

2023 TCFD

Formosa Plastics Corporation

Task Force on Climate-related Financial Disclosures Report



GREAT THINGS

SMALL BEGINNINGS

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Introduction

In recent years, warming of the planet caused by greenhouse gas (GHG) emissions has posed serious risks to the global economy. Meanwhile, it will have an impact across a lot of enterprises. However, it is difficult for investors to learn which companies are susceptible to climate change risks, which companies are adequately prepared and which ones are taking response actions. Accordingly, the Financial Stability Board (FSB) has assembled a special task force, Task Force on Climate-related Financial Disclosures (TCFD), which published its "TCFD Recommendations Report" in June 2017 after spending 18 months gathering opinions from business and financial leaders. The report provides businesses and investors with a complete and well-defined assessment framework for disclosing risks and opportunities associated with climate change and responding to financial impact.

In December 2021, to cope with the international trend, Formosa Plastics Corporation (hereinafter referred to as "FPC" or the "Company") has committed to disclose the risks and opportunities associated with climate change according to the TCFD Recommendations Report on the TCFD website, in order to demonstrate the responsibilities and strategies of FPC, thereby appropriating capital more reasonably and effectively to achieve the vision of low-carbon economic transition.



FPC's Climate Change Management Structure



Governance

- The Board of Directors is the Company's highest governing body to make decisions and supervise the Company in response to climate changes. The Chairman of the Board is the leader and is responsible for overseeing issues related to climate change.
- Furthermore, the climate change-related matters of the Company are also reported to the Board of Directors, in order to use such information as important reference and basis for establishing sustainability directives.
- Establish an energy saving and carbon reduction promotion team to handle the establishment and execution of response measures related to climate change topics. The Chairman of Board convenes energy saving and carbon reduction team meetings monthly, in order to review execution progress and target achievement outcome.
- To demonstrate the Company's determination in sustainable operations, FPC has completed the TCFD support registration on the TCFD website in December 2021.



Strategy

- Coal burning heading toward the low (zero) carbon energy transition: promote transition of coal into gas, replace old and obsolete coal-burning boilers, implement carbon capture and re-use, promote low-energy consumption hydrogen power generation technology.
- Energy saving and carbon reduction, circular economy: implement artificial intelligence (AI) technology and apply it to energy saving, equipment upgrade/process optimization, research, and develop catalyst of low energy consumption.
- Increase renewable energy consumption: construct solar power panel generation equipment and use the wind power of Formosa Heavy Industries (FHI) Corporation.
- Other carbon reduction measures: use biomass ethylene for the manufacturing of polyethylene (PE), develop recycled materials for renewable energy products, and expand the applications of light-weight products and renewable energy equipment materials.



Risk Management

- Collect, analyze, and summarize information on risks and opportunities of climate change and energy semi-annually, and identify and assess climate change-related risks and opportunities according to the "Risk Management Procedure" established in accordance with the ISO 22301 principles, framework, and spirit.
- Use a risk matrix to determine major risks and opportunities and the assessment indicator includes financial impact level and risk and opportunity occurrence probability, divided into 5 levels with the score from 1 to 5 points. If the assessment total score is greater than (or equal to) 15 points, it is considered a major risk and opportunity and is assessed to have a substantial potential impact on finance or strategy.



Indicators and Targets

- FPC uses the year of 2020 as the base year and establishes the absolute target for carbon emission reduction, including:
 - Short-term reduction target: reduction of carbon emission by 20% from the base year in 2025
 - Medium-term reduction target: reduction of carbon emission by 40% from the base year in 2030
 - Long-term reduction target: reach carbon neutrality in 2050



Chapter I Governance

1.1 Company Profile

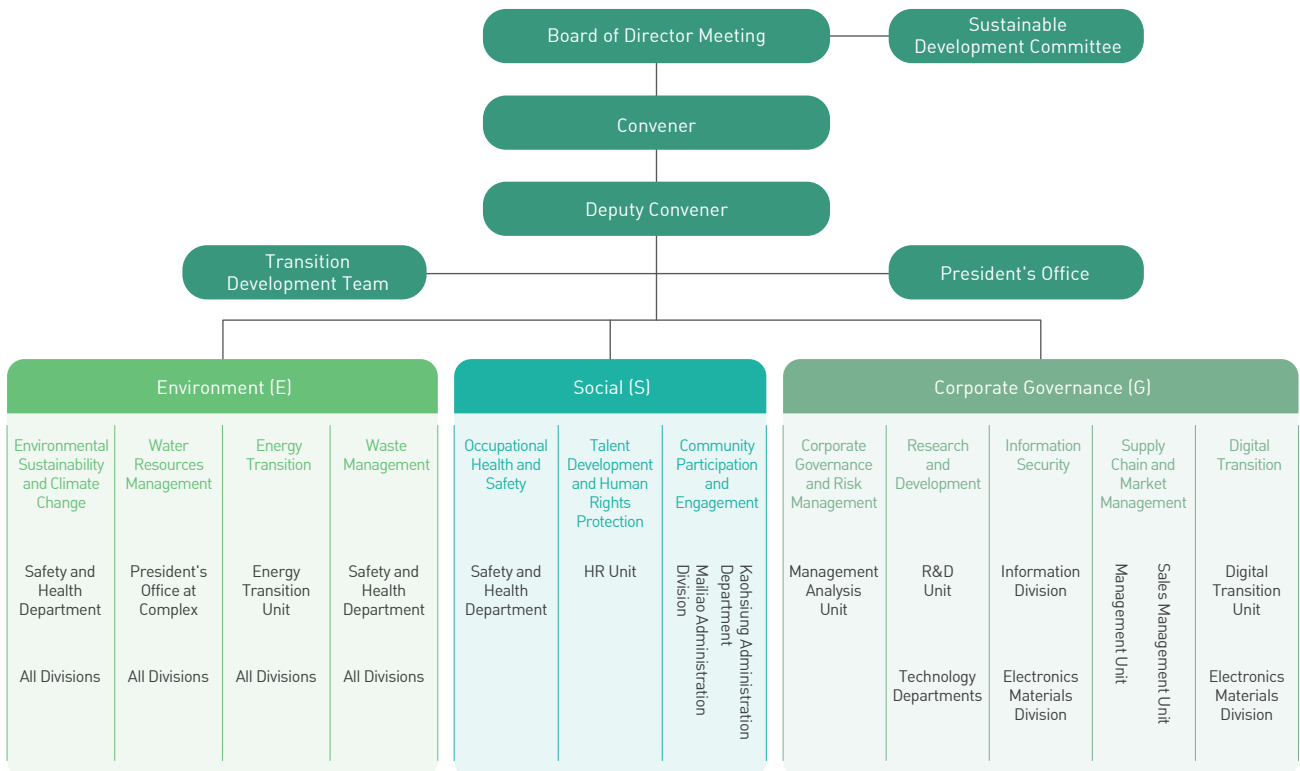
FPC’s capital is NT\$63.6 billion, and the Company’s main businesses refer to the production and sales of plastics, fibers, and raw materials of chemicals. In terms of the annual production capacity of the products including polyvinyl chloride (PVC), vinyl chloride (VCM), liquid caustic soda, acrylic ester (AE), Epichlorohydrin (ECH), n-butanol (NBA), superabsorbent resin (SAP), acrylonitrile (AN), and ethylene vinyl acetate copolymer (EVA), if the production capacities of overseas investees are also considered, FPC is ranked one of the top ten manufacturers in the world, and in terms of the other products, also comes out among the top in the world.

1.2 Organization and Responsibility

FPC believes that the focus on the Environment, Society, and Corporate Governance (ESG)-related topics and integration with various business strategies is fundamental to achieving sustainable development. Accordingly, on May 10, 2022, the Board of Directors approved the establishment of the Sustainable Development Committee, in order to enhance the review and supervision responsibility of the Board of Directors on sustainable matters of the Company’s response to climate change.

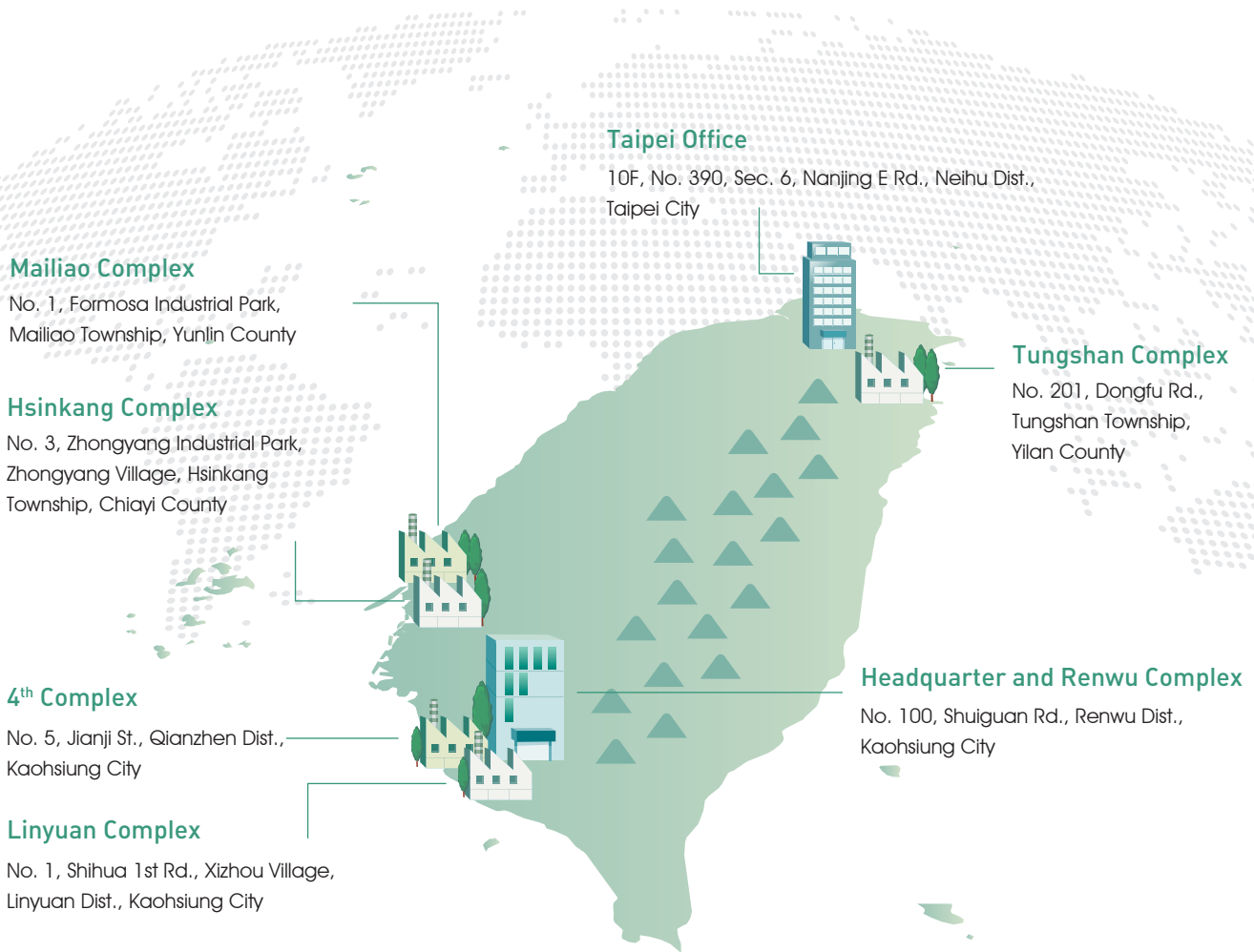
FPC has established the Sustainable Development Promotion Team (as shown in the image below). The Chairman of the Board acts as the convener, President and Senior Vice President acts as the deputy conveners, in charge of the establishment of corporate sustainability strategy, execution of the program, and promotion of social responsibility and risk management.

