



**2024**  
**TCFD**

**Powertech Technology Inc.**  
**Task Force on Climate-related Financial**  
**Disclosures Report**





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( All photos presented in the Report were taken from PTI's events or photography competitions.)

# 1 Preface

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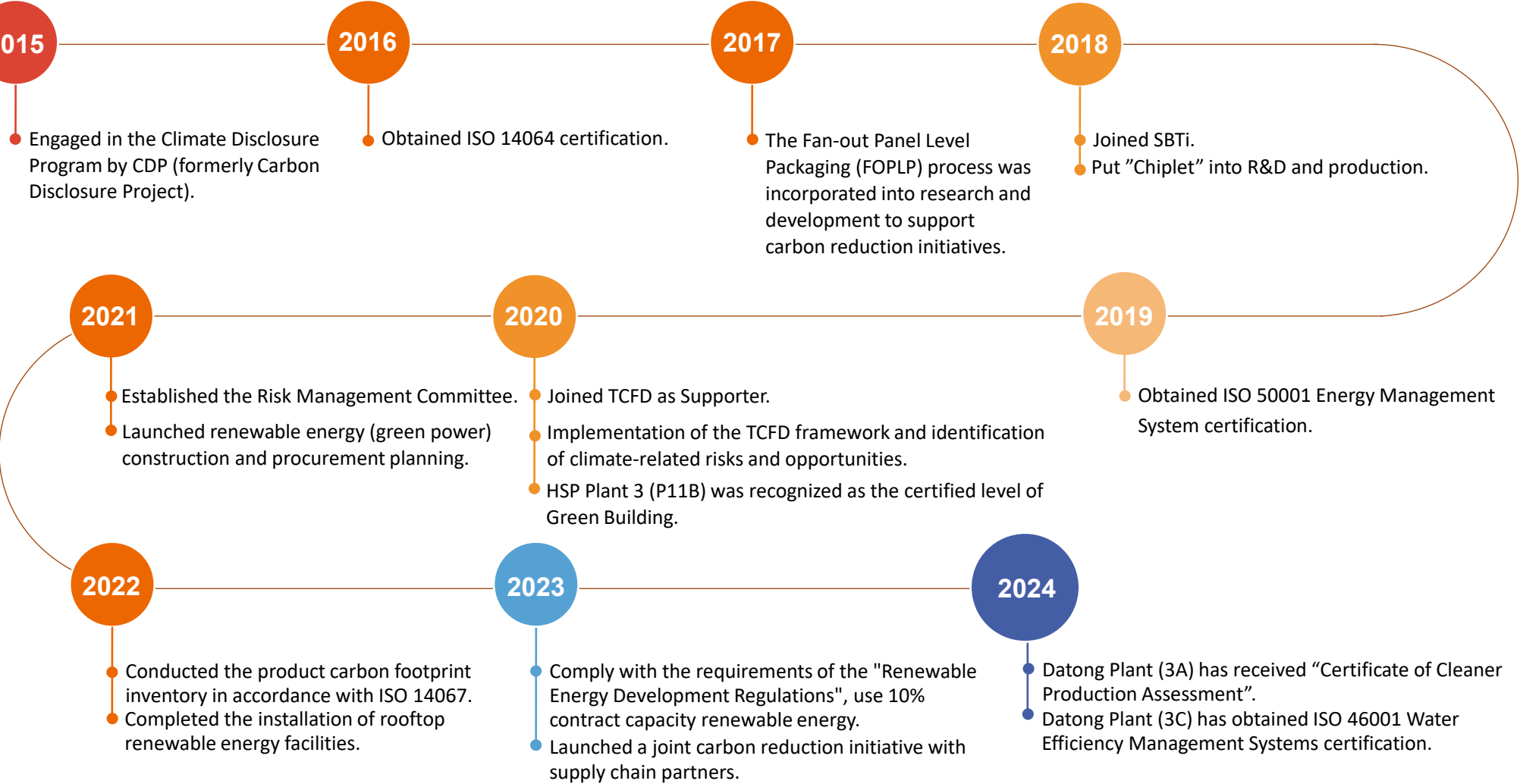
Climate change driven by global warming is a crisis that humanity must face collectively, and it is a topic of great concern to the international community. In response to the threats posed by extreme weather, PTI has actively engaged in environmental protection initiatives. Since 2015, it has participated in the Climate Change Project launched by CDP, disclosing information through the Climate Change and Water Security questionnaires. In July 2020, PTI officially signed on as a supporter of the Task Force on Climate-related Financial Disclosures (TCFD), demonstrating its commitment to climate adaptation governance.

Each year, the company identifies climate-related risks and opportunities based on the TCFD framework. By assessing transitional and physical risks and opportunities related to climate change, the company formulates environmental management policies and implements measures to adapt to and mitigate the impacts of climate change, aiming to reduce environmental harm and ensure sustainable corporate development. In recent years, carbon reduction has become a top priority in addressing the threat of climate change. PTI is working together with employees, customers, and suppliers to pursue a low-carbon transition and move toward its vision of net-zero emissions by 2050, striving to build a sustainable future.



# The Climate Change Response Milestone of PTI

PTI continues to monitor and advance climate-related initiatives. A summary of key actions taken over the years is as follows:





# Strengthening Climate Resilience - TCFD Report

Faced with the possible impact of climate change on operations, with the support of senior executives, PTI implements climate-related risks and opportunities in accordance with the framework of the “Task Force on Climate-related Financial Disclosures Recommendations (TCFD Recommendations)” to identify and assess climate change risks and responses across organizations.

PTI regularly organize “Climate Risk and Opportunity Workshops” to prioritize identified transition risks (including policy and legal, market, technology, and reputational risks) and physical risks. The outcomes are disclosed to highlight the potential impacts of climate change. Based on the assessment, we develop response strategies to mitigate climate risks and enhance climate resilience.

## PTI TCFD Framework

Core Elements	Description	Operational Model
Governance	Disclosure of the PTI’s management of climate-related risks and opportunities.	<ul style="list-style-type: none"><li>■ The Board of Directors regularly reviews the risks and opportunities associated with climate change and water resources.</li><li>■ The Risk Management Committee regularly reports to the Board of Directors on the assessment and management measures for climate-related and water resource risks and opportunities.</li></ul>
Strategy	Disclosure of actual and potential climate-related risks and opportunities and their financial impacts on the organization.	<ul style="list-style-type: none"><li>■ Conducted short, medium and long-term climate risks and opportunities through cross-departmental discussions.</li><li>■ Evaluated the impact of major risks and opportunities on company operations and finances.</li><li>■ Identified the impact of major risks and opportunities by taking into consideration different climate-related scenarios.</li></ul>
Risk Management	Processes for identifying, assessing, and managing climate-related risks.	<ul style="list-style-type: none"><li>■ Establish management mechanisms and response measures for major risks and opportunities, integrate them with the company's operational risks, and regularly report implementation results to the board of directors and the management team.</li><li>■ Evaluated future management measures and monetized the resources into financial costs.</li><li>■ Organized workshops to strengthen the employees’ climate awareness.</li></ul>
Metrics and Targets	Key metrics and targets for managing climate-related risks and opportunities.	<ul style="list-style-type: none"><li>■ Develop management indicators and targets for climate risks and opportunities, and regularly review progress and implementation effectiveness, such as carbon emissions and water resources.</li><li>■ Followed the ISO 50001 standard for energy management to reduce energy consumption.</li><li>■ Determined the scope of the inventory after regular reviews of potential sources of carbon emissions with the materiality principle based on ISO 14064-1 standards.</li><li>■ Enhance waste management efficiency to prevent resource depletion.</li></ul>

## 2 Climate Governance

PTI places strong emphasis on the governance role of senior management in corporate sustainability. We have established a climate risk identification and response mechanism, guided by a “top-down oversight and bottom-up feedback” approach to ensure effective climate governance. Sustainability and climate-related issues are regularly reported, discussed, and reviewed at the Board of Directors and cross-functional committees, reinforcing the organization’s resilience to climate change.

### Organization Operating

In response to the impacts of climate change, the company leverages internal cross-functional collaboration for risk identification, operations, and communication to mitigate its effects on business operations.



### Climate Governance Organization

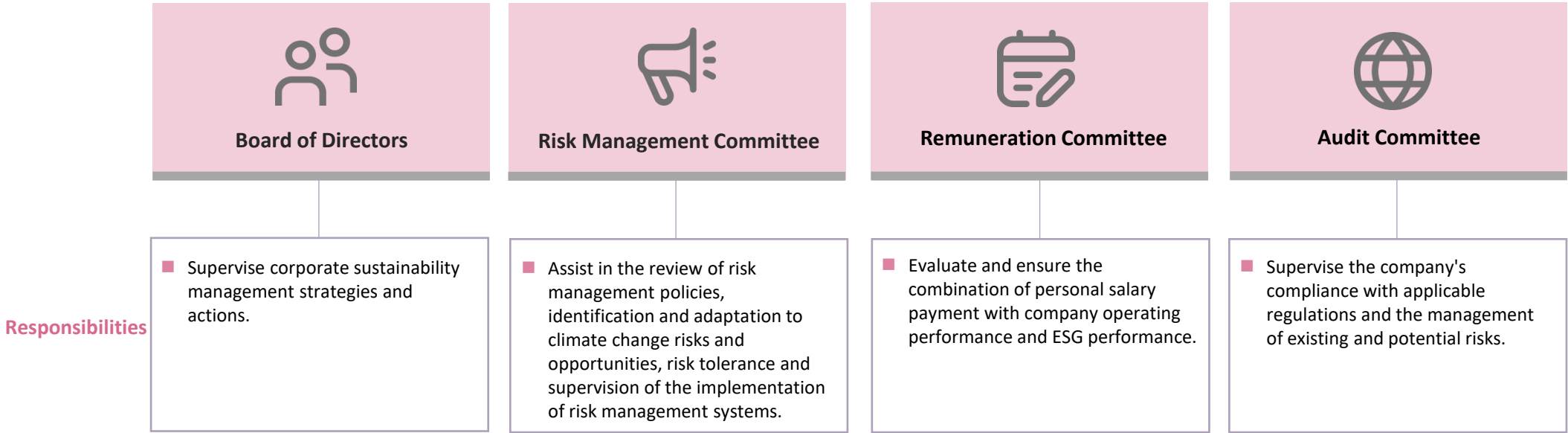


# Board of Directors Participation and Operating Organization

PTI is committed to sustainable development and shareholder interests, with the Board of Directors serving as the highest decision-making authority. In driving climate change and sustainability strategies, the Board plays a supervisory and directive role. Under the Board, the Audit Committee, Remuneration Committee, and Risk Management Committee assist in overseeing sustainability initiatives and climate-related management efforts, with each committee regularly reporting to the Board of Directors on the implementation progress.



