



台塑企業
FORMOSA PLASTICS GROUP

2023 TCFD

Nan Ya Plastics Corporation

Task Force on Climate-related
Financial Disclosures Report



Table Of Contents

Introduction

02

1

Governance

- 1.1 Company Profile 05
- 1.2 Organization and Responsibility 05
- 1.3 Organization Boundary 10

2

Strategy

- 2.1 Energy Saving and Carbon Reduction Outcome 12
- 2.2 Water Saving and Water Resource Efficiency Improvement Outcome 13
- 2.3 Low-carbon Products Promotion Method and Outcome 14
- 2.4 Other Energy Saving and Carbon Reduction Projects 17
- 2.5 Impact Posed by Climate Transition 18

3

Management of Climate Change Risks and Opportunities

- 3.1 Risk and Opportunity Management Process 20
- 3.2 Risk and Opportunity Identification 22
- 3.3 Summary Table of Impact of Risks and Opportunities on the Company 23
- 3.4 Climate Risk Scenario Analysis 28

4

Indicators and Targets

- 4.1 Carbon Reduction Absolute Targets and Emission Indicators 31
- 4.2 Scope 3 Emission Indicators 33
- 4.3 Other Indicators and Project Targets 33

- TCFD Appendix comparison table 35

Introduction

In recent years, World Economic Forum (WEF) lists the environmental topic of "Climate Change" as one of the long-term significant risks, and in its "Global Risk Report" published in 2024. "Natural Disaster and Extreme Weather Events" are listed as the most significant global risk for the next 10 years. Furthermore, in response to the climate action topic, governments worldwide are establishing net zero goals, and member states of the European Union (UN) are also implementing measures of carbon border tax, in order to ensure the international competitiveness of local low-carbon products.

To align with the international climate action trend and ensure competitiveness, Nan Ya Plastics Corporation (hereinafter referred to as "NPC" or "the Company") has set a target of achieving "Carbon Neutrality by 2050". NPC has actively promoted the four major carbon reduction strategies: "low carbon energy transformation", "energy saving, carbon reduction and circular economy", "increase renewable energy consumption" and "carbon capture technology utilization". Following the net-zero transformation roadmap, NPC strengthens climate resilience and steadily progress towards carbon neutrality. We also proactively seize opportunities arising from regulatory changes and shifts in consumer behavior due to climate change, expanding into new business ventures or industries. By doing so, NPC aims to ensure the perpetual flow of its sustainable value.

Further, to facilitate a better understanding of NPC's efforts in addressing climate change among stakeholders, we adopted the four major frameworks provided by the Task Force on Climate-related Financial Disclosures (TCFD). We transparently disclose the risks and opportunities associated with climate change and demonstrate our responsibility and strategies. Additionally, NPC reviews the promotion of various programs annually and makes timely adjustments to our climate action plans to ensure the achievement of "Carbon Neutrality in 2050".

NPC's Climate Change Management Focus

- The Board of Directors serves as the highest governance unit for the climate-related matters. "Sustainable Development Committee" is further established under the Board of Directors, in order to enhance the ESG management. In 2023, the Sustainable Development Committee convened a total of 2 meetings.
- For NPC's "ESG Promotion Organization", the Chairman acts as the Convener and the President acts as the Deputy Convener, responsible for providing approval to the ESG strategies and goals related to the climate change and risk management, supervising the proper actions of the "ESG Promotion Team", and reporting to the Board of Directors annually.

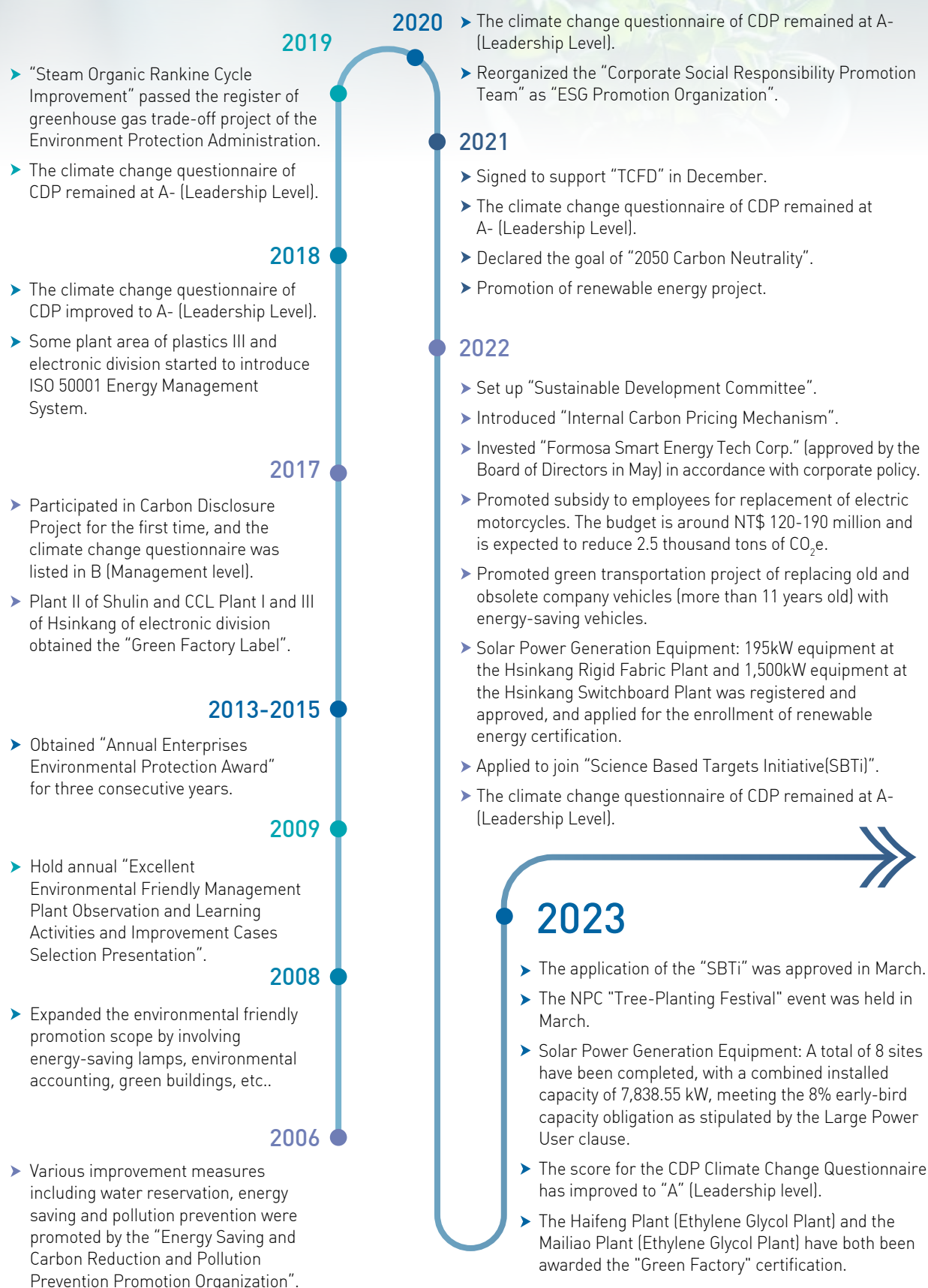
- Establish climate-related performance indicators and quantitative targets, and periodically track the implementation status and publicly disclose the result.
- Establish short/medium/long-term goal for "Scope 1+Scope 2": ①Goals for external commitment: "With 2007 as the base year, reducing carbon by 20% in 2025, reducing carbon by 35% in 2030, and achieving carbon neutrality in 2050"; ②Goals for internal rigorous management: "With 2020 as the base year, reducing carbon by 12.5% in 2050, reducing carbon by 25% in 2030, and achieving carbon neutrality in 2050".

- Low carbon energy transition
- Energy saving, carbon reduction and circular energy
- Increase renewable energy consumption
- Carbon capture technology utilization



- Identify and assess climate-change related risks and opportunities according to ISO 14001 risk identification procedure.
- Cross-department collaboration to execute risk and opportunity identification operation, assess financial impact and establish countermeasures.

NPC's Energy Saving and Carbon Reduction Promotion Schedule



Climate-related Performance and Achievements



Improve the score to "A" for the CDP Climate Change Questionnaire, maintaining Leadership for **six** consecutive years



Scored "A" for the CDP Water Security Questionnaire, maintaining Leadership for **five** consecutive years.



Supported TCFD initiative since 2021, the 2022 TCFD report has been published in 2023



Science-based targets has been approved in 2023



100% of Taiwan sites completed greenhouse gas inventory verification.



14 production plants passed ISO 50001 verification.



The Haifeng Plant (Ethylene Glycol Plant) and the Mailiao Plant (Ethylene Glycol Plant) have both been awarded the "Green Factory" certification additionally.



First national thermal insulation film awarded with carbon footprint/reduction footprint label.

1 Governance

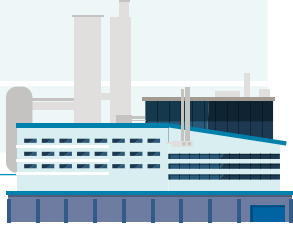
1.1 Company Profile

NPC, established in 1958, specialized in the production of secondary processing plastic products of PVC pipes, PVC film and PVC leather at the early stage of the company, and then gradually entered the fields of chemical products, polyesters fibers, electronic materials, and electrical and mechanical engineering fields from the original plastic processing field. In addition, since 1979, NPC has started its overseas businesses in the U.S. and China. Presently, NPC has become an international and diverse business entity (please refer to NPC's company website "About Us" for details of the company development history).



"Company Profile"
on NPC website

Company Name	Nan Ya Plastics Corporation
Company Establishment Date	August 22, 1958
Main Business Items	Electronic materials, chemical products, polyester fibers, plastic processing, electrical and mechanical engineering
2023 Global Number of Employees	30,392 people
2023 Consolidated Revenue	NT\$259,755,344 thousand



1.2 Organization and Responsibility

The operation of the Board of Directors of NPC complies with relevant laws and the resolutions of the shareholders' meeting to exercise the authority and to supervise the corporate management to ensure the sustainable development of the Company. In addition to overseeing the company's major operational strategies, the Board of Directors also monitors the implementation of sustainable development goals, including environmental protection, social responsibility, and corporate governance. The ESG promotion status is discussed at least once annually, and such discussion also includes climate-related issues.

For NPC's "ESG Promotion Organization", the Chairman acts as the convener, and the President acts as the vice convener, in charge of establishing strategic direction for climate change management. The President's Office and its subordinate departments, including "ESG Promotion Team" is responsible for executing the promotion and implementation of relevant duties, and ESG promotion execution status is reported quarterly.

To cope with the global sustainability trend of carbon reduction, NPC has established the "Risk Management Promotion Team" and the TCFD Task Force has been further established to handle the identification of risks and opportunities associated with climate change, following which the "ESG Promotion Team" and "Energy Saving and Carbon Reduction Promotion Team" discuss and establish the management actions of climate change risk adjustment and enhancement of risk resilience, and periodically tracks the energy saving and carbon reduction promotion of each business department and the relevant unit, as well as submit reports to the "ESG Promotion Organization" timely.

Furthermore, to enhance the Board of Director's supervision and management on ESG matters of the company with respect to climate change, the "Sustainable Development Committee" under the Board of Directors was established in 2022 to be responsible for the review of sustainable development policies, strategies and management directives, and the supervision of the company in the promotion of sustainable development related matters and execution plans.



Supervision Mechanism of Board of Directors

NPC believes that through implementation of ethical management and construction of sound and effective Board of Directors serve as the foundation for the sustainable development of the company. To cope with the global sustainability trend and to focus on the climate change issue, the Board of Directors takes the role of the supervisor and director for sustainable management strategies. In addition, the "Audit Committee," "Remuneration Committee," and "Sustainable Development Committee" are further established under the Board of Directors in order to assist the Board of Directors to exercise its authority and to supervise NPC's implementation and promotion of sustainability affairs in response to climate change.

Board of Directors' Climate Change Supervision Focus



Management Responsibility

"ESG Promotion Organization" is the highest supervisory and governing unit of NPC among the management for promoting ESG, and the Chairman of the Board acts as the convener, and the President acts as the vice convener, for leading the management team to supervise the promotion of ESG affairs of climate change, to establish NPC's carbon reduction targets and sustainable development strategies, and to report to the Board of Directors annually.

Regarding NPC's sustainable management structure, under the supervision of the ESG Promotion Organization, the "Risk Management Promotion Team" identifies the climate-related risks and opportunities, followed by submitting to the "ESG Promotion Team" and the "Energy Saving and Carbon Reduction Promotion Team" to establish and implement action plans for climate-related issues.

ESG Promotion Organization

Convener Chairman of the Board

- Member**
- President acts as the deputy convener
 - According to the three main aspects of "Environmental Protection (E)", "Social Welfare (S)" and "Corporate Governance (G)", a supervisor from the President's Office having a job rank above the management head is assigned to act as the responsible person for each main aspect respectively; in addition, according to the functional attribute of each issue, relevant supervisors of the President's Office, direct department or business department shall act as the members.
 - "ESG Promotion Organization" is responsible for the establishment of the ESG strategic targets and the supervision of execution of ESG affairs. Its responsibilities also include the establishment of NPC's risk management strategic targets, and supervision of the risk management operation status (task-based team formation).

Review frequency Quarterly

Responsibility The Chairman of the Board leads the management team to establish company's risk management of ESG vision and strategic directives, and supervises the ESG affairs promotion status of each unit, in order to strengthen the sustainability culture and to create transition opportunities.

ESG Promotion Team



"ESG Promotion Team" is an ESG internal communication platform of NPC. In addition to passing on and implementing the sustainability policies and directives of the Board of Directors and the highest management, it also acts as the lateral communication channel among departments. The responsible persons of the three main aspects of the "ESG Promotion Organization" supervise the execution of affairs and duties, and lead each task force to establish response strategies and management directives according to the major sustainability issues identified, thereby coordinating resource allocation, and tracking the project execution outcome, in order to ensure the proper implementation of ESG strategies.