Sustainable Development Promotion Structure at FPC



Meanwhile, FPC has established the Energy Saving and Carbon Reduction Promotion Team, in charge of collection of climate change-related information in order to establish response strategies and action plans. In addition, the Chairman of the Board convenes Energy Saving and Carbon Reduction Team meetings monthly, in order to review execution progress and target achievement outcomes of energy conservation and carbon reduction. Furthermore, the climate change-related matters of the Sustainable Development Committee are also reported to the Board of Directors, in order to use such information as an important reference and basis for establishing sustainable development policies, strategies, and management directives.

1.3 Organization Boundary





Chapter II Strategy

2.1 Greenhouse Gas (GHG) Emission Reduction Strategy

FPC upholds the business philosophy of “Equal Emphasis on Safety, Health, Environment and Economy” and is committed to the sustainability strategies of improving pollution control measures, responding to energy saving and carbon reduction, implementing industrial reduction of wastes, achieving circular economy and promoting energy transition, etc., in order to protect our precious Earth and to become a sustainable environment creator.

With regard to the business strategy of FPC, climate change is considered an important issue and it is also a challenge to be overcome and a business opportunity to be seized by the company. In response to the global ESG development trend and the 13 climate actions of the United Nations (UN) Sustainable Development Goals (SDGs), FPC aims to achieve the goal of carbon neutrality by 2050 and has established four main aspects: coal-burning heading toward low (zero) carbon energy transition, implementation of energy saving/carbon reduction/circular economy, increase of renewable energy consumption and execution of other carbon reduction measures. The short-term, medium-term and long-term carbon reduction strategies for each aspect are explained as follows:

1 Coal-burning heading toward low (zero) carbon energy transition:

- Promote the change of high carbon emission energy sources, such as coal, to the use of energy of relatively low carbon emission, such as natural gas. For example, replace the Renwu public plant, Linyuan public plant’s existing coal-burning (fuel-burning) boilers of the company with gas-burning boilers and replace old and obsolete coal-burning boilers, etc.
- FPC and academic units engage in the research of carbon capture and re-use. In addition, a carbon fixation pilot plant has been set up at Renwu Complex, in order to convert CO₂ in the waste gas of the public plant into methane, such that it can be used as the fuel for the cracking furnace of the VCM plant. The pilot plant has been completed in 2022. In addition, since 2023, FPC has also engaged in the research and development of carbon fixation and conversion of alkanes with lower energy consumption.
- Develop low-power consumption electrolyzer and develop the world’s No. 1 energy-saving electrolyzer for the caustic soda plant with FPC’s own technologies, and head toward the large-scale development, in order to save electricity consumption and to reduce the energy consumption for hydrogen power generation.



The aforementioned measures are expected to reduce **674** thousand tons of CO₂e.

2 Energy saving, carbon reduction and circular energy:

- Implement artificial intelligence (AI); e.g. application of AI technology to adjust the bottom temperature of the isomer separation tower to separate semi-finished products, such as n-butyraldehyde and isobutyraldehyde, through the difference in boiling point temperature more precisely, and to reduce the steam consumption.
- Recycle and reuse the CO₂ produced by some of the manufacturing processes as raw materials of chemicals instead of direct emissions. In 2023, approximately 16,960 metric tons of CO₂ was recycled.
- Continue to replace old and obsolete high-energy consumption equipment and perform equipment upgrades and process optimization.



The aforementioned measures are expected to reduce **569** thousand tons of CO₂e.

3 Increase renewable energy consumption:

- Continue to evaluate the construction of solar power generation equipment at the main Complexes of Mailiao, Renwu and Linyuan.
- Wind power generation: FPC and Formosa Heavy Industries (FHI) Corporation engage in the joint establishment of onshore wind power facility, and wind power generation has been developed at Mailiao Complex. In addition, the method of bulk-sale of the electricity and green power certificate to FPC is implemented, in order to ensure the use of green power without any difficulties.



The aforementioned measures are expected to reduce **708** thousand tons of CO₂e.

4 Other carbon reduction measures:

- Assess the use of biomass ethylene for the manufacturing of polyethylene (PE), develop PE recycled materials for renewable products.
- In response to the government's policy, FPC has implemented the measure of providing direct subsidies to employees for the purchase (replacement) of new electric motorcycles in 2022. For the purchase of a new electric motorcycle, a subsidy of NT\$10,000 is provided; for the replacement of old vehicles with a new electric motorcycle, a subsidy of NT\$16,000 is provided, in order to encourage employees to consider the selection of electric motorcycles in priority if they have the need to purchase (replace) motorcycles. FPC aims to implement carbon reduction together with employees and domestic electric motorcycle manufacturers.
- Promote low-carbon transportation policy. Based on the consideration that the carbon emission of an energy-saving vehicle is at least 20% lower than that of a fuel vehicle, since 2022, FPC has started to replace new small passenger cars, light trucks, and old fuel company cars aged above 11 years old with energy-saving vehicles of hybrid vehicles or electric vehicles as priority.
- Expand the applications of light-weight products and renewable energy equipment materials.



The aforementioned measures are expected to help the value chain reduce **5.255** million tons of CO₂e.

FPC's Strategy for Promoting Carbon Neutrality

	Short term 2021~2025	Medium term 2025~2030	Long term After 2030
1 Coal-burning heading toward low (zero) carbon energy transformation	Promote change of coal to gas use	Continue to develop and install low (zero) carbon power	
		Replace old and obsolete coal-burning boilers	
	Carbon capture and re-use	Continue to research and develop carbon fixation technology	
		Promote hydrogen energy power generation	
2 Energy conservation & Circular economy	Continue to promote energy conservation and carbon reduction improvement projects		
	Implement AI smart power plant platform	Continue to implement AI/AIoT technology, research and develop technologies related to new catalyst and equipment upgrade	
	Develop electrolyzers with lower energy consumption		
	Assess the introduction of special new catalysts in the vinyl chloride process		
3 Increase renewable energy consumption	Install solar power generation equipment and collaborate with FHI in the installation of onshore wind power generation equipment		Continue to install renewable energy equipment
4 Other carbon reduction measures	Assess the use of biomass ethylene for the manufacturing of PE	Continue to promote a circular economy and develop eco-friendly products	
	Use recycled materials and renewable products in the manufacturing process		
	Expand eco-friendly low-carbon products, promote product carbon footprint certification and smart management		

2.2 GHG Emission Reduction Performance

Case Description Continuous promotion of progressive energy transition

To cope with the international trend of carbon reduction, to cooperate with the government’s energy transition policy and to increase natural gas supply, FPC actively seeks energy transition opportunities, in order to reduce the impact of climate change. In 2023, numerous energy transition projects have been planned and are in the process of active implementation. It is estimated that in terms of carbon reduction, 863 thousand metric tons of carbon is expected to be reduced in comparison to the base year of 2020. The key items are summarized in the following:

No.	Transition strategy item	Description of progress up to end of 2023	Expected completion date
1	Renwu Complex with suspension of one coal-burning unit during non-summer period	Completed	—
2	Linyuan Complex with low volume running and arrangement of annual maintenance during non-summer period	Completed	—
3	Renwu Complex with introduction of AI smart power plant management platform	Completed	—
4	Renwu Complex with JP-4/5 high pressure feed water heater implemented for operation	Under entrusted design process	2024/6
5	Linyuan Complex with introduction of AI smart power plant management platform	Under entrusted design process	2024/7
6	Linyuan Complex with LP-2 boiler burner modification (coal-gas mixed burning)	Ongoing equipment manufacturing	2024/12
7	Linyuan Complex with additional installation of 95T/H gas-burning exhaust gas boiler (changed the existing oil-burning exhaust gas boiler to backup use)	Ongoing construction process	2025/6
8	Renwu Complex with additional installation of 95T/H gas-burning boiler (changed JP-3 coal-burning boiler to backup use)	Under entrusted design process	2026/6

Case Description Promote product carbon footprint verification

Up to the end of April 2024, all 82 main products of FPC have obtained the “Product Carbon Footprint Verification Statement”.

Case Description Promote International Sustainability & Carbon Certification (ISCC) Plus Certification

The ISCC (International Sustainability & Carbon Certification) provides a globally applicable verification system for the sustainability of raw materials and products, traceability of the supply chain, and GHG emissions and emission reduction. ISCC Plus is a certification system established based on the ISCC certification system and is particularly for the technology and chemical fields (such as bioplastics application). In view of the increasing demand for bio-based materials and green products, FPC has obtained the ISCC Plus certification for 6 types of purchased materials and 12 types of products in 2023. In the future, depending upon the customers’ request, we will manufacture products based on customers’ orders in order to satisfy customer demands.



Mailiao Carbon Fiber Plant Carbon Footprint Verification Statement

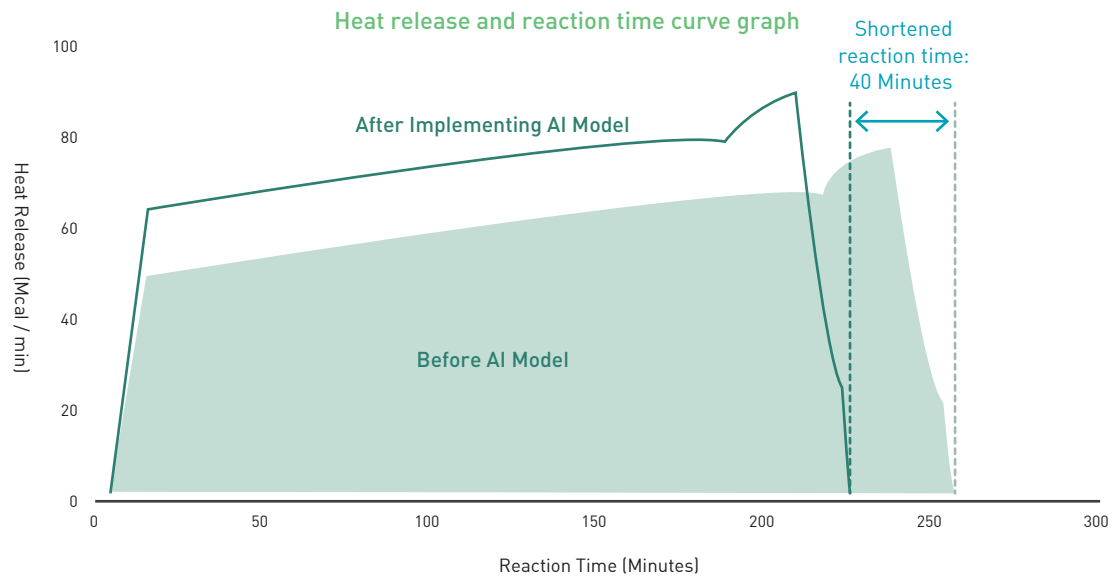


Mailiao Complex ISCC PLUS Verification Statement

Case Description

Process optimization - polyvinyl chloride (PVC) polymerization tank reaction time optimization

PVC polymerization is an exothermic reaction. To prevent loss of control of the reaction, the additional amount of catalyst is relatively conservative, such that during the PVC polymerization process in the polymerization tank, there is still some heat removal capability left without sufficient use, resulting in a waste of time and energy. In view of such deficiency, FPC has developed an AI model to predict the heat release from the reaction and to adjust the catalyst efficiency parameter automatically along with the calculation of the optimal catalyst combination and injection timing, thereby sufficiently utilizing the heat removal capability of the polymerization tank. The reaction time can be shortened, and the PVC output is increased by approximately 20 tons/day while saving approximately 483 thousand kWh/year of electricity at the same time, which is equivalent to the reduction of carbon emissions of approximately 290 metric tons of CO₂e/year.



