

### Company History



## About PSMC

To focus on professional wafer OEM with a clear market position, Powerchip Group completed its corporate restructuring in May 2019, and Powerchip Technology yielded three 12" production plants, relevant business, and net assets to Powerchip Semiconductor Manufacturing Corp.; Powerchip technology transformed into a holding company. Powerchip Semiconductor Manufacturing Corp was listed in 2020 and its IPO was held on December 6, 2021.

### Corporate Summary

Company name	Powerchip Semiconductor Manufacturing Corp.
Founded year	2008
IPO/Ticker symbol	December 6, 2021 (TPE : 6770)
Major product	Wafer OEM
Chair	Frank Huang
Number of employees	7,448
Capital	NT\$35.35 billion
Revenue	NT\$65.62 billion
Manufacturing sites	Corporate Headquarter Address : No. 18, Li Hsin 1st Rd, East District in Hsinchu Science Park. Owns two 8" and three 12" wafer foundries. All of them are located in Ministry of Science and Technology's Hsinchu Science Park and Zhunan Science Park.



Words from the decision makers

2021 Sustainable Results and Performances

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## Factory Introduction



Zhunan Science Park

Hsinchu Science Park

### A Focus on Foundry

Powerchip Semiconductor Manufacturing Corp. currently owns two 8" and three 12" wafer foundries and employs nearly 7,500 people. The Company will focus on the three primary wafer OEM services including advanced memory, customized integrated circuits, and discrete devices, and continue with the Open Foundry business. It will build a tight but flexible collaboration based on clients' different attributes and needs through chip designs, manufacturing services, equipment, and production sharing.

By insisting on excelling in technology, strict quality control, and high production efficiency, Powerchip Semiconductor Manufacturing Corp. will continue to explore international strategic collaboration, employ cutting edge technology, develop proprietary technology, and expand steadily in the market. The company continues to dedicate itself to providing professional wafer OEM services to create a win-win situation with our clients, and to cumulate a competitive edge in this rapidly-changing high-tech industry to become a global semiconductor manufacturer with steady profits.

### External Participation

Powerchip Semiconductor Manufacturing Corp. is situated in a rapidly changing semiconductor industry. Other than continuing to improve production technology, the Company also has a firm grasp on the latest industry trends. Our Company actively joins many industry associations while serving important roles such as the chair, director, and supervisor to facilitate the optimization of the industry environment and policy with our peers. Powerchip Semiconductor Manufacturing Corp. also actively calls for experts from each professional field to form associations to promote inter-industry exchange and development. The organizations and associations that Powerchip Semiconductor Manufacturing Corp. joined focus on issues such as but not limited to corporation sustainability, technology innovation, and sustainable environment; also providing advice in government policies on earth, water, electricity, and human resource, which are all related to industry competitiveness and supporting a sustainable environment.



Words from the decision makers

2021 Sustainable Results and Performances

About PSMC

Realizing Sustainable Development

In 2021, the domestic and international associations relating to industry development that Powerchip Semiconductor Manufacturing Corp. joined mainly included the following :

## Domestic Associations: Industry Development and Technology Innovation

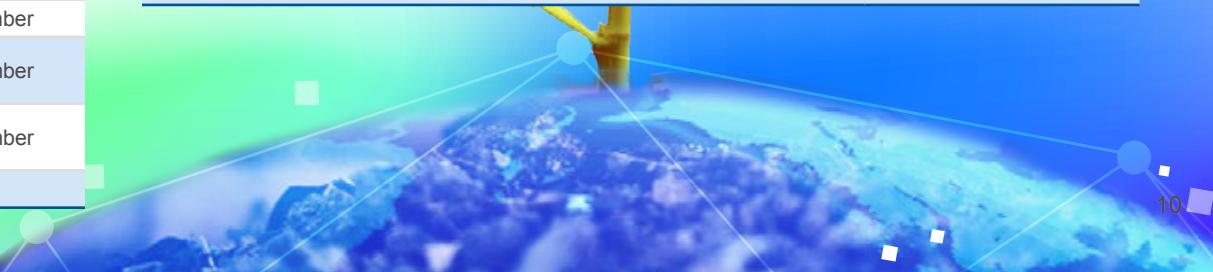
Organization Name	Sustainable Action	Role
Taiwan IoT Technology and Industry Association	Through joining the Taiwan IoT Technology and Industry Association and serving in a managerial position gives Powerchip Semiconductor Manufacturing Corp. influential power in the formulation of IoT industry standards and their applications. It will ensure the Company's current technology is utilized widely in each IoT-related field, and it will also continue to equip Powerchip Semiconductor Manufacturing Corp.'s core competency in technology development for the applications of this rising industry.	Chair, Executive supervisor, director
Taiwan AI Communication and Information Association	Facilitates domestic software design, hardware design, and system integration industries to exchange and collaborate while interacting closely with the academia and government departments. The goal is to use everyone's knowledge and power to promote artificial intelligence and IoT technology's innovation and application to assist the industries in grasping new and rising business opportunities.	Chair, Director, Supervisor
Taiwan Advanced Automotive Technology Development Association	Joining the Taiwan Advanced Automotive Technology Development Association is beneficial for Powerchip Semiconductor Manufacturing to foster communication with the automotive industry. It allows both parties to share knowledge and our Company's technology development to be introduced to the potential market of electric vehicles and smart vehicles. Now facing the development of carbon reduction regulations in automotives and the expansion of electric vehicle, the demand for semiconductor and automotive electrical modules has increased dramatically. By joining the association, Powerchip Semiconductor Manufacturing Corp. is now stepping into advanced automotive fields to assist in the smart transformation of the automotive industry along with counterparts from such industries; thereby deepening the collaboration between the two major industries to reach the nation's future sustainable goal of zero pollution, and ultimately, establish a well-rounded supply chain for the electric vehicle industry.	Chair, Supervisor
Taiwan Semiconductor Industry Association	Powerchip Semiconductor Manufacturing Corp. joined the Taiwan Semiconductor Industry Association with concern for industry development; reach consensus with industry peers through the association's activities to facilitate collaboration despite competition. Together, harvest a well-rounded development for the entire industry and strengthen competitiveness as a whole. Hoping to maintain the Company's competitive edge in this rapidly-changing global environment.	Executive director
Taiwan Allied Association for Science Park Industries	Joining the Allied Association for Science Park Industries extends our Company's interactions with industry peers and vendors from different industries in the science park. The Allied Association's grouping scheme allows members establish an effective communication mechanism with the government unit and protect members' common interest. The industry peer's clustering effect can help build the industry's international reputation and enhance our Company's competitiveness.	Director

## Domestic Associations for ESG Exchange

Organization Name	Role	Organization Name	Role
PM2.5 Control Association	Member	Taiwan Environmental Management Association	Member
Taipei Computer Association	Member	Taiwan RISC-V Association	Member
The Third Wednesday Club	Member	Taiwan India Business Association	Member
Cross-Strait CEO Summit	Member	Taiwan IC Industry & Academia Research Alliance	Member
The Institute of Internal Auditors-Chinese Taiwan	Member	Computer Audit Association	Member
Friend of Police R.O.C.	Director		

## International Associations, on Top of International Trends

Organization Name	Role
Global Semiconductor Alliance	Member
JEDEC Solid State Technology Association JEDEC (JC-42)	Committee Member





Words from the decision makers

2021 Sustainable Results and Performances

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# Realizing Sustainable Development

Our Company concurrently masters manufacturing technologies for both memory and logic. We provide a variety of DRAM products : Flash memory, LCD driver chips, energy management chips, CMOS image sensors, and various OEM services for information, communication, and consumer electronics markets through advanced technologies and production capabilities.

With the rapid development of IoT and Artificial Intelligence, Powerchip Semiconductor Manufacturing Corp. will have opportunities to make the first move in the market, and continue to facilitate international strategic collaboration, employ cutting-edge technology, invest, and expanding steadily. We aim to accumulate our competitive edge in this rapidly changing high-tech industry and be the semiconductor manufacturer and supplier to deliver mutual benefits to our clients, employees, shareholders, and society.

## Vision

Become a world-class electronics technology giant; be environmental friendly; and give back to society.

## Mission

Build an efficient management team and provide the best products and services to our clients. Enhance quality of life and bringing maximum benefits to investors (shareholders and employees).





Words from the decision makers

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Powerchip Semiconductor Manufacturing Corp. has already embedded the four corporate culture values to its core. The Company is dedicated to having healthy corporate governance, pursuing fair benefits for stakeholders, engaging in environmental protection, energy-saving, and contributing to society. We stipulated our corporate ethics regulations including our "Code of Ethical Operation," "Guidelines for Ethical Operation Procedures and Behavior," "Sustainable Development Practices," and "Corporate Ethics Guide" to build a complete integrity and ethics compliance system for the Company.

On December 22, 2021, Powerchip Semiconductor Manufacturing Corp. received its RBA certification. The Company promised to comply with the Code of Conduct – Responsible Business Alliance, RBA Version 7.0 (Formerly called the EICC) to ensure coverage of the five major categories such as labor, health and safety, environment, ethics, and our management system. We also aligned with the United Nation's Sustainable Development Goals (SDGs) by disclosing our Company's specific actions on corresponding goals based on our core capabilities. It is our corporate responsibility to facilitate society's sustainable, positive development.

## Fulfilling ESG Development

Powerchip Semiconductor Manufacturing Corp.'s IPO was in December 2021. On February 8th, 2022, the Board of Directors voted to establish the "ESG Guidance Committee" and the "ESG Committee" as the designated units to be responsible for facilitating sustainable development with the goal of fulfilling corporate social responsibility and facilitating the improvement of the economy, environment, and society in mind. "ESG Guidance Committee" is the decision-making center, our Company's chair and CEO, Frank Huang, served as the chair of the committee, and president and deputy CEO, Brian Hsieh, served as the vice-chair of the committee. The independent board member, Jia-Lin Chang took on an advisory role, and the committee meetings were held routinely each year. "ESG Committee" was formed under the "ESG Guidance Committee" to promote plans in business governance, sustainable environment, and social involvement to effectively reach the Company's sustainable development goals. The president is the chair of the "ESG Committee" and meetings were held quarterly. The performance results were reported to the Board of Directors at least once a year. The "ESG Implementation Committee" is responsible for carrying out the plans drafted by the ESG Committee. The ESG Organization Chart is as follows.



### Powerchip Semiconductor Manufacturing Corp. ESG Committee Organization Chart

#### Highest Governing Unit

**Board of Directors**Consultant Jialin  
Chang (Independent  
board member)

#### Strategic Planning Division

**ESG Advisory  
Committee  
Chair Frank Huang**

Meeting frequency: Yearly Routine meetings  
Agenda:  
Plan the corporate sustainability governance strategy/ blueprint/ long-term goals

#### Directing Unit

**ESG Committee  
Chair Brian Hsieh**

Meeting frequency: Quarterly  
Agenda:  
1. Determine sustainability issues that require attention, plan corresponding action plans  
2. Track performance on each sustainability issue of all aspects; build continuous improvement plans

#### Executive Units

**ESG Executive  
Committee**

Meeting Frequency: Irregular  
Agenda:  
Execute projects based on ESG committee's plans



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## Sustainable Development Goals (SDGs)

Item	Sustainable Development Goal	Corresponding Section	Powerchip Semiconductor Manufacturing Corp.'s Action and Benefits
2 Goals 2  Goals 2	2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.	5.2 Care and Return	Taiwan's domestic fruits are of excellent quality. Our Company provides free fruit in the company cafeteria for employees to assist local farmers in solving the overproduction of fruits such as bananas, guavas, and oranges.
3 Goals 3  Goals 3	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.	3.3 Green Production	Our Company implemented the ISO 14001 Management System to effectively manage air pollution and emissions and continue to seek the best viable technology to decrease pollutant emissions. All of our Company's production sites are located in the Ministry of Science and Technology's Hsinchu Science Park Administration, where necessary environmental evaluation and inspections were all made under the administration's supervision. There were no incidents in 2021 or penalties from the environmental protection government authority.
4 Goals 4  Goals 4	4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.	4.1 Talent Acquisition	Propose a "Pre-hire Project." Our Company expects to reach out to campuses early to invite students to join us upon their graduation. The internship is awarded to those who are interested in being a part of Powerchip Semiconductor Corp., giving them a taste of their future work environment, familiarizing them with their future teams, understanding the operations of a wafer OEM, and receiving practical training. Our company completed 25 "Pre-hire Project sessions" across 18 universities such as National Yang Ming Chiao Tung University, National Chung Hsing University, and National Taipei University of Technology...etc. Attracting over 1,700 students with over 150 juniors and seniors applying to the intern engineer position.
5 Goals 5  Goals 5	5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.	4.2 Employee Welfare	The salary and wage scheme is fair and reasonable; the salary is above minimum wage. Performance incentives and bonus plans are also in place. 100% of employees who were on board for more than three months all received routine performance evaluations. In 2021, our company's female to male ratio in terms of salary at a managerial position was 1:0.88.
6 Goals 6  Goals 6	6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.	3.2 Risk Management for Water	1. Facing potential water supply issues caused by climate changes in recent years, our company continues to refine our technology and invest in equipment to increase our water recycling rate and water usage efficiency during the manufacturing process. We are the first semiconductor plant in the science park to promise to raise the water recycling rate to over 85%. In 2021, our water recycling rate exceeded 86.5% across each production site. 2. After the water recycling plant is up and running, the entire company will have 1,050 CMD of recycled water to use (P1/2 : 500 CMD, P3 : 250 CMD, and 8A : 300 CMD); as the response to the government's promotion of water recycling and re-use policy.

Item	Sustainable Development Goal	Corresponding Section	Powerchip Semiconductor Manufacturing Corp.'s Action and Benefits
 Goals 6	6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.	3.2 Risk Management for Water	Our company's wastewater from the manufacturing process will go through the production site's wastewater treatment for pre-treatment before discharging into the science park's sewage treatment plant for final treatment and discharge. To master the treatment results for different compositions of the wastewater, there are over 20 different types of water (recyclable or unrecyclable) for treatment, depending on the water's attributes such as but not limited to type, density, and conductivity from the manufacturing end. Treatments can increase the rate of water recycling; even some acidic wastewater and organic wastewater still possess economical value post-recycling. The distribution of water recycling can effectively decrease the chemicals used in the treatment plant and decrease the difficulty in handling the end-waste and its environmental burden.
 Goals 7	7.3 By 2030, double the global rate of improvement in energy efficiency.	3.1 Climate Change and Carbon Emission Management	The 12" production plant deployed an energy management system (ISO 50001) in 2015, the energy management system was successfully deployed to 8" production plants in 2021 by following our company's energy policy. Through the energy management analysis on the consumption efficiency, our company can find more effective ways to use the energy and increase our efficiency.
 Goals 8	8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors.	Column : Metaverse – The fourth-generation dioxide semiconductor	Our company adopts many energy-saving plans such as examining how to decrease the energy consumption per unit production, replace old equipment, and develop renewable energy. We set our annual energy-saving goal to be 1% per year.
	8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.	4.4 Occupational Health and Safety	Our company completed the environment safety management system upgrade and three-year access authorization check in 2020. The "Environment Safety and Hygiene Management Manual" was stipulated to manage the internal and external environmental safety issues regarding activities, products, and services both on and off production sites. The stakeholders include but are not limited to employees, clients, contractors, suppliers, outsourcers, government environmental protection authorities, and NGOs.
 Goals 10	10.3 Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard.	1.1 Organization Chart	Our company's board member candidates are all nominated. Each candidate's education, work experience, professional background, credibility, and related professional qualifications are assessed and determined by the Board of Directors first, then appointments are made in the shareholders' meeting.
 Goals 11	11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.	3.3 Green Production	Our company strictly controls the discharge of pollutants and "Multiple treatments for the most feasible technology" are adopted for pollution prevention. The VOC removal efficiency in all plants was far better than the stipulated 90% in the "Air Pollution Control and Emissions Standards for the Semiconductor Industry" – the removal efficiency of all the plants exceeds 95%!



Words from the decision makers

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Item	Sustainable Development Goal	Corresponding Section	Powerchip Semiconductor Manufacturing Corp.'s Action and Benefits
12 RESPONSIBLE CONSUMPTION AND PRODUCTION 	12.2 By 2030, achieve the sustainable management and efficient use of natural resources.	3.2 Risk Management for Water	Facing potential water supply issues caused by climate changes in recent years, our company continues to refine our technology and invests in equipment to increase our water recycling rate and water usage efficiency during the manufacturing processes. We are the first semiconductor plant in the science park to promise to bring the water recycling rate to over 85%.
	12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	3.3 Green Production	Employed the management concept of life cycle recycling on waste management. The following goals are in place : (1) decrease from source (2) increase the reuse value of waste (3) Properly handle waste and track it. Our company values environmental protection. All created waste is managed through their types and processing methods before being cleaned or recycled by certified waste disposal professionals. We strictly require that all waste is managed according to the Waste Disposal Act and international regulations. The waste created on-site is monitored at all times and the waste disposal is evaluated for its adequacy.
	12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	Increase the reuse value of waste	Our company strengthens the classification of the wastes to increase the value of the wastes. We also conduct recycling and reusing feasibility assessments with collaborated vendors; these efforts are made to ensure the end product will have a proper place to go. Our company's actual reuse rate was at 91.22% in 2021, it met the short-term goal. Our 8" production plants were also gradually deploying the recycling system. Our overall recycling reuse rate is expected to rise.
	12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.	2.4 Supply Chain Management	Our company calls for any supplier partners who have business with Powerchip Semiconductor Manufacturing Corp. to join the Responsible Business Alliance's declaration on "Not accepting nor using conflict minerals," and we require these raw material suppliers to fulfill their social responsibility.
	12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities.	2.4 Supply Chain Management	Based on our company's "Raw Material, Component, and Supplier Regulations," new suppliers must fill out preliminary questionnaires, and an annual assessment will be conducted according to the regulations. A supplier behavior code is drafted to demand that suppliers comply with business practices in labor, health and safety, environment, business ethics, and management system.
13 CLIMATE ACTION 	13.2 Integrate climate change measures into national policies, strategies and planning.	1.4 Risk Management	Powerchip Semiconductor Manufacturing Corp. has a systematic method for handling and managing crises. It is to ensure the company can resume production in the shortest time when a major accident or crisis occurs. Examples of specific crises are prolonged durations of power outages, impact of climate change, disruption of the raw material supply...etc.
16 PEACE, JUSTICE AND STRONG INSTITUTIONS 	16.5 Substantially reduce corruption and bribery in all their forms.	1.1 Organization Chart	Our company has its "Guidelines for Ethical Operation Procedures and Behavior." There is a regulation on avoiding conflicts of interest, and the same regulations are also applied to the Board of Directors' meetings. If there is a conflict of interest with the individual or their represented companies in the meeting agenda, they are not allowed to join discussions and vote. These situations will be recorded clearly in the meeting minutes.
	16.6 Develop effective, accountable and transparent institutions at all levels.	1.1 Organization Chart Whistleblower Protection Procedures	The Company's highest governing unit is the Board of Directors, which is all voted in by all shareholders. In 2021, the Company established its "Whistleblower Protection and Anti-Retaliation Management Procedures" to protect employees, suppliers, and other internal or external parties to exercise their rights to report.



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# Communicating with Stakeholders

Powerchip Semiconductor Manufacturing Corp. conducts stakeholder analysis for creating sustainable development and long-term business by following the five primary principles from the AA1000 Stakeholder Engagement Standard (SES). Crucial Stakeholders determined by our company include 7 types : employees/job seekers, clients, investors (shareholders), suppliers, government authorities, contractors, and neighboring plants/neighbors.

## Respond to Stakeholders

Stakeholders	Stakeholder's importance	Concerned issues	Communication channels and frequency	2021 Communicatoin effectiveness	
	Employees/Job seekers	Employees are Powerchip Semiconductor Manufacturing Corp.'s most valuable asset. They are also the talents that will drive the company's productions and business forward. Refining welfare and workplace care to attract and retain talent, and building a friendly workplace will create mutual benefits for labor/management relations.	<ul style="list-style-type: none"> <li>Economical performance</li> <li>Market position (salary level)</li> <li>Production Quality Control</li> </ul>	<p>1. Searchable web portal announcements on the company's website (real-time)      2. Feedback Corner/Employee Wellness Site (any time)      3. Quarterly meetings (quarterly)      4. Dispute direct line (any time) : Receiving employees' issues and providing necessary assistance and responses.      5. Labor relations meeting (quarterly), Welfare committee meeting (quarterly) : Raise proposals for further discussions.      6. Employee Opinion Mailbox (any time).      7. Occupational Safety, Hygiene, and Environmental Protection Committee meetings (quarterly)      8. Health counseling with on-site physicians and specialists (weekly).      9. Powerchip Semiconductor Manufacturing Corp.'s Human Resource Hiring Page. (<a href="https://esg.powerchip.com/ref/#m4tji0">https://esg.powerchip.com/ref/#m4tji0</a>).      10. Human Resource Staff phone number/E-mail (any time).</p> 	Received a total of 733 instances of "Feedback Corner." Response rate at 100%.
	Clients	Clients' satisfaction and feedbacks are our continuous drive to try harder and grow. Our company insists on excelling in technology, rigorous quality control, and highly efficient production, and dedicates to providing professional wafer OEM services!	<ul style="list-style-type: none"> <li>Production Operation</li> <li>Quality Control</li> <li>Product Services and R&amp;D and Innovation</li> <li>Client Privacy</li> </ul>	<p>1. Customer service number/E-mail (any time).      2. Client satisfaction survey (yearly).      3. Participating in product-related exhibitions and fairs to directly understand clients and market development trends (any time).      4. Sales visits to clients (any time).</p>	Customer satisfaction score was 91 points.
	Investors (shareholders)	The company's entire capital consists of shareholders' and investors' funding. Protecting shareholders' interests is our company's fundamental responsibility.	<ul style="list-style-type: none"> <li>Economical Performance</li> <li>Ethical Governance</li> <li>Anti-Corruption</li> </ul>	<p>1. Routinely publishing information on the business operation outlook (monthly), and financial report (quarterly).      2. Shareholders' meeting (yearly) : Annual financial report is composed by following the regulations.      3. The investor's page is set on the company's website (<a href="https://esg.powerchip.com/ref/#investor_en">https://esg.powerchip.com/ref/#investor_en</a>) (anytime).      4. Dedicated contact window and E-mail for shareholders (anytime).      5. Contact window for the company's spokesperson (anytime).</p> 	<ul style="list-style-type: none"> <li>Shareholders' meeting was held on July 2, 2021.</li> <li>0 corruption incidents.</li> </ul>



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Stakeholders	Stakeholder's importance	Concerned issues	Communication channels and frequency	2021 Communicatioin effectiveness
Suppliers	Powerchip Semiconductor Corp. is run by a professional global business team. Other than strengthening our competitiveness through self-quality control, sustainable supplier chain management is also critical. Through our supplier management measures, preliminary assessment of new suppliers, and spot checks/assessments of the current suppliers, we can maintain the excellent quality of our supply chain.	<ul style="list-style-type: none"> <li>Economical Performance</li> <li>Ethical Governance</li> <li>Supplier Management</li> </ul>	<ol style="list-style-type: none"> <li>1. Suppliers Convention (When available)</li> <li>2. Suppliers assessment (half a year)</li> <li>3. E-Supplier system (any time)</li> </ol>	Assessment tasks were 100% completed.
Government authorities	The government authority is the supervisor of the relevant regulations, and abiding by the law and governance is the first and foremost corporate social responsibility when running a business.	<ul style="list-style-type: none"> <li>Waste</li> <li>Energy</li> <li>Water</li> </ul>	<ol style="list-style-type: none"> <li>1. Maintaining proper interactions with the government authorities and actively participating in workshops and seminars held by the government authorities (any time).</li> <li>2. Identifying the laws and regulations stipulated by government agencies, and provide industry operation experience and content suggestions for the draft. (Irregularly)</li> <li>3. Official document transactions, project discussion meetings, public information (any time)</li> <li>4. Partaking in the functional operation of the Science Park and the Science Park Administration's organization (any time).</li> </ol>	<ul style="list-style-type: none"> <li>Receiving multiple awards on environment, safety, and hygiene from government authorities.</li> <li>0 major violation incidents.</li> </ul>
Contractors	Contractors that are in collaboration with Powerchip Semiconductor Manufacturing Corp. share prosperity and honor with Powerchip Semiconductor Manufacturing Corp. in business promotion and engineering quality.	<ul style="list-style-type: none"> <li>Economical Performance</li> <li>Climate-related Financial Disclosure</li> <li>Energy</li> </ul>	<ol style="list-style-type: none"> <li>1. Contractor assessment (yearly).</li> <li>2. Contractor meetings (quarterly).</li> <li>3. Toolbox meetings (daily).</li> </ol>	Assessment tasks were 100% completed
Neighboring plants/Neighbors	The operation spaces within the Science Park are inter-connected. Maintaining proper contacts and communications with neighboring plants is necessary to maintain the Science Park's safety and environment.	<ul style="list-style-type: none"> <li>Economical Performance</li> <li>Ethical Governance</li> <li>Occupational Safety and Hygiene</li> </ul>	<ol style="list-style-type: none"> <li>1. Regular checks and telephone communication (any time).</li> <li>2. Company website (any time).</li> <li>3. Partaking in social group events or seminars (any time).</li> <li>4. Partaking in external associations' operations (any time).</li> </ol>	<ul style="list-style-type: none"> <li>Participated in 176 meetings with relevant associations.</li> <li>Participated in TSIA Online Convention on Oct. 27, 2021.</li> </ul>



# Identifying and Managing Major Issues

Our company listens and responds to issues that stakeholders are concerned about. Practical analyses were conducted and written in the sustainability report. We hope to determine the sustainability issues that the stakeholders are concerned about through a systematic analysis, which results will be used as the references to disclose information in this report for more effective communication with the stakeholders. This report adopted five steps to determine major issues :

## Identifying the Stakeholders

Powerchip Semiconductor Manufacturing Corp. conducted a stakeholder analysis for creating sustainable development and long-term business operation by following the five primary principles from the AA1000 Stakeholder Engagement Standard (SES). After an internal discussion with the management team and referring to peers' CSR reports, we identified 7 types of stakeholders as our company's major stakeholders. They include: employees/job seekers, clients, investors (shareholders), suppliers, government authorities, contractors, and neighboring plants/neighbors.

## Review and Discussion

Based on the analysis of the current year's major subjects, our 8 sustainable categories were finalized as "Corporate Governance," "Information Security," "Continuous Profits," "Clients' Trusts," "Energy Resources," "Pollution Prevention," "Friendly Workplaces," and "Environmental Safety." They are intended for management direction disclosure and Powerchip Semiconductor Manufacturing Corp. will continue to strengthen management and disclose relevant information in the sustainability report.

## Collecting Issues and Organizing Subjects

There are two primary sources (internal and external) for our issue collection. The external sources include GRI Standards which disclose 34 subjects; international issues and standards were included afterwards to compile a list of concerned issues for CSR representatives to do a preliminary screening of the list. The internal sources are from the discussions and feedback obtained by the CSR representatives. There are 31 subjects.

## Identifying and Managing Major Issues

### Understanding the Issues

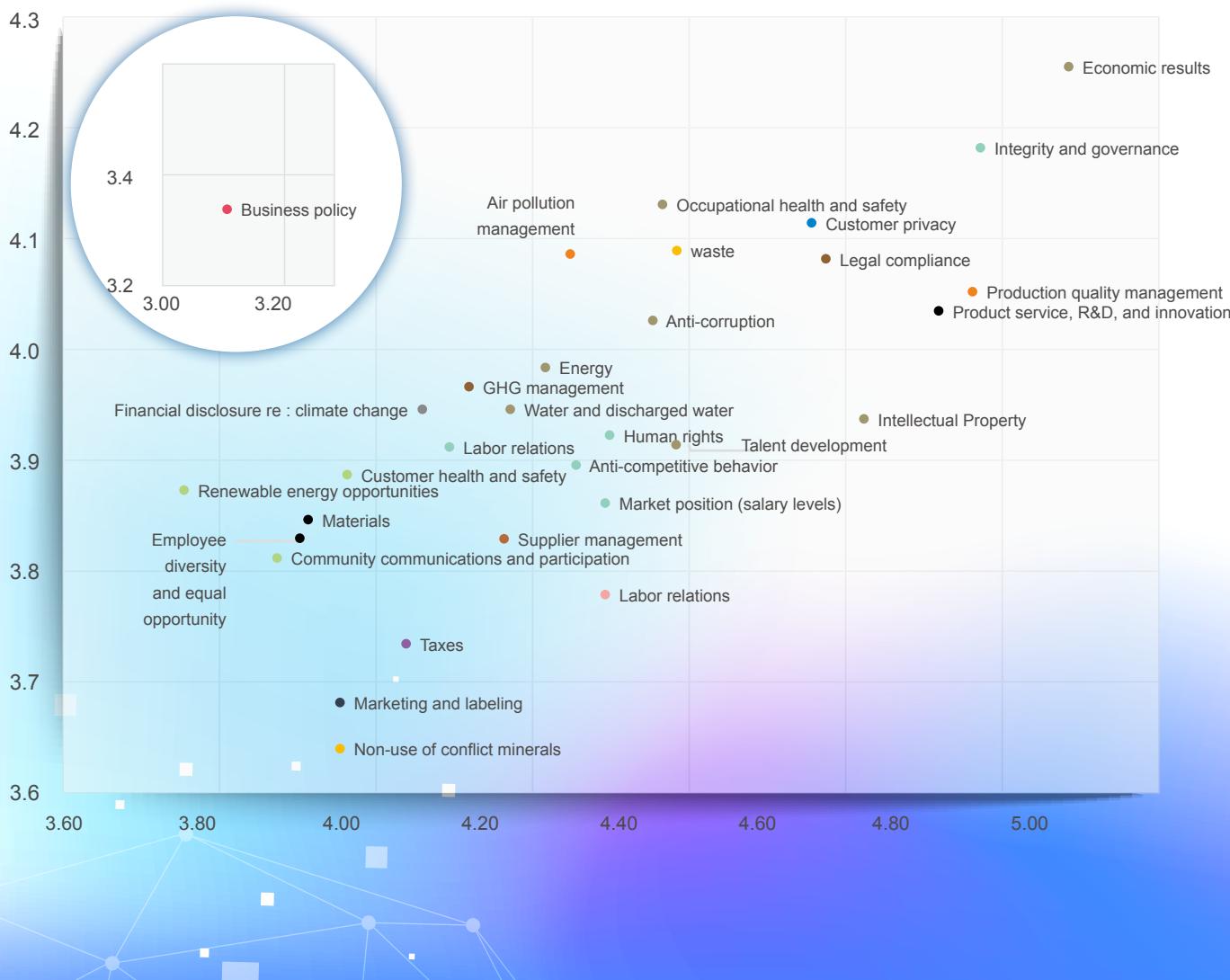
Questionnaires were given in 2021 to help the company understand how concerned the stakeholders were on each subject, the same questionnaires were given to Powerchip Semiconductor Manufacturing Corp.'s management to evaluate each subject's impact on the company's operation. There were a total of 490 questionnaires collected and analyzed, 419 questionnaires were of concerned issues, and 71 questionnaires were of business impact (answered by the management).

## Results of Determining Major Issue

The priority of the subjects was analyzed after calculating their respective score from stakeholders' and management's questionnaires. After managers and representatives from each department had a thorough discussion, 20 major subjects for Powerchip Semiconductor Manufacturing Corp. were finalized for 2021.



There were 20 major subjects determined and analyzed in the 2021 report. Wastewater discharge followed the GRI indicator to sort and distribute water. Former employee competency management, training, and education were merged into human resource development. Environmental and social-related regulations were disclosed in regulation compliances. Non-discrimination, freedom of assembly, collective bargaining, child labor, forced or compulsory labor, and human rights evaluations were merged and disclosed under the subject of human rights. Management directions and performances for these 20 major subjects were disclosed. Climate-related financial disclosure, market position (salary level), labor/management relations, forced or compulsory labor, and other subjects were listed as secondary subjects in importance with 11 in total. For the purpose of information transparency, the disclosure of the information was done as transparently as possible.



### Major Subjects

1. Economic results	11. Anti-corruption
2. Integrity and governance	12. Talent development
3. Production quality management	13. Human rights
4. Product service, R&D, and innovation	14. Energy
5. Customer privacy	15. Water and discharged water
6. Legal compliance	16. Anti-competitive behavior
7. Intellectual Property	17. GHG management
8. Occupational health and safety	18. Employer-employee relations
9. waste	19. Supplier management
10. Air pollution management	20. Customer health and safety



### Secondary Subjects

1. Financial disclosure re : climate change	7. Community communications and participation
2. Market position (salary levels)	8. Renewable energy opportunities
3. Labor relations	9. Marketing and labeling
4. Taxes	10. Non-use of conflict minerals
5. Materials	11. Business policy
6. Employee diversity and equal opportunity	



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## Description of Major Issues and Their Boundaries

Sustainable Theme	Major Subjects	GRI Indicators	Impact Boundaries			Respective chapters for Management Directions and relevant content	
			Internal (Direct Impact)	Business partners (Impact on Business)			
				Clients	Suppliers		
Corporate Governance	Anti-corruption	GRI 205- Anti-corruption	●		●	1.Striving with Sound Operations	
	Anti-competitive behavior	GRI 206- Anti-competitive behavior	●			1.Striving with Sound Operations	
	Regulatory compliance (custom-ized topic)	GRI 307 Environmental compliance GRI 419 Socioeconomical compliance	●		●	1.Striving with Sound Operations	
	Integrity and governance (cus-tomized topic)	--	●			1.Striving with Sound Operations	
Information Security	Client privacy	GRI 418- Client privacy	●	●		1.Striving with Sound Operations	
Continuous Profit	Economic performance	GRI 201- Economic performance	●			2.Striving with Innovative Services	
	Intellectual property (customized topic)	--	●			2.Striving with Innovative Services	
	Product service and R&D and innovation (customized topic)	--	●			2.Striving with Innovative Services	
Clients' Trust	Supplier management (custom-ized topic)	GRI 204- Practical procurement, GRI 308- Supplier environmental assessment, GRI 414- Supplier social assessment	●		●	2.Striving with Innovative Services	
	Clients' health and safety	GRI 416- Client health and safety	●	●		2.Striving with Innovative Services	
	Production quality control (cus-tomized topic)	--	●			2.Striving with Innovative Services	
Energy Resource	Energy	GRI 302- Energy sources	●			3.Striving as a Green Manufacturer	
	Water and effluents	GRI 303(2018)- Water and effluents	●			3.Striving as a Green Manufacturer	
	Greenhouse gas management (customized topic)	GRI 305- Emissions	●			3.Striving as a Green Manufacturer	
Pollution Prevention	Air pollution management	GRI 305- Emissions	●			3.Striving as a Green Manufacturer	
	Effluents and wastes	GRI 306(2020)-Effluents and wastes	●			3.Striving as a Green Manufacturer	
Friendly Workplace	Labor/Management relation	GRI 401- Labor/Management relation	●			4. PSMC as a Happy Enterprise	
	Talent development (customized topic)	GRI 404- Training and Education	●			4. PSMC as a Happy Enterprise	
	Human rights (customized topic)	GRI 406- Non-discrimination, 407- Freedom of assembly and collective bargaining, 408- Child labor, 409- Forced and compulsory labor, 412- Human rights assessment	●		●	4. PSMC as a Happy Enterprise	
Safe Environment	Occupational health and hygiene	GRI 403(2018)- Occupation safety and hygiene	●		●	4. PSMC as a Happy Enterprise	



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# Development Strategies and Sustainable Goals

Perspective	Sustainable Theme	Strategy	2021 Performance	2022 Goals	Mid and Long Term Goals
Economic Aspec	Corporate governance		Major topics : Anti-corruption, Anti-Competitive behavior, Socioeconomical compliance, and Ethical management	<ul style="list-style-type: none"> <li>No occurrence of corruption.</li> <li>No occurrence of anti-competitive behavior.</li> <li>No major violations at all operating locations of PSMC.</li> </ul>	<ul style="list-style-type: none"> <li>No occurrence of corruption.</li> <li>No occurrence of anticompetitive behavior.</li> <li>No violation of regulations.</li> <li>Introduce TCFD framework to link climate change impacts to financial statements</li> <li>Participate in the corporate governance evaluation of Taiwan listed companies for the first time, with a target evaluation score of more than 85 points.</li> </ul> <ul style="list-style-type: none"> <li>Complete the RBA verification audit of each plant in 2023</li> <li>Disclose the report on Climate-related Financial Disclosures (TCFD)</li> <li>Maintain a score of 90 or more in the corporate governance evaluation of Taiwan listed companies</li> </ul>
	Information security		Major Subjects : Customer privacy	<ul style="list-style-type: none"> <li>The Company had no occurrence of "proven violation of customer privacy" and "complaint on missing customer information" that would damage the interest of an external party.</li> <li>Internally, the audit on various information use found no abnormal storage and retrieval of information that would evidently damage the Company's interest.</li> </ul>	<ul style="list-style-type: none"> <li>No occurrence of information security incident.</li> </ul> <ul style="list-style-type: none"> <li>Implement the information security incident notification process and the promotion of SIEM information security incident management platform to reduce information security risks</li> <li>Link employee performance appraisal to the information security assessment to enhance employees' information security awareness</li> <li>Introduce new information security technologies, strengthen vulnerability scanning, synchronize external threat information, and prevent social engineering and cyber attacks.</li> </ul>
	Sustainable Profitability		Major topics : Economical performance, Intellectual property, Product Services and R&D and innovation	<ul style="list-style-type: none"> <li>In this year, there were 205 patent applications filed and 131 patents granted. The goal was accomplished.</li> <li>48nm NOR Flash is in mass production.</li> <li>28nm NAND Flash is in mass production.</li> <li>25nm DRAM is in mass production.</li> </ul>	<ul style="list-style-type: none"> <li>Number of annual patent applications to exceed 110</li> <li>Complete the construction of Tongluo Fab</li> <li>Complete the development of 3D Interchip display samples at the end of 2022</li> <li>Continue to develop the Computing-in-Memory technology platform, which is to implement AIM chips into more IP designs, enhancing the performance of AIM chips and increasing applications.</li> <li>Complete the Automotive IGBT engineering sample verification</li> <li>Develop below 25nm DRAM process</li> <li>Develop below 28nm NAND Flash process</li> </ul> <ul style="list-style-type: none"> <li>In 2030, the monthly production capacity of Tongluo P5 factory will reach 100K wafers.</li> <li>By becoming a world-class technology manufacturer, increased profits mean we are able to contribute more to society's social welfare.</li> </ul>



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Perspective	Sustainable Theme	Strategy	2021 Performance	2022 Goals	Mid and Long Term Goals
Major topics : Supply chain management, Client health and safety, Production quality control management					
Economic Aspect	Customer Trust	Promote internal 6S activities and implement "QC 080000" to enhance the qualities of production processesComply to the procurement policy of PSMC to ensure stable material sources from suppliers	<ul style="list-style-type: none"> <li>100% of the raw material vendors and contractors completed the evaluation process in accordance with the selection principles.</li> <li>100% of new suppliers completed the preliminary survey and achieved a 100% examination rate.</li> <li>Score 91 points in customer satisfaction</li> <li>6S competition results of all departments met the target. No major deficiencies in the customer's FAB 6S audit participating units</li> </ul>	<ul style="list-style-type: none"> <li>100% of the raw material vendors and contractors to complete the annual evaluation process in accordance with the selection principles.</li> <li>100% of new suppliers to complete the preliminary survey.</li> <li>100% of tier 1 suppliers to sign the Responsible Business Alliance (RBA) commitment letter</li> <li>100% of tier 1 suppliers to complete the sustainability management self-assessment questionnaires</li> <li>100% of major suppliers to complete the regular evaluation</li> <li>Achieve a 100% examination rate.</li> <li>To main customer satisfaction at a score of 85 points.</li> <li>6S compliance scores of participating departments to formulate quarterly according to different groups.</li> </ul>	<ul style="list-style-type: none"> <li>100% of tier 2 suppliers to complete the sustainability management self-assessment questionnaires</li> <li>100% of major suppliers to complete the regular evaluation</li> </ul>
Major Subjects : Energy、GHG management、Water and discharged water					
Environmental Aspect	Energy/Resources	Introduce the relevant international management system and supervise in accordance with PDCA mechanisms for continuous management; while promoting the relevant measures in reducing electricity and water uses, carbon emission, and energy resources, so as to mitigate the possible impact caused by climate change.	<ul style="list-style-type: none"> <li>Greenhouse gas emissions per unit production capacity were reduced by 1% or more.</li> <li>Introduce ISO 50001 Energy Management System in 8-inch fabs.</li> <li>Process water recovery rate of all plants reached 86% or more.</li> <li>Wastewater discharge rate at 67% or less.</li> </ul>	<ul style="list-style-type: none"> <li>Implement energy-saving/carbon reduction programs and reduce greenhouse gases by 1%.</li> <li>Process water recovery rate to reach 85.6%</li> <li>Wastewater discharge rate to reach 67.5%</li> <li>Reduce the rate of water consumption per unit product area by 5%.</li> <li>Reduce the ultrapure water consumption per unit wafer area by 5%, compared with 2021</li> </ul>	<ul style="list-style-type: none"> <li>Cooperate with suppliers to develop an energy-saving equipment</li> <li>Reduce direct greenhouse gas emissions per unit wafer area by 15% in 2030; the cumulative reduction of fluorine content to reach 5 million tons; achieve process fluoride emission reduction rate of 90%</li> <li>Process water recovery rate reach 85.6% and wastewater discharge rate reach 67% in 2030.</li> <li>To reducte rate of water consumption per unit product area by 15% in 2030.</li> <li>The power consumption per unit wafer area to reduce by 20%</li> <li>The ratio of setting up renewable energy facilities/purchasing green electricity to exceed 8% in 2023.</li> <li>(Note : The base year is 2015)</li> </ul>



Perspective	Sustainable Theme	Strategy	2021 Performance	2022 Goals	Mid and Long Term Goals
Environmental Aspect	Pollution Prevention	Major topics : Air pollution emission management, Waste		<ul style="list-style-type: none"> <li>Number of abnormal discharge events due to air pollution control equipment failure &lt;1 ; zero leakage around the perimeter of the VOC treatment facility</li> <li>VOC treatment facility performance to be better than BACT standard (up to 92.5%);reduce rate of organic matter emission per unit product area by 10%.</li> <li>Recycling rate of waste to reach 87% or more; waste landfill rate less than 1%</li> <li>Proportion of on-site audit and counseling for waste treatment and recycling vendors : ≥ 80%</li> </ul>	
		Major Subjects : Employer-employee relations ▶ Talent development ▶ Human rights		<ul style="list-style-type: none"> <li>Recruitment yield ratios reached 94.29%</li> <li>Achievement rate for training programs was 96.4%.</li> <li>"Feedback Corner" - employee communication platform response rate was 100%.</li> <li>RBA Validated Assessment Program (VAP) Certification</li> </ul> <ul style="list-style-type: none"> <li>Recruitment yield ratios ≥ 90%</li> <li>The achievement rate for the training programs ≥ 90%.</li> <li>"Feedback Corner" - employee communication platform response rate ≥ 95%.</li> </ul>	
Societal Aspect	Safe environment	Major Subjects : Occupational health and safety		<ul style="list-style-type: none"> <li>The Frequency-Severity Indicator (FSI) of the Company to be lower than one-third of the industry standard</li> <li>The proposals for effective improvement of occupational health to reach 50 or more.</li> <li>No cases of occupational diseases caused by chemical exposure</li> <li>No cases of major environmental and industrial safety accidents</li> <li>100% re-examination of supply qualifications should a supplier has a major violation in environmental safety and health</li> <li>Incidence rate of abnormal events per thousand person a day &lt;0.005</li> <li>Achievement rate of health and improvement in key ethnic groups ≥ 50%</li> </ul>	
		Conduct daily operations in accordance with occupational health and safety management systems and impose examinations and correctional measures on the overall working conditions of the operational system to fulfill the goal of continuous improvement		<ul style="list-style-type: none"> <li>The Frequency-Severity Indicator (FSI) of the Company was 0.01, which was lower than one-third of the industry standard</li> </ul>	



# 1

## Striving with Sound Operations

- 1.1 Organizational Structure
- 1.2 Integrity and Compliance
- 1.3 Financial Performance
- 1.4 Risk Management
- 1.5 Information Security Control





1.1 Organizational Structure

1.2 Integrity and Compliance

1.3 Financial Performance

1.4 Risk Management

1.5 Information Security Control



## Corporate Governance / Managing Directions

### Core Topics' Meanings to Powerchip Semiconductor Manufacturing Corp.

Regulatory compliance is the basic requirement for running a sustainable corporation. If one fails to manage the risks of regulatory and corruption issues, it will create a negative impact on the corporate image and its operations. We stipulated relevant mandates to ask employees to meet the Company's ethical standards when carrying out business. The stipulations also brought understanding to corporate stakeholders about our ethical standards. Such information regarding corporate governance can be found on our website to fulfill our social responsibility and ethical operations.

### Core Topics



Anti-corruption



Anti-competitive practices



Social and economical regulatory compliance



Ethical management



## Performance Highlights



### Stock Market IPO

Completed application for stock market IPO in 2021.

### 96 Score

The performance self-evaluation of the board was 96 in 2021.



After adding two additional independent board members, the independent board member ratio of the board reached five out of nine, exceeding 1/2.

### VAP Certification

Completed VPA certification from Responsible Business Alliance (RBA) for P1/2 production site.

### The Surplus Per Share NT 4.92



The gross profit margin was 42% in 2021, the surplus per share was NT4.92.

## Policies

Our company believes in "Ethics, Service, Quality, and Innovation." Thus, "The Code of Ethical Operation," "The Guideline to Ethical Operation Procedure and Behavior," "The Practice of Corporate Social Responsibility," and "Corporate Ethics Guide" were stipulated.

To meet the requirement of the company's IPO operation and corporate governance, and to extend relevant standards for management, the board passed the addition and amendment of "The Code of Ethical Operation," "The Guideline to Ethical Operation Procedure and Behavior," "The Practice of Sustainable Development," and "Corporate Ethics Guide" on March 9th, 2021.

In regards to the reporting of financial statements, it is done by following our corporate accounting standards, "Regulations Governing the Preparation of Financial Reports by Securities Issuers," relevant regulations, and commonly accepted accounting practices. The annual financial reports are all audited by certified accountants to ensure its fairness.

Our company had already planned to implement TCFD framework in the following phases.

## Promises and Goals

### Short-Term Goals

- Zero corruption incidents.
- Zero anti-compete practice incidents.
- Zero regulatory violations.
- Implement the TCFD framework, including the impact of climate change in the financial reports.

- Participate in the company's first corporate governance evaluation as a domestic public traded (listed) company, with a target score of more than 85.

### Mid-Term Goals

- Complete RBA evaluation and certification for each production site by 2023.
- Disclose Task Force on Climate-Related Financial Disclosures (TCFD) by 2023.

- The target score of corporate governance evaluation as a domestic, publicly traded (listed) company to exceed 90 by 2023.

### Long-Term Goals

- Maintain the target score of corporate governance evaluation as a domestic, publicly traded (listed) company at above 90.



1.1 Organizational Structure

1.2 Integrity and Compliance

1.3 Financial Performance

1.4 Risk Management

1.5 Information Security Control

## Governance Methods

Establish a transitional committee to receive anonymous or signed letters from employees or external parties to handle any conduct violation reports. The members of the company and external parties can all report a violation either signed or anonymously.

Promote business ethics and anti-corruption to every member of the company via email and public announcements on the corporate website.

Establish "Conduct incident reporting system" and "Reporting Email," members of the company should comply with "The Code of Ethical Operation," "The Guideline to Ethical Operation Procedure and Behavior." Reported cases will be compiled by the Conduct Transition Committee and submitted to the president or independent board members.

The auditing department will conduct periodic or random reviews of the company's internal standards and operations to ensure the effectiveness of the design and the actual implementation of internal control.

The corporate website will disclose the company's financial information and email addresses for contacts, establish proper internal mechanisms for handling and disclosing critical information, implement a spokesperson channel, and disclose the company's revenue and combined revenue information on a monthly basis.

## Reporting Mechanism

If a member of the company fails to comply with the company's requirements on ethics and honesty during their business operation, both internal and external parties can file a report anonymously or signed. It will be investigated by the auditing department from the board and the result is then submitted to the president or chairman. Any internal and external parties can file a report anonymously or signed if a member of the company is involved in illegal conduct during their business operation.



## Assessment Mechanism

01

The auditing department will compile reports on the lack of internal control, unusual incidents discovered in routine audits, and self-evaluations from each department of the company and its subsidiaries, and then submit them to the auditing committee and the board.

02

The company will conduct a self-evaluation on internal control standards at least once per year, and a statement will be released from the board and the president declaring the effectiveness of the company's internal control standards.

03

The company's annual financial reports will be submitted to the auditing committee for approval before receiving final approval from the board. The reports will be certified by the accountants first before receiving approval in the shareholders' meeting.

04

The appointed department of the company is responsible for collecting and gathering company information and disclosing related information on the corporate website.

## Performance Report

### Goals in 2021

Zero corruption incidents.

Zero anti-compete practice incidents.

Zero regulatory violations.

Bring understanding to corporate stakeholders about critical information regarding the company's governance and operations.

### Performances in 2021

Zero corruption incidents.

Zero anti-compete practice incidents.

Zero regulatory violations.

The CSR report was already released, and disclosed information on the company's governance and operations in detail.





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## Information Security / Managing Directions

### Core Topics' Meanings to Powerchip Semiconductor Manufacturing Corp.

Powerchip Semiconductor Manufacturing Corp., as a professional wafer OEM, must strictly prevent any leaking of client information. If a client's privacy were mismanaged, it would damage our clients's confidence in us and our corporate image, further impacting any future work relationships.

### Core Topics



#### Customer privacy





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## Performance Highlights



**100%**  
**Education**  
**Training**

Every employee of Powerchip Semiconductor Manufacturing Corp. (Expatriate personnel excluded) has 100% completed training on "Information Security Management Measures."



## Policies

The stipulation of the "Information Security Policy" and "Information Security Management Measures" was done to show dedication in protecting client-related information and files through the company's strict recording and control internal system. "Ensuring security of our company's and client/partner's information assets, and protecting the rights of our company and stakeholders." - The authorization's approval and activation for internal members will follow the regulations for each individual system.

## Promises and Goals

### Short-Term Goals

- Zero information security incident.

### Mid-Term Goals

- Promote the SIEM information security incident management platform and the standard procedure on reporting an information security incident in order to decrease the information security risks.
- Ensure employee's performance evaluations have information security assessments included to raise information security awareness.

### Long-Term Goals

- Implement the latest information technology and strengthen weak spots. Synchronize with external intelligence to prevent social engineering and hacking.



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## Governance Methods

Establishing an information security committee to be responsible for stipulating and carrying out the company's information security management operation. Routine meetings shall be conducted to discuss and determine information security-related issues including but not limited to human resources, physical safety, and information security. When critical changes or an information security incident occurs, extraordinary meetings shall be conducted to engage in further discussions.

Paper-reduction promotion plan. Expecting to use electronic devices aided with a revamped information system (apply/search/read) to decrease paper document use. It will effectively mitigate the risk of using paper documents in an information security scheme.

Stipulating that every member from each department must receive annual "Information Security Management Measures" course training and promotions (information security promotion training course is included in new employee's orientation), it is expected to raise the company's internal awareness of information security, ensuring information safety.

The company shall promote control projects on trade secret control and enhance hardware and software control measures.

## Reporting Mechanism

Clients can contact us via customer service telephone or email any time.



## Assessment Mechanism

01

The security information committee engages in routine discussions on information security issues. When critical information security changes or information security incidents occur, the security information committee will hold meetings to discuss the follow-up adjustment on operation regulations.

02

IBM Qradar was purchased to conduct internet traffic analysis on internal and external networks. Utilizing the internet reputation evaluation mechanism provided by the IBM Exchange, when traffic from a high-risk website is detected, a firewall is set to engage the protection measures. Nessus was purchased to scan for weaknesses in the company's internal system to ensure server security. There is also an in-house development of an SOC system to assess and evaluate each communication (such as email, VPN), to ensure the implementation of information security for Powerchip Semiconductor Manufacturing Corp.

## Performance Report

### Goals in 2021

Zero information security incidents.

### Performances in 2021

Externally, there were no incidents such as "proven client privacy violations" or "complaints of misplaced client information"; Internally, there were no records of unusual access to information nor any unusual activities that might infringe on the company's rights after verifying each information usage.

### Accomplishments





## 1.1 Organizational Structure

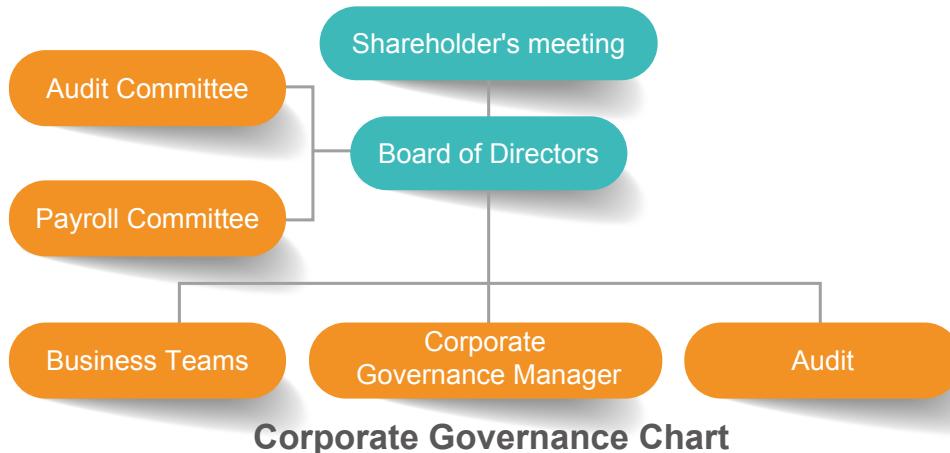
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# 1.1 Organizational Structure



The organization's governance structure includes the committee as the highest governing unit : Powerchip Semiconductor Manufacturing Corp.'s highest corporate governing unit is the Board of Directors. They are all appointed through voting by all shareholders. The duty of the board is to develop the company's vision, strategy, operation, budget planning, determine the company's mid-term and long-term development direction, and oversee the actual operation and implementation of the company.

The company's Board of Directors consists of 9 board members, including 4 board directors and 5 independent directors; the tenure per seat is 3 years (the average tenure of the board is 3.31 years as of the end of 2021). 10 board meets were held in 2021, with an average attendance rate being 98.44%, which is sound evidence of a board with healthy operations.

The Board of Directors' duty is to be responsible for the company's operations, development, and governance. All of the board members have professional backgrounds and experience, and they are beneficial to the company's business decision-making and strategic planning. Powerchip Semiconductor Manufacturing's board is healthy in its governance functions – in fact, to strengthen the management function, a salary and fees committee and an auditing committee were established. The salary and fees committee is responsible for assisting the Board of Directors in stipulating and assessing the performance evaluation of the board and professional managers, and payroll-related policy, scheme, standard, and structure; they routinely assess and determine the aforementioned parties' fees. The auditing committee is responsible for supervising the fairness of our company's financial reporting, appointing (dismissing) the certified accountants, suitability, independence, and performance, the effective implementation of the company's internal control, corporate compliance-related regulations and rules, the control of the existing and potential corporate risks.

Our company stipulated its "Guideline to Ethical Operation Procedure and Behavior," where guidelines for avoiding conflict of interests are clearly enumerated. There are also regulations on the scope of the board member's meeting, when the meeting items conflict with the interests of individuals or their representing companies, they are not permitted for the discussion and the vote, related avoidance measures are documented in the meeting minutes.

The core business teams are formed of professional managers who were evaluated and appointed by the Board of Directors, all the professional managers have specialized educational backgrounds and abundant industry experiences for handling the company's daily operation and management tasks. These professional managers are tasked to make strategic decisions from economical, social, and environmental perspectives, and present them to the board routinely.

Based on our company's diversity policy and to strengthen corporate governance and facilitate the establishment of the Board of Directors and the development of a healthy structure, the nomination of our company's Board of Directors' candidates is done in accordance with the company's bylaws through the adoption of a nomination scheme. Each candidate's qualifications including education, experience, professional background, credibility, and related professional qualifications are assessed and determined by the Board of Directors first, then appointments are made in the shareholders' meeting. The number of members on the Board of Directors concurrently holding positions in the company's managerial positions shall not exceed 1/3 of the Board. In addition, the Company has, based on its own operations, operational patterns and developmental needs, formulated appropriate diversification policies including but not limited to the following :

1. Basic conditions and value : gender, age, nationality and culture.
2. Professional knowledge and skills : Business judgment capabilities, accounting and financial analysis abilities, operation management capabilities, crisis management abilities, industry knowledge, international market vision, leadership, and decision-making capabilities.

The company's Board of Directors consists of nine board members currently, the status of diversity for actual management goals are as follow :

Diversity management goals	Accomplishments
Independent board member exceeds 1/3 of the Board of Directors	
Board members holding concurrent managerial positions in the company not exceeding 1/3 of the Board of Directors	
An independent board member's tenure not exceeding three terms	
Adequate diversity in professional knowledge and skill sets	



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The implementation of the diversity policy for the board of the directors is summarized below :

Diversity core		Basic criteria			Professional background				Professional knowledge and skill sets						GICS Level 1 <sup>(Note)</sup>	
		Name	Nationality	Holding position as employees	Tenure of independent board members (under 3 years)	Accounting	Industry	Finance	Technology	Business judgment capabilities	Operation management capabilities	Leadership and decision-making capabilities	Crisis management abilities	Industry knowledge	International market vision	
Board of Directors	Frank Huang	Republic of China		●			●		●	●	●	●	●	●	●	Industry, Medical and health, Finance, Information Technology, Communication service
	Brian Shieh			●			●		●	●	●	●	●	●	●	Information technology
	Jerry Shao			●			●	●	●	●	●	●	●	●	●	Finance, Information technology
	Qing-Xiang Xu					●		●	●	●	●	●	●	●	●	Information technology
Independent board members	Chong-Yu Wu			●			●		●	●	●	●	●	●	●	Medical and health, Information technology
	Jia-Lin Chang				●		●	●	●	●	●	●	●	●	●	Finance, Information technology, Communication service
	Xian-Ming Lin			●			●		●	●	●	●	●	●	●	Finance, Information technology, Communication service
	Ben-Jian Lin			●			●		●	●	●	●	●	●	●	Information technology
	Shu Ye			●		●	●	●	●	●	●	●	●	●	●	Finance, Information technology, Communication service



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The Board of Directors' meetings have regulations on avoiding the conflict of interests. When the meeting items have a conflict of interests with individual or their representing companies, they are not permitted for the discussion and the vote, related avoidance measures are documented in the meeting minutes.