## Climate Risk Operating Organization Responsibilities



Enterprise Risk Management

To ensure the sustainability of corporate operations and protect stakeholders' rights, PTI established the Risk Management Committee in accordance with the “Risk Management Regulations”. The committee oversees the Risk Management Task Force, which integrates and manages various potential risks that may impact operations. It convenes at least once a year to report risk management conditions or significant risks to the Board of Directors, enabling the Board to implement appropriate risk management and business continuity measures.

The Risk Management Task Force comprises five functional teams covering operations, hazards (including climate hazards), information security, finance, and legal affairs. These teams identify, gather, and monitor internal and external risk information, continuously track risk factor ratings, and implement improvement measures. They also regularly present their findings to the Risk Management Committee. The Task Force convenes quarterly meetings to assess the performance of each functional team and review the business continuity plan, ensuring the suitability, effectiveness, and efficiency of ongoing operations.

Enterprise Risk Management Process

Step 1	Step 2	Step 3	Step 4
Business Impact Analysis and Risk Identification	Risk Control	Business Continuity Management	Monitoring and Reporting
<ul style="list-style-type: none"><li>■ The Risk Management Task Force uses risk attributes (severity and frequency) to evaluate the risk incident level and impact on operations.</li><li>■ The risk identification results are reported to the Risk Management Committee.</li></ul>	<ul style="list-style-type: none"><li>■ Risk communication with all units/businesses for risk management and mitigation measures.</li><li>■ The Risk Management Committee implements the risk control program and continuously improves it.</li></ul>	<ul style="list-style-type: none"><li>■ Establish contingency action plans, crisis management, and business continuity plans.</li><li>■ BCP Task Force implements response and recovery exercises for major incidents.</li><li>■ Implement hazard awareness training for all employees.</li></ul>	<ul style="list-style-type: none"><li>■ Compile information on risk identification, assessment, and control measures within the organization and report to the Risk Management Committee and the Board of Directors.</li></ul>



# Responsibilities and Roles of the Management

In the promotion of carbon reduction, environmental sustainability and other issues, in addition to the support of senior management, the participation and cooperation of all units are also required. Taking sustainable goals as the longitude and cross-functional organizations as the latitude, PTI outlines the content of environmental sustainability comprehensively in all aspects. It offers senior executives and management with a glimpse of the whole picture, providing effective support and cooperation.

## Responsibilities of Climate Risk Management

	ESG Committee	EHS Committee	Risk Management Task Force
Meeting Frequency	Meetings are held quarterly, and reported to the Board of Directors	Meetings are held quarterly	Meetings are held quarterly, and relevant content is reported to the Risk Management Committee
Responsibilities	<ul style="list-style-type: none"><li>To oversee corporate sustainability management affairs, the President serves as the convener, while the Sustainability Development Management Dept. acts as the executive secretary. The Dept. supports the implementation of sustainability-related policies and objectives, and facilitates communication and engagement on issues of concern to stakeholders.</li><li><b>TCFD Task Force</b> The Sustainability Development Management Dept. acts as the convener to carry out TCFD climate-related risk and opportunity identification every year, compiling the results of identification to report in the "ESG Committee" and provide them to the management team as decision reference.</li></ul>	<ul style="list-style-type: none"><li>The president acts as the convener and is responsible for the research and discussion of industrial safety and environmental protection related matters to prevent occupational accidents and pollution incidents, improve the safety and hygiene of the working environment and strengthen environmental safety and health management. meeting are held once a quarter, the discussion includes climate change and environmental protection issues, e.g. formulating environmental and energy-saving performance indicators, tracking and improving greenhouse gas inventory results.</li><li><b>Energy Conservation Task Force</b> The Plant Engineering Department acts as the convener, conducts discussions and research on energy conservation issues and energy management in each factory area every year, and compiles and provides annual energy conservation statistics in the report of the EHS Committee.</li></ul>	<ul style="list-style-type: none"><li>In order to operate climate governance smoothly, a "Risk Management Task Force" was established under the Risk Management Committee. It operates in the form of task grouping. The president serves as the team leader, appoints a deputy team leader, and the corporate governance supervisor serves as the executive secretary. Quarterly meetings are held to discuss risk issues, including the impacts and hazards of extreme weather on the company's operations. Submit relevant contents to the risk management committee for discussion to implement the effectiveness of risk management.</li></ul>

# 3 Climate Strategy

In response to the impacts of natural disasters and evolving external regulatory environments, PTI has established both mitigation and adaptation measures, ensuring that plant operations, assets, equipment, and raw material storage and logistics are supported by a comprehensive business continuity plan. In terms of power stability, PTI has established voltage and frequency regulation systems, along with backup power supplies, to enhance the quality of electricity supply across its facilities. Additionally, the ISO 50001 Energy Management System has been implemented to improve energy efficiency. Regarding renewable energy, in addition to procurement, the company has obtained Board approval to invest in energy projects, ensuring a stable supply in the future. For water resource management, we actively improve water recycling efficiency and promote water conservation and reuse initiatives to address the challenges posed by reduced rainfall and increasing drought frequency, thereby strengthening our water adaptation capacity.

## Mitigation Management | Identifying Carbon Hotspots – Greenhouse Gas (GHG) Inventory, Product Carbon Footprint

### GHG Inventory

Since 2016, PTI has conducted annual organizational greenhouse gas (GHG) inventory management processes. These processes were established in accordance with internationally and domestically recognized guidelines, including ISO 14064-1:2018 and the GHG Protocol, to ensure consistency, accuracy, and transparency in emissions accounting. The 2024 PTI GHG emissions data consists of actual inventory checks performed at respective plants. The data encompasses operation-related direct GHG emission sources (Category 1), energy indirect GHG emission sources (Category 2) and other indirect GHG emission sources (Category 3 to 6). Direct GHG emissions (Category 1) were 7,455.97 MtCO<sub>2</sub>e, energy indirect GHG emissions (Category 2) were 339,416.97 MtCO<sub>2</sub>e, and the total annual emissions of Category 1 and Category 2 were 346,872.94 MtCO<sub>2</sub>e. The Category 1 direct GHG emissions accounted for around 2.15% of total emissions, while the Category 2 indirect GHG emissions accounted for approximately 97.85% of total emissions. This is predominantly generated using externally purchased electricity. Therefore, PTI's GHG reduction strategy focuses on electricity management and reducing electricity consumption. A power-saving target has been set, aiming for an annual electricity saving rate of 1% to effectively achieve the goal of reducing greenhouse gas emissions.

PTI conducted annual GHG inventories and internal reduction initiatives, while proactively identifying Category 3-6 emission sources. Through ISO 14064-1 verification, high-impact reduction hotspots are identified to guide targeted mitigation actions.



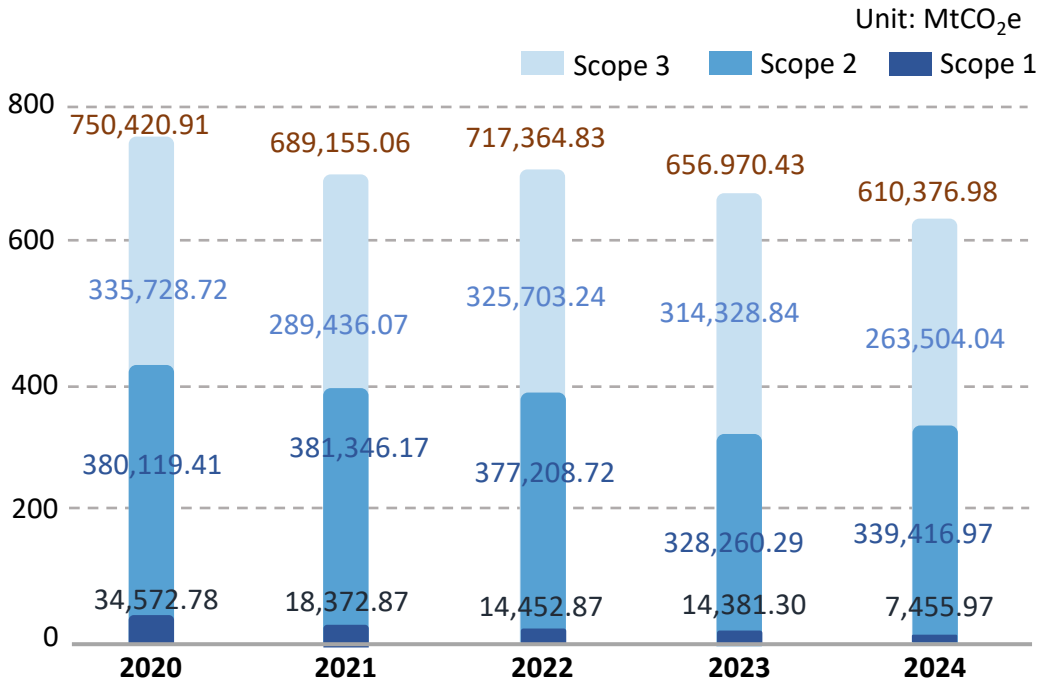


Greenhouse Gas Emissions Status

PTI conducts annual carbon inventories in accordance with ISO 14064-1:2018 and other relevant standards and undergoes third-party verification to identify sources and quantities of carbon emissions, serving as the foundation for carbon reduction planning.