Case Description

Process optimization: Hydrogen production technology with low energy consumption

Through technology research and development, FPC actively promotes clean technology. For the "Hydrogen production technology with low energy consumption" presently developed, the latest electricity saving technologies of high efficiency and power-saving film and increased electrolyzer total electrolysis area are introduced, in order to reduce the current density and electrolysis voltage, thereby effectively reducing the energy consumption of the ion exchange film electrolysis in the hydrogen generation technology. In addition, Renwu VCM Plant's pyrolysis furnace also achieves the mixed burning of hydrogen and natural gas, in order to reduce carbon emissions. FPC will continue to engage in the research and development of process optimization and improvement in order to establish the foundation for future commercialization of hydrogen production on a large scale.

Case Description

8-in-1 all material polypropylene (PP) fully recyclable cold-resistant clothing

FPC collaborates with the Taiwan Textile Research Institute to develop the first "FPC New Functional PP Fiber" in the world, which can be used in the manufacturing of "All material PP fully recyclable cold-resistant clothing". The innovative use of "8-in-1 wearing system" has honorably received the ISPO Top Product 2024 German iF Design Award.

The "8-in-1 wearing system" means that all materials, including fabric, breathable waterproof film, lining, zipper pull, zipper teeth, zipper ribbon, sewing thread and button are all made of one single material of PP. Accordingly, it is able to successfully integrate the three main functions of lightweight, insulation, and waterproof with moisture permeability while being equipped with the eco-friendly characteristics of energy and water saving and facilitated for recycling. The product also demonstrates that FPC has achieved an important milestone in the promotion of sustainable system from the material supply aspect, which is also an important breakthrough in the garment recycle and reuse.

The processing temperature required for the manufacturing of PP material fibers and fabric is low, such that the carbon emissions generated from the manufacturing process is also lower. According to the statistics, the carbon emissions per kg of PP fiber finished product is approximately 3.097 kg of CO₂e, a reduction of 40 ~ 60 % of emissions in comparison to other common fibers, such that it is able to mitigate the adverse impact on the climate.



8-in-1 all material PP fully recyclable cold-resistant clothing

Case Description

Process optimization: TG-3 rotor replacement and improvement

Renwu public plant TG-3 steam turbine is equipped with the thrust bearing interlock protection mechanism, and steam has the minimum steam volume limitation; if the steam usage is reduced due to reduction of load or suspension of other plant, the excessive steam would need to be released to the atmosphere, causing unnecessary waste. Accordingly, the TG-3 steam turbine rotor is replaced with a new one in order to improve the minimum steam drawing volume, such that it can be adjusted according to the actual load of the plant site, thereby preventing waste due to the imbalance of supply and demand of steam. For this project, the investment amount is NT\$170 million, and it is expected to reduce the steam emissions of approximately 2,860 tons/month, and reduction of carbon emissions of 10.3 thousand metric tons of CO₂e.

Case Description

Assisting downstream processing process to reduce carbon emission

The PA processing agent self-developed by FPC is able to accelerate the curing time for PVC processing and enhance the cutting capability during high-temperature processing, thereby expanding the processing scope of PVC. According to the statistics, the curing time of PVC without the addition of PA processing agent is approximately 215 seconds. When 10kg of PA product is added to one ton of PVC for curing, the curing time can be reduced to 90 seconds, such that the energy loss of 125 seconds of the processing machine can be reduced. When the production volume of the PA processing agent of 7,762 tons in 2023 is used as the calculation basis, it can be used as the agent for the processing of 776,200 tons of PVC. As the specific heat of PVC is 0.9 KJ/kg/k, it is estimated that the energy loss of approximately 1,453 GJ can be reduced during the PVC processing by the downstream operators.

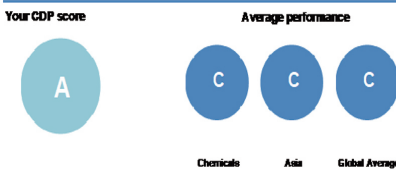
2.3 Participate in international carbon reduction initiatives

For the Carbon Disclosure Project (CDP) in 2023, FPC was awarded the rating of “A” leadership class for the climate change and water security projects and rated as “Leadership,” demonstrating the management policies, promotion outcomes, and response measures with respect to energy saving, carbon reduction, and water consumption have been recognized and approved by major international institutional investors.

CDP SCORE REPORT - WATER SECURITY 2023 

Formosa Plastics Corp	
Region	Asia
Country/Area	Taiwan, China
Questionnaire	Chemicals
Activity Group	Chemicals

The CDP Score Report allows companies to understand their score and indicate which categories require attention to reach higher scoring levels. This enables companies to progress towards environmental stewardship through benchmarking and comparison with peers, in order to continuously improve their Water governance. Investors will additionally receive a copy of the CDP Score Report upon request. For further feedback please contact your account manager or your key CDP contact.



UNDERSTANDING YOUR SCORE REPORT

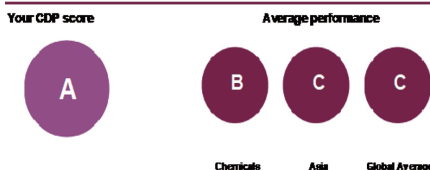


2023 CDP water security project score of “A”

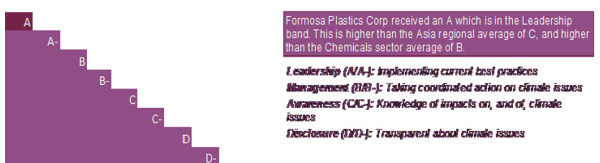
CDP SCORE REPORT - CLIMATE CHANGE 2023 

Formosa Plastics Corp	
Region	Asia
Country/Area	Taiwan, China
Questionnaire	Chemicals
Activity Group	Chemicals

The CDP Score Report allows companies to understand their score and indicate which categories require attention to reach higher scoring levels. This enables companies to progress towards environmental stewardship through benchmarking and comparison with peers, in order to continuously improve their Climate Change governance. Investors will additionally receive a copy of the CDP Score Report upon request. For further feedback please contact your account manager or your key CDP contact.



UNDERSTANDING YOUR SCORE REPORT



2023 CDP climate change project score of “A”



Chapter III

Management of Climate Change Risks and Opportunities

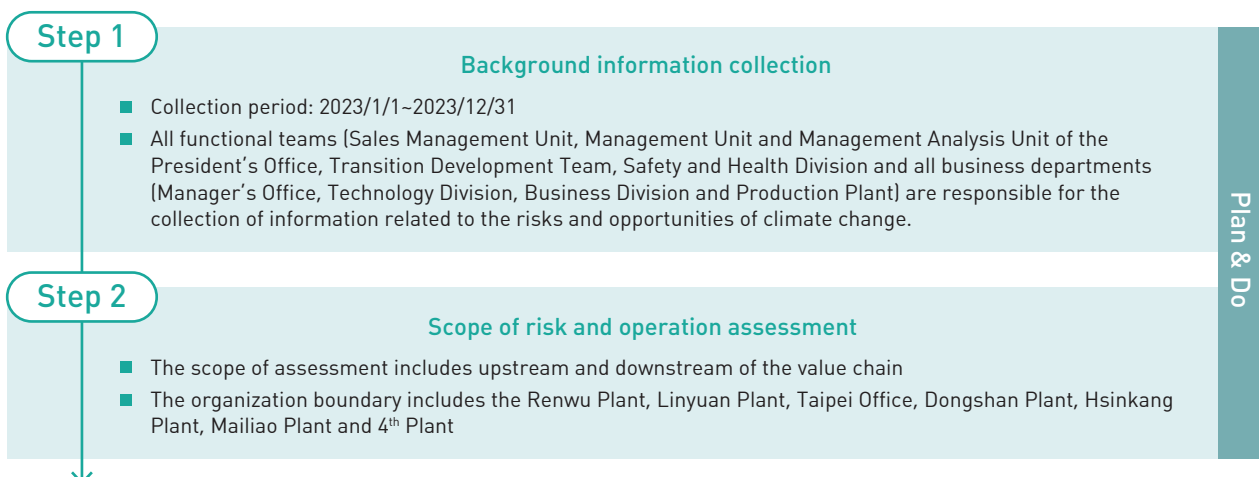
3.1 Risk and opportunity identification process

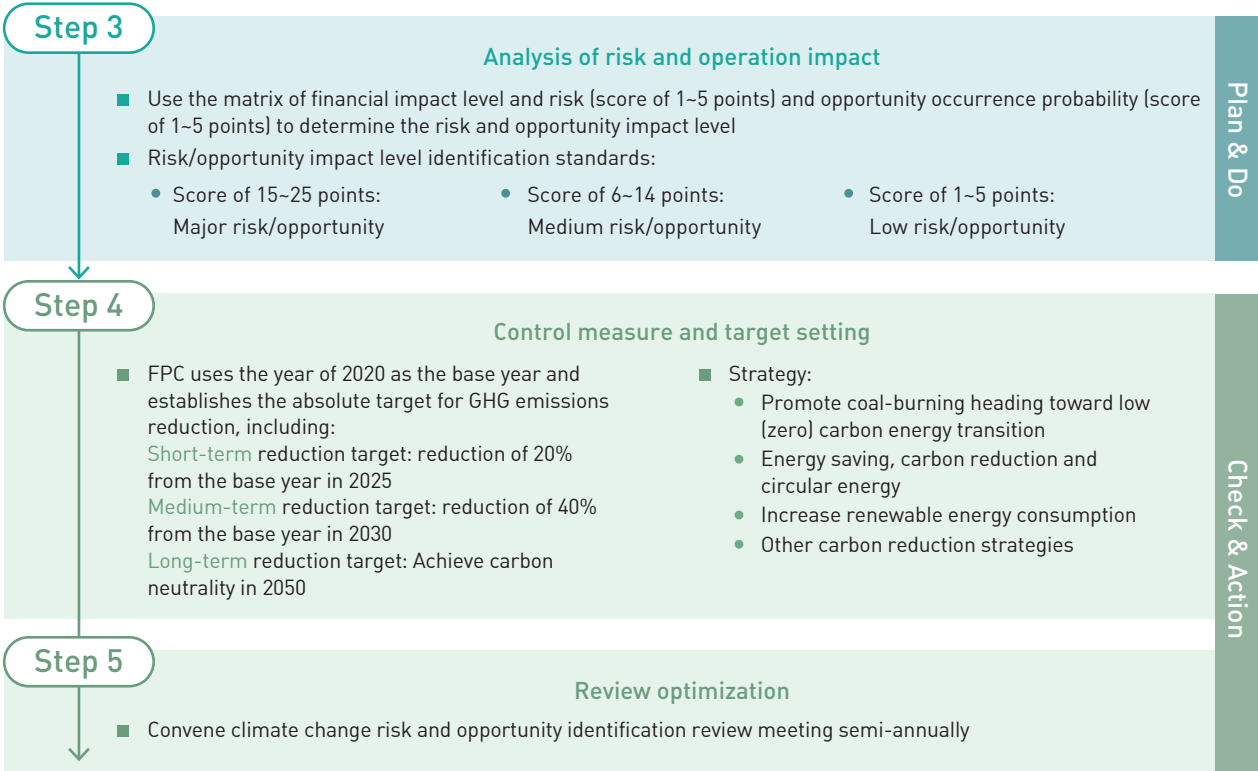
All functional teams (Sales Management Unit, Management Unit and Management Analysis Unit) of the President's Office, Transition Development Team, Safety and Health Division and all business departments (Manager's Office, Technology Division, Business Division and Production Plant) are responsible for the collection, analysis and summarization of information related to the risks and opportunities of climate change, and climate change risk and opportunity identification review meeting is convened semi-annually to perform review.