Summary of conflict of interest avoidance among the Board of Directors in 2021 :

Board of Directors meeting, date, and term	Name of the board member	Meeting items	Reason for avoiding conflict of interest	Participation in the vote
2021.07.028th term, No. 11	Mr. Shu Ye	The Company's intention to sign a "Co-op education and academic return mechanism contract" with National Taiwan University	Complied with regulations, must avoid at all cost according to the law, not participate in discussion and voting	For this case, the independent board member, Mr. Shu Yeh, abstained from participating in discussion and voting in accordance with the law. The remaining Board of Directors were present and passed the case without any objections.
	Mr. Ben-Jian Lin	The company's intention to sign with National Tsing Hua University for "Co-op education and academic return mechanism contract"		For this case, the independent board member, Mr. Ben-Jian Lin, abstained from participating in discussion and voting in accordance with the law. The remaining Board of Directors were present and passed the case without any objections
2021.07.138th term, No. 12	Mr. Frank Huang, Mr. Brian Shieh, Mr. Jerry Shao	The Company's 2021 evaluation on performance bonuses for the second quarter for professional managers The pay raise for professional managers and employee salary adjustment	Conflict in interest, must avoid at all cost according to the law, not participate in discussion and voting	For this case, the chair, Mr. Frank Huang, director Brian Shieh, and director Jerry Shao were the Company's professional managers. They abstained from participating in discussion and voting in accordance with the law. The remaining Board of Directors were present and passed the case without any objections
	Mr. Frank Huang	The Company's donation to the Powerchip Cultural Foundation in 2021	Conflict in interest, must avoid at all cost according to the law, not participate in discussion and voting	For this case, the chair, Mr. Frank Huang, is concurrently the chair of the Powerchip Cultural Foundation. He abstained from participating in discussion and voting in accordance with the law. The remaining Board of Directors were present and passed the case without any objections
2021.08.098th term, No. 13	Mr. Frank Huang	The intention to lift the limits on non-compete for the Company's professional managers	Conflict in interests, must avoid at all cost according to the law, not participate in discussion and voting	For this case, the chair, Mr. Frank Huang abstained from participating in discussion and voting in accordance with the law. The remaining Board of Directors were present and passed the case without any objections
2021.09.03 8th term, No. 14	Mr. Frank Huang, Mr. Brian Shieh, Mr. Jerry Shao	1. The Company's 2021 evaluation on performance bonuses for the third quarter for professional managers 2. The 2020 assessment results for the Company's professional managers 3. Review of the Company's Board of Directors and professional managers' salary policy 4. The Company's 2020 fee for Board of Directors and supervisors 5. The recommendation for the Company's 2020 professional manager salary ratio and amount 6. The Company's 2021 evaluation on performance bonuses for the first quarter for professional managers 7. The proposal for professional manager to participate in employee share purchasing allocation 8. The Company's second employee share purchasing certificate (issued in 2020). The first phase was for issuing the list of share purchasers	Conflict in interests, must avoid at all cost according to the law, not participate in discussion and voting	For this case, the chair, Mr. Frank Huang, director Brian Shieh, and director Jerry Shao were the Company's professional managers. They abstained from participating in discussion and voting in accordance with the law. The remaining Board of Directors were present and passed the case without any objections
2021.10.198th term, No. 16	Mr. Frank Huang, Mr. Brian Shieh, Mr. Jerry Shao	1. The proposal of a cash financing plan through issuing new shares for professional managers to participate in employee share purchasing 2. The Company's 2021 evaluation on performance bonuses for the fourth quarter for professional managers	Conflict in interests, must avoid at all cost according to the law, not participate in discussion and voting	For this case, the chair, Mr. Frank Huang, director Brian Shieh, and director Jerry Shao were the Company's professional managers. They abstained from participating in discussion and voting in accordance with the law. The remaining Board of Directors were present and passed the case without any objections
2021.12.068th term, No. 17	Mr. Frank Huang	The Company's donation to the Powerchip Cultural Foundation in 2022	Conflict in interests, must avoid at all cost according to the law, not participate in discussion and voting	For this case, the chair, Mr. Frank Huang, abstained from participating in discussion and voting in accordance with the law. The remaining Board of Directors were present and passed the case without any objections



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All members of the Board of Directors were voted in by the shareholders. In consideration of the operation style and development requirement for diversity and to balance practical needs, our company evaluated the candidates based on professional background, background in education (experience), credibility, industry, related professional qualifications, and experiences in order to actively consider the candidates who could bring a diverse background and viewpoints, other criteria include but not limited to gender, age, nationality, and cultural backgrounds; the Board of Directors attracts qualifying candidates equipped with diverse business background and experiences to enhance the overall professional knowledge and skills to achieve the ideal goal of corporate governance. The board members and professional managers have made arrangements to attend courses related to economics, society, and the environment each year.

The continuous education for Board of Directors (including independent board members) in 2021 is summarized in the following :

Name	Course title	Hours
Frank Huang	<ul style="list-style-type: none"> <li>Corporate Governance and Securities Regulations</li> <li>Corporate M&amp;A Practices Sharing - Focusing on Hostile Takeovers</li> </ul>	3.0 3.0
Brian Shieh	<ul style="list-style-type: none"> <li>Corporate Governance and Securities Regulations</li> <li>Corporate M&amp;A Practices Sharing - Focusing on Hostile Takeovers</li> </ul>	3.0 3.0
Qing-Xiang Xu	<ul style="list-style-type: none"> <li>Analysis of Economic and Industrial Situation in the Post-Pandemic Era</li> <li>Ransomware and Business Risk Management</li> <li>Corporate Governance and Securities Regulations</li> <li>Current Domestic and International Economic Situation and Outlook for 2022</li> </ul>	1.5 1.5 3.0 1.5
Jerry Shao	<ul style="list-style-type: none"> <li>Corporate Governance and Securities Regulations</li> <li>Corporate M&amp;A Practices Sharing - Focusing on Hostile Takeovers</li> </ul>	3.0 3.0
Xian-Ming Lin	<ul style="list-style-type: none"> <li>Corporate Governance and Securities Regulations</li> <li>Talk on the Blueprint for Corporate Governance 3.0 and Director Responsibilities</li> <li>Corporate Operations &amp; Public Opinion, News, and Crisis Management Strategies</li> </ul>	3.0 3.0 3.0
Jia-Lin Chang	<ul style="list-style-type: none"> <li>Corporate Governance and Securities Regulations</li> <li>Corporate M&amp;A Practices Sharing - Focusing on Hostile Takeovers</li> </ul>	3.0 3.0
Chong-Yu Wu	<ul style="list-style-type: none"> <li>Corporate Governance and Securities Regulations</li> <li>Information Security Governance Practices of the Board of Directors</li> <li>Viewing Corporate Sustainable Governance from a Risk Perspective - from Corporate Governance to ESG</li> </ul>	3.0 3.0 3.0

Name	Course title	Hours
Chong-Yu Wu	<ul style="list-style-type: none"> <li>Prevention and Investigation of Internal Fraud of AI and Big Data(Part1)</li> <li>Prevention and Investigation of Internal Fraud of AI and Big Data(Part2)</li> <li>Corporate M&amp;A Practices Sharing - Focusing on Hostile Takeovers</li> </ul>	3.0 3.0 3.0
Ben-Jian Lin	<ul style="list-style-type: none"> <li>Corporate Governance and Securities Regulations</li> <li>Talk on Corporate Tax Governance and Tax Technology Solutions from Aspects of ESG Trends and Environmental Effects of the Pandemic</li> <li>Discussion on Legal Responsibilities of Directors and Supervisors in Cases of False Financial Statements</li> <li>Talk on Management of Intellectual Properties from the Perspective of the Board of Directors</li> </ul>	3.0 3.0 3.0 3.0
Shu Ye	<ul style="list-style-type: none"> <li>Corporate Governance and Securities Regulations</li> <li>Corporate M&amp;A Practices Sharing - Focusing on Hostile Takeovers</li> </ul>	3.0 3.0

On March 9th, 2021, in the 8th meeting of the 8th term of the Board of Directors, our company passed the decision to stipulate "Board of Directors Performance Evaluation Measures"; the evaluation results were submitted on February 8th, 2022 in the 18th meeting of the 8th term to the Board of Directors meeting and to all functional committees. The score of the Board of Directors' performance evaluation was 96, the board members' performance evaluation was 96, and the functional committees' performance evaluation was 96; the evaluation results were all "exceed the benchmark" (over 90).

To reach the goal of talent acquisition, inspiration, and retention, the Board of Directors and professional managers' performance evaluation policy and payroll policy, scheme, standard, and structure, were all drafted and reviewed by the salary and fee committee. The independent board member is included in the committee to provide external advice on the payroll. The review of the payroll is done annually to ensure the competitiveness of the salary.

Our company pays fees to the board members and professional managers. It is done under the consideration of the company's future operations, development, and risk, and is also positively correlated to their performance evaluation in order to seek a balance between sustainable development and risk management.

Our company's salary and fees committee is formed by three independent board members. The fees for the board members are reviewed by the salary and fees committee and approved by the Board of Directors' subsequently, and are reported in the shareholders' meeting. The professional managers' salary (including salary, bonuses, and employee compensations) is calculated based on the manager's participation in the company's operations and the value of their contributions; the salary uses an annual salary survey as a basis and refers to the salary levels of managers in the same industry. The salary and fees committee will review the salary level for the Board of Directors to approve subsequently.



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## Column



## Independent and Professional Board of Directors

Our company complies with the competent authority to promote corporate governance and maintain the Board of Directors' independence and diversity. Two additional independent board members were added to the board in 2021 before filing for the Company's IPO. The number of independent board members in the seats now is 5 out of 9 among the Board of Directors, exceeding 1/2 of the total.

The following is a summary of each independent board member and their contribution to our company's professional governance :

Name	Introductions
Chong-Yu Wu	Dr. Chong-Yu Wu graduated from National Chiao Tung University with a PhD in Electronics Engineering. He specializes in semiconductor IC design; he is also National Chiao Tung University's former president and emeritus. He holds the authority in Taiwan's IC design, founded National Chip Implementation Center, and was the chair of Taiwan's first analog IC laboratory. He has trained many top talents in IC design and served as an independent board member in many other corporations. He is an industry professional whom our company needs.
Ben-Jian Lin	Dr. Ben-Jian Lin graduated from The Ohio State University's Department of Electrical and Computer Engineering, he is renowned in the semiconductor industry. He was TSMC's vice president of research and development, his development in Immersion Lithography to replace Dry Lithography put TSMC in the global leader position to push the manufacturing process to the present day. Dr. Lin is an Academician of Academia Sinica, a member of the U.S. National Academy of Engineering, a current adjunct professor at National Tsing Hua University, Dean of the College of Semiconductor Research, and Director of TSMC - NTHU Research Center. These are all related to our company's industry, he is a professional of the industry.
Xian-Ming Lin	Mr. Xian-Min Lin graduated from National Chiao Tung University with a Bachelor's Degree in Computer Engineering and Control Engineering. He is currently the chairman and Chief Strategy Officer of Wistron Corporation and the chairman of Wiwynn. He has solid experience in running a business, and his current positions is related to the supply chain of our company's industry. He can provide recommendations and advice on our company's operation management.
Jia-Lin Chang	Jia-Lin Chang received a PhD from Princeton University's Electrical Engineering and an MBA from The Wharton School of the University of Pennsylvania in the U.S. He was a global partner of The Goldman Sachs Group, General Manager and Chief Financial Officer of HTC, semiconductor engineering in Motorola U.S., he has a broad experience in the semiconductor industry, high-tech industry, and global capital market. He will provide a solid contribution to answering the company's needs in strategy, market positioning, and the capital market.
Shu Ye	Dr. Shu Yeh graduated from The University of California, Los Angeles with a PhD in Accounting. He is specialized in international financial accounting. He was appointed to be the Chief Financial Officer and independent board member of Chunghwa Telecom, and independent board member of Lungyen Life Service Co. He is currently teaching in National Taiwan University's Department of Accounting as a professor. He is able to provide sound advice and professional knowledge in the topics, such as preparing and disclosing the financial statement, corporate governance and compliances. He is the expert our company needs for risk management.

As of the end of December, in the summary of independent board members' participation in the salary and fee committee, as well as the auditing committee, other than independent board member of the auditing committee, Mr. Ben-Jian Lin, asking for leave once, the rest of the independent board members have 100% attendance and participation rate. It shows the participation is in an excellent state.



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## 1.2 Integrity and Compliance

### Professional Norms

Our company believes in "Integrity, Service, Quality, and Innovation," "The Code of Work Ethic Operation," "The Guideline to Ethical Operation Procedure and Behavior," "The Practical Guideline for Sustainable Development," "Corporate Ethics Guide," and "Work Ethic Regulations" were stipulated in order to ensure ethical business practice. In response to the certification requirements from corporate governance and Responsible Business Alliance (RBA), "Reporting, Dispute, and Recommendation and Employee Feedback Management Procedures" and "Whistleblower Protection and anti-retaliation Management Procedures" were updated and released in 2021. In January 2022, the transitional committee's organization and members were structured to meet the relevant regulations during February and March 2022; the former Work Ethic Regulation was merged into "The Code of Ethical Operation," "The Guideline to Ethical Operation Procedure and Behavior," and "Reporting, Dispute and Recommendation, and Employee Feedback Management Procedures."

Our company complies with "The Code of Work Ethic Operation" and "The Guideline to Ethical Operation Procedure and Behavior." The evaluation scheme for the risk of unethical behavior will be established in 2022, it aims to routinely analyze and assess those business activities within business practices with a higher risk of having unethical activities occurring; prevention measures will be drafted and routinely reviewed for their feasibility and effectiveness. Our company had already passed certifications from RBA, such as "RBA Social Responsibility Management Measures," "RBA Social Responsibility Performance Target Management Measures," "RBA Social Responsibility Risk Management Measures". Routine assessments will be conducted to evaluate the integrity, and no unjust enrichment to comply with our business ethics.

To ensure our employees meet work ethic standards in their business practices, our company promotes anti-corruption and business ethics to each employee through educational training. "Critical Information, Prevent Insider Trading, Corporate Social Responsibility, and Work Ethic Operation" and "Powerchip Semiconductor Manufacturing Corp.'s Social Responsibility and Business Ethics" were delivered as training to everyone in the company in 2021 with the expectation of strengthening employee's awareness of anti-corruption, business ethics, and social responsibilities.

To fulfill business ethics and integrity of the operation along with our company's external stakeholders, our company released relevant regulations on the company's website, and demanded the primary suppliers and production plant contractors to sign the "RBA Promises Agreement" or to pledge in the contracts on fully complying with our company's ethical business policies.

Our company has a "Work Ethic Incident Reporting System" and "Reporting Email," both internal and external parties can file a report anonymously or signed through the "Reporting Email." Our company also discloses such email to external parties through their orders and business invoices, so they can alert our company via email should there be any regulatory violations. Our company appoints the dedication promotion committee to be responsible for handling the report cases, the person in charge will state in writing that the whistleblower's identity and the content of the violation remain confidential and ensure the whistleblowers will not face any retaliation as a result of reporting. For reporting against general employees, the case should be submitted to the president. If the case involves a Board of Directors or someone at a managerial level, it should be submitted to an independent board member. Once the accused person is proven to violate relevant regulations or our company's work ethic policies and rules, the accused person will be asked to cease the activities in question immediately and given adequate punishment. If necessary, the case will be reported to the government authority for judiciary investigation, or through the legal process to request compensation for the damage to protect our company's reputation and rights.

Our company has a "Work Ethic Incident Reporting System." For anyone who fits the reporting criteria, employees should proceed to the reporting process. Our company's internal auditing unit will be responsible for compiling the record and present it to the president. In 2021, our company's internal auditing unit did not receive any request from the dedication promotion committee, professional managers, the Board of Directors, or supervisors for assistance in investigating any case.

In 2021, there was not any corruption incident, nor received any reporting on breaching work ethic regulations in our company.





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## Internal Control

Our company is fully aware that establishing, implementing, and maintaining an internal control system is the responsibility of the company's Board of Directors and professional managers, and such a system had already been established. The purpose of this system is to provide reasonable assurance in fulfilling the targets such as the business effectiveness and efficiency (including but not limited to profit, performance, and assets security), reporting reliability, promptness, transparency, and compliance to relevant regulations, acts, and laws. There is going to be a limitation in such an internal control system, the effectiveness of the internal control system can only provide reasonable assurance to the three targets mentioned above regardless of how refined the design is. Further, the internal control system's effectiveness can be affected by the change in environment and situations. Our company's internal control system has a self-supervision mechanism in place for the company to act immediately if any fault were detected. Our company used items stated in "Regulations Governing Establishment of Internal Control Systems by Public Companies" ("Governing Regulations" in short) to examine the internal control system effectiveness in order to determine whether the design and the implementation of the internal control system are effective.

The items adopted in the "Governing Regulation" for assessing the internal control system categorize the internal control system into five categories based on the process of control management : 1. Environmental control, 2. Risk assessment, 3. Control operation, 4. Information and Communication, and 5. Supervision. Each category has multiple items included. The aforementioned items can be referred to in the rules stated in the "Governing Regulation." Our company had already adopted the aforementioned items to assess the internal control system's effectiveness in its design and implementation. Based on the previous assessment result, our company believed that as of December 31st, 2021, our company's internal control system (including supervising and managing subsidiaries), including understanding the effectiveness of the operation and efficiency of reaching the target, reporting reliability, promptness, transparency, and compliance to relevant regulations, acts, and laws, were all effective in their design and implementation. It can be reasonably expected that the aforementioned targets can be reached.

On February 8th, 2022, the Board of Directors passed and released a statement stating that the internal control system's design and implementation were effective in 2021.

There were no major violations on each business site in 2021. The summary of our company's regulatory compliance in 2021 is listed as the following :





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## RBA (VAP Certification)

In recent years, people started putting emphasis on human rights issues, the global pandemic has come and gone, and extreme weather occurs more frequently across the world. Powerchip Semiconductor Corp. values caring about our society, corporate sustainable development, and expectations from clients, so our company has been realizing corporate social responsibility one step at a time, establishing a management system, and excelling through reviews.

Responsible Business Alliance (RBA) had established a guideline for business practices to ensure the safety of the working condition and supply chain in the electronics industry or in industries with electronics as the core components, the laborers are treated with respect and dignity, the business practices meeting environmental protection aspects and comply with business ethics.

For such reasons, Powerchip Semiconductor Manufacturing Corp. had officially begun preparing for the certification at the beginning of 2021. The appointed consultants guided the company to assess the risks, feasibility measures, and actual practices by inspecting the company's systems in labor rights, health and safety, environment, business ethics, and management to determine the suitability. Using P1/2 production plant as the demonstration, we successfully passed RBA VAP (Validated Audit Process) certification in Q4 through the third party auditing organization appointed by the RBA, and obtained the GOLD status in Q1 2022. Our company plans to expand to P3, 8A, and 8B production plants in 2023 to obtain the certifications P1/2 production plant achieved.

We used our RBA certification to show that Powerchip Semiconductor Manufacturing Corp., its employees, and suppliers all realized, fulfilled, and complied with the requirements from international societies and clients, and put the best effort in delivering our promises and fulfilling corporate social responsibility as a global corporation.



### Establishment of Management System :

RBA's scope includes five major categories, A "Labor," B "Health and Safety," C "Environment," D "Ethical Guidelines," and E "Management System." Related management measures such as "RBA Social Responsibility Management Review Measures," "RBA Social Responsibility Performance Target Management Measures," "RBA Social Responsibility Risk Management Measures," and "RBA Social Responsibility Adjustment and Prevention Management Measures" were established. Powerchip Semiconductor Manufacturing Corp. has been dedicated to corporate social responsibility for the long term, there are designated departments implementing actions in these categories, Labor, Health and Safety, Environment, Ethical Guideline, and Management System. In 2021, our company integrated multiple perspectives and stipulated more thorough and rigorous guidelines and management procedures after working with consultants from an advisory firm. We will conduct routine self-audit for review and the president will lead management review meetings to harvest a continuous positive reinforcement of improvement for the organization.

### Increasing Promotion on the Spirit Of Rba to Employees :

In consideration of clients and markets, quality is the foundation for long-term establishment and growth – it is to be ingrained in employees' minds. RBA's "Human Rights" category is highly correlated to prominent international human rights standards such as the "UN Guiding Principles on Business and Human Rights," the International Labor Organization's "Declaration on Fundamental Principles and Rights at Work," and the "UN Universal Declaration of Human Rights."

Thus, the president repeatedly emphasizes RBA's human rights in many internal occasions. Promotional materials are printed by designated teams and posted in public office areas as reminders. The RBA audit from our clients served as an opportunity to bring emphasis on human factors, and instills its spirits to be included in each self-evaluation.



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## Column



## Whistleblower Protection Procedure

Powerchip Semiconductor Manufacturing Corp. had begun drafting corporate social responsibility reports in 2015, clients had begun CSR-related audits since 2017. In 2021, our company decided to apply for Responsible Business Alliance's Validated Audit Process and obtained the certification on December 22nd. It showed how much Powerchip Semiconductor Manufacturing Corp. values corporate social responsibility and discipline. Powerchip Semiconductor Manufacturing Corp. established a dedication promotion committee to stipulate relevant policies to comply with regulations and meet clients' requirements. It asked the entire employee body to comply with business ethics and provide stakeholders a dispute channel specifically for business ethics-related issues in Powerchip Semiconductor Manufacturing Corp; also granted proper protections to the whistleblower to prevent any retribution. In 2021, to meet RBA's related guidelines, our company established "Whistleblower Protection and Anti-Retribution Management Procedures" to protect our employees, suppliers, and other internal or external persons who exercise their rights to file a report. To protect "whistleblowers" from the fears of receiving retribution.

The internal and external anonymous reporting channels are the following :



Report, dispute, and recommendation cases	Report, dispute, and recommendation channels	Note
Employee relations related issues	1. Physical location : Employee Opinion Mailbox 2. Email : 885@powerchip.com 3. Feedback Corner myOA/HR/"Feedback Corner" /Employee Opinion 4. Extension Number : 2683	Employee Opinion Mailbox is located in the pantry in the first floor zone A
Healthy, safety, and environment related issues	Feedback Corner myOA/HR/"Feedback Corner" /Employee Opinion	
Business ethics related issues	1. In person : To elaborate in person 2. Email for external party : ethic@powerchip.com 3. Internal party : In company's website/About Powerchip Semiconductor Manufacturing Corp/Business Ethics Policies, there is a reporting button for the process.	



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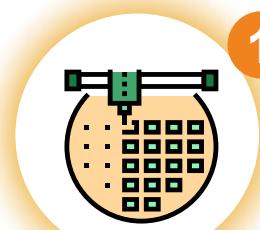
## 1.3 Financial Performance

Powerchip Semiconductor Manufacturing Corporation (PSMC) has lived up to the entrustment of its shareholders, and completed its stock listing in December 2021. In 2021, it achieved a consolidated revenue of NT\$65.6 billion, a net income of NT\$16.09 billion, and an earnings per share of NT\$4.92. Both revenue and profit hit a record high for PSMC, accentuating the strong competitiveness of the Company's successful transformation into the foundry industry.

Looking back on 2021, the world is still shrouded in the haze of the pandemic. The semiconductor supply chain is being affected by the US-China trade war, turning chips into an important strategic material. In addition, with the rapid advancement of the digital revolution and the booming of various remote applications driven by the stay-at-home economy, as well as the rise of emerging industries such as smart applications and the metaverse, the demand for foundries continues to increase, resulting in a booming business cycle for the semiconductor industry.

Last year, PSMC expanded its production capacity of 8-inch and 12-inch fabs as planned, and successively developed its 3D interchip, new image sensors, GaN power components, 40-nm display driver chips, and 90-nm power management technologies and 48-nm NOR products. It also successfully initiated the construction project of the Tongluo P5 fab. In 2021, the operating cost was NT\$38 billion and the operating expense was NT\$7.77 billion. Although the number increased by 9.6% and 42.3% respectively, compared with the previous year, the gross margin in 2021 soared by 18% to reach 42%, demonstrating our strength and effectiveness in driving up revenue through active investment in technology.

**Looking forward to 2022, the shortage of chips will continue. The industry, in general, believes that semiconductor production capacity is still tight, and there is still potential for foundry prices to rise. PSMC will continue to carry out the following four technology development as well as operation strategies to improve production efficiency and increase profits :**



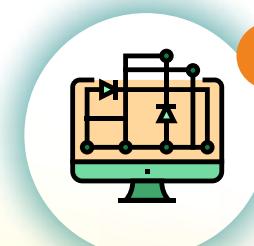
1

**The foundry for memory operations will be focused on low- and medium-capacity specialty DRAM products, targeting the applications of low-power special memory.**



2

**Utilizing memory and logic stacking integration technology (3D Interchip) to build a foundry platform for various high-performance, low-power, and highly-integrated products.**



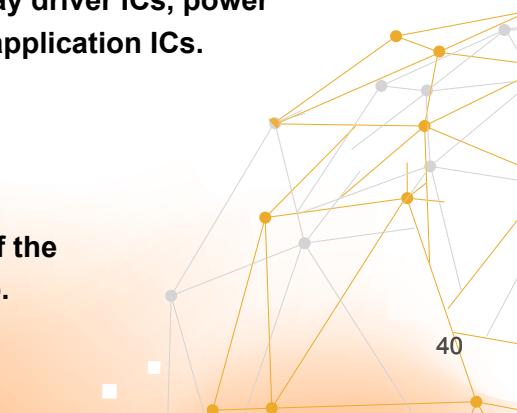
3

**The foundry for logic operations will be focused on the production of system peripheral ICs and power components, targeting the applications of display driver ICs, power management ICs, and embedded application ICs.**



4

**Complete the construction of the Tongluo P5 fab.**





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Unit : NT\$ thousand

While going all out to increase profits and give back to shareholders, PSMC also embraces the ideals of ESG, upholds the belief of being friendly to the environment and giving back to the society, and pursues the balanced interests of stakeholders through sound corporate governance. It fulfills the Company's commitment to social responsibility, and adheres to the corporate culture of Integrity, Service, Quality, and Innovation to realize co-prosperity and co-existence with customers, society, and the environment, achieving stable and profitable operating performance to give back to shareholders for their long-term support.



Item/Year	2020	2021	Comparing the growth of 2021
Operating revenue	45,684,615	65,622,945	43.6%
Gross profit	10,992,411	27,584,614	150.9%
Operating profit/loss	5,744,244	20,090,575	249.8%
Non-operating income and expenses	-945,171	-875,779	7.3%
Profit before tax	4,799,073	19,214,796	300.4%
Profit of continuing operations	3,806,477	16,092,355	322.8%
Net income (loss)	3,806,477	16,092,355	322.8%
Other comprehensive income for the period (net income after tax)	-86,850	103,209	218.8%
Total comprehensive income for the period	3,719,627	16,195,564	335.4%
Net income attributable to parent	3,806,477	16,092,355	322.8%
Total comprehensive income attributable to parent	3,719,627	16,195,564	335.4%
Earnings per share	1.23	4.92	300.0%
Employee wages and benefits	9,502,870	14,561,683	53.2%
Payment of shareholders' dividends (cash)	600,000	3,739,245	523.2%
Payment of government taxes <sup>Note</sup>	41,465	48,286	16.5%

Note : Tax paid to the government includes stamp tax, house tax, vehicle registration tax, and fuel tax.



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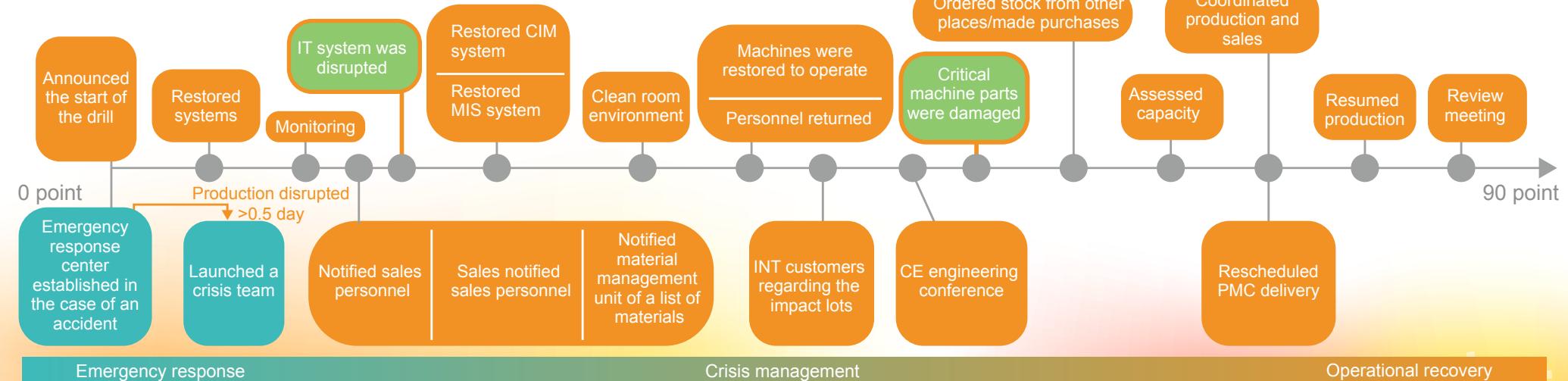
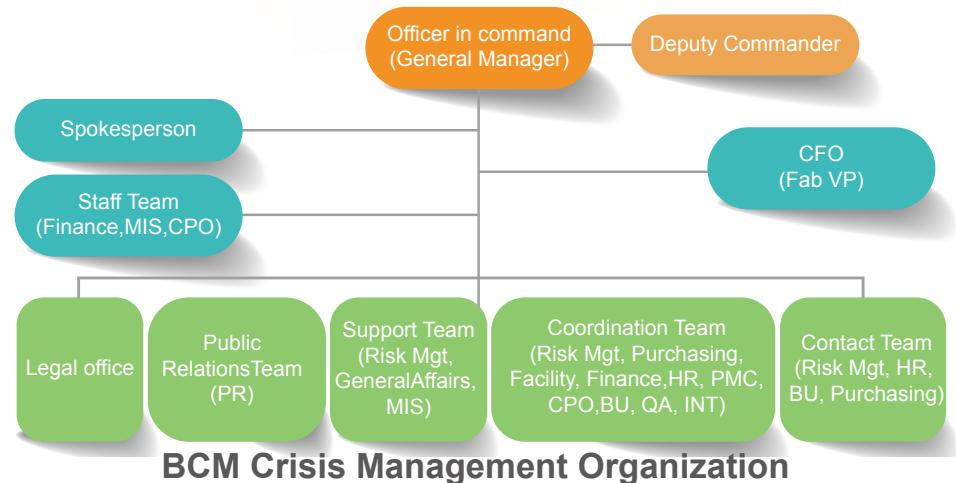
# 1.4 Risk Management

## Operational Risk Diagnosis

We use the operational impact analysis method to identify the Company's key operations and the possible impact these operations may cause and establish an optimal operation recovery time.

We analyze these key operations using operation impact. Through risk assessment charts, we analyze the potential threats, weaknesses and consequences of these hazards individually within operations, and understand the existing prevention and detection control measures. Then according to the seriousness level of the analysis level chart, occurrence analysis chart, risk level judgment standards, we can determine and grasp the operating risks and establish risk control policies to reduce risks.

Operational risk diagnosis is made by the joint evaluation and diagnosis of all units; these include plant affairs, risk management, manufacturing, engineering, automation, information management, property management, purchasing, sales, production management, finished products, finance, human resources, and quality customer service.





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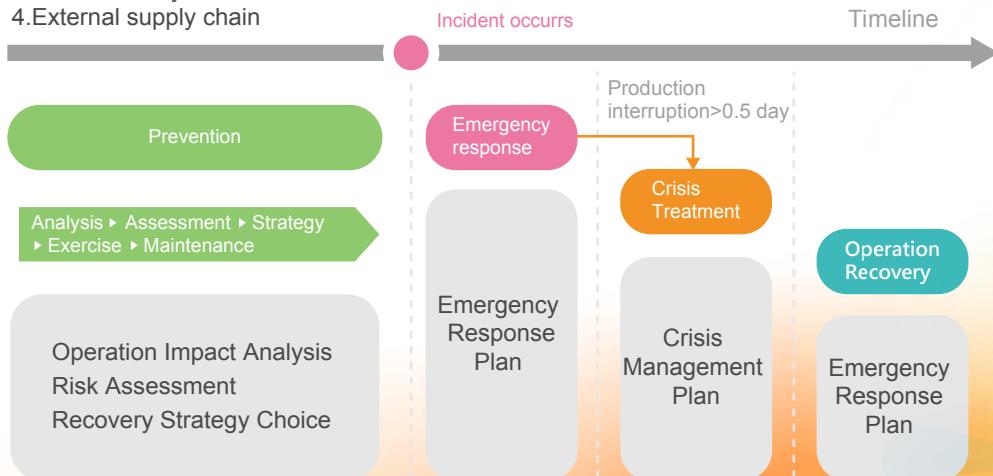
1.5 Information Security Control

## Continuous Operation Management

PSMC is an enterprise that pursues sustainable operations. To ensure that the Company does not experience operation interruption in the event of a major incident or crisis, and minimize the loss of property, employee lives, corporate image, customers and investors, the Company has management plans that handle crises systematically. To restore operations back to normal in the shortest time possible in the event of a major incident or crisis, PSMC has formulated crisis management plans and recovery plans on certain crises such as power and water shut-down for an extensive period, severe fires, destructive earthquakes, climate changes, interruption of raw material supplies, shortage of labor, hacking of the information system and key equipment malfunctioning; themed drills are carried out each year. The drill completion rate of continuous operation management amounted to 100%. The Company will continue to uncover weaknesses and make improvements.

In 2021, the BCM drill was completed. The scenario was that the gas contractor accidentally broke the electrical pipelines during the construction which caused a power outage across the entire production site; the production was down for one day and equipment was damaged. Each department was tested according to the above scenario for its ability to sustain the business operation. Each department followed the relevant guideline and paperwork to complete the crisis management and restore the business operation.

- 1.Factory accidents
- 2.Factory supply system
- 3.Information system
- 4.External supply chain



### References for continuous operation management

Operating Procedures for HSE Risk Evaluations	Plant Disaster Emergency Response Measures	Procedures for Crisis Management Plans	Procedures for Operation Recovery Plan
Procedures for emergency response on water supply interruption and restriction	Standard operating procedures for electricity recovery for plant affairs	Procedures for emergency response on raw material shortage	Procedures for MIS backup





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## Relevant Measures to Continue Operating Under Covid-19 –

As employees are the Company's important assets, we take good care of employees' health to maintain our competitiveness; and therefore have listed preventing infectious diseases as a part of our daily operations, and conduct risk assessment according to potential epidemic scenarios and have devised a contingency plan for epidemic prevention and response. Moreover, we actively collect information on and pay attention to the development trends of epidemics as the basis for employee health management and countermeasures while conducting annual reviews and adjustments to ensure the feasibility of the countermeasures.

In response to the potential impacts of COVID-19 on the Company, the Department of Risk Management has been paying attention to the development of the pandemic since the end of 2019, and had begun to provide appropriate health education to our employees to avoid false concepts. When the pandemic was gradually escalating, we mobilized our response team, composed of members from the Health Center, human Resources Department, the Information Management Department, the Operation Planning Department, the Procurement Department, the Public Relations Department, and the General Affairs Department, to launch the disease prevention according to the epidemiology, and to implement the measures below at different stages gradually while reviewing and adjusting them regularly to respond to changes in the pandemic :

1. Promot individual health management and work with the government's pandemic prevention measures. If necessary, self-supervision will be in place for the designated unit to track and follow up with wearing a mask at all times. High-risk employees at will be listed as follow-up targets and rapid test kits and assistance will be provided.
2. We strengthened the cleaning and disinfection of the public areas of each plant and provided disinfection supplies for our personnel, and conducted body temperature measurement and confirmed disease-related information for all vendors/visitors before entering the plant.
3. Informed vendors of on our pandemic prevention measures pertaining to them. Employees with a high risk of infection should wear masks at work; employees should avoid unnecessary business trips and reduce/decline visits from personnel from high-risk areas.
4. We implemented alternative measures, such as working in different areas, work from home, video conferencing, etc., to reduce the risk of exposure to the virus.
5. We launched various preparatory tasks for impact on our operations, including supply chain confirmation, disinfection of products upon entry and exit, product inventory and storage, communication with customers, and communication with the media.

Through the efforts of relevant units and employees, although COVID-19 is still in the global pandemic stage, we can effectively keep track of our employees' conditions and take measures and actions early. We will continue this vigilant spirit to ensure that all partners working in the Company receive complete health care to achieve the goal of "win-win outcome for work and health", thereby strengthening the Company's overall competitiveness.

## Financial Risk

(1) Responding measures to the impact on our company from the fluctuation of interest rates, exchange rates, and inflation

### 1. Interest rates

Unit : One thousand New Taiwan Dollars; %

Year/Item	Year 2020	Year 2021
Combined interest fee	678,183	697,812
Combined net profit	45,684,615	65,622,945
Percentage of combined interest fee to combined net profit	1.48	1.06

Sources : Combined financial report signed by certified accountants

Our company's interest fee to respective net profit ratios for the years 2020 and 2021 were 1.48% and 1.06% respectively. They were considered to be a very small portion. The main reason was that the loan from financial institutions for the business operation and capital expenses did not cause any major setback to the company's revenue and profit despite the fluctuation of the interest rate. Our company monitors and analyzes constantly the impact of the financial market and interest rate fluctuation on our cash flow while maintaining excellent relationships with banks. The risks of paying interest and bearing debt are evaluated accordingly to decrease the impact of interest fluctuation on our company's income.

### 2. Exchange rate fluctuation

Unit : One thousand New Taiwan Dollars; %

Year/Item	Year 2020	Year 2021
Combined net loss on foreign currency	316,469	212,671
Combined net profit	45,684,615	65,622,945
Percentage of combined net loss on foreign currency to combined net profit	0.69	0.32

Sources : Combined financial report signed by certified accountants



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Our company's combined net loss on foreign currency to respective net profit ratios for the years 2020 and 2021 were 0.69% and 0.32% respectively. Since our company's capital expenses and manufacturing costs are mostly in non-New Taiwan Dollar currency such as U.S. Dollars or Japanese Yen, our primary income is also in U.S. Dollars, volatile fluctuation in the exchange rate may harm our company. Our company adopts a natural hedge depending on the changes in the exchange market, actual price, and cash reserves. Risks from exchange rates are further averted through foreign exchange spot and forward exchange agreements under the scope allowed by the policies.

## 3. Inflation

The Company has not been significantly affected by inflation. Further, the Company closely monitors market inflation and has good interactive relationship with suppliers and customers so as to avoid the impact caused by inflation on the Company's profit or loss.

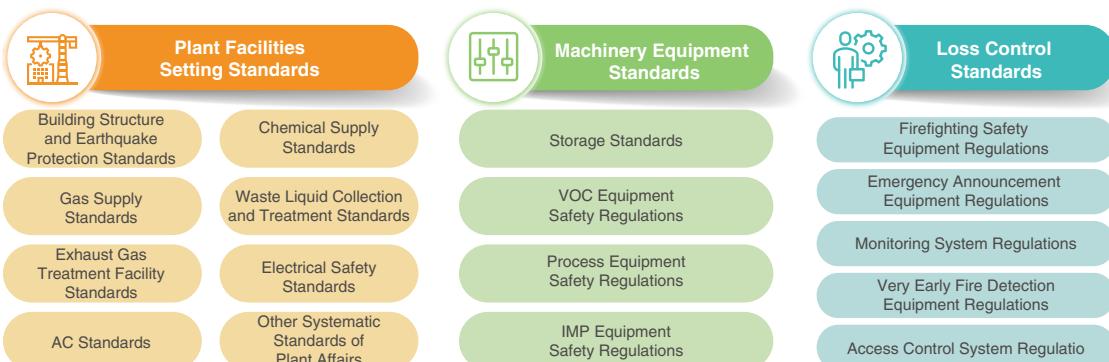
(2) The rationale of policies and future countermeasures for the profit or loss incurred for engaging in high-risk, high-leverage investments, loaning funds to others, endorsements/guarantees and derivatives :

1. The Company has established "Procedures for Lending Funds to Other Parties", "Procedures for Endorsements/Guarantees" and "Procedures for the Acquisition or Disposal of Assets" which serve as the basis of compliance for the Company. The Company has not engaged in high-risk and highleverage investments, lending funds to other parties and extending endorsements/guarantees.
2. The Company mainly engages in derivative transactions to mitigate the exchange rate risks for USD-NTD and JPY-NTD. The risk arises from assets and liabilities in foreign currencies. The derivative transactions are risk mitigating in nature and are strictly subjected to the "Procedures for the Acquisition or Disposal of Assets", which serves as the basis of compliance for these transactions. As such, the Company is not exposed to major risks.

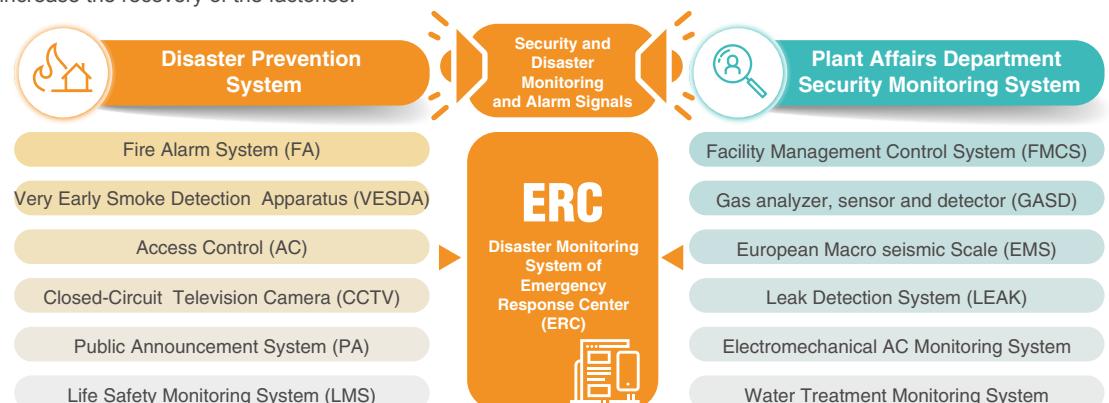


## Security Surveillance

The hardware facilities used in the Company 's daily production are in compliance with the domestic and foreign regulations as well as the actual conditions of various plants. Security standards and control measures of plant machinery and equipment are compiled by the professionals of Risk Department; ensuring industrial safety risks are controlled from the source.



Further, an Emergency Response Center (ERC) is established in all factories. Through an integrated disaster monitoring system, the Company has more time to respond when disasters occur. Proper early response can not only reduce casualties and environmental pollution to the minimum, it can also substantially reduce equipment loss and increase the recovery of the factories.





## Safety Improvement Performance

Item	P3 production plant protection system effectiveness improvement project	P1/2 production plant fire fighting system effectiveness improvement project																																																
Annual improvement plan	<ul style="list-style-type: none"> <li>Fire fighting pipeline followed the requirements of NFPA 13 and FM 2-8. The pipeline further supports longitudinal and four-directional, anti-tilting and anti-swinging.</li> </ul>	<ul style="list-style-type: none"> <li>Improvement constructions done in high-risk areas with annual budgets scheduled.</li> <li>Increased the inspection rate in high-risks areas (frequent malfunctions to environmental reasons).</li> <li>Managed system supplies (established safety level of inventory and conducted quarterly inventory check)</li> <li>Special area inspection and routinely replaced system components according to their lifetime.</li> </ul>																																																
Performance result	<ul style="list-style-type: none"> <li>The pipeline's designed structural strengthen coefficient was 0.5G in the horizontal direction; it was increased to 0.75G for both horizontal and longitudinal directions.</li> </ul> <p><b>Construction Planning</b></p> <p><b>Construction areas:</b> All plant area, including the FAB, the SUP, the CUB, and the PS buildings.</p> <p><b>Construction content:</b></p> <ol style="list-style-type: none"> <li>1. The main fire pipelines and sub-pipelines of the entire plant need to be equipped with longitudinal bracing.</li> <li>2. As the direction of fire pipelines (<math>\geq 2-1/2"</math>) of the entire plant was changed (more than 3.6m), horizontal and longitudinal bracing needs to be installed.</li> <li>3. As the length of the fire pipelines (standpipes) of the entire plant exceeded 1m, horizontal and longitudinal bracing needs to be installed.</li> <li>4. Anti-tilting (over 11m) needs to be installed in the fire pipelines of the entire plant.</li> </ol> <p>※The priority of the construction areas: 1. Plant-wide standpipes; 2. production machine (including auxiliary equipment); 3. factory supply system; 4. other areas (office area, material storage area, parking space, etc.).</p> <p><b>Planned schedule:</b></p> <ul style="list-style-type: none"> <li>• 2017-The standpipes, sprinkler system filter, and fire hydrant system of the clean rooms in a total of six areas(2F, 3F, and 5F of FAB; 2F, 3F, and 5F of SUP )</li> <li>• 2018-The standpipes, sprinkler system (including water mist), and fire hydrant system of the factory supply system in a total of six areas(1F, 4F, 6F, and 8F of FAB; B1F of CUB; 8F of SUP )</li> <li>• 2019-The standpipes, sprinkler system (including water mist), and fire hydrant system of the factory supply system in a total of six areas(1F-3F of CUB and 3F-5F of PS)</li> <li>• 2020-The factory supply system, and standpipes, sprinkler system, and fire hydrant system of the warehouse in a total of four areas(B3F of SUP, B2F of SUP, 1F of SUP, and 4F of SUP)</li> <li>• 2021-The standpipes, sprinkler system (including foam), and fire hydrant system of other areas in a total of one area(6F of SUP)</li> </ul>	<p>The statistics on the number of malfunction of system components in 2020–2021 showed a decreasing trend.</p> <table border="1"> <thead> <tr> <th>Malfunction Type</th> <th>2019</th> <th>2020</th> <th>2021</th> </tr> </thead> <tbody> <tr> <td>Extensive filth in detectors</td> <td>12</td> <td>10</td> <td>9</td> </tr> <tr> <td>Malfunction of detectors (main body)</td> <td>7</td> <td>6</td> <td>6</td> </tr> <tr> <td>Malfunction of detectors (baseplate)</td> <td>10</td> <td>8</td> <td>7</td> </tr> <tr> <td>Malfunction of modules</td> <td>8</td> <td>8</td> <td>7</td> </tr> <tr> <td>Malfunction of PBL</td> <td>4</td> <td>3</td> <td>3</td> </tr> <tr> <td>Malfunction of manual switch</td> <td>4</td> <td>3</td> <td>3</td> </tr> <tr> <td>Malfunction of storage battery</td> <td>6</td> <td>5</td> <td>5</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Malfunction Type</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Extensive filth in detectors</td> <td>22%</td> </tr> <tr> <td>Malfunction of modules</td> <td>17%</td> </tr> <tr> <td>Malfunction of detectors (baseplate)</td> <td>17%</td> </tr> <tr> <td>Malfunction of detectors (main body)</td> <td>15%</td> </tr> <tr> <td>Malfunction of PBL</td> <td>8%</td> </tr> <tr> <td>Malfunction of manual switch</td> <td>8%</td> </tr> <tr> <td>Malfunction of storage battery</td> <td>5%</td> </tr> </tbody> </table>	Malfunction Type	2019	2020	2021	Extensive filth in detectors	12	10	9	Malfunction of detectors (main body)	7	6	6	Malfunction of detectors (baseplate)	10	8	7	Malfunction of modules	8	8	7	Malfunction of PBL	4	3	3	Malfunction of manual switch	4	3	3	Malfunction of storage battery	6	5	5	Malfunction Type	Percentage	Extensive filth in detectors	22%	Malfunction of modules	17%	Malfunction of detectors (baseplate)	17%	Malfunction of detectors (main body)	15%	Malfunction of PBL	8%	Malfunction of manual switch	8%	Malfunction of storage battery	5%
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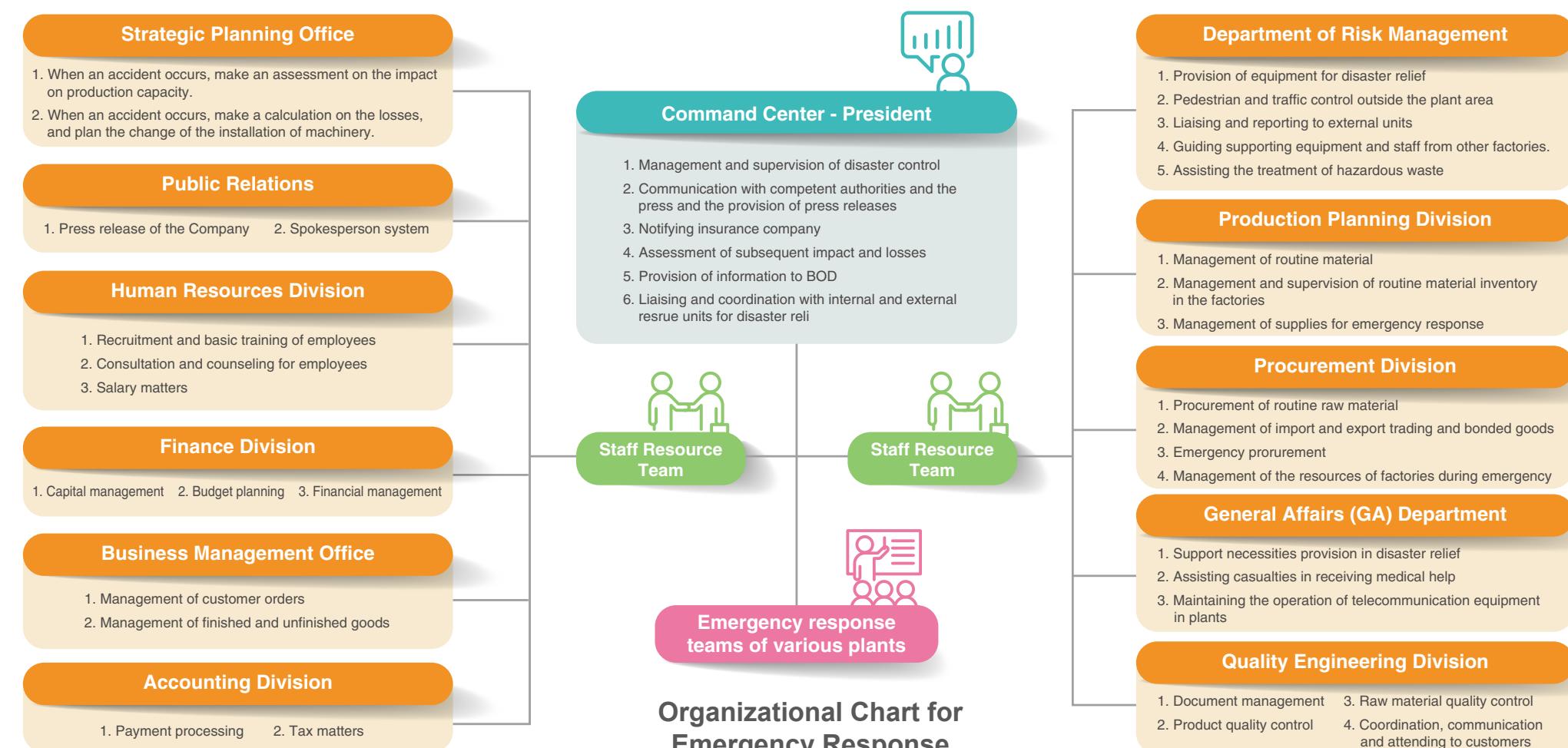
1.3 Financial Performance

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## Emergency Response

To apply the correct and effective response measures in case of an emergency so as to minimize the casualties, property damage and impact on the environment due to an accident, the Company has established the "Plant Disaster Emergency Response Measures" and formed and trained an emergency response team. The team is subjected to a departmental drill at least once every six months, and a comprehensive (cross departmental) drill once a year. General employees are subjected to one evacuation drill every year.





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### Organizational Chart for Emergency Response

#### Regional Command Center

1. Overall response command
2. Responsible region personnel evacuation decision
3. Each Group response work of the contact and coordination
4. Announce the condition released and personnel reversion decision
5. Plant outer emergency rescue unit notification



#### Aides Support Group

- A. Prevention system confirmed
- B. Collection site conditions return
- C. Coordinator job
- D. Assist resource scheduling and confirmation
- E. Assist commanders



#### Safety Control Group

1. Guiding personnel evacuation
2. Personnel Controlled
3. Isolation Disaster
4. In/Out of the disaster record/equipment check
5. Erecting decontamination station/equipment decontamination

#### Rescue Group

1. Search and rescue Personnel accident site
2. The accident scene rescue and containment
3. Removal and interdiction of dangerous substances
4. The important material of rescue
5. Assist and support the fire fighting personnel in rescue
6. Environment Monitoring

#### First Aid Group

1. Set up a provisional aid station
2. Casualty be taken to hospital for medical treatment



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## Emergency Routine Training



## Emergency Response Drill



## Fire Extinguisher Training and Evacuation Drill



In response to emergency incidents that require evacuations of the entire production plant and a personnel check afterwards, the 12" plants (P1/2/3) have already implemented a name-checking system to assist officers in ensuring every personnel on the production site was evacuated safely in 2019. After evaluation, the same system will be implemented in the production plant 8A to strengthen 8A's emergency evacuation and assembly check to decrease the time needed for the emergency crew to search and rescue.



Deployed in 12" plant  
in 2019

Deploy in 8" plant  
in 2022

Work or no  
Shift  
Beginning of shift

Employee  
Attendance  
Record  
(Personnel System)

TCP/IP  
E/O ↔ O/E  
Name  
Employee ID / Plant number  
Department / Company

Card number  
Time/place of access entry

Activity status of plant  
(Access Control system)



- Cloud database streaming to synchronize each department's system information. Important information is listed in the index.
- To be on top of employee activities within the plant, integrate an emergency evacuation and check-in system (portable)
- When an abnormal incident occurs, to be able to quickly grasp the evacuation status of workers to shorten the time to locate personnel and ensure rescue direction.



1.1 Organizational Structure

1.2 Integrity and Compliance

1.3 Financial Performance

1.4 Risk Management

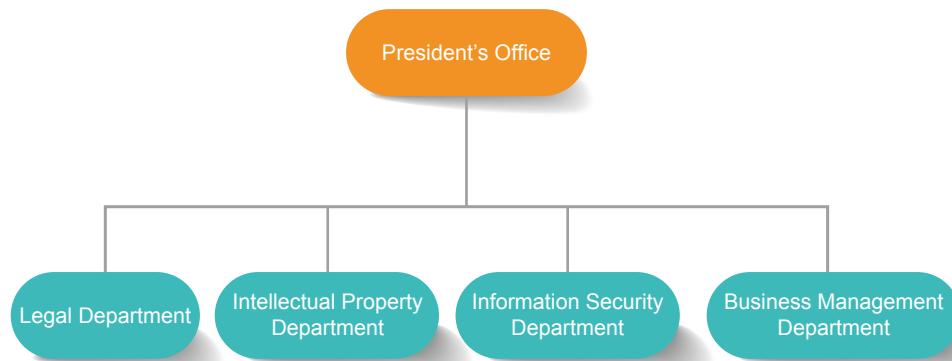
1.5 Information Security Control

## 1.5 Information Security Control

### Information Security Policy



To ensure the information security of the correspondence between the Company and its customers/partners, and thus protecting the interest of the Company and its stakeholders.



Powerchip Semiconductor Manufacturing Corp. is a technology-intensive enterprise, we are fully aware our competitiveness is built on the foundation of the safety of our intellectual property. Thus, the "Information Security Unit" was formed by the company and direct reports to the President's Office; issues related to information security are reported directly to the president. "Information Security Policy" and "Information Security Management Measures" were created for internal use; they are the company's guidelines on related matters to protect important information such as trade secrets and intellectual properties. In the meantime, the company is dedicated to protecting information related to clients, all information and document exchange with clients are rigorously documented and controlled by the company's internal system. The access control and activation for related personnel follow each system's related guidelines and measures.

In terms of the implementation of information security management, it may be difficult to control the use of paper in practice. Due to a raising awareness of environmental protection in

recent years, PSMC began to implement a plan to reduce paper use in February 2018, in hopes of replacing paper with electronic files, so as to improve the systemic operations (application/enquiry/reading), thereby reducing the use of paper, continuing to respond to environmental protection with practical actions, continuing to implement energy-saving and carbon reduction measures. This has also reduced the risk of paper documents in information security management more effectively.

According to the "Information Security Policies", the Information Security Committee is composed of the representatives appointed by all relevant units who are responsible for formulating and implementing the Company's security control operations. The Committee holds meetings regularly to discuss and resolve issues relating to information security, covering aspects on human resources, physical security, and information security. When major changes or an incident involving information security occurs, an emergency meeting is held. Each year, via training and internal announcements, the Company promotes and communicates the importance of information security to all its employees to implement its information security policy.

Since 2018, the company had initiated an internal trade secrets control project by strengthening the door-access control and surveillance, auditing and reviewing the information system access record and archive, strictly monitoring personnel traffic as well as accessing data (such as but not limited to the following, no personal storage device on the company's premise, surveillance software is installed on the company computers, install camera management APP on personal cellphones, conducting information security check when entering and exiting the company). All of these are to prevent company information from being illegally accessed, tampered with, and to prevent leaks and theft of the company's trade secrets and intellectual properties. In 2021, Powerchip Semiconductor Manufacturing Corp. had no occurrences of "proven clients privacy violation" and "complaints of misplaced clients' information." In addition, employees are required to participate in the education training program "Information Security Management Measures" (information security promotion training course is included in new employee's orientation) to strengthen the company's internal awareness of information security to ensure the safety of information. In 2021, Every employee of the Powerchip Semiconductor Manufacturing Corp. (Expatriate personnel excluded) have all completed training on "Information Security Management Measures."



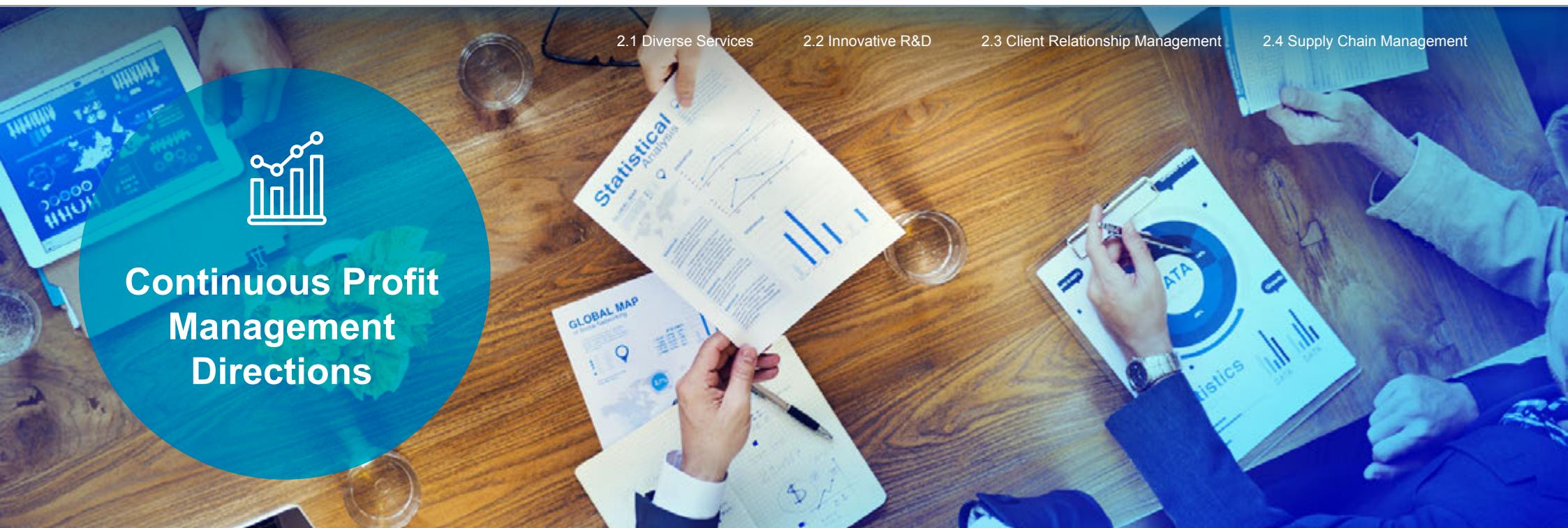


# 2

## Striving with Innovative Services

- 2.1 Diverse Services
- 2.2 Innovative R&D
- 2.3 Client Relationship Management
- 2.4 Supply Chain Management





## Core Topics' Meanings to Powerchip Semiconductor Manufacturing Corp.

Powerchip Semiconductor Corp. operates in the high-tech industry, steady growth and profits are the basic criteria for the company's sustainable operation. Our company is dedicated to creating maximum interest for our shareholders and stakeholders through maintaining technical advantage, creating stable profits, and treating the company's sustainable operation as the highest goal.