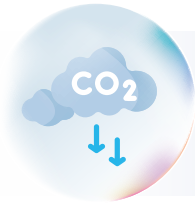
Organization Structure

Supervising Head	Responsible persons for three main aspects of "ESG Promotion Organization" .
Members	The President' s Office and direct departments assign management representatives to take the role of members according to relevant functional attributes of "Environmental Protection (E)", "Social Welfare (S)" and "Corporate Governance (G)".
Review frequency	Quarterly
Work Items	<ul style="list-style-type: none">● Identify major sustainability issues annually, and establish response action plans.● Promote ESG affairs cross-department communication, and integrate resources.● Track the execution performance for each aspect of sustainability issue, and establish continuous improvement plans.● Report execution outcome and work plan to the Chairman of the Board quarterly.

2023 Climate Change Issue Promotion Outcome

In response to the corporate policy, continue to promote the 8 major carbon reduction projects. The major performance results are listed as follows:

- Published the NPC 2022 TCFD Report in June 2023
- Implemented "Internal carbon pricing mechanism"
- Promoted the subsidies program for employees' new purchase/replacement of electric vehicles, and 704 persons have applied up to the end of 2023.
- Solar Power Equipment: By 2023, a cumulative total of 7,838.55 kW of rooftop solar power capacity was installed, meeting the obligated capacity for major electricity users.
- In March 2023, the application of "Science Based Targets initiative (SBTi)" was approved.
- CDP climate change questionnaire score improved from "A-" to "A " (both in the leadership class)



Energy Saving and Carbon Reduction Promotion Team

The President acts as the chairperson of NPC's organization of climate change risk and opportunity actions management and execution. Relevant management strategies are established, and execution status and future plans are reviewed quarterly.

Organization Structure

Chairperson President

Members

- Supervising head: "Environmental Protection (E)" responsible person (Executive Vice President of the President's Office, Assistant Vice President of the President's Office)
- President's Office, Engineering Department and supervising head of each business department, energy saving and carbon reduction officer

Review frequency Quarterly

Work Items

- Discuss relevant strategies for physical risks, transition risks and opportunities in response to climate change.
- Establish management plan, inspect execution status and discuss future plans.
- Report execution outcome and work plan to the Chairman of the Board irregularly.

2023 Climate Change Issue Promotion Outcome

Continue to promote NPC's four major carbon reduction strategies to achieve the goal of "Carbon Neutrality in 2050" :

- | | |
|---|--|
| ① Low carbon energy transition | ② Energy saving, carbon reduction and circular economy |
| ③ Increase renewable energy consumption | ④ Carbon capture technology utilization |



Risk Management Promotion Team

"Risk Management Promotion Team" is formed by representatives assigned by each organization, and it is responsible for conducting risk matrix assessment based on the risk event occurrence frequency and operation impact level, and is also responsible for executing risk control project, reviewing project outcome, and performing continuous improvement. In addition, TCFD Task Force is established under the "Environment (E) Risk Management Team", in order to execute the climate change risk and opportunity identification, followed by submitting the identification result to "ESG Promotion Team" and the "Energy Saving and Carbon Reduction Promotion Team" for the establishment and promotion of relevant risk mitigation strategies.

Organization Structure

Supervising Head Vice President of President's Office

Members

Formed by representatives assigned by each organization

Review frequency Annually

Work Items

- Understand international ESG risk trend, and collect relevant information.
- Identify ESG risk items; in addition, TCFD Task Force is responsible for the identification of climate change risks and opportunities.
- Submit the risk items identified to the "ESG Promotion Team" and "Energy Saving and Carbon Reduction Promotion Team" in order to continuously promote risk mitigation measures and to strengthen the risk resilience of NPC.

2023 Climate Change Issue Promotion Outcome

- Identify 16 climate change risks and opportunities.

1.3 Organization Boundary

This report is presented by NPC as the reporting entity, following the TCFD framework. It primarily highlights the carbon reduction goals and strategies set in response to climate change in 2023, as well as the identified risks and opportunities.



2 Strategy

Since the establishment, NPC has upheld the philosophy of equal importance for both industrial development and environmental protection. NPC focuses on industrial safety, environmental protection and climate change trends, seeks reduction of energy and resource investment, utilizes most optimal control technologies and implements waste reduction at the source and during the production process with best effort. In addition, according to the principle of circular economy, NPC reviews and recycles the use of various resources. Through operation control and periodic monitoring, various air pollutant emissions are superior to the national standards. In addition, optimized process management and green product development are integrated into the company's business management to contribute to the economic development and social prosperity in Taiwan jointly.

NPC focuses on the "climate change issues" and actively faces the opportunities and challenges associated with the climate change to the company's business operation. To cope with the global carbon reduction trend and in response to the UN's Sustainable Development Goals (SDGs) 13 climate actions, NPC has set the long-term carbon reduction goal of carbon neutrality by 2050, and actively promotes the four main carbon reduction strategies. The strategy promotion focuses and carbon reduction benefits expected to be achieved by 2030 are summarized in the following:

I. Low carbon energy transition :Stop the running of coal-burning boilers at the public factory, and install gas-burning steam boiler equipment. In addition, all production plants also change to use low-carbon energy (such as natural gas) to replace high-carbon energy sources (such as coal and heavy oil). It is expected to reduce 1.14 million tons of carbon annually.

II. Energy saving, carbon reduction and circular economy :Continue to promote process improvement, circular economy, AI and digital transformation, increase energy use efficiency and reduce waste generation. It is expected to reduce 870 thousand tons of carbon annually.

III. Increase of renewable energy consumption :Solar power generation equipment is installed at the facility roof of each plant site of NPC. Up to 2023, the accumulated installation capability is approximately 7,838.55KW, and the Company's obligations with respect to the provisions of the Energy-heavy Industries of Renewable Energy Development Act (8% of early-bird preferential offer) have been fulfilled. In addition, up to 2026, we also plan to complete the installation of solar power generation equipment for the rest of the plants in NPC and PFG, and the accumulated total installation capability is expected to 55,664.39KW. After the completion of installation of all facilities, NPC is expected to reduce 50 thousand tons of carbon annually.

IV. Utilization of carbon capture technology :Expand the construction of electronic and industrial liquid CO₂ factory in order to recover CO₂ generated during the chemical manufacturing process to achieve resourceization. It is expected to reduce 190 thousand tons of carbon annually.


NPC's Short/Medium/Long-Term Strategy of Carbon Reduction

	Short-Term 2021-2025	Medium-Term 2025-2030	Long-Term 2030-2050
Low Carbon Energy Transformation	Replace the coal-burning boilers with gas-burning steam boilers of utility factory		Introduce low-carbon(zero-carbon) fuel at a proper time
	Replace high-carbon energy sources (such as coal, heavy oil) with low-carbon energy (such as natural gas)		
	Continue to understand the development trend of hydrogenic energy and alternative energy and storage equipment and introduce at a proper time		
Energy Saving, Carbon Reduction and Circular Economy	Continue to promote improvement projects of energy saving and carbon reduction of production process		
	Promote recycle and reuse projects in accordance with the 4 R principle of circular economy		
	Promote AI and digital transformation, introduce intellectual management system, increased resource use efficiency		
Increase Renewable Energy Consumption	Install solar power generation facilities at the plant roof of each plant site with a total capability of 55,664.39kW(including PFG)	Review and evaluate other areas within each plant site where solar power generation equipment can be implemented	Evaluate the procurement of renewable energy certificate
	Continue to assess the renewable energy application of water power, wind power and geo-heat		
Utilization of Carbon Capture Technology	Expand the construction of electronic-grade and industrial-grade liquid CO ₂ factories to recover all CO ₂ generated during the manufacturing process to achieve resourceization		Introduce feasible carbon capture technology of Stack Emission to reduce carbon emission
	Co-study technology of negative emissions such as carbon capture, carbon sink in forests, etc. with industry and academia, and introduce at a proper time.		

2.1 Energy Saving and Carbon Reduction Outcome


To date, the four major carbon reduction strategies implemented by NPC have achieved significant progress. The summaries are as follows:

1
Low Carbon
Energy Transition




- Replaced the coal-burning boilers at the Shulin utility factory and Chiayi utility factory with gas-burning boilers. The annual carbon reduction is estimated to be approximately 422,000 tons/year.

2
Energy Saving and
Carbon Reduction
Circular Economy




- The phenol recovery method of process wastewater in BPA4 was changed from azeotrope breaking to extractive distillation, reducing annual carbon emissions by approximately 14,818 tons per year.
- By optimizing process conditions through AI technology to reduce raw material and energy consumption, NPC (including PFG) has achieved AI improvement benefits. This has resulted in saving 129.6 thousand tons of fuel, 398.4 thousand tons of steam, and 11,232 thousand kWh of electricity annually, collectively reducing carbon emissions by approximately 174.32 thousand tons of CO₂e per year.

3
Increase
Renewable Energy
Consumption



- Up to the end of 2023, the solar power station construction for Xingang Plastic Fabric Plant, Power Distribution Plant, and Chiayi Plant site, etc. has been completed, and the accumulated installation capability has reached 7,838.55 KW. Accordingly, the Company's obligations with respect to the provisions of the Energy-heavy Industries of Renewable Energy Development Act have been fulfilled.
- Planned to complete the equipment installation in the remaining plants by 2026, bringing the company's total installed capacity to approximately 52,996 kW. Including PFG, the total capacity will reach 55,664 kW.

4
Carbon Capture
Technology
Utilization



- Recycle all CO₂ generated during the chemical process for resourceization.
- Continue to assess the investment in the electronic liquid CO₂ factory expansion project.

NPC KungSan Site honorably received “Energy Saving Benchmark Awards - Silver Award” Key Project Sharing - Steam boiler improvement, and introduction of natural gas burner

- In 2017, boiler improvement was made, and natural gas burner with low-carbon fuel was used in order to increase the burning efficiency and to reduce power consumption of the auxiliary unit. The residual heat of waste gas from natural gas burner was used to eliminate wet desulfurization equipment exhaust visual pollution.
- Up to 2023, a total of 7 units were improved with the total investment amount was 167,395 thousand, and 1,533 thousand kWh/year of electricity was saved.
- The benefits of this energy-saving measure include saving 144,800 kWh of electricity per year, conserving 7,246 cubic meters of fuel oil per year (equivalent to 7,743 cubic meters of oil per year), and reducing carbon emissions by 22,615 metric tons per year.

Energy saving benefit of the improvement



Saving
electricity of
144.8
kWh/year

Saving
fuel oil of
7,246
kL/year

Suppressing
carbon emissions
of **22,615**
metric tons/year

2.2 Water Saving and Water Resource Efficiency Improvement Outcome

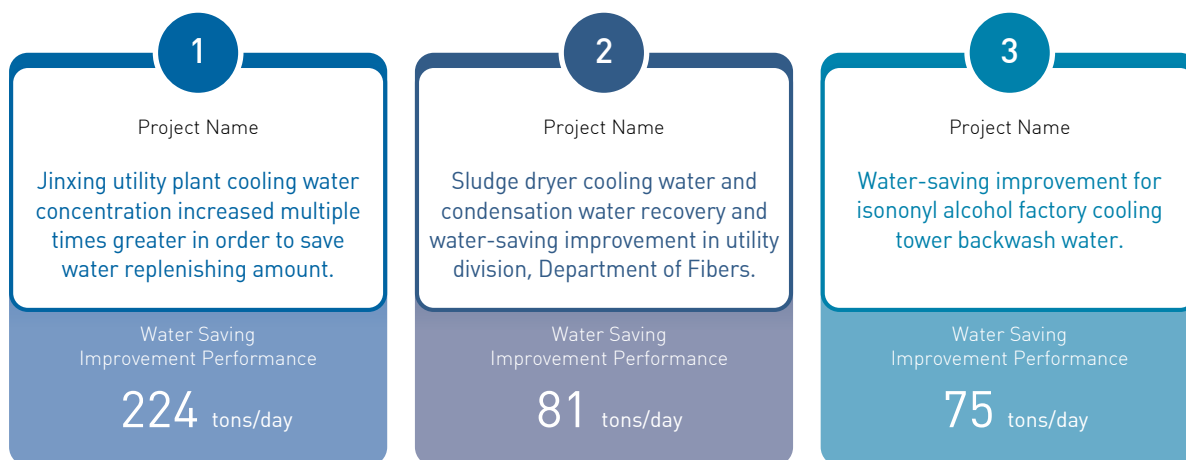
The total number of water saving improvement projects completed by NPC in 2023 was 33 cases. The investment amount is estimated to be NT\$5 million, and it is expected to save 4,581 tons/day of water.

Summary of Water-Saving Implementation Status of the Company

Item	Year	1999 - 2021 (A)	2022 (B)	2023 (C)	In progress (D)	Total (E=A+B+C+D)
Number of improved cases		775	33	25	26	859
Water saved (tons/day)		31,290	1,868	4,581	3,311	41,050
Investment amount (NT\$ hundred million)		5.7	0.9	0.05	1.4	8.3
Improvement effect (NT\$ hundred million/year)		1.67	0.08	0.03	0.1	1.9

Source: FPG Water and Energy Conservation Project Database; in-progress projects are counted as ongoing improvement cases for January 2024 statistics.