Transition risks (policy and law/ market/ technology/ company reputation) and physical risks (chronic and acute) are considered. In addition, for events that may occur, risk assessment on the indicators including financial impact level, impact duration (short, medium, long term), parties impacted in the value chain and risk probability, may be conducted.

During the establishment of opportunity scenarios, the resource efficiency, energy source, product and service, market and adaptability are considered. In addition, for events that may occur, opportunity assessment on the indicators including financial impact level, impact duration (short, medium, long-term), affected parties in the value chain and the opportunities probability, may be conducted.

Climate change related risks and opportunities are identified and assessed according to the "Risk Management Procedure" established in accordance with the ISO 22301 principles, framework and spirit, and the matrix of financial impact and occurrence probability is used to determine the impact level of risks and opportunities. For potential events of major risks, response strategies (such as risk transfer or risk aversion) and handling solutions (such as reduction of the number of occurrences and reduction of financial impact in order to reduce possible loss caused by the risk) are planned in advance and reported to the Chairman of the Board.





3.2 Risk and Opportunity Assessment

The matrix of financial impact level and occurrence probability is used to determine the risk and opportunity impact level. The assessment indicator is classified into five levels and the score is from 1 to 5 points (as shown in the image below).

Financial impact level	Amount	Probability of occurrence				
		Almost never (Score 1)	Unlikely (Score 2)	Probable (Score 3)	Very likely (Score 4)	Almost certain (Score 5)
		Never occurred	Never occurred in a given period of time (e.g., 10 years)	May occur more than one time in a given period (e.g., 10 years)	May occur several times in a given period of time (e.g., 10 years)	Certain to occur
High (5 points)	More than NT\$10 billion					
Medium to high (4 points)	NT\$ 1 billion~NT\$10 billion				8 10	
Medium (3 points)	NT\$100 million~NT\$1 billion				7 9 11 12	1 4 5
Medium to low (2 points)	NT\$10 million~NT\$ 100 million					2 3 6
Low (1 point)	Less than NT\$10 million					

■ Risk
 ■ Opportunity
 ■ Score of 1~5 points: Low risk/opportunity
 ■ Score of 6~14 points: Medium risk/opportunity
 ■ Score of 15~25 points: Major risk/opportunity

■ Risk
 ■ Opportunity
 M Medium risk/opportunity
 H Major risk/opportunity

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1 H Transition Risk/Policy and Law/Carbon Fee Collection</p> <p>2 M Transition Risk/ Policy and Law/Renewable Energy Development Act - Green Energy Installation</p> <p>3 M Transition Risk/Policy and Law/Water Conservation Charge Collection</p> <p>4 H Transition Risk/Policy and Law/ Carbon Reduction Policy of Kaohsiung City</p> <p>5 H Transition Risk/Market/Carbon Reduction Demanded by Customers</p> <p>6 M Transition Risk/Company Reputation</p> | <p>7 M Physical Risk/Acute/Flooding</p> <p>8 H Physical Risk/Chronic/Water Shortage</p> <p>9 M Opportunity/Product and Service/Circular Economy</p> <p>10 H Opportunity/Product and Service/Carbon-reduction Product</p> <p>11 M Opportunity/Product and Service/Renewable Energy Supply Chain</p> <p>12 M Opportunity/Product and Service/Biomass Materials</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

For relevant content and response strategy of risks and opportunities, please refer to 3.3 "Summary Table of Impact of Risks and Opportunities on the Company" for details.

3.3 Summary Table of Impact of Risks and Opportunities on the Company

1. Climate Change Topic: Carbon Fee Collection

Analysis of Current Risks or Opportunities (possible impact on the company)

- The "National Climate Change Action Guideline" and the "Climate Change Response Act" specify Taiwan's long-term GHG reduction targets and establish a total GHG emissions control and allocation method for manufacturing departments.
- The "Climate Change Response Act" is expected to list manufacturers of large volumes of carbon emissions in the manufacturing industry with GHG emissions reaching 25 thousand metric tons of carbon dioxide equivalent (CO₂e) and above as the subjects for carbon fee collection, such that the cost and expenditure is increased. In case where the product price cannot reflect the carbon cost due to the limitation on the supply and demand, the competitiveness will be affected, resulting in a significant financial impact.
- After 2026, the European Union (EU) will start the collection of carbon border tax, and it is expected to cause an impact on vinyl chloride monomer (VCM) and poly vinyl chloride (PVC).

Topic Category

Transition risk/Policy and law

Level of Risk/Opportunity

Major Risk

Response Strategy and Target

- FPC establishes reasonable and feasible carbon emission transaction mechanism and relevant regulations through communication with industry unions (or association) and the government, in order to achieve a win-win solution.
- Coal burning heading toward the low (zero) carbon energy transition: promote the change of burning fuel from coal to gas, replace old and obsolete coal-burning boilers and use electricity of low (zero) carbon source.
- Energy saving, carbon reduction and circular energy: implement smart factory (AI technology assistance, improve raw materials conversation rate, reduce unit consumption), equipment upgrade/process optimization, research and develop process with low energy consumption catalyst, install carbon fixation pilot plant and convert CO₂ in the waste gas into methane (burning fuel)
- FPC has implemented an internal carbon pricing mechanism since 2022 in accordance with the "Climate Change Response Act" in terms of carbon fees and charges for excessive carbon emissions, and carbon cost is included in the internal income statement as the basis for the implementation of carbon risk management. In addition to serving as the basis for establishment of greenhouse gas emission reduction measures, relevant information is an important indicator for performance evaluation, products and operations and investment evaluation.
- Target: FPC uses the year of 2020 as the base year and establishes the absolute target for GHG emissions reduction, including: reduction of 20% in 2025 from the base year, reduction of 40% in 2030 from the base year, and achieving carbon neutrality in 2050.

Case Example

- Report the energy consumption, water consumption and carbon emission of each plant to the responsible person of the Water Saving and Energy Saving Promotion Team on a monthly basis.
- It is estimated that by 2030, the total investment amount in water saving and energy saving improvement plan will reach NT\$6.98 billion, including the following investment costs:

(1) Coal-burning heading toward low (zero) carbon energy transition: NT\$1.37 billion.	(3) Increase renewable energy consumption: NT\$2.18 billion.
(2) Energy saving, carbon reduction and circular economy: NT\$2.49 billion.	(4) Other carbon reduction measures: NT\$940 million.

2. Climate Change Topic: Renewable Energy Development Act - Green Energy Installation

Analysis of Current Risks or Opportunities (possible impact on the company)

The amendment to the "Renewable Energy Development Act" has been officially passed in April 2019. Since the contracted capacity of 25,000 KW of electricity consumed by FPC's Linyuan Complex is greater than 5,000kW required by law, it is necessary to install 10% of the contracted capacity of renewable energy power generation facilities, storage facilities, or purchase renewable energy certificates within five years according to the law; otherwise, FPC shall pay monetary substitution.

Topic Category

Transition risk / Policy and law

Level of Risk/Opportunity

Medium Risk

Response Strategy and Target

- To comply with the regulatory requirements, the Engineering Division has proposed the response solution of installation of renewable energy demonstration sites and to conduct preliminary assessment on the location and type of the renewable energy facility installation. Since all of the main plant sites are located in central and southern Taiwan and daylight is abundant such that it is suitable for the installation of solar power generation facilities. After assessment, solar power generation facility above 5,000kW will be installed in order to comply with the regulatory requirements.
- FPC plans to further purchase wind power and green power certificates from FHI, in order to ensure adequate use of renewable energies and compliance with laws and regulations.
- Target: Electricity for the administrative area of the plant site will completely use renewable energy in 2025.

Case Example

- Renwu Complex has been installed with the solar power generation facility to increase the renewable energy power generation capacity. Up to 2023, the installation capacity of 456kW has been completed, and a total of 499 thousand kWh has been generated in 2023. The application for change of the solar power generation to own use has been submitted to Taipower, in order to supply power to the administrative and living areas of the plant site for use. In addition, starting in 2025, FPC will purchase bulk wind power from FHI.
- After the assessment, Renwu Carbon Fiber Plant will be setup as a renewable energy demonstrative site, and approximately 4,000 kW of solar power generation modules will be installed, with an annual power generation capability of 5.296 million kWh, such that 4,443 metric tons of carbon emissions can be reduced annually. The construction cost is approximately NT\$240,000 thousand.

3. Climate Change Topic: Water Conservation Charges Collection

Analysis of Current Risks or Opportunities (possible impact on the company)

- Based on the consideration of the impact of water shortage caused by the climate change, to stabilize the water supply and to promote the development of Taiwan's economic society, the Ministry of Economic Affairs (MOEA) has started the collection of water conservation charge in 2023. Accordingly, large water consumption users with the single month water consumption greater than 9,000 m³ during the dry season (January-April, November-December), "Water Conservation Charge" will be collected.
- Presently, the average monthly water consumption of FPC's Mailiao Complex and Renwu Complex are both more than 9,000 m³ per month, and a water conservation charge is required for these plants, such that the operating cost will be increased.

Topic Category

Transition risk/Policy and law

Level of Risk/Opportunity

Medium Risk

Response Strategy and Target

- To reduce the water resource consumption, it is necessary to reduce the water demand through source management, and improve the reuse of water resources and accelerate the recycling process at the terminal.
- Target: Promote the reduction of water consumption per product unit by 5% from the average value of previous year.

Case Example

For the reclamation of water discharged from the cooling water tower at Renwu Complex, the jamming of UF/RO film is likely to occur due to the characteristics of water quality. After the Company adopts the self-developed patented treatment technology, the water quality is able to satisfy the UF/RO water quality standard. FPC plans to revitalize and then reuse the existing canal water treatment facilities with a low utilization rate. For the time being, the facilities are under the drug dosing test and the on-site survey on the physical equipment is under re-planning.

4. Climate Change Topic: Carbon Reduction Policy of Kaohsiung City

Analysis of Current Risks or Opportunities (possible impact on the company)

- In order to achieve the goal of net zero by 2050, Kaohsiung City Government has passed the first reading of the "Kaohsiung City Self-Government Ordinances Governing Net Zero City" in October, 2022 to schedule for the coal reduction and phase-out in the future, in order to become a coal-free city step by step.
- Presently, Renwu and Linyuan Public Plant mainly use coal-burning boilers to generate power for own use and for sale of excessive electricity to Taipower. If the competent authority prohibits coal burning in the future, the revenue may be decreased.

Topic Category

Transition risk/Policy and law

Level of Risk/Opportunity

Major Risk

Response Strategy and Target

Coal burning heading toward the low (zero) carbon energy transition: promote the change of burning fuel from coal to gas, replace old and obsolete coal-burning boilers and use electricity of low (zero) carbon source.

