東和鋼鐵
TUNG HO STEEL

Task Force on Climate-Related Financial Disclosures

氣候相關財務揭露報告書

TCFD 2022

CONTENTS

Message from the Management

A Declaration for Corporate Sustainable Development in the Face of Climate Change

As a result of global warming in recent years, we are faced with a higher risk of climate change, and its impact on energy and water resources has affected the operations of businesses. As a global citizen, we must assume our corporate responsibilities for environmental protection and the development of sustainable energy. In 2007, the project for installation of wind turbines in the Longgang Industrial Park passed the EIA review. In 2010, we established the first steel mill in Taiwan adopting a process for direct rolling of hot steel billets without any reheating furnace. In 2012, we applied to join the WSA Climate Action Program as a member, and we submitted the information of greenhouse gas emissions. By actively taking innovative actions, we are ahead of our peers.

In order to pursue corporate sustainable development and stay committed to tackling the risks and opportunities of climate change, and with reference to the TCFD (Task Force on Climate-related Financial Disclosures) recommendations on climate-related financial disclosures published by the Financial Stability Board (FSB), we have set up an “Environmental Sustainability Sub-committee” under the Corporate Governance and Nominating Committee to identify the potential material risks and opportunities in operations, propose strategies in response to such risks and opportunities, and establish climate-related metrics and targets that can be continually managed. The Corporate Governance and Nominating Committee holds at least two meetings each year and submits regular reports on climate-related issues to the Board of Directors.

Since 2020, we have launched projects for environment or climate-related international initiatives including TCFD (climate-related financial disclosures), CDP (carbon disclosures) and EPD (Type III Environmental Product Declaration), and we formally signed up to become a TCFD supporter in February 2021. In May of the same year, we published our first “Report on Climate-related Financial Disclosures (TCFD)” which was verified by the British Standards Institution (BSI) as “Level 5: Excellent.” In 2021, we completed CDP’s climate change questionnaires for the first time and achieved the level of B. Our score was better than the average of the metal smelting, refining and forming industry (C), the average of

Asian businesses (B-) and the average of global businesses, demonstrating that we have entered the stage of climate change management and taken integrated actions regarding climate issues. We are also the first manufacturer of building-purpose steel in Taiwan that has received certificates of EPD and carbon footprints for all products.

The Environmental Sustainability Sub-committee has held a meeting on identification of climate change risks and opportunities, and has identified six climate-related material risks and four climate-related material opportunities. Based on our short-, medium- and long-term financial conditions, we are still able to maintain stable and sustainable operations and take advantage of the opportunities arising from climate change to generate more profits and set carbon reduction targets that are in line with the national pathway to net-zero emissions in 2050. Presently, Tung Kang Wind Power Corp. has installed additional solar PV power generating equipment, and we have engaged in a joint venture with Taiwan Sugar Corporation to develop biomass energy. We will continue to seek alternative renewable energy and improve the performance of electric furnaces to move toward the emission reduction targets in 2031. In the future, we will ensure full disclosures and good performance with regard to climate risks and opportunities according to TCFD recommendations and other internationally recognized frameworks. To ensure the sustainable management of Tung Ho Steel, we hope to keep ahead of our peers in electric furnaces with a lower carbon emission intensity and actively meet the expectations of all stakeholders.

Chairman Henry C. T. Ho

1.Climate Change Management

According to the "Global Risks Perception Survey Ranks" in the Global Risks Report 2022 published by the World Economic Forum (WEF) in January 2022, "climate action failure" and "extreme weather" are listed as the top two risks. Moreover, in March 2022 the government of Taiwan published "Taiwan's Pathway to Net-Zero Emissions in 2050," which is focused on the four areas of "energy transition," "industrial transition," "lifestyle transition" and "social transition" as well as the two foundations of governance in "technology R&D" and "climate legislation," and is supplemented by "12 key strategies," with the aim to develop plans and achieve the goals of net-zero transition. In order to pursue sustainable development and stay committed to tackling the risks and opportunities presented by climate change, Tung Ho Steel Enterprise Corporation (hereinafter "Tung Ho Steel" or "we") has included climate change as a material issue and a key material risk for sustainable development, and has continued to engage in its analysis and control and promote low-carbon transition and climate adaptation.