(Unit: MtCO <sub>2</sub> e)					
Items	2020	2021	2022	2023	2024
Scope 1	34,572.78	18,372.82	14,452.87	14,381.30	7,455.97
Scope 2	380,119.41	381,346.17	377,208.72	328,260.29	339,416.97
Scope 3	335,728.72	289,436.07	325,703.24	314,328.84	263,504.04
Total	750,420.91	689,155.06	717,364.83 <small>Note</small>	656,970.43	610,376.98

Note: Carbon emissions increased in 2022 due to the commissioning of the new Plant (P11B).



Carbon Reduction Measures

PTI is actively implementing carbon reduction measures for Scope 1, Scope 2, and Scope 3 emissions, as outlined below:

Items	Description	Carbon Reduction Measures
Scope 1	<ul style="list-style-type: none"><li>The emissions include stationary combustion sources, mobile combustion sources, process emissions, and fugitive emissions. Among these, fugitive emissions constitute the majority. The primary sources of fugitive emissions are fluorinated refrigerants (HFCs and PFCs) used in cooling and refrigeration equipment, as well as specialized fluorinated lubricants.</li></ul>	<ul style="list-style-type: none"><li>In alignment with national regulations and policies, the company is gradually reducing the use of fluorinated refrigerants (HFCs, PFCs) and specialized fluorinated lubricants.</li><li>When refilling refrigerants or fluorinated lubricants, and when procuring cooling and refrigeration equipment, the company prioritizes the use of low-GWP refrigerants or environmentally friendly alternatives that are not classified as greenhouse gases, in order to reduce overall usage.</li></ul>
Scope 2	<ul style="list-style-type: none"><li>Primarily from the use of purchased electricity.</li></ul>	<ul style="list-style-type: none"><li>Implement measures to improve energy efficiency and develop renewable energy infrastructure.</li></ul>
Scope 3	<ul style="list-style-type: none"><li>Other indirect greenhouse gas emission sources.</li></ul>	<ul style="list-style-type: none"><li>Engage suppliers and partners in value chain decarbonization efforts.</li><li>Innovation in low-carbon technologies and product design.</li></ul>

Product Carbon Footprint

In addition to conducting organizational-level greenhouse gas inventories, PTI also performs ISO 14067 product carbon footprint assessments for specific products, verified by a third party. This process identifies carbon emission hotspots throughout the product life cycle from raw material extraction, manufacturing, and distribution, to usage and disposal enabling the implementation of management measures to effectively reduce emissions and fulfill the company’s commitment to carbon reduction.

Mitigation Management | Advancing Energy Management - ISO 50001 for Energy Savings, Renewable Deployment

Implementing ISO 50001 to improve energy efficiency

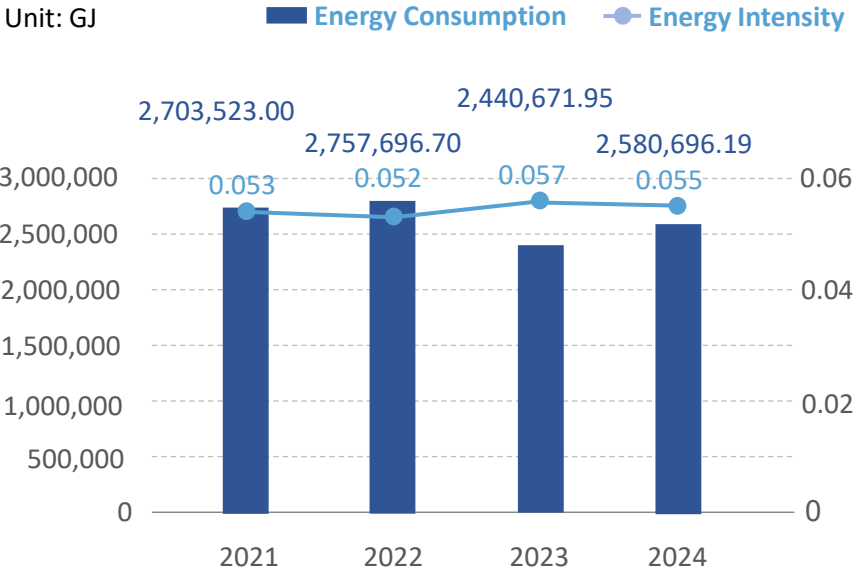
PTI’s energy sources include electricity, natural gas, and diesel, primarily supplied by public utilities. Electricity is the dominant source, contributing over 95% of total carbon emissions. Eight facilities are ISO 50001 certified, with energy-saving measures implemented across equipment, processes, and buildings, such as upgrading cooling systems, replacing old dryers, recycling process water, optimizing machine settings, improving lighting, and enforcing power-off protocols to reduce energy consumption and enhance operational efficiency.

PTI Energy Consumption in 2024

Energy Type	Consumption Amount	Energy Conversion (GJ)	Description
Electricity	712,134,409 kWh	2,563,683.87	<div><div></div>The increase in electricity consumption in 2024 compared to 2023 was 38,981,259 kWh (140,332.53 GJ).</div> <div><div></div>The electricity intensity was 15.05 kWh/thousand (NTD).</div>
Natural gas	427,559 m³	16,554.71	<div><div></div>The decrease compared to 2023 was 67,134 m³ (259.92 GJ).</div>
Diesel	12,120.01 L	457.61	<div><div></div>The decrease compared to 2023 amounted to 1,290.06 L (48.71 GJ).</div>

PTI evaluates energy use from an efficiency perspective, comparing electricity consumption with revenue over recent years. In 2024, energy intensity decreased by 4.31% compared to 2023. PTI remains committed to improving energy efficiency and advancing plans for renewable and alternative energy adoption.

PTI Energy Consumption and Energy Intensity





### Operational Energy Saving and Carbon Reduction

In 2024, PTI implemented various energy-saving measures across facilities, processes, and buildings, achieving a total electricity savings of 14,182,415 kWh equivalent to a reduction of approximately 7,006.1 MtCO<sub>2</sub> equivalent emissions <sup>(Note)</sup>. The achievement meets PTI’s 1% energy-saving target. A total of 159 energy-saving and carbon-reduction initiatives were carried out in two main areas: facility management and manufacturing processes, aimed at reducing energy consumption and greenhouse gas emissions.

Note: The carbon dioxide equivalent (CO<sub>2</sub>e) is calculated based on the 2023 electricity emission factor (0.494 kg CO<sub>2</sub>e/kWh) announced by the Taiwan Ministry of Economic Affairs Energy Administration.

#### PTI Energy Conservation and Carbon Reduction Measures

Category	Description of Measures	Number of Measures	Power Consumption Reduction (Unit: kWh)	Carbon Emission Reduction (Unit: MtCO <sub>2</sub> e)
Equipment Replacement	■ Replacement of dryer equipment	23	1,705,408	842.5
	■ Replaced the pump with an IE3 energy-saving motor			
	■ Cooling tower filter material replacement			
Parameter Optimization	■ Cleaning and maintenance of the chiller condenser	83	7,405,683	3,658.4
	■ Compressed air system PCW cooling water switched to chilled water supply			
	■ Adjustment of the operating hours and frequency of regional fans			
	■ Adjusting air compressor operation according to production capacity planning			
	■ Parameter optimization of the factory equipment in response to the climate			
	■ Optimization of air intake in the server room			
Lighting Replacement	■ Use high-efficiency LEDs	52	1,550,864	766.1
	■ Adjusting lighting control methods in certain areas			
Solar Energy	■ Installed solar panels for self-generated and self-consumption in Datong Plant (3A/3B/3C/3D), Wenhua Plant 1 (P9) and Xinxing Plant (P10)	1	3,520,460	1,739.1
Total		159	14,182,415	7,006.1

Renewable Energy Deployment

Regarding the use of renewable energy (green electricity), PTI generated a total of 3,520,460 kWh (12,673.66 GJ) of renewable energy in 2024, all for self consumption. Additionally, 20,894,000 kWh (75,218.4 GJ) of externally purchased renewable energy was transferred for renewable energy use. In 2024, PTI's total renewable energy usage amounted to 24,414,460 kWh (87,892.06 GJ), contributing to the reduction of carbon emissions associated with electricity consumption. Moving forward, the company plans to increase renewable energy procurement by 15 million kWh for transfer in 2025, with the annual renewable energy usage expected to reach 37.5 million kWh.

Renewable Energy Target

- Use of renewable energy to reach 5% in 2025, 15% in 2030.
- Aligning with RE100: Toward 100% Renewables by 2050.

Active Renewable Energy Strategy

In May 2025, PTI’s board approved an investment in a renewable energy project in partnership with Daypower Energy Co., Ltd. A special purpose vehicle (SPV) was established to support this initiative, with the primary goal of expanding renewable energy deployment through solar power investment.