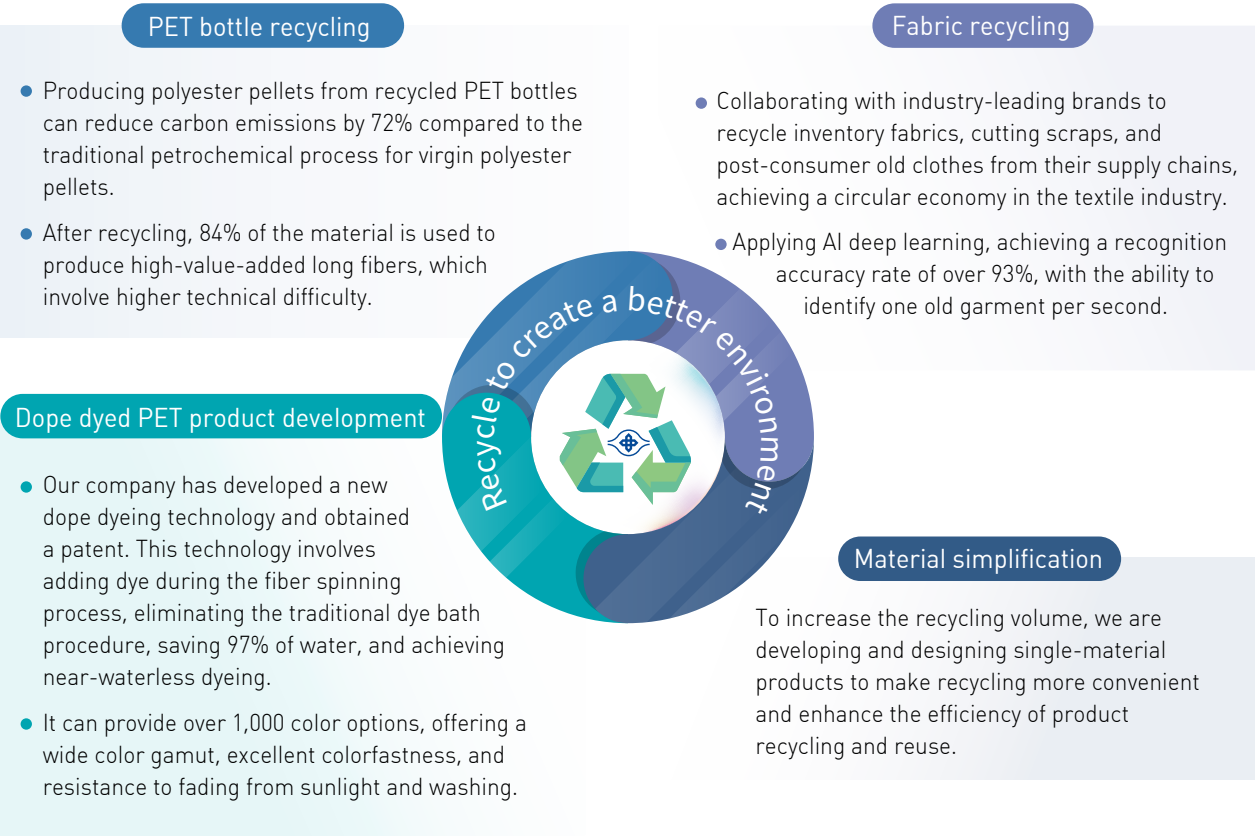
2023 Water Saving Improvement Project and Outcome



2.3 Low-carbon Products Promotion Method and Outcome

Plastic Recycled Products

With regard to NPC’s eco-friendly and sustainable products, for the current stage, the Company mainly focuses on the four topics of “PET bottles recycle”, “Fabrics recycle”, “material simplification” and “dope dyed PET product development”, and their key features are described in the following:



In addition, the main promotion items are described in the following:

Material homogeneity design and development

Cooperate with major international brands in various industries to adopt the purchase recycle method of lease rather than sale or replacement with a new one in order to ensure the source of homogeneous material. Integrate the benchmark brand marketing and design capability to ensure the sustainability promotion for homogeneous material. Utilize NPC’s advantages in diverse plastic processing, becoming the first enterprise of green gold recycling in Taiwan.

To drive the supply chain to collectively exert the influence of the circular economy, relevant raw materials are provided by Formosa Plastics Corporation, with internal vertical integration in the development and production chain, jointly creating sustainable recycling value. NPC will continue to develop single-material PP packaging (high-barrier BOPP film for electroplating, heat-resistant BOPP film) to provide customers with single-material packaging solutions, and will continue to expand its applications.

Dimension	Product	Promotion process and method
Development of modified polyester pellets (Material homogeneity)	Curtains	NPC develops modified PET polyester granules to replace other materials that are not conducive to recycling, in order to promote the use of fully polyester curtains.
	Garments/ Backpacks	Presently, most of the traditional garments and backpack accessories (such as zippers and buttons, etc.) use non-PET materials. After recycling, it is necessary to perform manual removal and selection. By developing modified polyester pellets for accessories, it is able to achieve material homogeneity, thereby facilitating the subsequent recycling and reuse. The garment and backpack products are under verification process.
	All-polyester Running Shoes	Running shoes are manufactured in different functional materials with adhesive bonding method. Through the development of foamed, thermal bonding and elastic modified polyester pellets, the currently existing manufacturing process can be adopted, such that the entire running shoes can be made of polyester with facilitated recycle process.
	Luggage	Modified PET pellets are used to replace PC and ABS pellets sold. Luggage boards can be manufactured via the traditional manufacturing method, and accessories can use modified PET pellets in order to replace non-PET materials of zippers, handles, and wheels completely. Accordingly, luggage is able to qualify the luggage standard certified by SGS, and once the aluminum pulling handle of luggage is removed, the entire luggage is facilitated for recycling.
Homogeneity of packaging film	Packaging bags	Functional packaging films, based on quality and preservation considerations, require high moisture and oxygen resistance properties. These films often use different laminated materials, making recycling difficult. Therefore, single-material packaging materials (high-barrier BOPP film, heat-resistant BOPP film) have been developed to facilitate future recycling and reuse.
Expected outcome	Products of material homogeneity will be able to jointly drive the value chain to promote the convenience and efficiency of recycle. In addition, homogeneous material packaging (PP or PE) can be recycled. It is preliminarily estimated to reduce 25% of packaging wastes, thereby achieving the characteristics of raw material recycle and reuse.	

Recycle of 6.4 billion PET bottles for reuse, and 72% of carbon emissions is reduced in comparison to the virgin raw materials.

NPC upholds the business philosophy of Earth protection and sustainable development, and has been committed to the recycle and reuse of polyester products of PET used by consumers since 2007. NPC aims to develop eco-friendly and sustainable products with best effort and continues to expand production lines. NPC's target for 2024 is to achieve the sales volume for products using recycled materials reaching 49.2% of the products using virgin raw material pellets.

Promotion Performance

6.4 billion PET bottles recycled in 2023.

Reduction of carbon emissions of 139 thousand metric tons/year.

84% PET bottles are recycled for the regeneration of long filaments with high manufacturing technology difficulty and high added value.

PET bottles are recycled for pellet manufacturing to replace virgin polyester pellets, reducing by 72% of Carbon emissions in comparison to the original manufacturing process.

Historical Recycle Quantity and Carbon Emissions Reduction Amount

Year	2021		2022		2023	
	Recycle Quantity	Carbon Emissions Reduction Amount	Recycle Quantity	Carbon Emissions Reduction Amount	Recycle Quantity	Carbon Emissions Reduction Amount
Benefit	109,008 metric tons	188,039 metric tons	88,140 metric tons	152,042 metric tons	80,904 metric tons	139,559 metric tons
	8.7 billion PET bottles		7 billion PET bottles		6.4 billion PET bottles	
	Recycle bottles are able to circle the Earth 148 times	482 fields of Daan Park carbon absorption amount	Recycle bottles are able to circle the Earth 120 times	390 fields of Daan Park carbon absorption amount	Recycle bottles are able to circle the Earth 110 times	358 fields of Daan Park carbon absorption amount

Note (1) 1 metric ton of recycled products = 80,000 PET bottles.
(2) Carbon emissions reduction amount = (Virgin pellet carbon emissions - Recycled pellet carbon emissions)*Sales volume.

All types of products are recycled effectively, in order to establish a solid foundation for green R&D innovation

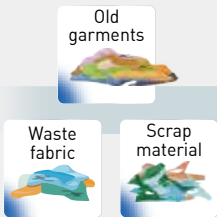
Recycle of PP Pallets

The production of eco-friendly plastic pallets (manufactured with externally purchased recycle PP pellets and non-standard products) of low carbon footprint are introduced. In 2023, the production volume was 12,899 tons (accounted for 88.4%), achieving approximately 76% of carbon reduction benefit in comparison to the virgin raw material products.

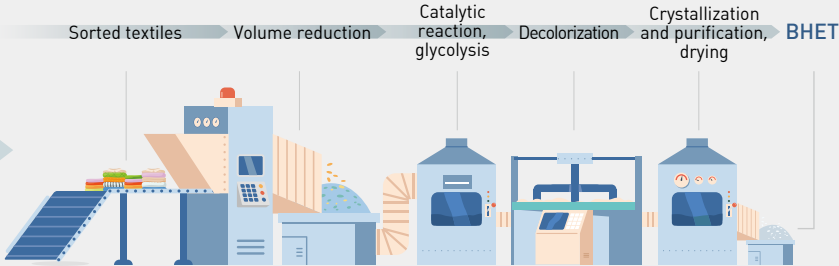
Recycle of Fabrics

NPC has equipped with the recycling and mass production technology for pure PET greige fabrics, finished fabrics and fabric scraps, and has also established the pre-treatment and pellet manufacturing production line with a monthly production capacity of 1,000 tons. In addition, NPC has developed the high-end BHET chemical recycling technology, and has constructed a leading factory to serve as the basis for mass production in the future.

Recycle Resource

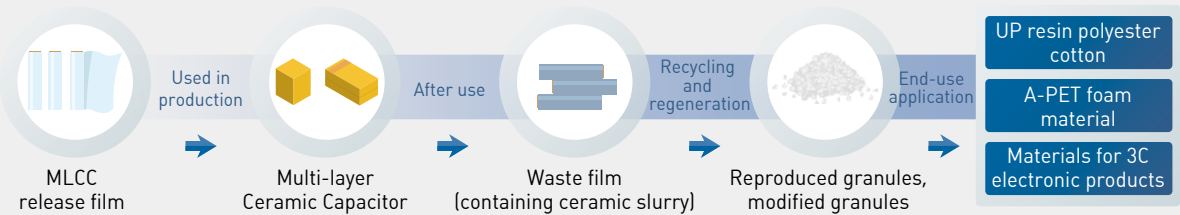


Production Process Treatment



MLCC (Multi-layer Ceramic Capacitor) release film recycling

After the customers' use, the release films were originally disposed as waste. Currently, after recycling treatment by NPC, we can provide for the manufacturing of the products of UP resin and polyester staple fibers. The recycling capacity is 600 tons/month, and the release films used by domestic MLCC and optical customers can be recycled.



2.4 Other Energy Saving and Carbon Reduction Projects

To cooperate with the energy saving and carbon reduction projects coordinated and planned by the FPG, NPC continues to implement projects comprehensively from management aspect to new investment opportunities, in order to enhance the company's energy saving and carbon reduction actions. The summary of each project is described in the following:

Internal carbon pricing



To enhance the awareness of all employees on carbon reduction, NPC continues to implement the internal carbon pricing mechanism and performs calculations according to the carbon fees and charges for excessive carbon emissions. Relevant carbon emission cost is included in the internal income statement as the basis for the implementation of carbon risk management. In addition to continuing to establish greenhouse gas (GHG) emission reduction measures, relevant information is also considered as an important indicator for performance evaluation, products and operations, and investment evaluation, thereby maintaining the competitiveness of NPC.



Promotion of Green Transportation

Provide subsidy to employees for replacement of electric motorcycles

Direct subsidy for employees' new purchase (replacement) of electric motorcycles is implemented. NPC collaborates with the domestic electric motorcycle manufacturer to jointly achieve carbon reduction. Details as explained in the following:

- Subsidy amount: NT\$ 10 thousand/person for new purchase of electric motorcycle, and NT\$ 16 thousand/person for replacement with electric motorcycle.
- Up to 2023, 929 employees applied for the subsidy, and approximately metric tons of CO₂e can be reduced. The subsidy program will continue to be implemented.



Project for purchase of energy-saving vehicles in priority for old and obsolete company vehicles

To promote a low-carbon transportation policy, for newly purchased passenger cars and light trucks, energy-saving vehicle models (hybrid, electric vehicles) will be considered as a priority. According to the schedule and plan of each unit, fuel vehicles of age above 11 years old will be replaced progressively. The expected investment amount is approximately NT\$ 2.16 million, and approximately 3.83 metric tons of carbon emissions can be reduced annually.

Planning of Green New Energy Industry



Investment in Formosa Smart Energy Technology (FSET)

To cope with the global energy saving and carbon reduction and new energy development trends, internal departments related to the development of new energies of FPG are integrated, promoting new energy industry planning. NPC and other companies will continue to invest in Formosa Smart Energy Tech Corporation. Key aspects of the investment are described in the following:

- Investment amount: FSET's capital is NT\$ 7 billion, of which NPC's investment is NT\$ 1.75 billion with the shareholding ratio of 25%, including NPC's investment amount of NT\$ 1 billion in 2022 and NT\$ 750 million in 2023.
- FSET plans to enter four main fields of: ① Energy saving, ② Energy storage, ③ New energies, ④ Recycle and reuse.



Green Procurement

In response to the government’s green procurement policy, NPC has used products with the logos and marks of “Energy Saving, Water Saving, Environmental Protection, Carbon Reduction and Green Building Material” (such as air conditioners, carbon cartridges and fluorescent lamps) in a long period of time. In addition, since 2022, all departments are also informed of the products related to green procurement and corresponding corporate material numbers on a quarterly basis in order to control the purchase requisition in priority, thereby reducing resource consumption and reducing environmental pollution and impact on the Earth.




2.5 Impact posed by climate transition


NPC has participated in multiple important carbon reduction initiatives or alliances in Taiwan or abroad, including media exposures, in order to respond to the climate transition initiative and issues. It expects to urge the chain value to improve the carbon reduction awareness jointly, create a sustainable environment, and achieve common good and common prosperity.