Case Example

Please refer to 2.2 [Case Description - Continuous promotion of progressive energy transition]

5. Climate Change Topic: Carbon Reduction Demanded by Customer

Analysis of Current Risks or Opportunities (possible impact on the company)

In recent years, customers of plastic products are affected by the Paris Agreement and the Carbon Disclosure Project (CDP) such that they have started to implement transition and to develop low-carbon green products, and they also expect raw material suppliers of the supply chain can also jointly reduce the carbon emission. Accordingly, the sales volume of non-low carbon and non-energy saving products may be reduced progressively.

Topic Category

Transition risk/Market

Level of Risk/Opportunity

Major Risk

Response Strategy and Target

Since 2018, FPC has promoted green product plans for the promotion of green products based on the eight aspects of energy efficiency, emission reduction, waste reduction, water saving, toxicity free, health, renewable product and safety. In addition, based on such eight aspects, FPC continues to invest in research and development resources in order to develop differential, high-value and prospective products, thereby transforming the climate change risks into business opportunities and increasing corporate value. For example, development of PP post-consumer recycled pellets applied to plastic woven bag packaging can help reduce the use of new materials and carbon emissions by more than 30%. Meanwhile, use of the bioethylene made of the raw materials including sugarcane and corn to replace ordinary ethylene to produce PE may help reduce the carbon footprint. FPC is committed to promoting the innovation and development of green products, expected to respond to the environmental problems and also practice the sustainable development more effectively.

Case Example

- In 2017, FPC has established the Composite Materials Center and in 2023, FPC has continued to develop polypropylene (PP) green products (emission reduction), such as EPP foam bead raw materials that can be used for the vehicle dashboard, decorative panel, lamp inner casing and bumper, thereby effectively reducing vehicle weight, saving vehicle energy consumption and GHG emission.
- The Polyethylene Division develops PE post-consumer recycle products that can be applied to the market of cleaning agent bottles (HDPE) and wrapping film (LLDPE), etc.

6. Climate Change Topic: Company Reputation

Analysis of Current Risks or Opportunities (possible impact on the company)

- In response to the increasing trend of ESG, domestic and foreign financial institutions tend to evaluate clients' ESG performance during the determination of investment and loan extension. If a business fails to meet the sustainability requirements, its reputation can be negatively affected and financial institutions may increase the interest rates on loans or even refuse to provide loans.
- During the COP26 Summit, 40 countries have committed to gradually eliminating coal-burning activities. FPC's assessment results on the continuing coal-burning activities indicate that such activities can cause adverse impact to the reputation of the Company.

Topic Category

Transition risk/
Company reputation

Level of Risk/Opportunity

Medium Risk

Response Strategy and Target

- FPC actively participates in domestic and foreign ESG rating and initiatives, such as: the Carbon Disclosure Project (CDP), TCFD initiative and Science Based Target initiative (SBTi), etc., demonstrating the company's determination in promoting sustainable development and carbon reduction outcome.
- In addition, FPC also actively heads toward the low (zero) carbon energy transition and in the future, we will guide waste gas into the coal-burning boilers in order to reduce the fuel consumption.
- Target: Continue to attend the initiatives of climate change mitigation organizations at home and abroad.

Case Example

Replace the coal (fuel)-burning boilers of Renwu and Linyuan public plants with gas-burning boilers. The estimated investment is NT\$1.37 billion.

7. Climate Change Topic: Change in precipitation pattern - Flood

Analysis of Current Risks or Opportunities (possible impact on the company)

Considering the impact of strong winds or typhoons caused by abnormal climate events, it is necessary to provide safe parking at the plant site in order to prevent factory process hazard. Considering the impact of heavy rainfall/flood, operations at the plant site will be suspended due to floods, resulting in decrease of revenue.

Topic Category

Physical risk/Acute

Level of Risk/Opportunity

Medium Risk

Response Strategy and Target

- FPC periodically monitors and manages the energy consumption and water consumption of each plant site on a monthly basis and establishes climate change countermeasures to mitigate the risk arising from the climate change.
- Target: Shutdown due to floods for 0 day each year

Case Example

- The Renwu Complex is installed with the flood control pumps, and inspection, repair and maintenance are performed periodically, in order to maintain the normal operation during heavy rainfall/flood, such that the occurrence probability of flood at the plant site can be reduced. The annual maintenance, repair and inspection expenses are approximately NT\$1,622 thousand.
- For the Mailiao Complex, major flood prevention desilting and dredging operation is performed annually and its annual expense is approximately NT\$3,708 thousand, in order to reduce the probability of flooding in the plant site due to heavy rainfall/flood.

8. Climate Change Topic: Change in precipitation pattern - Drought

Analysis of Current Risks or Opportunities (possible impact on the company)

Water shortage or drought caused by abnormal climate will cause reduction of revenue.

Topic Category

Physical risk/
Chronic

Level of Risk/Opportunity

Major Risk

Response Strategy and Target

- FPC periodically monitors and manages the energy consumption and water consumption of each plant site on a monthly basis and establishes climate change countermeasures to mitigate the risk arising from the climate change.
- Target: Shutdown due to water shortage for 0 day each year

Case Example

- To cope with potential risk of production suspension due to water shortage or drought at the plant site, Linyuan Complex has excavated 2 anti-drought wells, and an amount of 2,300 M³/day water supply can be increased each day.
- FPC also cooperates with government departments to develop the sub-surface water of the Donggang River and Gaoping River, in order to stabilize the water source supply. In addition, FPC also assesses the development of the Huliiao River high ammonia nitrogen wastewater treatment, in order to acquire water rights via the reclaimed water exchange method.

9. Climate Change Topic: Circular economy

Analysis of Current Risks or Opportunities (possible impact on the company)

Considering the product life cycle and value chain, in 2023, FPC has invested an amount of NT\$2.78 billion. We have made improvements in three aspects of reducing the consumption of raw materials, improving the process and reducing transportation in the supply chain to research and develop low-carbon products. In addition, we also introduce the concept of circular economy through recycle and reuse of the waste gas and wastes generated from the processes, in order to reduce production costs and to promote the sustainable use of resources at the same time.

Topic Category

Opportunity/
Product and service

Level of Risk/Opportunity

Medium opportunity

Response Strategy and Target

- FPC implements a circular economy and develops PCR (post-consumer recycled resin materials) materials, plastic composite materials made of recycled waste oyster shells, and reuse of recycled scraps, in order to effectively reduce the oil extraction, plastics raw materials production and carbon emission of the product.
- Target: Products of circular economy expected to increase the revenue by NT\$6,000 thousand/year in 2025; development of new PP renewable materials applied to the PCR woven bags with the annual production and sales volume of be 1,620 tons/year in 2025.

Case Example

- In 2021, FPC has planned to set up the "Medical Materials Production Center" at Renwu Complex, including the antibacterial shell powder production line with the production capacity of 5 tons per month, and the equipment installation and test run is scheduled to be implemented at the end of July 2024. By converting wasted oyster shells into the natural "FPC antibacterial shell powder," FPC recycles the fishery waste resources and also mix the plastics including PVC, PE and PP to produce natural antibacterial plastic composite materials that can be applied to production of the general consumer products, in order to improve home hygiene and to enhance social welfare.
- In 2023, the sales volume of antibacterial shell powder products was 8.8 tons, and the net profit was NT\$1,234 thousand.

10. Climate Change Topic: Low-carbon product

Analysis of Current Risks or Opportunities (possible impact on the company)

- According to the requirements of EU’s new vehicle emission standard, by the year of 2030, the average carbon dioxide emissions of new ex-factory vehicles and vans must be reduced by 1/3 from the emissions in 2021.
- The light-weight PP material manufactured by FPC can be applied to auto parts, thereby reducing vehicle weight and improving fuel efficiency and reducing carbon emission. Accordingly, the sales order on such material is expected to increase in the future.

Topic Category

Opportunity/
Product and service

Level of Risk/Opportunity

Major opportunity

Response Strategy and Target

FPC’s Polypropylene (PP) Division has developed light-weight PP eco-friendly automobile materials that can be used for vehicle dashboard, decorative panel, lamp inner casing and bumper, thereby effectively reducing vehicle chassis weight, saving energy consumption and reducing GHG emissions.

Case Example

The estimated light-weight PP material sales volume is 61,313 tons/year, and it is expected to increase the revenue by NT\$2,262,449 thousand/year.

11. Climate Change Topic: Renewable energy supply chain

Analysis of Current Risks or Opportunities (possible impact on the company)

- “Paris Agreement” was passed in the UN COP26 Summit on December 12, 2015. Nations around the globe all agree with the voluntary reduction of GHG emissions, and the world is under the crucial era for energy transition. Renewable energy-related issues will become the new engine driving the economic growth in the future.
- Since the products manufactured by FPC including EVA, HDPE and carbon fiber can be applied to wind power generation and solar power generation, the operating revenue is expected to increase in the future.

Topic Category

Opportunity/
Product and service

Level of Risk/Opportunity

Medium opportunity

Response Strategy and Target

- To cope with the international trend, FPC continues to research and develop carbon fiber for the wind power generator blades, the EVA materials used for solar power packaging film and HDPE used for solar power offshore platform pipelines.
- Target: For EVA for solar cell packaging film, the 2024 sales volume is estimated to increase by 630 tons/month from 2023; the 2024 sales volume of HDPE is estimated to increase by 290 tons/month from 2023; the estimated marketable carbon fiber in 2024 is 150 tons/month.

Case Example

To satisfy the wind power demand, large-ton carbon fiber production process improvement is implemented, and Renwu Carbon Fiber Plant expansion annual production capacity is estimated to be 1,600 tons of carbon fiber, and the investment expense is expected to be NT\$3.69 billion.

12.

Climate Change Topic: Biomass materials

Analysis of Current Risks or Opportunities (possible impact on the company)

Considering that climate changes will cause increase of the price of raw materials, in order to improve the resilience of the supply chain, FPC reviews the types of alternative raw materials and anticipates that the demand for biomass raw materials are likely to increase in the future.

Topic Category

Opportunity/
Product and service

Level of Risk/
Opportunity

Medium
opportunity

Response Strategy and Target

Ethylene is the raw material for polyethylene (PE) and ethylene vinyl acetate copolymer (EVA). FPC will use biomass ethylene to replace traditional petrochemical ethylene in the future.

Case Example

- Plan to produce 500 tons of bio-PE with bio-ethylene
- Plan to produce 5,920 tons of bio-EVA with bio-ethylene

3.4 Climate Risk Scenario Analysis

According to the TCFD recommendations, FPC adopts the Worst-case Scenarios for the transition and the physical risks and includes the analysis results in the strategic resilience assessment.

For the transition risk, FPC will take into account the "IEA WEO 450 Scenario, 2016" promulgated by the International Energy Agency and the Nationality Determined Contribution (NDC) goals set by the countries where FPC's production bases are located. In the INDC (Intended Nationally Determined Contributions) of Taiwan, Taiwan sets the GHG emission reduction by 50% subject to the BAU (Business As Usual) in 2030. Under such scenario, the power generation structure in 2025 will be 20% for renewable energy, 30% for coals and 50% for gases. After the above scenarios are implemented, the impact on FPC is analyzed with respect to the aspects of market, technology, reputation, finance and operations in the future.