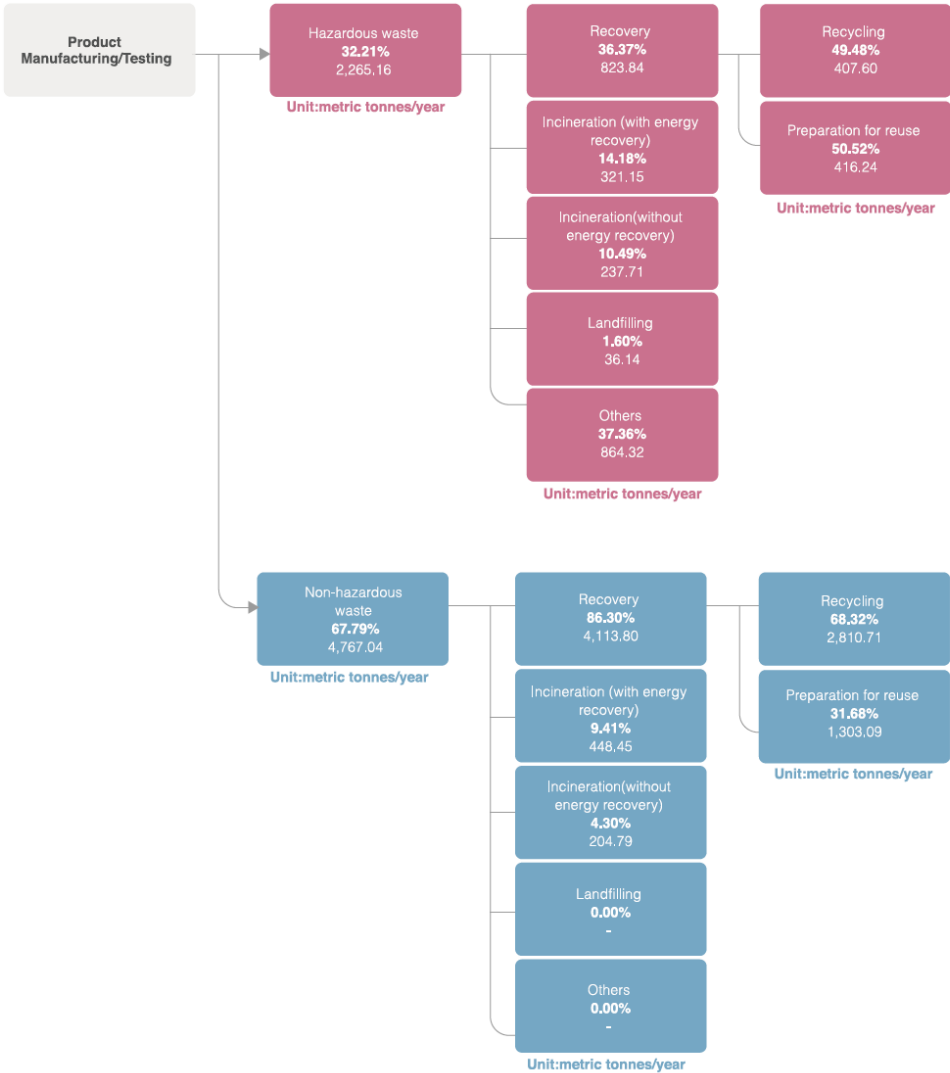
Mitigation Management | Advancing Circular Economy - Waste Management

In 2024, PTI produced a total of 7,032.20 metric tonnes of waste, reducing the waste intensity by 18.0% compared to the base year, exceeding the shortterm target (6% reduction in waste intensity in 2024 compared to 2018). The output is properly cleaned by qualified cleaning manufacturers, of which 2,265.16 metric tonnes of hazardous waste are produced, mainly for waste liquid generated in the wafer cleaning process, 4,767.06 metric tonnes of non-hazardous waste are produced, and the bulk is inorganic sludge generated in the wastewater treatment process.

By continuously increasing the number of recycling and reusing institutions, and gradually adjusting the flow of waste treatment, the non-hazardous waste recycling

rate reached 95.7%, with a rate of 86.3% without energy recovery, exceeding the short-term target of over 80% in 2024, and maintaining the achievement of zero landfill of non-hazardous waste. In 2024, the recycling rate of hazardous waste exceeded 50%, with a rate of 36.4% without energy recovery.

PTI Waste Generation and Disposal





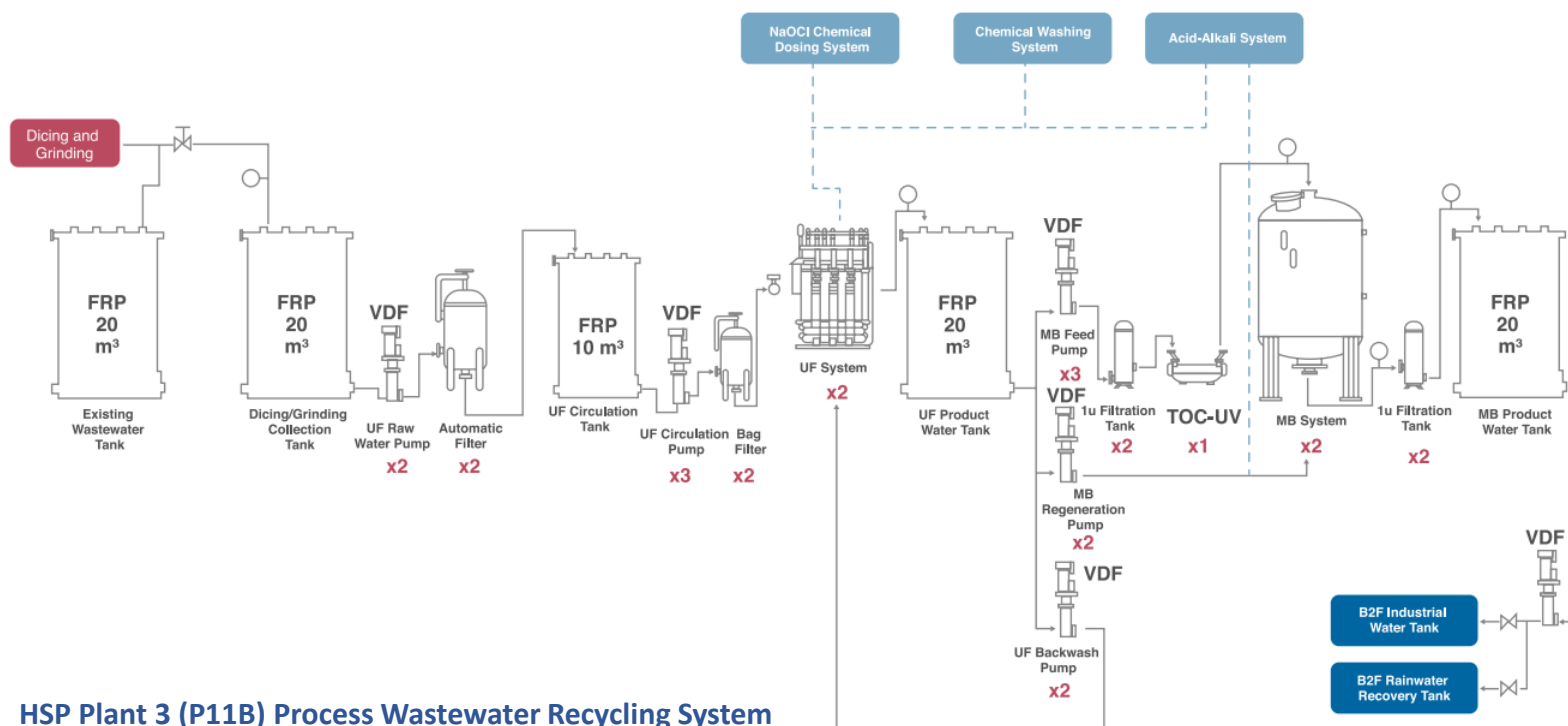
## Adaptation Management | Water Sustainability - Process Water Conservation, Enhanced Water Management

PTI primarily sources its water from municipal supply, accounting for 98.8% of total usage, with the remaining 1.2% coming from groundwater (well water) <sup>Note</sup>. To ensure effective water resource management, the company obtained ISO 46001 Water Efficiency Management System certification in 2024. Water usage data is regularly collected and monitored through the EHS Committee. The identification, assessment, and management of water-related risks are reported to the Risk Management Committee, establishing a comprehensive water governance framework. The Risk Management Committee also provides annual reports to the Board of Directors.

Note: PTI has installed a well as a backup water source, which is regularly inspected and only activated during water shortages.

PTI installed wastewater recycling systems at sites with dicing and grinding processes, expanding capacity based on production needs. The system uses reliable, easy-to-maintain components to improve recovery volume and efficiency. From 2018 to 2024, recovery performance consistently exceeded the 85% target. The recycling rate of the dicing and grinding process recycling water system in PTI was 86.89% in 2024. The water recycled in the packaging process in 2024 totaled 1,528.50 megaliters, which was an increase of 246.138 megaliters (an increase of approximately 19.19%) compared to 2023 mainly due to the process adjustments. The plants will continue to improve their systems and adopt reliable and easy-to-maintain key components to increase the amount of water recycled and enhance the recycling efficacy. In 2024, the process water recycling system in HSP Plant 3 (P11B) was officially launched.

PTI has actively implemented process wastewater recycling in all plants by applying a Ultra-Filtration (UF) system to filter out insoluble solids through the hollow fiber membrane, to steadily recycle and reuse the wastewater from the dicing and grinding process.



## Process Water Conservation

PTI has actively invested in building a wastewater recycling system for its production facilities. To align with overall capacity planning, the system continues to expand, incorporating highly reliable and easy-to-maintain key components. This enhances water recovery and reuse efficiency, ensuring system performance remains above 85%, significantly surpassing the original target.