International initiatives


In addition to setting the long-term carbon reduction target, “Carbon Neutrality in 2050”, NPC also participated in the “Carbon Disclosure Project [CDP]” questionnaire evaluation, “Task Force on Climate-related Financial Disclosures [TCFD],” “Science-Based Targets Initiative [SBTi]” to improve internal carbon reduction management operations. Besides, NPC implemented carbon reduction practices and added (amended) related regulations in response to international trends. We review the execution status regularly and discuss it in a timely manner to ensure the pursuit of carbon reduction and transition.



- ◆ Participated since 2017, and achieved A- (leadership level) in the climate change evaluation in 2022.
- ◆ Maintain the “Leadership Level” in the CDP climate change evaluation for five consecutive years.



- ◆ Signed the support for TCFD initiative at the end of 2021.
- ◆ Published the Chinese and English versions of NPC’s “2022 TCFD Report” in 2023.



- ◆ Applied for SBTi in 2022 and submit the carbon reduction goals.
- ◆ The SBTi application was approved in March 2023. NPC will implement various carbon reduction projects according to the approved goals.

Cross-industry Alliance, Joint Establishment of Recycling Chain

NPC clearly understands that in order to carry forward the ESG sustainable life circle, it needs the joint participation by the industry and public to co-build the "Sustainable New Life." In view of this, we participate in the cross-industry alliance of the recycling chain and work with renowned manufacturers in Taiwan or abroad to enable the "1+1 make sustainable and good infinitely" to keep fortunate life and make each corner of the society full of sustainable influence. The key cases executing are enumerated as follows:



Work with Taiwan's well-known outdoor sports brand "ATUNAS," and combine old clothes recyclers, fabric factories and designers upholding the same concept, to build the first circular textile demonstration supply chain domestically.



Work with President Chain Store Corporation to build a "Bottle to Bottle" PET bottle recycling system in Central Taiwan, South Taiwan, and offshore islands and establish a green circulating supply chain.

Media Sharing

Since 2023, NPC has agreed to be interviewed by multiple media to make outsiders understand the Company's primary practices in response to climate change. In addition to promoting energy-saving and carbon-reduction projects in production plants, NPC uses the ESG carbon-reduction cycle strategy on operations and products and invites customers and end consumers to respond to the sustainable cycle, care for the surrounding living environment, and create a sustainable life circle jointly. The main external communication items are as follows:

2023

Apr.

Collaborated with ATUNAS to establish the first domestic textile cycle demonstrative supply chain, and jointly organized the "AUTANS Love Recycle Garments" kick-off press conference.

May

Taiwan Food and Drug Administration has officially approved the food-grade recycled polyester pellets manufactured by NPC, which can be used in the manufacturing of containers and packaging materials contacting foods directly.

Aug.

NPC solely developed the BPA-Clear bisphenol A removal control technology, capable of effectively controlling BPA content of the production line through "Removal Technology" and "Rigorous Control" in compliance with the international standards, thereby improving the safety of recycled polyester products.

Sep.

Taipei 101 Vertical Marathon (Run Up Contest) is an internationally well-known contest, emphasizing the concept of environmental protection with the use of eco-friendly products of reusable cups. In addition, NPC sharing the same sustainability philosophy was also invited to sponsor the eco-friendly (recycled filament) sportswear.

Nov.

FTV "Yi Yan Tang" TV program invited NPC to participate in the topic interview of "Second Life for Second-hand Clothes".

Dec.

PTS "Our Island" TV program invited NPC to interview for SAYA textile recycle, and filming in order to introduce NPC's effort in the recycle material development in the textile industry.

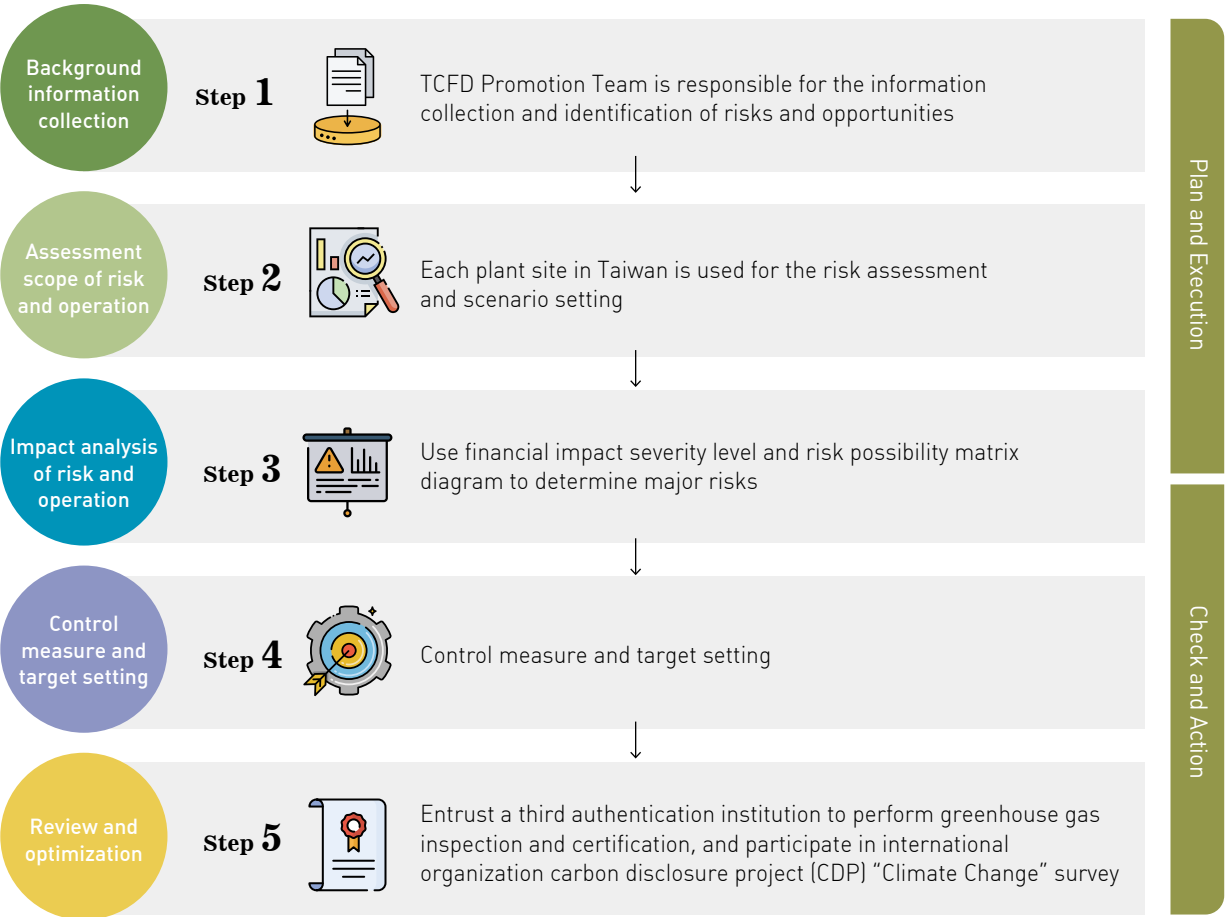
3 Management of Climate Change Risks and Opportunities

3.1 Risk and Opportunity Management Process

NPC has established comprehensive risk management culture to implement risk management. In addition, on December 16, 2020, the Board of Directors approved the “Risk Management”, and climate change is explicitly specified as one of the risk items of the Company. Furthermore, in conjunction with currently implemented ISO 14001 environmental management system, risk management procedures such as “identification, analysis and evaluation, control and handling, supervision and review, information communication and report” are incorporated into climate risk management and integrated into the Company’s overall risk management mechanism.

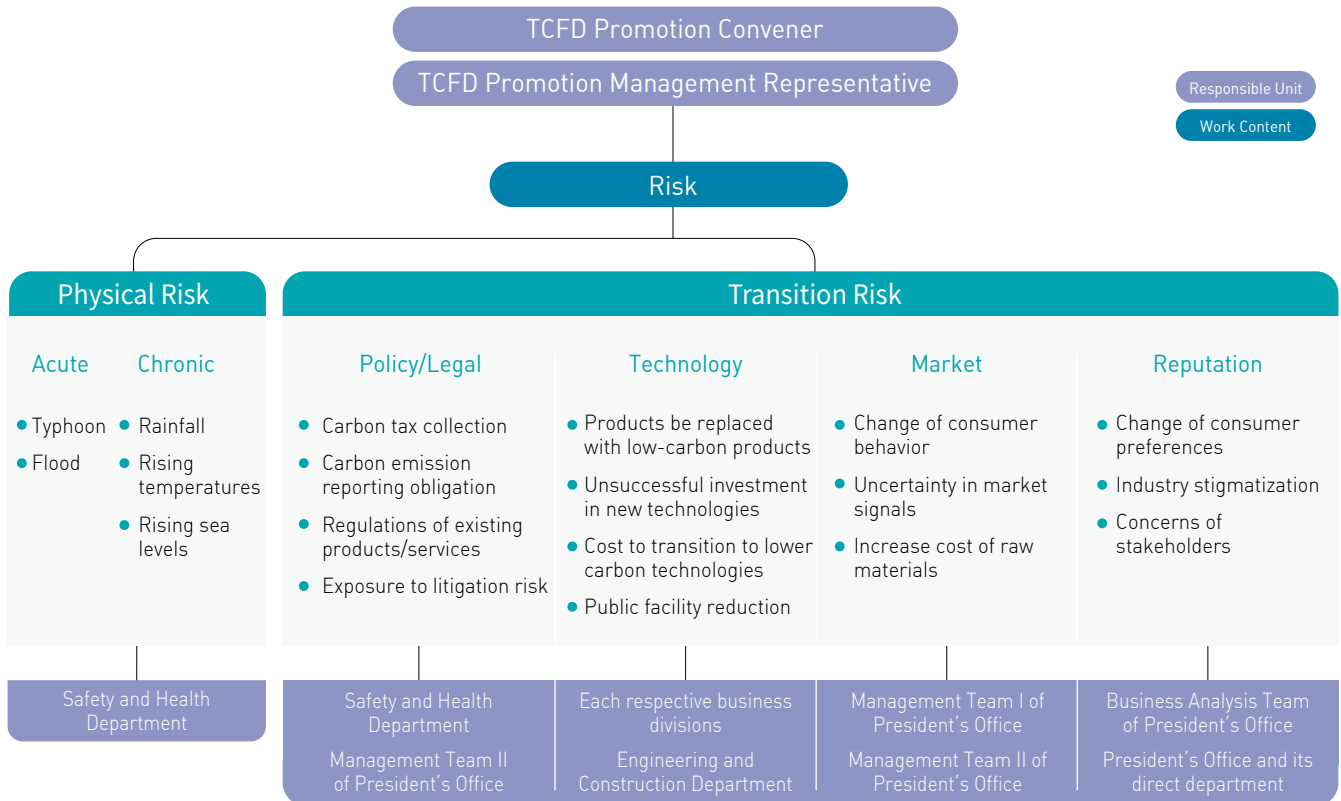
TCFD Team of NPC is composed of the President’s Office, direct departments and business divisions. It refers to the item attributes such as transition risks, physical risks, and transition opportunities from Recommendations of the Task Force on Climate-related Financial Disclosures (June 2017). In addition, the work is divided according to authorities and functions. Each year, the TCFD Team collects, analyzes, and summarizes information on climate change and energy-related risks and opportunities, which are identified and assessed according to ISO 14001 risk identification procedure, following which the “ESG Promotion Team” and the “Energy Saving and Carbon Reduction Promotion Team” establish targets and response strategies according to the identification result. The promotion outcome is also inspected periodically and reported to the “ESG Promotion Organization”, in order to facilitate the management to monitor and track the implementation effect of the projects.