As for the physical risk, we refer to the Taiwan Climate Change Projection Information and Adaptation Knowledge Platform (TCCIP) and the National Science and Technology Center for Disaster Reduction to predict the flood disaster, drought disaster and high temperature disaster level for the period of 2021~2100 with respect to the scenarios of SSP1-2.6, SSP2-4.5, SSP3-7.0 and SSP5-8.5.

Transition risk	Physical risk
<p>Scenario</p> <p>IEA WEO 450 Scenario, Intended Nationally Determined Contributions Report</p>	<p>Scenario</p> <p>TCCIP, National Science & Technology Center for Disaster (SSP1-2.6, SSP2-4.5, SSP3-7.0, SSP5-8.5)</p>
<p>Description</p> <p>GHG emissions in 2030 is estimated to be reduced by 50% according to the current development trend</p>	<p>Description</p> <p>Prediction of flood disaster, drought disaster and high temperature disaster level for the period of 2021~2100</p>

Note: The Shared Socioeconomic Pathway (SSP) refers to the socioeconomic result up to 2100 under the assumption of different global climate change scenarios in the future. The socioeconomic development consideration is newly included, and according to different assumption criteria, such as economic growth, globalization level, land use change, technology development and education opportunity, it is classified into five scenarios of SSP1~SSP5, and corresponding adaption and mitigation challenge scale are also identified.

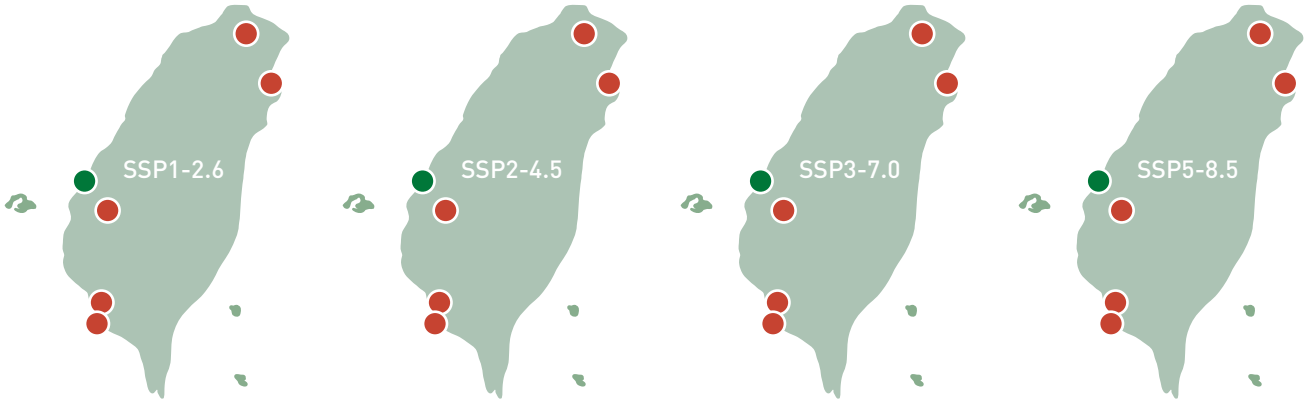
<p>Risk type Flood disaster </p>	<p>Risk type Drought disaster </p>	<p>Risk type High temperature disaster </p>
<p>Metric parameters</p> <ul style="list-style-type: none"> The probability of rainfall under the scenario at each site is higher than 650 mm per 24 hours Compare the flood potential map to determine whether flood occurs 	<p>Metric parameters</p> <ul style="list-style-type: none"> Compare the strength of droughts to determine whether drought occurs Estimate the probability subject to the potential for domestic water shortage 	<p>Metric parameters</p> <ul style="list-style-type: none"> Daily maximum high temperature value of each site under the scenario Compare the heat wave duration index (HWDI) occurrence status

Plant site		Scenario	Climate disaster		
			Flood	Drought*	High temperature
FPC-1	Taipei Office	SSP1-2.6	Medium to high	No available data	Low
		SSP2-4.5	Medium to high	No available data	Low
		SSP3-7.0	Medium to high	No available data	Medium to low
		SSP5-8.5	Medium to high	High	Medium to low
FPC-2	Tungshan Complex	SSP1-2.6	Low	No available data	Low
		SSP2-4.5	Medium to low	No available data	Low
		SSP3-7.0	Low	No available data	Low
		SSP5-8.5	Medium to low	High	Low
FPC-3	Mailiao Complex	SSP1-2.6	Medium to high	No available data	Low
		SSP2-4.5	High	No available data	Low
		SSP3-7.0	High	No available data	Low
		SSP5-8.5	High	High	Low
FPC-4	Hsinkang Complex	SSP1-2.6	High	No available data	Low
		SSP2-4.5	High	No available data	Low
		SSP3-7.0	High	No available data	Low
		SSP5-8.5	High	Low	Medium to low
FPC-5	Renwu Complex	SSP1-2.6	Low	No available data	Low
		SSP2-4.5	High	No available data	Low
		SSP3-7.0	High	No available data	Medium to low
		SSP5-8.5	High	Low	Medium to low
FPC-6	Linyuan Complex	SSP1-2.6	Low	No available data	Low
		SSP2-4.5	Low	No available data	Low
		SSP3-7.0	Low	No available data	Low
		SSP5-8.5	Low	High	Medium to low
FPC-7	4 th Complex	SSP1-2.6	High	No available data	Low
		SSP2-4.5	High	No available data	Medium to low
		SSP3-7.0	High	No available data	Medium to low
		SSP5-8.5	High	High	Medium to low

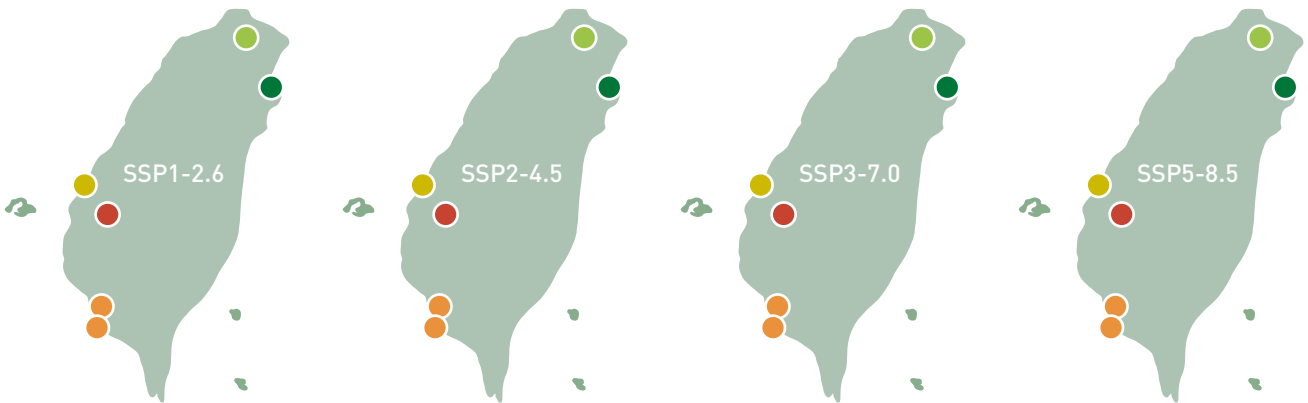
* : For the risk of drought, the RCP-8.5 scenario of the end of century is analyzed only