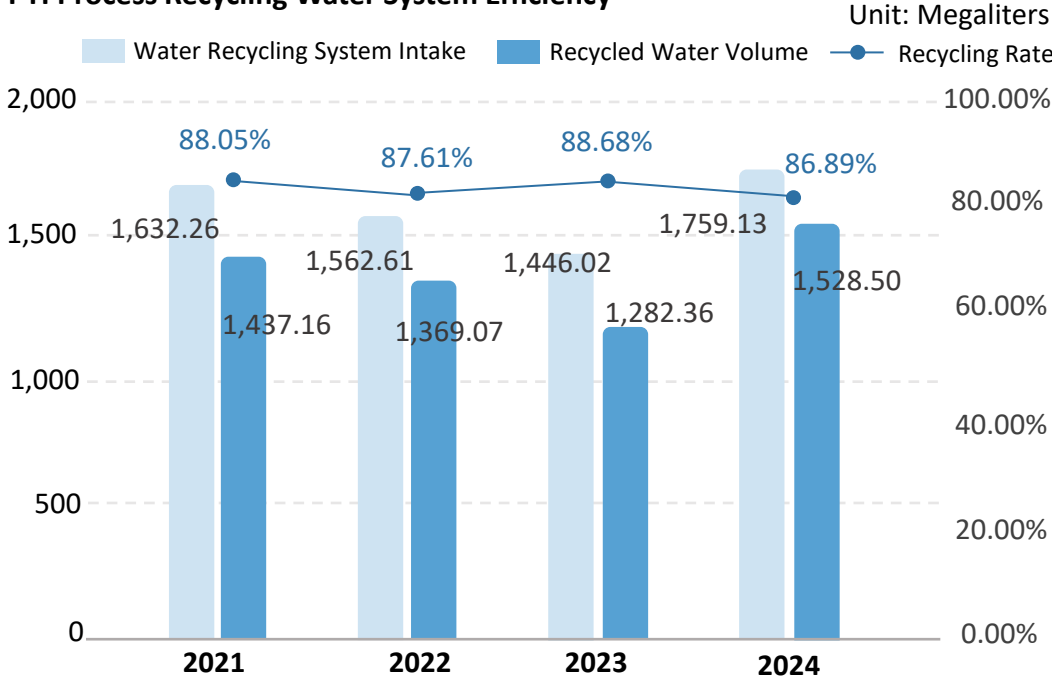


## Enhancing Water Efficiency and Management

In addition to emergency response measures, PTI integrates water resource management into daily operations, actively improving water conservation and usage efficiency. Key water recycling initiatives include process wastewater reuse, greywater recycling, rainwater harvesting, and domestic water-saving practices, ensuring efficient water circulation and reducing overall consumption to enhance sustainability.

To strengthen water-saving efforts, the facilities are equipped with environmental and water-efficient systems, such as low-flow faucets, irrigation systems, and water-saving restroom fixtures. Regular awareness campaigns and employee training further reinforce water conservation, ensuring long-term effectiveness of these measures.

PTI Process Recycling Water System Efficiency



Category	Description of Measures
Process Wastewater Recycling	Accounting for the majority of water recycling, the recovery efficiency reached 86.89% in 2024.
Reclaimed Water Recycling	Applied to cooling tower water, toilet water, etc.
Rainwater Recycling	Storage and application for cleaning water, gardening plant watering, etc.
Domestic Water Conservation	Purchasing appliances and faucets with water-saving labels; promoting personal water-saving habits.

Adaptation Management

Clean Tech -  
Investing in Low-Carbon Innovation and Technology R&D

In response to climate change and resource challenges, PTI actively promotes energy-saving and low-carbon initiatives, driving process and product transformation. The company focuses on developing low-carbon solutions, including fine-pitch interposers with TSV and advancing Chip-on-Wafer (CoW) capabilities. These efforts support next-generation products such as logic chips, HBM, and heterogeneous integration for AI applications. Collaboration with customers and suppliers further strengthens R&D momentum and manufacturing competitiveness.



Strategy

- Annually identify climate-related risks and opportunities based on the TCFD framework (please refer to Chapter 4 “Climate Risk Management” of this report).
- Adopted and implemented the development strategy of "Clean Tech".
- Invested in the development of "Clean Tech", such as FOPLP (fan-out panel level packaging) and advanced packaging.

Ratio of R&D Expense to Revenue	Investment in R&D Expenses such as FOPLP, Advanced Packaging, etc.	Annual Revenue	Annual Revenue in FOPLP, Advanced Packaging, etc.
<ul style="list-style-type: none"><li>■ R&amp;D expenses represented 5.14% of net operating income in 2024, marking an increase from the previous year.</li><li>■ R&amp;D expenses accounted for 71.3% of annual operating expenses in 2024.</li></ul>	<ul style="list-style-type: none"><li>■ In 2024, the R&amp;D expenses of FOPLP and advanced packaging will account for 58.17% of the overall R&amp;D expenses, and there is a trend of continuous growth.</li></ul>	<ul style="list-style-type: none"><li>■ In 2024, PTI’s individual revenue was NT\$47.314 billion, marking an 11.9% increase from 2023.</li></ul>	<ul style="list-style-type: none"><li>■ In 2024, the revenue of FOPLP and advanced packaging will account for &lt; 5% of the overall revenue, but there is a tendency for continuous growth.</li></ul>



## Green Packaging, Smart Innovation: PTI's Low-Carbon Product Journey

### FOPLP - Leading the Future of Green Packaging Innovation

The breakthrough in FOPLP (Fan-Out Panel Level Packaging) technology marks a key milestone for PTI in green packaging. Recognized as a next-generation advanced packaging trend, FOPLP reflects PTI's commitment to low-carbon innovation and leads the industry toward a more efficient and sustainable future.

- The biggest difference between FOPLP and traditional packaging technologies lies in its use of larger panel sizes, which allows for simultaneous packaging of more chips. This significantly enhances production efficiency while reducing energy consumption and material usage per unit product. FOPLP technology also enables thinner, lighter, and smaller packages, meeting the miniaturization and lightweight requirements of mobile and wearable devices.
- In 2018, PTI established a FOPLP mass production facility to meet the rapid development of emerging technologies such as 5G, AI, and automotive electronics. As market demand for FOPLP packaging surged, PTI leveraged its technology and forward-looking strategy to successfully seize the market opportunity.

### New Product Development: Sustaining the Green DNA

- Continuously exploring green packaging technologies and applying them to the development of new products - for example, actively developing heterogeneous integration 2.5D/3D packaging technologies, which enable the integration of chips with different functions into a single package, thereby achieving higher product performance and reduced power consumption.
- PTI continues to develop critical silicon photonics and Co-Packaged Optics (CPO) technologies for AI data center optical communication modules, while expanding HBM (High Bandwidth Memory) capacity to meet the growing demand for AI packaging.
- Committed to developing more environmentally friendly packaging materials, such as biodegradable biomaterials and recyclable regenerated materials, to further reduce the environmental impact of products. Powertech Technology's new product development revolves around the concept of "low carbon", aiming to continuously innovate and provide customers with more eco-friendly and efficient packaging solutions.



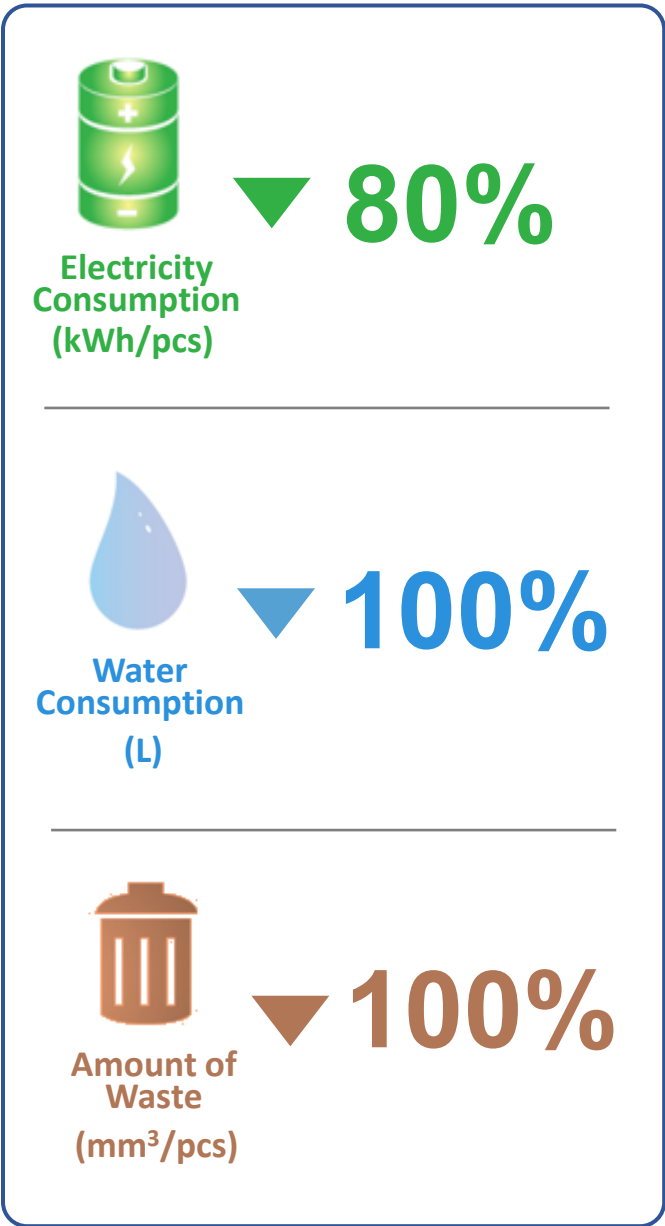
PTI is committed to developing low-power, high-performance products and collaborates with leading global partners to advance next-generation memory solutions, achieving significant breakthroughs in both performance and energy efficiency.

### Low-Carbon Packaging Technology

As semiconductor wafer saw technology continues to evolve from traditional Blade Saw process to Stealth Dicing (SD) technology. In 2017, PTI began to gradually introduce this technology into the process and now the process has introduced 40% of Stealth Dicing technology which has significantly reduced electricity consumption by 80% and save water consumption by 100%, as well as using this technology to destroy wafers to achieve zero silicone waste emissions and improve the quality of the process. Although the equipment cost is relatively high, we continue to implement ESG sustainability and actively invest in the development of this technology to achieve green and sustainable low-carbon goals.

#### Wafer Dicing Technology Converts “Blade Saw” to “Stealth Dicing”

Items	Blade Saw	Stealth Dicing
Equipment Cost	Low	High
Range of Cutting Damage	Large	Little
The Amount of Waste	High (326 mm <sup>3</sup> /pcs)	Low (0 mm <sup>3</sup> /pcs) (zero silicone)
Cost of Waste	High	Low
Operating Time	Long (20 min/pcs)	Short (4 min/pcs)
Electricity Consumption	High (1.3 kWh/pcs)	Low (0.15 kWh/pcs)
Water Consumption	High (195 L/pcs)	Low (0 L/pcs)





## Joint Carbon Reduction in the Supply Chain

To support the 2050 net-zero emissions target, PTI participated in the program “Advancing Low-Carbon and Smart Transformation in the Manufacturing Industry,” which ran from November 2023 to August 2025. A total of 13 companies joined this carbon reduction initiative, which is projected to reduce carbon dioxide emissions by 5,667 metric tonnes by the end of the project.