## Core Topics



Economic  
performance



Intellectual  
property



Production service  
R&D and Innovation





2.1 Diverse Services

2.2 Innovative R&amp;D

2.3 Client Relationship Management

2.4 Supply Chain Management

## Performance Highlights

### 25nm DRAM    28nm NAND Flash    0.18nm BCD technology

The driver chip for metaverse with a resolution of over **3200 PPI**

**Speed is 10 times faster** Half of the energy consumption

25nm DRAM is in mass production. 28nm NAND Flash is in mass production. 0.18 micron BCD technology completed the development of 12V, 24V, and 36V components, the Rsp and BVD had reached the qualities that can be provided for clients to use.

There was a breakthrough in the development of the fourth-generation dioxide semiconductor material IGZO (Indium gallium zinc oxide), which can be used in the production of the driver chip for metaverse with a resolution of over 3200 PPI.

The client adopted 3D Interchip packaging technology; its speed is 10 times faster than the 2.5D packaging technology with half of the energy consumption.

## Policies

- Comply with "Patent Management System (EPS)" and "Intellectual Property Management Measures", and provide clients with more advanced and comprehensive solutions through patent development and technology innovation to obtain stable customer orders.
- Continue developing OEM services and advanced manufacturing processes for logic and special applications, a professional logic OEM platform will be established to develop semiconductor intellectual property core for providing professional wafer OEM services.
- Collaborate with clients to produce customized DRAM, and continue developing next generation (NOR/NAND Flash) advanced manufacturing processing technology.

## Promises and Goals

### Short-Term Goals

- File more than 110 patent applications in 2022. (Intellectual Property Department)
- Complete the construction of the Tongluo P5 production foundry in 2022. (Strategic Planning Department)
- Complete verification sampling for automobiles in 2022. (Technology R&D Center)
- Demonstrate the developed 3D Interchip sample by the end of 2022. (Advanced Technology R&D Center)
- Continue to develop Computing-in-Memory technology platform to include AIM chips in more intellectual property design. Strengthen AIM chip's performance and increase the number of application fields. (DRAM R&D Center)
- Develop sub-25 nm DRAM manufacturing processes/ Develop sub-28 nm NAND Flash manufacturing processes. (FLASH R&D Center)

### Mid-Term Goals

- Tongluo P5 production foundry joins force in 2023 and its monthly production capacity to reach 50,000 pieces in 2025. (Strategic Planning Department)
- Produce 3D Interchip in small quantity in 2023. (Advanced Technology R&D Center)
- New product lines planning - Special memory, biochip, Memory and logic integration technology (intra-chip / 3D inter-chips), BSI image sensors, GaN/SiGe power components and chips. (Strategic Planning Department)
- Preliminary test productions for IGBT for automobiles in 2023. (Technology R&D Center)
- Complete engineering design kits for 80 nm BCD platform's 60V and 100V components. Their preliminary test productions are scheduled for 2023. (Technology R&D Center)
- Complete 1Xnm DRAM manufacturing process optimization in 2024. (DRAM R&D Center)

### Long-Term Goals

- Tongluo P5 production foundry's monthly production capacity to exceed 100K pieces by 2030. (Strategic Planning Department)
- Become a global technology giant by developing profitable products from market and technology, and give back to society. (Strategic Planning Department)



2.1 Diverse Services

2.2 Innovative R&amp;D

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## Management

Establish Intellectual Property Department to be responsible for the protection of Intellectual Property. Raise employees' awareness of intellectual property-related regulations and knowledge through recorded online training courses (E-Learning). Using patents to ensure the R&D's accomplishments are receiving full protections.

Setting a incentive scheme to encourage employees to use their talents to solidify the company's intellectual property.

Establish Technology R&D Center to be responsible for each product line's manufacturing processes R&D.

Establish Strategic Planning Department to be responsible for coordinating the company's operation and client development directions

The Chief Technology Officer is responsible for determining both the long term and short-term R&D directions and integrating the company's R&D resources.

## Assessment Mechanism

**01**

Based on both the company's strategic consideration and operation goal, continue improving the patent management system and optimize patent combination, and calculate costs for patent maintenance. Internal patent proposals are reviewed by the intellectual property reviewing committee for innovative and beneficial patents for the industry.

**02**

The Chief Technology Officer plans technology R&D KPI, and holds routine meetings to check for their progress.

**03**

The president of LSPF commended "Technology R&D Center" to conduct monthly "New Business Development Plan" (NBDP) meetings with "Marketing Department" and "Project Management Department" to conduct PDCA evaluation on each R&D project and discuss the optimal way to integrate and allocate the company's resources.

**04**

Routinely hold business management meetings and performance evaluation reviews, set business objectives and other related necessary measures to be taken.

## Reporting Mechanism

A dedicated page on our company's website for investors is set; investors can contact our company through the spokesperson contact window and E-mail at any time.



## Performance Report

### Goals in 2021

The number of company-wide patent applications exceed 100.

### Performances in 2021

There were 205 patent applications filed and 131 patents granted.



### Accomplishments

Complete the R&D of the smallest NOR Flash Cell in the OEM industry. Expected to be in mass production beginning in 2021. (Advanced Technology R&D Center)

48 nm NOR Flash is in mass production



2.1 Diverse Services

2.2 Innovative R&amp;D

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2.4 Supply Chain Management



## Clients' Trusts Management Directions

### Core Topics' Meanings to Powerchip Semiconductor Manufacturing Corp.

Powerchip Semiconductor Manufacturing Corp. ensures the production processes meet international environmental protection regulations, and satisfies clients' requirement regarding product qualities and environmental protection specifications. The company selects excellent suppliers to ensure the smooth supply of materials to gain clients' trust to continuously order from us; creating an even better performance for our company.

### Core Topics



Supplier  
management



Client health  
and safety



Production operation  
quality management



2.1 Diverse Services

2.2 Innovative R&amp;D

2.3 Client Relationship Management

2.4 Supply Chain Management

## Performance Highlights



### Supplier Evaluation

57 suppliers and 32 contractors in total were evaluated in 2021, all of them passed and the collaboration is continued.



### CIP Competition

The company's CIP competition had 166 entries, which was a record high.



### Certified Number

Six Sigma education training and the number of certified employees continues breaking records in 2021.



### Client Satisfaction

Client satisfaction score at 91.

## Policies

- The company controls the procurement, quality, environmental safety risk, and engineering according to our "Raw Material, Component/Supplier Management Measures".
- Our company deploys the QC080000 management system to demonstrate the company's focus and promises to systematically manage hazardous materials.
- Our company's workplace principle is "Enhance production quality, fulfill operation discipline".

## Promises and Goals

### Short-Term Goals

- Raw material suppliers and contractors must 100% complete the assessment per the screening policy. (Procurement Department)
- 100% of new suppliers complete the preliminary survey. (Procurement Department)
- Phase one suppliers sign Responsible Business Alliance (RAB) Promises, completion rate reaches 100%.
- Phase one suppliers sign the "Sustainable Management Self-evaluation Questionnaire", completion rate reaches 100%.
- Assessment done on major suppliers, completion rate reaches 100%.

- Expected auditing completion rate to reach 100%. (Supply Quality Department)
- Maintain client satisfactory score over 85. (Customer Service)
- Set 6S passing score for the different groups of the participating departments each quarter. (Productions)

### Mid-Term Goals

- The signing of Responsible Business Alliance (RAB) promises is extended to phase two suppliers.
- Routinely assess major suppliers with a completion rate of 100%.

### Long-Term Goals

- Expand the signing of the "Sustainable Management Self-evaluation Questionnaire" to the phase two suppliers with a completion rate of 100%.



2.1 Diverse Services

2.2 Innovative R&amp;D

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2.4 Supply Chain Management

## Management

Per our company's regulation and ISO/IECQ QC080000 articles, the responsible departments must assist in the operation to manage hazardous materials.

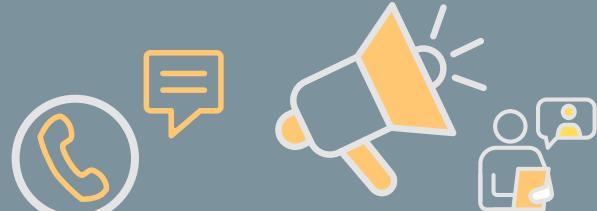
To ensure smooth supply from suppliers at reasonable prices, quality materials, and a schedule that meets our company's needs, the supplier assessment is conducted every half a year, the contractor assessment is done once per year. New suppliers must complete the preliminary review for assessment.

Establish 6S management and campaign task force, the foundry manager is assumed as the host to hold several related competitions with prizes to encourage employees to spot any potential issues from daily operations and provide improvement plans and practical measures.

Host CIP competitions to strengthen employees' awareness of quality and build team spirit, which can enhance competitiveness and client satisfaction.

## Reporting Mechanism

- Our company has "Employee Work Ethics Regulations" in place. Any supply and procurement-related violations can be reported to our company via E-mail at [ethic@powerchip.com](mailto:ethic@powerchip.com)
- Clients can contact our company through the customer service phone number or E-mail.



## Assessment Mechanism

- 01 The results from supplier/contractor assessments are used to evaluate continuing the collaboration relationships or remove them from the qualifying list.
- 02 Routinely review the effectiveness of the hazardous material process management system and continue to refine operation procedures.
- 03 Management review is conducted quarterly along with environmental safety and hygiene departments to announce the improved performance of 6S participating departments.
- 04 Conduct client satisfaction reviews every year to propose improvement plans based on clients' needs to continuously improve overall customer satisfaction.

## Performance Report

Goals in 2021	Performances in 2021	Accomplishments
Raw material suppliers and contractors' assessment are done according to the screening principle with 100% completion.	Raw material suppliers and contractors' assessment done with 100% completion.	
100% of new suppliers completed the preliminary survey. The expected audit rate reached 100%.	100% of new suppliers completed the preliminary survey. The expected audit rate reached 100%.	
Each department's 6S competitions all met the standards.	Each department reached its standards in the 6S competition. No major fault from participating departments for the client FAB 6S audit.	
Maintain client satisfaction score above 85.	Client satisfaction score at 91.	



## 2.1 Diverse Services

## 2.2 Innovative R&amp;D

## 2.3 Client Relationship Management

## 2.4 Supply Chain Management

## 2.1 Diverse Services

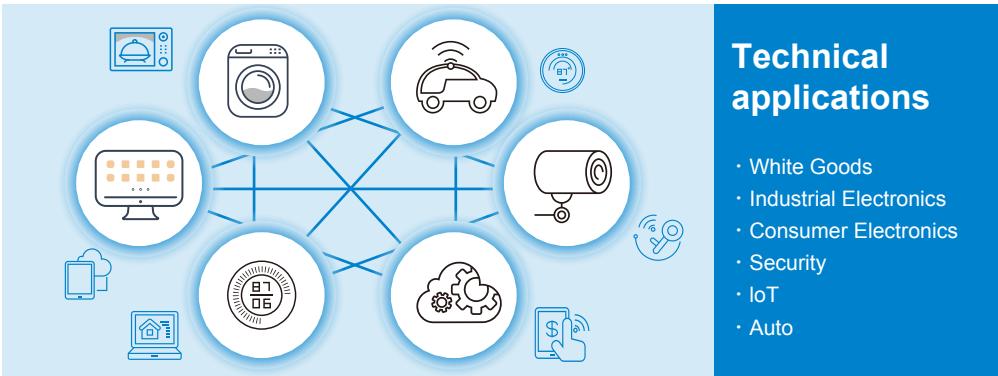
According to World Semiconductor Trade Statistics (WSTS), it is estimated that the global semiconductor market will see a surge in market demand in 2021, which will push the global semiconductor market to a new peak of US\$553 billion, an increase of about 25.6% from 2020's figure of US\$440.4 billion. WSTS predicts that the market will maintain positive growth momentum in 2022. However, considering the flattening of supply and demand and the high base period, it is predicted that the global semiconductor market scale in 2022 will reach US\$601.5 billion, for an annual growth rate of about 8.8%. The main growth momentum comes from sensor, logic, memory and other related products.

In the pure wafer foundry industry, the increasing market demand and tight production capacity have driven up wafer prices. According to Omdia (an international research and analysis institution), it is estimated that the output value of pure wafer foundries in 2021 will reach about US\$77.1 billion, an increase of about 20% compared with that in 2020. It is expected that the output value of pure wafer foundries will reach US\$86.2 billion in 2022, a positive growth rate of about 12% or more. This indicates that we outperformed the overall semiconductor industry in terms of the growth.

Since the outbreak of COVID-19, the pandemic has spread around the world, and has not yet been effectively controlled. What's more, the US-China trade war has not yet ended, and there are still many uncertainties in the market. It is still necessary to closely observe subsequent impacts on the global economy.

Since 2019, many countries have begun to fully support commercial 5G operations. The leading countries include South Korea, the United States, Australia, the United Kingdom, and mainland China; this makes clear that the world has officially entered the 5G generation. 5G technology features high-speed transmission, low latency, and massive networking. In addition to business opportunities driven by 5G infrastructure, it will also trigger a new wave of demand for terminal equipment upgrades and replacements. In addition, with the increase of computing power, the improvement of data transmission speed, and the gradual maturing of network and cloud data collection technologies, the use of data to develop artificial intelligence (AI) has become a very important science and technology topic in recent years. It is estimated that the application of AI to terminal devices will be carried out in the following six directions : Voice assistants; advanced photography; intuitive user interfaces; reducing power consumption to extend battery life; improving connection quality; and increasing personal security. AI is also gradually developing into a full range of terminal applications, including terminals such as smart phones, smart wearables, drones, smart homes, smart factories, smart driver assistance, smart mobile medical care, and public/security management, as well as terminal applications such as gene sequencing, all of which will be connected to AI.

When commercial 5G operations become successful and the era of AI coming, the combination of application scenarios and behavioral habits such as the Internet of Things (IoT), Internet of Vehicles, intelligent environment, and biometric and voice recognition will bring a series of changes



### Technical applications

- White Goods
- Industrial Electronics
- Consumer Electronics
- Security
- IoT
- Auto

and business opportunities in the semiconductor industry. At the same time, due to the improvement of AI technology and efficiency, the construction of IoT and 5G mobile communication has been perfected, and many new types of terminal products have emerged, which has continuously increased the complexity of chip design; in addition to the pursuit of chip function integration and low power consumption, it is also necessary to consider production efficiency or further require semiconductor process technology scaling. 12-inch fabs have been the mainstream supply size for semiconductors, and the thresholds to entry for new competitors in the industry are higher than that in the past. In addition, there has been a clear trend toward global IDM manufacturers gradually transforming into Fab-lite in recent years, and gradually expanding their wafer outsourcing orders. Taiwan's wafer foundry industry has become the biggest beneficiary of this wave of transformation. The Company has abundant 12- inch advanced process wafer production capacity and focuses on niche processes, and has gradually attracted many international IDM fabs and fabless design companies to become the Company's foundry clients.

In view of the gradual maturing of AI and 5G industries, the demand for high-speed and low-power customized products in future terminal products will be even greater. In response to these market trends, the Company actively develops special logic processes and memory product processes that better meet client needs to provide clients with wafer foundry services that are more competitive in the market.

Looking back on the years 2020–2021, the escalating US-China trade war led to a surge in pull for electronic components such as semiconductors. Later on, with a variety of factors such as the stay-at-home economy driven by the COVID-19 pandemic, demand for various types of "stay-at-home economy"-related chips was booming, leading to the tight production capacity for upstream wafer foundries. Production capacity remains in short supply. Looking forward to 2022, 5G, AI, and electric vehicles are still the main driving forces for the growth of the industry. At the same time, driven by the new topic of "Metaverse" business opportunities, it will even push forward strong demand for wafer foundry, IC design, Wi-Fi 6, silicon wafers, equipment and materials, automotive electronics, DRAM, passive components, 5G equipment, etc.



## 2.1 Diverse Services

## 2.2 Innovative R&amp;D

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## Markets

The Company's 12-inch fab facility has stepped into the foundry business successfully since 2012. With world-class technology, international manufacturing standards, and strict quality control, we provide customers with satisfactory foundry services to create new peaks in business together. So far, we have developed different customers in the foundry business, and the scope of customers' application products covers application in a wide range of electronic products : computers, wireless communications, consumer electronics, and automotive electronics. The Company not only provides an advanced niche memory process for domestic and overseas customers, it is also the only 12-inch foundry that provides a comprehensive memory product line. We also provide a customized logic and special application foundry service, and therefore is the best collaborative partner for many international companies. After the integration of the Company's 12-inch and 8-inch fabs, we have provided customers with a more complete product line and better service quality.

Meanwhile, we have expanded our collaboration with global industry, government, and academic research institutions in the development of relevant process technologies, with the aim of keeping abreast of forward-looking technologies early, shortening the research and development timelines effectively, and reducing the cost of patents and technology transfer.

The development of IoT and AI has created a variety of demand for semiconductors, from cloud to edge\* computing, providing a new long-term growth momentum for the semiconductor industry amid a maturing global smartphone market. In addition to a comprehensive memory designing service and manufacturing capability, the Company also possesses the production platform for DRAM/ NAND Flash and NOR Flash that can satisfy a wide range of customer requirements in memory products. We will continue to develop new generation memory production processes to maintain its competitive advantage in cost, while collaborating with OEM customers to provide diversified and high-quality memory products.

The compatible logic and memory production processes and capacity in foundry services of the Company are advantageous in the flexible allocation of production capacity amid a tumultuous economy, and conducive for increasing capacity utilization, allowing the Company to maintain better and stable profitability as opposed to our counterparts in the industry.

\* Edge computing is a distributed computing paradigm, as opposed to cloud computing, whereby "data computation" occurs at the location closest to the user.

Item	Item of major products (services)
 Semiconductor foundry services	<ol style="list-style-type: none"> <li>Specialty logic application products wafer foundry : We provide IC design companies with wafer foundry services for display driver IC products, Power Management IC, Discrete devices, CMOS Image Sensor, Embedded NVM, etc.</li> <li>Memory product foundry : We provide IC design companies with wafer foundry services for DRAM and Flash.</li> </ol>

Development trends in terminal electronic products For the foundry services provided by the Company, applications for electronic terminal products can be roughly classified into computer products, communication applications, consumer electronics, and automotive electronic products. At present, the Company is also actively developing ICs for medical electronic product applications. With these, given the popularity of smartphone products and the introduction of AI-related products, the IoT industry chain is also gradually forming, which has even driven the demand for upstream and downstream related components. With the demand for and trend toward "light, thin, long-lasting, and efficient" consumer end products, it is even more important for specialized foundries to be able to provide customized process development for clients.

The Company provides 12-inch and 8-inch wafer specialized foundry services, including specialty logic application products and memory products foundry services.

### (1) Specialty Logic Application Product Foundry Business

The slowdown in Moore's Law growth after the 28 nm node indicates that advanced logic processes are not the only direction for the market. Foregoing advanced processes that endless cash-burning, and turning instead to the more profitable market for specialty application products, is the Company's competitive strategy; the Company provides various customized specialty application processes (applied to manufacturing of display driver ICs, power management IC, discrete components, CMOS image sensors, and embedded non-volatile memory) with excellent logic processes and technologies, as well as multiple foundry cooperation models, so as to effectively shorten production processes for clients and improve our competitive advantages for clients. There is still considerable space in the mature process market at 28 nm and above, including applications in 5G, industry, automotive electronics, and others. Unlike other 12-inch standard logic wafer foundries on the market, which are primarily based on copper interconnects, the Company can provide low-cost 12-inch aluminum interconnect platforms. Compared with the 8-inch aluminum interconnects of the same technology node, the Company's cost for 12-inch aluminum interconnect dies can be reduced by 30%, which greatly improves product competitiveness for clients.

The Company provides customized specialty logic application product specialized foundry services with advanced technology, primarily TFT-LCD Driver IC, Power Management IC, Discrete Devices, Flash Memory, Image Sensor IC, Integrated Memory Chips, RF Chips, and Bio-tech Chips.



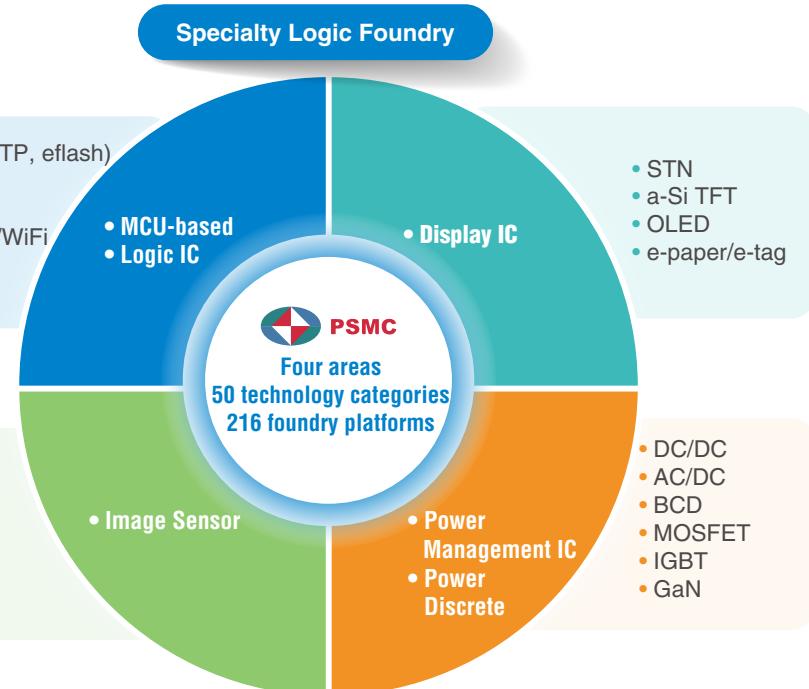


## 2.1 Diverse Services

## 2.2 Innovative R&amp;D

## 2.3 Client Relationship Management

## 2.4 Supply Chain Management



## Short-term Business Goals

The Company's 55 nm LCD driver IC high-voltage process has reached successful mass production, and it has also cooperated with a number of clients in the 40 nm AMOLED panel driver IC process so as to meet demand from the mobile phone market. Power semiconductor components are introduced into competitive processes aimed at high efficiency terminal power applications. In addition, BSI processes are being actively developed for CMOS image sensor products, which are introduced into 55 nm RF production lines at the same time. As for other production lines, the Company is cooperating more actively with manufacturers worldwide so as to develop more diversified products.

## Long-term Business Goals

In addition to the continuous development of advanced manufacturing processes for specialty logic application product foundry services, the Company will establish a logic specialized foundry platform and develop silicon intellectual property to provide specialized foundry services.

At the same time, the Company also uses the manufacturing capacity in which it excels to strive for world-class manufacturers to import their proprietary technology to production and manufacture in the Company. Meanwhile, in order to respond to industry changes and maintain the Company's flexibility, in addition to providing commissioned production capacity, manufacturing, and design services in the future, the Company can also provide the concept of diversified foundry services (Open Foundry) such as operation management to create win-wins with clients. At present, the 12-inch logic wafer foundry business has been integrated with the 8-inch fab. In the future, the Company will provide clients with the product planning for the seamless transition from 8-inch to 12-inch, better service quality, and foundry product competitiveness with a higher cost-performance ratio.

	Product design	Process develop	Equipment	Operation Mgt.
<b>Generic Foundry</b>				
<b>Open Foundry</b>	/	/  /	/	

foundry

customer

cooperation



## 2.1 Diverse Services

## 2.2 Innovative R&amp;D

## 2.3 Client Relationship Management

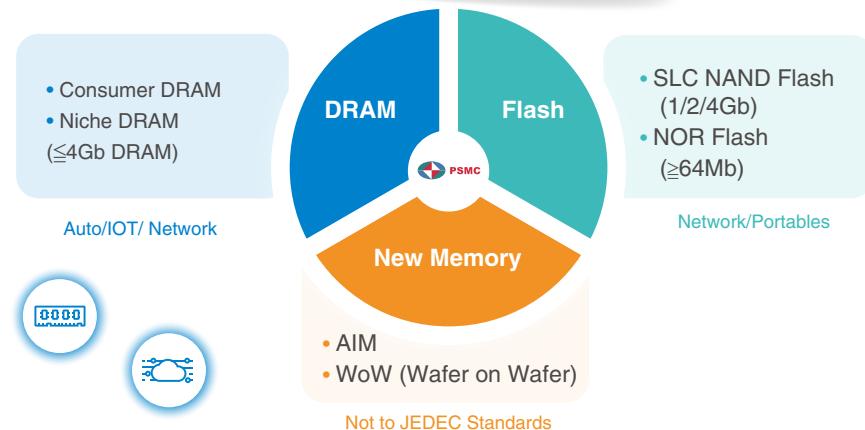
## 2.4 Supply Chain Management

**(2) Memory Wafer Foundry Business****Dynamic Random Access Memory Process Technology**

Considering the trends toward performance improvements, thinning, energy saving, etc. in the demand for terminal electronic products, chip design needs to be more highly functionally integrated, and demand for high performance, low power consumption, etc. needs to be better supported by higher-end process memory products. At present, the 25 nm process has been introduced into the niche DRAM foundry, and the development of new process platforms 68 for 25 nm and below has been accelerated. At the same time, AI Memory (In-Memory Computing, or IMC) and a new type of memory that can be stacked with logic chip and wafers (Wafer on Wafer, or WoW) required for neural network computing systems such as AI are being developed, so as to meet clients' different demands for customized memory. All of these can highlight the Company's position as the only foundry industry that provides excellent memory products. At present, the Company is currently working closely with clients and key suppliers to tap into the AI field, where market demand is growing strongly.

**Nor and Nand Flash Memory Process Technology**

The Company's Flash products aim at mobile application devices, consumer electronic products, and industrial application markets, providing low-power, energy-saving, high-reliability products. Low-capacity NAND Flash and low-power DRAM have become the main memory solutions for entry-level wireless communication products. In addition, low-capacity NAND Flash is also commonly used in consumer electronics, communication products, and automotive networking or industrial applications. At present, the 28 nm NAND Flash process has been successfully mass production. In recent years, many emerging applications have created more demand for NOR Flash memory, such as AMOLED panels. There is NOR Flash demand for all true wireless Bluetooth headsets (TWS) and 5G base station facilities. The response to the demand for these emerging application products has driven the global NOR Flash market to bottom out and rebound. The estimation of the global annual turnover in 2021 will exceed US\$3 billion. The Company is actively developing a new-generation 48 nm NOR Flash process, which has now entered the stage of mass production. In the future, the Company will be able to provide clients with higher capacity, more costcompetitive Flash products that can take care of both quality and reliability requirements.

**Memory Foundry****Short-term Business Goals**

For the niche DRAM foundry, considering that, following the mature mass production of the 30 nm process, the demand for terminal electronic products is moving toward the trend for function enhancement, thinning, and energy savings, the Company has assisted clients in successfully introducing the 25 nm process into the chip design due to complex factors such as function integration, low power consumption, and performance improvement. At the same time, the Company will continue to improve its process technology and develop a process technology platform for 25 nm or below, so as to maintain the Company's leading edge among niche DRAM foundries. In addition, in order to meet client demand for different memory customization, the Company has developed a new type of memory that can be stacked with logic chip and wafers (Wafer on Wafer, or WoW). For flash memory, the Company has advanced NAND Flash process technology development and product design capabilities. The main products are 1Gb–4Gb SLC flash memory products. The application fields cover consumer electronics, wireless communication products, industrial grade products, smart home appliances, smart meter wireless connections, and other application markets. With the steady growth of these application markets and limited supply, the global SLC flash memory market is expected to maintain steady growth as well. At present, the Company's NAND Flash 28 nm has entered mass production, and the Company is actively developing processes below 28 nm. In addition, the new-generation 48 nm NOR Flash process developed by the Company has entered mass production. In the future, the Company will be able to provide clients with higher capacity, more cost-competitive flash products that can take care of both demand for both quality and reliability.



## 2.1 Diverse Services

## 2.2 Innovative R&amp;D

## 2.3 Client Relationship Management

## 2.4 Supply Chain Management

The core business teams are formed of professional managers who were evaluated and appointed by the Board of Directors. All professional managers have specialized educational backgrounds and abundant industry experience in handling the company's daily operations and management tasks. These professional managers are tasked with making strategic decisions from economical, social, and environmental perspectives, and present them to the board routinely.

## Long-term Business Goals

For the DRAM foundry, in addition to continuing to provide advanced manufacturing processes to strengthen competitiveness, we will cooperate with clients to produce customized products to meet their demand, and improve product life cycles in order to pursue long-term stable growth. For flash memory (NOR/NAND Flash), the Company will continue to develop the next-generation advanced process technology to improve product competitiveness. At present, the Company is also actively developing new markets and new clients in the Greater China region, in order to establish a long-term, stable product export market.



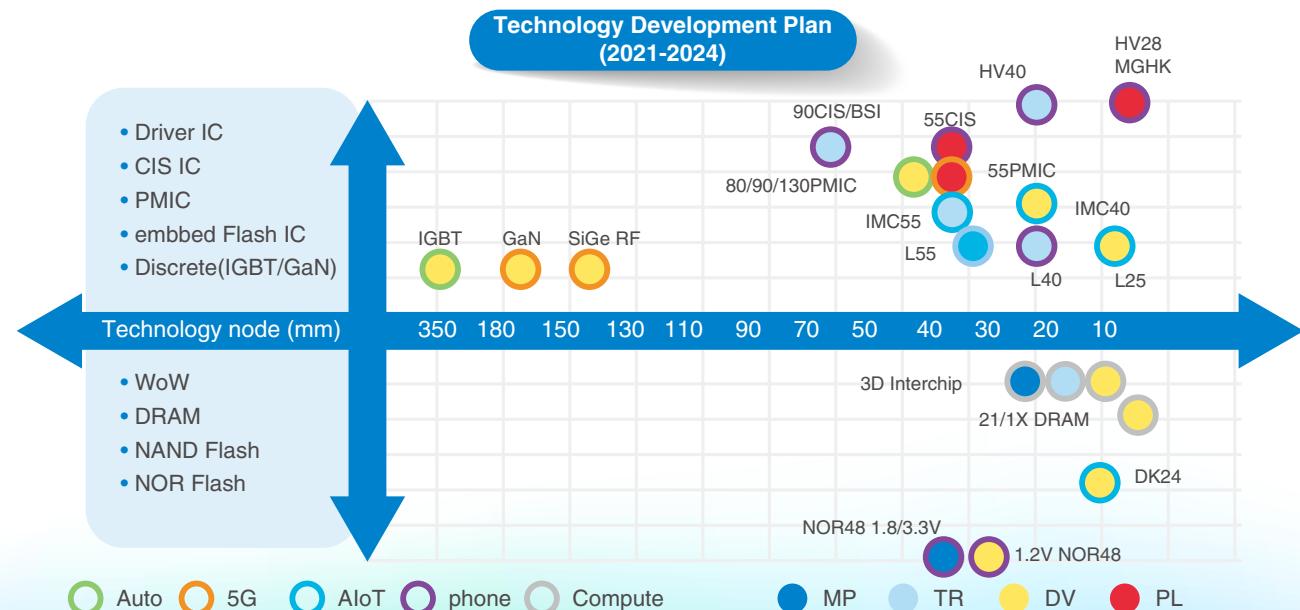
## 2.2 Innovative R&amp;D

Besides investing in production capacity, innovation is also crucial in increasing value. PSMC is the only professional foundry in the world with both memory and logic process technologies.

The new next-generation products and services the Company plans to develop are :

**(1) Specialty logic application products foundry service platform :** Wafer foundry platforms for 28 nm display driver IC process, 55/80 nm BCD process, BSI CMOS image sensor IC process, 25 nm logic process, 40 nm memory integrated chip process, etc., 3D integrated chip technology platforms, and third-generation semiconductor power components manufacturing and other foundry platforms.

**(2) Foundry service platforms for memory products :** Currently providing DRAM foundry platforms with more advanced processes of 30/25 nm and below, as well as 28 nm NAND Flash foundry products, and developing 48 nm NOR Flash foundry products, in order to provide clients with better and more diversified foundry platforms so as to enhance product competitiveness for client.





2.1 Diverse Services

2.2 Innovative R&amp;D

2.3 Client Relationship Management

2.4 Supply Chain Management

## Future direction of R&D

### Advanced and Green Electronics with Energy Efficiency

Usually, for semiconductor process technology to boost a new generation, the line width of IC must be shrunk by a certain percentage (70%), so that the chip surface area of products will grow smaller (0.5 times) and the power consumption of the electronics will also be lower.

PSMC provides a wide variety of comprehensive specific processes. With an excellent capability in integrating the early and later stages of the processes, the Company possesses competitive advantages in terms of power consumption, efficiency and chip size; producing more advanced, energysaving and eco-friendly products for customers; and lowering the impact on the environment caused by technological advancement.

#### Large LCD



LCD TV



Notebook



LCD display

#### Medium LCD



Mobile phone/smartphone



Digital camera



Hand-held game console



MP3

## Environmental Contributions of PSMC's Professional IC Manufacturing Services

### PSMC products with notable environmental and social contributions are as follows :

- |                                       |  |
|---------------------------------------|--|
| • DRAM                                | • Low power consumption LED driver IC  |
| • FLASH                               | • LED driver IC for indoor and outdoor solid-state lighting  |
| • Small/large panel display driver IC | • MOSFET is applied in battery protection, AC-DC transformers, battery chargers, machine tool batteries, servers, step motors, and 5G base stations. |

### Continuous development in new process technology to lower power consumption of chips and increase resource conservation.

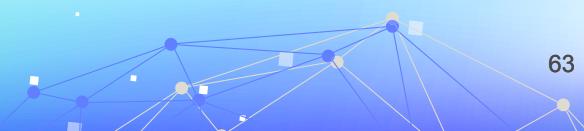
• PSMC continues to develop semiconductor advanced process technology to manufacture advanced, energy-saving and eco-friendly products for customers and contribute to the sustainability of the planet. For example, the number of electronic components that the 80 nm chip can fit in is twice the amount of 110 nm. The power consumption of products with 80 nm IC in use or sleep mode is 70% of products with 110 nm IC. In other words, the efficiency of the unit surface has increased by 2.8 times. The goal of PSMC is to increase the development of 80 nm or more advanced process technology (e.g. 55 nm, 40 nm, 25 nm process technologies), and increase the percentage in sales revenue of 80 nm or more energy-saving processes, contributing to the growth of the Company and the sustainability of the planet.

• 21 nm DRAM trial production was completed in 2021. In 2022, the company will continue to improve yield and proceed to the development of the 1X nm DRAM manufacturing process. The company expects to complete the optimization of the 1X nm DRAM manufacturing process to increase the number of DDR4 particles by 30% on each wafer.

Note : DDR4 is the fourth generation Dual Data Rate 4 synchronous dynamic random-access memory.

• The company dedicates to improving the manufacturing process technology. In 2020, the development of the 24 nm NAND Flash technology platform was initiated. The number of masks required decreased significantly by 16%, and 9% of the total processes through newly designed IP, however, the unit production area was increased by 14%. The energy consumption was decreased effectively. In 2021, the development of the 1.2V NOR Flash technology platform was initiated to satisfy the market needs for low-energy consumption products.

• Clients adopted 3D Interchip packaging technology, which has 10 times the speed but half of the energy consumption compared with the 2.5D packaging technology.





## 2.1 Diverse Services

## 2.2 Innovative R&amp;D

## 2.3 Client Relationship Management

## 2.4 Supply Chain Management

## Providing power management IC technology with the best power management efficiency

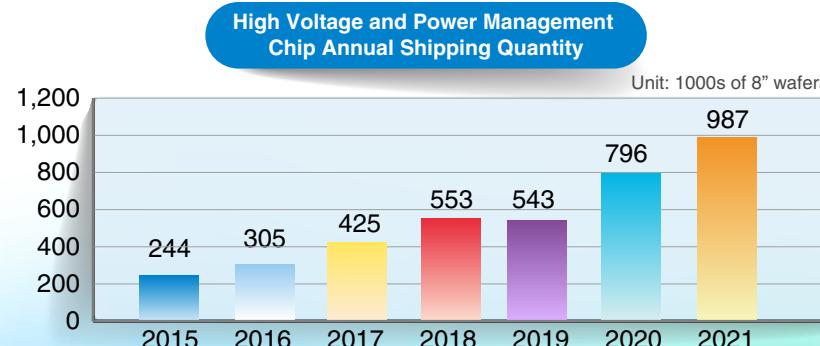
PSMC successfully assists customers in designing and manufacturing green products. For example, the power management IC is the most iconic green product; it is the core component in the power consumption of all electronics. PSMC provides customers with a design platform with high energy efficiency. Customers can develop various energy-saving products via this platform.

Currently, the R&D team of 8-inch and 12-inch foundries have developed process technologies of MOSFET, Bipolar-CMOS-DMOS (BCD), and ultra-highvoltage(UHV).

Enable customers to produce high-quality power management ICs that can obtain a stable energy supply and reduce power consumption. The IC has since become ubiquitous in consumer electronics, telecommunication products, and computers. The BCD process of PSMC with a high CP value is the best process option for power management IC, LED driver IC, and LED driver IC for indoor and outdoor solid-state lighting.

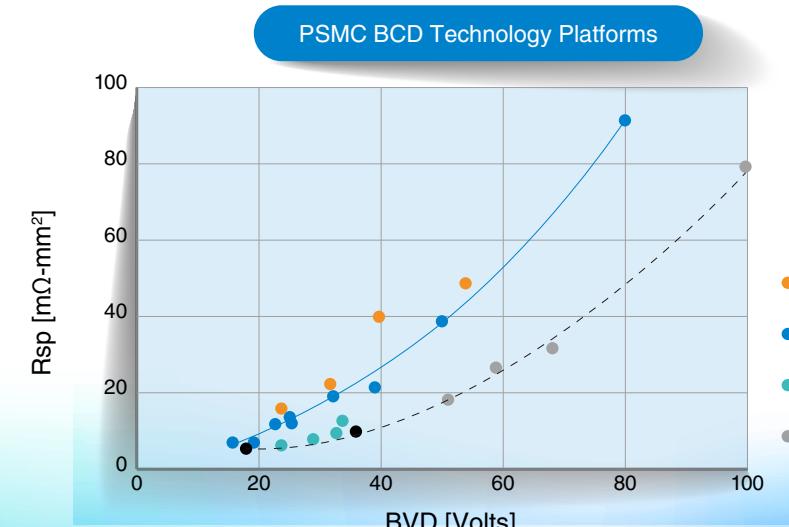
Further, the 700-volt UHV process that PSMC provides is the best choice for producing high conversion rate AC-DC transformers, indoor and outdoor solid-state LED lighting, high-efficiency BLDC motor, and other green product applications.

Energy management chips occupy a significant portion of Powerchip Semiconductor Manufacturing Corp.'s revenue. From 2015 to 2021, Powerchip Semiconductor Manufacturing Corp. shipped about 3.85 million pieces of wafer in high voltage MOSFET and power management (PMIC) chips alone. The YoY average is 27%.



## 0.18 Micron Bcd Technology of PSMC

- BIPOLAR, CMOS and DMOS field-effect transistor (FET)
- Rsp denotes the spreading resistance. It is measured in  $\text{m}\Omega\text{-mm}^2$ . Usually, the lower the Rsp, the better the voltage conversion efficiency.
- In 2017, the first generation was made by the technology known as the Epi-A platform which used a silicon atomic layer of silicon substrate epi as a base. As opposed to Deep N-type Well (DNW) technology in 2015, it was able to provide more high voltage options.
- In 2019, the Company managed to develop the third generation Epi-C technology platform, in which the drain voltage (VD) of high voltage components working under 24 volt could further improve Rsp (approximately by 50%).
- We planned to develop an 80nm BCD technology platform in 2020, which will cover the EPI-C technology platform and expand the drain voltage (VD) to 100 volts; our goal is to further reduce Rsp to achieve world-class level.
- Our company completed the development of 12V, 24V, and 36V components in 2021. Among them, Rsp and BVD reached client-ready qualities.





## 2.1 Diverse Services

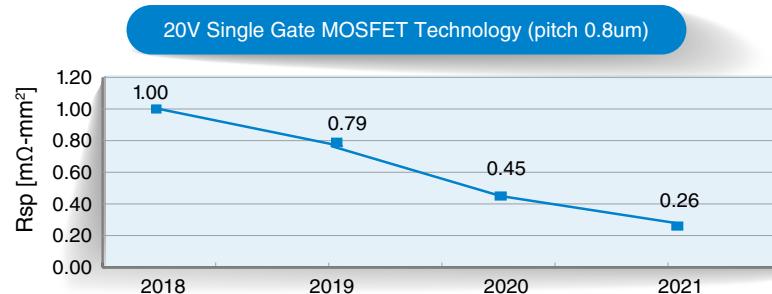
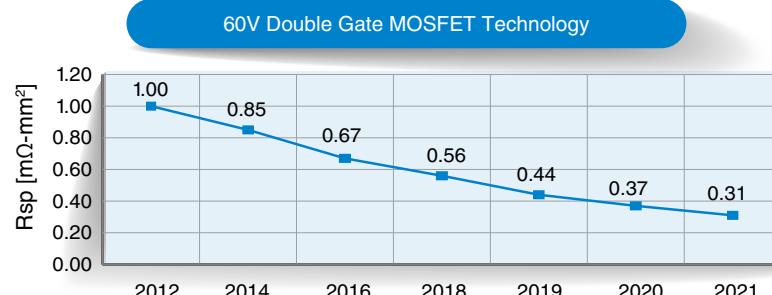
## 2.2 Innovative R&amp;D

## 2.3 Client Relationship Management

## 2.4 Supply Chain Management

## PSMC Discrete MOSFET

- The lower the Rsp [ $\text{m}\Omega\cdot\text{mm}^2$ ], the better the voltage conversion efficiency.
- G1 represents the first generation process component, so on and so forth.
- SG = Single Poly Trench Gate MOSFET
- DG = Double Poly Trench Gate MOSFET



Note 1 : MOSFET is an electronic component made with numerous MOSFET components of the same type and serves as the switch of the circuit. The BCD process uses IC to make various types of MOSFET components to form logic circuits to control the voltage or current of the power supply.

Note 2 : To clearly illustrate the MOSFET technology Rsp roadmap, the Trench Gate technology is broken down into two figures for Single Gate and Double Gate. The 2022 development goals are also proposed.

2015

With an innovative component framework, PSMC managed to develop 0.18-micron high-voltage BCD technology that was leading in efficiency, producing highly efficient, and low power consuming LED driver chips.

2016

With an innovative component framework, PSMC managed to develop 0.18-micron BCD technology that was leading in efficiency, catering to the demand for highly efficient and low energy consuming power management ICs.

2017

The second-generation 0.18 micron UHV BCD technology produced LED driver ICs with an even more highly efficient conversion rate and lower power consumption.

2018

The second-generation 0.18 micron BCD technology catered to the demand for highly efficient and lower energy consuming power management ICs.

2019

PSMC planned for a brand new component framework of 90 nm BCD technology, which integrated 1.2-volt high density 90 nm logic circuit and 9 to 100-volt power supply components, as well as a back-end aluminum process for metal interconnects. This process technology had a highly competitive advantage, which could provide more highly efficient and low energy consuming mobile PMIC solutions.

2020

Regarding the 80nm BCD technology of the new component architecture, PSMC has integrated 1.2-volt high-density 80nm logic circuits and 9-100-volt power components, along with the backend aluminum process, for metal interconnects; the R&D of the relevant technologies has been completed 80%. This process technology has great advantages and can provide a mobile PMIC solution that features higher performance and lower power consumption.

2021

80 nm technology platform adopts aluminum in the later stage of the manufacturing processes, it integrates 32/40V high voltage components which is a unique technology platform in the industry. It has been in mass production by 2020 and is adopted by multiple clients with a yield rate of over 90%. In 2021, the production shipped out over 158K pieces.

## Technology Innovation

Powerchip Semiconductor Manufacturing Corp. utilizes the current expertise in memory R&D and production to actively engage in developing various logic and memory integrated chips for building a wafer OEM service with a competitive edge and to stand apart from peers in the industry. The R&D focus for future technology will be based on the current foundation and continue to develop various logic and memory OEM manufacturing process platforms to provide the best OEM services to clients. Our expectation is to be as competitive as the world-class manufacturers in logic OEM and memory OEM manufacturing process technology.



## Column



# Metaverse – The Fourth-generation Dioxide Semiconductor (IGZO)

## Metaverse Has Arrived

Metaverse is a 3D virtual world on the internet that focuses on social connections. Such virtual environments can be accessed through virtual reality (VR) glasses, augmented reality (AR) glasses, cellphones, personal computers, and video game consoles. Metaverse has great potential in computer games, business, education, retail, and real estate sectors, they require many technologies such as artificial intelligence, block chain, and computer vision.

Powerchip Semiconductor Manufacturing Corp. and peer manufacturers collaborated and had a breakthrough in the development of the fourth-generation dioxide semiconductor material IGZO, which can be used in the production of the driver chip for metaverse with a resolution of over 3200 PPI. Its properties of low energy consumption, low noise for small size OLED display are good for application in AR/VR products. The resolution of the display can be enhanced significantly. It's a display driver chip necessary for metaverse.

## Artificial Intelligence Accentuates the Highly Efficient Computational Power of Analog In Memory

5G communications and artificial intelligence (AI) related application developments require higher and higher computational speed, such as machine learning, neural networks, and biometric system. These applications produce a massive amount of data which derives the requirements for storage and computations. IGZO is a newer semiconductor material with an extremely low cutoff leakage current, it can be used to realize the goal of analog in memory of integrated circuits with extremely low energy consumption including storage devices.

## Why Develop Igzo Analog in Memory Chip?

Following the explosion of artificial intelligence, the weakness of the present computer architecture in the system started to show, for example, the energy consumption, performance, and memory. Key issues are the following :

1



the transportation of data requires a mass amount of energy consumption. Under the conventional architecture, the power required to transport data from the storage unit to the computational unit is more than a hundred times the power for the computation itself. Thus, the ratio of energy consumption and time required for computation is very low.

2



the development of memory is far behind the development of processors. The computational power of a processor grows threefold every two years; compared to memory's power of only growing onefold every two years. Memory's power significantly influenced the speed of data transmission.

Analog in memory chip is currently the best solution to solve the issues above - it is similar to the human brain which merges data storage unit and computation unit into one, it will significantly decrease data transportation and enhance computation performances. Powerchip Semiconductor Manufacturing Corp.'s IGZO analog in memory processor's computational capacity is 143.95 trillion TOPS/W, it was published in IEDM 2021 and was highly regarded by IEEE journals. Analog in memory is categorized as one type of analog memory, our technology capability allows us to create 64 partitions, which is also our proudest record in the industry.



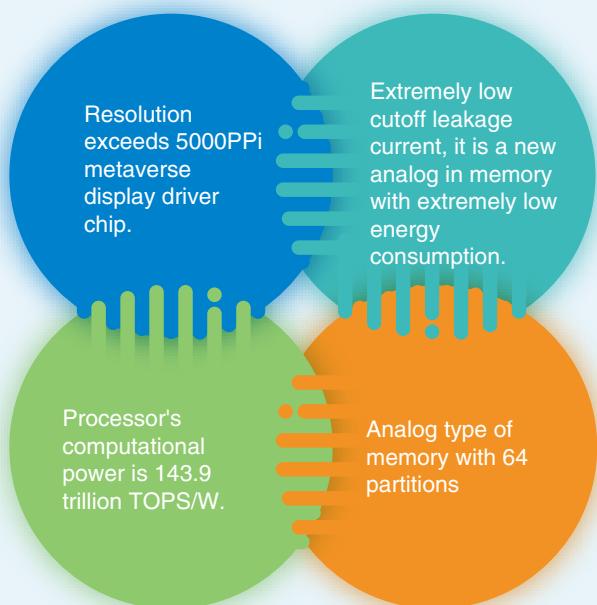
2.1 Diverse Services

2.2 Innovative R&amp;D

2.3 Client Relationship Management

2.4 Supply Chain Management

## The Property of IGZO (Indium gallium zinc oxide) Technology



## NEWS

### Novel Analog in-Memory Compute with <1 nA Current/Cell and 143.9 TOPS/W Enabled by Monolithic Normally-off Zn-rich CAAC-IGZO FET-on-Si CMOS Technology

H. Baba<sup>1</sup>, S. Ohsita<sup>1</sup>, T. Hamada<sup>1</sup>, Y. Ando<sup>1</sup>, R. Hodo<sup>1</sup>, T. Ono<sup>1</sup>, T. Hirose<sup>2</sup>, Y. Kurokawa<sup>3</sup>, T. Mizukawa<sup>1</sup>, H. Kusunoki<sup>1</sup>, T. Nakura<sup>2</sup>, M. Kobayashi<sup>1</sup>, H. Yoshida<sup>4</sup>, M.-C. Chen<sup>5</sup>, M.-H. Liao<sup>5</sup>, S.-Z. Chang<sup>4</sup> and S. Yamazaki<sup>6</sup>  
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Phone: +886-3-5795000 ext. 2290 E-mail: [schang@powerchip.com](mailto:schang@powerchip.com)

Powerchip Semiconductor Manufacturing Corp. (PSMC) and Japanese peer Semiconductor Energy Lab (SEL) co-published high efficiency IGZO Analog in Memory chip in IEDM 2021

### Promise of Analog AI Feeds Neural Net Hardware Pipeline

> Exotic technologies could lead to ultra-low-power AI applications

BY CHARLES Q. CHOI | 23 DEC 2021 | 3 MIN READ | 13

oxide semiconductor field-effect transistors (OSFETs) displayed ultra-low-current operations below 1 nano-ampere per cell and operation efficiencies of 143.9 trillion operations per second per watt, the best reported to date in analog AI chips, findings detailed on Dec. 14 at the IEDM conference.

Powerchip Semiconductor Manufacturing Corp. (PSMC) and Japanese peer Semiconductor Energy Lab (SEL) collaborated on high efficiency IGZO Analog in Memory chip, which was cited and reported in an international electrical and electronics magazine.



2.1 Diverse Services

2.2 Innovative R&amp;D

2.3 Client Relationship Management

2.4 Supply Chain Management

## Column



## WOW(3D Interchip 2.0)

### Artificial Intelligence (AI) Requires High Efficiency and Low Energy Consumption

Artificial intelligence requires high computational power and quick access to memory, it causes issues in energy consumption; despite the fact that AI started an industrial revolution, it became an industry that required high energy consumption after all due to the computational power failing to increase at the same time.

The integrated logic chip and memory chip's 3D Interchip stacking method can provide high bandwidth channels between processors and memory which shortens the distance for data transmission. It will significantly improve AI's computational power while largely decreasing energy consumption.

### Key Technology for 3D Interchip Stacking

D Interchip Hybrid Bonding indeed is the most effective method to decreasing distance and improving connectivity, but the stacking chip's output signal path, TSV-Middle on top of Hybrid Bonding is a necessary pairing technology. Yet, TSV's existence will increase the design difficulty and wafer area for the processor chip which is not good for advanced manufacturing processes to adopt. It will require closer interactions and technology exchanges between the chip designer, logic wafer OEM, and Hybrid Bonding service provider.

There are only a limited number of manufacturers which provide Hybrid Bonding services mainly focus on stacking the logic chips. Powerchip Semiconductor Manufacturing Corp. as a DRAM OEM service provider plans to provide TSV-Middle technology on DRAM chips to eliminate the hassles of designing TSV on processor chips; it will help them adopt high bandwidth and lower energy consumption DRAM as quickly as possible to raise their product performances and competitiveness. It will ultimately enhance the supply chain flexibility between wafer OEM and wafer stacking OEM.

### AP Memory Developed New Type of Dram Architecture

Powerchip Semiconductor Manufacturing Corp. sets logic circuit and memory components all in one as the future development path, we collaborated with engineering design firms such as AP Memory to develop 3D Interchip WoW wafer stacking technology; AP Memory will work on the new types of DRAM architecture for the next generation AI applications. The customized DRAM can decrease clients' design complexity and strengthen the data communication interface between DRAM and Logic through the 3D Interchip technology. It opens the bandwidth limitation between DRAM and Logic chip processors which will be very beneficial for the performances of AI, near 5G and high-speed computation, and Ether mining.

### 3D Interchip's Notable Strengths in High Bandwidth and Low Energy Consumption

Among the semiconductor manufacturers, there are players such as Taiwan Semiconductor Manufacturing Company, Samsung, and Intel who are currently developing WoW wafer stacking technology. 3D Interchip is to stack vertically between wafers; thin wafer to wafer Bumpless technology in low temperature can significantly lower the overall stacking height, tighten the connection seal, and greatly shorten the internal connection paths to speed up the transmission speed between chips with minimum noise. They can effectively decrease (the number of) parasitic elements such as resistors and capacitors to realize high bandwidth and low latency, highly sealed, high efficiency, and smaller in size. In comparison to the 2.5D packaging technology, the speed can be approximately 10 times faster with half of the energy consumption.



## 2.1 Diverse Services

## 2.2 Innovative R&amp;D

## 2.3 Client Relationship Management

## 2.4 Supply Chain Management

## Powerchip Semiconductor Manufacturing Corp. Integrates Wafer OEM and 3D Interchip Packaging

Powerchip Semiconductor Manufacturing Corp.'s line of business covers various levels of technologies in wafer manufacturing, TSV, and stacking. 3D Interchip has three stages, Oxide Bonding (Figure 1), TSV-Middle on top of Hybrid Bonding (Figure 2), and HBM multiple wafer stacking. The Oxide Bonding platform is going to be ready by the end of 2022 for clients' design usage at the beginning of 2023. The platform for TSV-Middle on top of Hybrid Bonding is scheduled to be completed by the end of 2023, and the engineering demonstration will be done at the beginning of 2024 with an anticipated small quantity production at the end of 2024. HBM is currently still in the planning stage. Powerchip Semiconductor Manufacturing Corp is not only working with AP Memory to refine OEM manufacturing technology for new architecture DRAM, but also working with more design firms to develop up and downstream collaboration business processes.

Provide TSV-Middle technology on DRAM chips.

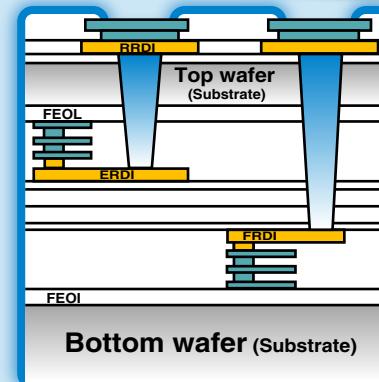
The current manufacturing processes available for DRAM are 38 nm and 25 nm; there is 21 nm for the future.

The Property of 3D Interchip 2.0 Technology

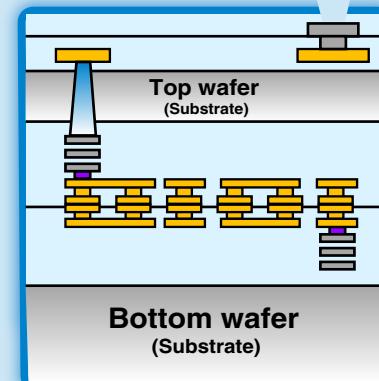
TSV-Middle and Hybrid Bonding pairing development are available for clients' usage.

Advantages include decreased latency, high performance, low energy consumption, and being smaller in size.

(Figure 1) Oxide Bonding



(Figure 2) TSV-Middle & Hybrid Bonding





2.1 Diverse Services

2.2 Innovative R&amp;D

2.3 Client Relationship Management

2.4 Supply Chain Management

## Column



### Automotive Electronics (IGBT)

The new generation of 12" wafer production IGBT Technology for 600V/1200V, manufactured by advanced 12" equipment which has a cost advantage, lowers the IGBT's dynamic energy consumption drastically. This can be used for the next generation of power semiconductor components of home appliances, industrial applications, and electric vehicles.

In recent years, due to the diminishing of natural resources, energy-saving, carbon reduction, and environmental protection issues are receiving more and more attention. Many countries in the world have actively promoted related policies and plans which facilitate the emergence of the green-energy sector. In the sector, the power module (PM) plays a critical role. The power module's applications can be used in motors, industrial equipment, the motor drive of an electric vehicle, industrial variable frequency drive, and air-conditioner compressors. The core of the power module's power transformation is used on electrical equipment's circuit control which is the core to process an electrical system. The typical power transformation functions include power management, frequency transformation, amplifying, converting, and transforming power. These are the proof to show the increase in the demand for the power module.

As a response to such a trend, products that advertise energy-saving emerged, such as machine tools, industrial equipment, electric vehicle, industrial variable frequency drive, and common home appliances including air conditioners, refrigerators, and washing machines. All of the aforementioned's internal core is a motor drive, and the power module within is the key component to achieving energy saving. Such a power module is IGBT (Insulated Gate Bipolar Transistor); its component structure is a duplex structure which means it's a MOSFET design from the input end and BIPOLAR at the output end.

Its many advantages include high input resistance, low power for control, simple drive circuits, fast switches, large current during the on state, lower forward voltage, and low consumption. Therefore, it has an absolute advantage in the current market.

IGBT is a switch component that is either on or off; its state is controlled by the voltage at the gate and source. It can achieve accurate adjustment based on signals to adjust voltage, current, frequency, and phase. Thus, IGBT has become the main star in the power semiconductor market. It has a wide range of applications in new power generation, electric vehicles, charging poles (stations), electric ships, direct current, energy storage, industrial power control, and energy-saving.

There are many vehicle models that can achieve 0-96 km/hr in 6 seconds; most of them are much faster than the current fuel-based new cars, regardless of the models. The electric vehicle's motor is powered by direct current, and one electric vehicle requires 8 to 12 battery modules. Each module (using 750 A as an example) needs 12 IGBT to control the current output, so one electric vehicle needs 96 to 144 IGBT.

Since the energy flows very differently in an electric vehicle's motor from a conventional fuel-based vehicle, it is on a stand-by state as long as the power is on, the system can immediately give the respective power output as soon as a signal is received from the "power paddle". The torque output would also be the maximum value. Changing gear is almost not required – all the movements (actions) are direct and quick. The motor's life is extremely long and the maintenance of the vehicle is quite simple. With the improvement of reusable energy and green energy technology and decrease in costs, high efficiency and low energy consumption components are being developed at a faster and faster pace. IGBT components can provide end-users with more reliable performances, and power component technology is the key for us to continue to improve our facilities.



2.1 Diverse Services

2.2 Innovative R&amp;D

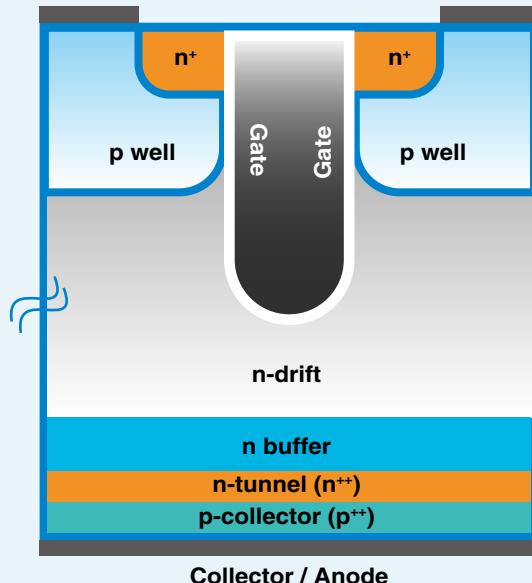
2.3 Client Relationship Management

2.4 Supply Chain Management

Powerchip Semiconductor Manufacturing Corp. uses 12" wafer manufacturing technology to develop outstanding automotive IGBT power semiconductor components in the applications such as industrial applications, electric vehicles, and internal combustion vehicles. The technology was verified by the client at the end of 2021 and proceeded to mass production (3000 pieces per month). The next generation IGBT is also in the trial production stage.