NPC’s TCFD Risk and Opportunity Identification Process

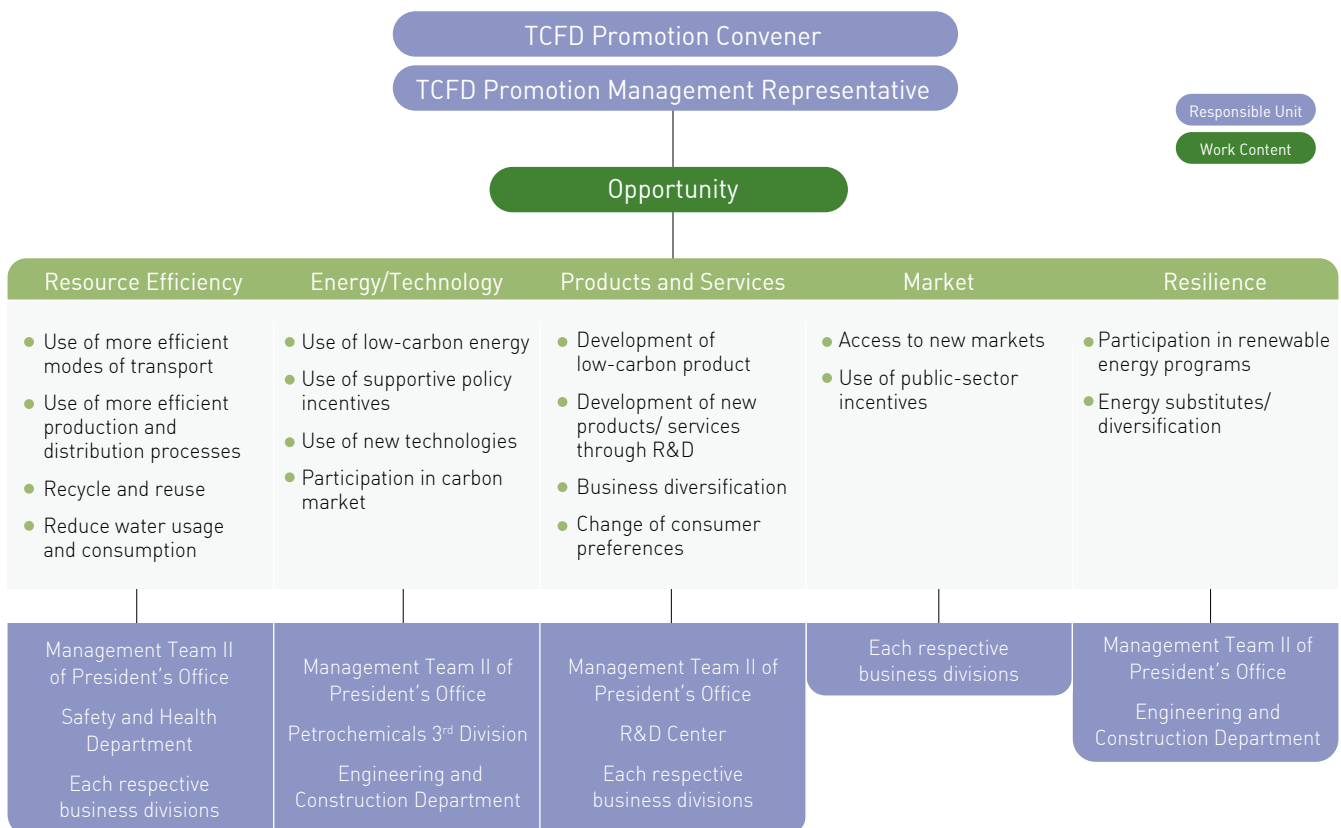


NPC's TCFD Risk and Opportunity Identification Work Allocation

Risk Identification Work Allocation



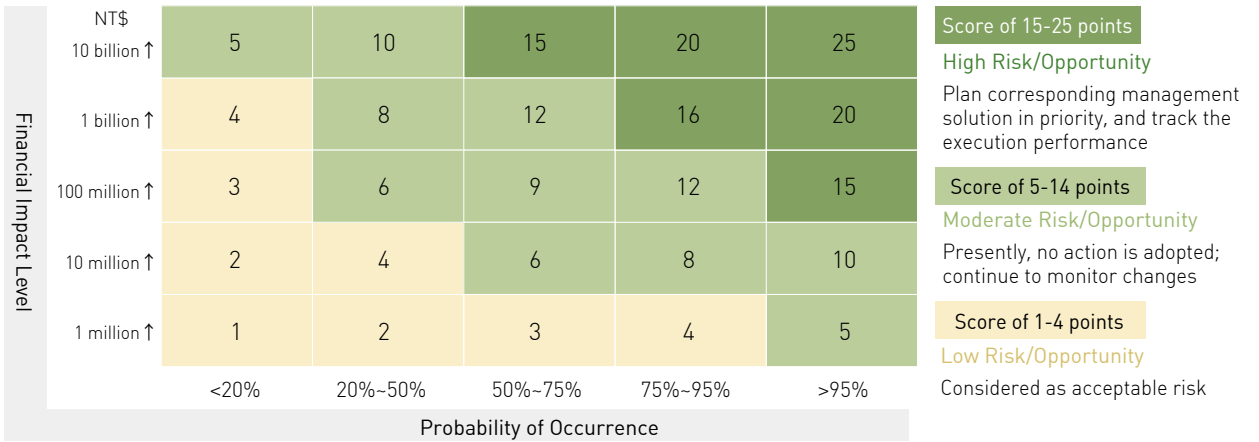
Opportunity Identification Work Allocation



3.2 Risk and Opportunity Identification

The method for identifying climate change risks and opportunities is based on the recommendations from the TCFD report (Recommendations of the Task Force on Climate-related Financial Disclosures, June 2017). When formulating risk scenarios, both transition risks (policy and legal/market/technology/reputation) and physical risks (chronic and acute) are considered. For potential events, risk explanations are provided. Additionally, climate-related opportunities (resource efficiency/energy/products and services/market/resilience) are evaluated.

The risk and opportunity matrix takes into account the likelihood of occurrence and the degree of financial impact for each risk and opportunity. The severity of financial impact and the likelihood of occurrence are classified into five levels each. Based on the different levels of financial impact and likelihood, scores are assigned, and the resulting "Materiality Matrix" after identification is as follows:



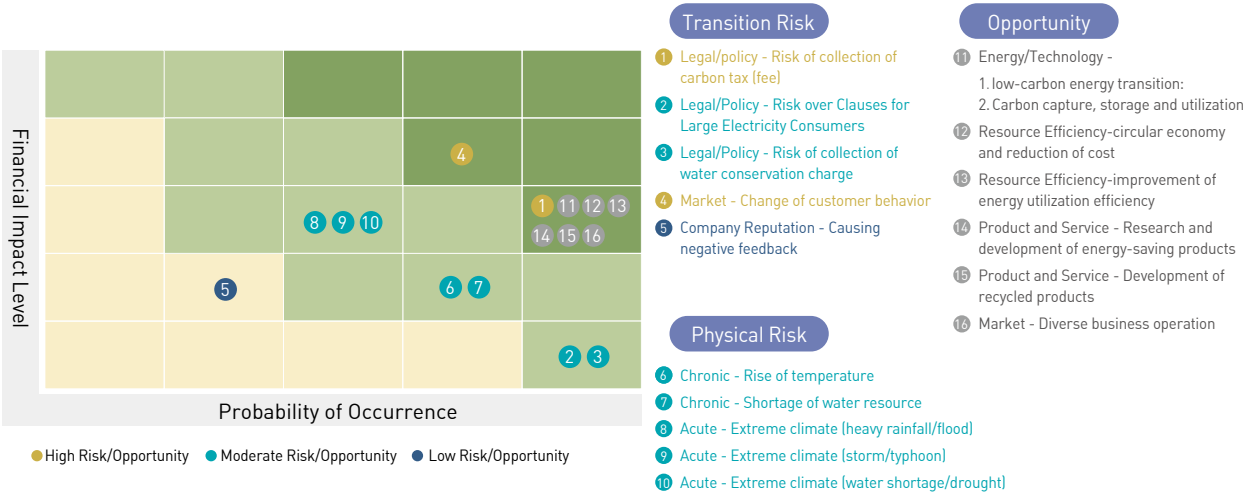
According to the results of the above Materiality Matrix, the risks and opportunities are classified as follows:

Score of 1~4 points is defined as low risk/opportunity: Acceptable or temporarily ignored.

Score of 5~14 points is defined as moderate risk/opportunity: No action is required at this time, and changes are continuously monitored.

Score of 15~25 points is defined as high risk/opportunity: Planning of the corresponding management strategy is prioritized and the performance outcome is tracked periodically.

After the climate change risks and opportunities are assessed by each unit, the risks and opportunities are compiled into a risk-opportunity matrix correspondingly. The risk-opportunity matrix is as shown in the figure below:



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

No.	Current risk or opportunity analysis (Possible impact on the company)	Topic category	Level of risks/ opportunities	Response strategy/ Implementation case example
1	<p>◆ Legal Policy - Risk of collection of carbon tax (fee)</p> <p>1. Domestically - Legislative Yuan passed the change of the name from "Greenhouse Gas Reduction and Management Act" to the "Climate Change Response Act" after the final reading in January 2023. NPC will be charged the carbon tax. According to the trial calculation of carbon emissions in 2023, it is expected to increase operating costs and pose an impact on the standalone operating revenue by 0.58%.</p> <p>2. Overseas - The "CBAM" issued by EU in July 2021 is expected to be implemented officially in 2027. In 2023, NPC's export sales to the EU accounted for about 1.49% of the consolidated operating revenue, which posed minor impact, and the Company has promoted various carbon reduction measures proactively to mitigate possible tax impacts.</p>	Transition Risk/ Policy and Law	High risk	<p>1. Continue to promote the four main carbon reduction strategies of "Low carbon energy transformation".</p> <p>2. Promote low-carbon manufacturing technologies: Continue to adopt optimal and feasible control technologies and process optimization, in order to reduce greenhouse gas emissions of products, and to promote the research and development of eco-friendly products.</p> <p>3. Increase energy-saving improvement benefits: Continue to promote various water-saving and energy-saving improvement projects. Through the assistance of AI technology, find reduction solutions, improve raw material conversion rate, and reduce unit consumption.</p> <p>4. Energy conservation and carbon reduction achievement case sharing: Encourage participation in internal and external evaluation and demonstration tours, learn from outstanding case examples, provide incentives timely, and increase employees' carbon reduction awareness and knowledge.</p>
2	<p>◆ Legal Policy - Risk over Clauses for Large Electricity Consumers</p> <p>The "Renewable Energy Development Act (Clauses for Large Electricity Consumers)" in Taiwan was officially implemented in 2021. Since the contracted capacity of electricity consumed by NPC is larger than the 5,000 KW required by the law, it is necessary to obtain 10% of the contracted capacity (or 8% within three years) of renewable energy power generation facilities, storage facilities, or certificates within five years; otherwise, monetary substitution needs to be paid.</p> <p>Up to the end of 2023, NPC's accumulated installation capacity has satisfied the 8% early bird preferential offer under the government's Clauses for Large Electricity Consumers, such that there is no risk of payment of official fees.</p>	Transition Risk/ Policy and Law	Moderate Risk	<p>1. Before the end of 2023, solar power generation equipment construction has been completed on the roof of facilities at parts of the sites in Chiayi and Xingang consecutively, and the accumulated installation capacity has reached 7,838.55KW, such that it has also satisfied the requirements of 8% early bird preferential offer under the government's Clauses for Large Electricity Consumers.</p> <p>2. In addition, by the end of 2026, the construction can be completed for the rest of the sites. The total installation capacity will be 52,996 KW, and including subsidiary Bichen and other Taiwanese subsidiaries, the total will reach 55,664 KW.</p>
3	<p>◆ Legal Policy - Risk of collection of water conservation charge</p> <p>1. Ministry of Economic Affairs promulgated the "Regulations on the Water Conservation Charge" in January 2023. As of February, the large water consumers who consume water of more than 9,000 degrees in a single month during the dry season will be levied the "water conservation charge" at NT\$ 3 per degree, provided that if the recovery rate reaches the announced standard, the rate may be reduced by NT\$ 2 or NT\$ 1 as favorable treatment.</p> <p>2. According to NPC's actual water consumption, water reclaiming rate self-inspection value, corresponding water conservation charge rate for the water conservation charge calculation period in 2023 along with the consideration of the reduction of fee collection for the desalination equipment at Mailiao Site, the water conservation charge is estimated to account for approximately 0.003% of the standalone revenue of NPC.</p>	Transition Risk/ Policy and Law	Moderate Risk	<p>NPC promotes the water resource management and monitors the application of water resource at various factory premises regularly, in order to promote various water-saving measures. The key cases are stated as follows:</p> <p>1. The seawater desalination plant project of Mailiao Industrial Complex (construction by Formosa Petrochemical Corporation) will ensure the water source of the Mailiao Site premises upon completion of the project.</p> <p>2. Jinxing Site uses effluent water of Taoyuan Norther District Water Resource Recycle Center as the process cooling water.</p> <p>3. Implement circular economy, and promote various water-saving improvement projects including recycling rainwater.</p> <p>4. Apply AI technology to improve water resource utilization efficiency.</p>

No.	Current risk or opportunity analysis (Possible impact on the company)	Topic category	Level of risks/ opportunities	Response strategy/ Implementation case example
4	<p>◆ Market - Change of customer behavior</p> <p>To satisfy the demands of international brand customers, recycled raw materials are used to replace the virgin pellets manufactured from petrochemical raw materials, or eco-friendly low-carbon raw materials are used. Consequently, the demand for the existing products decreases, and in the future, the risk of a decree in revenue may occur in the future.</p> <p>Presently, some of the products of the Plastics Department III, Department of Fibers and Department of Electronics of NPC have turned to adopt eco-friendly or recycled materials, such that the product profile change occurs. By using the fiber product as an example, customers of Adidas and NIKE request the use of recycled PET pellets to replace the virgin pellets, such that the production volume of the virgin pellets decreases. According to the statistics, the potential risk of revenue decreases due to "Change of customer behavior" is approximately 1.84% of the standalone operating revenue.</p>	Transition Risk/ Market	High Risk	<p>In order to respond to customers' needs for low-carbon environmental protection or recycled products, NPC combines e-commerce and online marketing to expand high-end markets and emerging markets, such as the United States and Japan. Accelerating research and development towards manufacturing services, the primary practices are stated as follows:</p> <ol style="list-style-type: none"> 1. Since 2018, NPC has promoted green solutions and developed eco-friendly products in terms of eight aspects including "energy efficiency," "emission reduction," "waste reduction," "water saving," "non-toxic," "healthy," "recycled products" and "safety," and enhanced technologies and relevant applications. Meanwhile, the green product categories (Type I and Type II environmental labels) were expressly defined in 2021. NPC demands that each of its business departments develops and promotes the products. 2. In response to market demand, NPC researches and develops products for new uses, made of new materials, and in line with the environmental protection trend and special specifications. 3. Strive to engage in cooperation of production and sale, and strategic alliance, with major manufacturers at home and abroad, e.g., PRESIDENT CHAIN STORE CORPORATION and ATUNAS, in order to co-build the "Sustainable Recycling Circular Value Chain." 4. Expand and improve the source of materials for recycled products to stabilize production capacity.
5	<p>◆ Company Reputation - Causing negative feedback</p> <p>In response to FSC's Sustainable Finance 3.0, investment institutions tend to evaluate clients' ESG performance during the evaluation of investment and loan extension. If a business fails to meet the ESG sustainability requirements, its reputation can be negatively affected, and financial institutions may increase the interest rates on loans or may even refuse to provide loans to industries of high carbon emissions. According to the assessment of NPC, if the sustainability linked loan signed with the financial institutions fails to reach the target, the loss of interest benefit is expected to account for approximately 0.07% of the standalone revenue of NPC.</p>	Transition Risk/ Reputation	Low Risk	<p>NPC actively participates in domestic and foreign energy saving and carbon reduction advocacies. To demonstrate the execution outcome and effort, the promotion case examples are summarized in the following:</p> <ol style="list-style-type: none"> 1. Participate in the international "Carbon Disclosure Project (CDP)" evaluation, "TCFD Advocacy", "(Science Based Target initiative (SBTi))". 2. Improve the information disclosure and issue the ESG report and TCFD report each year. 3. Improve the Company's ESG international assessment performance. For example, in 2023, NPC received outstanding result in the CDP "Climate Survey" and "Water Survey" with the ranking of A. 4. Participate in the sustainability syndicated loan case with the Bank of Taiwan and CTBC Bank acting as the arranger of the syndicated loan.
6	<p>◆ Chronic - Rise of temperature</p> <p>Affected by climate change, the average temperature increases and thereby causes the increase of temperature, increase in consumption of the air conditioners at the Company's office premises and factory premises, and increase in water consumption. Meanwhile, NPC's operating cost increased whenever its water/electricity consumption increased by 1% in 2023. As a result, it caused the potential impact to the standalone operating revenue by 0.07%.</p>	Physical risk/ Chronic	Moderate Risk	<p>NPC plans to promote the following improvement measures in order to deal with the potential impact posed by the increase in average temperature:</p> <ol style="list-style-type: none"> 1. Replace old air-conditioning equipment, use high-efficiency energy-saving models, and have new factory premises adopt the green building specifications and design. 2. Promote the factory premises to pass the certification of ISO 50001 energy-saving management system, and 14 factories have obtained the certification until 2023. 3. Continue to promote circular economy and apply AI technology to improve the efficiency of water-saving and energy-saving projects, such as optimization of the chilled water host system.