### Action Plan

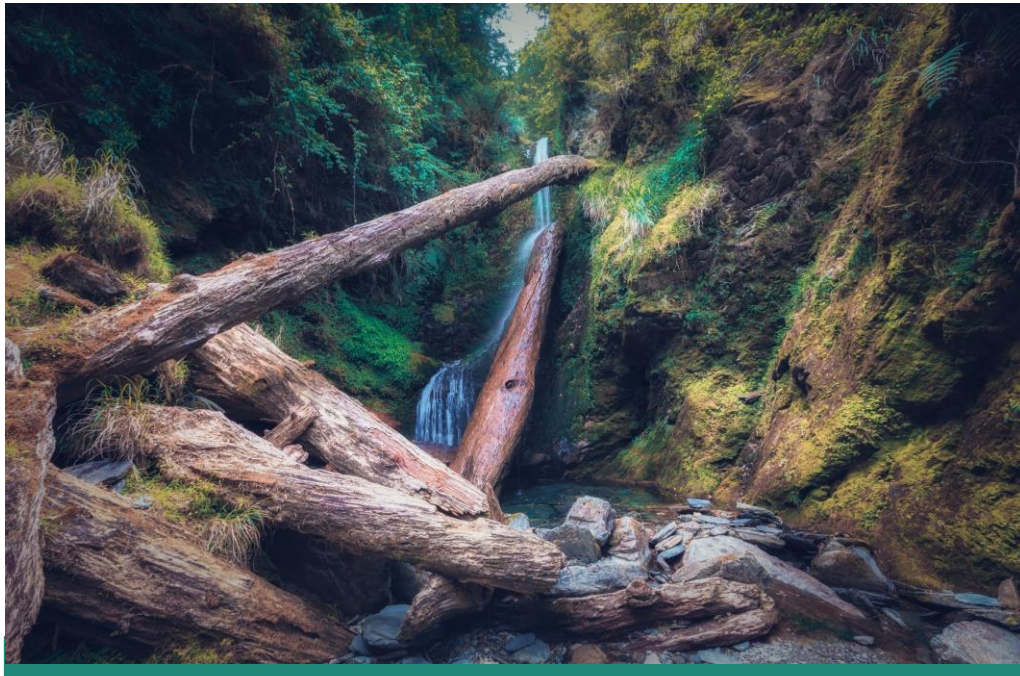
- Work together with customers and suppliers to create a low-carbon and power-saving production environment.
- Conduct an organizational greenhouse gas inventory and the product carbon footprint inventory to identify carbon emission hotspots in the product manufacturing process and make improvements.





# 4 Climate Risk Management

The identification of climate-related risks and opportunities at PTI is led by the Sustainability Development Management Dept. By integrating external information with internal operational insights, the team develops climate risk and opportunity assessment items. Cross-functional representatives from facilities, EHS, R&D, sales, supply chain management, regulatory compliance, and finance departments are convened for TCFD workshops to review and discuss these items. In 2024, PTI identified 10 climate risk factors and 8 climate opportunity factors. Risk identification is based on a combined evaluation of the likelihood of occurrence and the degree of impact, with the top two risks classified as high-risk. A similar methodology is applied to identify climate opportunities, with the top two ranked as material opportunities and identified potential risks and opportunities across short-, medium-, and long-term horizons for the organization's future operations.



## Climate Scenario Setting

Climate-related risks and opportunities have a significant impact on the company's strategy and financial planning. To formulate appropriate responses, PTI conducts both quantitative and qualitative climate scenario analyses. Using the 2°C scenario (2DS), the 1.5°C scenario, and the high-emissions scenario (RCP 8.5) as the basis for assessment, we evaluate the probability, potential scale, and site-specific implications of climate hazards. This comprehensive analysis helps identify potential physical and transition risks, as well as related opportunities under future climate conditions, thereby enhancing climate resilience and informing strategic planning.

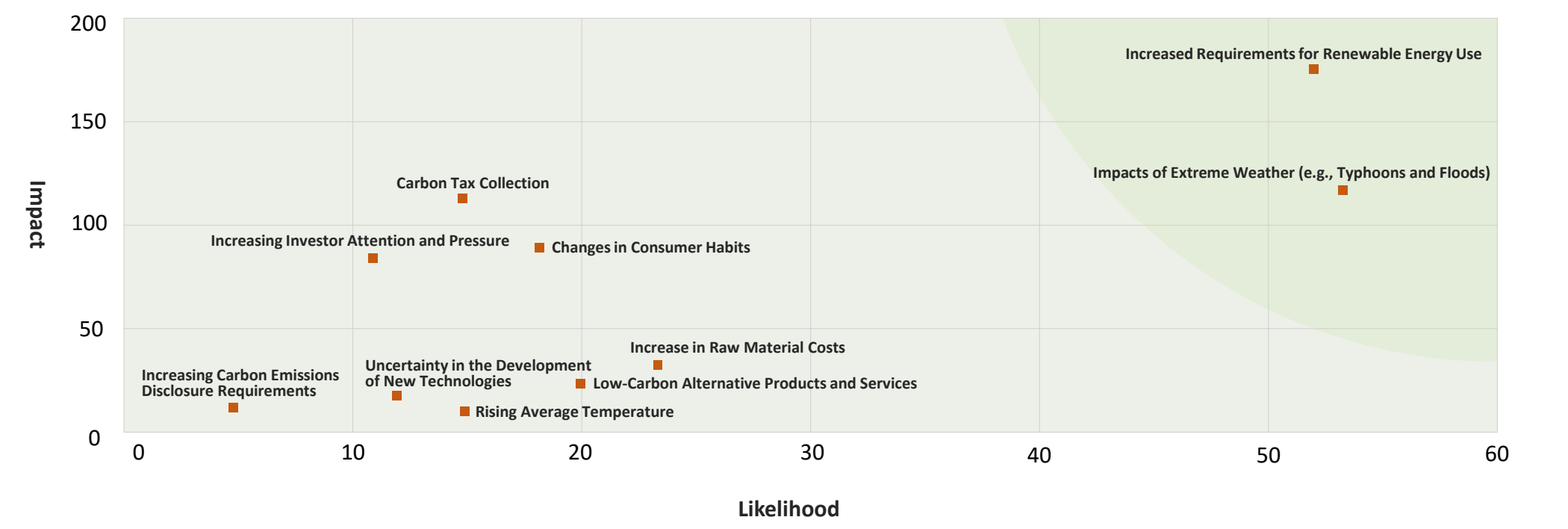
## Process for Climate Risks and Opportunities Identification

- 1 Collect issues to make a list for climate risks and opportunities evaluation.
- 2 Identify climate risks and opportunities.
- 3 Assess the climate risk and opportunity impact level/likelihood of occurrence.
- 4 Rank the climate risks and opportunities.
- 5 Risk and opportunity matrix output.
- 6 Formulate countermeasures and take action.

## Climate Risks Identification

According to the results of the climate risk matrix, the top two major risks are primarily concentrated in the “Policy and Legal” and “Physical Risks” category. Based on the combined assessment of likelihood and impact, the highest-ranked risks are: (1) increased requirements for renewable energy use, and (2) impacts of extreme weather (e.g., typhoons and floods). In response, PTI has established control measures, conducted resource assessments for mitigation actions, and evaluated potential areas for future enhancement.

### Climate Risks Matrix



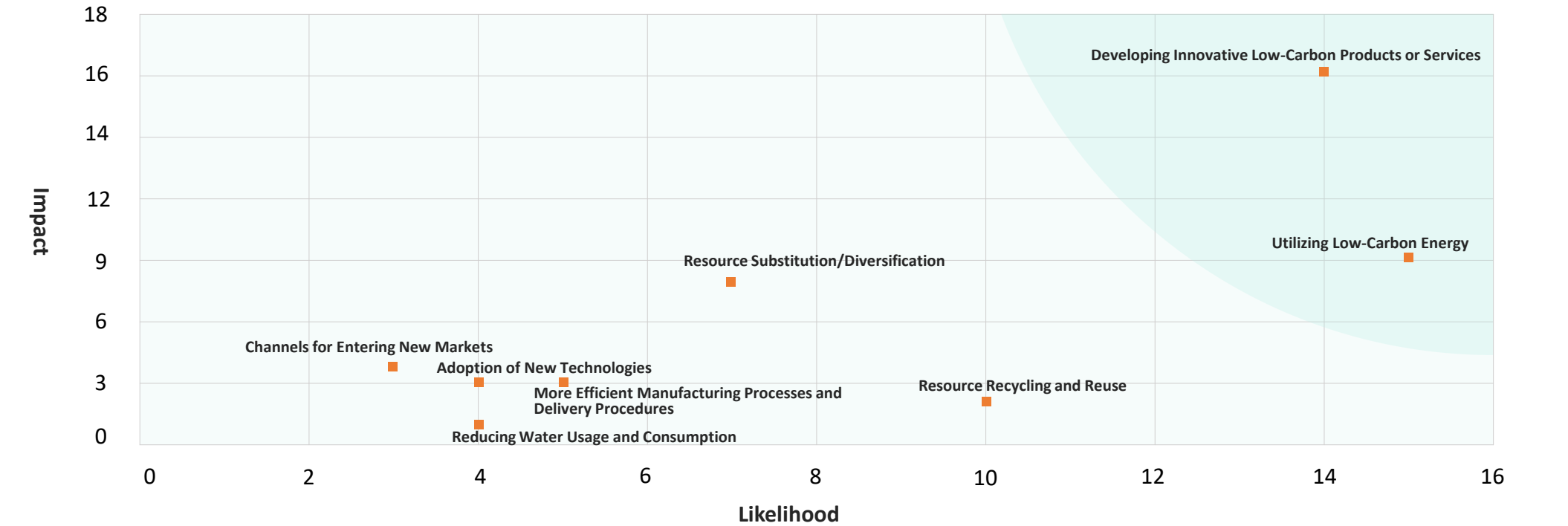
Climate risks are identified and categorized as follows:

Risk Category	Risk Factor	Time	Likelihood	Degree of financial impact	Ranking
Policy and Legal	Increased Requirements for Renewable Energy Use	Short-term	Very High	High	1
Physical Risks	Impacts of Extreme Weather (e.g., Typhoons and Floods)	Short-term	Very High	High	2

## Climate Opportunities Identification

Based on the materiality of opportunity factors across categories such as resource efficiency, energy source, products and services, markets, and resilience, PTI has identified its top two climate-related opportunities. According to the climate opportunity matrix, these opportunities primarily fall under the “Products and Services” and “Energy Sources” categories. The highest-ranked opportunities, based on the combined assessment of likelihood and impact, are: (1) developing innovative low-carbon products or services, and (2) utilizing low-carbon energy. In response, PTI will actively evaluate potential implementation strategies to maximize the benefits of these climate opportunities.