### IGBT Component Charts

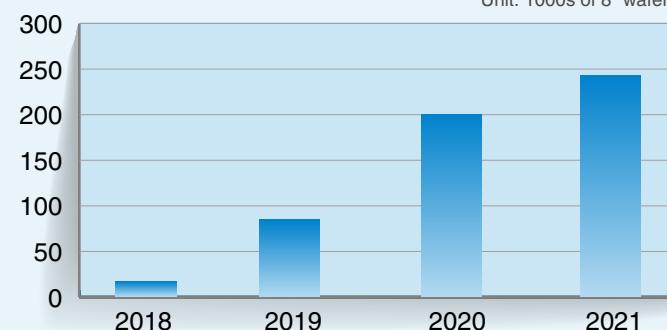
Emitter / Cathode



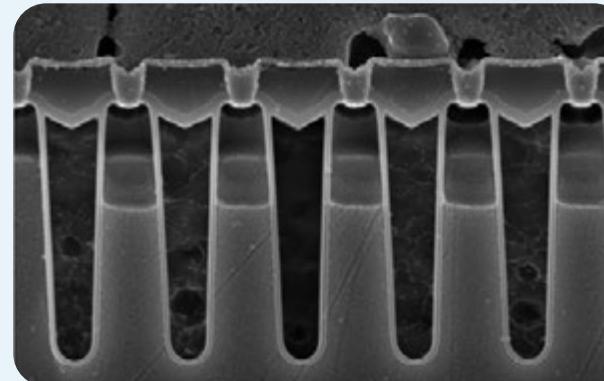
Emitter / Cathode

### IGBT

Unit: 1000s of 8" wafers



### The actual structure diagram of the component of IGBT





## 2.1 Diverse Services

## 2.2 Innovative R&amp;D

## 2.3 Client Relationship Management

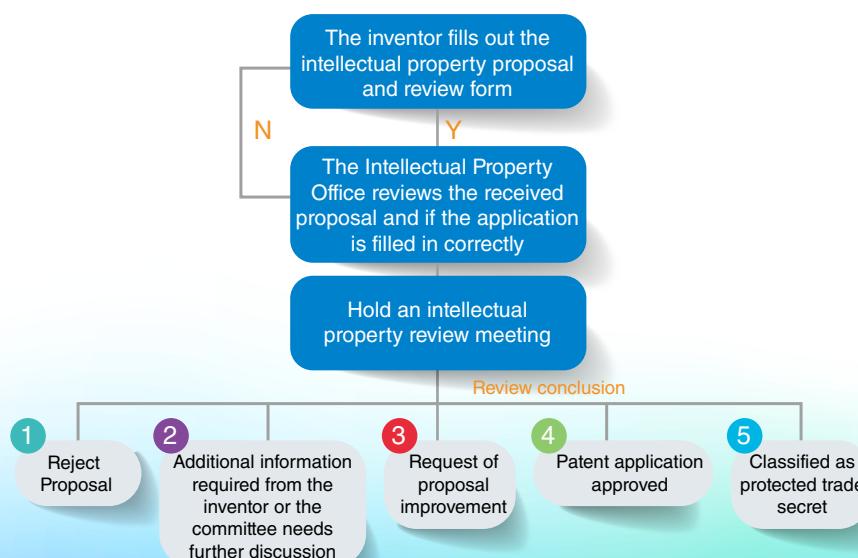
## 2.4 Supply Chain Management

## Intellectual Property Management

PSMC operates in a high-tech industry that requires proprietary technologies to achieve operational freedom. As such, the Company secures its overall R&D results and strengthens its competitive advantage via patent applications. The Company has established an Intellectual Property Office to oversee matters regarding intellectual properties. The Office formulates strategic plans for managing the intellectual property capital based on the patent layout and combines the Company's strategy considerations and operation goals. The Office also continues to improve the intellectual property management system, optimize intellectual property portfolios, and carefully maintains costing to implement the output, management and application of intellectual properties to ensure the leading technological position of the Company. The intranet of the Company has established a section for "PSMC IP." The employees can submit a patent proposal, conduct training and share knowledge via this section.

To strengthen the management of intellectual property rights, the Company has specifically formulated the "Procedures for Intellectual Property Management" to encourage employees to contribute their ideas and make new invention proposals for relevant technologies in R&D, production and operations. Certain internal procedures will determine the patents, trademarks, trade secrets, or other intellectual property rights to be processed, to expand the Company's intellectual properties.

Procedure chart of intellectual property proposals :



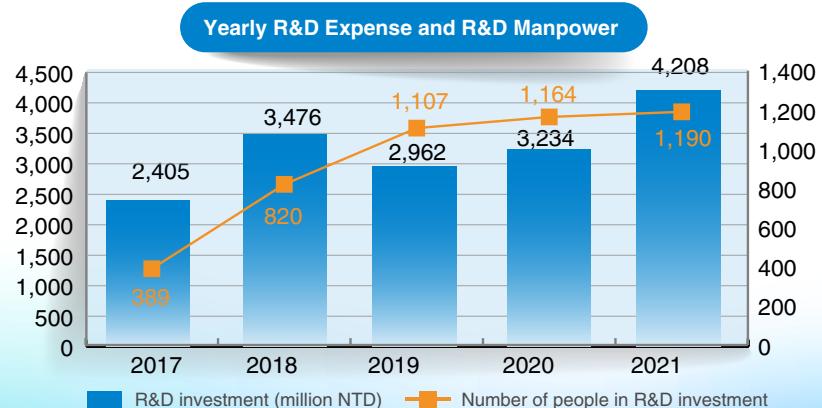
The Company continues to invest in innovative R&D and patents, strengthening the powerful capital of knowledge. Recorded e-learning courses can increase the employees' regulatory knowledge of intellectual properties. The Company also encourages proposals on new technologies and new ideas from employees. The inventor will be given a bonus after the proposal has been approved and will be granted a reward after the patent is obtained. These measures will foster a culture that encourages internal innovation and R&D.

The Company also makes use of the Derwent Innovation patent database. The database includes the search platform for IP. Employees can make use of the product function provided by the database to do a smart search and analyze the global patent development trend for a particular technology, the level of innovation in patents, past cases of patents, and patent information of competitors.

In terms of the incentive and reward system, the Intellectual Property Management Measures stipulate the reward system clearly. For applicants making external patent applications, after obtaining an official application number, a reward of NT\$10,000 will be given; after obtaining the patent certification, a certification reward will be given according to the country granting the certification. For certifications granted by the US, Japan and the EU, a reward of NT\$40,000 will be given; for certifications granted by Taiwan, Mainland China and other countries, a reward of NT\$20,000 will be given per country.

Further, to increase the dynamics of patents, apart from various incentives and activities, researchers will form R&D teams to establish yearly targets for internal proposals and external applications to stimulate new ideas from one another and gather momentum for innovation. New technologies and ideas can then be used for making proposals. After approval, rewards will be granted.

The Intellectual Property Office uses the "Enterprise Patent System" to manage and control internal proposals and external application processes. A strict examination will be conducted by a technological panel to ensure optimal patent quality.





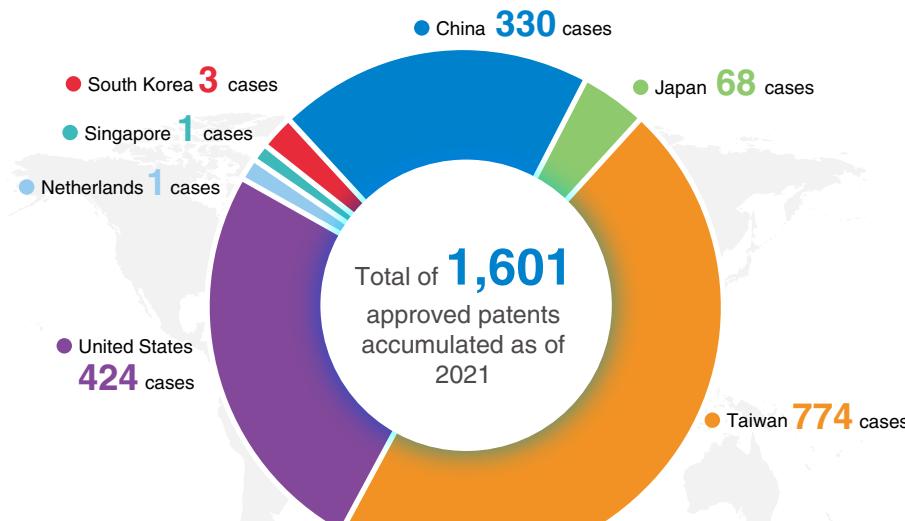
2.1 Diverse Services

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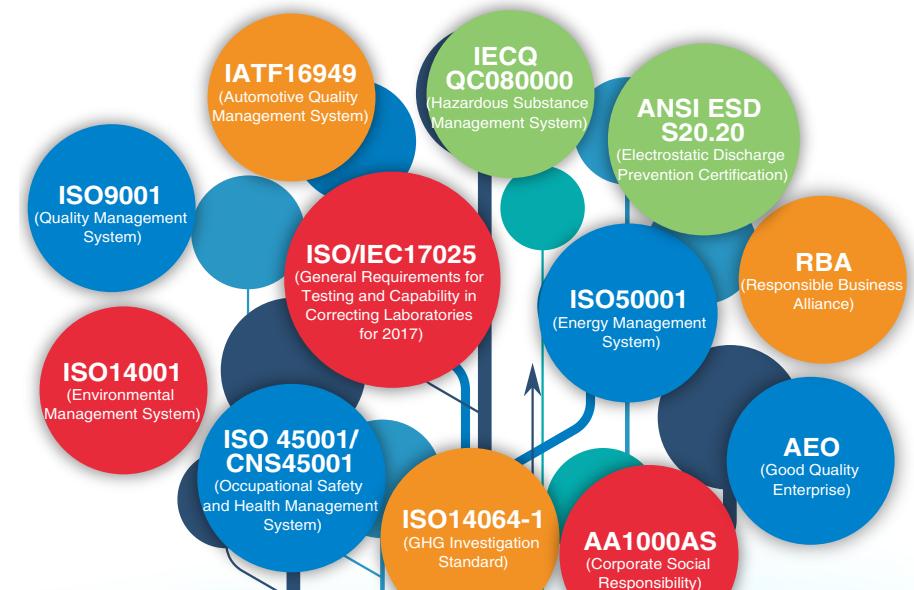
Among the internal patent proposals in 2021, the intellectual property review committee picked 205 cases that were innovative and applicable to the industry for external application upon their review, it was a 15% increase from 2020 and a good way to enhance Powerchip Semiconductor Manufacturing Corp.'s patent quality and external competitiveness. In addition, the company was flexible in exploiting different patent application regulations to plan for the application strategy in order to seek the best protection for our company's new technologies. There are 131 Powerchip Semiconductor Manufacturing Corp.'s patents that received approval in 2021, which was a 7% increase from 2020. The total number of approved patents cumulated as of 2021 was 1,601.

**Patent Approval Received from Each Country**

As of December 31, 2021

## 2.3 Client Relationship Management

With our advanced technologies, we offer foundry services to our customers. In addition to the continuous improvement of manufacturing processes, we also strictly monitor our quality of production. Through implementing various management systems, we control each production with detail. Not only do we comply with international regulations, but we also ensure that the products and services meet customer needs.

**System/Standard certification**



2.1 Diverse Services

2.2 Innovative R&amp;D

2.3 Client Relationship Management

2.4 Supply Chain Management

## Outstanding Production and Manufacturing Control

### Manufacturing Service

- Excellent manufacturing capabilities

PSMC provides professional and excellent process technology and strict quality control procedures. Through collaboration with international brands in Japan and other countries, we strive to enhance our product quality to create a win-win outcome with customers. The current process technologies and products provided by PSMC include memory products, LCD driver ICs, integrated memory chips, CMOS image sensors, discrete components, and power management.

### Best Efficiency

- Effective improvement in yield

Effective shortening of the learning curve to increase yield is an important factor for PSMC when assisting customers in shortening their product launching schedule.

- Optimal and flexible production scheduling management

We strive to keep improving our production management efficiency and optimizing the production procedures, in hopes of serving customers effectively and in the shortest time. The Company also caters to customers' needs for urgent orders through a flexible production scheduling.

- On-time delivery

The Company has a fully automated production and a strict online monitoring system to supervise the input and output of product scheduling to deliver products as scheduled.



## On-Site 6s Quality Management

PSMC makes a concerted effort in the work environment. To implement the relevant policies, the Company raises the awareness of employees via numerous competitions and activities, encouraging employees to discover possible problems in the production processes during their daily operations, and hence improving the cleanliness of the FAB environment and the safety of the staff, making the workplace more comfortable and secure.

To effectively manage the product quality and production environment, the Company has established a 6S management promoting team to implement on-site 6S management according to the 6S management procedures and execution instructions. The Company has also established 6S competition procedures to increase the momentum of employee participation, as well as provide rewards as encouragement. The relevant content and performance of the execution are presented every quarter in the management review meeting, which is held along with the Environmental, Health and Safety unit, disclosing improvement results of various 6S participating departments.

In 2021, all competing departments met their targets while customers found no material deficiencies in their audits of our FAB facilities.

### The Rankings of the Fab 6s Competition on the Billboard



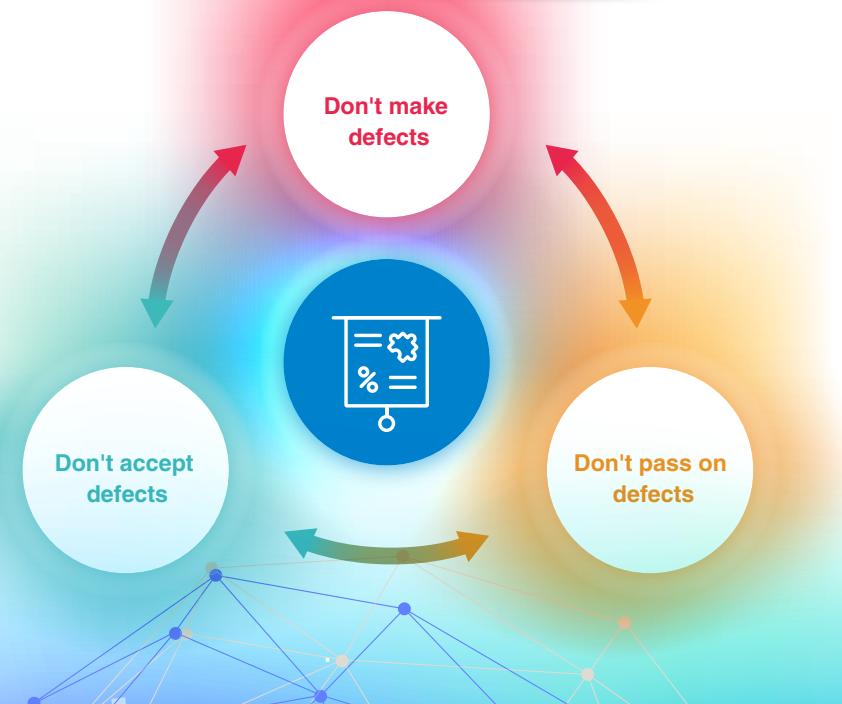


## Quality System

### Quality System

Quality Policy	Through continuous improvement and innovation from the Powerchip Semiconductor Manufacturing Corp.(PSMC) workforce, PSMC aims to build and maintain long-term relationships with its customers and partners, in the endeavor to growing a successful business, which is also supported by excellence in product quality, cost competitiveness, and on-time delivery.
Laboratory Quality Policy	PSMC's professional teams strive to implement the most rigorous measurement and characterization procedures to ensure the quality and reliability of products in this competitive market.

### The Three Don'ts in Quality Policy



## Continuous Improvement CIP

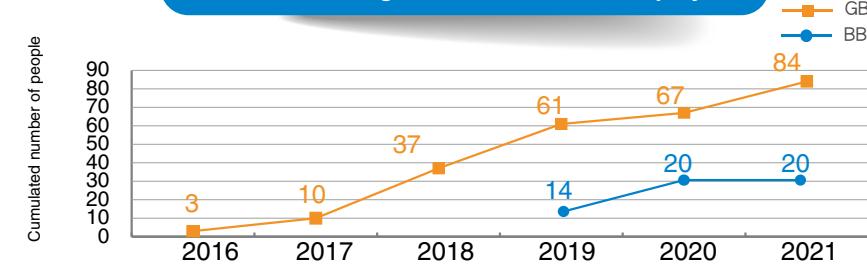
Upholding Powerchip Semiconductor Manufacturing Corp.'s corporate culture : Integrity, Service, Quality, and Innovation, through continuous improvement is the best solution to better our corporate culture. By replicating the continuous improvement DNA to each and every one of the employees, team innovation and passion will be stimulated.

Quality Courses are held to enhance employees' problem-solving capabilities, case management and experience sharing platforms are set to pass down experiences, and CIP competition prizes are set to inspire personnel.

- Enhance employees' problem-solving capabilities (quality courses)

Quality Engineering Department planned a series of Six Sigma Courses to lead the organization to continuous improvement. Six Sigma courses are categorized to be general education YB, and elite education GB and BB. As of 2021, the number of YB training certified was 3,046; 84 obtained GB certification, and 20 obtained BB certification.

### Cumulated Six Sigma GB/BB Certified Employees



### Cumulated Six Sigma YB Certified Employees



Note 1 : Training for Problem Solver : Black Belt (BB) and Green Belt (GB), creating a common language for problem solving : Yellow Belt (YB)

Note 2 : There was no YB training due to the pandemic in 2021



## 2.1 Diverse Services

## 2.2 Innovative R&amp;D

## 2.3 Client Relationship Management

## 2.4 Supply Chain Management

- Inspire employees to participate in CIP competition

To develop the corporate culture and the habit of continuous improvement, the Engineering Quality Department had started hosting CIP competitions since 2019 with many cash prizes as incentives to encourage employees to participate. Employees' quality awareness, team spirit, and competitiveness could be enhanced through the competitions; and client satisfaction could also be raised.

## CIP Competition Flow Chart



In 2021, "Service improvement" was a newly added category in the competition to encourage the company's supporting departments to participate. External supporting departments are sales and marketing ... etc. Internal supporting departments are MIS, automation, HR, troubleshooting, quality, general services, finance, and accounting... etc. We expect to expand the spirit of continuous improvement to each and every department.

There were 166 applications for the CIP competition in 2021, which was a record-high. After a month-long review process by the judges, 25 were picked for the CIP finals.

## CIP Competition Applications

	Quality improvement	Efficiency improvement	Innovative thinking	Service improvement
Applications	83	37	25	21
Accepted	10	5	5	5

## CIP Competition Applications



## Campaign poster



## President's remark





2.1 Diverse Services

2.2 Innovative R&amp;D

2.3 Client Relationship Management

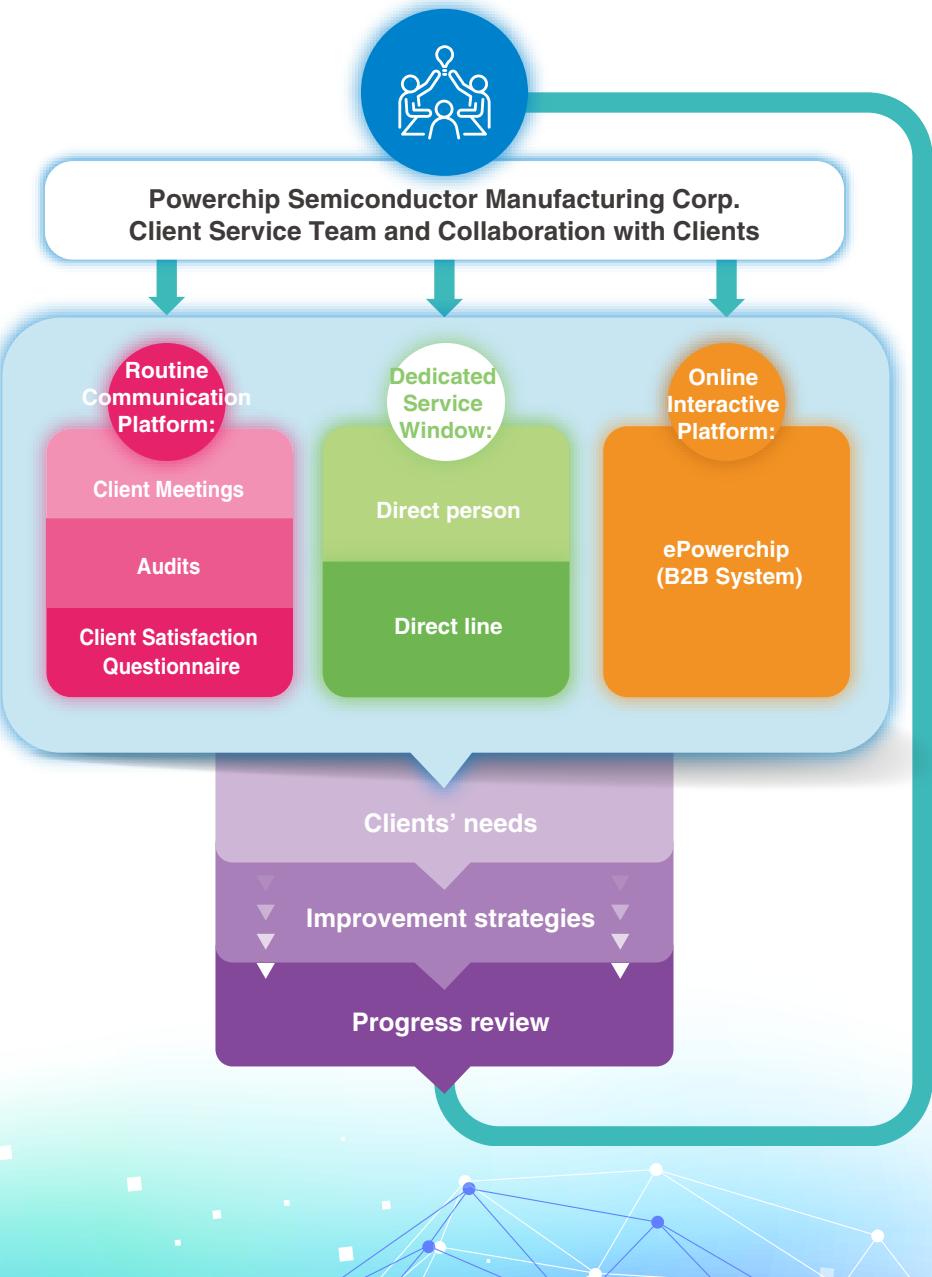
2.4 Supply Chain Management

## Clients' Recognitions

Powerchip Semiconductor Corp. dedicates to providing professional wafer OEM service and developing partnerships with our clients to seek win-win situations; thus, we value and appreciate client feedback. Client issues are handled immediately through the ePowerchip online interactive platform where comprehensive and up-to-date information and a direct window to a dedicated person/line for professional services. In addition, multiple channels are used to investigate client needs such as client meetings and client satisfaction questionnaires (including aspects such as quality, technology, delivery date, and green products); suitable improvement plans are proposed based on these results to improve client relationships. Related records are also submitted to the performance evaluation meeting for management to review. In 2021, under the impact of the COVID-19 pandemic, the face-to-face meetings and audits were all converted to video conferences to avoid possible transmissions. Video conferencing allowed us to continue communication with the clients, which was highly recognized by our clients. The client satisfaction score was 91, which was an excellent performance.

## Client Satisfaction

In 2021, the client satisfaction score was 91. In addition to Powerchip Semiconductor Manufacturing Corp. providing the ePowerchip Online Instant Service Platform and dedicated service windows for immediate response to clients, the company collects and improves client suggested issues through meetings, satisfaction surveys, and client audits to raise the overall client satisfaction.





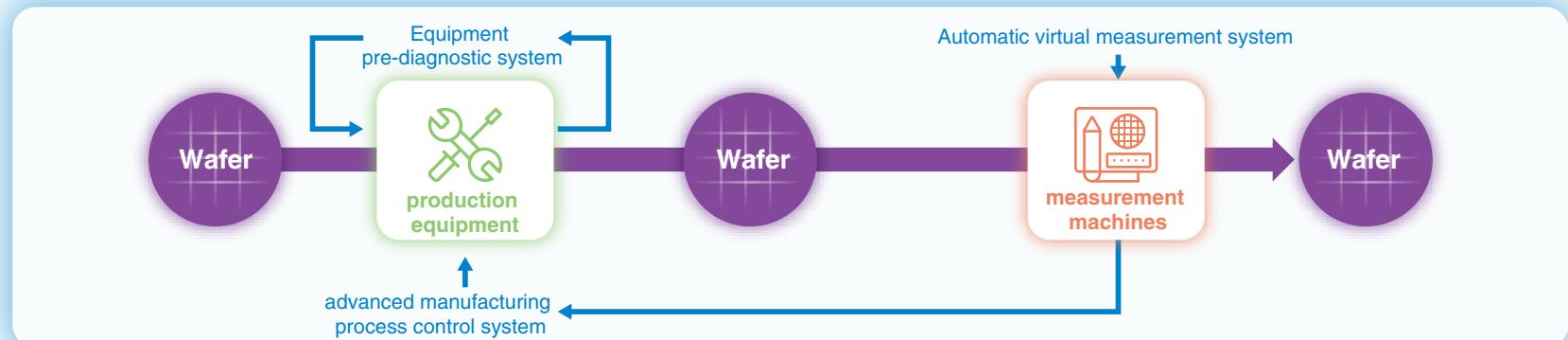
## Column



## Artificial Intelligence Task Team

Powerchip Semiconductor Manufacturing Corp. established AI Task Team at the end of 2021, the task team's goal is to strengthen the connections between wafer manufacturing and innovative technologies such as AI, big data, professional systems, and the Internet of Things and their applications on wafer foundry's scheduling, personnel and equipment's productivities, manufacturing process and machinery control, quality improvement for building a smart factory environment. The current production quality system mainly uses FDC/ED to monitor abnormality and measurement machines to check for the product quality, the AI technology can be applied here to reinforce the procedures. In our manufacturing process, we deploy AI technologies before, in processing, and after to strengthen wafer production quality's reliability verification. The production energy consumption efficiency can also be enhanced at the same time to contribute to carbon reduction and achieve sustainable environmental development.

Powerchip Semiconductor Manufacturing Corp continuously dedicates to developing a smart factory, the goal is to establish the 3Ps in machinery and product : prediction, prevention, and protection. AI technology can be flexibly used for prediction beforehand, to immediately be on top of machine and product quality abnormality, as these can decrease product's defect rate, and result in potential production loss. Different departments started collaborating in 2022, and the smart factory project is gradually moving forward from the development phase, implementation, to the expansion to realization.





2.1 Diverse Services

2.2 Innovative R&amp;D

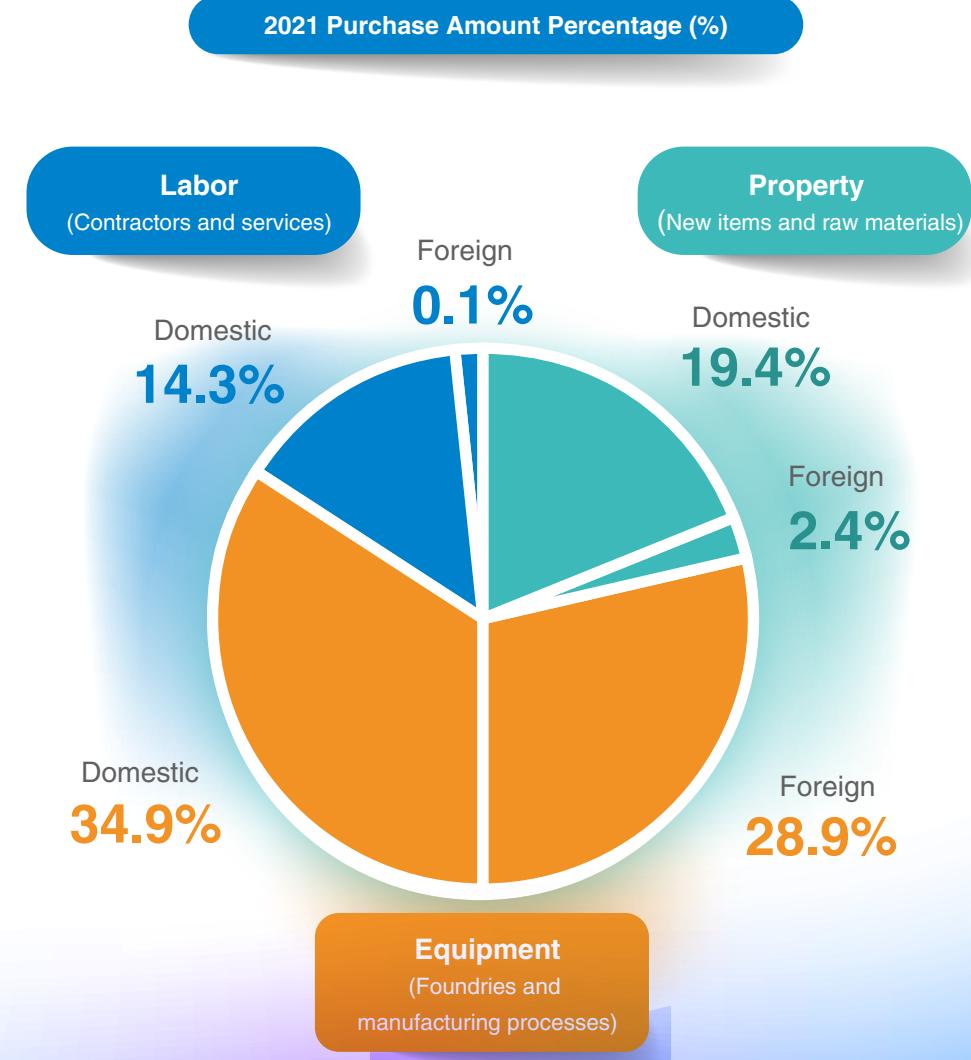
2.3 Client Relationship Management

2.4 Supply Chain Management

## 2.4 Supply Chain Management

In terms of the company's procurement, labor services and property are from domestic suppliers. However since most of the semiconductor equipment is produced and manufactured abroad, the amount of equipment purchased abroad is relatively high. The overall local purchase amount of these three types is about 63% of the total procurement value.

Contract Types	Countries	Number of Vendors	Transaction Value in 2021 (NTD)	Percentage in 2021 (%)
Property (New items and raw materials)	Domestic	823	17,360,811,012	19.4%
	Foreign	50	2,135,093,727	2.4%
Equipment (Foundries and manufacturing processes)	Domestic	712	25,781,019,389	28.9%
	Foreign	92	31,177,485,616	34.9%
Labor (Contractors and services)	Domestic	925	12,788,283,056	14.3%
	Foreign	15	106,730,234	0.1%
Total		2,617	89,349,423,034	100%





2.1 Diverse Services

2.2 Innovative R&amp;D

2.3 Client Relationship Management

2.4 Supply Chain Management

## Supply Status of Main Raw Materials

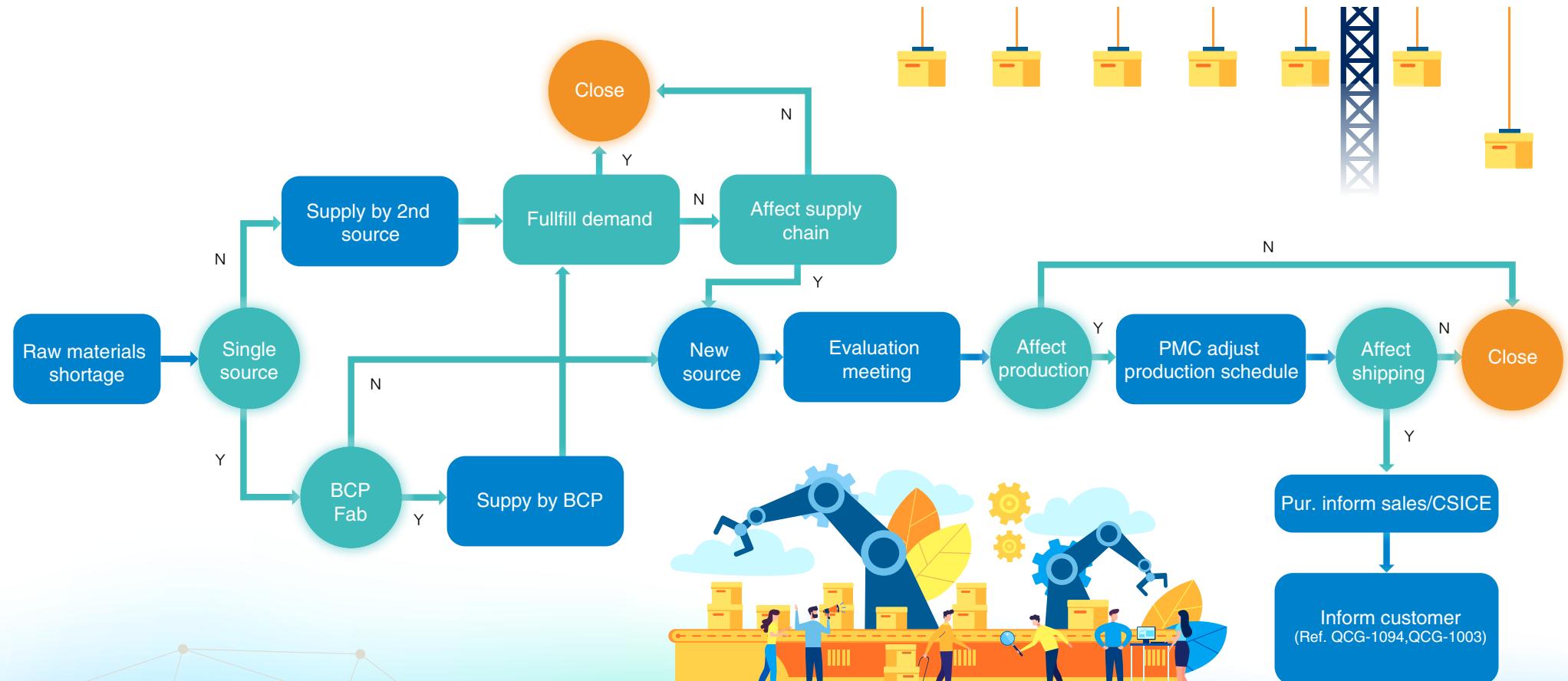
Main raw materials	Supplier	Purchasing strategy
 Silicon wafer	Company A Company B Company C Company D Company E	<ol style="list-style-type: none"><li>1. The Company strictly controls and selects the source of silicon wafer suppliers. The quality of each supplier's supply must first go through a sample evaluation process stipulated by the Company, and only after it has been determined to be qualified by relevant departments, can it be listed as a qualified supplier.</li><li>2. The Company purchases chips from Asia, Europe and other areas to reduce risks.</li><li>3. The Company maintains a good supply and demand relationship with various suppliers, and has considerable advantages in the purchase price and supply quality of chips.</li><li>4. The Company regularly reviews the supplier's supply price, quality, delivery accuracy, and related technical consulting services, to determine order quantities for each supplier.</li><li>5. The Company conducts supplier performance appraisals every six months, to ensure that management measures are actually implemented.</li></ol>
 Photoresist	Company F Company G Company H Company I Company J Company K	<ol style="list-style-type: none"><li>1. The Company provides the estimated amount of photoresist to suppliers at the beginning of each month, so that suppliers can prepare the inventory as soon as possible.</li><li>2. The Company monitors its inventory on a monthly basis, to ensure stable supply.</li><li>3. The Company conducts supplier performance appraisals every six months, to ensure that management measures are actually implemented.</li></ol>
 Gas	Company L Company M Company N Company O Company P Company Q Company R	<ol style="list-style-type: none"><li>1. Since suppliers compete with/among each other and all of them establish mutual support relationships with the Company, it is favorable for purchase conditions and ensures a secure supply when stocks are low.</li><li>2. The Company monitors its inventory on a monthly basis, to ensure stable supply.</li><li>3. The Company conducts supplier performance appraisal every six months, to ensure that management measures are actually implemented.</li></ol>
 Chemicals	Company S Company T Company U Company V Company W	<ol style="list-style-type: none"><li>1. Suppliers have factories and warehouses in Taiwan, so the supply is stable, which is favorable for the Company's ability to reduce inventory while ensuring quality.</li><li>2. The Company conducts supplier performance appraisal every six months, to ensure that management measures are actually implemented.</li></ol>



## Procurement - Raw Material Emergency Response Measures

There were no major changes in our company's line of business in 2021, so there were no major changes in our supply chain (including selection and termination). Our company has detailed emergency response measures for production raw material shortages; if production raw

material shortage occurs, the procurement team will conduct cross-department evaluation meetings according to the emergency response measures to determine the follow-up course of action.





## Supplier Audits

According to the Company's "Raw Materials, Parts, and Accessories/Supplier Management Regulations", new suppliers should fill out a preliminary selection survey, the selection items cover four aspects of procurement : quality, risk, environmental safety, and engineering. According to the Supplier Management Regulations and the Contractor Management Regulations, we evaluated the existing suppliers and contractors randomly based on their transaction frequency and amounts. We conduct random evaluation of suppliers semiannually and contractors annually.

Our Supplier Management Regulations is based on the "Code of Conduct of the RBA" (formerly known as EICC), specifying a statement on supplier code of conduct, requiring suppliers to duly comply with the code in terms of labor, health and safety, environment, business ethics, management systems, and other business conduct and to fully comply with the laws and regulations of the country/region where they operate. We also audit our suppliers in the annual audit, and their compliance with the code serves as one of the factors we take into account during the procurement evaluation and the decision-making process. Meanwhile, the "Contractor Management Regulations" stipulated that if a contractor has a major violation of the social or the environmental safety and health regulations, we will terminate the collaboration and remove it from the list.

In 2021, 57 suppliers were assessed, 32 contractors were assessed, and all passed the assessment, collaboration relationships were maintained.

### A. The evaluation and selection method of contractors

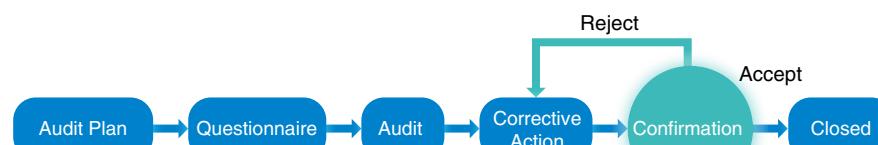
1. For contractors with yearly transaction value over NT\$20 million with a yearly repair/maintenance of over 36 times, select all.
2. For contractors with yearly transaction value between NT\$15 million and NT\$20 million with a yearly repair/maintenance of over 36 times, select two.
3. For contractors with yearly transaction value between NT\$10 million and NT\$15 million, with a yearly repair/maintenance of over 36 times, select two.

### B. The evaluation and selection method of suppliers

1. Supplier with a risk grade changed to an A Grade.
2. Wafer suppliers.
3. Transaction value in 6 months exceeds NT\$5 million.



To ensure the effectiveness of the supplier's quality system, the Company selects suppliers for audits based on the "Audit Instructions for Suppliers" and "Audit Instructions for Component Suppliers." An audit is carried out on production wafer suppliers at least once a year; an audit is carried out on suppliers on other production raw materials or key spare components at least once every 3 years. The supplier audit plan for the following year is proposed at the end of each year. The contents of the audit use the requirements of the ISO/IATF provisos and the special audit items of individual materials for reference, including properties of materials, abnormal events, the re-examination of previous weaknesses, and horizontal development, which are carried out by trained and qualified auditors. The relevant documentation and records of the entire audit plan and individual audits, including audit reports, improvement for weaknesses, and supporting documents and records, are handled by the Company's eAuditing system, which also serves as a two-way communication channel with the suppliers. Cases may only be closed after confirmation by the audit team.





2.1 Diverse Services

2.2 Innovative R&amp;D

2.3 Client Relationship Management

2.4 Supply Chain Management

In accordance with the requirements of ISO 9001 and IATF 16949, PSMC audits the quality control system of the suppliers. Currently, the Company adopts an on-site audit and documentation review model to examine the quality systems.

### The Number of Suppliers Audited for Quality Control in 2021

Audit Type	Suppliers
On-site Audit	11
Paper Assessment	35

The result of conducting the 2021 supplier onsite audit and paperwork review indicated all 46 suppliers met the ISO 9001 or IATF 16949 quality system requirements.

### Audit scope checklist for suppliers



Context of the Organization



Leadership



Planning for the quality management system



Support



Operations



Performance evaluation



Improvement

### Conflict Minerals

Among the Powerchip Semiconductor Manufacturing Corp.'s current target material and gas suppliers, 100% of them all promised to not use upstream vendors or source countries with conflict minerals. We also call for all Powerchip Semiconductor Manufacturing Corp.'s supplier partners to join the declaration on "Not accepting nor using conflict minerals", and we ask raw material suppliers must comply with the following regulations : Suppliers must fulfill their social and environmental responsibilities.

- Suppliers must ensure that no products are made from the minerals extracted in the areas of Congo, or its neighboring countries that are in armed conflicts, or extracted in poor working conditions.
- Suppliers must disclose the source of the minerals, such as Ta, Sn, Au, and W; and complete investigation forms.
- Suppliers must convey PSMC's policy of "no conflict minerals" to their upstream suppliers and supply chains.





# 3

## Striving as a Green Manufacturer

- 
- 3.1 Climate Change and Carbon Management
  - 3.2 Risk Management for water resources
  - 3.3 Green Production





## Energy Resources and Management Policy

### Core Topics' Meanings to Powerchip Semiconductor Manufacturing Corp.

In recent years, there have been power and water shortages in Taiwan. If they are not properly managed, they may affect production and even give rise to regulatory risks in the future. By managing greenhouse gas (GHG) emissions effectively, the cost control risk of the Company can be lowered and the product competitiveness in regards to sustainability can be enhanced.

### Core Topics



Energy (reducing  
energy consumption)



Green gas  
management



Water and effluent



3.1 Climate Change and Carbon Management

3.2 Risk Management for water resources

3.3 Green production

## Performance Highlights

Reduce  
**90 %** ↑

A unique catalyst method is adopted to reduce over 90% of ammonia and nitrogen in effluents, the company received Hsinchu Science Park Ammonia Nitrogen Reduction Excellence Award.

All foundries implemented  
**ISO50001**

All foundries implemented ISO 50001 energy management systems and received third-party certifications.

Each drop of water can  
be used **3.3 times**

Water resources undergo a complete distribution and categorization for recycling and purification before being reused by each unit in the foundry. Each drop of water can be used 3.3 times.

Carbon absorption  
**43 million kg**

Approximately 80 million kWh in energy consumption and 43 million kg of carbon emission were saved in the past six years, an equivalent of about 108 Da'an Forest Parks in annual carbon absorption.

## Policies

Bureau of Energy, Ministry of Economic Affairs requires energy consumption giants to reduce power usage by 1% every year, and being equipped with reusable energy power generators is compulsory.

The company's environmental safety and hygiene policies stipulated power-saving, carbon reduction, and increasing energy efficiency measures, complying with the nation's energy regulations and international trend of carbon reduction while maintaining the effective operation of our management system. This can decrease the potential impacts of climate change while fulfilling our corporate social responsibilities.

International management systems such as ISO 50001, ISO 14001, and ISO 14064-1 were implemented, and "Greenhouse gas emission reduction management measures" and "Greenhouse gas emission check and verification details" were stipulated for management purposes.

Based on the promises in the water-usage plan and the environmental appraisal, the Hsinchu Science Park Administration demands the recycling rate of water for semiconductor foundry's manufacturing must exceed 85%.

The foundry's wastes and effluents were processed according to the discharge standard set by the Science Park.

To support the government's reusable water policy, our company promised to use 1,050 CMD of reclaimed water after the Science Park's water reclamation plant is established.

## Promises and Goals

### Short-term Goals

- Meet the energy consumption giant's energy-saving goal – to continue saving 1% of energy, and reduce greenhouse gas by 1%.
- Manufacturing process water recycling rate reaches 85.6% / Effluent discharge rate

### Mid-term Goals (2015 as the benchmark year)

- Unit wafer area greenhouse gas direct emission reduce by 10%; fluoride compound emissions from the manufacturing processes reduce by 85%.

### Long-term Goals (2015 as the benchmark year)

- Work with suppliers to develop equipment with energy-saving design
- Unit wafer greenhouse gas direct emission reduce by 15%; cumulated fluoride compound reduction exceeds 5 million tons; fluoride compound emissions from the manufacturing processes reduce by 90%.
- Unit product area water consumption reduce by 15%.
- Unit wafer area energy consumption decrease by 20%; continue to buy power from renewable sources.



3.1 Climate Change and Carbon Management

3.2 Risk Management for water resources

3.3 Green production

## Management

Appoint energy-saving management personnel to routinely report to each foundry manager on their respective energy consumption; the annual energy consumption report is filed to the Bureau of Energy, Ministry of Economic Affairs.

Appoint designated personnel in the foundry to monitor the energy and water resource consumption; monthly water-usage report is filed to the Hsinchu Science Park Administration.

Appoint a greenhouse gas check and reduction task force to monitor the status of greenhouse gas emission.

The strategic planning department is responsible for creating the renewable energy establishment plan.

## Assessment Mechanism

01

Our company follows internal management and review procedures such as ISO 50001, ISO 14001, and ISO 14064-1 to maintain effective assessments of the PDCA procedures.

02

Our company set environmental management goals according to the changes in the external environment conditions and routinely evaluates the progress to reach the goals and their respective improvement plans.



## Performance Report

### Goals in 2021

Continue to promote energysaving/carbon-reduction plans, reduce greenhouse gas by 1%

### Performances in 2021

Unit production (greenhouse gas) emission was reduced by over 1%



Implement ISO 50001 energy management system in 8" foundry

The ISO 50001 energy management system was smoothly implemented in 8" foundry and received third-party verification

The recycling rate of manufacturing process water is to be greater than 85.5%

Each foundry's recycling rate for manufacturing process water all exceeded 86%

All foundries' effluent discharge rate to be lower than 70%

All foundries' effluent discharge rate were lower than 67%

## Reporting Mechanism

Our company and the government authorities maintain proper communications in writing via official documents, and actively participate in seminars and workshops.

Actively participate in external associations' operations to maintain proper relationships with the external stakeholders.





## Pollution Prevention and Management Policy



### Core Topics' Meanings to Powerchip Semiconductor Manufacturing Corp.

Our company treats environmental protection, green production, and fulfilling corporate social responsibilities as part of our corporate governance. Other than preventing any potential violation and fines to reduce our company's external risks and risks from environmental costs and enhance our products' competitiveness in regard to sustainability, we dedicate to maintaining an excellent corporate image and clients' trust. It is the ultimate goal to achieving a sustainable business.

#### 3.1 Climate Change and Carbon Management

#### 3.2 Risk Management for water resources

#### 3.3 Green productio

### Core Topics



Air pollution emission  
management



wastes



## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production

## Performance Highlights



Received Waste Reduction and Recycling Economy Excellence Awards in the Hsinchu Science Park for two consecutive years.

## Swapped



The older model electrical heating Local Scrubbers were swapped with the new combustion Local Scrubber, the NF<sub>3</sub> removal efficiency was increased from 50.0% to 99.7%. There was a total of 16 units swapped in the P1/2 foundry.

↑ 99.7 % IPA

Established IPA Recycle System (IPRS) to reclaim IPA effluents, the refined IPA concentration can exceed 99.7% for machinery to reuse. This is a win-win situation for both the company and the environment.

## Policies

Implemented international management systems such as the ISO 14001; also stipulated "environmental safety, hygiene, and fire regulations collection and evaluation management guide" and "Foundry environmental pollution prevention measures" for management purposes.

Adopt the best feasible technology to control, realize the reduction from sources, and examine each recycled resource for reuse to ensure each operation meets the environmental protection standards.

## Promises and Goals

## Short-term Goals

- Operation meets environmental regulations' requirements; air pollution emission prevention equipment malfunction incident < 1; 0 leaks in the vicinity of the VOC treatment equipment.

## Mid-term Goals (2015 as the benchmark year)

- Operation meets environmental regulations' requirements; air pollution emission prevention equipment malfunction incident < 1; 0 leaks in the vicinity of the VOC treatment equipment.

- VOC treatment equipment efficiency exceeds BACT standards (reach 92.5%); the organic matter unit's production area emission ratio reduce by 10%.
- Wastes recycling ratio ≥ 87%; waste landfill rate ≤ 1%; Waste management contractors' onsite advisory rate ≥ 80%.

- VOC treatment equipment efficiency reaches 94%; organic matter unit's production area emission ratio reduce by 15%.
- Waste recycling ratio ≥ 90%; waste landfill rate ≤ 0.7%; Waste management contractors' onsite advisory rate ≥ 100%.

## Long-term Goals (2015 as the benchmark year)

- Operation meets environmental regulations' requirements; air pollution emission prevention equipment malfunction incident < 1; 0 leaks in the vicinity of the VOC treatment equipment.
- VOC treatment equipment efficiency reaches 96%; organic matter unit's production area emission ratio reduce by 20%.

- Waste recycling ratio ≥ 92%; waste landfill rate ≤ 0.6%; Waste management contractors obtain ISO 14001 certification ≥ 80%.



## Management

Routinely conduct advisory meetings with the environmental safety and hygiene representatives and environmental safety and hygiene education training, and execute each department's training plan.

Implement ISO 14001 management and evaluate the necessity to add or improve prevention equipment for the manufacturing processes; also, make improvements on sensitive issues.

Each foundry is equipped with air pollution prevention equipment and a wastewater treatment system. They are routinely maintained and performance is improved upon, designated personnel are appointed to operate and monitor each pollution prevention equipment.

In response to the trend of decreasing ammonia nitrogen in the wastewater, our company selected a method of catalyst that is highly secure, has zero waste, high construction cost as the environmental protection measures to reduce ammonia nitrogen.

Each foundry has designated personnel to be responsible for the waste management in the vicinity, they are assisted by departments such as foundry affairs, general affairs, and storage management.

The annual budget for waste cleaning in 2021 was approximately NT\$160 million.

## Reporting Mechanism

The Hsinchu Science Park Administration would audit or check our company following any complaints filed.



### 3.1 Climate Change and Carbon Management

### 3.2 Risk Management for water resources

### 3.3 Green production

## Assessment Mechanism

01

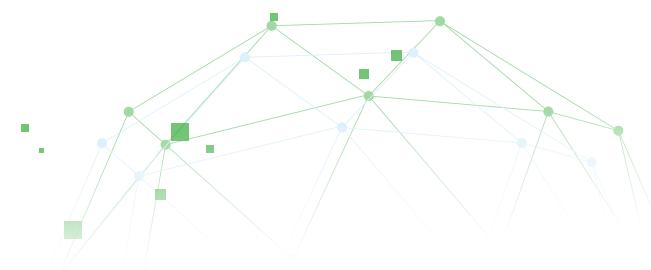
Our company follows internal management and review procedures ISO 14001 to conduct effective assessments of the PDCA procedures quarterly.

02

Conduct assessments on waste removal and management contractors with at least one onsite visit each year. Related visit records are saved in the foundry's internal audit system.

03

Our company sets environmental management goals based on the changes in the external environment, and routinely conducts assessments on the respective progress and improvement plans.



## Performance Report

### Goals in 2021

Air Pollution : VOC treatment equipment efficiency to be greater than 92.5%

Waste : Recycling and reuse ratio reach 85%

### Performances in 2021

Air Pollution : Each foundry's VOC treatment equipment efficiency is greater than 95%

Waste : Each foundry's recycling and reuse ratio exceeded 90%





## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production

## 3.1 Climate Change and Carbon Management

To showcase our commitment to low-carbon green manufacturing and sustainable environmental development, PSMC jointly announced the Declaration of Voluntary Energy Conservation and Carbon Reduction by High-tech Industries with members, such as TSMC, United Microelectronics Corporation, Advanced Semiconductor Engineering, Inc., and Micron Memory Taiwan Co., Ltd. at the High-tech Industry Energy Conservation and Carbon Reduction Forum hosted by the Taiwan Semiconductor Industry Association (TSIA), with the aim of establishing an energy management system (ISO50001) to improve and reduce fluorine-containing greenhouse gas emissions, and collaborate with suppliers to develop energy-saving equipment to achieve our voluntary energy-saving and carbon reduction targets in a comprehensive manner.



### Energy And Resource Consumption

The statistics of the Company's energy consumption are shown in the table below. Although the consumption increases with the increase in production (in 2019, yearly maintenance conducted using diesel generator caused an increase in diesel use), the Company continues to improve consumption efficiency, striving to reduce the impact on the environment.

Plant	Energy resources	2018	2019	2020	2021
12-inch	Electricity consumption (degrees/year)	867,091,072	862,449,877	880,319,632	877,873,892
	Diesel consumption (L/year)	27,667	200,779	23,911	46,634
	Natural gas consumption (m <sup>3</sup> / year)	8,712,301	8,374,129	8,585,664	9,723,948
8-inch	Electricity consumption (degrees/year)	195,401,621	239,923,299	255,136,483	250,806,537
	Diesel consumption (L/year)	9,632	30,293	12,451	41,202
	Diesel consumption (L/year) Natural gas consumption (m <sup>3</sup> / year)	2,331,727	3,825,077	3,985,201	3,653,877



## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

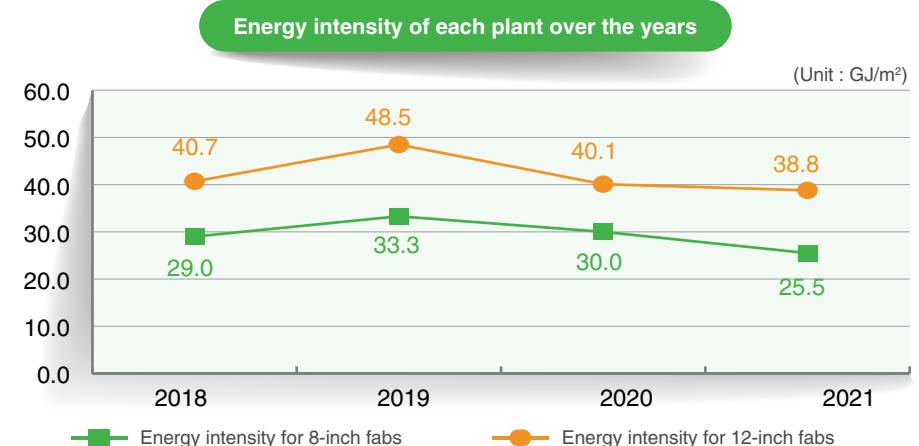
## 3.3 Green production

PSMC has adopted an energy management system (ISO 50001) into its management system in the 12-inch fabs since 2015. The system analyzes energy consumption efficiency and seeks effective use of energy, laying the foundation for building green plants. Via regular inspection of the system conducted by a bona fide third party, the verification of the administration system is updated, ensuring its effectiveness and that the performance and culture of energy administration of the Company can gradually grow. Following our company's energy policy, the energy management system (ISO 50001) was smoothly implemented in the 8" foundry and received third-party verification. We expect to improve our equipment energy management and optimize energy usage efficiency. As a result, the energy usage remained almost the same in 2021 while each of our foundries had significant increases in production. The 12" foundry and 8" foundry's energy usage decreased by 3.2% and 15% respectively. The electrical power usage accounted for 88.9% of the overall energy usage.

Plant	Year	Energy use (GJ)	Energy intensity(GJ/m <sup>2</sup> )
12-inch	2018	3,453,587.62	40.7
	2019	3,429,840.06	48.5
	2020	3,494,247.82	40.1
	2021	3,528,283.43	38.8
8-inch	2018	792,417.13	29.0
	2019	1,009,647.31	33.3
	2020	1,069,513.07	30.0
	2021	1,041,957.00	25.5

Note : 1.The heat value of 1L of diesel is 8,400kcal; the heat value of 1m<sup>3</sup> of natural gas is 9,000kcal; 1 kWh is equivalent to 3,600 KJ; 1 kcal is equivalent to 4.184 kJ.

2.The adjustment in energy usage information in 2018, 2019, and 2020 came from the variances caused by natural gas heating values.



Overall energy consumption (million watt hours)	2018	2019	2020	2021
	116,953	130,818	132,255	140,831
Non-renewable energy	A. Non-renewable fuel	1,062,493	1,102,373	1,135,456
	B. Purchased non- renewable energy (electrical power)	1,179,446	1,233,191	1,267,711
	Total consumption : A+B	0	0	0
	Renewable energy total consumption	100	100	100
	Coverage (%)	100	100	100



## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production

## Energy Saving

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To comply with the "Regulations on Setting Energy Conservation Objectives and Execution Plans for Energy Users" set by the Ministry of Economic Affairs, the Company executes various energy-saving measures such as making plans to renew old equipment and develop renewable

energy, reviewing and reducing the electricity usage of production units, and setting the goal of saving electricity by 1% each year. The energy-saving statistics of each plant for 2021 are shown in the table below; all plants have achieved their annual energy saving targets.

Foundry	Energy reduction (electrical power, diesel, natural gas)	Energy-saving rate
P1/2 Foundry	<b>24,421,734 MJ</b>	<b>1.065%</b>
	Disable P2 FMCS SUPS	P1 install harmonic power factor equipment to improve filters
	Switch to high efficiency mo-tor for P1 AMX1-1	P1/2 Improve lighting in the truss zone
	AWL RO pump outlet change to common header	Decrease substation's air conditioner loading in P1 PS 2F
	Replace the old P1 CDA air compressor #3 for a new one to improve energy saving	Merge general pump P-121 and P-1403 for operation
	AW*4,FW*3(11KW) as the improvement of water pump's energy saving	P1 WWR P-201 pump energy saving (45 KW)
	P2 Cold-A/B/C optimize cy-cling ratio	P1 energy saving adjustment on industrial water pump
	P1 HUPW P-138 pump energy saving	P2 JW optimizing cycling ratio
	P2 NH3-Y with magnetic heating system added	QDK01 Main PC Turn off energy saving
	Remove UPS from FC3000 machine	PGU chiller bypass 5 units
	HV80_1G Strip Recipe de-crease 15 Seconds (85S -> 70S)	Eye-D PC monitor power managing on the energy saving mode
	Alpha-303i switch to Pfeiffer Vacuum energy saving pump	Switch to Alpha-303i Load Area LED
	Reduce the electrical power usage of the TSM SR760	B1F adjust the air ventilation operating hours in the parking lots



## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production

	Foundry	Energy reduction (electrical power, diesel, natural gas)	Energy-saving rate
	<b>P3 Foundry</b>	<b>12,953,047 MJ</b>	<b>1.051%</b>
Energy-saving plans	Disable cleanroom yellow light Pressure blower	Disable IT server room air conditioner heating box	Disable ventilation fans in PS power generator room
	Clean ice machine's cooling system	Lighting improvement	Shut off 9 °C cold water in waste sulfuric acid exchanger
	25nm RG.EEA10 Asher skip	Bypass UV cure chiller unit	Disable two AWH windblowers
	DBTN2 chiller move out	Disable QPHM2	PS40_Laser energy saving management
	Use preheat and humidifier function for energy saving during winter season on external air conditioner box	Switch to energy saving LED on WET machinery	
	<b>8A Foundry</b>	<b>20,610,941 MJ</b>	<b>2.695%</b>
Energy-saving plans	Switch to LED lighting in ADMB1F & CUP2F OFFICE & WP1F PUMP area	Switch to high efficiency motor for 250RT#2/#3 cooling water pump	Replace 1000RT NO : 6 ice/cold cooling water pump
	Replace AT ultrapure water pump	Replace WP ultrapure water pump	Replace WP pure water pump
	AT RO switch to low pressure energy saving pump	Switch to high pressure rotor for air compressor No.5	Replace WP VOC
	Energy saving improvement on production machinery dry pump	Adequate operation allocation for cleanroom FFU_2 (membrane zone)	Adequate operation allocation for cleanroom FFU_3 (Amber lighting zone)
	Alpha-303i switch to Pfeiffer Vacuum energy saving pump	Switch to Alpha-303i Load Area LED	Disable 9 UPS since QPA is connected to DUPS
	<b>8B Foundry</b>	<b>926,014 MJ</b>	<b>1.247%</b>
Energy-saving plans	Improve the power factor of the E5A and E6A transform-ers	Improve the optimal operation efficiency of the ice water mainframe system	Adjust operation in the refrigerator room of the storage area



## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production

## GHG Investigation and Reduction

```

graph LR
    A[Gas Box Exhaust reduction] --> B[Auto off lighting when no one present]
    B --> C[30% illumination when not in use]
    C --> D[Lighting adjustments according to the plant operations]
    C --> E[Development of ground type mechanical timing switch]
    C --> F[1/4 of lights stay on]
    D --> G[Replacement of frequent used lights to LED]
    D --> H[100% no lighting when no one present]
    E --> I[Optimized energy saving]
    G --> I
    
```

**Continuous improvement**

## GHG Investigation and Reduction

For climate change mitigation and adaptation, the Company had established a greenhouse gas inventory and reduction management team to collect greenhouse gas emissions data every year, and to set the greenhouse gas reduction target by 1% on an annual basis. The total greenhouse gas emission in 2021 was about 1.2% less than in 2020. Not only was the anticipated target reached, but unit production greenhouse gas emissions also significantly decreased by 7.9%.