Mid-Century Flood Disaster Hazards- Vulnerability Summary Map

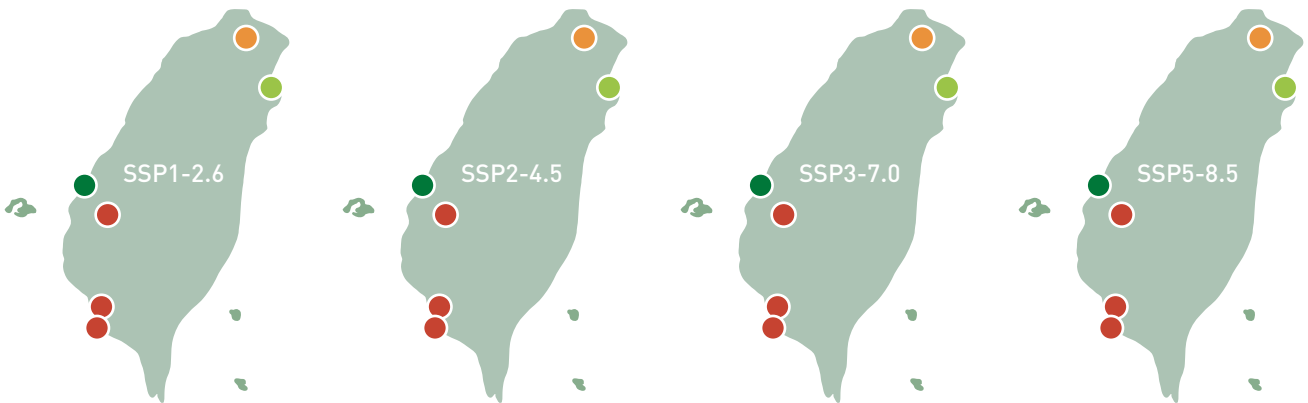
Hazard Level



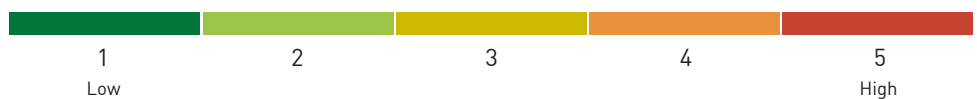
Vulnerability Level



Hazard- Vulnerability Level

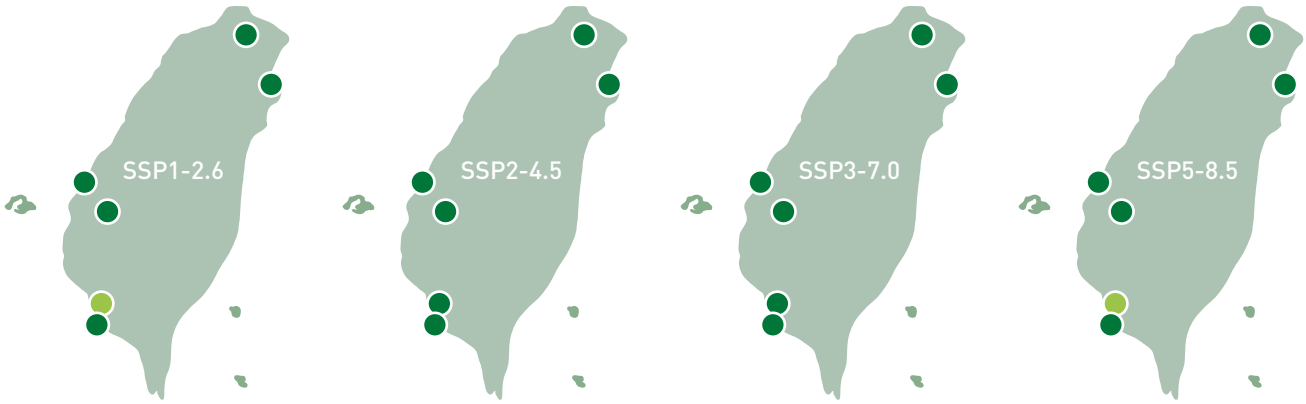


Risk Level

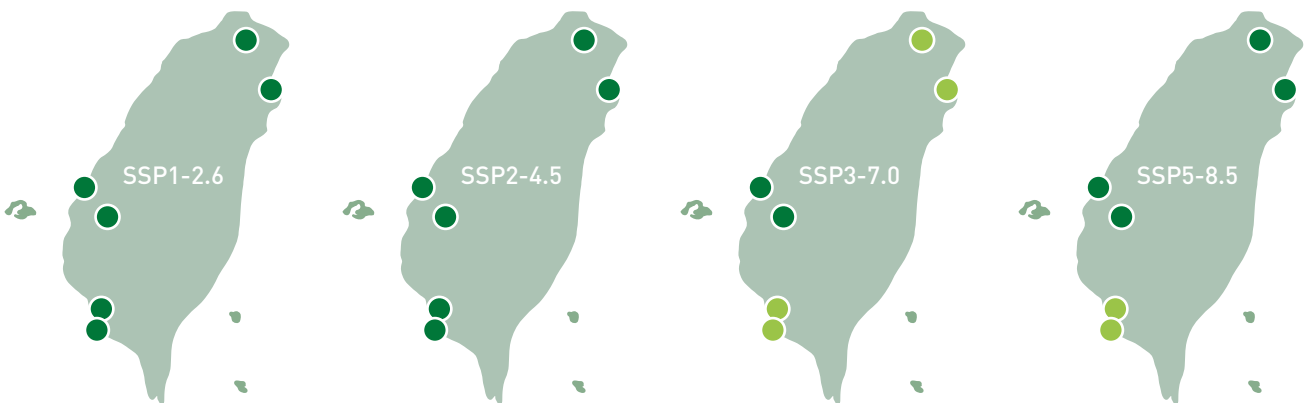


Drought Disaster Risk Summary Map

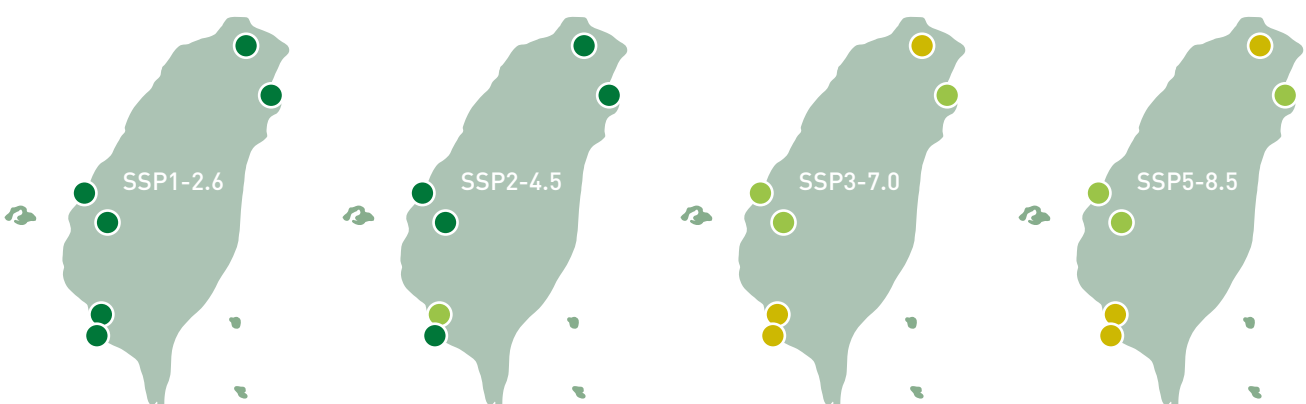
Short term



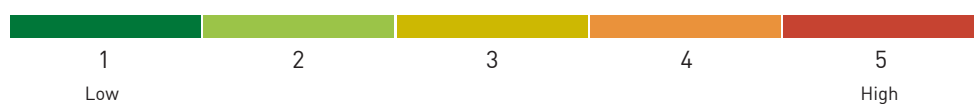
Medium term



Long term



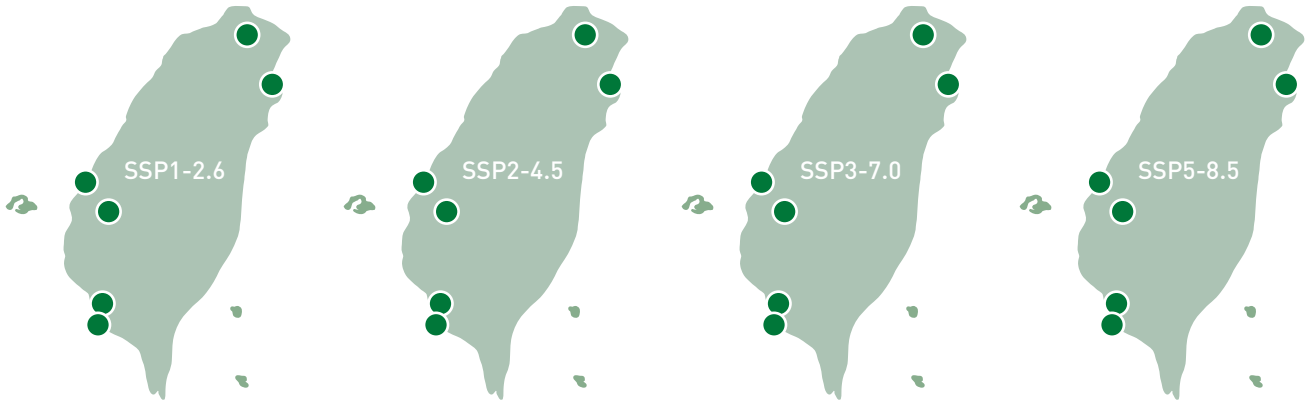
Risk Level



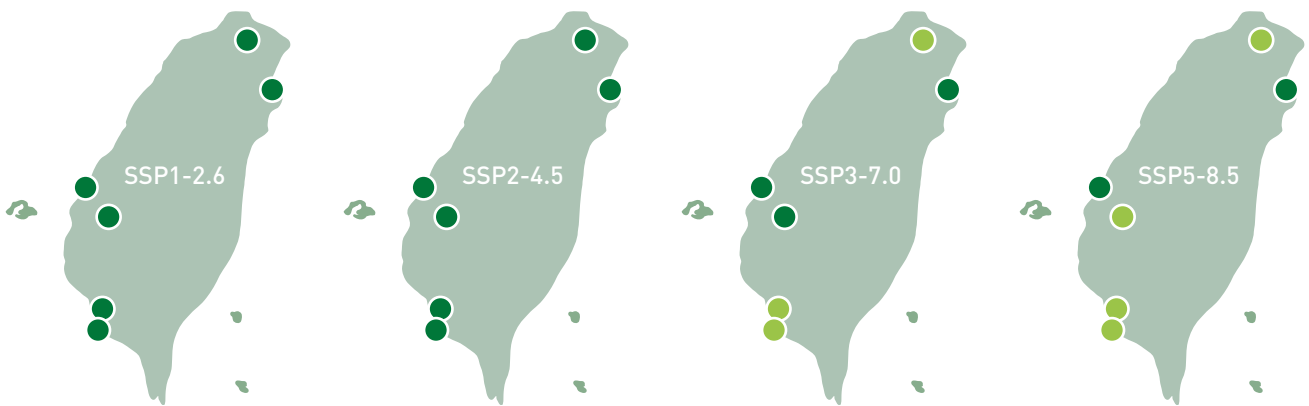
According to the reference period used by IPCC AR6, the future period is divided into short-term 2021-2040, medium-term 2041-2060, and long-term 2081-2100.

High-Temperature Disaster Risk Summary Map

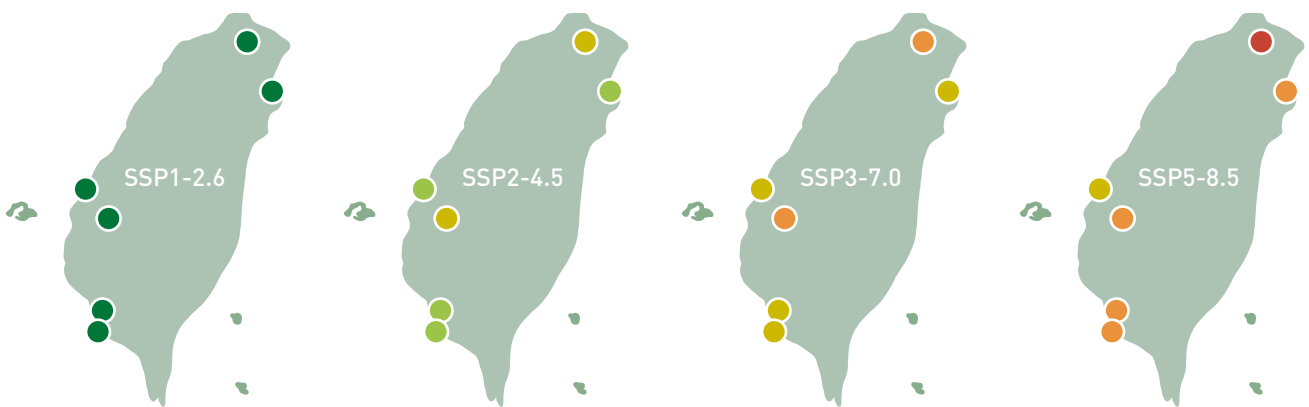
Short term



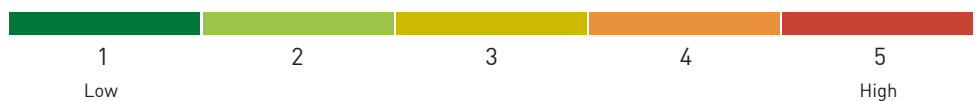
Medium term



Long term



Risk Level



According to the reference period used by IPCC AR6, the future period is divided into short-term 2021-2040, medium-term 2041-2060, and long-term 2081-2100.



Chapter IV Indicators and Targets

4.1 Carbon Reduction Absolute Targets and Emission Indicators

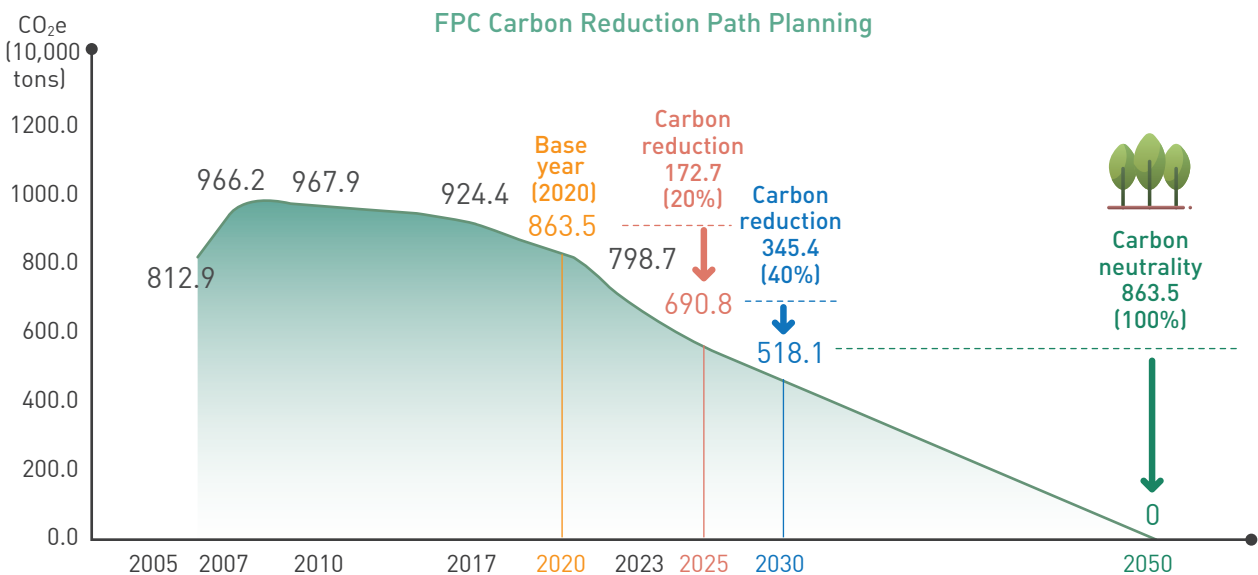
FPC's performs GHG emissions inventory inspection annually and also disclose the inspection result in the relevant environmental aspect chapter of the Sustainability Report, which is also verified annually by a third-party authentication, such as SGS Taiwan and British Standards Institution (BSI), in order to ensure the accuracy of the GHG emissions. The GHG emission for 2018–2023 (Scope 1 and Scope 2) is as shown in the table below.