### Climate Opportunities Matrix



Climate opportunities are identified by category as follows:

Opportunity Category	Opportunity Factor	Time	Likelihood	Degree of financial impact	Ranking
Products and Services	Developing Innovative Low-Carbon Products or Services	Short Term, Medium Term, Long Term	Very High	High	1
Energy Source	Utilizing Low-Carbon Energy	Short Term	Very High	High	2



## Major Climate Risks and Opportunities

PTI assesses climate-related risks and opportunities and evaluates their impact on organizational operations. Risks are prioritized based on their significance to enable effective resource allocation. For the identified climate risks and potential opportunities, the company formulates concrete and actionable response strategies to enhance resilience, seize sustainable transition opportunities, and ensure robust corporate development.



## Climate-related Financial Impact Analysis

Category	Climate-related Risk (▲) / Climate-related Opportunity (★)	Potential Financial Impact	Response Plans	Administrative Cost
Physical Risks / Climate-related Opportunity	▲ Impacts of Extreme Weather (e.g., Typhoons and Floods) (short-term) ★ Resource Recycling and Reuse (short-term) ★ Reducing Water Usage and Consumption (medium-term)	■ Conditions affect production and cause financial losses and decreased revenue. ■ Unstable prices of material supply increase operating costs.	■ Strengthen the management and monitoring of water resources and introduce the ISO 46001 Water Efficiency Management System to reduce the risk of water shortage or flood disasters. ■ Implement waste recycling and reduce waste generation. ■ Operate the ISO 22301 Business Continuity Management Systems to strengthen the resilience of disaster response and recovery.	■ About NT\$8 million is invested annually in water resource management, circular economy, and the building of disaster and response capabilities.
	▲ Rising Average Temperature (long-term)	■ Increase in electricity consumption, cost, and carbon emissions.	■ Implement energy conservation projects. ■ Install rooftop renewable energy facilities.	■ About NT\$6 million is invested annually in implementing ISO 50001 and various energy saving and carbon-reduction measures. ■ Annually, NT\$60 million is allocated for renewable energy infrastructure and certificate procurement.

## Climate-related Financial Impact Analysis

Category	Climate-related Risk (▲) / Climate-related Opportunity (★)	Potential Financial Impact	Response Plans	Administrative Cost
Transition Risks / Climate-related Opportunity	▲ Increased Requirements for Renewable Energy Use (short-term) ★ Utilizing Low-Carbon Energy (short-term)	■ Directly increases operational costs and requires additional expenditure for renewable energy infrastructure.	■ Established a renewable energy procurement project team. Set up renewable energy power generation facilities (solar panels) and energy storage facilities and purchased renewable energy certificates to ensure a stable supply of renewable energy sources. ■ Continue to focus on renewable energy regulations, development trends, and customer requirements and plan follow-up management measures.	■ Annually, NT\$60 million is allocated for renewable energy infrastructure and certificate procurement.
	▲ Increasing Requirements for Carbon Emission Disclosure (short-term)	■ Increased operating costs due to customer and regulatory disclosure requirements.	■ Implement ISO 14064-1 greenhouse gas inventory and establish a carbon emissions inventory subject to third-party certification. ■ Conduct annual ISO 14067 product carbon footprint inventory for specific products and third-party certification to understand related product carbon emission hotspots. ■ Participate in the disclosure of climate-related information, such as CDP and self-prepared TCFD reports.	■ Approximately NT\$1.5 million is invested annually in greenhouse gas inventory and carbon information disclosure.
	▲ Carbon Tax Collection (short-term) ★ Resource substitution/diversification (medium-term)	■ Increased operating costs (e.g., purchase/repairs of energy conservation and carbon reduction facilities and operating costs).	■ Establishment and operation of the ISO 50001 Energy Management Systems. ■ Implement energy efficiency improvement projects, replace old equipment, factory facilities, and other energy-saving and carbon-reduction measures.	■ About NT\$6 million is invested annually in implementing ISO 50001 and various energy saving and carbon-reduction measures.
	▲ Uncertainty in the Development of New Technologies (short-term) ▲ Changes in Consumer Habits (medium-term) ★ Adoption of New Technologies (short-term)	■ Decrease in product orders and increase in additional communication costs for the client.	■ Establish a monitoring mechanism for relevant laws, regulations, and trends, and make good use of multiple channels to maintain smooth communication and engagement with stakeholders. ■ Voluntarily join domestic and foreign climate-related organizations or initiatives.	■ About NT\$4.5 million is invested annually in research and monitoring regulations and trends, establishing multiple communication channels and participating in domestic and international initiatives.
	▲ Increasing Investor Attention and Pressure (medium-term)	■ Unable to satisfy the stakeholders' expectations, resulting in damage to the company's reputation.	■ Disclose the company's low-carbon and sustainability actions with transparency and openness for responding to climate change to improve the company's sustainability image.	
	▲ Low-Carbon Alternative Products or Services (long-term) ★ Channels for Entering New Markets (long-term) ★ More Efficient Manufacturing Processes and Delivery Procedures (medium-term) ★ Developing Innovative Low-Carbon Products or Services (short-term)	■ Increased R&D and operating costs. ■ Capacity planning constraints (reduction in the demand for existing specific services and technologies).	■ Invest in low-carbon and eco-friendly products or processes. ■ Move towards green manufacturing processes and smart factories.	■ Investing in the research and innovation of low-carbon products, as well as raw material development, with an annual investment of approximately NT\$20 million.
	▲ Increase in Raw Material Costs (short-term)	■ The increase in the cost of energy and other raw materials leads to an increase in expenditure and a decrease in profits.	■ Continue to search for diverse suppliers to stabilize purchase prices in the market. ■ Continue to communicate with suppliers to control the increase in material costs.	

5

Metrics and Targets

PTI is committed to corporate sustainability and actively engages in climate change mitigation. In response to the Paris Agreement’s goal of limiting global warming to well below 2°C and striving for 1.5°C, the company has developed a climate strategy based on the IPCC Sixth Assessment Report (AR6) and other international references. Using 2020 as the baseline year, targets include a 5% carbon reduction by 2025, 15% by 2030, and achieving net zero emissions by 2050. Upholding the principles of uninterrupted operations and zero workplace injuries, the company continues to enhance facility resilience and disaster adaptation, with clear adaptation goals. It also actively participates in CDP climate initiatives, monitors climate trends, and strengthens climate risk awareness to meet stakeholder expectations for sustainable development.

Short, Medium and Long-term Plans for Environmental Sustainability

PTI upholds environmental sustainability and develops short-, mid-, and long-term plans for operations. Through action, it addresses key sustainability issues and strengthens its ability for long-term sustainable growth.