Activity	2018	2019	2020	2021
<b>Direct emission (Scope 1) (ton CO<sub>2</sub>e)</b>	107,183	95,781	108,217	94,996
<b>Indirect emission (Scope 2) (ton CO<sub>2</sub>e)</b>	552,566	548,034	565,128	570,181
<b>Total emission (Scope 1 + Scope 2) (ton CO<sub>2</sub>e)</b>	659,748	643,815	673,345	665,177
<b>Coverage (%)</b>	100	100	100	100

Note : 1.In 2019, 8B fab formally commenced production and was included in the statistics.

2.In the GHG emission inspection of various plants, PSMC conducts the inspection in accordance with procedures stipulated in ISO 14064-1, and a third party certification is required; for the GHG emission factors, PSMC mainly refers to the Management Table for GHG Emission Factors Version 6.0.4 set by the EPA, in which the electricity factor of 0.509kgCO<sub>2</sub>e/kWh serves as the scope 2 computation. (This calculation method is based on the regional coefficient method for statistics.)

3.The global warming potential (GWP) that the table uses comes from the "IPCC Fourth Assessment Report (2007)".

4.The greenhouse gases include nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), carbon dioxide (CO<sub>2</sub>), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF<sub>6</sub>), nitrogen trifluoride (NF<sub>3</sub>), etc.

5.Method of consolidating GHG : Operational control.

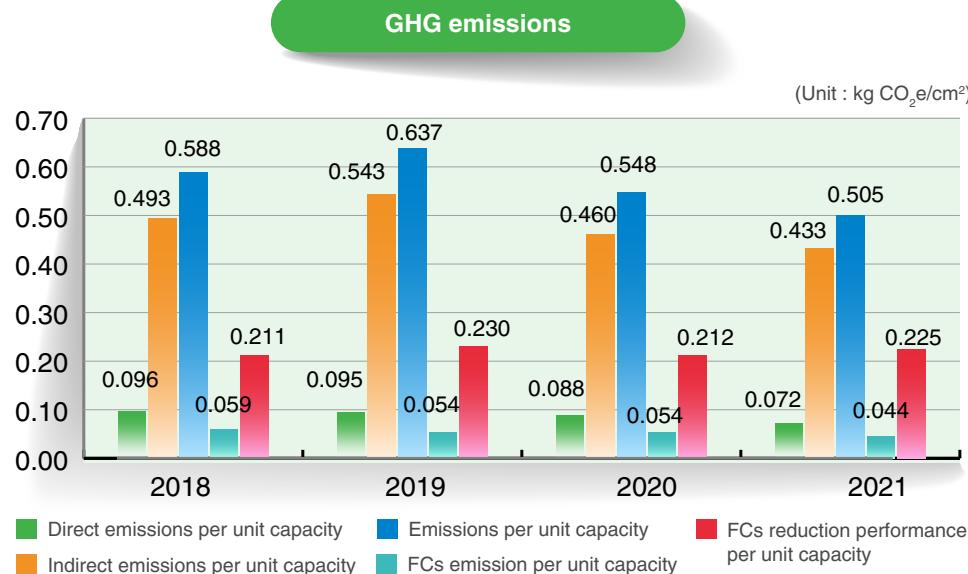
6.Use of standard, methodology, hypothesis, and/or computational tools : the energy consumption data is from measurements in which a fee payment was required. The review table does not contain any estimation values. For the factors used, the Company mainly referred to the latest recommended factors released by the EPA, among which, the uncertainty data of the emission factors. For evaluating the uncertainty of the activity data, the Company used the Regulations Governing Verification and Inspection of Measuring Instruments as its evaluation basis.



## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production



Regarding PFCs' emission issue, other than continuing to control the source and evaluate replacement materials, our company was also dedicated to improving treatment efficiency and replacing older equipment at the end of the manufacturing process. In 2021, the company-wide total fluorinated greenhouse gas emission was approximately 36,161 tons CO<sub>2</sub>e, the unit product emission was approximately 153,964.2 Kg CO<sub>2</sub>e PFC/ton.

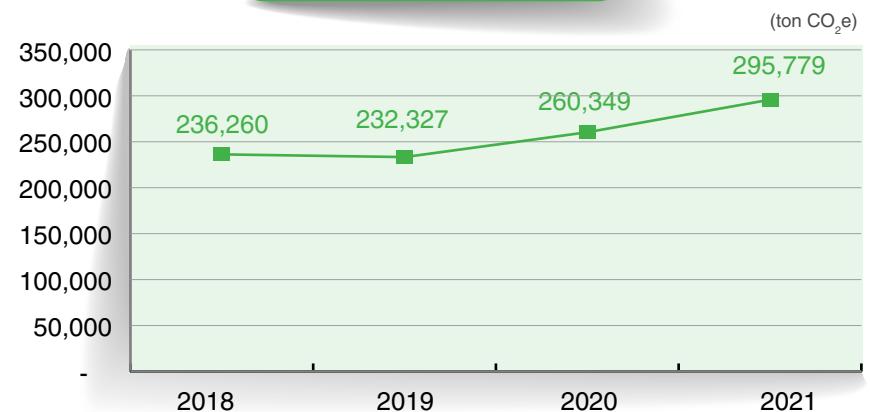
## 2018~2021 Powerchip Semiconductor Manufacturing Corp.'s overall PFCs emission summary table

PFCs (Kg CO <sub>2</sub> e PFC / Ton production)	2018	2019	2020	2021
PFCs direct emissions	196,070.6	178,729.7	170,924.5	153,964.2
Coverage (%)	100	100	100	100

In 2021, each foundry was dedicated to increasing production capacity and expanding 8B foundry product lines; each unit was also actively promoting carbon reduction plans by proposing plans such as replacing older treatment equipment and increasing their connecting coverages. Thus, the FCs emissions from the manufacturing processes in 2021 were 13.5% lower than in 2020; the reduction performance was a 13.6% increase.

Activity	2018	2019	2020	2021
FCS Emissions(ton CO <sub>2</sub> e)	66,527	54,818	66,890	57,864
FCS Reduction performance(ton CO <sub>2</sub> e)	236,260	232,327	260,349	295,779

## FCS Reduction performance



Note : 1. The types of such gases include hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride.  
2. The scope of the reduction is direct (Scope 1).  
3. The Tier 2b emission calculation method by the Intergovernmental Panel on Climate Change was adopted for calculation.

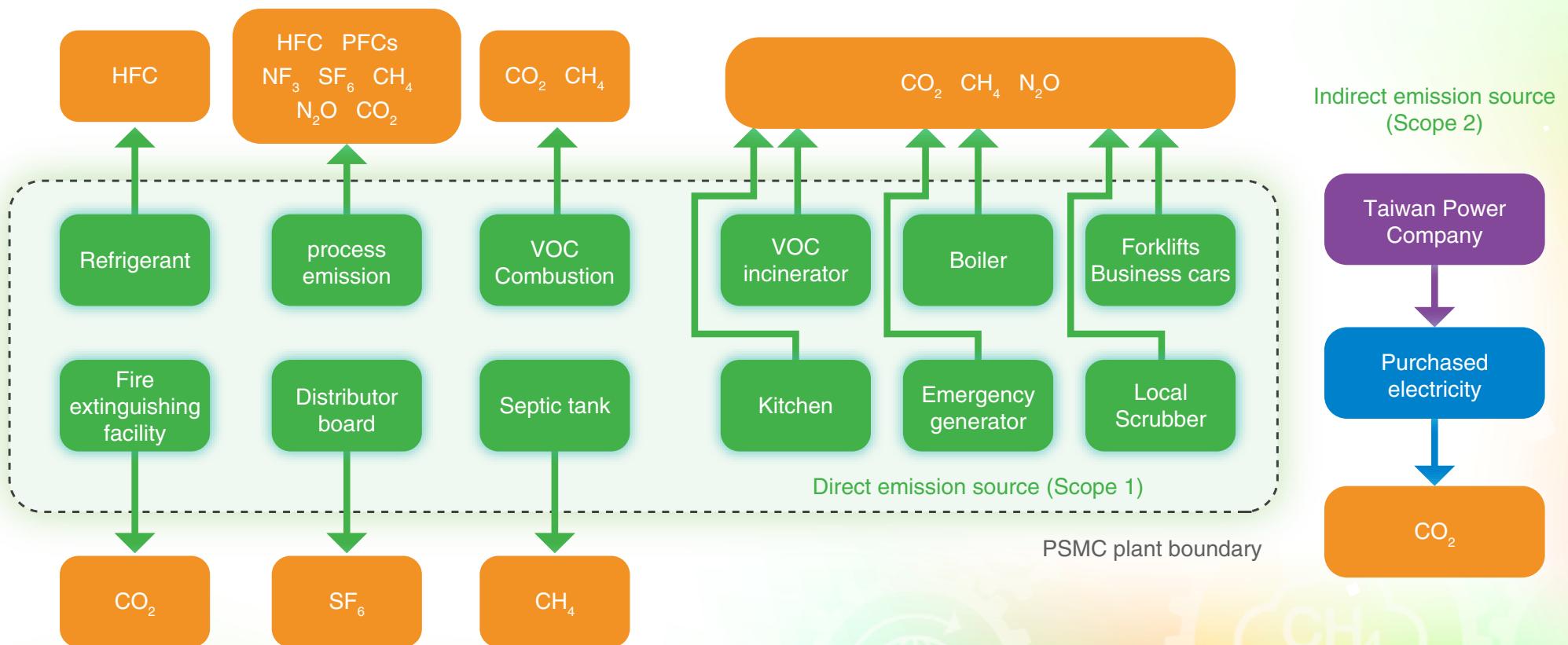


## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production

## PSMC GHG emission inventory scope





## 3.1 Climate Change and Carbon Management

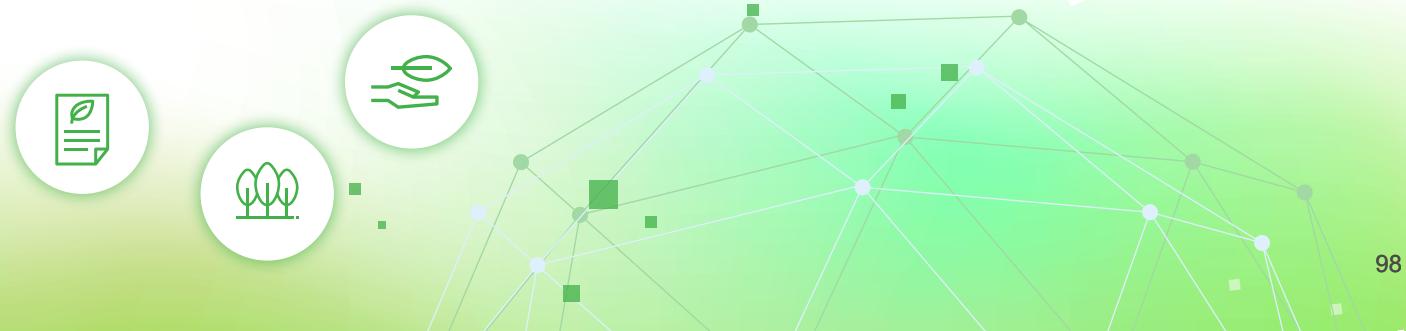
## 3.2 Risk Management for water resources

## 3.3 Green production

To bridge the international carbon reduction trend, our company continuously enhances fluoride treatment efficiency from the manufacturing process. We expect to achieve the ultimate goal of 90% fluoride emission reduction by 2030. In 2022, our actions start with replacing older emission treatment equipment at the end of the manufacturing process with high-efficiency equipment and increasing their coverages; making progress toward the goal year by year.

## 2022 Greenhouse Gas Reduction Plans

Foundry	Plans	Actions
8A / 8AD	Replace gas emission treatment equipment	Add additional 2~3 LS for etching
8B	Add high-efficiency gas emission treatment equipment on all new manufacturing machinaries with fluorinated gas	Add high-efficiency gas emission treatment equipment on all new manufacturing machinaries with fluorinated gas
P1/2	1. Replace gas emission treatment equipment 2. Increase gas treatment coverage	1. Replace 15 older models of electrical heating L/S with newer models of combustion L/S 2. Connect adsorption L/S in series to PFC L/S to increase PFC treatment efficiency
P3	Add high-efficiency gas emission treatment equipment on all new manufacturing machinaries with fluorinated gas	Add high-efficiency gas emission treatment equipment on all new manufacturing machinaries with fluorinated gas





## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production

Column



## Implement Foundry-wide Energy Management System

Powerchip Semiconductor Manufacturing Corp. is a professional wafer OEM company; we uphold the idea of growing with the society and our employees and profit-sharing. The company also complies with the nation's energy regulations and international trend of carbon reduction through decreasing our energy consumption and fulfilling our corporate social responsibilities. We promise to abide by the following ideas, principles, and policies to cherish energy and utilize them well; and engage with all employees to put efforts into protecting the Earth's energy environment.



### Philosophy and Guidelines



Provide resources to execute energy-related projects, implement energy regulations.



Strengthen equipment energy management and decrease consumptions to reach the goal of energy-saving.



Continue energy reduction measures and optimize energy consumption efficiency.



Purchase equipment with energy-saving certification; implement energy-saving designs into products and manufacturing processes.



Establish proper energy strategies and encourage complete participation to facilitate corporate's sustainable development.



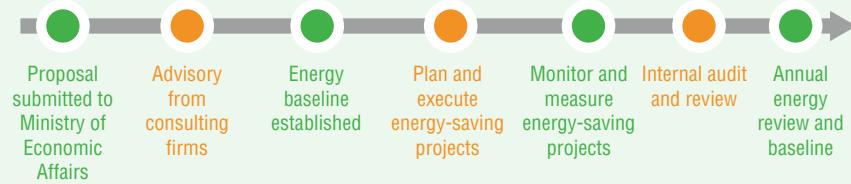
## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production

## Annual Highlights

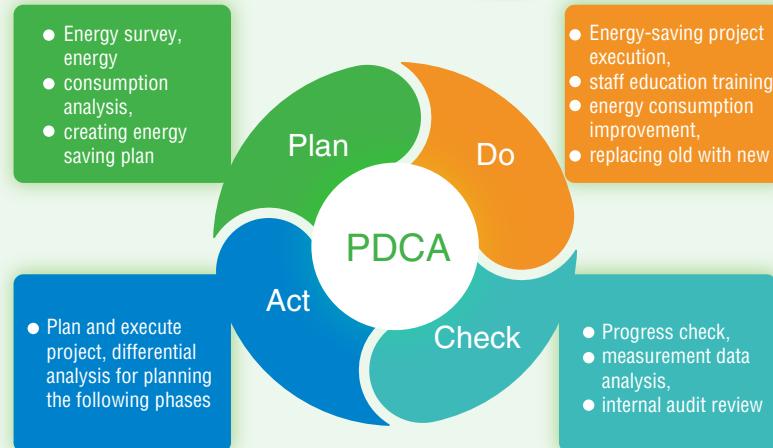
2021/03 2021/04 2021/05 2021/06 2021/07 2021/08 2021/09 2021/10 2021/11 2021/12 2022/01



## Received third-party verification



## Review passed





3.1 Climate Change and Carbon Management

3.2 Risk Management for water resources

3.3 Green production

## 3.2 Risk Management for Water Resources

### Water Resource Management

All of the Company's plants use tap water. The main water sources come from the Hsinchu Baoshan First and Second Reservoirs and the Miaoli Yongheshan Reservoir. According to the water stress map, the Hsinchu Science Park is at the low-medium level. In addition to the water used for the cleaning process, there is still water needed for air-conditioning to maintain the clean room operation, washing water for processing exhaust gas from the process, and the domestic water in the plant. As climate changes in recent years may have affected the normal water supply at the plant, we have continued to improve the water recycling rate and process water efficiency through technological improvement and investment in equipment as the first semiconductor plant in the park committed to achieving 85% or more of the process water recycling rate : the process water recycling rate at each plant all reached 85% or more.

In addition, to save water, we have controlled the water consumption of our 12-inch fab to below 95% of the permitted amount of water use. Since the establishment of the fab, we have upheld an excellent tradition of water conservation. The water-saving work through continuous technological improvements and investment in equipment have become our mission. Given the unique requirements of the semiconductor manufacturing process, the water or recycled water must go through necessary processes before it can be put into production. In 2021, the company-wide ultrapure water usage was 8,765,869 tons; yet the unit product ultrapure water usage went down from 0.0082 ( $m^3/cm^2$  wafer) to 0.0067 ( $m^3/cm^2$  wafer). This ultrapure water usage data covers 100% of the ultrapure water usage in our company. We also promise that the entire company will use 1,050 CMD of recycled water (P1/2 : 500CMD, P3 : 250CMD, 8A : 300CMD) when the water reclamation plant is established in the park to respond to the government's policy of promoting the recycling and reuse of reclaimed water proactively.

#### Summary of the past average annual recovery rate of the manufacturing process recovery plan of P1/2 fab

Activity	2018	2019	2020	2021
<b>Annual manufac-turing process re-covery (Million liters/year)</b>	5,271.293	5,104.187	5,473.977	5,457.088
<b>Tap water consumption (Million liters/year)</b>	2,689.684	2,608.617	2,723.580	2,673.458
<b>Average annual manufacturing process recovery rate <sup>(1)</sup></b>	86.4%	87.4%	88.2%	88.3%

Note : 1. Average annual manufacturing process recovery rate (standard of Hsinchu Science Park Bureau >85%).

#### Summary of the past average annual recovery rate of the manufacturing process recovery plan of P3 fab

Activity	2018	2019	2020	2021
<b>Annual manufac-turing process re-covery (Million liters/year)</b>	2,160.003	2,246.929	2,208.095	2,399.356
<b>Tap water consumption (Million liters/year)</b>	1,333.003	1,383.128	1,489.256	1,488.716
<b>Average annual manufacturing process recovery rate <sup>(2)</sup></b>	86.6%	85.3%	86.4%	86.5%

Note : 1. The change in the process caused the reuse rate to fall slightly in 2019 as compared to 2018. After improving the efficiency of the recycling system in 2020, the rate has since rebounded.

2. Average annual manufacturing process recovery rate (standard of Hsinchu Science Park Bureau >85%).



## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production

**Summary of the past average annual recovery rate of the manufacturing process recovery plan of 8A fab**

Activity	2018	2019	2020	2021
Annual manufacturing process recovery (Million liters/year)	2,502.008	2,564.562	2,660.471	2,632.525
Tap water consumption (Million liters/year)	1,248.571	1,224.712	1,223.262	1,125.163
Average annual manufacturing process recovery rate <sup>(1)</sup>	85.2%	85.6%	85.6%	86.5%

Note : 1. Average annual manufacturing process recovery rate (standard of Hsinchu Science Park Bureau >85%).

**Summary of the past average annual recovery rate of the manufacturing process recovery plan of 8B fab**

Activity	2018	2019	2020	2021
Annual manufacturing process recovery (Million liters/year)	-	133.234	240.705	316.978
Tap water consumption (Million liters/year)	-	333.535	458.572	482.260
Average annual manufacturing process recovery rate <sup>(2)</sup>	-	89.9%	89.3%	86.9%

Note : 1. The 8B plant commenced production in 2019, hence no information from 2018 is available for disclosure.

2. Average annual manufacturing process recovery rate (standard of Hsinchu Science Park Bureau >85%).

**2018~2021 Powerchip Semiconductor Manufacturing Corp.'s Ultrapure Water Usage Summary Table**

Ultrapure Water (Cubic meter)	2018	2019	2020	2021
Ultrapure water usage	8,158,676	8,253,029	8,740,283	8,765,869
Coverage (%)	100	100	100	100

**2018~2021 Powerchip Semiconductor Manufacturing Corp.'s Water Usage Summary Table**

Water Usage (Million Cubic Meter)	2018	2019	2020	2021
A. Public facility water (tap water)	5.271	5.550	5.895	5.770
B. Surface water	0	0	0	0.029
C. Underground water	0	0	0	0
D. Recycled water	0.318	0.304	0.262	0.252
E. Clean water resource total consumption : A+B+C-D	4.953	5.246	5.633	5.546
Coverage (%)	100	100	100	100



## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production

When Hsinchu Science Park Bureau announced a water restriction policy, the Company conducted water rationing in 4 stages according to the directions of the Bureau : 10%, 20%, 50%, and 100% according to the rationing plan. The initial stage was to restrict public and daily use. The next stage was expanded to use of water in the manufacturing process. Lastly, priority was given to maintaining the operation of the cleanroom. Water trucks were contracted for transferring water to the Company at the announced water collection point to extend the water supply within the plants in case of insufficient water supply during the water restriction period.

During the preparation to fight against drought in 2021, the Water Resource Agency built water reclamation plants in Keya Water Resource Recycling Center and Zhunan/Toufen Water Resource Recycling Center. Our company went ahead and tested the water for trial in the early stage and determined the water quality as secondary usable water. During the most difficult drought in May and June, the company cumulated 15 truck rides to Keya Water Resource Recycling Center to load 375 tons of reclaimed water. If there is a water reclamation plant in the science park in the future as a direct water supply to our foundry, we will increase the percentage of the reclaimed water used in our production depending on the quality of the science park's reclaimed water.

### Keya Water Resource Recycling Center Pick Up Drill (P1/2)

**Drill Title:** Keya Water Resource Recycling Center  
RO Pure Water Pick Up Drill

**Drill Activities:** Pick up from the water source -> Unload in foundry's tank (CUP Building Unloading Spot)

**Drill Locations:** Keya Water Resource Recycling Center (pick up)-> P1/2 (Unload)

**Vehicle Type:** One Jiamao Water Tanker (Plate number: 569-09, Tank number: 6W-18)



(1) Withdrawning water from water source

Location: Water Resources Recycling Center  
Time per trip: 40 minutes  
Water withdrawal time: 30minutes  
Water withdrawal: 20 tons  
Total time spent: 70 minutes



(2) Return / Water quality inspection

Location: P1/2 Plant of PSMC (water unloading are of CUP Building)  
Time per trip: 50 minutes  
Operation time: 30 minutes (water quality inspection, and pipe connection)  
Total time spent: 80 minutes  
Water quality testing: Conductivity 414 s/cm; pH =7.41; TOC:232ppb;TOC:232ppb



(3) Water unloading

Location:  
P1/2 Plant of PSMC (water unloading are of CUP Building)  
Water unloading time: 30 minutes  
Total time spent: 30 minutes

Total time spent for the entire process: 3 hours  
(in-plant operation time: 60 minutes)

**Drill Results:**

- Volume Transported: 20 tons / vehicle, time required to fill up at the pick up location: 20 minutes
- Operation time in the foundry: 50 minutes (filling time: 20 minutes)
- Traffic time: 40 minutes one way (80 minutes round trip)
- Time required for one shipment: Approximately 2 hours and 30 minutes

## Wastewater Treatment

All of the Company's wastewater has to go through the wastewater treatment facilities within the plants, and then flow to the similar facilities at the Park before it is discharged. To monitor the treatment effect for different compositions, the Company distinguishes the wastewater into 20 different types of reusable and non-reusable water treatment based on the type, concentration, and conductivity of the liquid discarded from the processes. In addition to increasing the water reuse rate, recycling some waste liquid acid (phosphoric acid/copper sulfate/sulfuric acid/hydrofluoric acid/ Ammonium fluoride) and organic waste liquid (IPA/PGMEA/TMAC/Stripper/Developer) has generated economic values. Single split-flow reduces not only the dosage for chemicals treating the wastewater but also the difficulty for treating the wastewater in the subsequent process, hence alleviating the environmental impact.

To continuously increase the amount of recycled water and reduce the volume of water discharge, the Company is equipped with pH and Fion testing instruments for effluents, and the administration of the park will sample the quality of the effluents twice a month to control the effluents from the plants strictly. In recent years, the annual average values of the effluents from our plants have all met the management standards of the park.

### Reuse and discharge planning of wastewater





## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production

## Water resources information of each plant over the years

Foundry	Activity	Unit	2018	2019	2020	2021
12-inch(P1/2)	Total water intake	Million liters/year	2,823.707	2,759.324	2,856.737	2,804.340
	Total emission of wastewater	Million liters/year	1,899.268	1,793.100	1,839.691	1,877.755
	Water consumption	Million liters/year	924.439	966.224	1,017.046	926.580
	NH <sub>3</sub> -N (<50)	mg/L	20.6	20.9	19.8	20.4
	Chemical Oxygen Demand (COD<500)	mg/L	114.6	83.2	110.2	82.8
	Suspended solids (SS<300)	mg/L	18.7	26.8	35.5	53.6
12-inch(P3)	Total water intake	Million liters/year	1,453.443	1,494.078	1,574.999	1,533.221
	Total emission of wastewater	Million liters/year	925.903	962.678	1,031.749	1,036.721
	Water consumption	Million liters/year	527.540	531.400	543.250	496.500
	NH <sub>3</sub> -N (<50)	mg/L	10.1	6.3	5.2	10.4
	Chemical Oxygen Demand (COD<500)	mg/L	45.2	54.7	40.0	44.5
	Suspended solids (SS<300)	mg/L	21.9	27.7	23.3	23.2





## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production

Foundry	Activity	Unit	2018	2019	2020	2021
8-inch(8A)	Total water intake	Million liters/year	1,295.318	1,266.945	1,265.937	1,179.311
	Total emission of wastewater	Million liters/year	792.113	813.411	833.846	789.719
	Water consumption	Million liters/year	503.205	453.534	432.091	389.592
	NH <sub>3</sub> -N (<50)	mg/L	14.4	12.4	12.6	13.4
	Chemical Oxygen Demand (COD<500)	mg/L	90	88.5	103.7	115.2
	Suspended solids (SS<300)	mg/L	15.4	18.5	18.8	39.7
8-inch(8B)	Total water intake	Million liters/year	NA	333.535	458.572	513.680
	Total emission of wastewater	Million liters/year	NA	233.603	306.620	336.648
	Water consumption	Million liters/year	NA	99.932	151.952	177.032
	NH <sub>3</sub> -N (<50)	mg/L	NA	NA	NA	NA
	Chemical Oxygen Demand (COD<500)	mg/L	NA	42.3	42.6	53.1
	Suspended solids (SS<300)	mg/L	NA	36.2	20.3	18.6
Total	Total volume of water picked up	Million liters / year	5,572.468	5,853.882	6,156.245	6,030.552
	Total effluents dis-charged	Million liters / year	3,617.284	3,802.792	4,011.906	4,040.843
	Water consumption	Million liters / year	1,955.184	2,051.090	2,144.339	1,989.704

Note : 1.Total water intake = Tap water + condensed water + rainwater.

2.The wastewater discharge is the actual measurement of effluent in the plant going through the flowmeter.

3.The measurements of various pollution indices are yearly average measurements taken by the Park Bureau twice every month.

4.The NH<sub>3</sub>-N value of the 8B plant is not monitored by the park where the fab is located

5.The company's drainage is collected to the sewage treatment plant in the park, and total dissolved solids have not been detected.



## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

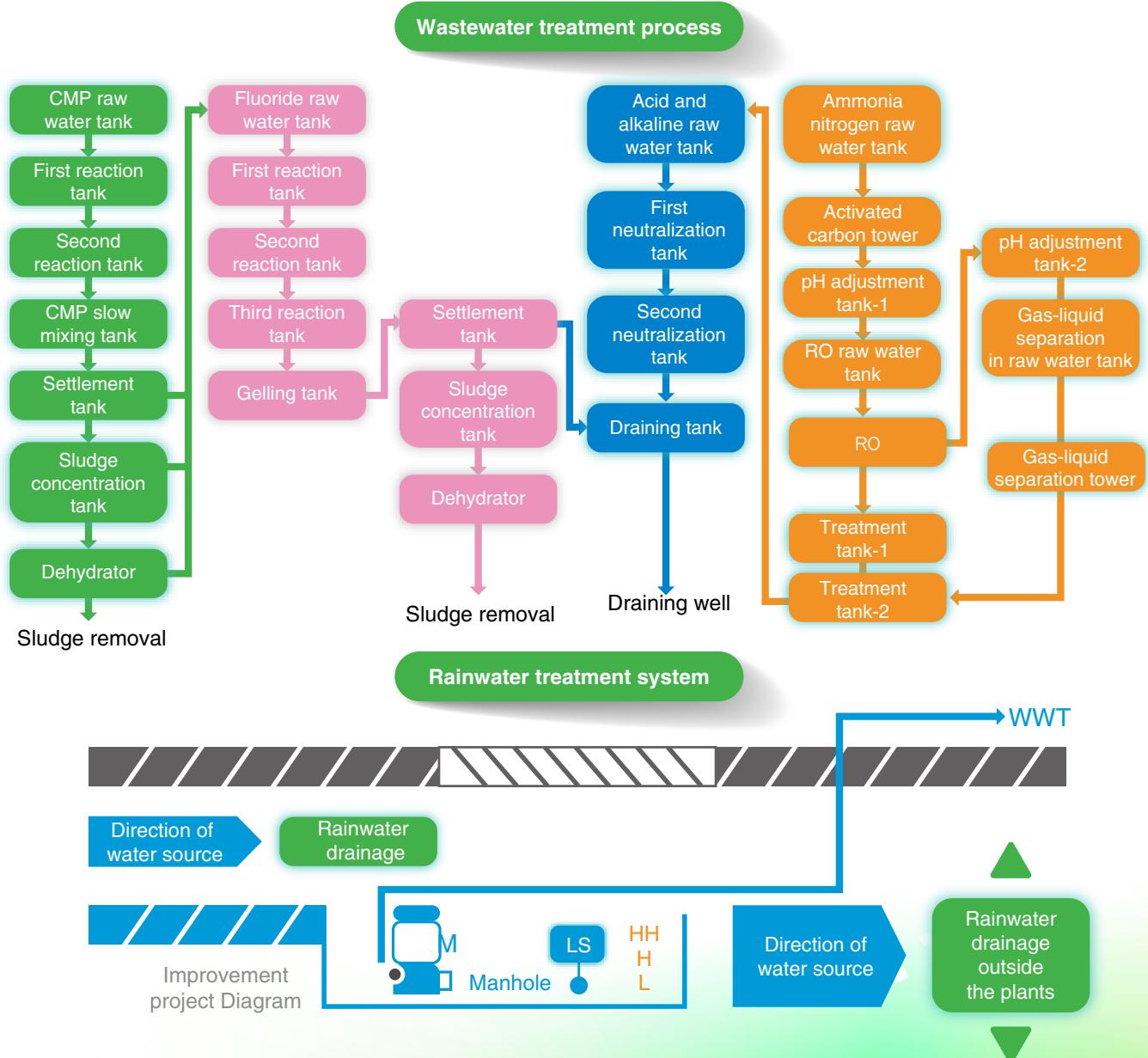
## 3.3 Green production

The recycled water generated from processes is treated with the appropriate recycling water system treatment before returning to the pure water system for reuse, which will increase the recovery rate. The unrecyclable and highly concentrated wastewater is discharged into the wastewater treatment systems (including : acid-base/fluoric acid/milling/ammonia nitrogen wastewater treatment system). After treatment, it will be diverted into the Park's sewage treatment plant for subsequent treatment and discharge. Therefore, the Company's effluents are not discharged into the rivers directly, having no direct impact on the water body and surrounding habitats. All plants of the Company have not had serious wastewater leakage incidents nor been imposed a major fine over the years

The wastewater treatment facilities in the plants are surrounded by jetty and flood pumps. The bottom story of various buildings also have flood pumps installed. In case of an abnormal leakage, heavy rain or flood, the flood pumps will transfer the water to the wastewater treatment facilities before discharging to the sewage of the Park. The relevant process is undertaken according to the treatment protocol for rainwater.

Further, the filling areas of chemical tankers also have been installed with jetties. In case of a leaking accident during a chemical refill, the chemicals can be effectively blocked and collected for subsequent treatment, and an environmental disaster can be avoided.

Because of an incident whereby hydrant water from a fellow plant in Pingzhen District contaminated the adjacent river in 2018, the Company has also installed flood pumps in the rainwater drainage at high-risk areas in case of abnormal incidents. The water can then be diverted back into the wastewater treatment facilities in the plants, avoiding similar contamination by hydrant water flowing into the rainwater sewage.





3.1 Climate Change and Carbon Management

3.2 Risk Management for water resources

3.3 Green production

## 3.3 Green Production

The plants of the Company are all located in the jurisdiction of Hsinchu Science Park. All business operations must be reported to and are under the purview of the Park Bureau. Any environment evaluation and environment monitoring will be conducted under the supervision of the Park Bureau, which has not caused a direct impact on the community. The environmental protection, and health and safety aspects have always been prioritized in the operations within the plants, to maintain certain environmental health and safety standards. The Company consistently strengthens its interaction and exchange with the Hsinchu Science Park Bureau, such as participating in seminars regarding environmental protection and health and safety; and holding activities in conjunction with the Industrial Safety and Environmental Protection Month, to continuously review the awareness campaign in these regards and establish a comprehensive environmental health and safety system within the plants, thus providing a hygienic, safe and comfortable workplace for the employees. In 2020, the Company did not receive any disciplinary action from the environmental protection authorities. The Company is a part of the Environmental Supervision Team of the Park and regularly communicates with local residents to understand their expectations on the manufacturers operating in the Park in regard to matters concerning environmental protection, and health and safety, and thus strengthening the management mechanism of the manufacturers in the environment, health and safety aspects.

and the most advanced and suitable pollution reduction technology. As such, the air pollution prevention equipment, treatment facilities, and monitoring equipment are all compliant with the relevant regulations. Further, the continuous R&D on the best practicable technology has enhanced the effectiveness of existing control facilities. According to the actual test results over the years, the concentration of air pollutants emitted is lower than the emission standards stipulated by the competent authority.

Powerchip Semiconductor Manufacturing Corp.'s air pollutant emission is listed in the following table. The reported total emission items include Fuel for prevention equipment, organic compounds from the manufacturing processes, boiler and emergency power generator's fuel, and organic effluents' volatile during shipping. The emission volume is calculated based on routine pipeline inspections and air pollution fees.

Total Emission Volume(ton)	SOx	NOx
2021	1.91	29.72

### Air Pollutant Emissions

To maintain the quality of the environment, the Company strictly controls its pollutant emission. The emission of the Company over the years has been compliant with the regulations. Air pollutants from the semiconductor manufacturing industry are mainly acidic/base gas or volatile organic compounds. Among them, the acidic and base exhaust gas from the manufacturing processes are treated in the wet scrubbing tower before emission; the volatile organic compounds first go through the carousel rotor for absorption before desorption through heated air to a burner for emission. "Multiple treatments for the most feasible technology" are adopted for pollution prevention to decrease the amount of pollutants entering our atmosphere - to make the emitted pollutants meet or be lower than the regulation's standards. In 2021, the VOC removal efficiency in all plants was far better than the stipulated 90% in the "Air Pollution Control and Emissions Standards for the Semiconductor Industry" – the removal efficiency of all the plants exceeds 95%!

With increasing production capacity, while new manufacturing processes progresses, the total emission also increases correspondingly. The Company, therefore, opts for source recycling,





## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production

## Acidic, Base Exhaust Gas Treatments

## First phase

Exhaust treatment equipment is installed on the machine to treat toxic, flammable, fluorinated greenhouse gas.

## Second phase

Treated gas is vented to the backend central exhaust treatment system for treatment before being emitted to the atmosphere.

## Volatile Organic Compounds Treatments

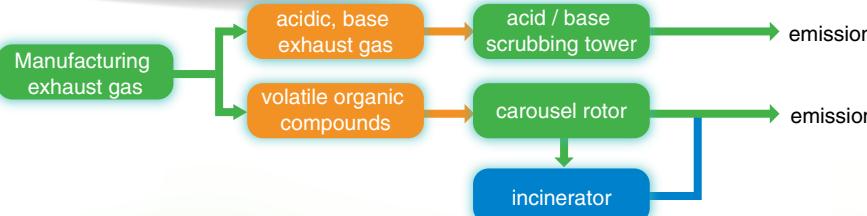
Volatile organic compounds were treated through carousel rotor by low temperature absorption, high temperature desorption before emission.



• Acidic, Base Exhaust Gas Treatment Facility

• Volatile Organic Compounds Treatment Facility

## Exhaust gas treatment flow chart

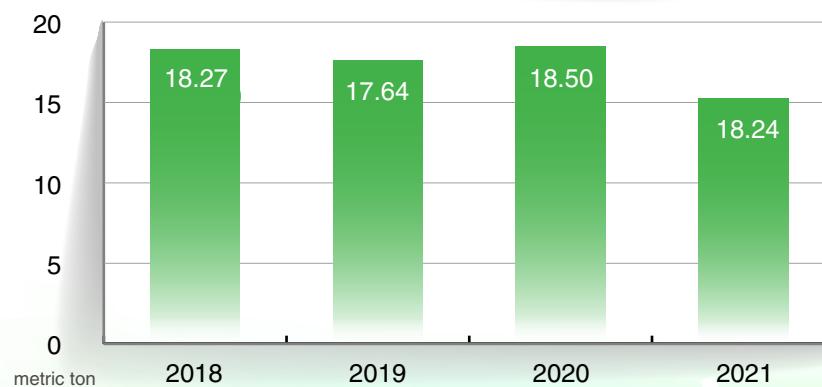


All the volatile organic compounds from all of our company's foundries are treated in the carousel rotor equipment. All foundries are dedicated to continuously improving the performance of treatment equipment. In 2021, 8A foundry installed a new carousel rotor treatment equipment and converted the original equipment to be the backup system. P1/2 and P3 both completed a set of routine replacement of the carousel for the volatile organic compounds treatment equipment, making the removal effectiveness became more manageable. In 2021, the company-wide volatile organic compound average removal ratio reached 97.3%, and the emission volume was 21.65% lower than the previous year. These were better than the semiconductor manufacturing procedure's optimal control technical condition (emission removal ratio  $\geq 92\%$ ) from "Fixed pollutants Optimal Feasible Technology". In addition, the company's carousel rotor system's removal ratio is also on an increasing trend year after year, strengthening our prevention of pollution.

## 2018~2021 Powerchip Semiconductor Manufacturing Corp.'s VOC Emission Statistics

VOC Emission Volume	2018	2019	2020	2021
Total (ton)	18.27	17.64	18.50	15.24
Coverages (%)	100	100	100	100

## VOC Emission Volume



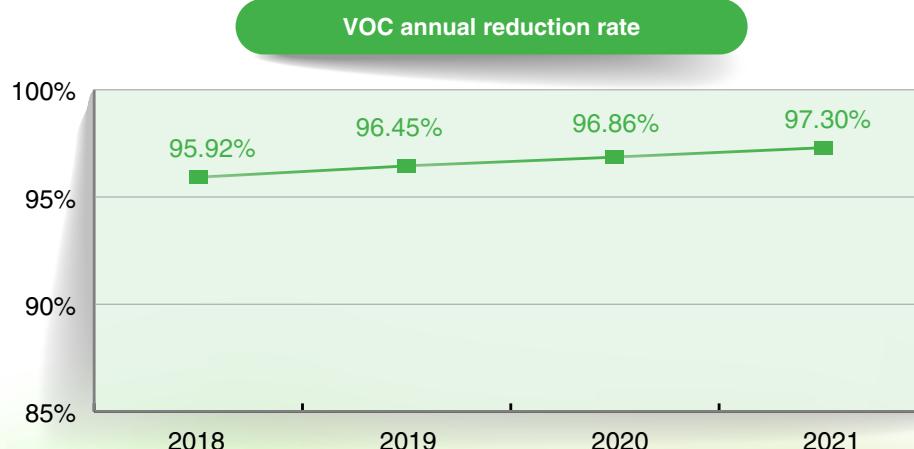
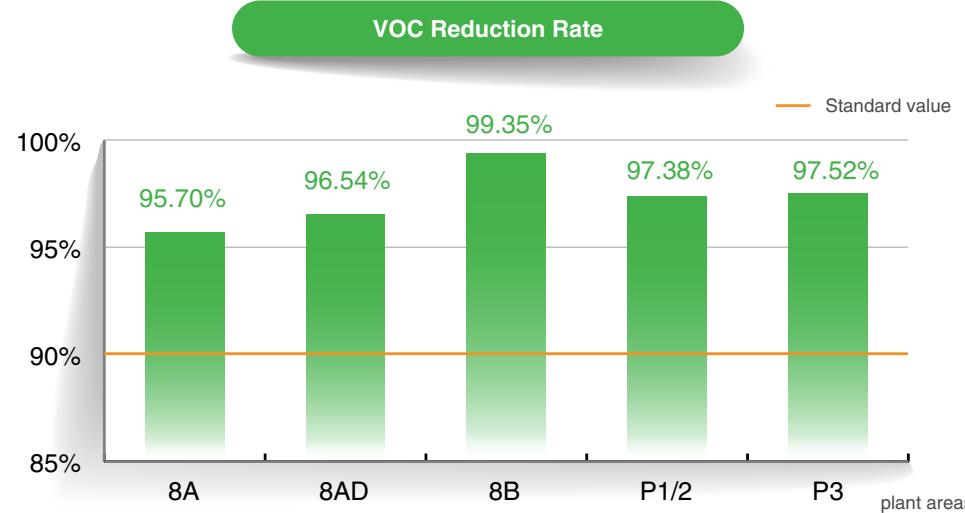
Note: Data was adjusted in 2018, 2019, and 2020 due to the changes from the calculation source



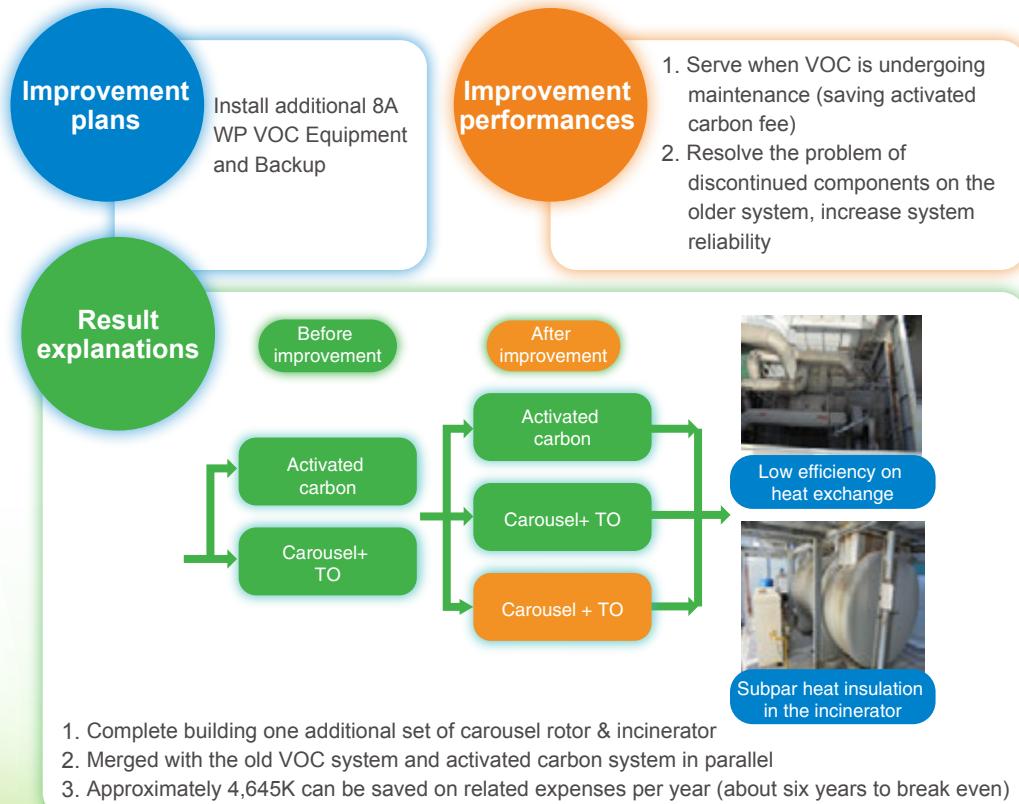
## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

## 3.3 Green production



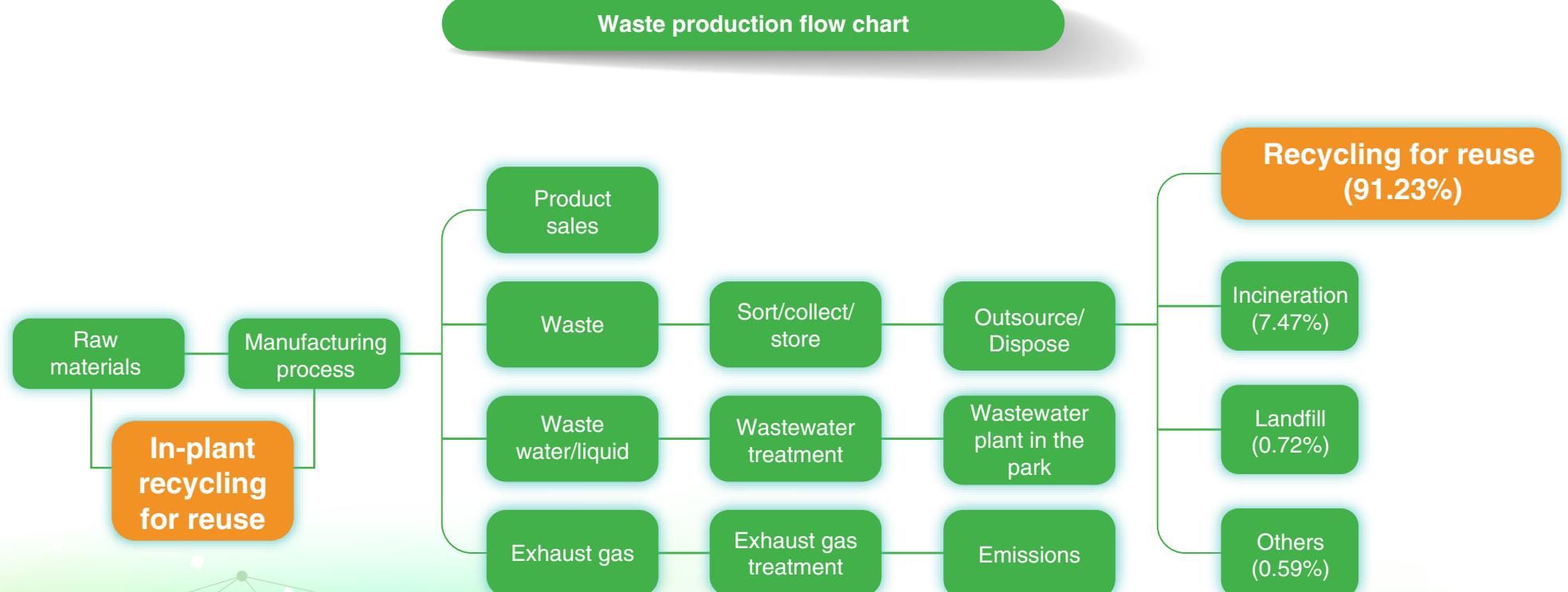
To effectively manage the emission of air pollutants, the Company has adopted the ISO 14001 management system and strives to meet its goals in reducing the emission of pollutants and improving the best practicable technologies. In addition to strengthening measures in treating the possible pollutants within the plants, the Company collaborates with other companies within the Park to work on notable pollution issues. From time to time, the Company will evaluate whether to add and improve prevention facilities pertaining to the manufacturing processes and make improvements to tackle notable pollution issues, such as improving odor and white smoke emissions. The following improvements are made according to schedule : optimization of L/S, verification of the efficiency of L/S, verification of the efficiency of M/S and C/S, increase in the efficiency of C/S, addition or replacement of prevention facilities and improvement on white smoke emission.

**Main Results of Improvement :**



## Waste Treatment

Designated personnel in different plants have been assigned to take charge of the waste management and will be assisted by personnel from plant affairs, general affairs, and property management units. In 2021, the Company's budget for waste removal amounts to approximately NT\$160 million. The Company adopts a life cycle circulation of waste management to continuously promote these goals : (1) A reduction from the source (2) Improving the reuse value of waste (3) Proper treatment of waste and waste tracking.





## 3.1 Climate Change and Carbon Management

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Through the improvement of process technology; reduction of raw materials; an inspection of waste solvents and other management measures at source; as well as the monitoring, examination and replacement of machinery, and circuit and pump components to reduce waste, the overall reduction of waste was achieved. In 2021, due to an increase of around 7.3% in total output, the overall waste per unit of output decreased by around 3.5% compared with 2020.

- 2021, the total wastes produced were approximately 17,788 tons, 91.23% of them were recycled for reuse, 7.47% were incinerated, and 0.72% were landfilled.
- In 2021, general wastes were approximately 11.334 tons (about 63.72% of the total), 10,711 tons among them were recycled and reused (94.5% in ratio), about 623 tons cannot be reused.
- In 2021, hazardous wastes were approximately 6,454 tons (about 36.28% of the total), 5,517 tons among them were recycled and reused (85.5% in ratio), about 938 tons cannot be reused.

2018~2021 Powerchip Semiconductor Manufacturing Corp. Waste Production Summary Table

Activity	Treatment	2018(ton)	2019(ton)	2020(ton)	2021(ton)
General wastes	Recycle / reuse	9198.566	9218.463	10293.836	10710.896
	1.Energy recycling	0.000	0.000	0.000	0.000
	2.Incineration	863.285	693.830	477.670	448.506
	3.Landfill	305.760	146.220	137.580	127.420
	Total (1+2+3)	1169.045	840.05	615.250	575.926
	Other methods	7.510	47.640	26.700	46.730
Hazardous wastes	Recycle / reuse	3671.375	4086.962	5051.870	5516.504
	1.Energy recycling	0.000	0.000	0.000	0.000
	2.Incineration	753.843	799.483	1188.495	880.089
	3.Landfill	0.000	0.000	0.000	0.000
	Total (1+2+3)	753.843	799.483	1188.495	880.089
	Other methods	0.000	1.585	6.226	57.768
Total waste quantity (ton)		14,800.343	14,994.183	17182.377	17,787.912
Unit waste production (kg/cm <sup>2</sup> )		0.01320	0.01484	0.01400	0.01351
Data coverages (%)		100	100	100	100

Note: 1. Reuse : Adopted the reuse option set by the EPA or the reuse method among the common treatment options.

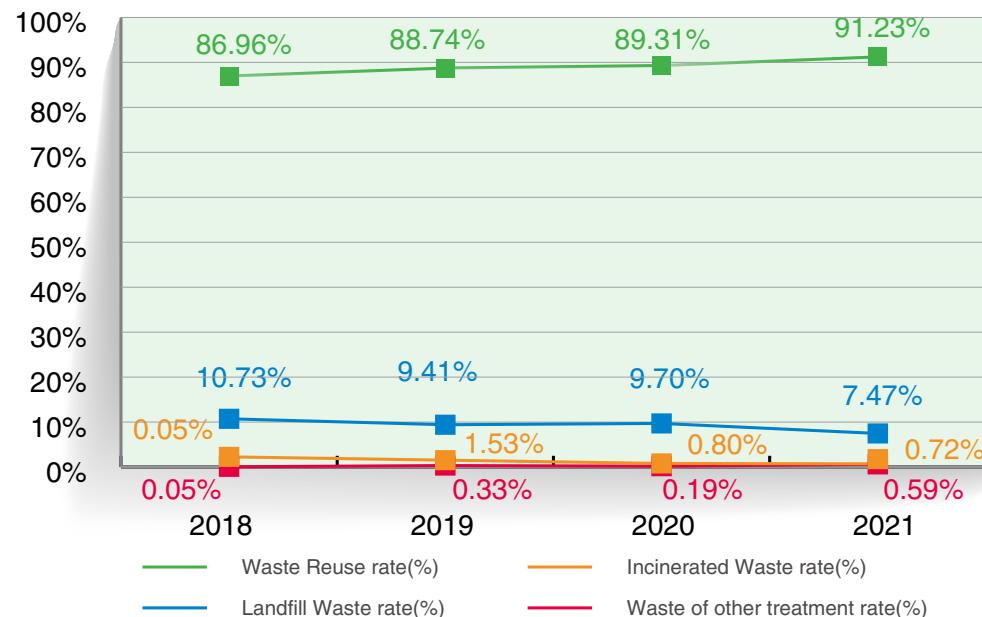
2. Incineration : Waste treated by incineration (Z05) does not include organic waste liquid with low heat value.

3. Landfill : Waste (X01) sent to landfill.

4. Others : Waste that was not treated by the aforementioned methods. Such as solidification treatment, off-shore treatment, or intermediary treatment which had not changed the form of the waste.

5. The Company has filed reports on waste treated in accordance with the requirements of laws and regulations.

6. For 8B, the information was adjusted due to data categorization changes in 2018 and 2019.



## Source Reduction

- Implementation of Effective Sorting and Water Conservation :

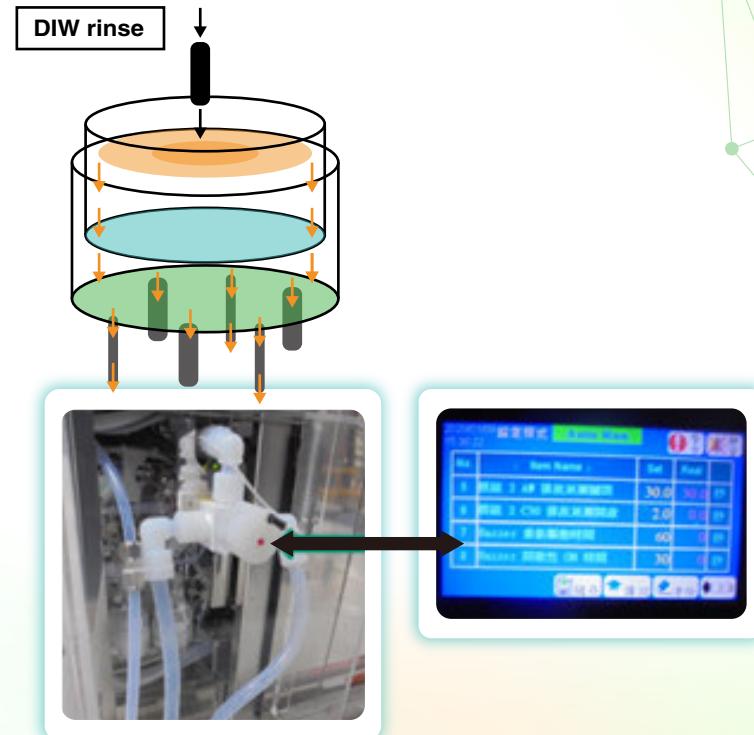
For non-reusable waste solvents, a machine using a split-flowing design is installed; selector pumps are put in place on the discharging piping for switching discharge pipelines, effectively reducing the emission of waste solvents. The remaining wastewater can be diverted to the wastewater treatment or the recovery facilities for recycled water processing.

The correct selector recycling settings will divert the machinery DI rinse time to the wastewater treatment system, which can relatively reduce the waste solvents requiring treatment and increase water resources.

### 3.1 Climate Change and Carbon Management

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- IPA Concentration Reuse :

To reduce the treatment costs for waste solvents and the usage of raw material, the Company has installed an isopropyl alcohol (IPA) inline recycling equipment, and waste liquid sorting and collection equipment at 8A fab, which will sort and select waste IPA of a higher concentration, before diverting to the inline recycling system for re-purification and the IPA supply system at the manufacturing process for reuse. In 2021, the yearly saving of IPA usage amounted to 173,225 liters; therefore, the use of raw IPA and the waste solvent for IPA dropped correspondingly.



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## Waste Reduction in the Processing End

### ● Ammonia Nitrogen Effluents Treatment :

When our company planned the ammonia nitrogen effluents treatment system for the 12" foundry, we considered first the environmentally friendly way and also took derivative wastes into consideration. Thus, we adopted hot air stripper + catalyst since it has no derivative waste to reduce the overall quantity of waste produced. It could remove over 85% of ammonia nitrogen from the effluents. Such methodology received excellence awards in the ammonia nitrogen effluents reduction category, and was promoted to industry peers through the collaboration with Hsinchu Science Park Administration. It served as a reference guide for other industries.

### ● Sludge Reduction :

P3 Foundry's machinery characteristic is its hydrofluoric acid effluents' concentration exceeds over 20%. To decrease the environmental pollution from processing such highly concentrated effluents and to prevent possible waste of resources, we set up a recycling system designated for recycling such effluents after a discussion with the onsite unit. Then we hired a legitimate contractor to recycle these high concentration hydrofluoric acid effluents to remake them to be fluorite flux supplements. It can increase the foundry's waste reusable ratio and reduce the sludge volume.

## Improve the Reuse Value of Waste

The waste produced by the Company is mainly solvents, acids, and sludge. By strengthening sorting from the front end and consistently improving the values of waste, the Company works with vendors to evaluate the feasibility of reusing the waste to ensure the final waste is properly handled. In 2021, the actual reuse rate increased to 91.23%, which was in alignment with the Company's short-term target. After the corporate restructuring was completed in 2019, part of the waste from the 8-inch fabs has been switched to recycling treatment. Therefore, the Company's overall recycling and reuse rate should continue to increase. At present, each plant evaluates the suitable recycling and reuse method according to its production characteristics of the process as shown in the table below.

Types of waste	Recovery rate	Plants	Re-use method
Waste barrels	100%	P1/2、P3、8A、8B、8AD	Recycled and reused; made into plastic and glass raw materials after cleaning/breaking by suppliers
Sulfuric acid waste	100%	P1/2、P3、8B	Recycled in the plant and supplied to the AC and water treatment with acid; made into industrial grade sulfuric acid after being purified by suppliers
Copper sulfate waste	100%	P1/2	The manufacturer refines it into copper sulfate powder or copper recovery in acid solution.
Activated carbon	100%	P1/2、P3、8A、8B、8AD	Has secondary use after desorption regeneration by the manufacturer.
Inorganic sludge	100%	P1/2、P3、8A、8B、8AD	Recovered by the manufacturer then is made into artificial granulated stones, cement raw materials and artificial fluorite.
Phosphoric acid waste	100%	P1/2、P3	Purified and then made into industrial grade phosphoric acid by suppliers.
Slurry resi-due	100%	P1/2、P3	Chemicals are added and then made into potassium sili-cate raw materials by suppliers for reuse.
TMAH Sulfate waste	100%	P1/2、P3	Recovered by the manufacturer then is made into TMAH for panel manufacturers.
Diluent waste	100%	P1/2、P3、8A、8B、8AD	Purified by the manufacturer then is made into photoelectric grade EBR/ raw materials of paints.
Ammonium sulphate waste	100%	8A、8B、8AD	The vendor purifies it to reproduce solid ammonium sulphate.
Mercury lights waste	100%	P1/2、P3、8A	Extracted and reused after being dismantled by suppliers.
Hydrofluoric acid waste	100%	P3	Made into fluorite by suppliers for reuse.
Ammonium fluoride	100%	P1/2、8B	Made into fluorite by suppliers for reuse.