No.	Current risk or opportunity analysis (Possible impact on the company)	Topic category	Level of risks/ opportunities	Response strategy/ Implementation case example
7	<p>♦ Chronic - Shortage of water resource</p> <p>According to Taiwan's climate change scientific report, the warming scenario will be more and more serious. For example, the RCP 2.6 scenario forecasts that rainfall will decrease by 2%, and as affected by the global climate change, the original rain season is changed, and becomes shorter, so as to cause a shortage of water resources. Further, based on the estimation of the cost incurred by NPC to carry water from other areas with abundant water sources, the potential cost increase might account for 0.03% of standalone operating revenue.</p>	Physical risk/ Chronic	Moderate Risk	<p>In order to develop the water resource, NPC plans to promote the following measures:</p> <ol style="list-style-type: none"> 1. Conduct the water resource risk assessment and management each year. 2. Implement measures to expand sources of water and practice various water-saving measures, e.g., desalination plants, reclaimed water, rainwater, process water recovery and reuse, etc. 3. Promote the sharing and integration of water resources across factory premises and companies.
8	<p>♦ Acute - Extreme climate (heavy rainfall/flood)</p> <p>When taking 1986~2005 as the base period to predict the recent (2016~2035) climate conditions of the plant area, the RCP 4.5 and RCP 8.5 trajectories indicated that the maximum continuous rainfall is 7.5~7.7 days, 1078 mm~1085 mm, and the total rainfall has increased by 15% compared to the average. Assuming that NPC's factory premises are flooded as a result of heavy rain/flood and need to reduce production/stop work in the worst case, the potential impact posed therefor might account for 0.82% of the standalone operating revenue.</p>	Physical risk/ Acute	Moderate Risk	<p>NPC periodically monitors and manages the energy consumption and water consumption of each plant site a monthly basis, and has established strategies for mitigating the climate change risk. The key case examples are described in the following:</p> <ol style="list-style-type: none"> 1. Renwu Site is installed with the flood control pumps, and inspection, repair and maintenance are performed periodically, in order to reduce the occurrence of flooding in the plant site due to heavy rainfall. 2. For Mailiao Site, major desilting and dredging operation is performed annually, in order to reduce the probability of flooding in the plant site due to heavy rainfall.
9	<p>♦ Acute - Extreme climate (strong wind/typhoon)</p> <p>Using the base year from 1986 to 2005 to predict the climate condition in the plant from 2016 to 2035. By RCP 8.5 scenario, it predicts the number of typhoons in Taiwan will decrease by 15%; the rate of strong typhoons will increase by 100%, and the typhoon precipitation will increase by 20%. Assuming that NPC is attacked as a result of a storm or super typhoon and it is necessary to park safely at the factory premises to avoid hazards to labor safety and process and to reduce production/stop work in the worst case, the potential impact posed therefor might account for 0.27% of the standalone operating revenue.</p>	Physical risk/ Acute	Moderate Risk	<p>In order to mitigate the risks and hazards caused by storm or typhoon to the Company, NPC plans to promote the strategies which are outlined as follows:</p> <ol style="list-style-type: none"> 1. Set up typhoon prevention groups, define the authority and division of labor, and conduct emergency response training to minimize the risk and hazards caused by strong typhoons to the utmost. 2. Improve the infrastructure of the factory premises, and also the protection of doors and windows before any typhoon arrives. 3. Maintain the insurance for the Company's assets and equipment to mitigate the impact posed by accidents.
10	<p>♦ Acute - Extreme climate (water shortage/drought)</p> <p>The period of 1986~2005 is used as the base period to predict the climate condition of the plant site in the recent period (2016~2035). It is predicted that there will be two months of water shortage or drought every year.</p> <p>Based on the assumption of water shortage or drought that may cause the worst scenario of factory production reduction/suspension of operation, NPC estimates that the potential impact on the revenue is approximately 0.82%.</p>	Physical risk/ Acute	Moderate Risk	<p>NPC periodically monitors and manages the energy consumption and water consumption of each plant site a monthly basis, and has established strategies for mitigating the climate change risk. The key case examples are described in the following:</p> <ol style="list-style-type: none"> 1. Corporate Mailiao Industrial Complex 100,000 tons seawater desalting plant project (construction by Formosa Petrochemical Corporation) 2. Jinxing site uses effluent water from Taoyuan Norther District Water Resource Recycle Center as the process cooling water. 3. Implement circular economy and promote various water-saving improvement projects proactively, e.g., construction of the cooling water tower discharge water recovery system. 4. To cope with the potential risk of production suspension due to water shortage or drought at the plant site, Renwu site has excavated 2 anti-drought wells, and an amount of 2,300 M3/day water supply can be increased. 5. Cooperate with government departments to develop the subsurface water of Donggang River and Gaoping River, in order to stabilize the water source supply. In addition, assess the development of Huliao River high ammonia nitrogen wastewater treatment, in order to acquire water rights via the reclaimed water exchange method.

No.	Current risk or opportunity analysis (Possible impact on the company)	Topic category	Level of risks/ opportunities	Response strategy/ Implementation case example
11	<p>♦ Energy/Technology - 1. low-carbon energy transition: 2. Carbon capture, storage and utilization</p> <p>In response to the international climate transition trend, most governments commit to the goal of net-zero emissions. When planning to pursue the carbon reduction roadmap for "Carbon Neutrality in 2050," NPC invested in the low-carbon energy transformation by investing capital in the transformation of coal-burning/fuel-burning boilers to gas-burning boilers. The R&D and investment in carbon capture technology are more important. Therefore, it is expected to reduce carbon tax and increase operating revenue. The potential impact posed therefor might account for 0.14% of the standalone operating revenue.</p>	Opportunity/ energy and technology	High opportunity	<p>NPC has promoted the following projects recently:</p> <ol style="list-style-type: none"> 1. The low-carbon transition improvement projects include the completion of change of coal-burning boilers to gas-burning boilers for Linkou, Shulin sites and Chiayi utility plant, and the change of 40-ton oil fired steam boiler to one unit of gas-burning boiler for Kungshan site. 2. The CO₂ generated during the process is converted into liquid CO₂ via carbon capture technology for further sale to the downstream customers. 3. Continue to control the commercialization of technologies, such as "flue gas capture," "green algae," and "hydrogen energy," and implement them in a timely manner. 4. Work with academic institutions and other industrial, government, and academic circles to develop & research, and implement emerging carbon-negative technologies
12	<p>♦ Resource Efficiency-circular economy and reduction of cost</p> <p>The 4 R circular economy principles- ① Reduce, ② Reuse, ③ Recycle, ④ Renew, constitute an important part in NPC's promotion of sustainable circular value chain. NPC recycles and reuses the waste gas and waste goods generated from the process, and also takes into account the product value chain and life cycle to make the improvement from three aspects, namely "reduction of raw material consumption," "improvement of process" and "reduction of transportation in the supply chain," to reduce production costs and take into account the sustainable utilization of resources at the same time. It is expected to reduce the materials and processing costs. The impact posed therefor accounts for 0.09% of the standalone operating revenue.</p>	Opportunities/ Source of Energy	High opportunity	<p>The key cases of NPC to promote circular economy are stated as follows:</p> <ol style="list-style-type: none"> 1. Continue to expand the recycling of specially recommended products in site and PIR recovered outside the factory, including recycling and reuse of PET specially recommended products, PP recycled pellets, and MLCC release films. 2. Increase the proportion of waste resources for recycling and reuse, such as cases of reuse of glass fiber leftover materials, sandblasting waste, and SMC waste glass fiber. 3. Improve the proportion of recycled materials used to reduce carbon emissions at the raw materials end.
13	<p>♦ Resource Efficiency-improvement of energy utilization efficiency</p> <p>In order to improve the utilization efficiency of resources and achieve the goal for water conservation and energy conservation, NPC is pursuing "Carbon Neutrality in 2050" steadily, and promoting various water-saving and energy-saving improvement projects, including AI applications and implementation of advanced energy-saving equipment, proactively, in order to mitigate the carbon emission. The effect posed by the improvement is expected to account for 0.78% of the standalone operating revenue.</p>	Opportunities/ Source of Energy	High opportunity	<p>The measures promoted by NPC to improve the utilization efficiency of resources are stated as follows:</p> <ol style="list-style-type: none"> 1. Apply emerging technologies such as AI to reduce the raw materials consumed in the process and reduce the cost of materials. 2. Promote energy-saving improvement projects: 440 energy-saving improvement projects were completed in 2023, and CO₂ reduction by about 126,153 tons/year. 3. Promote the water-saving improvement projects: In 2023, the water-saving effect is expected to be 4,581 tons/day. 4. Promote the process technology improvement, and replace the traditional street lamps and office lamps of the factory premises in North Taiwan with LED lamps.

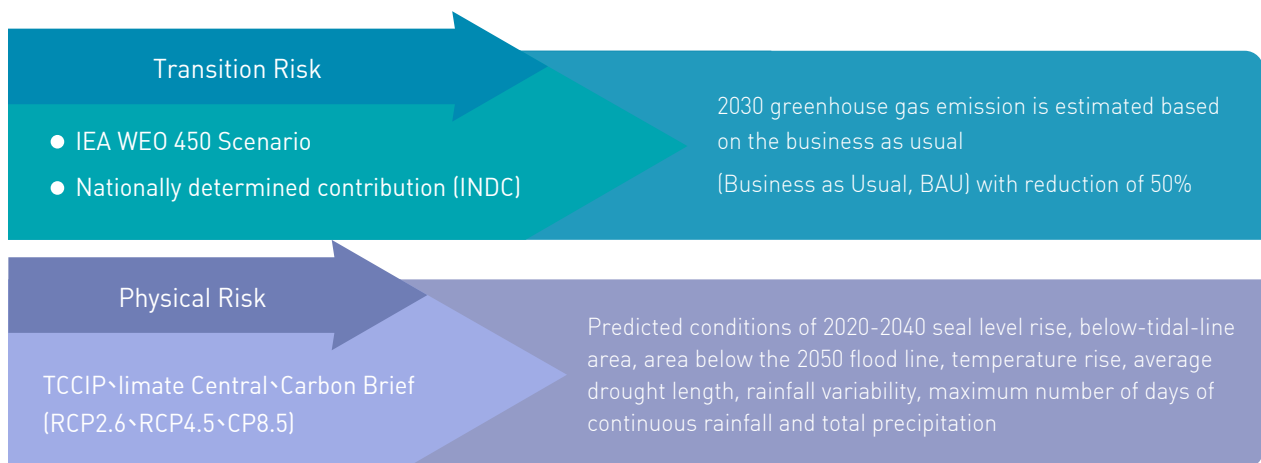
No.	Current risk or opportunity analysis (Possible impact on the company)	Topic category	Level of risks/ opportunities	Response strategy/ Implementation case example
14	<p>♦ Product and Service - Research and development of energy-saving products</p> <p>In recent years, due to the global impact of extreme climate, temperature continues to rise, and consumers' demand for low-carbon and energy conservation also increases. Accordingly, there are potential business opportunities for energy-saving and heat insulation products.</p> <p>NPC continues to develop and expand green or eco-friendly products of heat insulation paint and airtight windows, etc. Accordingly, the revenue is expected to increase, and the potential impact is approximately 0.65% of the standalone operating revenue.</p>	Opportunity/ Product and Service	High opportunity	<p>NPC has developed numerous green products. In addition to continuous investment in research and development, NPC will also follow the consumer market trend to expand green business opportunities. The key case examples are summarized in the following:</p> <ol style="list-style-type: none"> 1. Cooler Paint (heat insulation paint): The product is verified by the National Taiwan University of Science and Technology, and it is able to save 31.8% of air conditioning energy consumption in summer. 2. Energy-saving airtight window: Low thermal conductivity, heat insulation being 1/1250 of aluminum material, and capable of saving energy consumption by more than 20%. 3. ICE COOL (heat insulation paper): Use non-toxic material, and equipped with the characteristics of anti-explosion, high light transmittance and high IR, UV isolation, capable of reducing energy consumption. 4. Dry-type transformer: The energy efficiency ratio is 99.2, higher than the CNS value, 98.8, by 4%.
15	<p>♦ Product and Service - Development of recycled products</p> <p>In order to extend the product life cycle, make it easier to reuse, repair and recycle the product, and use recycled materials to replace the main raw materials as practical as possible, various countries' governments have expressly set the goal for beverage containers made of recycled materials. Meanwhile, major international brand manufacturers, such as NIKE, IKEA and HP, have set the target schedule for the use of recycled materials. In line with the industrial trend, NPC is promoting the recycling of products, such as PET bottles, eco-friendly film and fabric, proactively. It is expected to increase the operating revenue. The potential impact posed therefor accounts for about 0.56% of the standalone operating revenue.</p>	Opportunity/ Product and Service	High opportunity	<p>The recycling products developed by NPC are outlined as follows:</p> <ol style="list-style-type: none"> 1. Continue to expand the PCR products purchased externally, including PET products, eco-friendly film products, APET tape products and fabric, etc. 2. Develop the sources of recycled materials proactively to ensure the safe supply of raw materials. 3. Develop modified polyester pellets and packaging films made of a single material to facilitate following recycling and reuse. 4. Promote recycled products under NPC SAYA brand.
16	<p>♦ Market - Diverse business operation</p> <p>Many countries around the world have set a timetable to implement fuel bans from 2020 to 2040, in order to practice the goal of net-zero carbon emission. Local consumers can only procure electric vehicles or fuel cell electric vehicles (FCEV). The policy will drive the booming development of the industry chains, including electric vehicles, highway charging stations, hydrogen fuel infrastructure, and remodeling of old power grids.</p> <p>NPC estimates that the demand for lithium battery copper foil will benefit from the rapid increase in market demand, leading to higher sales volumes. Additionally, NPC has developed applications for wind power materials, capitalizing on new opportunities in renewable energy. This is expected to increase revenue, with a potential impact accounting for approximately 0.40% of NPC's individual revenue.</p>	Opportunity/ resilience	High opportunity	<p>For the external business environmental change due to climate change, to enhance risk resilience, NPC actively seeks and develops potential transition opportunities. The main case examples are summarized in the following:</p> <ol style="list-style-type: none"> 1. Actively engage in the research and development of electric vehicle industry-related products. For instance, copper foils are initially used in electrical and electronic industries, and NPC has consecutively developed copper foils of high heat resistance and high strength function. In recent years, some of the copper foils can be further used as the electrodes of the lithium batteries of electric vehicles. Accordingly, the copper foil production line is expanded. 2. Develop the "multi-axial fiberglass fabric for wind power" to promote the application market of wind power windmill blades.