GHG Emissions for 2018–2023

Unit: metric tons of CO₂e

Scope \ Year	2018	2019	2020	2021	2022	2023
Scope 1	3,836,493	3,659,904	3,966,548	3,918,988	3,338,612	3,542,116
Scope 2	5,008,477	4,981,555	4,668,706	4,685,085	4,605,137	4,463,433
Total	8,844,970	8,641,459	8,635,254	8,604,073	7,943,749	8,005,549

FPC passed the Science Based Target initiative (SBTi) and cooperates with the policy to adopt the progressive approach for carbon reduction. The GHG emissions (8.635 million metric tons) in 2020 is used as the base year in order to establish the short-term, medium-term and long-term absolute targets for GHG emissions. Accordingly, the GHG emissions in 2025 (short-term) is set to be 20% less than the emissions of the base year (reduced to 6.908 million metric tons); the GHG emissions in 2030 (medium-term) is set to be 40% less than the emissions of the base year; and carbon neutrality is set as the target for 2050 (long-term).



4.2 Scope 3 Emission Indicators

FPC conducts an annual inventory of the relevance and emission data of Scope 3 and such data has been verified by a third party authentication unit. FPC commits that with 2021 as the base year, for the products and services purchased, use of sold products, fuel and energy related activities as well as upstream transportation and delivery classified within the Scope 3 emissions, the emissions will be reduced by 11.1% before 2030.

FPC's Scope 3 emissions indicator information in 2023

Scope 3 Emission Source	Relevance	Emissions (metric tons of CO ₂ e)	Calculation Scope
Purchased products and services	Relevant and counted	3,594,345	After the calculation of the carbon emissions of purchased products with raw material purchase amount accounting for 80% of the purchase amount, the carbon emissions for 100% of the purchase amount are then inferred and estimated.
Capital goods	Relevant and counted	32,596	Land, house and building, machine and equipment, transportation equipment, electrical (electronic) and computer equipment, boilers, public equipment, general office equipment and miscellaneous equipment are included in the calculation.
Fuel and energy related activities	Relevant and counted	1,125,563	Including all fuel and energy activities, such as coal, pyrolysis low sulfur fuel oil, and natural gas
Upstream transportation and distribution	Relevant and counted	6,961	After the calculation of the transportation carbon emissions of purchased products with raw material purchase amount accounting for 80% of the purchase amount, the transportation carbon emissions for 100% of the purchase amount are then inferred and estimated.
Waste generated during operations - waste treatment	Relevant and counted	3,301	The scope of this inventory covers 100% of the emissions from the disposal of business waste.
Business travel - Air transportation	Relevant and counted	4,541	Emissions from air travel
Employee commute - Transportation vehicles	Relevant and counted	6,454	Emissions for taking a shuttle bus traveling from/to Mailiao Complex
Upstream asset leasing	Irrelevant	-	Relevance of upstream asset leasing business is relatively lower
Downstream transport and distribution	Relevant and counted	1,131,031	After deduction of returned products, the transportation carbon emissions of products with sales amount at the top 80.9% of the total sales amount, the transportation carbon emissions for 100% of the sales amount are then inferred and estimated.
Processing of sold products	Relevant and counted	2,436,730	The calculated processing methods refer to injection, extrusion, aggregation, film blowing products. For the rest of products, numerous processes are performed, such that presently, they cannot be analyzed.
Use of products sold	Irrelevant	-	For the plastic raw materials manufactured by FPC, the products need to be processed after being sold and no GHG emission is generated from the use of the products sold.
Ultimate disposition of the products sold	Relevant and counted	5,252	Carbon emissions from the final disposal of packaging materials used by products sold are calculated.
Downstream asset leasing	Irrelevant	-	Relevance of downstream asset leasing business is relatively lower.
Franchising	Irrelevant	-	No franchising right
Investment	Relevant and counted	3,498,585	Carbon emissions of investees disclosed in the consolidated financial statements
Total			11,845,359

4.3 Other Indicators

In addition to the establishment of carbon reduction targets, FPC also sets up the energy saving target of reducing 5% of the unit energy consumption and continues to increase the energy use efficiency according to the energy consumption status of each plant site. In 2023, 21.83 tons/hour of steam was saved, and 4,973 kWh/hour of electricity was saved. The implementation status of energy-saving for steam, electricity and fuel related to GHG emissions in 2023 is summarized in the following:

Category \ Item	Amount saved		2023		Estimated investment effect (NT\$ 100 million/year)	Estimated GHG reduction (metric tons of CO ₂ e/year)
			Improvement completed Number of cases	Investment amount (NT\$100 million)		
Steam	21.83 tons / hour	65.66 GJ / hour	109	1.02	1.88	47,510
Electricity	4,973 kWh / hour	17.90 GJ / hour	501	7.10	1.33	31,228
Fuel	1 ton / hour	-	3	1.21	0.73	20,258
Total	-	83.56 GJ / hour	613	9.33	3.94	98,996

Source of Data: FPC's safety and health environmental management computer database; this database is used as the basis for the calculation.

Note 1: The data boundaries cover the plant sites of Mailiao, Hsinkang, Tungshan, 4th Plant, Renwu and Linyuan, excluding Taipei Office.

Note 2: The fuel is under Scope 1; externally purchased electricity and steam are under Scope 2. The type of GHG emissions reduced includes carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons.

Note 3: 1 ton of steam = 3.008 GJ; 1kWh of electricity = 3.6*10⁻³ GJ

FPC's other energy saving and carbon reduction targets are as follows:

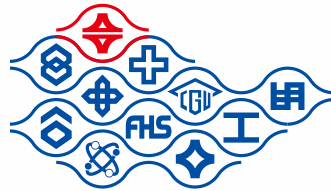
- **Promotion of internal carbon pricing:** According to the policy commitments, each plant establishes the annual carbon reduction target, and statistically calculates "carbon emissions" and "target achievement rate" on a monthly basis, in order to control the actual carbon emissions status. In case of exceeding the monthly control standard, it is necessary to provide an explanation and propose a future carbon reduction plan in order to facilitate the follow-up and control by each business divisions and the President's Office.
- To promote carbon reduction in the supply chain, FPC provides the "Equipment Selection Analysis Form" for high-carbon emission equipment procurement projects. The purchase requesting department estimates the carbon emissions of the equipment to be purchased and includes the carbon emissions cost as one of the purchase evaluation factors for consideration. In 2023, a total of 19 projects of replacement of old and obsolete equipment with new ones were completed for plant sites, such that the emissions of 35 thousand metric tons of CO₂e were reduced.
- **Water resource management:** Set 0 day of shutdown due to flood disaster, flooding, and water shortage each year as the goal.
 - Mailiao Complex premises used a drop of water for 7.3 times in 2015. Upon the promotion through so many years, it may use a drop of water for 11.4 times in 2023. In addition to the methods of process improvement, equipment performance enhancement, operating criteria optimization, waste recycling, and reuse, in order to increase water consumption efficiency, FPC also promotes rainwater reclamation and reuse. Accordingly, the target product unit water consumption is expected to be 5% less than the average value of the previous year.
 - Rainwater reclamation: The total volume of rainwater reclaimed in 2023 was 4,320 tons/day, and the total rainwater reclamation rate was 96%. In addition, the Mailiao Complex's rainwater reclamation volume in 2023 was 2,606 tons/day and the rainwater reclamation rate was 127.3%. In comparison to the average rainwater reclamation volume of 3,216 tons/day and rainwater reclamation rate of 125.2% for 2021-2023, the reclamation volume decreased by 610 tons/day, but the reclamation rate increased by 2.1%.
- Since 2019, FPC has obtained the carbon footprint inspection verification certificate (ISO 14067) issued by a third party. In 2022, FPC completed the carbon footprint inspection for main products: To enhance carbon management and establish carbon reduction targets, the Company also arranged carbon footprint inspection for main products. Up to the end of April 2024, all 82 main products of the Company have obtained the "Product Carbon Footprint Verification Statement". If there is no major change to the manufacturing process, the verification is planned to be updated once every two years.
- Electricity for the administrative areas of plant sites will completely use renewable energy in 2025: FPC plans to gradually increase the renewable energy use ratio via the methods of self-installation of renewable energy power generation facilities and purchase of green electricity. The target for 2025 is to completely use renewable energy for the electricity consumption of the administrative areas of plant sites.
- Completion of GHG inspection verification for all levels of subsidiaries listed in the consolidated financial statements in 2025: For all levels of subsidiaries listed in the consolidated financial statements of FPC, the GHG inspection has been implemented. In addition, the third party verification work is expected to complete in 2025 and relevant information will be disclosed in the "Sustainability Report".

Appendix 1. TCFD Report Index

Dimension	TCFD Disclosure Recommendation	Corresponding Pages
Governance	<ul style="list-style-type: none"> The monitoring status of climate-related risks and opportunities by the Board of Directors 	P4-P5
	<ul style="list-style-type: none"> Management's responsibilities in assessing and managing climate-related risks and opportunities 	P4-P5
Strategy	<ul style="list-style-type: none"> Identify short-, medium-, and long-term climate-related risks and opportunities 	P6-P10
	<ul style="list-style-type: none"> The effect of climate-related risks and opportunities on business, strategic and financial planning 	P6-P10
	<ul style="list-style-type: none"> Strategic adaptability, and also taking into account different climate-related scenarios (including 2°C or lower temperature scenarios) 	P19-P23
Risk Management	<ul style="list-style-type: none"> Identification and assessment process for climate-related risks and opportunities 	P11-P19
	<ul style="list-style-type: none"> Processes for managing climate-related risks and opportunities 	P11-P19
	<ul style="list-style-type: none"> Procedures for identifying, assessing, and managing climate-related risks and opportunities and how these are integrated into the risk management system 	P11-P19
Metrics and Targets	<ul style="list-style-type: none"> Disclosure of the indicators used by the organizations to evaluation on climate-related risks and opportunities, in accordance with their strategies and risk management processes 	P24-P26
	<ul style="list-style-type: none"> Disclosure of the greenhouse gas emission under Scope 1, Scope 2 and Scope 3 (if applicable), and related risks 	P24-P26
	<ul style="list-style-type: none"> The targets used by the organization in managing climate-related risks and opportunities and how the targets were implemented 	P24-P26

Appendix 2. Report Management

- This report covers the period from January 1, 2023 to December 31, 2023
- Preparation frequency of this report: Annually
- This report has been prepared primarily based on the Recommendations of the Task Force on Climate-related Financial Disclosures (June 2017)
- Email for the Report: fpctcfd@fpc.com.tw



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