## Proper Treatment and Tracking of Waste

We take environmental issues very seriously. The wastes we produce are meticulously classified and disposed of by qualified waste manufacturers for reuse. In strictly demanding waste management meet the standards in the Waste Disposal Act and international regulations, among them, requiring each foundry's direct current generator and SUPS system's Nickel-cadmium battery to be replaced every 3 to 4 years created about 16.808 tons of waste, which accounted for 0.0945% of the total number. By following the Basel Convention, they were shipped with ocean freight to the advanced country for recycling and treatment.

Waste Input and Output of PSMC	
Hazardous waste transported out	0
Hazardous waste input	0
Hazardous waste output <sup>(Note1)</sup>	16.808 (ton)
Hazardous waste treated	0
Percentage of hazardous waste transported overseas <sup>(Note2)</sup>	0.0945

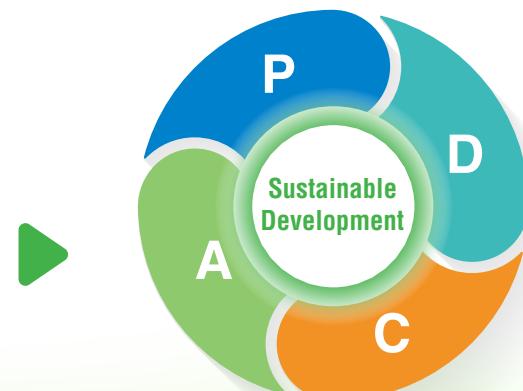
Note : 1.Basel Convention - A1170 hybrid battery waste - there are no treatment facility for nickelcadmium batteries locally. Therefore, they are processed overseas.

2.The weight of waste transported overseas/total waste = 16.808/ 17,787.91= 0.00094491

Bearing in mind that the earth is shared by all beings, the Company sets reducing, recycling, and re-using waste as its core ideology. The Company always monitors its waste output closely and evaluates the appropriateness of the waste disposal market. The Safety, Health and Environmental Committee of the plants compares the reasonableness of the waste output (the comparison between raw materials and waste) that is produced every quarter. According to the internal management review procedures of ISO 14001, the Company conducts a PDCA evaluation on the effectiveness of emission management every quarter.

To ensure the relevant audits are truly effective, a complete audit proposal for waste treatment vendors is prepared each year. Collaborating with the associations/unions and the plants on the inspection schedules, the Company visits the waste removal business unit/treatment vendors regularly. The conformity to regulations and the legality and appropriateness of waste treatment serve as the main auditing targets. In 2021, PSMC conducted audits on a total of 36 waste treatment vendors (including the common-interest association) and noted 32 weaknesses that required improvements. Via the electronic auditing system of the Company, E-Auditing, the reports were generated and improvement tracing was undertaken. The Company also demanded vendors to strengthen their management in the environment, safety and health, and firefighting aspects, to ensure the collaborating vendors did not violate any regulation.

- ✓ Sustainable operation
- ✓ Prevention of pollution
- ✓ Continuous improvement
- ✓ Self-management
- ✓ Gradually improved
- ✓ Do one's best to self-manage



- In accordance with the "Waste Disposal Act, Article 30, Paragraph 1" and the "Regulations Governing Determination of Reasonable Due Care Obligations of Enterprises Commissioning Waste Clearance ", the owners must fulfill their management responsibilities .  
The law requires conducting at least one audit (including ASIP/TSIA audits) for waste disposal/reuse manufacturers, which is also in line with the company's specifications.

### 3.1 Climate Change and Carbon Management

### 3.2 Risk Management for water resources

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In addition to conducting regular audits and yearly evaluation on waste treatment vendors at the end of every year, the scoring covers five management areas : (1) the audit on PSMC internal waste removal operation within the plants; (2) the audit on tracing of removal/treatment; (3) the audit conducted by the competent authority; (4) the operational status of the management system; (5) addition and deduction of the vendors' score. After a scoring analysis, in 2021, excellent vendors amounted to 46% (more than 85 points); passing vendors amounted to 54% (between 70 to 85 points). There were no vendors that required improvements or had failed (less than 70 points). The yearly evaluation results will be taken into consideration for vendor distribution of procurement in the coming year.

PSMC facilitates the waste treatment and the overall reuse process and makes proper documentation for the destination of the waste so that they can be subjected to effective review to ensure no occurrence of violation or pollution. Powerchip Semiconductor Manufacturing Corp. signed the "High-tech industry waste disposal and self-discipline convention" initiated by Taiwan Semiconductor Association. We continue to comply with the association to enforce the "Waste management contractor assessment plan", and appointed a third-party, Industrial Technology Research Institute, to conduct waste management contractor audit operation to ensure operations meet the requirements stated in the convention. The Company has been conforming to the environmental protection regulations faithfully and set reducing pollutant emissions for improving the environmental protection operation of all plants as its primary goal. In recent years, the Company has not received any penalty or been fined for any pollution incident. Further, since incorporation, the Company has never been involved in any dispute regarding a pollution incident.

## Green Products

Becoming a green enterprise is one of PSMC's goals. The Company conforms to the hazardous substance management policy, from obeying the law to mitigating risks, in hopes of improving its Hazardous Substance Process Management (HSPM) and satisfying the needs and expectations of its stakeholders. As such, the Company has attained the certification of IECQ QC080000 and on the existing basis of ISO9001, constructed the technological management process of QC080000 to control hazardous substances. These measures ensure legal compliance and satisfy its customers, proving its priority and commitment to the systematic management of hazardous substances. In the second quarter of 2020, all five plants of the Company passed the IECQ QC080000 certification.

PSMC is committed in its social responsibility in environmental protection, thus pledges that its manufacturing facility and process has complied with international standards and regulations on environmental protection issues, which means it meets customer requirements on environmental protection specifications for products without the expense on the environment. Since 2003, PSMC has been actively promoting green design, green procurement, green manufacturing, and green packaging. Also, the Company has been approved by all customers and has obtained the certification of SONY to become a Green Partner. In March 2020, the certification was renewed. All of our company's products meet the requirements listed in the IEC 62474 material disclaimer and related international regulations. In response to the client's inspection, our income from products with materials listed in IEC 62474 is 0%.



8A



8AD



8E



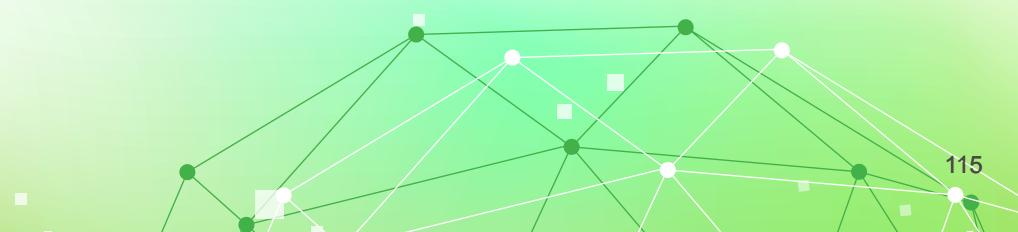
P1/2



P3



SONY Green Partner





## 3.1 Climate Change and Carbon Management

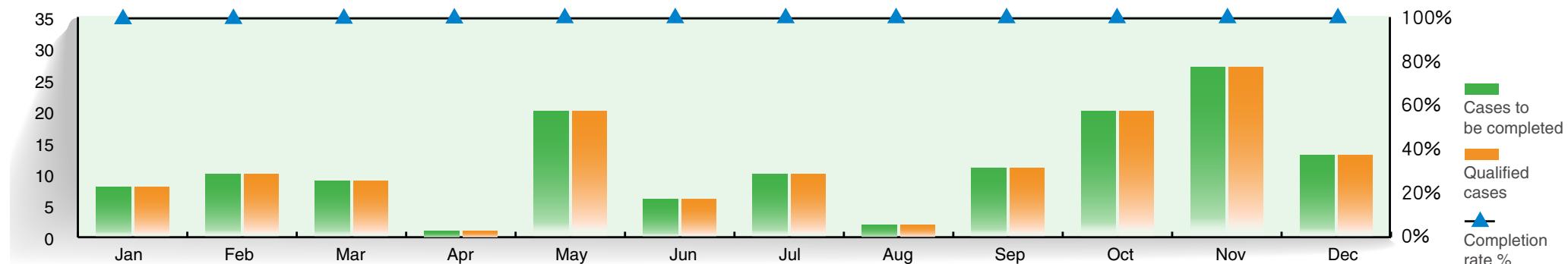
## 3.2 Risk Management for water resources

## 3.3 Green production

## Management Evaluation of Suppliers

The Company adopts the management mechanism on hazardous substance control of its vendors mainly to generate letters of commitment and testing reports on non-use of hazardous substances in hopes of distinguishing the hazardous substances that are currently in use. 100% of our vendors have signed the letter of commitment not to use hazardous substances and have submitted test reports on the green material they provide.

We provided a total of 137 testing reports and declarations throughout the year, achieving the requirement "100% of green product testing report/commitment of raw materials for production are submitted" of the hazardous substance management target. Green, yellow, and red warning lights were added to the company's internal e-Supplier management system for indications, it is a systematic way to 100% monitor, and ensures whether the suppliers are late for submitting the green documents (material inspection report and promise statements). It enhances the IQC inspection efficiency; it came online in 2021 H2 and was validated for functionality's effectiveness.



	Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Inspection report	Wafer	2/2	0/0	2/2	0/0	5/5	1/1	0/0	0/0	0/0	5/5	2/2	1/1	18
	Target	3/3	4/4	1/1	1/1	7/7	1/1	3/3	0/0	5/5	0/0	6/6	1/1	32
	Polymide/Color filter	0/0	0/0	3/3	0/0	0/0	0/0	1/1	0/0	0/0	1/1	1/1	0/0	6
	Packing	3/3	6/6	3/3	0/0	7/7	0/0	2/2	2/2	5/5	9/9	13/13	8/8	58
Disclaimer	Wafer	0/0	0/0	0/0	0/0	0/0	1/1	2/2	0/0	0/0	4/4	4/4	1/1	12
	Target	0/0	0/0	0/0	0/0	1/1	3/3	2/2	0/0	1/1	1/1	0/0	1/1	9
	Chemical	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0
	Resist	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1/1	1
	Gas	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0
	Packing	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	1/1	0/0	1
Cases to be completed		8	10	9	1	20	6	10	2	11	20	27	13	137
Qualified cases		8	10	9	1	20	6	10	2	11	20	27	13	137
Completion rate %		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

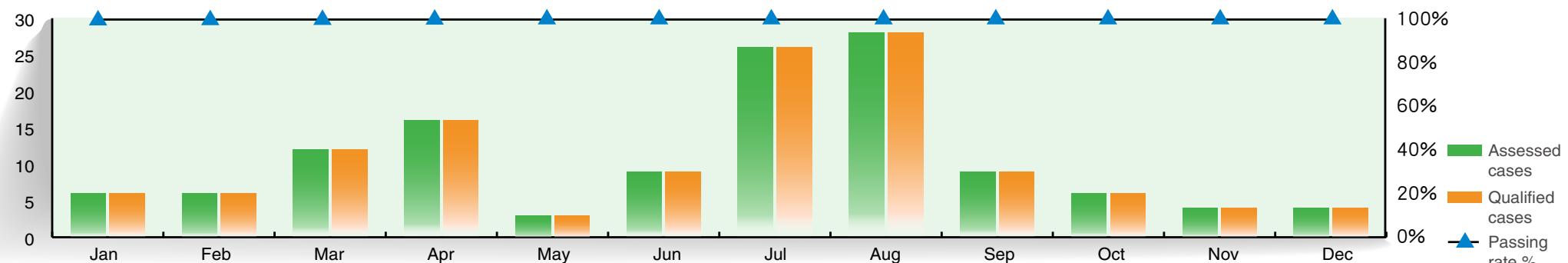


## 3.1 Climate Change and Carbon Management

## 3.2 Risk Management for water resources

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129 eAPQP HSF evaluations were completed for the given year. The hazardous material management goal, "eAPQP HSF evaluation of Green product (GP) raw production material qualifying rate to be 100%", was met.



Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Assessed cases	6	6	12	16	3	9	26	28	9	6	4	4	129
Qualified cases	6	6	12	16	3	9	26	28	9	9	4	4	129
Passing rate %	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

In accordance with the control of the QC080000 system on the input of materials, the Company has constructed the raw material ICP test report/declaration database in its e-Supplier system. When the IQC review is conducted on the input of materials, the Company will check if the materials are compliant with the requirements of the hazardous substance management (HSF), and if the test report and declaration provided by the vendors are valid. Such measures will strengthen the automated checking function on the input of materials.

The improvement results were :

1. Automated raw material management HSF IQC ensures compliance.
2. Report and statement of effective management and review reduce the misuse risk of hazardous substances.
3. Meanwhile, the international regulation (Reach) demands the PFOA reduction planning (PFOA will be banned from July 2020 onward). The replaced material has been evaluated by all the plants and is in use.





3.1 Climate Change and Carbon Management

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## Column



### SEMICON Taiwan International Semiconductor Exhibition

Since the globe and Taiwan both face the challenges of climate change, sustainable development has become the Taiwanese semiconductor industry's critical competency for the next decade. In SEMICON Taiwan 2021, the "Green Production Innovation Pavilion" showcased the important ESG achievements of the semiconductor industry for the first time. Our company actively participated and responded to SEMI's calling. Our long-term achievements were delivered

through a series of events in SEMICON Taiwan to those who care about Powerchip Semiconductor Manufacturing Corp.'s development. On December 29, the company's spokesperson VP Eric Tang joined the "SEMI Semiconductor Industry ESG Sustainability Campaign Ceremony" to push a positive impact and determination for the industry's sustainable development as our action.



▲ Powerchip Semiconductor Manufacturing Fully Push for ESG to create Co-prosperity among Corporation, Environment, and Society



▲ Powerchip Semiconductor Manufacturing Corp.'s Spokesperson VP Eric Tang Participated in "SEMI Semiconductor Industry ESG Sustainability Campaign Ceremony" on December 29





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Energy-saving and carbon reduction have been our company's long-term focuses. 240 million NTD was spent on optimizing energy-saving equipment in the past 6 years. 80 million kWh of electricity was saved and a total of 43 million Kg of carbon was reduced, which is equivalent to 108 Da'an Forest Parks in annual carbon absorption volume. In terms of saving water resources, the company decreased the usage of tap water through a comprehensive distribution/categorization recycling and purification for different departments to reuse. Every drop of water is used 3.3 times.

Our company had won two consecutive years (2020 : 8A, 2021 : P1/2 ,P3) the Hsinchu Science Park Waste Reduction and Recycling Economy Performance Excellence Awards. IPA Recycle System (IPRS) was set in our foundries to recycle and refine IPA effluents from the manufacturing process, the refined IPA concentration that exceeded 99.7% were recycled for machinery to reuse. This significantly decreased the amount of IPA effluents and the resources were recycled and reused. The system can

recycle and refine 180K liters of IPA every year, it is a win-win situation for the corporation and the environment.

Further, our company adopted a unique catalyst method in the ammonia nitrogen effluent treatment system. The ammonia nitrogen effluents are treated through concentrate, air stripping, and catalyst and turned into harmless nitrogen gas. The ammonia nitrogen effluent reduction exceeds 90%; more importantly, no additional waste is created during the process. It significantly diminishes environmental pollution, Powerchip Semiconductor Manufacturing Corp. received Hsinchu Science Park Ammonia Nitrogen Effluent Reduction Excellence Award for it.





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## Column



## Friendly Environment "Local Scrubber Replacement Project"

### Topic :

Enhance NF<sub>3</sub> removal rate, reduce carbon emission and improve air pollution odor, to decrease complaints from neighbors

### Idea :

Adding, modifying, and replacing onsite "exhaust treatment system" (local scrubber) to decrease greenhouse gas and carbon emission, and decrease complaints from neighbors

### Project :

With reducing pollution emission as the continuous improvement goal, the company speeds up replacing the older model of electrical heating Local Scrubber with newer model of combustion Local Scrubber. A total of 16 scrubbers were replaced in P1/2 foundry.

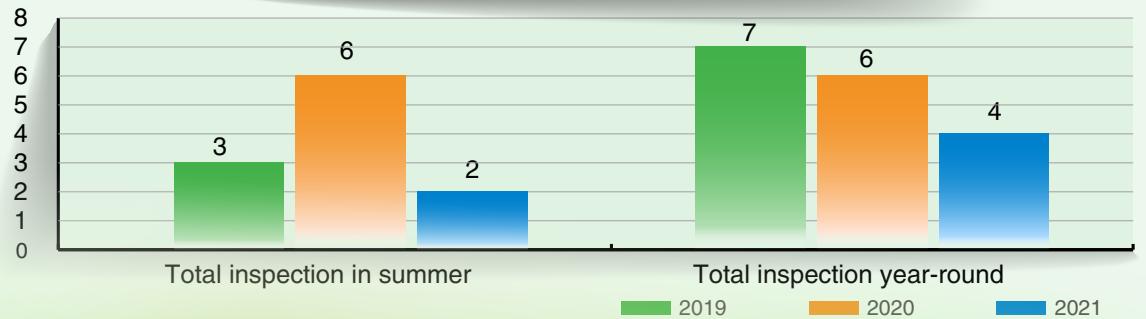
### Improvement Results :

- According to the inspection results on the L/S removal rate (electrical heating removal rate : 50.0%; combustion removal rate : 99.7%), we also extrapolated from greenhouse gas Tier 2b and obtained the following results : After replacing 16 Local Scrubber, carbon reduction (NF<sub>3</sub>) was approximately 6,476 tons CO<sub>2</sub>e / year (99.4% efficiency).

Schedule to replace electrical heating model of Local Scrubber with combustion model of Local Scrubber	Carbon Emission for combustion model (NF <sub>3</sub> )	Carbon Emission for combustion model (NF <sub>3</sub> )	NF <sub>3</sub> carbon reduction
Replacement date	Progress	ton CO <sub>2</sub> e / year	
2021/6/2~2021/10/19	100%	6,515	39
			6,476

- Decrease odorous material F<sub>2</sub> emission (under 1.5 PPM), the electrical heating model had 5PPM measured, and the average measurement of the combustion model fell between 0.4–0.5 PPM (max at 1.1–1.4 ppm). The complaints from neighbors decreased.

### Air pollution equipment inspection records (including complaints)



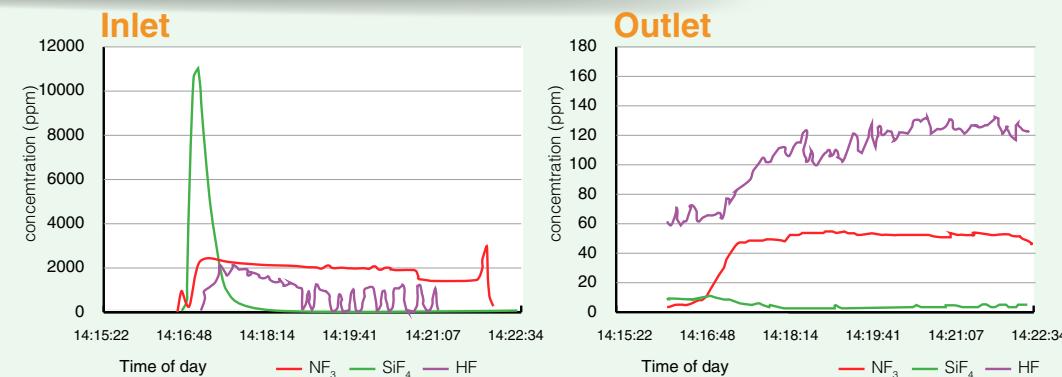
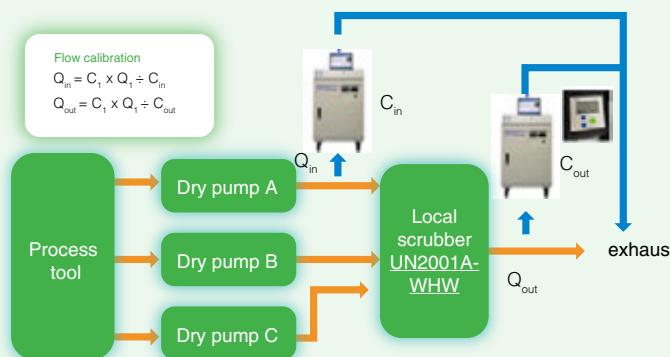


## 3.1 Climate Change and Carbon Management

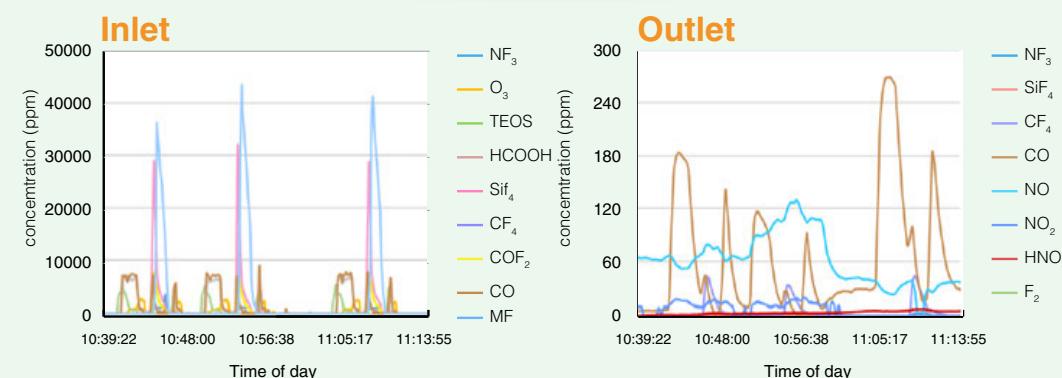
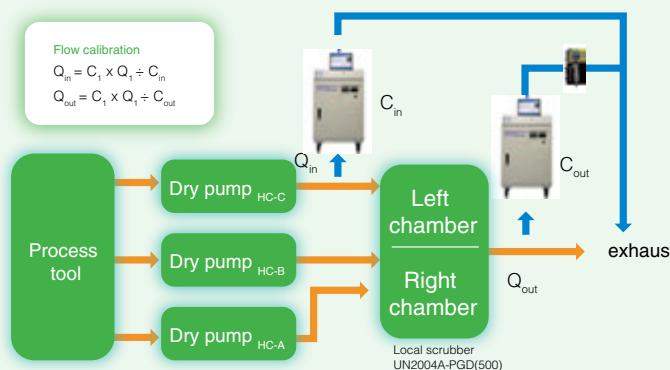
## 3.2 Risk Management for water resources

## 3.3 Green production

FTIR sampling illustration and flow calibration – Electrical heating model DRE removal rate was 50.0% (before improvement)



FTIR sampling illustration and flow calibration – Combustion model DRE removal rate was 99.7% (after improvement)

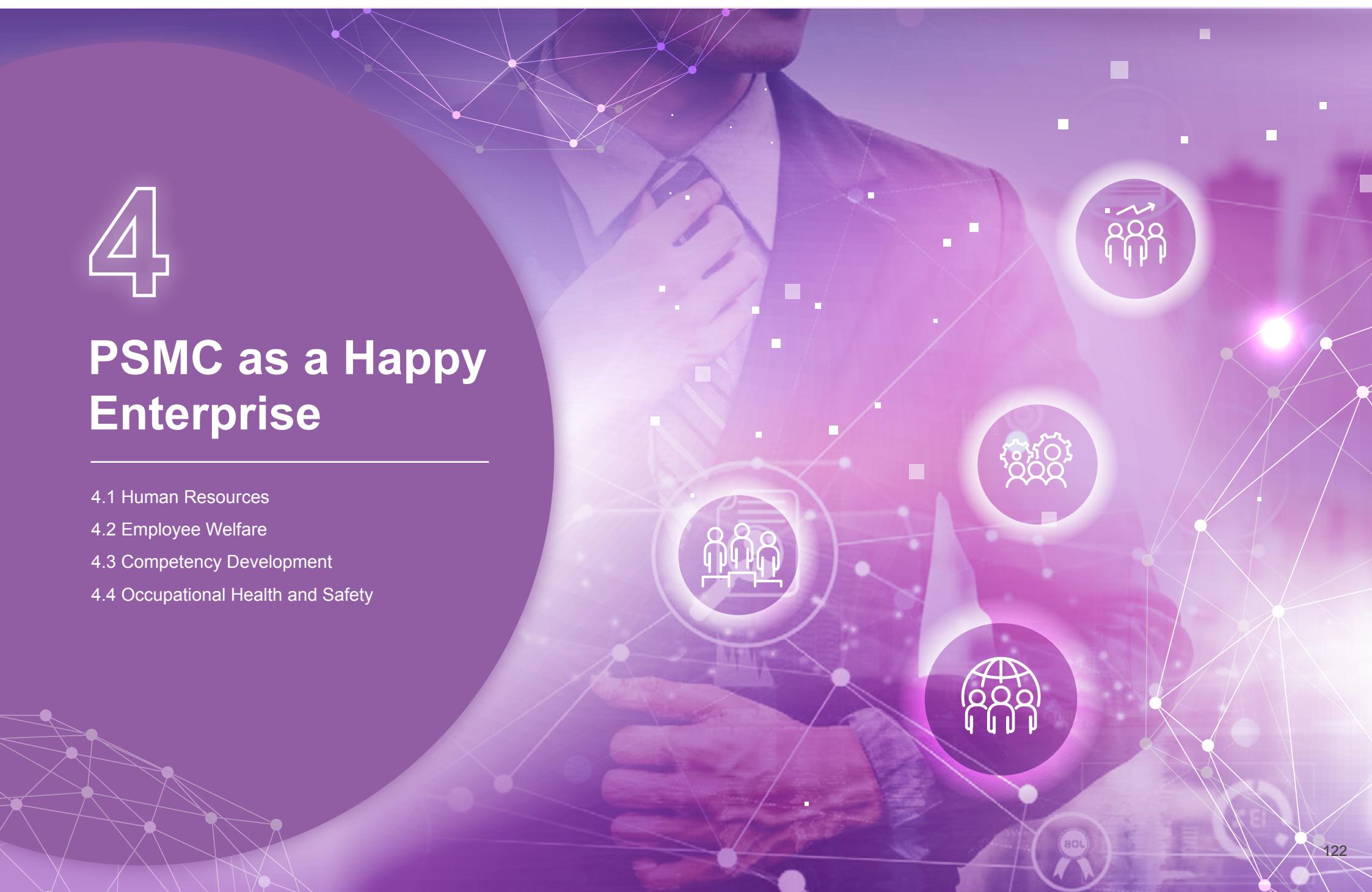




# 4

## PSMC as a Happy Enterprise

- 
- 4.1 Human Resources
  - 4.2 Employee Welfare
  - 4.3 Competency Development
  - 4.4 Occupational Health and Safety





## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety



## PSMC as a Happy Enterprise

### Core Topics' Meanings to Powerchip Semiconductor Manufacturing Corp.

Employees are regarded as the Company's most important assets. A good interaction between the labor and management can enhance the corporate culture and organizational atmosphere, and facilitate the harmony between the labor and management. The Company and employees can thus strive for a stable growth together.

The company works on talent training and development and encourages employees to seek improvement in their professional capabilities and skills through channels such as on-the-job training and external training to strengthen their professional knowledge and work skills.

### Core Topics



#### Employer-labor relations



#### Talent development



#### Human rights





## Performance Highlights



In 2021, the company stipulated and announced the "Report, Dispute, and Suggestion and Employee Feedback Participation Management Procedures", and the "Whistleblower Protection and Anti-Retaliation Management Procedures".

### Policies

According to the "Regulations for Implementing Labor-Management Meeting" set by the Ministry of Labor, the Company holds regular labor-management meetings with labor representatives from all fabs, where the attendees of the meetings can voice their opinion.

The annual training master plan is based on the "Education Training Measures" and "Employees Education Training Procedures"; subsidies are granted based on the "On-the-job Training Management Measures". The "Work Rules" and "Workplace Anti-Sexual Harassment Prevention Measures, Dispute and Punishment Measures" were written to provide a communication channel.



In 2021, the company subsidized training-related expenses to assist 10 employees in receiving advanced degrees, and 229 employees in obtaining certifications.

**100 % training proportion**

In 2021, a total of 16,162 employees participated in training related to human rights policies. The employee participation proportion was 100%.

## Promises and Goals

### Short-Term Goals

- Position staffing ratio  $\geq 90\%$ .
- Training plan completion rate  $\geq 90\%$ .

- "Feedback Corner" employee communication platform response rate  $\geq 95\%$ .

### Mid-Term Goals

- Position staffing ratio  $\geq 91\%$ .
- Completion rate of mandatory training programs for managers  $\geq 90\%$ .

- "Feedback Corner" employee communication platform response rate  $\geq 95\%$ .

### Long-Term Goals

- Position staffing ratio  $\geq 92\%$ .
- Completion rate of mandatory training programs for managers  $\geq 92\%$ .

- "Feedback Corner" employee communication platform response rate  $\geq 96\%$ .



## Management

Labor-management meetings and elections for labor representative have been held and conducted in accordance with the "Regulations for Implementing Labor-Management Meeting" on a regular basis.

The prevention and treatment for unlawful workplace conducts have been handled in accordance with the following management procedures : "Administrative Measures of the Prevention of Unlawful Conducts when Performing Duties," "Regulations for Establishing Measures of Prevention, Correction, Complaint and Punishment of Sexual Harassment in the Workplace", and "Procedures for Reporting Unlawful Conducts when Performing Duties."

The departmental supervisors listed the job scope for different positions. The training courses that the employees needed according to the job scopes were identified. Training programs have been tailored to the needs of the employees.

If it is necessary to extend a worker's working hours, after workers agree to work overtime, they must submit an application so that supervisors and workers can double check the overtime hours in the system, and they will be paid based on the overtime hours. When overtime has exceed the standard as prescribed by law, a warning will show on the screen of the system, and the pre-overtime work order will not be allowed to send.

## Reporting Mechanism

Employees can use multiple internal channels to raise suggestions and dispute(reporting) to the company : (1) Feedback Corner, (2) Employee Wellness Site, (3) 885 E-mail, and (4) Consultation.



## Assessment Mechanism

01

The Company regularly held labor-management meetings to discuss work hours, leave and welfare.

02

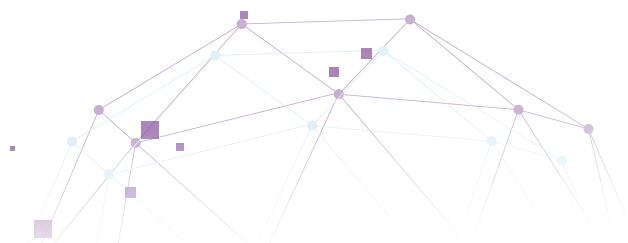
The Training Development Department and the departmental supervisors listed the job scope for different positions. The supervisors then selected the professional courses that their subordinates should take accordingly. The Training Development Department would devise the courses according to the training needs of the employees.

03

The Quality Control and Review Committee would review the execution status of the training and education every six months.

04

The quality assessment committee routinely reviews the response rate on "Feedback Corner" to ensure opinions are heard and received.



## Performance Report

### Goals in 2021

Training plan completion rate exceeds 80%

### Performances in 2021

Training plan completion rate at 96.4%

### Accomplishments



"Partner's Words" employee communication platform response rate at 90%.

"Partner's Words" employee communication platform response rate at 100%.





4.1 Human Resources

4.2 Employee Welfare

4.3 Competency Development

4.4 Occupational Health and Safety



## Safe Environment and Management Policy

### Core Topics' Meanings to Powerchip Semiconductor Manufacturing Corp.

Occupation safety is an important indicator to show whether the company's environmental safety and hygiene management system is fully functional. When these matters fail to be managed effectively, it jeopardizes the company's public image and even creates the risk of disruption in operations.

#### Core Topics



##### Occupation Safety and Hygiene





## Performance Highlights



Received recognition from the Hsinchu Science Park Administration for two consecutive years : The Safety and Hygiene Excellence Award in 2020; and in 2021, the Safety and Hygiene Outstanding Award, and the Outstanding Employees Award.



No major environmental protection or safety incidents occurred at our foundries or suppliers in 2021.



530 employees underwent special health checks during 2021; there were no instances of occupation-induced illness.



Our company held 94 environmental safety and hygiene training in 2021, with the total number of attendees exceeding 13,900.

## Policies

Powerchip Semiconductor Manufacturing Corp.'s Occupation Safety and Hygiene Management System was established based on articles in ISO 45001 and CNS 45001 to facilitate environmental protection and employee's physical and mental health, eliminate any foreseeable danger, and manage potential loss.

"Environmental Safety and Hygiene Management Handbook" is drafted to regulate the internal environmental safety and hygiene operation on the production sites and external issues.

## Promises and Goals

### Short-Term Goals

- The frequency - severity indicator is 1/3 or lower than the semiconductor industry average.
- 50 or more improvement cases of occupational hygiene proposals.
- 0 occupation-induced injuries caused by chemical exposures.
- 0 incidents of major environmental protection and construction safety.
- If a major environmental violation occurred to any supplier, the company will conduct a full assessment to re-evaluate its qualification as a supplier.
- Abnormal incidents occurrence rate for thousand-people-day < 0.005.
- Focus groups' health improvement completion rate  $\geq 50\%$ .

### Mid-Term Goals

- The company's frequency - severity indicator is lower than 1/3 of the semiconductor industry average.
- Increase improvement cases of occupational hygiene proposals by 20%.
- Occupation-induced injury caused by chemical exposures remains 0.
- 0 incidents of major environmental protection and construction safety.
- If a major environmental violation occurred to any supplier, the company will conduct a full assessment to re-evaluate its qualification as a supplier.
- Abnormal incidents occurrence rate for thousand-people-day < 0.005.
- Focus groups' health improvement completion rate  $\geq 55\%$ .

### Long-Term Goals

- The company's frequency - severity indicator is lower than 1/4 of the semiconductor industry average.
- Increase improvement cases of occupational hygiene proposals by 50%.
- Occupation-induced injury caused by chemical exposures remains 0.
- 0 incidents of major environmental protection and construction safety.
- If a major environmental violation occurred to any supplier, the company will conduct a full assessment to re-evaluate its qualification as a supplier.
- Abnormal incidents occurrence rate for thousand-people-day < 0.005.
- Focus groups' health improvement completion rate  $\geq 60\%$ .



## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety

## Management

Led by the President, we are committed to implementing various environmental safety and health projects to ensure that our occupational safety and health management system can achieve the results as expected while complying with relevant laws and regulations and requirements.

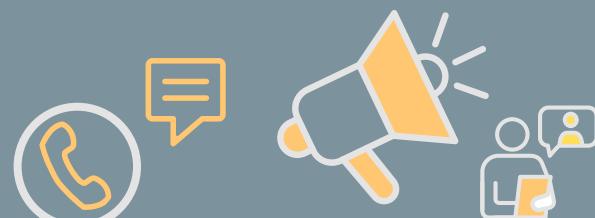
The Company has established health promotion plans, occupational disease prevention and management measures; conducted regular operating environment monitoring as required by the law; provided individual protective gears; and ran risk assessments for work hazards. By analyzing the causes of occupational injury in a timely manner, safety awareness and training can be properly enhanced.

The Company has established Safety, Health and Environmental Protection Committees at the headquarters and at the fab levels. Regular meetings are held to discuss matters regarding safety, health and the environment. Also, labor representatives are elected in accordance with the law, allowing the employees to comprehend the health, safety and environmental operational model and serve as a formal communication channel.

Promotion of prevention and control of infectious diseases, epidemic control, materials provision and support, follow-ups and crisis response were undertaken in accordance with the Employee Health Management Measures.

## Reporting Mechanism

- The Company has established "Procedures for Consultation and Communication of Environmental, Health and Safety Management" to maintain the communication channel between the Company's internal and external occupational health and safety management system, which convey the occupational health and safety policies, legal obligations and relevant information.



## Assessment Mechanism

- 01 Internal audits on environmental health and safety are conducted every six months to perform checks on the execution status and make necessary corrections on the overall system operations.
- 02 The Company has established "Procedures for Supervision and Measurement of Environmental, Health and Safety Management" to conduct regular performance measurement and directional adjustment of goals.
- 03 Environmental health and safety meetings are held to review and make corrections, achieving the goal of continuous improvement.
- 04 Supervisors at all levels are committed to providing necessary resources and implementing daily environmental health and safety management. They also continue to review and improve the system to ensure its suitability, adequacy and effectiveness.



## Performance Report

### Goals in 2021

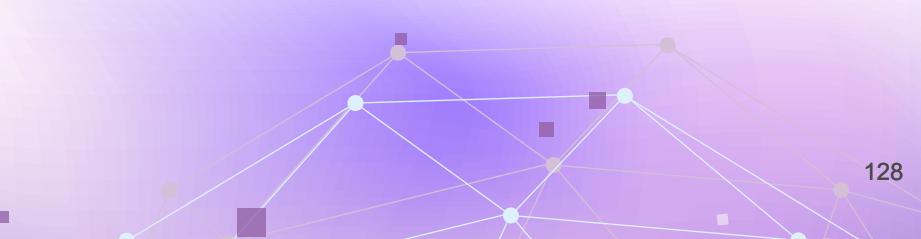
The company's frequency - severity indicator is lower than 1/3 of the semiconductor industry average.

### Performances in 2021

The frequency - severity indicator (FSI) was 0.01, which is lower than the FSI of the semi-conductor industry's 1/3.



### Accomplishments





## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety

## 4.1 Human Resources

PSMC conforms to the law to protect the human rights and privacy of employees. Discrimination is strictly forbidden. For recruitment, the Company adopts the principles of fairness, justice and honesty. Recruitment, selection and employment are all in compliance with government regulations. There will be no difference in treatment in terms of race, skin color, gender, sexual orientation, religion, marital status, age, nationality or physical and mental disabilities. Moreover, the Company is also dedicated to having preventive measures on sexual harassment. In addition to orientation training for new recruits, a hotline has been established to handle any sexual harassment complaints. If a complaint is received, privacy protection for the complainant is the ultimate governing principle, so that a workplace free of sexual harassment can be created for all.

The security personnel of the Company are required to attend human rights training each year. The content of the course includes the relevant law and regulations such as personal rights, labor freedom, wages, holidays, working hours, prohibition of discrimination, freedom of assembly and related cases to ensure that the security personnel are also compliant with the social convention.

### Employee Information

For the percentage of Taiwanese employees in the Company in 2021, Taiwanese employees accounted for 95.82% while foreign employees accounted for 4.18%; For the 25 supervisors above the assistant manager rank, Taiwanese supervisors accounted for 96.0% (There were 24 Taiwanese supervisors and 1 foreign supervisor), employees with disabilities had exceeded the stipulated 1%. The operating activities within the fabs are mainly undertaken by company employees. The employee statistics of this report are actual figures provided by the HR Division. Our company operates no overseas locations, so there are no expatriate employees.

Type	Age	Number		Percentage
		Male	Female	
Manager	Below 30	0	0	0.0%
	31-50	541	80	71.5%
	Above 51	211	36	28.5%
	Total	752	116	100.0%
Employee	Below 30	934	554	22.6%
	31-50	2762	2154	74.7%
	Above 51	94	82	2.7%
	Total	3,790	2,790	100.0%
Employment status	Full-time	4,542	2,906	100.0%
	Part-time	-	-	-
<b>Total</b>			7,448	
<b>Average seniority</b>			10.1	

Note 1 : Managers are personnel above section managers.

Note 2 : Full-time staff only, no part-time staff. Excluding 33 contract staff (male : 16; female: 17).





## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety

## Diversity of Employees

By maintaining good interaction between labor and management, corporate culture and organizational atmosphere are naturally reinforced and the harmony between labor-management relations is facilitated. In addition to offering diverse communication platforms, we also organize labor-management meetings on a regular basis. Through the communication between the labor and management, relevant matters regarding work hours, leave and welfare issues can be discussed to protect employee rights.

The human resources division has an Employee Relations Department that offers assistance and a referral service for counseling to the employees to relieve their stress and improve work performance. Apart from the communication platform "Feedback Corner", the Employee Relations Department has also set up complaint channels including the "Employee Wellness Site" and "Unlawful Conducts in the Workplace" to address various types of complaints via communication and responses, providing employees with a fair working environment that is free from discrimination.

In 2021, "Feedback Corner" received 733 cases, and the company's response rate was 100%. Powerchip Semiconductor Manufacturing Corp. has "Workplace Anti-Sexual Harassment Prevention Measures and Dispute and Punishment Measures" in place and openly disclosed the reporting channel to prevent sexual harassment incidents; any occurrences will be corrected and improved. There was one sexual harassment case received in 2021, the case was processed according to the company's measures with the investigation committee and a punishment ruling was made.

Since the establishment of the Company, the labor-management relationship has been harmonious. There has been no union established and no occurrence of labor-management disputes that could give rise to losses. The shortest notice regarding operational changes is processed in accordance with Article 16 of the Labor Standards Act. The Company offers various communication channels including making a direct report regarding the issues in question to the manager. If one was treated unreasonably, the employee could file a correction or complaint via a complaint channel. In 2021, we were not imposed with any penalty imposed by the competent authority for violations of freedom of association or collective bargaining.

In 2021, there were no occurrences of child or forced labor incidences. As such, there was no penalty imposed by the competent authority. The Company complies with laws and regulations, and protects the rights of its employees. Therefore, the Company has established labor and human rights policies to protect the mental and physical development of children and does not employ child workers under the age of 16. The employment of foreign workers has to also conform to the age requirement of the exporting country. No laborer under the age of 18 (young workers) engages in any work that may endanger the health and safety or violates the moral standard, including overtime or night shifts.

In 2021, there was no occurrence of forced or compulsory labor, nor any violation of the indigenous group's rights. We were clear from any fine coming from the government authority. Work conditions do not differ in terms of race, religion, gender, age, marital status or political preference. The Company does not recruit workers by force, threat, imprisonment, debt settlement, human trafficking or other illegal activities, including but not limited to forced labor or related coercive actions, corporal punishment, intimidation or other verbal abuse, withholding workers' finances, identity documents, etc.

If it is necessary to extend a worker's working hours, after workers agree to work overtime, they must submit an application so that supervisors and workers can double check the overtime hours in the system, and they will be paid based on the overtime hours. When overtime has exceed the standard as prescribed by law, a warning will show on the screen of the system, and the pre-overtime work order will not be allowed to send.

## Employee Turnover

In 2021, the turnover rate for new employees was 13.1%, the Resigned (incl. retired) was 9.4%, Employee staffing ratio is maintained at 94% which shows the employee turnover is stable and company operation is smooth.

Note : The employee staffing ratio's definition is (number of employees at the end of 2021 / number of employees expected for 2021)

Category	New employee		Resigned (incl. retired)		
	Number	Proportion	Number	Proportion	
Below 30	Male	394	42.2%	249	26.7%
	Female	194	35.0%	87	15.7%
31-50	Male	245	7.4%	198	6.0%
	Female	130	5.8%	147	6.6%
Above 51	Male	11	3.6%	16	5.2%
	Female	0	0.0%	3	2.5%
Total in 2021	Male	650	14.3%	463	10.2%
	Female	324	11.1%	237	8.2%
	Total	974	13.1%	700	9.4%
Total in 2020	Male	624	14.3%	382	8.8%
	Female	340	12.1%	286	10.1%
	Total	964	13.4%	668	9.3%
Total in 2019	Male	355	8.6%	286	7.0%
	Female	191	6.9%	192	6.9%
	Total	546	7.9%	478	6.9%



## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety

## Column



## Student Internship Program

Since 2020, the whole world was facing the challenge of the COVID pandemic, it reshaped global citizen's life and work format; distance education and work from home were the changes that contributed to a surge in electronics sales which kept raising the demand for semiconductors. Major players began their expansion plans and started hiring talents much earlier, leading to the shortage of professionals in the semiconductor industry. Taiwan is currently moving towards an aging society and the low birth rate caused a more intense hiring competition among corporations. Thus, Powerchip Semiconductor Manufacturing Corp. proposed the "Student Internship Program" this year. The company expected to enter the campus to invite students to join Powerchip Semiconductor Manufacturing Corp. by offering internship opportunities to those students who are interested in joining us after graduations. This allows students to be exposed to their future work environment, become familiar with their future coworkers, understand the operation of wafer OEM, and receive practical training.

Powerchip Semiconductor Manufacturing Corp. started the planning since April 2021, and has completed 25 campus "Internship sessions" in 18 universities such as National Yang Ming Chiao Tung University, National Chung Hsing University, and National Taipei University of Technology between September to December. Over 1,700 students were attracted and over 150 juniors and seniors applied for the intern engineer position. The admitted interns will report for duty from April to August 2022 in their respective departments in Powerchip Semiconductor Manufacturing Corp. Upon the completion of the internship, qualifying candidates may receive job offer opportunities for positions such as R&D, Manufacturing Process Integration, Manufacturing Processes, and Equipment Engineer.



▲ "Pre-hiring internship sessions" at National Taipei University of Technology





## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety

## 4.2 Employee Welfare

### Employee Welfare and Rights

To look after the employees and secure their standard of living, we offer excellent wages and benefits. The starting wage of personnel holding entry-level position does not differ base on gender. An Employee Welfare Committee has been established to provide or sponsor various welfare programs. In addition to providing labor insurance and National Health Insurance to employees, we also offer free or self-paying group insurance, which not only insures the employee, but also their spouses and children, shielding both our employees and their families. In 2020, the company held two employee stock purchase plans; the execution duration is spanned over 4 years for employees. The first purchase listing is expected to be done in 2022.

### Salary System

In the Company's remuneration system, based on the principle of fairness and reasonableness, our salaries are higher than the minimum wage set by the government, and we have an incentive bonus program based on performance in place, regardless of race, socioeconomic status, language, ideology, religion, party affiliation, native place, place of birth, gender, sexual orientation, age, marital status, appearance, facial features, disability, zodiac signs, blood type, or previous union membership. All our employees who have served for at least three months in 2021 received regular performance evaluation.

### Performances in 2021

Category	Male	Ratio	Female	Ratio
Manager or higher	444	6.0%	71	1.0%
General indirect labor	3,672	49.3%	1,118	15.0%
Direct labor	264	3.5%	1,646	22.1%
<b>2021 Total</b>	<b>4,380</b>	<b>58.8%</b>	<b>2,835</b>	<b>38.1%</b>

Note : Employee who have been employed for 3 months must receive performance evaluation; the denominator for the ratio calculation is the total number of the employees on December 31, 2021

In 2021, the number of non-supervisor full-time employees was 7,357. The average salary of employees in 2021 was NT\$ 1.501 million, and the median salary was NT\$ 1.315 million. Compared with 2020, the number of non-supervisor full-time employees increased by 256, and employee salaries increased by 256. The average increased by NT\$ 415,000, and the median salary increased by NT\$ 343,000. The wages for outsourced services, such as kitchen and cleaning staff, was better than the minimum wage

### 2021 male/female salary ratio

<b>Managerial position</b>	Female	1
	Male	0.88
<b>Engineering position</b>	Female	1
	Male	1.22
<b>Direct labor</b>	Female	1
	Male	0.9

Note : Managerial position for this table refers to administration support staff, Engineering position refers to engineers, and direct labor refers to laborers on the production line

Retirement regulations are in place for all full-time employees, and pension is contributed in accordance with the law. In the old pension system, we contribute 2% of the employees' total monthly salary to the account in the name of the Supervisory Committee of Labor Retirement Reserve with the Bank of Taiwan according to the Labor Standards Act. If the estimated balance of the account is insufficient for the pension paid to the employees who are qualified to retire conditions in the following year before the end of the year, we will make up for the amount before the end of March of the following year. In the new pension system, we contribute 6% of the employees' monthly salary to the individual labor pension account established by the Bureau of Labor Insurance in accordance with the Labor Pension Act.

Item	Content	Employees who are a part of the retirement plans
<b>Retirement funds of the old system by Labor Standards Act</b>	Employer : based on the monthly salary, 2% is reserved for labor retirement funds.	100%
<b>Retirement funds of the new system of the retirement regulations</b>	Employer : 6% of the labor's monthly salary Labor : 0-6% of the monthly salary	100%



## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety

## Unpaid Parental Leaves

Our company has a clear unpaid maternity leave structure, for any employee who has over 6 months of tenure, they are allowed to apply for unpaid parental leave for every child who is younger than 3 years old. The rate of return and remaining on the job showed a stable state.

Year	Category	Male	Female	Total
2021	Number of people to be reinstated	6	31	37
	Actual number of reinstatements	3	23	26
	Reinstatement rate	50%	74%	70%
	Number of non-reinstatement	3	8	11
	Actual number of reinstatements in 2020	6	25	31
	Number of people who will remain in office for 1 year after reinstatement	1	20	21
	Retention rate	17%	80%	68%
	The number of people application for childcare leave without pay in 2021	5	34	39
	The number of people eligible for childcare leave without pay	485	253	738



Year	Category	Male	Female	Total
2020	Number of people to be reinstated	9	38	47
	Actual number of reinstatements	6	25	31
	Reinstatement rate	67%	66%	66%
	Number of non-reinstatement	3	13	16
	Actual number of reinstatements in 2020	3	24	27
	Number of people who will remain in office for 1 year after reinstatement	2	17	19
	Retention rate	67%	71%	70%
	The number of people application for childcare leave without pay in 2021	9	33	42
	The number of people eligible for childcare leave without pay	510	259	769
2019	Number of people to be reinstated	7	36	43
	Actual number of reinstatements	3	24	27
	Reinstatement rate	42.9%	66.7%	62.8%
	Number of non-reinstatement	4	12	16
	Actual number of reinstatements in 2020	7	22	29
	Number of people who will remain in office for 1 year after reinstatement	6	17	23
	Retention rate	85.7%	77.3%	79.3%
	The number of people application for childcare leave without pay in 2021	505	261	766

## Note:

Number of qualified employees: Males = Number of male employees under parental leave between January 1, 2019 and December 31, 2021, Female = Number of female employees under maternity leave between January 1, 2019 and December 31, 2021

## Formula:

Number of employees re-instated = Number of expected re-instated employees in the current year due to unpaid parental leave

Re-instatement rate = Actual number of reinstated employees / expected number of re-instated employees

Number of employees retained in 2021 = actual number of re-instated employees in 2020 and still in service as of December 31, 2021



## Happy Workplace

Talents are the most important assets of the Company. Happy employees make an enterprise efficient and effective. As such, PSMC strives to provide a happy workplace for its employees. With a generous, fun and healthy spirit, the Company enables employees to nurture their innovation and energy whilst having a balanced work life through diverse welfare facilities and well-planned activities. For basic welfare, in addition to the three-festival and birthday gifts and vouchers, the Company also gives subsidies and allowances of various amounts for marriage, childbirth, hospital admission and scholarships for children of employees.

To facilitate work-life balance, the Company has established a variety of clubs that provide a wide range of choices in courses, which encourages employees to expand their social circle, cultivate interests and improve their health while broadening their networking. To help employees alleviate their stress and improve their health, the Company frequently holds numerous all-inclusive activities for the employees such as watching stage plays, hosting cultural and art activities, Family Day and Christmas activities, providing care to the families of the employees and fostering a sense of belonging for PSMC.

## Basic Amenities For Employees

### Delicious Food

The Company has convenience stores, cafes and employee canteens which provide different types of food including buffets, fast food and noodles. Lunches, dinners and suppers are subsidized by the Company. Employees can enjoy good food for a small fee.



### Accommodation

To help technicians who live afar, the Company offers comfortable dormitories with water, electricity and AC.



### Free Transportation

For employees who live nearby, such as Hsinchu, Zhudong, Zhubei, Hukou, Tofen and Miaoli, the Company offers free transportation.





## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety

## Recreational Facilities and Services

Engaging in sports is good for one's mental and physical health. PSMC cares about the work-life balance of its employees. The ninth floor of the P1/2 fab has a multi-purpose sports hall which includes a basketball court, tennis court, volleyball court, pool tables and table tennis tables; the fifth floor has a gymnasium, dance room and karaoke lounge and media room; at different fabs (P3、8A、8B), there are gyms, dance rooms and other facilities as well. These facilities are provided to encourage employees to cultivate a sporting habit. During lunch breaks or after work, many employees have been making use of these facilities.



▲ Gymnasium



▲ Sports hall

## Social Activities and Departmental Competitions

Powerchip Semiconductor Manufacturing Corp. encourages employees to start their own clubs and host events. Employees can also develop their hobbies while networking outside of their professional careers. The company has observed the trend of joining and the willingness of joining growing gradually. There are currently 16 clubs for badminton, table tennis, tennis, volleyball, pool, basketball, bowling, softball, rhythmic dance, movies, cycling, jogging, mental health, agriculture, languages, and music. The company encourages employees to expand their social networks and have hobbies in their lives. The welfare committee subsidizes expenses for the club's operation, additional grants are also in place when a club wins in competitions where they are representing the company.

Many clubs have routine and diverse club activities. The company hopes to gain employee identification and strengthen teamwork, so there are competitions hosted by ball clubs every year. Due to the pandemic in 2021, there was only the tournament hosted by softball club as a professional ball game. 360 players among 18 teams joined, and the championship was canceled due to the pandemic. Thus, NT\$4,000 of cash prizes were given to the top 6 teams. Other than the internal competitions, the company's clubs also gained honors in external events. In 2021, the clubs won third place in Hsinchu Mayor Softball Cup, and second and third place in the Hsinchu Science Park



▲ Softball game



▲ Tennis match



## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety

## Cultural and Art Appreciation

PSMC organizes a wide variety of cultural and art appreciation activities each year, including parent-child theaters and talks given by celebrities. However, due to COVID-19, we did not hold private theater activities with more than 1,000 people, but continued to hold art and cultural lectures in the Company last year. In 2021, the company held a celebrity lecture, "How to enhance our immune system", given by Ms. Duntzu Tan. There were 108 attendees. It let employees enhance their immune system to fight against viruses, work happily, and live healthy during the time of the pandemic.

Powerchip Semiconductor Manufacturing Corp. held its first painting exhibition from March to April in 2021, 10 employees' artworks were exhibited to showcase their passions and the pursuit of artistic works. Other than paintings from the employees, we were very honored to be able to invite the Chinese painting master Chaohsiung Huang who is known for mountains and forest impressions to exhibit his new techniques with mixed media. Chaohsiung Huang is celebrated for his dreamy impressions of mountains and forests, his artworks are collected by many celebrities. This exhibition opened a new window for employees to see into the world of arts which had fantastic reviews.



▲ "How to enhance immune system" lecture



▲ Painting exhibition feature Chinese painting master and employees

## Christmas Thanksgiving Activity

Christmas is a festival of gratitude, in the Christmas Events 2021, each employee received a small present of NT\$500 worth of FamilyMart gift card. It was delivered to 7,393 employees, giving them a feeling of Christmas happiness.



## Festival Welfare

During important festivals, to show appreciation for the hard work of the employees, for May 1st Labor Day gifts, employees were given eight options to pick from. For the Dragon Boat Festival, the supply of zongzi rice dumplings was disrupted due to the pandemic; the Company chose a NT\$200 gift card from the convenience store instead. The celebration of the Mid-Autumn Festival was for employees to pick one moon cake from three options, and one public welfare gift from two options. Finally, on the winter solstice and the lantern festival, yuanxiao sweet buns were given to employees for the holiday.



▲ Labor Day



▲ Mid-Autumn Festival



## 4.3 Competency Development

We believe that talents are crucial to maintaining enduring and competitive advantages for a company. Therefore, we are dedicated to creating a healthy learning environment to provide comprehensive education and training courses. We developed systemic training programs to enhance the knowledge and skills needed for the workplace, as well as a positive work attitude in order to increase the performances of employees and operation efficiency of the Company, enabling the employees to grow with the Company.



### Structure of Educational Training

The structures of educational training include "New Employee Orientation Training", "Functional Training" and "Knowledge Inspiration". These are comprehensive and systemic training courses needed for employees to plan their career development. We build a learning map for our employees to further extend their lifelong experiences as well as self-development.



### Career Development Training

Based on the difference in background from education and experiences, job types and professional abilities, different further training courses are co-planned between managers and our colleagues, providing colleagues with the most up-to-date and suitable training assistance plans.

Category	Course content
Professional	Provides two types of professional courses: operation technology and administrative management to improve the professional skills of our employees.
Management	Provides phased management skills to supervisors/successors of different levels, working their way up to being great managers.
General	Provides diverse, conceptual courses (such as time management, personal interaction) to nurture potentials.



## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety

## Diverse Learning Channels

By utilizing training resources inside and outside the Company to plan exclusive training WebPages, we provide our colleagues access to the latest information to learn quickly via diverse learning channels.

After hiring new employees, the Company quickly conducts training courses regarding human rights such as employee rights, environmental safety, information security and Labor Standards Act. In the process of talent development and nurture, we explore organizational and personnel needs persistently. Gender discrimination is not tolerated. The Company consistently makes reviews and gradually develops various training courses to improve the knowledge and skills that the employees need for their career development.

The annual training completion rate for 2021 (E-learning system included) was 96.4%, the satisfaction score for in-person lectures was 96%; the expenses for the training programs were NT\$3,079,473. Due to the pandemic's impact, almost all training was suspended during the first half. Powerchip Semiconductor Manufacturing Corp. initiated work from home from May to September, access to the company's E-learning system was temporarily closed due to security considerations during the work from home period. As the result, the average training hours were lower than in 2020. To respond to the difficulty of conducting training under the influence of the pandemic, Powerchip Semiconductor Manufacturing Corp gradually started using the in-house communication software, Pteam, to deliver online classes and the results were exceptional. In the future, the company will assess the class and requirements to deliver training through online streaming.



Year		2019			2020			2021		
Item /Gender		Total	Total training hours	Average training hours	Total	Total training hours	Average training hours	Total	Total training hours	Average training hours
Management	Male	681	20,831.2	30.6	706	19,076	27.0	752	14,444	19.2
	Female	113	2,330	20.6	112	2,453	21.9	116	1970	17.0
Full-time	Male	3,432	166,737.6	48.6	3,649	153,459	42.1	3,790	147,086	38.8
	Female	2,652	61,246	23.1	2,707	62,894	23.2	2,790	61,920	22.2

Note : 1. Managers refer to personnel above section managers.

2. The total hours of training courses include E-Learning. Computation formula: Average training hours = Total hours of training/total persons.



## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

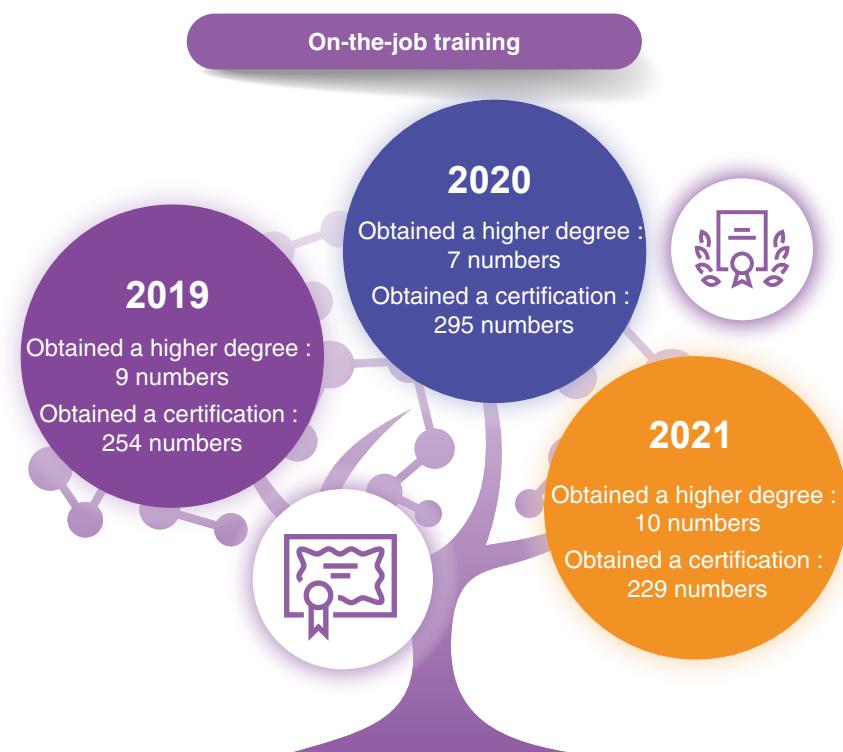
## 4.4 Occupational Health and Safety

In order for employees to comply with ethical standards when conducting business and for our stakeholders understand the Company's ethical standards, PSMC has specially formulated the "Professional Rules" and "Code for Business Gifts and Hospitality". We explain the integrity principles to the new recruits when we carry out the training before they start work with us. They should faithfully execute all Company business and are forbidden to have any improper engagement with other manufacturers. Emails and the Company's website are used to promote anti-corruption and integrity business. These rules are what help the Company fulfill social responsibilities and operate with integrity.

In 2021, the company stipulated and announced "Report, Dispute, and Suggestion and Employee Feedback Management Procedures", and "Whistleblower Protection and Anti-Retaliation Management Procedures". Also, trainings were given to the entire employee body focusing on "Critical information, Prevent insider trading, Corporate social responsibility, and Ethical business", and "Powerchip Semiconductor Manufacturing Corp. social responsibility and Business ethics", aiming to strengthen employees' awareness of business ethics and social responsibility.

To enable the employees to understand that physical and mental health is the key to a happy life, in addition to providing the relevant information from time to time on counseling, emotion and stress management, improvement of communication to strengthen the employees' awareness on mental health. The Company has established employee care and counseling mechanism. When employees encounter psychological, social and communication, or response management issues, they can seek out their supervisors and the Employee Relations Department for assistance or a referral service for counseling. Each year, every PSMC employee is entitled to five free counseling sessions.

The company subsidizes expenses in full for employees who need to obtain required certifications. For employees who wish to obtain a higher degree, they may apply for it according to "On-the-job Training Management Measures". The higher degrees obtained were mostly master's degrees, the certifications were mostly for radiation safety training, operating a forklift with over 1 ton of weight limit, and emergency cares. The numbers of employees whom our company assisted in obtaining higher degrees or certifications are listed in the following table.



In 2021, other than lecturing about the human rights related policies for new employees, there were also six human rights protection related workshops such as "Corporate Social Responsibility and Business Ethics", and "Labor Regulations", etc. totaling 7.4 hours. 16,162 attendees completed the training, 100% of our employees received human rights policy related training. We will continue to focus on human rights protection issues and facilitate more related educational training and promotion, to raise the overall human rights awareness.



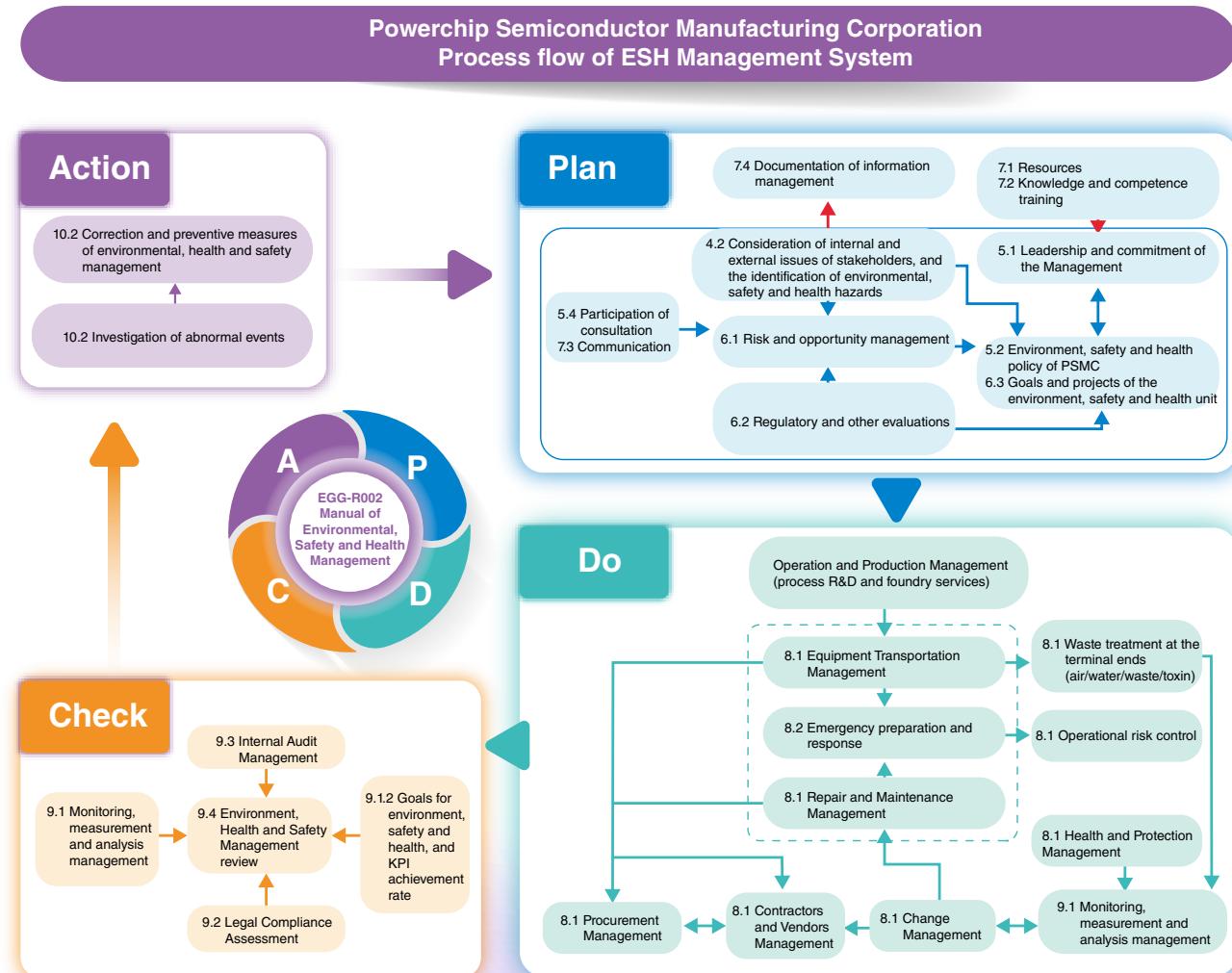
## 4.4 Occupational Health and Safety

### Environmental Safety Operation and Management

Since 1998, PSMC has managed to complete the certification of ISO 14001 and ISO45001. Further, since 2003, the management system has been integrated into one internal ESH Management System to promote the environmental management and other relevant management activities for occupational safety and health, hence consistently enhancing and aligning PSMC's occupational safety and health level with the international standards. In 2020, our company completed the system upgrade for the environmental safety and hygiene management system and the renewal of the certificate every three years.

The operations of the ESH Management System of PSMC is run in accordance with the environmental, health and safety policy released by the Vice President. The environmental, health and safety unit is responsible for the planning and execution of the activities, enabling the Company to live up to the motto "Safety and hygiene are not extras but are an important part of everyone's work." Every year, the President establishes the measures for tackling the environmental, health and safety issues for the year, and each department will, according to their risk and opportunity assessment results, prepare for their concrete and practicable working targets.

Powerchip Semiconductor Manufacturing Corp.'s environmental safety and hygiene management organization and the company's administration team are tied closely. Under the leadership of the president, the safety, hygiene, and environmental protection committee is consisted of members according to the regulation, it is the highest unit in power in the environmental safety and hygiene management system. The environmental safety and hygiene audit team consists of environmental safety and hygiene staff from each foundry, they conduct internal audits on the performance of the system operation; they also conduct quarterly reviews to check the execution completion rate of the environmental safety and hygiene goals.





## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety

The company encourages each foundry to participate in the occupational safety and hygiene excellence award held by the government authority in the organization and personal categories. It is a great opportunity to assess our performances on each safety and hygiene operation through participating in the selected events – it helps us achieve continuous improvements toward the safety and hygiene management goals. Under the guidance and supervision from the government authority, we received recognition from the Hsinchu Science Park Administration for two consecutive years: the Safety and Hygiene Excellence Award in 2020, the Safety and Hygiene Outstanding Award, and Outstanding Employees Award in 2021.



▲ Hsinchu Science Park Occupation Safety and Hygiene Excellence Award – Organization Category



▲ Hsinchu Science Park Occupation Safety and Hygiene Outstanding Award – Organization Category

The Department of Risk Management is set up to lead the implementation of the Company's safety, health, and environmental protection business. Its organization and operations are as follows :



## Risk management

- Headquarters Safety, Health and Environmental Protection Committee



## Plants (P1/2, P3, 8A(8AD), 8B)

- Risk, Safety and Environment (RSE) Department
- Plant Safety, Health and Environmental Protection Committee

PSMC has established Safety, Health and Environmental Protection Committees at the headquarters and at the fab levels. Regular meetings are held to discuss matters regarding safety, health and the environmental protection. Also, labor representatives are elected in accordance with the law, allowing the employees to get to know the health, safety and environmental operational model and serve as a formal communication channel. The proportion of labor representatives to the Company's Safety, Health and Environmental Protection Committee at each plant is as follows :

Plants	Headquarters	P1/2plant	P3plant	8Aplant	8Bplant
Number of labor representatives	27	10	7	13	9
Total number of people in the Committee	71	28	20	28	19
Proportion <sup>(Note)</sup>	38%	35%	35%	46%	47%

Note : The statistics above is calculated until 2022/02/18. The calculation formula is: Number of labor representatives/  
Total number of people in the Committee\*100%.



## Environmental Safety Risk and Improvement Measures

For various business operations, customer service and products, PSMC takes the environmental, occupational injury and health factors into consideration. PSMC gathers a wide variety of issues that internal and external stakeholders are concerned with; identifies the environmental, health and safety risks and opportunities to prepare for the corresponding measures; and establishes the environmental, health and safety policies and goals for the employees to comply with.

Employees who are exposed to significant environmental, health and safety risks are required to obtain the qualification and experience and complete the training so that they are equipped to identify the hazards and avoid severe immediate danger before assuming their positions. If there are any concerns of immediate danger during the execution of duties, the operation must be stopped and personnel must retreat to a safe place without jeopardizing the safety of other workers. Affected staff must report to their direct supervisor at once. In addition to providing a safe, healthy working environment, in accordance with "Administrative Measures of the Prevention of Unlawful Conducts when Performing Duties," PSMC regularly tries to identify internal or external bullying behavior, as we vow to end workplace violence or bullying and mold a conducive work environment for all.

In accordance with "Operating Procedures for HSE Risk Evaluations," "Procedures for Environment, Safety and Health, and Fire Regulations Collection and Identification Management," "Operational Instructions for the Investigation of Abnormal Incidents," "Procedures for Internal Audit on Environment, Safety and Health," "Procedures for Consultation and Communication of Environmental, Health and Safety Management" and "Procedures for Environmental, Safety and Health Management Review," PSMC identifies the risks and opportunities in environment, safety and health.

In accordance with "Operating Procedures for HSE Risk Evaluations", PSMC conforms to the regulations of ISO 14001:2015, and takes into consideration the product life cycle. PSMC firstly identifies activities that are controllable or can be influenced, environmental factors of products and services, and then subsequently conducts environmental risk assessment. In the occupational safety and health aspect, the Company adopts the regulations of ISO 45001:2018. In addition to the general safety, chemical, physical, biological and human factors, hazards that threaten the externality of the Company, workload, working hours, violence, harassment and bullying are also in the purview of our identification.

The results of the environmental, health and safety risk assessment are categorized into four risk levels. If after risk mitigation, the risk level falls to Grade A and B (risks and opportunities arising from the overall consideration of the environment, and risks not acceptable), the authority department should consider processes involving canceling/ replacing/controlling by engineering measures/management by scheduling or providing personal protection equipment to eradicate risks and reduce occupational

health and safety risk. After assessing the improvement measures, the Company will make use of the establishment of environmental, health and safety goals/planning at the departmental level and track the improvements made. At the environmental health and safety meetings, the establishment of improvement measures and execution progress will be reviewed and assessed. There were 7 incidents with unacceptable risks in 2021 that required improvements, one case was closed in the same year and the rest remained on the follow-up list. The company will continue to assess each unit's operation risks and manage them according to the respective risk levels; we will inspect the control procedures to prevent, and diminish danger and risks in order to provide a safe work environment for our workers.

For other controlled risks at Grade C and D, the departments involved should establish their own operating procedures (including protective measures, emergency response procedures, review initiation, relevant education training that is automatically checked for and completed, and documentation of management records) and impose supervision and control consistently to avoid high risk level hazards from taking place. Grade 4 risks, with a high probability (F) and severity (S), will be a prioritized supervision item for the departments involved.

### Post-control risk control model

Grades A and B

- Risks and opportunities arising from the overall consideration of the environment, and risks not acceptable.
- In accordance with the establishment of environmental, health and safety goals/planning at the departmental level, and track the improvements made.
- At the environmental health and safety meetings, the establishment of improvement measures and execution progress will be reviewed and assessed.

- Imposing supervision and control consistently in accordance with the operating procedures established by departments involved.
- Operating procedures: Automatically review and complete the managing of records of training and documentation on protective measures and emergency response procedures.

Grades C and D





## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety

When adding new, on-site chemicals, in construction, changing layout, or adding production/supporting equipment that are deemed by Operating Instructions for Management in Charge of Environment, Safety and Health as projects with high environmental, health and safety risk, the assessment procedures for the environmental, health and safety risk impact will be initiated to re-identify the hazards and risks involved. Further, in the process of reviewing organizational background, pertaining to the internal and external issues, such as the management systems, compliance obligation, risk management procedures, external communication, operational environment and resources of offices, health management, business operations and operational control, we will also evaluate the risks and opportunities that PSMC is exposed to, and develop the corresponding strategies and actions.

When an incident involving pollution, occupational and health disaster/hazard occurs, in accordance with "Operating Instructions for Investigation of Abnormal Incidents," accident investigators will find out the causes of the accident with the stakeholders, analyze the fundamental reasons of the accident and make recommendations on improvement measures. In 2021, one abnormal incident occurred when filling chemicals; the company had completed the incident investigation and cause analysis, and the correction items and procedures were made. At the same time, parallel investigations were conducted in other foundries to ensure the current operations met the standards. This case was closed in the same year. The company will continue to improve on situations of failing to meet the standards that had or may happen to mitigate the impact on environmental safety and hygiene. By conducting parallel investigations and corrections on prevention measures in all foundries, it enhances the company's operation safety and environment safety, and hygiene management performances.



Powerchip Semiconductor Manufacturing Corp.'s strategies for environmental safety and hygiene policy/management system/goals are done based on the process of going through the assessment of the company's risks and opportunities at each departmental and company level. The risks and opportunities assessment (analysis method explained through the SWOT analysis) are on four aspects – strength, weakness, opportunity, and threat. The analysis of actual impact factors produces respective risks and opportunities, the results were discussed among the departments' environmental safety and hygiene representatives before being submitted to the management and review committee for the president's final

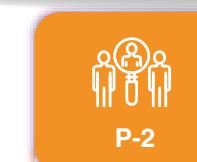
approval. It determined the current year's annual environmental safety and hygiene strategy/goal and the lighting indications for each respective foundry's operation.

For the risks and opportunities assessment at the company level, it was done through the screening process and the results of corporate social responsibility's major topics (i.e., regulatory impact, stakeholder requirements and expectations). Each foundry/department would conduct a SWOT analysis for the deliverable to assess related environmental safety and hygiene topics to identify the "risks" for setting environmental safety and hygiene goals and the "opportunities" for improving the management system's performances. The analysis results were presented in the management and review meetings, and the environmental safety and hygiene topics as well as the goals were discussed during the meetings.

For the risk and opportunity assessment at the departmental level, each responsible unit creates a table to summarize activities during the manufacturing processes (procedures and SWOT analysis included). They also need to review and update the risk assessment table to assess their departments' risks and opportunities such as major abnormal incidents, unacceptable risks, topics that stakeholders focus on, over 1 injury per day at the workplace, major failures in meeting standards, and regulatory impact assessments. The analysis results from the risk and opportunity assessment at the departmental level are linked to the department's goals. The risk assessment table shows their respective improvement process and damage assessment to help the departments clarify how to strengthen their advantages, diminish weaknesses, and utilize opportunities on hand to eliminate potential threats to finalize the direction for improvement; to further define risks and opportunity topics and create improvement strategies and plans to meet the spirit of continuously improving the management system.

**Powerchip Semiconductor Manufacturing Corp.'s Environment Safety and Hygiene Policy/ Continuous discussions on drafting mid and longterm goals and strategies**

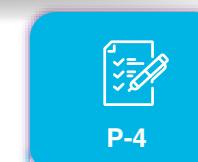
Innovating Sustainable Environmental Development, Fulfilling Corporate Social Responsibility



Strengthen the performance of safety and hygiene management



Strengthen the emergency response capability for environment safety



Decrease the operation loss caused by internal abnormal incidents



## Management Mechanism on Contractors

The five plants under PSMC are three 8-inch plants (8A/8B/8AD) and two 12-inch plants (P1/2&P3). They all adopt the access control measure of "one contractor certificate, one permit" to control the access of such personnel at our plants. After passing the test of our courses for contractors, each contractor will have an exclusive work permit and access control magnetic card, along with the contractor's work permit approved by the responsible unit of PSMC. They can only swipe the card to enter the plant area and their applicable operating area. With the dual control of the work permit and the access control magnetic card, we can control plant activities more effectively. To count the number of people in response to the labor requirement for the changes in the production capacity adjustments and operation expansions, moving equipment and production machinery when new equipment comes, operation support, or electrical system and automation system upgrades, routine maintenance, and general affairs. The total count on the numbers of people entering and exiting each foundry was 309,443.

PSMC provides statistical analysis data to the supervisors in charge of various business activities every month, and they formulate measures to strengthen management based on the results, and guide the contractors to have better self-management. We conduct quarterly reviews at the meeting of the Safety, Health and Environmental Protection Committee. Contractors' violation records during operations in the plant are listed as an important basis and indicator for contractors' evaluation. We review procurement and contractor-related management regulations regularly, and have integrated contractors and the access control system to improve operational safety management while confirming hazard alerts before operation and implementing audits of high-risk operations. The contractor violation count and rate in 2021 were lower than in the previous two years, indicating a decreasing trend. It ensured the "safety operation" for every contractor who entered the premise of the foundry.

### Management Information on Contractors

Item/Year	2019	2020	2021
Number of people entering and exiting	253,188	257,868	272,365
Violation count	1,116	827	687
Violation rate (violation count / number of people entering and exiting)	0.44%	0.32%	0.25%

PSMC has always paid close attention to occupational safety and health, and environmental protection. To conform to governmental regulations, ensure the safety and health of workers, and reduce the impact on the environment and energy conservation, the Company not only has established a comprehensive safety and health system and environmental protection organization, along with designated personnel, but also has a comprehensive system and regulatory requirements in place.

To implement the compliance and collaboration of contractor management, for example, yearly assessment of contractors in the collaborative meetings, confirmation of contractors' qualification by the undertaking department before commencement of projects, fulfillment of qualification requirements, sufficient routine response training and training system are conducted. Further, according to the nature and content of the contracting work, contractors are required to coordinate with the undertaking departments to conduct drills, so that the contractors are equipped with the capabilities in responding to various situations and evacuations.

The Company regularly reports on the operating status at the Safety, Health and Environmental Protection Committee meetings and the quarterly collaborative meetings, so that different undertaking departments are clear about the safety behavior condition of the contractors. 88 equipment contractors received assessments in 2021, 75. 20% of them received a score higher than 80, and only 8% of them received a score lower than 70. 14 foundry affair contractors received assessments, all scored over 83. 42.9% of them received a score higher than 90, 57.1% of them received a score of 80–89. The company will continue to review the assessment system based on the operation details and the violation types to influence the contractors to deeply root the ideas of operation safety and continue to raise the awareness of self-management.

Meanwhile, to ensure various suppliers, contract manufacturers and contractors fully comprehend the operating regulations and the execution requirements for the environmental, safety and health aspect, the Risk, Safety and Environmental Protection Department will, in accordance with the content of the Environmental, Safety and Health Assessment List and matters regarding the environmental, safety and health audit on vendors, request the contractors to make clarifications on issues that have arisen. The department will check on the improvement measures provided by the contractors in the following audit.

### Audit Information on Contractors (Suppliers, Components, New Suppliers) Over the Years

Type	2019	2020	2021
Suppliers/New suppliers	2	23	19
Components	8	5	3

Via the contractor management system, the Company has established a uniform contractor assessment. Once the yearly transaction volume and amount of the procurement department reach a certain level, a standard supervision is then warranted. The Risk, Safety and Environmental Protection Department will regularly conduct a fair, transparent and objective evaluation on contractors in charge of plant affair projects, equipment repair and cleaning. Contractors of various areas with outstanding performance will be selected; the quality of the contractors' service fulfills the requirements of the undertaking department and the regulations in environmental, safety and health aspects are ensured. The results of the assessment will also serve as a reference for future contracts. 34 assessments were conducted and completed in 2021.



## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety

## Full Promotion of Occupational Safety

PSMC has established the "Manual on ESH Management" to govern the local activities of the fabs, products and services, and the internal and external environmental, safety and health issues of the fabs. Stakeholders include all employees, customers, contractors, suppliers, contract manufacturers, the competent authority of the environment, safety and health and NGOs.

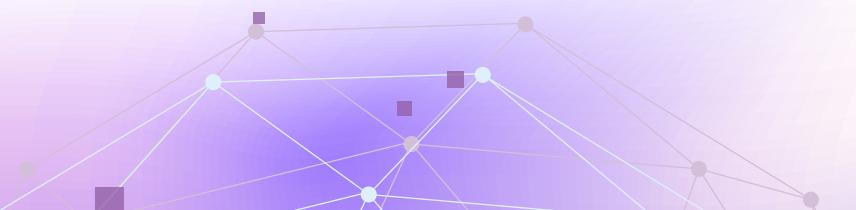
The President leads and is committed to various environmental, safety and health operations to ensure the ESH Management System can achieve its expected performance. Supervisors at different levels provide sufficient resources and support, encourage their departments to actively participate, offer improvement measures and training, and take part in discussions. Their initiation is pro-active, prompt, and increases a high level of alertness toward personal well-being, the environment, the machinery, products and construction; thus strengthening the attention to the overall environmental, safety and health aspect for themselves, their colleagues, vendors and visitors.

According to "Procedures for Environmental, Safety and Health Management Review" and "Operating Instructions for Investigation of Abnormal Incidents," the designated management and stakeholders are required to review the compliance of the EHS Management System on a quarterly basis and establish the operating procedures for investigations of abnormal incidents (e.g., occupational hazards (including road traffic accidents), abnormal accidents, hazard identification, safety patrol, on-site audit, etc.), to find out the actual causes of the incidents, make corrections and provide preventive strategy for future occurrences.

Our company stipulated the "Contractor Safety, Hygiene, and Environment Protection Regulations" for our contractors' management to ensure our contractors know the rules about safety and hygiene operations and their management responsibility as well as fully comply with each of the operation regulations, prevent occupational hazards from happening, and protect worker's safety and health prior to entering the foundry premise.

Worker types	Employees	Contractors with a qualification pass
Worker numbers	7,448	14,329

Note: Table reflects statistics as of December 31, 2021



## Special Health Examination、Prevention of Occupational Diseases

In accordance with the relevant occupational safety and health regulations, employees who engage in special operations including noise operation, ionizing radiation, chromatization treatment, and employees who are exposed to dimethyl formamide, arsenic and indium compounds are subjected to special medical examinations every year. Medical professionals and specialists will be arranged on a regular basis to go to the sites and collaborate with supervisors, employees, nurses and safety and health personnel to assess the relevance between the work on-site and health of the employees engaging in special operations; they are required to undertake preventive measures or make assessments regarding the competence of the employees depending on circumstances. In 2021, a total of 530 people participated in the special health examination, and 11 people needed consultation with occupational physicians based on the results. There were no cases of occupational diseases. A total of 234 people participated in health seminars. According to the results, no occurrence of occupational diseases for the year. Via medical examination follow-ups, care for individual health, environmental monitoring and other mechanisms, the Company can effectively prevent occupational diseases.

## Work Environment Monitoring

To gain perspective on the actual working environment of employees and assess the exposure to hazard factors, both of which serve as the basis for working environment improvement measures, in accordance with regulations, PSMC appoints a qualified operating environment monitoring institution to survey the fabs every six months. Over the years, the test results of chemical detection in the work environment obtained by monitoring personnel are lower than the national and international permitted level of exposure. Further, pertaining to the operation type, regular monitoring is also conducted on the laser machinery and central ventilation system. The results show both are compliant with the regulations.

### Monitored Items and Results of External Institution in 2021

Monitoring item	Passing rate for the first half	Passing rate for the second half	Remarks and description
Chemical factor	100%	100%	
Physical factor	100%	100%	Wearing earplugs and earmuffs at areas with high-frequency noise
Ventilation air	100%	100%	
Examination of laser machinery	100%		



## Protective Equipment Use

To ensure the safety and health of employees and reduce their exposure to hazard factors during hazardous operations. Continue to conduct suitability assessments on protection equipment and update PPE training materials to prevent the worker injury rate from increasing due to unsuitable PPE or PPE misuse. We have also formulated examples of suggested use of personal protective equipment for all types of operations, so that employees can follow them to avoid occupational injuries during operations.

### Example of Suggested Use of Personal Protection Equipment for All Types of Operations

Serial Number	Types of Operations	Applicable Group	Protection Area	Injury Prevention	Basic Protective Equipment
1	Operators who work in the pump area/ air return area/ construction area	Equipment and Facility	Head	Collision	Safety helmet
			Foot	Crush/Collision	Safety footwear
2	Those who are at risk of inhaling or exposed to highly hazardous toxic, corrosive or irritating gases	Equipment, plant affairs, and labs	Eyes	Eye irritation/ corrosion	<ul style="list-style-type: none"> <li>Full face protection mask and half-face canister breathing apparatus</li> <li>Full-face canister breathing apparatus</li> <li>Full breathing apparatus and Air-Line</li> <li>Self-contained breathing apparatus (SCBA)</li> </ul>
			Breathing	Irritation/ corrosion/ poisoning	
			Torso/Foot	Skin corrosion/ irritation and absorption poisoning	<ul style="list-style-type: none"> <li>Class C chemical protective clothing and safety footwear with footwear covers</li> </ul>
3	Operators who work in high noise areas (higher than 85dBA)	Equipment and plant affairs	Hearing	Hearing loss due to long-term exposure	Earplugs, ear-muffs
4	Exposure to high-temperature parts/ ovens	Equipment and plant affairs	Hand	Burns	Aluminum platinum heat resistant gloves (400° C)
5	Operations at a height of more than 2 meters above the ground	Equipment, plant affairs, and automation	Torso	Falling	Safety harnesses



▲ Personal Protective Equipment Type



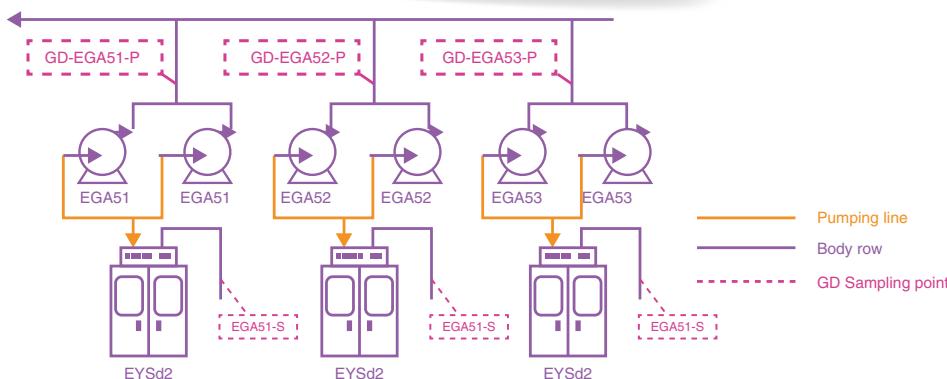
▲ Types of personal protection equipment and how to wear them



## Gas Detectors

Gas detectors are widely installed in high-tech foundries. Its main function is to detect gas concentration within a short period of time and prevent chemical hazards. To comply with the relevant regulations, the Company has installed a gas detector system in the chemical storage area, equipment supply and manufacturing equipment areas to prevent chemical hazards.

**Diagram: equipment pump/scrubber GD**



## Infrared (IR) Inspection

Each foundry conducts IR inspection operation on power supply equipment and connections at least once per year. If any anomaly is detected then it requires immediate correction and follow-up actions.

Foundry	Number of Inspections	Status Explanations
12"	9,487	Malfunctions on 6 switchboard's fans and 5 equipment anomalies; temperatures returned to normal after maintenance or replacement.
8"	6,219	Inspection result: No anomaly.

## Environmental, Safety and Health Training

In accordance with "Instructions on Environmental, Safety and Health Training" and "SOP for Employee Education and Training," PSMC imparts the relevant knowledge and skill on the ESH Management System to employees. The goal of the environmental, safety and health training is to effectively enhance their professionalism and capability in crisis response.

The environmental, safety and health training can be divided into three categories, namely ESH Management System, regulations and certifications, and operational control. 94 education training were conducted by our company in 2021, and the number of attendees exceeded 13,900. We actively encouraged participation in improvement proposals and reporting events to discover the risks and opportunities for the foundries to improve through company-wide engagement and inspections. 973 people are serving in environmental safety and hygiene positions, and they are all qualified with the necessary certifications.

When an emergency occurs, to familiarize the Emergency Response Team (ERT) with the emergency equipment so that they can correctly and effectively use it and avoid injury during the rescue operation, the ERT regularly receives training on how to wear protective equipment and use the emergency equipment. The training includes orientation training for new recruits and training for ERT. After completing the first-aid certification and professional training at a fire station, the ERT members will receive certification stickers. The certification is promoted to various departments so that they are able to recognize the conception and role of ERT. As of the end of 2021, our company had 852 qualified staff with ERT (emergency response team) certification.

Team	Color of sticker	Name of trainingcourse	Content of training course
Rescue team		ERT certificate-basic level	<b>Basic protective equipment</b> <ul style="list-style-type: none"> <li>• SCBA</li> <li>• Firefighting suit</li> <li>• Level A suit</li> <li>• Level C suit</li> </ul>
		Hsinchu City Fire Training Facility training	<ul style="list-style-type: none"> <li>• Turbo nozzle operation training</li> <li>• Hose deployment and use training</li> <li>• Air breathing apparatus training room</li> <li>• Tunnel/darkroom search training</li> <li>• Fire training room</li> </ul>

▲ ERT certification stickers



## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety

Each department must conduct a suitability assessment on personnel who may affect environmental safety and hygiene performances and with compliance responsibilities; required educational training will also be planned and a "Department Environment Safety and Hygiene Education Training Plan" will be drafted. There were 152 education train plans completed in 2021 and were all included in each department's quarterly goal to ensure the completion rate would be at 100%. A computerized environmental safety and hygiene education training plan system was utilized to update each department's environmental safety and hygiene education training achievements and for searching, which made the management and review of the environmental safety and hygiene training more effective. In addition, to ensure the contractor's professional competency, their knowledge meeting regulation standards, and having comprehensive education training to protect worker's safety, their performance capabilities are required to be evaluated before entering the premise of the foundry. In 2021, a total of 732 contractors were evaluated on different occasions. By building a system to evaluate capabilities, it will ensure workers to have the sense to recognize danger and diminish occupational hazards.

For our company to be able to proceed with correct and effective response procedures when emergencies occur, we specifically stipulated the "Foundry Disaster Emergency Response Measures" to mitigate and minimize the impact of the accidents on casualties, property damage, and the environment.



▲ P1/2 Difluorine canister leak response drill



▲ P3 Firefighting on pure water system response drill



▲ 8A Night time clean room evacuation drill



▲ 8B Chemical tank truck leakage response drill

The operational sites in the park are adjacent to each other. In the event of an emergency, it may affect the companies nearby. Therefore, in addition to the 24-hour operation of the security system and monitoring in the plants, we need to strengthen our emergency response capabilities. We participated in the Hsinchu City Hazardous Chemical Disaster Joint Defense Organization and the Hsinchu Science Park Joint Defense Organization. When a disaster occurs, we can launch a joint defense mechanism as soon as possible to assist the companies nearby. In addition to providing adequate emergency response equipment, we are also able to provide some equipment to support disaster rescue efforts outside the Company.

Our regular training aims to improve our personnel's response ability and to improve the efficiency of notification and support so they will become familiar with disaster response skills and improve such skills to avoid the expansion of disasters. Therefore, in addition to regular drills regarding notification for support between plants, the Administration and the Environmental Protection Bureau hold large disaster emergency response drills to allow the joint defense teams to train.





## Occupational Diseases

The Company provides an excellent and safe working environment and mechanical equipment in accordance with the relevant laws, and heads toward achieving the "zero industrial injury" target. Protection of employee safety and health is the goal that the Company strives to achieve.

The Frequency-Severity Indicators of the past three years are shown in Tables 1 and 2. If there was an occupational hazard incident, then one should follow the incident investigation feedback management system (incident unit/labor representative/occupation safety personnel) to lock down the source and make corrections in parallel to prevent the same accident from happening. The clocked work-hour total for Powerchip Semiconductor Manufacturing Corp. in 2021 was 15,745,948 hours; a total of 4 incidents were occupational hazards causing time loss (traffic accidents were not included). Most were physical injuries (4 cases with a total of 184 work hours lost). To analyze the cause of these incidents, the SOP was reviewed and corrected for cleaning room operation to prevent falling from tripping on construction materials and injury from valve maintenance. Additional preventive measures and education on hazards were made based on staff being cut by washing cups and falling on a staircase to prevent similar accidents from happening again. In 2021, the Industry Total Injury Index of PSMC amounted to 0.01, which was far lower than the semiconductor industry average of 0.11. The fatality rate of non-employee, severity rate and injury rate were zero.

**Table 1: Industry Total Injury Index (Excluding Traffic Accidents)**

Year	2019	2020	2021
Total working hours	14,400,368	15,139,768	15,745,948
Disabling Injury Frequency Rate(FR)	0.13	0.06	0.25
Disabling Severity Rate (SR)	1	0	1
Industry Total Injury Index (FSI)	0.01	0.00	0.01
Industry-wide Industry Total Injury Index	0.09	0.07	0.11

Note : Calculated based on the occupational injury statistics format of the Occupational Safety and Health Administration, Ministry of Labor

**Table 2: Analysis of Work-Related Injuries of PSMC (Excluding Traffic Accidents to and from Work)**

Type	Item	2019	2020	2021
Total working hours	Total working hours	14,400,368	15,139,768	15,745,948
Total fatalities due to occupational hazards	Total number of fatalities	0	0	0
Fatality rate of occupational injury		0	0	0
Number of severe occupational injuries (excluding fatalities)	Total number of severe occupational injuries	0	0	0
Severity injury rate		0	0	0
Documentable occupational injuries (including number of fatalities and severe injuries)	Total number of occupational injuries	2	1	4
Description of injury type (e.g., fracture, laceration, contusion, etc.)	Description of each occupational injury type	Two injury cases due to falling	One injury case due to falling	Two injury cases due to falling, One case due to pinching, One case due to cutting
Normal injury rate	Disability injury frequency (FR)	0.13	0.06	0.25

Note: 1. Severe occupational injury refers to loss of working hours of over six months.

2. The aforementioned data do not include traffic accidents.

3. Disability injury frequency (FR)=(Number of occupational injuries/Total working hours) \*1,000,000

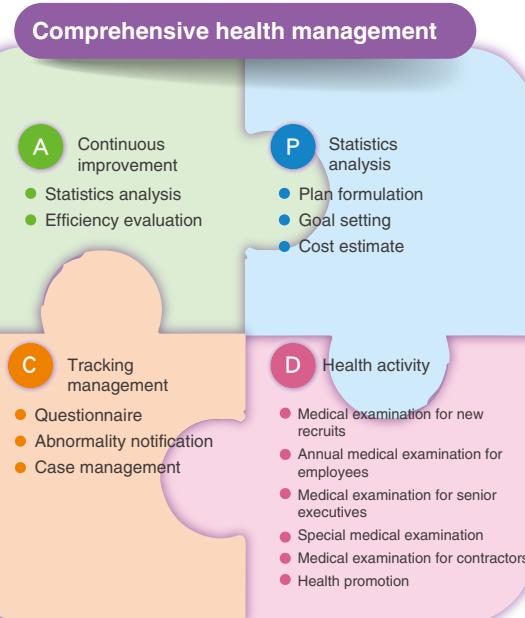
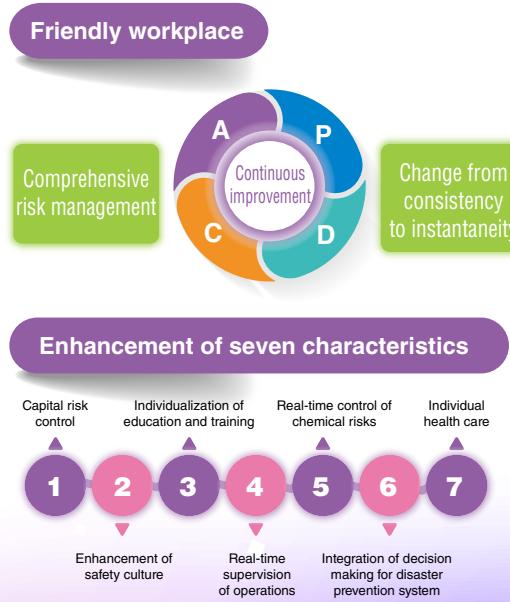


## Friendly Workplace

PSMC creates a friendly workplace while holding a comprehensive risk perception. The risk management of the Company is consistently assessed and improved upon in seven major themes. Using a computer system for a comprehensive health management model and multiple resources, the Company looks after its employees' health. Under a three-stage five-level preventive medicine conception, the Company adopts the PDCA execution model (preparing a plan → executing the plan → tracing and managing → continuously improving) to plan for comprehensive medical examinations and health promotion activities, enabling the employees to foster a "healthy body and mind" mentality through participating in these activities and caring for the health of the PSMC family.

In recent years, in addition to actively promoting health within the organization, the Company is always keen to participate in the health promotion activities held by the Ministry of Health and Welfare, Public Health Bureau of Hsinchu City, Ministry of Labor and Hsinchu Science Park Bureau. As such, the Company has received multiple accolades.

Via comprehensive health management procedures, the Company is able to actively facilitate the health of its employees in a consistent manner. There is no finish line in this regard but to persistently push forward. We have made caring for the health of the employees part of our job and are striving to achieve the "Win-win for work and health" target.



Referring to Powerchip Semiconductor Manufacturing Corp.'s EGG-I036 contractor pass application guideline details, there were approximately 428 contract workers (from places such as but not limited to a security company, cleaning company, and meal vendors) who had over three months of regular exposure to Powerchip Semiconductor Manufacturing Corp. employees in the within the past year. They were required to provide physical check reports or health statement declarations from their companies, allowing us to follow their health status. Those who failed to provide the report or without any acceptable explanation were banned from entering the foundry. Our control rate reached 100%. To decrease the risk of cluster infection in the workplace, we had pandemic-fighting measures specifically for contractors. Other than controlling the traffic flow for entering the premise, each person must complete the online health declaration prior to entering. Body temperatures were also taken at each entrance, and any person with unusual temperatures was prohibited from entering.

Powerchip Semiconductor Manufacturing Corp. upholds the spirit of "continuous improvement", so the company has a goal of creating a safe and healthy workplace for our employees to prevent occupational hazards and disease by implementing the environmental safety and hygiene management system, and keep in touch with the stakeholders such as employees, clients, contractors, suppliers, out-sourcing companies, and the society; it will lead the company to achieve the ultimate goal of the corporate's sustainable operation. Among the actions, there are the establishing environmental safety and hygiene organizations, conducting foundry's hazard recognition and risk assessment, occupational hazards management, environmental safety and hygiene education training, holding consultation meetings, investigating and analyzing hazardous incidents, accident management, occupation-induced disease management, and hazardous reporting. These are to increase the awareness of self, environment, machinery, product, and construction for strengthening self's, employees', contractors', and guests' overall value on safety and hygiene. In 2021, there was no case of violation of occupation safety and hygiene regulation that resulted in a fine from the government authority, and there was no monetary loss due to legal litigations.



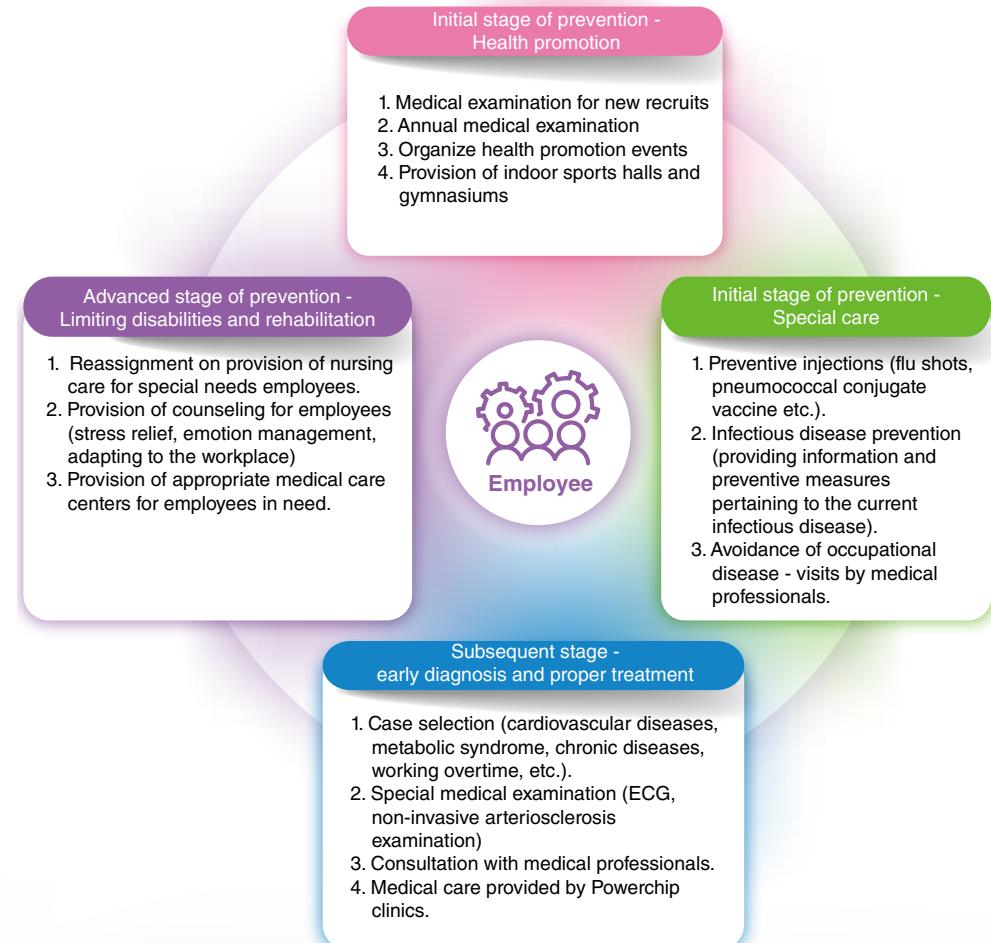
## Comprehensive Care for Health

Since the employees are an important asset to the Company, PSMC takes care of their health. From planning comprehensive medical examinations to hosting a series of tailored health promotion activities, the Company has established a complete professional health management organization. Using a three-stage five-level preventive medicine conception as its main management axis, along with an all-inclusive informationalized health management system, the Company proceeds to achieve the comprehensive care target in the workplace. To enhance the welfare for employee health care, the Company has consistently increased its health management budget year after year. Even during a period of operational setbacks, the Company still carried on with the execution despite much hardship. We aim to let all who work at PSMC to receive comprehensive health care to achieve the goal of "win-win for work and health", thereby strengthening the Company's overall competitiveness.

### A Three-Stage Five-Level Preventive Medicine Conception

Initial stage of prevention	Health promotion	<ul style="list-style-type: none"> <li>1. Annual medical examination</li> <li>2. Organize health promotion events</li> <li>3. Provision of indoor sports halls and gyms</li> </ul>
	Special care	<ul style="list-style-type: none"> <li>1. Infectious disease prevention(providing information and preventive measures pertaining to the current infectious disease).</li> <li>2. Prevent occupational disease - visits by medical professionals.</li> </ul>
Subsequent stage of prevention	early diagnosis and proper treatment	<ul style="list-style-type: none"> <li>1. Case selection</li> <li>2. Special medical examination</li> <li>3. High-risk group activities</li> <li>4. Regularly educate on disease and health</li> <li>5. Consultation with medical professionals.</li> <li>6. Medical care provided by Powerchip clinics.</li> </ul>
Advanced stage of prevention	Limiting disabilities	<ul style="list-style-type: none"> <li>1. Prevent disease progression</li> <li>2. Referral for medical treatment</li> <li>3. Reassignment</li> </ul>
	rehabilitation	Provision of appropriate medical care centers for employees in need.

### A three-stage five-level preventive medicine conception to achieve total occupational health care

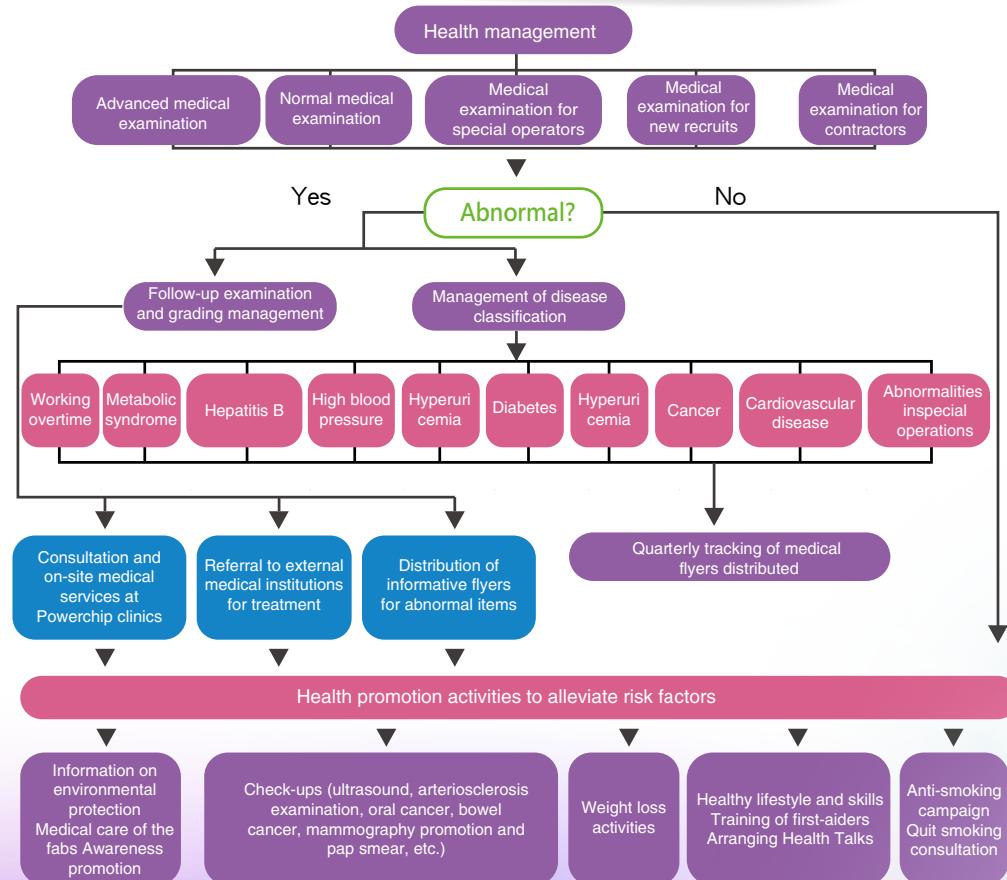




## Comprehensive Health Management

Health management is achieved through physical examinations and regular health examinations, to stay abreast of workers' health. Through classifying health statuses and diseases, we manage and track their health; we also arrange consultation with occupational physicians, offer health education, provide health education instructions, and implement health promotion activities.

### Procedures of a comprehensive health management



Since 2007, after taking into consideration advice from professionals, the Company reviewed the operations of the fabs and undertook consolidation and planning, which ultimately led to the establishment of the Occupational Disease Preventive Measure Management Items. Via (occupational disease) Prevention, Return to Work and Compensation (PRC), the Company strives to achieve its ultimate goal of employee health care—No Pain at Work, Healthy Life's a Perk." Meanwhile, we also reviewed potential hazardous operations, updated the list of these operations, and incorporated them in the internal supervision management with a multi-layered preventive method and diverse pro-active management.

### Classification of Health Statuses for Health Management

Providing more than what the law stipulates, PSMC sponsors comprehensive medical examinations for its employees annually and will follow-up on various medical abnormal items, so that early treatment can be provided upon early detection. Moreover, the employees who receive health examination will be classified into different health levels for health management by the health center in accordance with the result of their diagnosis at the hospital:

### Classification of health status for health management





## 4.1 Human Resources

## 4.2 Employee Welfare

## 4.3 Competency Development

## 4.4 Occupational Health and Safety

We conduct case management for high-risk groups (cardiovascular diseases, maternity health protection employees, special operators, etc.) and track their health status; provide them with professional consultation service and transfer them to the on-site occupational physicians to help them find suitable jobs. Meanwhile, PSMC also provides the same health care management to the long-term contractors and requests them to complete their medical examination regularly as an inclusion into the health care sphere of the Company to develop a healthy and non-infectious workplace.

### Special Health Check Items and Number of People Examined in 2021

Item / Number of people	Foundry	12" Foundry	8" Foundry
Dimethylformamide		85	60
Ionizing radiation operation		129	84
Noise operation		175	96
Arsenic and its compounds		82	34
Indium and its compounds		82	0

### ● Health Promotion and Psychological Consultation

According to medical examination results and seasonal changes, the Company arranges for different types of ultrasound check-ups, vaccination, health promotion activities for weight loss, health care for those with cardiovascular diseases, check-ups for breast and cervical cancer etc. to take care of the physical health of the employees. In addition, the Company also organizes various talks and provides specialist consultation service for enhancing health knowledge and cultivating correct mental health perception of the employees.

In the assessment of health promotion needs, we analyzed the gender ratio, age group, and work nature of employees based on the Company's characteristics. We analyzed items with high abnormality rates in the employee health examination, new recruits health examination, and health examination activities, to plan the major measures in the health promotion program in detail. We arranged re-inspections for those with abnormal results in the health examination, and guided those who are overweight or have high cholesterol, abnormal blood sugar levels, or hypertension to participate in a series of activities, such as a weight control health program. We managed to understand employees' common health problems based on their health needs survey results, and held further physical fitness tests, including body composition, muscle fitness, flexibility, and cardiorespiratory endurance. Finally, we implemented health promotion activities, such as stress management, physical fitness activities, and diet guidance. We posted health information (divided into three categories: safety and health communications, medical knowledge, and chronic disease health education) to improve employees' health knowledge, change their lifestyle habits, and promote their health according to laws, seasons, and employee needs. Employees with chronic diseases were screened for by annual physical examinations and new recruit physical examinations (hyperuricemia, hepatitis carriers, hyperglycemia, obesity, diabetes, metabolic syndrome, etc.), and were provided with health education instructions regularly every three months.

### 2021 Health Promotion Activities

Month	Events	Number of Attendees
Sep-Dec	Abdominal ultrasonography	179
Jul	Thyroid ultrasonography	44
Sep; Dec	Breast ultrasonography	95
Oct	Gynecology ultrasonography	78
Sep	Prostate ultrasonography	41
Oct-Nov	Pap smear test	106
Jan	Bone density test	699
Jan	Intraocular pressure	646
Sep	Heart healthcare workshop	106
Nov-Dec	Hearing protection healthcare workshop	234
Jun; Sep	Blood donation	158
Oct-Dec	Influenza vaccination	383



▲ Low calorie diet



▲ Blood donation event



▲ Healthcare workshop



▲ Influenza vaccination

### ● Establishment of Powerchip Clinic

The company has established Powerchip clinic in the plan to provide health management services such as clinic visit, health advisory, prophylactic inoculation and so on to our employees and their family members, the employees of our affiliated companies and the contractors. There are occupational health service doctors who offer health education and health guidance to help employees find suitable work.

The fabs have full-time nurses on a 24-hour rotation. They provide professional services on health protection and care, organize health promotion activities and provide emergency rescue and relief, thus lifting the worries of our employees in terms of health care.



▲ Powerchip's clinical service information

### ● Digitalized Health Management

Via an electronic health management system, the employees can not only see their medical examination reports over the years to have a full picture of their health condition, our employees can also make appointments with doctors, sign up for health promotion activities, and consult physicians about their health problems online. The system also offers various and comprehensive health services to strengthen our employees' abilities for health self-management.



▲ PSMC's health management system information



There are medical general knowledge and information on activities on the homepage of PSMC's health management website for our employees' references.



The website also includes health Q&A and mom & baby websites that our employees can ask questions and exchange information.



We update the bulletin boards on a regular basis, post health information and health education posters and so on.



We e-mail our employees on the different types of health promotion activities and health information messages for their reference.



4.1 Human Resources

4.2 Employee Welfare

4.3 Competency Development

4.4 Occupational Health and Safety

## Pandemic Prevention Task Force and Pandemic Management Measures

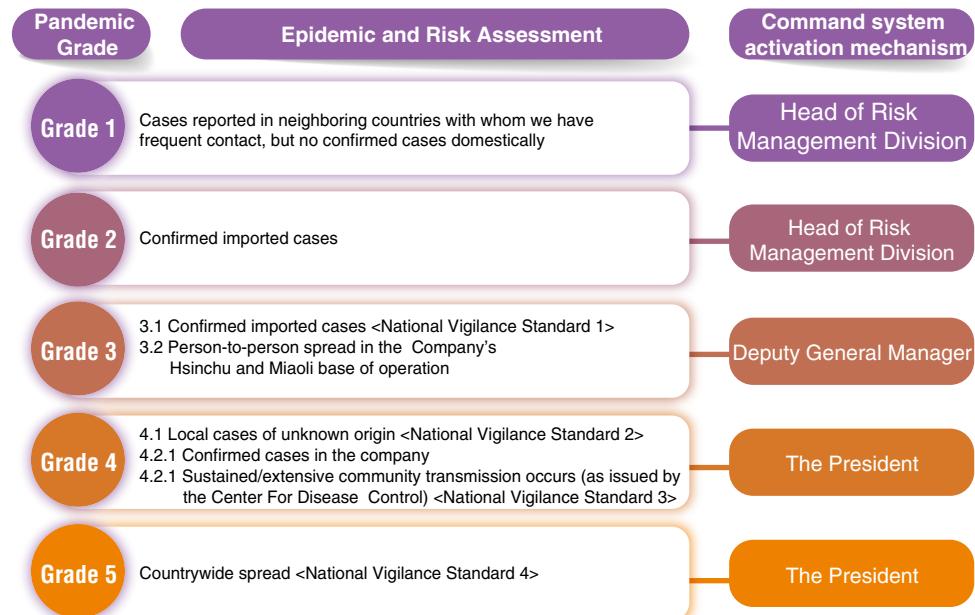
Believing in the idea of employees as the company's most valuable assets, our company takes care of its employees' health to maintain at full competitiveness. Daily pandemic fighting is part of the foundation, and the company assesses the risks of any potential pandemic development scenario to draft prevention and response plans. Also, by actively gathering and focusing on the pandemic's development, the company can provide a basis for employees' health management and for drafting strategies. Review is conducted every year for any necessary adjustment to ensure the actions' practicality.

In response to the potential risks of COVID-19's impact on our company, the risk management team has been following the pandemic's development since the end of 2019. Health education has been given to the employees to avoid possible misunderstandings. When spotting signs of the outbreak of the pandemic, the response teams were deployed to the pandemic fighting tasks according to the defined pandemic levels, the departments involved included but not limited to: Health Center, Human Resource Department, Information Management Department, Operation Planning Department, Procurement Department, Public Relation, and General Affairs. The following measures were taken based on different stages, and were adjusted accordingly based on ISO 45005's guide to managing the risk of COVID-19.

With the efforts from related departments and employees' compliances, despite the fact that COVID-19 still remains at the stage of global pandemic, the company can effectively be on top of personnel conditions to stay alert in the early stage and take preemptive response actions. Our company will continue to stay sharp to let our company-wide employees receive comprehensive healthcare. By achieving the goal of "Win-win on work and health", we can further strengthen the competitiveness of the corporation.

- The person in charge of the Pandemic Mission Control Center is appointed based on the severity of the pandemic; the person in charge at the highest level will be the president.
- By linking each electronic system through the Pteam app on cellphone and computer, pandemic fighting functions were developed (e.g., a. remote meetings; b. daily temperature records; c. immunization records; d. contractor/visitor sign-ins and electronic questionnaires). These actions are meant to avoid clustering to fully implement health risk management.
- Promote self-health management to employees and work with the government to announce pandemic fighting measures. For anyone who needs to undergo self-monitor procedures, facial masks must be worn and the designated unit should proceed with follow-up. Employees with a high risk of infection are listed as the targets for health check and necessary assistance are provided. To prevent employees from experiencing physical symptoms and panic attacks caused by the mental pressure of facing the unknowns, the company has counseling services and mental preparation for guiding and assisting employees accordingly.

**Pandemic Response Level Table**



- The cleaning and sanitization in the foundries' public areas are strengthened and personal sanitization supplies are provided for employees to use. For every vendor and guest to enter the foundry, body temperature must be taken and related records must be checked.
- Vendors are notified of the related pandemic measures: employees with a high risk of exposure must wear facial masks during the operation at all times, and avoid unnecessary business trips and activities. Everyone is required to minimize or politely decline the number of visits from people coming from high-risk areas. The high-risk cohort must provide negative test results (including rapid test kits at home) or immunization records prior to entering the foundry for operation.
- Plan and deploy zoning in the office space, work from home, and video conferences as alternative measures to mitigate the risk of infection from direct contacts.
- Initiated each preparatory work for business impacts, including double-checking the supply chain, sanitization of cargos coming in and out of the premises, product stock storage, communication with clients, and communication with media.



# 5

## Pursuing a Co-prosperity Society

- 5.1 Social Welfare & Environmental Protection
- 5.2 Caring and Giving Back
- 5.3 Art and Literature





## 5.1 Social Welfare &amp; Environmental Protection

## 5.2 Caring and Giving Back

## 5.3 Art and Literature

# 5.1 Social Welfare & Environmental Protection

## Plastic Waste Cleanup Activity

In a bid to make our environment better and to prevent animals from mistakenly eating plastic, our Health Club has been promoting the "333 No Plastic" campaign since 2017. On the third Wednesday of each month, colleagues are encouraged to pick up litter at the neighborhood of the Company using their 30-minute lunch break. To make our environment better, our efforts in this regard have never stopped for more than four years. Picking up trash outdoors allows us to bathe in the sun, appreciate the trees and flowers, chat with each other, check on each other, and care about each other, enabling us to have a healthier body and mind. Despite the outbreak of the pandemic, the Company still held two "plastic cleanup" events between March to May in 2021.