3.4 Climate Risk Scenario Analysis

According to the TCFD's recommendations, NPC adopts the worst-case scenarios for the transition and the physical risks and includes the analysis results in the strategic resilience assessment.

Regarding the transition risk, NPC refers to the IEA WEO 450 Scenario (2016) and the Nationally Determined Contribution (NDC) target set by each manufacturing site. In Taiwan's Intended Nationally Determined Contribution (INDC) report (2015), the greenhouse gas emissions are set to be reduced by 50% by 2030 based on the business-as-usual (BAU) scenario. 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 NPC is analyzed in terms of market, technology, reputation, finance, and operations in the future.

As for the physical risk, we refer to Climate Change Knowledge Portal, Taiwan Climate Change Projection Information and Adaptation Knowledge Platform (TCCIP) and National Science and Technology Center for Disaster Reduction to estimate temperature rise, precipitation, flooding and drought conditions of 2020~2040 for scenarios such as RCP2.6, RCP4.5 and RCP8.5.

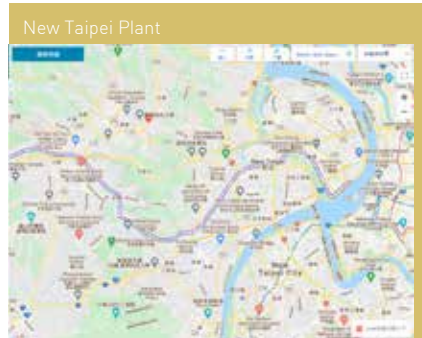


Plant Site	New Taipei Plant	Taoyuan Plant	Yunlin Plant	Chiayi Plant	Kaohsiung Plant
Scenario Analysis	The extreme climate risk assessment is mainly conducted using RCP 8.5 scenarios, with some of the RCP 2.6 and RCP 4.5 scenarios				
Sea-level rise (RCP 8.5)	Partially impacted	No impact	Impacted	No impact	No impact
Below-tidal-line area (risk of flooding) (RCP 8.5)	No impact	No impact	Partially impacted	No impact	No impact
Area below the 2050 flood line (RCP 8.5)	No impact	No impact	Impacted	No impact	No impact
Rise of temperature (RCP 8.5)	1.58	1.63	2.59	2.57	2.54
Rainfall variability (RCP 8.5)	5%- 10%	5%- 10%	10%- 15%	5%- 10%	10%- 15%
maximum number of consecutive dry days, CDD (RCP 8.5)	26.3 days	28.1 days	74 days	56.1 days	60.1 days
Maximum number of consecutive days of precipitation (RCP 4.5-8.5)	11.6 days - 11.8 days	9.5 days - 9.7 days	5.9 days - 12.2 days	5.9 days - 12.2 days	12.3 days - 12.4 days
Total precipitation (RCP 4.5-8.5)	2,291 mm- 2,306 mm	1,807 mm	1,017 mm- 1,041 mm	1,661 mm- 1,720 mm	1,755 mm- 1,817 mm

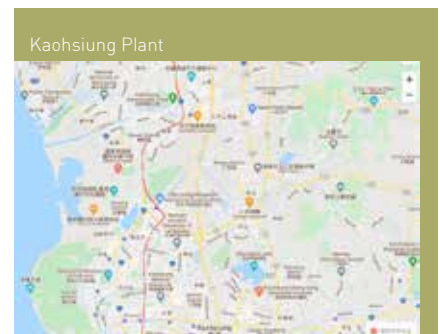
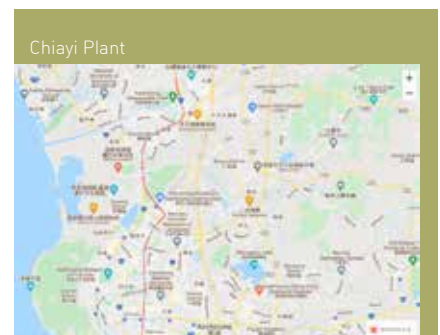
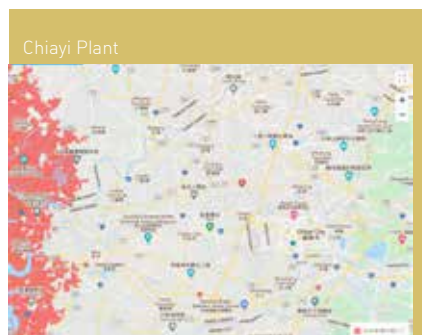
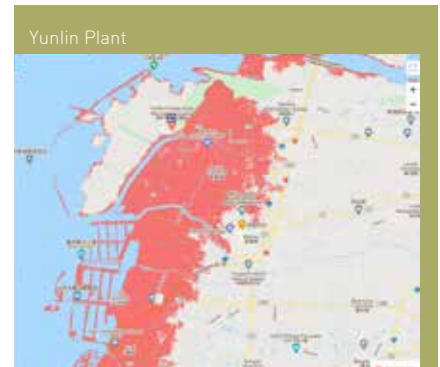
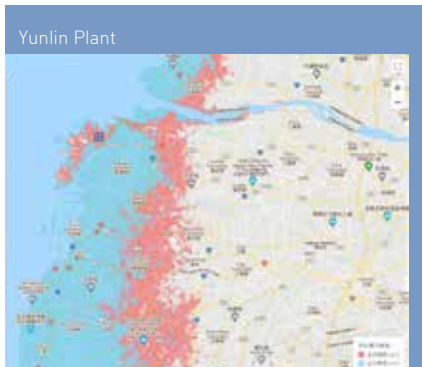
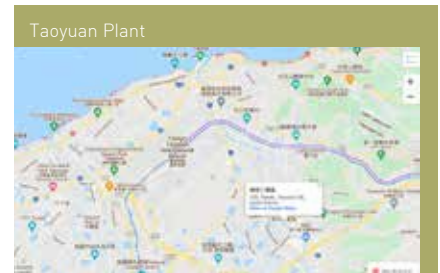
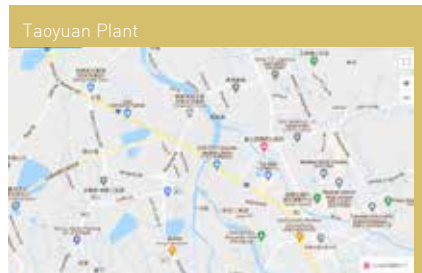
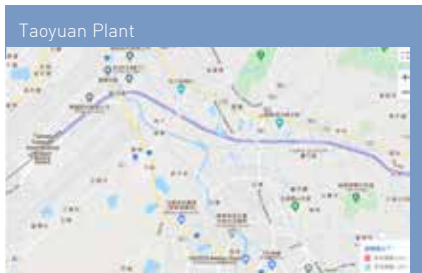
Rise of Seal Level



Area lower than tidal line

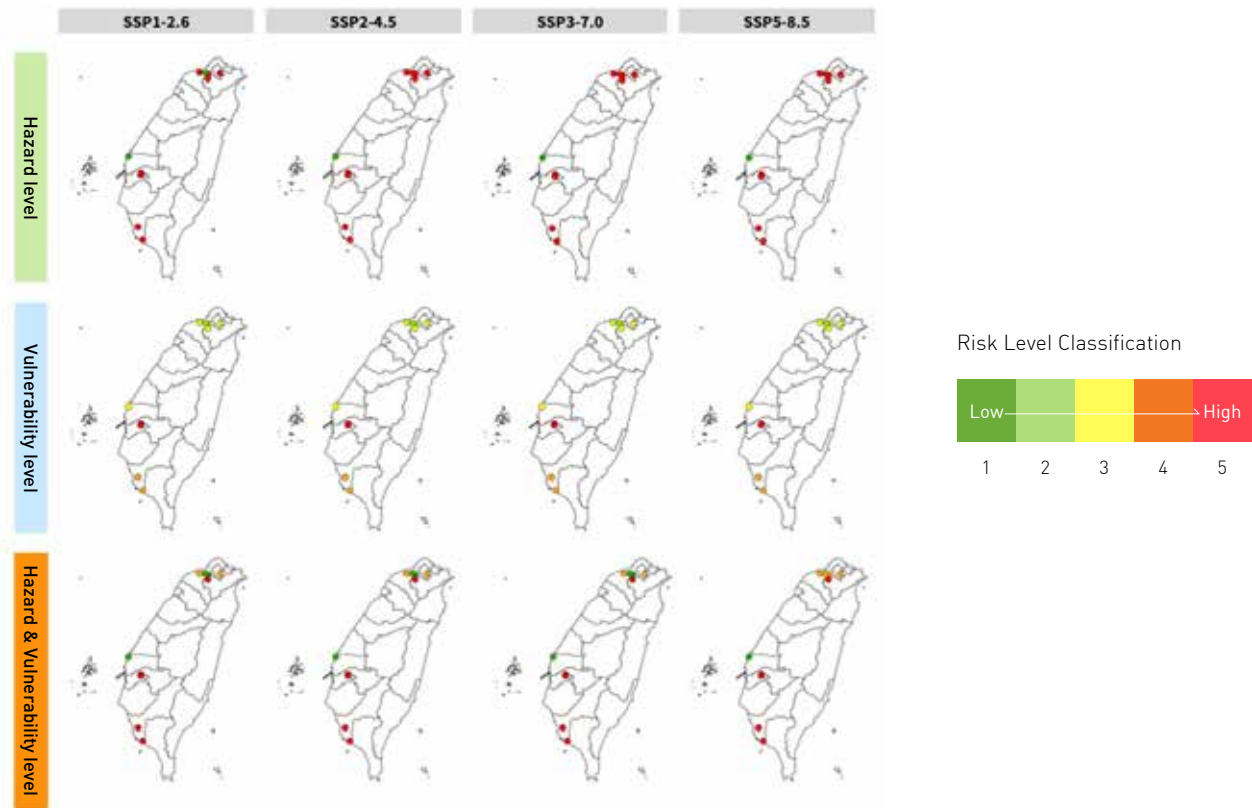


Area below the 2050 flood line



Estimate and analyze future flood risks under different scenarios.

Consolidation map of vulnerability to flood disasters in the mid-century.



Estimate and analyze future drought risks under different scenarios.