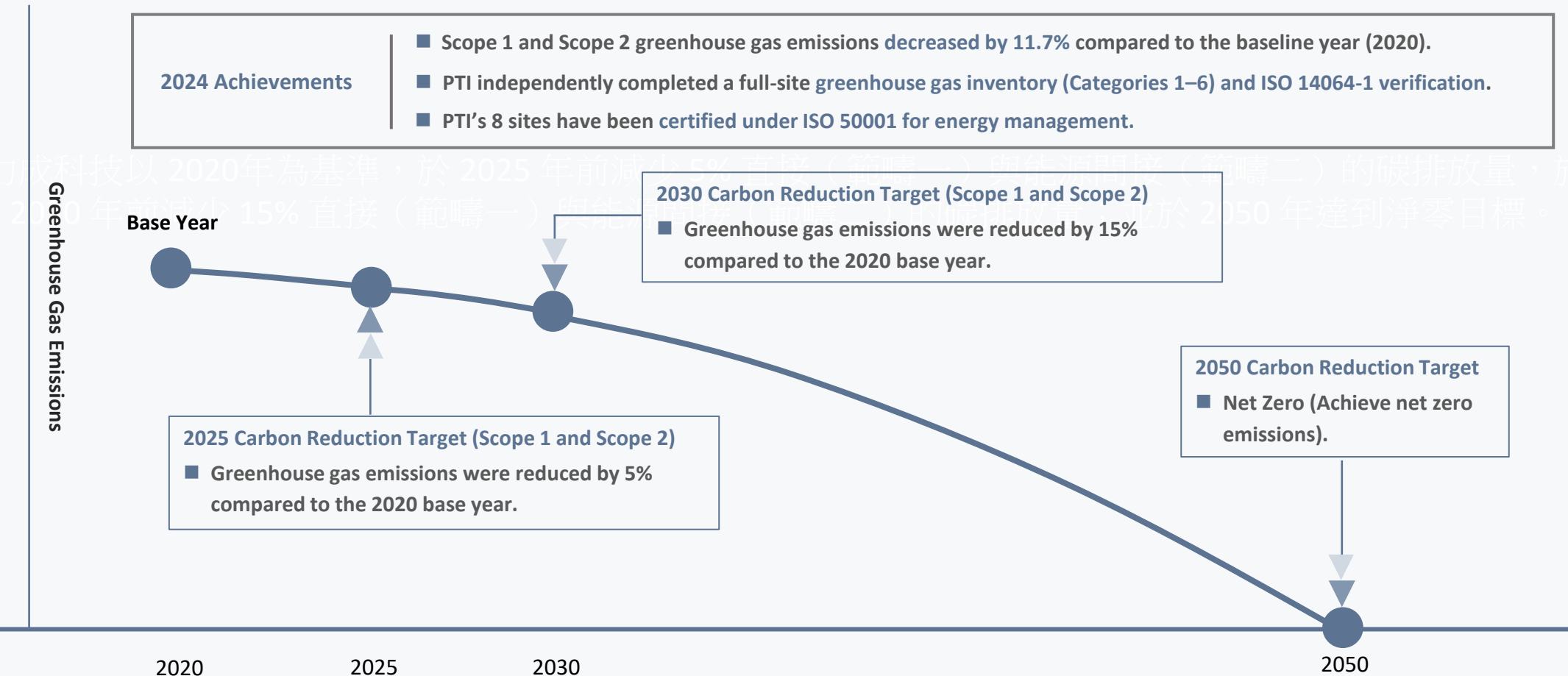
Aspect	Short-Term Plan (2025-2026 )	Medium-Term Plan (2027-2029 )	Long-Term Plan (2030-)
Environmental	<div><div></div> Achieved 1% annual power savings.</div> <div><div></div> Carbon Emissions Reduction: 5% by 2025.</div> <div><div></div> Attained 85% water recycling rate in the dicing/grinding process.</div> <div><div></div> Non-hazardous waste recycling rate reaches 85%.</div> <div><div></div> Reduce waste intensity by 7% compared to 2018.</div> <div><div></div> Datong Plant (3C) obtained Clean Production Assessment certification in 2025.</div>	<div><div></div> Continue improving water reclaim system efficiency.</div> <div><div></div> Establish a water resource management system to strengthen governance, risk control, pollution prevention, and water recovery.</div> <div><div></div> Non-hazardous waste recycling rate reaches 88%.</div> <div><div></div> Reduce waste intensity by 10% compared to 2018.</div>	<div><div></div> Carbon Emissions Reduction: 15% by 2030.</div> <div><div></div> Establish a water resource management system to strengthen governance, risk control, pollution prevention, and water recovery.</div> <div><div></div> Non-hazardous waste recycling rate reaches 90%.</div> <div><div></div> Reduce waste intensity by 12% compared to 2018.</div>



## Greenhouse Gas Reduction Targets

PTI continuously promotes energy efficiency and greenhouse gas reduction by setting measurable annual targets and implementing incentive mechanisms. Through tangible rewards, both managers and employees are encouraged to actively participate in sustainable energy management, fostering a low-carbon culture within the organization. Energy-saving and carbon-reduction efforts follow the principles of measurability, reportability, and verifiability, in alignment with UN Sustainable Development Goal 13: Climate Action. Using 2020 as the baseline year, the company aims to reduce direct (Scope 1) and energy-related indirect (Scope 2) carbon emissions by 5% by 2025 and by 15% by 2030, with a goal to reach net zero by 2050. (For detailed decarbonization strategies and measures, please refer to Chapter 3: Climate Strategy in this report.)

### PTI Net Zero Pathway



## Key Indicators to Environmental Sustainability

Aspect	Indicator	Unit of Measure	2021	2022	2023	2024	Management of Measures and Targets
Water	Water withdrawal	m <sup>3</sup>	3,017,359	2,967,257	2,780,544	3,017,526	<ul style="list-style-type: none"> <li>■ Increase the utilization of water resources and water recycling capacity.</li> <li>■ Establish a water recycling system to steadily recycle and reuse the process wastewater in the plants. Furthermore, water resource management performance is reviewed regularly.</li> <li>■ Attain 85% water recycling system effectiveness from the dicing/grinding process.</li> </ul>
	Water discharge	m <sup>3</sup>	1,991,060	2,115,966	1,967,811	2,109,579	
	Water consumption (Total net fresh water consumption)	m <sup>3</sup>	1,026,299	851,291	812,733	907,947	
	Water Intensity (Water withdrawal per individual revenue)	m <sup>3</sup> /NT\$ million revenue	58.86	56.30	65.77	63.78	
	Process water recycling rate	%	88.05	87.61	88.68	86.89	
Energy	Total energy consumption	GJ	2,703,523.00	2,757,696.70	2,440,671.95	2,580,707.04	<ul style="list-style-type: none"> <li>■ Continue to promote energy conservation programs and reduce electricity consumption by 1% per year.</li> <li>■ Launch the Green Power Purchase Project to achieve a 10% contracted capacity renewable energy requirement by 2023.</li> <li>■ Use of renewable energy to reach 5% in 2025, 15% in 2030, and 100% in 2050.</li> </ul>
	Purchased electricity	kWh	750,978,720	762,571,840	673,153,150	687,719,949	
	Total renewable energy consumption	kWh	0	146,196	8,535,594	24,414,460	
	Solar power generation	kWh	0	146,196	3,545,149	3,520,460	
	Purchased renewable energy	kWh	0	0	4,990,445	20,894,000	
	Energy savings	kWh	13,036,365	11,435,224	17,240,951	14,182,415	
	Energy intensity (Total energy consumption per individual revenue)	GJ/NT\$ thousand revenue	0.053	0.052	0.057	0.055	
Waste	Non-hazardous waste recycling rate (with energy recovery)	%	-	-	91.5	95.7	<ul style="list-style-type: none"> <li>■ Strengthen waste reduction at the source and waste recycling and reuse.</li> <li>■ Improve pollution prevention and decrease the impact on the environment.</li> </ul>
	Waste intensity (Industrial waste generation per individual revenue)	metric tonnes /NT\$ million revenue	0.16	0.15	0.15	0.15	
	Volatile organic compounds (VOCs)	metric tonnes	100.4	93.6	73.3	89.6	
Emissions	Total GHG emissions	MtCO <sub>2</sub> e	689,155.06	717,364.83	656,970.43	610,376.98	<ul style="list-style-type: none"> <li>■ Set an annual carbon reduction target of 1% and continuously implement emission reduction initiatives.</li> <li>■ Implementation of ISO 14067 Carbon Footprint Verification.</li> <li>■ Carbon reduction by 5% in 2025, 15% in 2030, and net zero in 2050.</li> </ul>
	Direct GHG emissions (Scope 1)	MtCO <sub>2</sub> e	18,372.82	14,452.87	14,381.30	7,455.97	
	Indirect GHG emissions (Scope 2) (Location-based)	MtCO <sub>2</sub> e	381,346.17	377,208.72	328,260.29	339,416.97	
	Indirect GHG emissions (Scope 3)	MtCO <sub>2</sub> e	289,436.07	325,703.24	314,328.84	263,504.04	
	GHG emissions intensity ((Scope 1 + Scope 2) emissions per individual revenue)	MtCO <sub>2</sub> e/NT\$ million revenue	7.80	7.43	8.10	7.33	
	Perfluorocarbons (PFCs) emissions	MtCO <sub>2</sub> e	98.17	6,216.56	6,627.15	3,187.09	

# 6 Prospect

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As global attention to net-zero emissions and carbon reduction initiatives continues to grow, the responsibility and influence of enterprises in promoting environmental sustainability are expanding. Sustainable development is increasingly becoming an indispensable core competitive strategy. PTI is deeply concerned about the potential impact of climate risks on operational performance and the overall stability of its supply chain. In response, the company is proactively implementing a range of measures, including the formulation of medium- to long-term strategies for climate change mitigation and adaptation, the promotion of low-carbon transformation in its products and services, and the extensive adoption of renewable energy to reduce environmental burden and carbon emissions.

Furthermore, PTI continues to implement energy-saving and carbon-reduction initiatives, extending its influence outward from the core of its operations. By encouraging employees, suppliers, and partners to jointly uphold its green commitments, the company is strengthening climate resilience and sustainable business capabilities, thereby creating long-term value across both environmental and economic dimensions.



# 7 Appendix

## About the Report

The report aligns with the TCFD recommendations issued by the Financial Stability Board (FSB), covering the four core elements: governance, strategy, risk management, and metrics and targets. It is published in both Chinese and English on PTI’s official website. For inquiries or feedback, please contact us.

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## TCFD Disclosure Comparison Table

Dimension	TCFD Disclosure Recommendation	Chapter	Page
Governance	The board’s oversight of climate-related risks and opportunities.	2 Climate Governance	06
	Management’s role in assessing and managing climate-related risks and opportunities.	2 Climate Governance	06-09
Strategy	The climate-related risks and opportunities the organization has identified over the short, medium, and long term.	4 Climate Risk Management	21-24
	The impact of climate-related risks and opportunities on the organization’s businesses, strategy, and financial planning.	4 Climate Risk Management	24-25
	The resilience of the organization’s strategy, taking into consideration different climate-related scenarios, including a 2° C or lower scenario.	4 Climate Risk Management	21
Risk Management	The organization’s processes for identifying and assessing climate-related risks.	4 Climate Risk Management	21
	The organization’s processes for managing climate-related risks.	4 Climate Risk Management	21-25
	How processes for identifying, assessing, and managing climate-related risks are integrated into the organization’s overall risk management.	3 Climate Strategy 4 Climate Risk Management	10-20 24-25
Metrics and Targets	Metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	5 Metrics and Targets	26
	Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	3 Climate Strategy 5 Metrics and Targets	10-11 28
	Targets used by the organization to manage climate-related risks and opportunities and performance against targets.	5 Metrics and Targets	26-28





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**Power To Innovate**

**Let us create new paths to sustainability one step at a time,  
towards net zero carbon emissions.**

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