## Powerchip Environmental Protection Foundation

The Foundation was established in May 2006. The Foundation is dedicated to promoting environmental education and environmental applications, domestically and abroad. We engage or sponsor research, discussions, and relevant events on domestic and international environmental issues. We actively promote the results of our effort to individuals, society, and corporations, implementing environmental protection in our daily lives. The 2021 activities are as follows:

### A Midway Home for Old Trees

**Project Period :**  
January to December

**Content of Implementation :**  
We undertook the project for old tree protection, promoting the missions of our committee, and hiring management consultants to help with tree care and consultation.

**Result of Implementation :**  
We moved trees that were going to be cut down for reasons such as constructions to appropriate sites, where proper care and arrangements would also be provided. We hoped that by doing this, we were able to raise awareness in environmental protection in Taiwan, treasure the lives of trees, and educate our future generations.





## Assisting in Promoting Environmental Protection Activities.

**Project Period :**

4/8 ~ 4/9

**Content of Implementation :**

(1) Sponsored a series of promotion events for NGO Taiwan Concern Society's children's play, "Saving Earth by You and Me".

**Result of Implementation :**

A total of 308 people directly benefited from the participation, from Zhongxing, Zhulin, Su'ao, and Masai Elementary School in Yilan County. There is a gradually increasing trend in water and electricity consumption, and under the impact of the global COVID-19 pandemic, the idea of "revenge trips" have led to a surge in domestic travel. These situations have caused overloads in many natural habitats and ecology systems. Other than the government's policies and regulations for remedying the situations, consumers and the general public should be encouraged to join industries in adopting the actions of "Energy Conservation and Carbon Reduction with No Regrets". It means to take actions in our daily life proactively and paying more attention to our surrounding environment.

**Project Period :**

4/7 ~ 4/15 ~ 4/16

**Content of Implementation :**

(2) Sponsored a series of promotion events for Taiwan Indigenous Cultural Awareness Association's Tsou Tribe culture and environmental protection play, "I Am the Best Way to Protect the Environment".

**Result of Implementation :**

A total of 781 people directly benefited from the participation, from Jilin and Zhongzheng Elementary Schools in Taipei City, and Penglai, Bihou, Nan'ao, and Jinyue Elementary Schools in Yilan County. The concept of Earth's limited resources was delivered to the children through these events, to further reinforce the importance of recycling resources to diminish unnecessary wastes; and return to a simple life to live with nature in harmony to achieve sustainable developments. Through these events, children could learn more about Taiwan's indigenous group, and they can share the knowledge learned from the events with friends and family to increase their capabilities in protecting the environment.

**Project Period :**

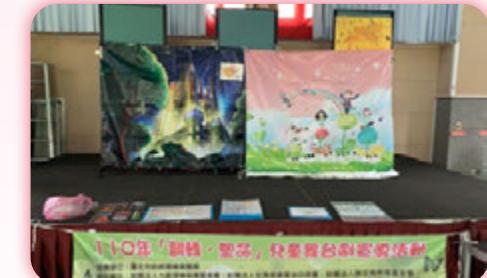
4/26 ~ 4/27 ~ 5/13

**Content of Implementation :**

(3) Sponsored a series of promotion events for Public Welfare Cultural Creativity and Art's children's play, "Turning Around, Make Destiny".

**Result of Implementation :**

A total of 717 people directly benefited from the participation, from Longtan, Shengou, Yuanshan, and Lixing Elementary Schools in Yilan County, and Xinmin and Xinying Elementary Schools in Tainan City. Video recordings were given to some elementary schools as their educational resources for promotional purposes. During the events, correct recycling concepts were taught, and misconceptions about certain materials (such as paper plates and environmentally-friendly eating utensils) were dispelled. This way, the participants gained the ability to pick environmental-friendly products as a priority. By lecturing on how the advanced nations in the world have a consensus on plastic wastes, we hope that the Taiwanese public's awareness of environmental protection will gain global visibility.





## 5.1 Social Welfare &amp; Environmental Protection

## 5.2 Caring and Giving Back

## 5.3 Art and Literature

## Environmental Safety Promotion

To increase the awareness of safety protection, energy-saving, carbon reduction, and health promotion among our colleagues, the Department of Risk Management held a series of activities for our Industrial Safety and Environmental Protection Month, in hopes that the participation of all employees may retain relevant values on personal safety, energy conservation, carbon reduction, and self-health management, and that these values could be implemented into their daily lives. By working together, the commitment to protect lives and the planet can be fulfilled.

### Environmental Safety and Health Communication Quiz Activity

**Date of Activity**

September –October

**Description and Benefits**

- This activity allowed employees to learn plant environment and important concepts in industrial safety, environmental protection, and hygiene; 10 true or false questions were provided to employees to answer.
- Participants who answered all questions correctly were eligible to receive a beautiful gift (stainless tumbler, ceramic plate, double wall mug, and ceramic cup/bowl set), with a total of 300 sets available.
- Number of participant was 1,630, the correct answer ratio was 95%.

### Flea Market - Public Welfare Event

**Date of Activity**

September – November

**Description and Benefits**

- The Company's employees donated items they no longer needed and sold them for charity at the event to make the best use of the materials, recycle and reuse resources, as well as save energy and reduce carbon emissions for environmental protection. Unsold items were donated and the proceeds were given charity organizations.
- A total of NT\$156,644 from the charity sale fundraiser were 100% included in the World Vision Taiwan's "Education Support and Hope" event.



Communication types	Promotion topics
Safety and Hygiene	COVID fighting, Chemical management
Environmental Protection	Environment protection and waste reduction, Water pollution management, Cherish water resources, Carbon reduction issues, waste management, plastic reduction in life
Damage Control	Home antifire damage



## 5.1 Social Welfare &amp; Environmental Protection

## 5.2 Caring and Giving Back

## 5.3 Art and Literature

## Column



## Public Welfare Committee

The purpose of establishing our company's public welfare committee is to represent our company's participation in local public welfare to support disadvantaged groups and fulfill corporate sustainability. The committee has a president, consultants, committee members, an executive secretary, and a task force. Their primary function is to host public welfare events, plan sport/culture/education sponsorship, and participate in social services. Budgets are planned based on the event types before every fiscal year begins, the Company will approve the budget prior to execution. The planned directions are the following :



Employee-initiated public welfare events (such as donation, purchasing from certain vendors, beach cleaning)



Participate in animal protection



Sponsor school varsity



Donating resources required by rural schools and students



Help in charity sale for disadvantaged groups



Respond to government's call for buying domestic products

Events planned for the first half of 2022 :

Order	Event	Execution
1.	"Eat good rice, do good deeds, give good shoes"	Employees buy the organic rice, and the farmer donates profits as shoe purchase funds to donate to preschools in Hsinchu's rural areas.
2.	Zhudong Junior High School + Tongtex Secondary High School Badminton Varsity Sponsorship	NT\$640K for three years for title sponsorship to help Zhudong Junior High School and Tongtex Secondary High School develop their badminton programs, and excel .
3.	Tsing Hua Sunrise Scholarship Public Welfare Basketball Tournament	1. On March 19, 2022, the Company put together teams to play in public welfare tournaments. 2. Employee purchased fairs tickets or donated cash to support the event. The admission income minus the event expenses was the sum donated to the Sunrise Scholarship to support disadvantaged students in turning their life around. 3. Public welfare task force hosted blood pressure measurement activity onsite.



## 5.2 Caring and Giving Back

### Community Care

Local fruits have high quality, to assist farmers in resolving an oversupply of fruits such as banana, guava and citrus, we provide such fruits in the employee cafeteria from time to time for our employees to take.

PSMC is actively involved in maintaining the green space of the park; and has assumed tree maintenance duty of Second Street of the Park (an adopted space of 319 pings), including weed control and replanting before regular maintenance. At stage one, weeds and deadwood were removed, and fertilizer was added for soil cultivation. The subsequent stage involved planting rose periwinkle, common lantana, and cigar flowers. The undertaking has improved the environmental quality of the science park and fulfilled the responsibility of the maintenance and management of the green space.



In response to the Hsinchu City Air Quality Improvement Area adoption event, the Company specifically picked Nanliao Environment Protection Park (approximately 1.17 acres) as a target for environmental maintenance. To reinforce and strengthen the ecosystem in the park, the main activities are cleaning and sanitation or planting more plants. There are environment protection bike trails going through trees and woods with ocean breezes coming along and the sound of waves hitting the shore, it is very uplifting and relaxing.





## Charities

Powerchip Semiconductor Manufacturing Corp. upholds the value of love and care and provides support to the community, cultural and educational organizations, and disadvantaged groups through actual participation and providing services. The company hopes to share a piece of responsibility for the society and fulfill the duty as a corporate citizen to harvest kindness and harmony among the society and support one another to share a co-prosperous atmosphere.

### Yihe Garden Organic Green Farm [Eat good rice, do good deed, give good shoes]

#### Event Content

Council of Agriculture of the Executive Yuan directed and guided the improvement of organic rice grown in the Ruanqiao District Zhutong Township through Taoyuan Area Agricultural Farm. The water source of the irrigation comes from the Zhudong Canal which goes through the Shaping River of Wufeng Town in the mountains, the water quality is clean and clear. This is not only a promotion of organic rice that is friendly to the environment and healthy, but also a means to make donations to children in the rural mountains.

Employees purchased organic rice grown locally in Ruanqiao Zhudong through Yihe Garden Organic Green Farm's event, "Eat good rice, do good deed, give good shoes". The farmers will donate the profit as shoes purchasing funds. The shoes purchased are donated to Francis Preschool in Guanxi Township, Hsinchu, Sacred Heart Preschool in Wufeng Township, Hsinchu, and Preschool of Taoshan Elementary School in Wufeng Township, Hsinchu.

#### Donations

- NT\$282,330
- A total of 91 pairs of shoes were donated



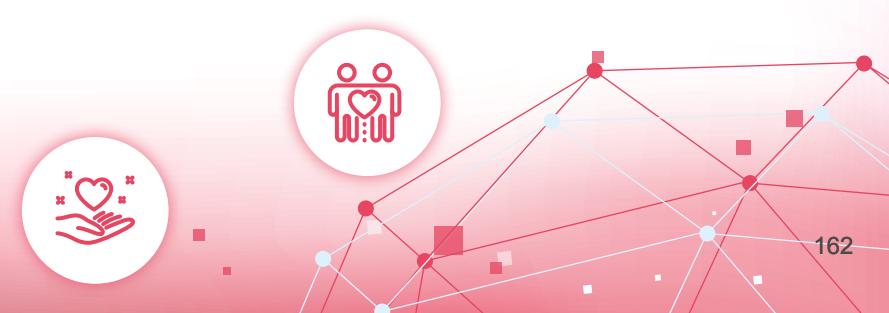
### Ren'ai Social Welfare Foundation - "Health and Happiness – Meal Fundraiser"

#### Event Content

Through this fundraiser activity, the funds raised are used in sponsoring the Saint Joseph Social Welfare Foundation, a charitable organization of Hsinchu City, to conduct educational activities and provide nutritious lunch boxes. It is for patients with severe mental retardation to receive more comprehensive care.

#### Donations

- NT\$520,000





### Taiwan Association for Visually Impaired People - "Love and Happiness Sheltered Workshop" Handmade Soap Charity Sale

#### Event Content

To raise visually impaired people's employability through occupation capability re-design, Taiwan Association for Visually Impaired People founded a Sheltered Workshop (Handmade Soap Workshop).

The company gives visually impaired people in Taiwan support and encouragement through purchasing their handmade soap gift sets, helping visually impaired people keep a job that can support themselves.

#### Donations

- NT\$507,500



### 5.1 Social Welfare & Environmental Protection

### 5.2 Caring and Giving Back

### 5.3 Art and Literature

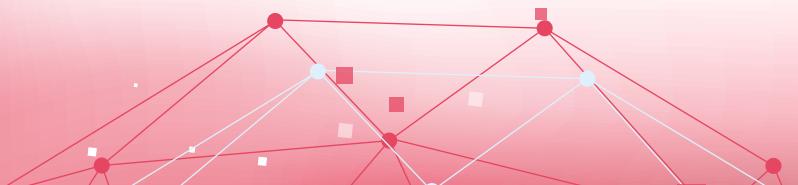
### World Vision Taiwan - Love, Education, and Hope

#### Event Content

Over 500 employees participated from the Company, and the funds were all donated to the Hsinchu Region of World Vision Taiwan for scholarships for children, Naluo After School Care in Jinping Village (Jianshi Town, Hsinchu County) and career exploration projects for children in both Hsinchu City and County.

#### Donations

- NT\$1,000,000(including flea market sales of NT\$156,644, employees and company donation of NT\$843,356)





## Column



## Sponsoring College of Semiconductor Research

**"Value Education to Cultivate Talents for The Semiconductor Industry, and Sponsor the Founding of a College of Semiconductor Research at the National Level**

The COVID pandemic in 2020 caused a shortage in automotive chip supplies, in turn causing more global demands on Taiwan's semiconductor chips from multiple countries in the world. The Executive Yuan approved the draft of the "National Key Fields Industry-University Cooperation and Skilled Personnel Training" in 2020, it was already submitted to the Legislative Yuan for approval. Executive Yuan also approved the "Higher Education Sandbox Innovation Regulation Act", NT\$9.6 billion in 12 years will be used to found "College of Semiconductor Research" at National Taiwan University, National Cheng Kung University, National Tsing Hua University, and National Yang Ming Jiao Tung University. It is expected over 400 master's and PhD candidates will be trained every year.

Chairman Frank Huang believes that Taiwan is already the "Silicon Valley of the semiconductor industry". How to maintain Taiwan's leading position in the semiconductor industry? The most important factor is the self-sustainable supply and training of talents. The main reason that Powerchip Semiconductor Manufacturing Corp. is willing to contribute to the College of Semiconductor Research is to hope to be able to train and cultivate more Taiwanese engineers. Powerchip Semiconductor Manufacturing Corp. is one of the few among all the corporate sponsors of the nation's four major College of Semiconductor Research which fully participates and makes donations. The company expects to allocate NT\$100 million to the College of Semiconductor Research in these four universities. We hope to cultivate over 5,000 semiconductor professionals for Taiwan in the next twelve years, and hire more talents to join Powerchip Semiconductor Manufacturing Corp. to make significant contributions to Taiwan's semiconductor industry.



▲ Photo Credit: Liberty Times



## 5.3 Art and Literature

Powerchip Cultural Foundation was founded in November 2004 with promoting artistic and cultural activities as its goal. Currently, the Foundation organizes or co-organizes cultural activities, performances, and competitions to help promote cultural, artistic developments, and other charitable activities that share the same philosophy as the Foundation.



Powerchip 2021 Classic Series - Our Beloved Beethoven: Piano Concerti No. 3, 4 & 5



The Four Seasons with Yu-Chien Tseng

### Event Content

To celebrate Beethoven's 250th birthday in 2021, the Company sincerely invited three elite pianists, Rolf-Peter Wille, Daming Zhu, and Evan Wong in collaboration with an emerging conductor, Tung-Chieh Chuang, and National Taiwan Symphony Orchestra to perform Beethoven's piano concerto No. 3, No. 4, and No. 5 which were from his most creative years. We invited fans to experience the maestro's love and passion for music and life.

### Date/Location

- January 7 at National Concert Hall, 1 concert

### Number of Participants/Beneficiaries

c. 2,200 attendees



### Event Content

Powerchip Cultural Foundation upholds cultivating outstanding musicians in Taiwan by continuing to support excellent Taiwanese musicians. Yu-Chien Tseng, a violinist, who won the silver prize in 2015, is one of our foundation's long-term focuses. This time, Yu-Chien Tseng plays with the Academy of Taiwan Strings and works with the conductor Shi-Hong Yang to interpret music in Baroque style. The concert leads attendees through the changes of the four seasons in the diverse and exciting sound of the violin.

### Date/Location

- April 30 at National Concert Hall, 1 concert
- April 18 at National Kaohsiung Center for the Arts – Wei Wu Ying, 1 concert
- April 24 at National Concert Hall, 1 concert
- May 1st, National Taichung Theater, 1 concert

### Number of Participants/Beneficiaries

c. 8,051 attendees





## 5.1 Social Welfare &amp; Environmental Protection

## 5.2 Caring and Giving Back

## 5.3 Art and Literature

**Powerchip 2021 Classic Series –Taiwan International Flute Festival VI :The Flute and Beyond****Event Content**

The godmother of flute, Man-Long Fan, served as the art director of the Taiwan International Flute Festival, which has the longest history in Asia and is the biggest flute event in Taiwan; it is a bridge that connects Taiwan to the world's music scene. Powerchip Cultural Foundation upholds the promoting of musical education and supports the festival over the years. The sixth Taiwan International Flute Festival covers diverse music styles in the program including classical, contemporary, jazz, improvisation, and cross disciplines, it is a performance of Avant-garde music for a new era.

**Date/Location**

- April 28 at National Concert Hall, 1 concert
- April 29 at National Concert Hall, 1 concert
- May 1st at National Kaohsiung Center for the Arts – Wei Wu Ying, 1 concert
- May 2nd at National Concert Hall, 1 concert
- May 7th at National Concert Hall, 1 concert
- May 8th at National Concert Hall, 1 concert
- May 9th at National Concert Hall, 1 concert

**Number of Participants/Beneficiaries**

c. 4,600 attendees

**Powerchip 2021 Classic Series :  
Blessings from Felix Mendelssohn****Event Content**

This concert assembled the elite Taiwanese musicians such as the violinist Ching-Ting Chang, the renowned pianist Chun-Chieh Yen, Chiao-Han Liao, and Kuan-Ting Lin, joined by the Evergreen Symphony Orchestra and the resident conductor Wen-Chen Chuang, together they performed a rare Mendelssohn concert. Other than listening to the maestro's classics, the attendees could even get a chance to appreciate the maestro's creative peak during his teenage years.

**Date/Location**

October 29 at National Concert Hall, 1 concert

**Number of Participants/Beneficiaries**

c. 2,200 attendees

**Paul Huang & NSO****Event Content**

The renowned conductor and NSO art director - Jun Märkl will join hands with the violinist at his prime, Paul Huang, and the National Symphony Orchestra to perform the classic works from three maestros together: a French composer, Hector Berlioz, a German Composer, Johannes Brahms, and a British composer, Sir William Turner Walton. Leading the attendees to appreciate the maestros.

**Date/Location**

March 26 at National Concert Hall, 1 concert

**Number of Participants/Beneficiaries**

c. 3,200 attendees





## 5.1 Social Welfare &amp; Environmental Protection

## 5.2 Caring and Giving Back

## 5.3 Art and Literature



## 3rd Taipei Music Academy Festival @ SF

## Event Content

"Taipei Music Academic Festival" is the classical music festival and music education camp that has the most international vision in Taiwan. This event gathers the leading musicians of each top-notch orchestra to be the instructors. In addition to the sold chamber music training, there are also many master's classes and professional lectures available for giving students the best opportunities to learn from maestros and broaden their international visions. Powerchip Cultural Foundation has long been paying attention to cultivating music talents in Taiwan; we hope to utilize this rare opportunity from the event to continuously cultivate more excellent musicians, putting our humble effort into promoting this world-class elegant culture for Taiwan.

## Date/Location

- July 31, live stream of Taipei Music Academy Festival Symphony Concert
- August 4, live stream of Maestro Super Star Concert
- August 8, Taipei Music Academy Festival Symphony Concert Broadcast
- August 14, Maestro Super Star Concert Broadcast

## Number of Participants/Beneficiaries

c. 80,000 attendees



## On The Road ~ Yu- Chien Tseng

## Event Content

Powerchip Cultural Foundation has not held back the effort to sponsor classical music performances and music education for years. Powerchip Cultural Foundation's long-term sponsored violinist, Yu-Chien Tseng was the recipient of Ten Outstanding Young Persons of 2020, we believed he could be a great example for Taiwan's youth. Now Yu-Chien Tseng took on the challenge of the classics again by collaborating with conductor Shi-Hong Yang and Evergreen Symphony Orchestra, to perform Pablo de Sarasate's "Zigeunerweisen", "Carmen Fantasie", along with Amédée-Ernest Chausson's "Poème" of France, and Henryk Wieniawski's "Legende" of Poland for the fans. The sounds of the violin will accompany the fans to explore the romantic stories around the world.

## Date/Location

- September 25 at National Concert Hall, 1 concert
- September 26 at National Concert Hall, 1 concert

## Number of Participants/Beneficiaries

c. 4,044 attendees

Yu-Chien Tseng's  
Powerchip 2021 Classic Series Yu-Chien  
Tseng - Bruch and Sibelius,  
Powerchip 2021 Classic Series; Yu-Chien  
Tseng - Mozart and Beethoven.

## Event Content

Yu-Chien Tseng specially planned this project to perform two concertos. In Yu-Chien Tseng's performance career, both concertos marked their significance by recording his career development track. The project opened with the collaboration with Wen-pin Chien and Taipei Symphony Orchestra (TSO) to perform the Bruch and Sibelius violin concerto; followed by Mozart and Beethoven's violin concerto performed with National Symphony Orchestra (NSO). Yu-Chien Tseng performed these four concertos again with a different mindset and showed more mature skills, which stems from more diverse experiences working with the top symphonies and a more experienced life.

## Date/Location

- December 4th at National Concert Hall, 1 concert
- January 9th, 2022 at National Concert Hall, 1 concert

## Number of Participants/Beneficiaries

c. 4,044 attendees





## 5.1 Social Welfare &amp; Environmental Protection

## 5.2 Caring and Giving Back

## 5.3 Art and Literature

力晶文化基金會 典藏藝術美學沙龍  
藝界名師與您一起品藝術、賞美學！

Aesthetic Life  
美感生活 X 曾少千

2021-01-24 sun. 下午 2:00-4:00.  
美國現代畫派：主體性和筆勢  
Jackson Pollock 和 Franz Kline 的筆勢行動，如何  
透露藝術家和美國的主體性。

2021-01-31 sun. 下午 2:00-4:00.  
美國現代畫派：崇高和秘密  
Mark Rothko 和 Barnett Newman 的色域繪畫特色，  
如何傳達隱晦內含光和崇高的美感。

講師：曾少千(國立中央大學藝術學研究所教授)



## Powerchip Cultural Foundation - Art Collections Aesthetics Salon

## YOSHITOMO NARA

## Event Content

Powerchip Cultural Foundation has not held back on promoting art education for a long time, we worked together with "ARTouch" magazine to plan a series of art knowledge lectures. These lectures were designed to go deep into the essences of different art movements, to know the respective representing artists, and analyze their artworks through a professional point of view and solid art history under the guidance of professional lecturers, enabling attendees to learn more about the art world systematically. It is the least the foundation can do for promoting the arts and cultural developments in Taiwan.

## Date/Location

- December 27, 2020 – July 29, 2021 at Museum of National Tai-pei University of Education, 10 salons

## Number of Participants/Beneficiaries

c. 1,500 attendees

## Event Content

Japanese contemporary artist Yoshitomo Nara held his first welfare public exhibition in Taiwan to show the deep relationship between Taiwan and Japan, and it was a trending event. Powerchip Cultural Foundation has particularly paid attention to allocating resources to art education for schools in rural areas for a long time. In this feature exhibition, we incorporated the "Powerchip Aesthetics Seed Project" by inviting the entire faculty and student body from rural schools to witness; we hope to help give students in the rural area more opportunities to gain exposures to art resources.

## Date/Location

- March 12 to June 20, Kuandu Museum of Fine Arts of Taipei National University of the Arts

## Number of Participants/Beneficiaries

c. 40,000 attendees





Powerchip 2021 Classic Series - New Aspect presents – MEDEA by Contemporary Legend Theatre



Contemporary Legend Theatre Traditional Opera Talent Cultivation and Succession Project 2021

#### Event Content

Powerchip Cultural Foundation has supported a variety of cultural and art events for many years to stimulate participation; we hope to give a boost to the promotion and development of art and culture in Taiwan. The Contemporary Legend Theatre's "Medea" is a classical cross-discipline theater work, it fully shows the abundant creativity and the essence of Taiwan's art and culture. The sole disciple of the Mei School in Taiwan is the famous Beijing Opera star, Hai-Min Wei, and the Chinese Opera Maestro Hsing-Kuo Wu who successfully merged stage performances of East and West; with their excellent and vivid interpretation through their inner-self, and through a vivid contrast of Chinese traditional opera and western theater, they have fully manifested the essence and value of "Eastern theatrical plays".

#### Date/Location

- January 8 to January 10 at National Dr. Sun Yat-Sen Memorial Hall at Taipei, 3 shows
- January 23 to January 24 at National Taichung Theater, 2 shows
- February 27 to February 28 at National Kaohsiung Center for the Arts – Wei Wu Ying, 2 shows

#### Number of Participants/Beneficiaries

c. 16,040 attendees

#### Event Content

Powerchip Cultural Foundation holds the long-term idea to promote and pass-down art education and support diverse art and cultural events. As a response to the issue of the talent gaps between generations of Chinese Opera and Kunqu Opera, the project recruits talents aged 20 to 30 with potential coming from theatrical schools to go through one year of training. The art director, Hsing-Kuo Wu, also serves as the administrative director and Xiu-Wei Lin acts as the lecturer to invite famous teachers from the opera scene to teach the fundamentals, including Sheng (male role), Dan (female role), Jing (painted face), and Chou (clown), and the traditional plays. The project aims to raise the teaching of opera techniques and trainees' personal morality for them to seamlessly bridge to be a professional actor or actress, cultivating a new generation of young opera talents for this era.

#### Date/Location

- January 1<sup>st</sup> to December 31<sup>st</sup> at the theater location

#### Number of Participants/Beneficiaries

c. 1,000 attendees





# 6

# Appendix

Appendix 1 : Statement of Assurance

Appendix 2 : GRI Sustainability Reporting Standards (GRI Standards) Comparison Table

Appendix 3 : Taiwan Stock Exchange Corporation Rules Governing the Preparation and Filing of Sustainability Reports by TWSE Listed Companies Correspondence Table (Article 4, Item 4)

Appendix 4 : United Nation Sustainable Development Goals (SDGs) Correspondence Table

Appendix 5 : Sustainability Accounting Standards Board (SASB) Standards S1

Appendix 6 : The UN Global Compact Comparison Table

Appendix 7 : ISO26000 Social Responsibility Index Comparison Table





## Appendix 1 : Statement of Assurance



### INDEPENDENT ASSURANCE OPINION STATEMENT

#### Powerchip Semiconductor Manufacturing Corporation 2021 Sustainability Report

The British Standards Institution is independent to Powerchip Semiconductor Manufacturing Corporation (hereafter referred to as PSMC in this statement) and has no financial interest in the operation of PSMC other than for the assessment and verification of the sustainability statements contained in this report.

This independent assurance opinion statement has been prepared for the stakeholders of PSMC only for the purposes of assuring its statements relating to its sustainability report, more particularly described in the Scope below. It was not prepared for any other purpose. The British Standards Institution will not, in providing this independent assurance opinion statement, accept or assume responsibility (legal or otherwise) or accept liability for or in connection with any other purpose for which it may be used, or to any person by whom the independent assurance opinion statement may be read.

This independent assurance opinion statement is prepared on the basis of review by the British Standards Institution of information presented to it by PSMC. The review does not extend beyond such information and is solely based on it. In performing such review, the British Standards Institution has assumed that all such information is complete and accurate.

Any queries that may arise by virtue of this independent assurance opinion statement or matters relating to it should be addressed to PSMC only.

#### Scope

The scope of engagement agreed upon with PSMC includes the following:

1. The assurance scope is consistent with the description of Powerchip Semiconductor Manufacturing Corporation 2021 Sustainability Report.
2. The evaluation of the nature and extent of the PSMC's adherence to AA1000 Account Ability Principles (2018) and the reliability of specified sustainability performance information in this report as conducted in accordance with type 2 of AA1000AS v3 sustainability assurance engagement.
3. The assessment of disclosure to be in conformance with the applicable SASB industry standard(s) in this report as conducted in accordance with type 1 of AA1000AS v3 sustainability assurance engagement.

This statement was prepared in English and translated into Chinese for reference only.

#### Opinion Statement

We conclude that the Powerchip Semiconductor Manufacturing Corporation 2021 Sustainability Report provides a fair view of the PSMC sustainability programmes and performances during 2021. The sustainability report subject to assurance is materially correct without voluntary omissions based upon testing within the limitations of the scope of the assurance, the information and data provided by the PSMC and the sample taken. We believe that the performance information of Environment, Social and Governance (ESG) are correctly represented. The sustainability performance information disclosed in the report demonstrate PSMC's efforts recognized by its stakeholders.

Our work was carried out by a team of sustainability report assurers in accordance with the AA1000AS v3. We planned and performed this part of our work to obtain the necessary information and explanations we considered to provide sufficient evidence that PSMC's description of their approach to AA1000AS v3 and their self-declaration in accordance with GRI Standards: Core option and SASB Standard(s) were fairly stated.

#### Methodology

Our work was designed to gather evidence on which to base our conclusion. We undertook the following activities:

- a top level review of issues raised by external parties that could be relevant to PSMC's policies to provide a check on the appropriateness of statements made in the report
- discussion with managers on PSMC's approach to stakeholder engagement. Moreover, we had sampled 2 external stakeholders to conduct interview
- interview with 35 staffs involved in sustainability management, report preparation and provision of report information were carried out
- review of key organizational developments
- review of the extent and maturity of the relevant accounting systems for financial and non-financial reports
- review of the findings of internal audits
- the verification of performance data and claims made in the report through meeting with managers responsible for gathering data
- review of the processes for gathering and ensuring the accuracy of data, followed data trails to initial aggregated source and checked sample data to greater depth during site visits
- the consolidated financial data are based on audited financial data, we checked that this data was consistently reproduced
- review of supporting evidence for claims made in the reports

- an assessment of the organization's reporting and management processes concerning this reporting against the principles of Inclusivity, Materiality, Responsiveness and Impact as described in the AA1000AP (2018)
- an assessment of the organization's use of metrics or targets of SASB Standard to assess and manage topic-related risks and opportunities.

#### Conclusions

A detailed review against the Inclusivity, Materiality, Responsiveness and Impact of AA1000AP (2018) and sustainability performance information as well as GRI Standards and SASB Standard(s) is set out below:

#### Inclusivity

In this report, it reflects that PSMC has continually sought the engagement of its stakeholders and established material sustainability topics, as the participation of stakeholders has been conducted in developing and achieving an accountable and strategic response to sustainability. There are fair reporting and disclosures for the information of Environment, Social and Governance (ESG) in this report, so that appropriate planning and target-setting can be supported. In our professional opinion the report covers the PSMC's inclusivity issues and has demonstrated sustainable conduct supported by top management and implemented in all levels among organization.

#### Materiality

The PSMC publishes material topics that will substantially influence and impact the assessments, decisions, actions and performance of PSMC and its stakeholders. The sustainability information disclosed enables its stakeholders to make informed judgements about the PSMC's management and performance. In our professional opinion the report covers the PSMC's material issues.

#### Responsiveness

PSMC has implemented the practice to respond to the expectations and perceptions of its stakeholders. An Ethical Policy for the PSMC is developed and continually provides the opportunity to further enhance PSMC's responsiveness to stakeholder concerns. Topics that stakeholder concern about have been responded timely. In our professional opinion the report covers the PSMC's responsiveness issues.

#### Impact

PSMC has identified and fairly represented impacts that were measured and disclosed in probably balanced and effective way. PSMC has established processes to monitor, measure, evaluate and manage impacts that lead to more effective decision-making and results-based management within an organization. In our professional opinion the report covers the PSMC's impact issues.

#### Performance Information

Based on our work described in this statement, specified sustainability performance information such as GRI Standards disclosures disclosed in this statement, PSMC and BSI have agreed upon to include in the scope. In our view, the data and information contained within Powerchip Semiconductor Manufacturing Corporation 2021 Sustainability Report are reliable.

#### GRI Sustainability Reporting Standards (GRI Standards)

PSMC provided us with their self-declaration of in accordance with GRI Standards: Core option (For each material topic covered by a topic-specific GRI Standard, comply with all reporting requirements for at least one topic-specific disclosure). Based on our review, we confirm that sustainable development disclosures with reference to GRI Standards' disclosures are reported, partially reported or omitted. In our professional opinion the self-declaration covers the PSMC's sustainability topics.

#### SASB Standards

PSMC provided us with their self-declaration of in accordance with SASB Standard(s) (SEMICONDUCTORS Sustainability Accounting Standard). Based on our review, we confirm that the sustainability disclosure topics & accounting metrics of SASB Standard(s) (SEMICONDUCTORS Sustainability Accounting Standard) are reported, partially reported or omitted. In our professional opinion the self-declaration covers disclosure topics, associated accounting metrics and activity metrics for applicable SASB industry standard(s).

#### Assurance Level

The high level assurance provided is in accordance with AA1000AS v3 in our review, as defined by the scope and methodology described in this statement.

The moderate level assurance provided is in accordance with AA1000AS v3 in our review of SASB Standard(s).

#### Responsibility

This sustainability report is the responsibility of the PSMC's chairman as declared in his responsibility letter. Our responsibility is to provide an independent assurance opinion statement to stakeholders giving our professional opinion based on the scope and methodology described.

#### Competency and Independence

The assurance team was composed of Lead auditors experienced in relevant sectors, and trained in a range of sustainability, environmental and social standards including AA1000AS, ISO 14001, ISO 45001, ISO 14064 and ISO 9001. BSI is a leading global standards and assessment body founded in 1901. The assurance is carried out in line with the BSI Fair Trading Code of Practice.



Statement No: SRA-TW-2021071  
2022-05-30

For and on behalf of BSI:

Taiwan Headquarters: 2nd Floor, No. 37, Ji-Hu Rd., Ni-Hu Dist., Taipei 114, Taiwan, R.O.C.

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...making excellence a habit™

Peter Pu, Managing Director BSI Taiwan



## Appendix 2 : GRI Sustainability Reporting Standards (GRI Standards) Comparison Table

The content below is verified by a third party, the British Standards Institution (BSI). The results of the verification are as per Appendix 1: Statement of Assurance.

「★」 denotes material topics and 「●」 denotes external verification obtained.

GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards	External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>1. Organization Overview</b>						
GRI102 General Disclosure 2016: Core	102-1	Name of the organization	●	About PSMC	8	
	102-2	Activities, brands, products, and services	●	About PSMC	8	
	102-3	Location of headquarters	●	About PSMC	8	
	102-4	Location of operations	●	About PSMC	8	
	102-5	Ownership and legal form	●	About PSMC	8	
	102-6	Markets served	●	About PSMC	8	
	102-7	Scale of the organization	●	About PSMC	8	
	102-8	Information on employees and other workers	●	About PSMC 4.1 Human resources	8 129	
	102-9	Supply chain	●	2.4 Supply Chain Management	79	
	102-10	Significant changes to the organization and its supply chain	●	A Focus on Foundry 2.2 Innovative R&D 2.4 Supply Chain Management	9 62 79	
	102-11	Precautionary Principle or approach	●	1.4 Risk Management	42	
	102-12	External initiatives	●	About this Report Realizing Sustainable Development	4 11	
	102-13	Membership of associations	●	External Participation	10	



GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards	External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>2. Strategies</b>						
GRI102 General Disclosure 2016: Core	102-14	Statement from senior decision-maker	●	Message from Manager	5	
GRI 102 General Disclosure 2016: Comprehensive	102-15	Key impacts, risks, and opportunities	●	1.4 Risk Management	42	
<b>3. Ethics and Integrity</b>						
GRI102 General Disclosure 2016: Core	102-16	Values, principles, standards, and norms of behavior	●	1.2 Integrity and Compliance	36	
GRI 102 General Disclosure 2016: Comprehensive	102-17	Mechanisms for advice and concerns about ethics	●	1.2 Integrity and Compliance	36	
<b>4. Governance</b>						
GRI 102 General Disclosure 2016: Comprehensive	102-18	Governance structure	●	1.1 Organizational Structure	31	
<b>5. Stakeholder engagement</b>						
GRI102 General Disclosure 2016: Core	102-40	List of stakeholder groups	●	Stakeholder engagement	16	
	102-41	Collective bargaining agreements	●	4.1 Human resources	129	
	102-42	Identifying and selecting stakeholders	●	Stakeholder engagement	16	
	102-43	Approach to stakeholder engagement	●	Stakeholder engagement	16	
	102-44	Key topics and concerns raised	●	Stakeholder engagement	16	



GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards	External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>6. Reporting practice</b>						
GRI102 General Disclosure 2016: Core	102-45	Entities included in the consolidated financial statements	●	A Focus on Foundry	9	
	102-46	Defining report content and topic Boundaries	●	Identifying and Managing Major Issues	18	
	102-47	List of material topics	●	Identifying and Managing Major Issues	18	
	102-48	Restatements of information	●	About this Report	4	
	102-49	Changes in reporting	●	About this Report	4	No reported changes
	102-50	Reporting period	●	About this Report	4	
	102-51	Date of most recent report	●	About this Report	4	
	102-52	Reporting cycle	●	About this Report	4	
	102-53	Contact point for questions regarding the report	●	About this Report	4	
	102-54	Claims of reporting in accordance with the GRI Standards	●	About this Report	4	
	102-55	GRI content index	●	About this Report	4	
	102-56	External assurance	●	About this Report	4	



GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards	External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>Specific Standards: 200 Series (Economic topics)</b>						
<b>★ Economic Performances</b>						
GRI 103 Management policy to economic performances 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Two, Fighting – The Best of Innovative Services	51	
	103-3	Evaluation of the management approach	●	Two, Fighting – The Best of Innovative Services	51	
GRI 201 Disclosures of economic performances issues 2016	201-1	Direct economic value generated and distributed	●	1.3 Financial performance	40	
	201-3	Defined benefit plan obligations and other retirement plans	●	4.2 Employee welfare	132	
	201-4	Financial assistance received from government	●	1.3 Financial performance	40	Not receiving subsidies from government
<b>Market Presence</b>						
GRI 202 Disclosures of market presence issues 2016	202-2	Proportion of senior management hired from the local community	●	4.1 Human resources	129	
<b>Procurement Practices</b>						
GRI 204 Disclosures of procurement practices issues 2016	204-1	Proportion of spending on local suppliers	●	2.4 Supply Chain Management	79	



GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards	External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>★ Anti-corruption</b>						
GRI 103 Anti-corruption management plan 2016	103-1	Define major topics and their boundaries	●	Description of Major Issues and Their Boundaries	20	
	103-2	Management plans and their components	●	1. Striving with sound operations	24	
	103-3	Assessment of management plans	●	1. Striving with sound operations	24	
GRI 205 Disclosure on anti-corruption topics 2016	205-2	Communications and trainings related to anti-corruption policies and procedures	●	1.2 Integrity and Compliance	36	
	205-3	Confirmed anti-corruption incidents and response measures	●	1.2 Integrity and Compliance	36	
<b>★ Anti-competitive behavior</b>						
GRI 103 Management policy to anti-competitive behavior 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	1. Striving with sound operations	24	
	103-3	Evaluation of the management approach	●	1. Striving with sound operations	24	
GRI 206 Disclosures of anti-competitive behavior issues 2016	206-1	Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	●	Internal control	37	



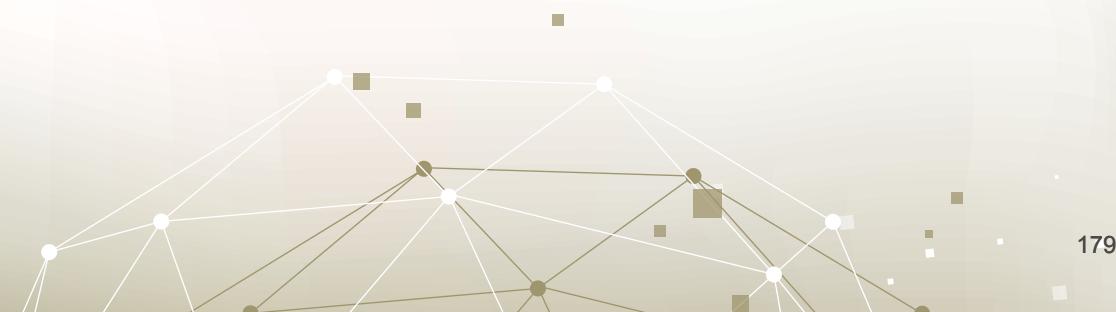
GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards	External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>Specific Standards: 300 Series (Environmental topics)</b>						
<b>★ Energy</b>						
GRI 103 Management policy of energy 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Three, Upstanding – Be an energy-saving and waste-reducing producer	84	
	103-3	Evaluation of the management approach	●	Three, Upstanding – Be an energy-saving and waste-reducing producer	84	
GRI 302 Disclosures of energy issues 2016	302-1	Energy consumption within the organization	●	Energy and resource consumption	91	
	302-3	Energy intensity	●	Energy and resource consumption	91	
	302-4	Reduction of energy consumption	●	Energy Saving	93	
<b>★ Water and effluents</b>						
GRI 103 Management approach of water and effluents 2018	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Three, Upstanding – Be an energy-saving and waste-reducing producer	84	
	103-3	Evaluation of the management approach	●	Three, Upstanding – Be an energy-saving and waste-reducing producer	84	
	303-1	Interactions with water as a shared resource	●	Three, Upstanding – Be an energy-saving and waste-reducing producer 3.2 Risk management for water resources	84 101	
	303-2	Management of water discharge-related impacts	●	Three, Upstanding – Be an energy-saving and waste-reducing produce 3.2 Risk management for water resources	84 101	
GRI 303 Topic-specific disclosures of water and effluents 2018	303-3	Water withdrawal	●	3.2 Risk management for water resources	101	
	303-4	Water discharge	●	3.2 Risk management for water resources	101	
	303-5	Water consumption	●	3.2 Risk management for water resources	101	



GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards	External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>★ Emissions</b>						
GRI 103 Management policy of emission 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Three, Upstanding – Be an energy-saving and waste-reducing producer	84	
	103-3	Evaluation of the management approach	●	Three, Upstanding – Be an energy-saving and waste-reducing producer	84	
GRI 305 Disclosure of emission issues 2016	305-1	Direct (Scope 1) GHG emissions	●	GHG Investigation and Reduction	95	
	305-2	Energy indirect (Scope 2) GHG emissions	●	GHG Investigation and Reduction	95	
	305-4	GHG emissions intensity	●	GHG Investigation and Reduction	95	
	305-5	Reduction of GHG emissions	●	GHG Investigation and Reduction	95	
	305-7	Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	●	Air pollutant emissions	107	
<b>★ Waste</b>						
GRI 103 Management approach of waste 2020	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Three, Upstanding – Be an energy-saving and waste-reducing producer	84	
	103-3	Evaluation of the management approach	●	Three, Upstanding – Be an energy-saving and waste-reducing producer	84	
	306-1	Waste generation and significant waste-related impacts	●	Three, Upstanding – Be an energy-saving and waste-reducing producer	84	
	306-2	Management of significant waste-related impacts	●	Three, Upstanding – Be an energy-saving and waste-reducing producer	84	
GRI 306 Topic-specific disclosures 2020	306-3	Waste generated	●	Waste treatment	110	
	306-4	Waste diverted from disposal	●	Waste treatment	110	
	306-5	Waste directed to disposal	●	Waste treatment	110	



GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards	External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>★ Legal Compliance for Environmental Protection Law</b>						
GRI 103 The management policy of legal compliance for environmental protection law 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	1. Striving with sound operations	24	
	103-3	Evaluation of the management approach	●	1. Striving with sound operations	24	
GRI 307 Disclosures of legal compliance for environmental protection law 2016	307-1	Non-compliance with environmental laws	●	3.3 Green productio	107	
<b>★ Environmental Assessment of Supplier</b>						
GRI 103 The management policy of environmental assessment of Suppliers 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Two, Fighting – The Best of Innovative Services	51	
	103-3	Evaluation of the management approach	●	Two, Fighting – The Best of Innovative Services	51	
GRI 308 Disclosures of the environmental assessment of Suppliers 2016	308-1	New suppliers that were screened using environmental criteria	●	Supplier audits	82	
	308-2	Negative environmental impacts in the supply chain and actions taken	●	Supplier audits	82	





GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards	External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>Specific Standards: 400 Series (Social topics)</b>						
<b>★ Labor Relations</b>						
GRI 103 Management policy of labor relations 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
	103-3	Evaluation of the management approachThe management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
GRI 401 Disclosures of labor relations issues 2016	401-1	New employee hires and employee turnover	●	Employee turnover	130	
	401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	●	4.2 Employee welfare Comprehensive health management	132 152	
	401-3	Parental leave	●	4.2 Employee welfare	132	
<b>Labor relations</b>						
GRI 402 Disclosures of labor relations issues 2016	402-1	Minimum notice periods regarding operational changes	●	4.1 Human resources	129	
<b>★ Occupational Health and Safety</b>						
GRI 103 Management policy to occupational health and safety for 2018	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
	103-3	Evaluation of the management approachThe management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
	403-1	Occupational health and safety management system	●	4.4 Occupational health and safety	140	
	403-2	Hazard identification, risk assessment, and incident investigation	●	4.4 Occupational health and safety	140	
	403-3	Occupational health services	●	4.4 Occupational health and safety	140	
	403-4	Worker participation, consultation, and communication on occupational health and safety	●	4.4 Occupational health and safety	140	
	403-5	Worker training on occupational health and safety	●	4.4 Occupational health and safety	140	
						180



GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards	External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>★ Occupational Health and Safety</b>						
GRI 103 Management policy to occupational health and safety for 2018	403-6	Promotion of worker health	●	4.4 Occupational health and safety	140	
	403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	●	4.4 Occupational health and safety	140	
GRI 403 Disclosures of occupational health and safety 2018	403-8	Workers covered by an occupational health and safety management system	●	4.4 Occupational health and safety	140	
	403-9	Work-related injuries	●	4.4 Occupational health and safety	140	
	403-10	Work-related ill health	●	4.4 Occupational health and safety	140	
<b>★ Training and Education</b>						
GRI 103 The management policy of training and education 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
	103-3	Evaluation of the management approachThe management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
GRI 404 Disclosures of training and education issues 2016	404-1	Average hours of training per year per employee	●	4.3 Competency development	137	
	404-2	Programs for upgrading employee skills and transition assistance programs	●	4.3 Competency development	137	
	404-3	Percentage of employees receiving regular performance and career development reviews	●	4.2 Employee welfare	132	
<b>Employee diversity and equal opportunity</b>						
GRI 405 Disclosure on employee diversity and equal opportunity topics 2016	405-1	Governing departments and employee diversity	●	1.1 Organizational Structure 4.2 Employee welfare	31 132	
	405-2	Basic wages, salaries, and employee ratios	●	4.2 Employee welfare	132	



GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards	External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>★ Discrimination free</b>						
GRI 103 Non-discrimination management plan 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
	103-3	Evaluation of the management approachThe management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
GRI 406 Disclosure on non-discrimination topics 2016	406-1	Discrimination incidents and response measures for improvement	●	4.2 Employee welfare	132	
<b>★ Freedom of assembly and negotiation with groups</b>						
GRI 103 Freedom of assembly and negotiation with groups management plan 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
	103-3	Evaluation of the management approachThe management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
GRI 407 Disclosure on freedom of assembly and collective bargaining topics 2016	407-1	Business sites and suppliers with potential risks from freedom of assembly and collective bargaining	●	2.4 Supply Chain Management 4.1 Human resources	79 129	
<b>★ Child labor</b>						
GRI 103 Child labor management plan 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
	103-3	Evaluation of the management approachThe management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
GRI 408 Disclosure on child labor topics 2016	408-1	Business sites and suppliers with major risks of using child labor	●	2.4 Supply Chain Management 4.1 Human resources	79 129	



GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards	External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>★ Forced of Compulsory Labor</b>						
GRI 409 The management policy of forced or compulsory labor issues 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
	103-3	Evaluation of the management approachThe management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
GRI 409 Disclosures of forced or compulsory labor issues 2016	409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	●	2.4 Supply Chain Management 4.1 Human resources	79 129	
<b>Rights of Indigenous Peoples</b>						
GRI 411 Disclosures of rights of indigenous peoples issues 2016	411-1	Incidents of violations involving rights of indigenous peoples	●	Internal control	37	
<b>★ Human rights assessment</b>						
GRI 103 Human rights assessment management plan 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
	103-3	Evaluation of the management approachThe management approach and its components	●	Four, Powerchip Semiconductor Manufacturing Corp. – Pursuing and Creating happiness	122	
GRI 412 Disclosure on human rights assessment topics 2016	412-1	Receive human rights evaluation or evaluate impactful business activities related to human rights	●	2.4 Supply Chain Management	79	
	412-2	Human rights policies and procedures for employee training	●	4.3 Competency development	137	
<b>Local Communities</b>						
GRI 413 Disclosures of local communities issues 2016	413-1	Operations with local community engagement, impact assessments, and development programs	●	3.3 Green productio	107	
	413-2	Operations with significant actual and potential negative impacts on local communities	●	5.2 Caring and Giving Back	161	



GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards		External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>★ Suppliers' social evaluations</b>							
GRI 103 Suppliers' social evaluation management plan 2016	103-1	Explanation of the material topic and its Boundary			Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components			Two, Fighting – The Best of Innovative Services	51	
	103-3	Evaluation of the management approachThe management approach and its components			Two, Fighting – The Best of Innovative Services	51	
GRI 414 Disclosure on suppliers' social evaluation topics 2016	414-1	Adopting social principle to screen new suppliers			2.4 Supply Chain Management	79	
	414-2	Negative impact on society in the supply chain and response actions			2.4 Supply Chain Management	79	
<b>Public Policy</b>							
GRI 415 Disclosures of public policy issues 2016	415-1	Political contributions			Internal control	37	No political contributions during the reporting period
<b>★ Customer Health and Safety</b>							
GRI 416 Customer Health and Safety Management policy 2016	103-1	Explanation of the material topic and its Boundary			Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components			Two, Fighting – The Best of Innovative Services	51	
	103-3	Evaluation of the management approachThe management approach and its components			Two, Fighting – The Best of Innovative Services	51	
GRI 416 Customer Health and Safety Disclosure of Issues 2016	416-1	Assessment of the health and safety impacts of product and service categories			2.3 Client Relationship Management 4.4 Occupational health and safety	73	
	416-2	Incidents of non-compliance concerning the health and safety impacts of products and services			Internal control	37	



GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards	External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>★ Customer privacy</b>						
GRI 103 Management policy of customer privacy 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	1. Striving with sound operations	24	
	103-3	Evaluation of the management approachThe management approach and its components	●	1. Striving with sound operations	24	
GRI 418 Disclosures of customer privacy issues 2016	418-1	Substantiated complaints concerning breaches of customer privacy and losses of customer data	●	1.5 Information Security Control	50	
<b>★ Compliance of Socioeconomic Regulations</b>						
GRI 103 Compliance of Socioeconomic Regulations Management policy 2016	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	1. Striving with sound operations	24	
	103-3	Evaluation of the management approachThe management approach and its components	●	1. Striving with sound operations	24	
GRI 419 Compliance of Socioeconomic Regulations Disclosure of Issues 2016	419-1	Non-compliance with laws and regulations in the social and economic area	●	Internal control	37	



GRI Standards Categories/Topics	Number	Disclosure Content of GRI Standards	External Verification	Corresponding Chapter	Page No.	Omitted/Notes
<b>Customized sustainability issues</b>						
<b>★ Integrity and governance</b>						
GRI 103 Management policy of integrity governance	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	1. Striving with sound operations	24	
	103-3	Evaluation of the management approachThe management approach and its components	●	1. Striving with sound operations	24	
<b>★ Intellectual Property</b>						
GRI 103 Management policy of intellectual property rights	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Two, Fighting – The Best of Innovative Services	51	
	103-3	Evaluation of the management approachThe management approach and its components	●	Two, Fighting – The Best of Innovative Services	51	
<b>★ Product service, R&amp;D, and innovation</b>						
GRI 103 Products, Services and R&D Innovation Management policy	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Two, Fighting – The Best of Innovative Services	51	
	103-3	Evaluation of the management approachThe management approach and its components	●	Two, Fighting – The Best of Innovative Services	51	
<b>★ Management of product and quality control</b>						
GRI 103 Management of product and quality control Management policy	103-1	Explanation of the material topic and its Boundary	●	Description of Major Issues and Their Boundaries	20	
	103-2	The management approach and its components	●	Two, Fighting – The Best of Innovative Services	51	
	103-3	Evaluation of the management approachThe management approach and its components	●	Two, Fighting – The Best of Innovative Services	51	



## Appendix 3 : Taiwan Stock Exchange Corporation Rules Governing the Preparation and Filing of Sustainability Reports by TWSE Listed Companies Correspondence Table (Article 4, Item 4)

Number	Indicator	Corresponding Chapter	Page No.
(1)	The number of its full-time employees who are not in a managerial position, the average and medium of the salaries of the full-time employees who are not in a managerial position, and the difference of the three figures from the previous year	4.2 Employee welfare	132
(2)	The company's governance around climate-related risks and opportunities, actual and potential climate-related impacts; how to identify, assess and manage climate-related risks; and metrics and targets used to assess and manage relevant climate-related issues.	1.4 Risk Management 3.1 Climate change and carbon management 3.2 Risk management for water resources	42 91 101





## Appendix 4 : United Nation Sustainable Development Goals (SDGs) Correspondence Table

Item	Sustainable Development Goal	Corresponding Section	Page number
Goal 2	2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.	5.2 Caring and Giving Back	161
Goal 3	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.	3.3 Green productio	107
Goal 4	4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.	4.1 Human resources	129
Goal 5	5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decisionJmaking in political, economic and public life.	4.2 Employee welfare	132
Goal 6	6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.	3.2 Risk management for water resources	101
	6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.	3.2 Risk management for water resources	101
Goal 7	7.3 By 2030, double the global rate of improvement in energy efficiency.	3.1 Climate change and carbon management	91
Goal 8	8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on highJvalue added and labourJintensive sectors.	Column : Metaverse – The Fourth-generation Dioxide Semiconductor	66
	8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.	4.4 Occupational health and safety	140



Item	Sustainable Development Goal	Corresponding Section	Page No.
Goal 10	10.3 Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard.	1.1 Organizational Structure	31
Goal 11	11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.  12.2 By 2030, achieve the sustainable management and efficient use of natural resources.	3.3 Green productio	107
	12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	3.2 Risk management for water resources	101
Goal 12	12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.  12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.  12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities.	Waste treatment	110
Goal 13	13.2 Integrate climate change measures into national policies, strategies and planning.	2.4 Supply Chain Management	79
Goal 16	16.5 Substantially reduce corruption and bribery in all their forms.  16.6 Develop effective, accountable and transparent institutions at all levels.	1.4 Risk Management	42
		1.1 Organizational Structure	31
		1.1 Organizational Structure	31
		Whistleblower protection procedure	39



## Appendix 5 : Sustainability Accounting Standards Board (SASB) Standards S1

Disclosure Topic	Indicator number	Disclosure indicator	Type	Page number	Report content or explanation
Greenhouse Gas Emissions	TC-SC-110a.1	• (1) Gross global Scope 1 emissions and (2) amount of total emissions from perfluorinated compounds	Quantitative	96	(1) Scope 1 direct greenhouse gas emission is 94,996 tons CO <sub>2</sub> e. (2) Perfluorinated compound gas emission is 36,161 tons CO <sub>2</sub> e. Please refer to greenhouse gas inspection and reduction
	TC-SC-110a.2	• Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets	Discussion and analysis	85	To align with the global carbon reduction trend, the Company set targets to reduce emissions and perfluorinated compounds for Scope 1*. Please refer to the energy/resource management plan. *Strengthen processing and neutralize gases from manufacturing processes, including control of perfluorinated compounds.
Energy Management in Manufacturing	TC-SC-130a.1	• (1) Total energy consumed, (2) percentage grid electricity, (3) percentage renewable	Quantitative	91	(1) Total energy consumption is 4,568,329 GJ (2) Electrical power consumption is 4,061,263 GJ, or 88.9% of total energy consumption. (3) Ongoing assessment of renewable energy development; no renewable energy is currently adopted. Please refer to 3.1 Climate Change and Carbon Management.
Water Management	TC-SC-140a.1	• (1) Total water withdrawn, (2) total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress	Quantitative	101	Powerchip Semiconductor Manufacturing Corp.'s total water intake is 6,030,552 cubic meters, Total water consumption is 1,989,704 cubic meters; no Powerchip Semiconductor Manufacturing Corp. production sites are listed as being in high-risk water resources areas. Please refer to 3.2 Risk Management for Water.
Waste Management	TC-SC-150a.1	• Amount of hazardous waste from manufacturing, percentage recycled	Quantitative	111	Please refer to 4.4 Occupational Health and Safety.
Employee Health & Safety	TC-SC-320a.1	• Description of efforts to assess, monitor, and reduce exposure of employees to human health hazards	Discussion and analysis	140	Please refer to 4.4 Occupational Health and Safety.
	TC-SC-320a.2	• Total amount of monetary losses as a result of legal proceedings associated with employee health and safety violations	Quantitative	140	Total Monetary loss was NT\$0. Please refer to 4.4 Occupational Health and Safety.
Recruiting & Managing a Global & Skilled Workforce	TC-SC-330a.1	• Percentage of employees that are (1) foreign nationals and (2) located offshore	Quantitative	129	(1) Foreign employees accounted for 4.18% of all employees. (2) The Company has no international locations, and thus no expatriate employees. Please refer to 4.1 Talent Acquisition.

Disclosure Topic	Indicator number	Disclosure indicator	Type	Page number	Report content or explanation
Product Lifecycle Management	TC-SC-410a.1	• Percentage of products by revenue that contain IEC 62474 declarable substances	Quantitative	--	Proportion of income ratio from products containing IEC 62474 materials was 0%.
	TC-SC-410a.2	• Processor energy efficiency at a system-level for: (1) servers, (2) desktops, and (3) laptops	Quantitative	--	Not applicable.
Materials Sourcing	TC-SC-440a.1	• Description of the management of risks associated with the use of critical materials	Discussion and analysis	42 79	Please refer to 1.4 Risk Management – Continuous Operation Management. Please refer to 2.4 Supply Chain Management.
Intellectual Property Protection & Competitive Behavior	TC-SC-520a.1	• Total amount of monetary losses as a result of legal proceedings associated with anticompetitive behavior regulations <sup>7</sup>	Quantitative	--	No related monetary losses in 2021.
Activity Metrics	TC-SC-000.A	• Total production	Quantitative	--	1,316,610,535 (cm <sup>2</sup> /year)
Activity Metrics	TC-SC-000.B	• Percentage of production from owned facilities	Quantitative	--	Proportion of production from self-owned plants is 100%.



## Appendix 6 : The UN Global Compact Comparison Table

Item	Clauses	Corresponding Section	Page No.
<b>1.Human Rights</b>			
1	Businesses should support and respect the protection of internationally proclaimed human rights.	About PSMC	8
2	Make sure that they are not complicit in human rights abuses.	About PSMC	8
<b>2.Labor</b>			
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4	The elimination of all forms of forced and compulsory labor.	4.1 Human resources	129
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6	The elimination of discrimination in respect of employment and occupation.	4.1 Human resources	129
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7	Businesses should support a precautionary approach to environmental challenges.	Three, Upstanding – Be an energy-saving and waste-reducing producer	84
8	Undertake initiatives to promote greater environmental responsibility.	Three, Upstanding – Be an energy-saving and waste-reducing producer	84
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10	Businesses should work against corruption in all its forms, including extortion and bribery.	1.2 Integrity and Compliance	36



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**PSMC** Powerchip Semiconductor Manufacturing Corp.