Overview of NPC's Drought Risk Map



* 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 2061- 2100

4 Indicators and Targets

4.1 Carbon Reduction Absolute Targets and Emission Indicators

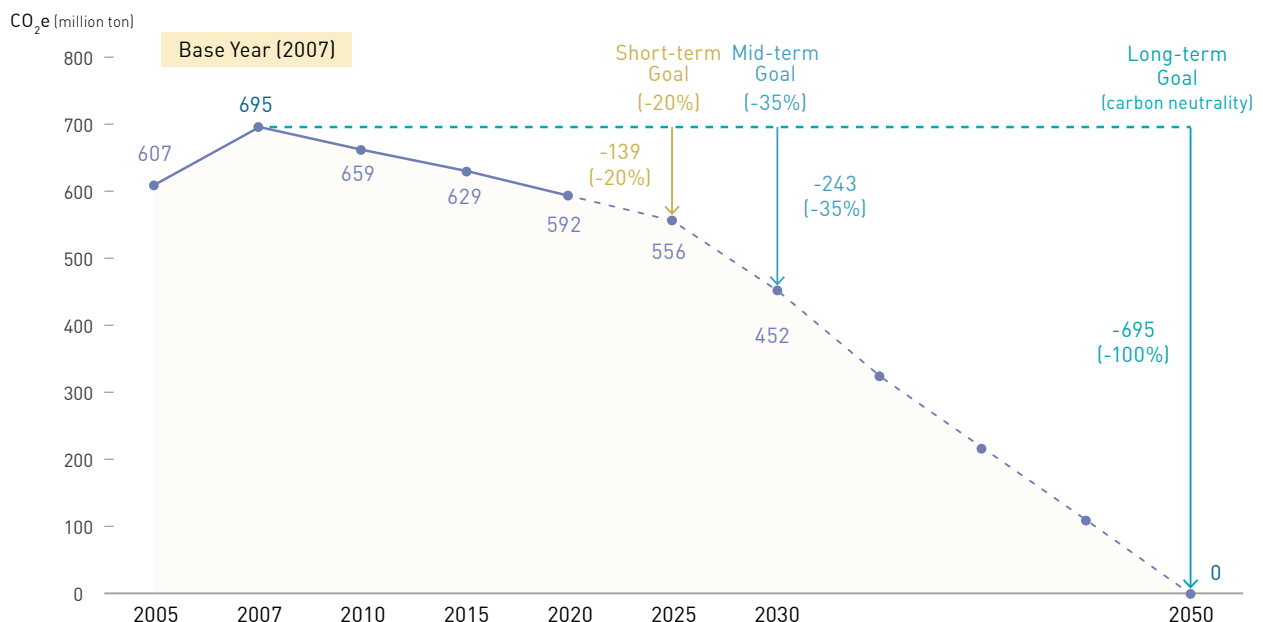
In order to ensure the accuracy of the greenhouse gas emission inventory values, the annual inventories of greenhouse gas emission of NPC are verified by SGS Taiwan, British Standards Institution (BSI), AFNOR and Bureau Veritas. Relevant data is disclosed in the "Environmental Protection" related chapters of the Sustainability Report to be used for the communication with stakeholders and internal performance review.

Carbon Reduction Target

Depending on different purposes, NPC has formulated three carbon reduction targets including "external commitment," "internal enhanced management," and "SBTi Targets." However, the most stringent reduction target will be adopted as the pursued one in order to ensure the carbon reduction path in each phase can achieve the aforementioned multiple targets and ultimately achieve the long-term goal of "carbon neutrality by 2050." The explanations for each indicator are as follows:

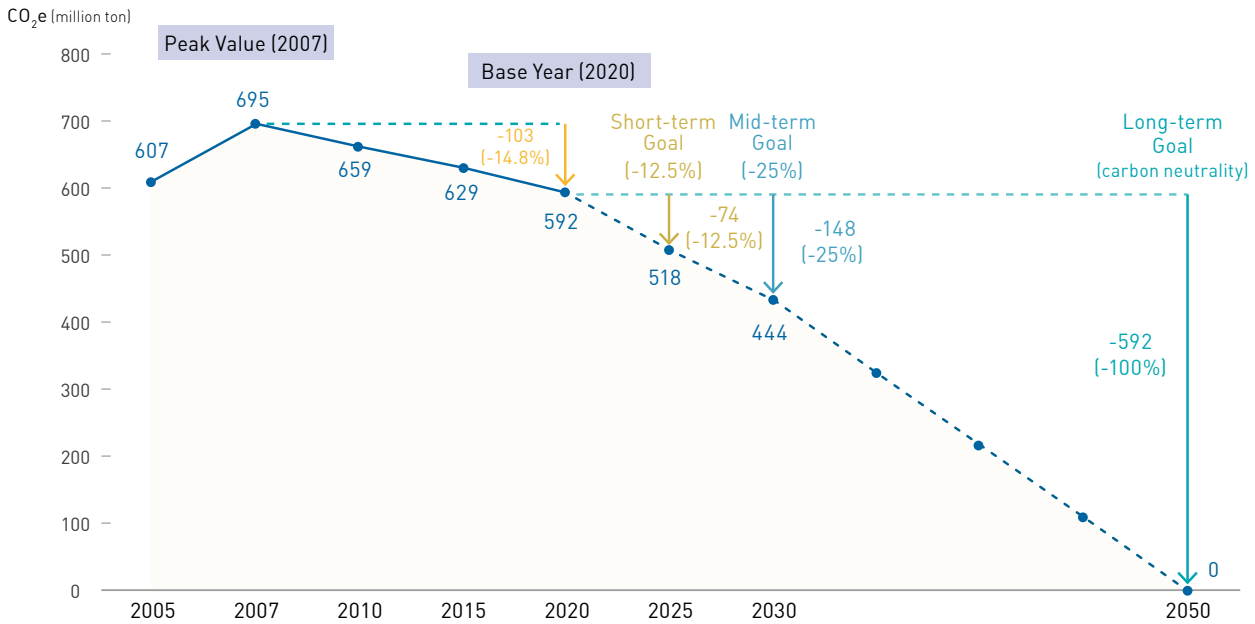
External commitment on carbon reduction targets: For "Scope 1 + Scope 2", with the base year of 2007 (6.95 million metric tons of CO₂e), reduction of 20% in 2025 (5.56 million metric tons of CO₂e), reduction of 35% in 2030 (4.52 million metric tons of CO₂e), and achieving carbon neutrality in 2050.

NPC's Carbon Reduction Roadmap - External commitment to carbon reduction targets



Internal enhanced management targets: For “Scope 1 + Scope 2”, with the base year of 2020 (5.92 million metric tons of CO₂e), reduction of 12.5% in 2025 (5.18 million metric tons of CO₂e), reduction of 25% in 2030 (4.44 million metric tons of CO₂e), and achieving carbon neutrality in 2050.

NPC’s Carbon Reduction Roadmap - Internal enhanced management targets

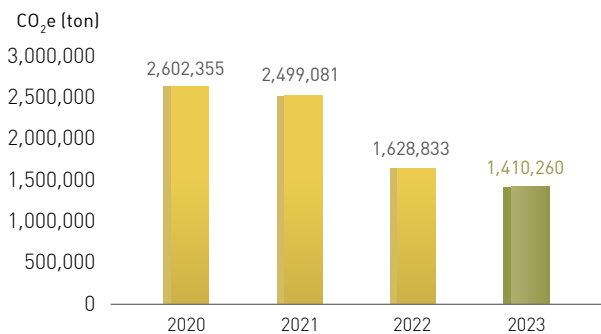


SBTi approval targets: According to the requirements on the application of SBTi targets, they are divided into:

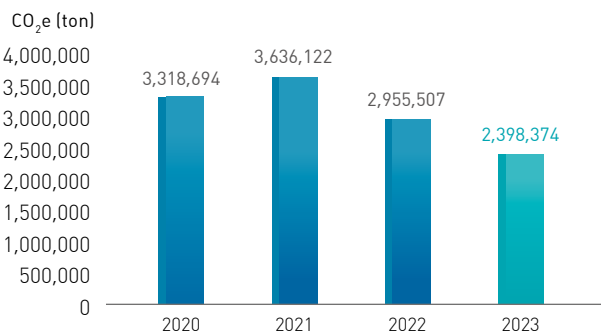
- ① For “Scope 1 + Scope 2”, 2021 is set as the base year (6.14 million metric tons of CO₂e), and the target is to achieve a reduction of 15% in 2027 (5.22 metric tons of CO₂e).
- ② For Scope 3, 2021 is set as the base year, and the target is to achieve a reduction of 7.4% in 2027.

NPC’s 2023 greenhouse gas emissions verification results show that the total carbon emissions in 2023 decreased by 16.92% compared to 2022. However, when comparing emissions per unit, the 2023 emissions increased by 16.12% compared to 2022, mainly due to a 28.45% decline in sale amount.

Scope 1



Scope 2



Note 1: Scope 1 refers to the GHG direct emissions.
Note 2: Scope 2 refers to the GHG indirect emissions.
Note 3: The SGS, BSI, AFNOR Asia and Bureau Veritas Certification (Taiwan) inspection verification data is used for 2016~2023.
Note 4: Starting from 2016 (inclusive), NPC has adopted the GWP from the IPCC Fourth Assessment Report (2007) as required by the EPA for emission calculations. Beginning in 2024 (inclusive), the GWP from the IPCC Fifth Assessment Report (2013) will be used for emission calculations in accordance with the regulations set by the Ministry of Environment.

Besides continuing to promote the four major carbon reduction strategies and implementing various carbon reduction projects, it is crucial to integrate a carbon reduction culture, including energy conservation, emission reduction and circular economy, into each plant and department. NPC will fully exert our efforts to strengthen our capabilities and resilience in the transition to climate change.

4.2 Scope 3 Emission Indicators

NPC conducts an annual inspection on the relevance and emission data of Scope 3, and such data is verified by a third-party authentication unit. The total Scope 3 emissions in 2023 were 11,608,872 metric tons of CO₂e. The emissions indicator information is as follows:

Emission source	Relevance	Emissions (metric tons of CO ₂ e)
Products and services purchased	Relevant and counted	4,613,424
Capital goods	Relevant and counted	39,063
Fuel and energy-related activities (not included in Scope 1 or 2)	Relevant and counted	561,348
Upstream transportation and distribution	Relevant and counted	16,964
Business waste output	Relevant and counted	1,901
Business travel	Relevant and counted	1,581
Employee commuting	Relevant and counted	7,058
Asset leasing(upstream)	Irrelevant	-
Transportation and distribution (downstream)	Relevant and counted	217,660
Processing of sold products	Relevant and counted	863,410
Use of products sold	Irrelevant	-
Final disposal of products sold	Relevant and counted	363,987
Asset leasing(downstream)	Irrelevant	-
Franchising	Irrelevant	-
Investment	Irrelevant	4,922,474
Total		11,608,872

4.3 Other Indicators and Project Targets

In addition to the statistical analysis of the GHG emissions, NPC also discloses the energy saving execution status of steam, electricity and fuel related to the GHG emissions. Please refer to NPC's 2023 Sustainability Report "3.2 Climate Action and Strategies" for details. In addition, the other energy saving and carbon reduction targets of NPC are described in following:

Construction of renewable energy facility

To comply with the government's "High Electricity User Clause", NPC plans to install solar power generation facilities at the plant roof of each site. The company's cumulative total installed capacity has reached approximately 52,996 kW. Including the planned capacity of PFG, the total capacity is expected to reach around 55,664 kW. It is expected to account for approximately 19.3% of the 2030 Taipower contract capacity, which is far higher than the requirement of 10% specified in the government's Energy-heavy Industries of Renewable Energy Development Act.

End of 2023

- Installed sites: Xingang site (Plant I of Rigid Film, Panel of Switchgear); Chiayi Site.
- Estimated capacity: 7,838.55KW
- Already complies with the company's obligations under the large electricity user clause.



2026

- Plan to complete the installation of equipment at the remaining sites by 2026.
- The company's cumulatively total installed capacity is estimated to reach approximately 52,996 KW. Including PFG, the total will reach 55,664 KW.

Other Indicators

1. Recycle of PP pallets:

Year	Actual Achievement in 2023	Prediction for 2024	Target in 2025
Sales Volume (tons/year)	12,899	15,660	16,926
As a percentage of the total sales	88.4 %	90.0 %	91.0 %
Carbon reduction amount (tons/year)	16,678	20,248	21,885

2. Green Transportation:

Year		Actual Achievement in 2023	Prediction for 2024	Target in 2025
Subsidy for electric motorcycles (units/year)	Newly-installed	85	50	51
	Accumulated	401	451	502
Purchase of energy-saving company vehicles (units/year)	Newly-installed	0	8	9
	Accumulated	0	8	17
Carbon Reduction (tons/year)	Newly-installed	10.61	7.52	7.8
	Accumulated	50.06	57.58	65.38

Note: The "electric scooter subsidy" refers to the subsidy situation for NPC only. Additionally, the disclosure scope of 'energy-saving official vehicle procurement' includes NPC and its Taiwanese subsidiaries such as NanYa PCB and PFG.

3.Promotion of paperless operation:

Year	Actual Achievement in 2023	Prediction for 2024	Target in 2025
Total paper usage quantity (thousand sheets/year)	15,397	15,094	14,780
Reduction in usage (thousand sheets/year)	21,553	21,856	22,170
Carbon reduction amount (tons/year)	294.85	298.99	303.29

Note: The data in the "reduction in usage" is compared to the total paper usage of 36,950 thousand sheets in 2019 (the base year).

TCFD Appendix comparison table

Themes	TCFD Recommended Disclosure	Corresponding Chapters	Corresponding Pages
Governance	Describe the board's oversight of climate-related risks and opportunities.	1.2 Organization and Responsibility	P.5 - 9
	Describe management's role in assessing and managing climate-related risks and opportunities.	1.2 Organization and Responsibility	P.5 - 9
Strategy	Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	3.2 Risk and Opportunity Identification	P.22
	Describe the impact of climate-related risks and opportunities on the organization's business, strategy, and financial planning.	Chapter II Strategy 3.3 Summary Table of Impact of Risks and Opportunities on the Company	P.11 - 19 P.23 - 27
	Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	3.4 Climate Risk Scenario Analysis	P.28 - 30
Risk Management	Describe the organization's processes for identifying and assessing climate-related risks.	3.1 Risk and Opportunity Management Process	P.20 - 21
	Describe the organization's processes for managing climate-related risks.	3.1 Risk and Opportunity Management Process	P.20 - 21
	Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	3.1 Risk and Opportunity Management Process	P.20
Indicators and Targets	Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	4.1 Carbon Reduction Absolute Targets and Emission Indicators	P.31 - 32
	Disclose Scope 1, Scope 2, and if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	4.1 Carbon Reduction Absolute Targets and Emission Indicators	P.31 - 32
		4.2 Scope 3 Emission Indicators	P.33
	Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	4.3 Other Indicators and Project Targets	P.33 - 34