Milestones in climate change management

2007	Feb	The project for installation of new wind turbines in the Longgang Industrial Park passed the EIA review, and the project formally commenced to install wind turbines with a capacity of 11.5MW.
2009	Jul	Construction began in the project to install 11.5MW wind turbines.
	Sep	In accordance with the "Principles Governing the Inventory and Registration of Greenhouse Gases" and "Principles Governing the Early Action and Offsetting Programs for Greenhouse Gases" promulgated by the Environmental Protection Administration, we began to conduct greenhouse gas inventories retroactively to 2003.
	Nov	Upon an investigation by the Environmental Protection Administration, we provided the data of the greenhouse gas emission intensity of our products as a basis of reference for determining the phase-1 emission intensities to be published for the steel industry to ensure smooth implementation of the subsequent policy on early action programs.
2010	Jul	The steel rolling mill of the Taoyuan Works conducted a successful hot trial run of its direct hot charge rolling system and began production, making it the first steel mill in Taiwan adopting a process for direct rolling of hot steel billets without any reheating furnace.
2011	Oct	Installation of the 11.5MW wind turbines was completed, but they could not be incorporated into the systems of Taipower due to problems in feeder lines.
	Nov	The Miaoli Works received a "verification statement issued by Bureau Veritas (BV)" for the carbon footprints of its products of steel shapes and plates.
2012	Oct	We applied to join the World Steel Association (WSA) as an associate member, and we also joined the WSA Climate Action Program to become a climate action member. We submitted the information of greenhouse gases and retroactively provided the data of greenhouse gas emissions for 2007–2011.
	Dec	The Miaoli Works was certified under the ISO 50001 energy and resource management system.
2014	Jun	A plan for alternative lines was implemented for the project to install wind turbines, with the laying of 22.8kV power cables until the Longgang Branch No. 1 transmission tower adjacent to the Miaoli Works to be incorporated into the systems of Taipower.
	Aug	The Taoyuan Works and Miaoli Works received reduction quotas issued by the Environmental Protection Administration for greenhouse gas early action programs totaling 447,603 ton-CO_2e.
	Nov	The Kaohsiung Works received a "verification statement issued by Bureau Veritas (BV)" and won a "glazed trophy" from the Industrial Technology Research Institute for the carbon footprints of five products including steel shapes and rebar, making it the first steelworks in the rebar industry of Taiwan to receive a "carbon footprint certificate."

With reference to the TCFD (Task Force on Climate-related Financial Disclosures) recommendations on climate-related financial disclosures published by the Financial Stability Board (FSB), we have established a climate change governance framework based on the four core element of climate-related financial disclosures, namely "governance," "strategy," "risk management" and "metrics and targets," to identify the potential material risks and opportunities in operations, propose strategies in response to such risks and opportunities, and establish climate-related metrics and targets that can be continually managed. In February 2021, we formally signed up to become a TCFD supporterNote. In May of the same year, we published our first "Report on Climate-related Financial Disclosures (TCFD)" which was verified by the British Standards Institution (BSI). Also in 2021, we for the first time completed CDP's climate change questionnaires and achieved the level of "Management (B)."

Note: For the list of TCFD supporters, please visit: https://www.fsb-tcfd.org/supporters/

2015	Mar	The "Corporate Social Responsibility Best-Practice Principles" (renamed the "Sustainable Development Best-Practice Principles" in 2022) was published and became effective after approval by the Board of Directors.
	Sep	The Taoyuan Works received a "verification statement issued by Bureau Veritas (BV)" for the carbon footprints of five products including rebar.
	Dec	We set up a cross-departmental "CSR Task Force.
2016	Mar	The "Corporate Social Responsibility Best-Practice Principles" (renamed the "Sustainable Development Best-Practice Principles" in 2022) was published and became effective after approval by the Board of Directors.
	Sep	The Taoyuan Works received a "verification statement issued by Bureau Veritas (BV)" for the carbon footprints of five products including rebar.
	Dec	We set up a cross-departmental "CSR Task Force.
2017	Jan	The fuel for the reheating furnaces at the steel rolling mill of the Kaohsiung Works was changed from heavy oil to natural gas. The Kaohsiung Works also applied for a greenhouse gas offsetting program and was expected to receive an offsetting quota of 71,600 ton-CO_2e.
	Aug	We voluntarily published our first CSR report (which won the silver award for traditional industries in corporate sustainability reporting from the "2016 Taiwan Corporate Sustainability Awards").
		Our subsidiary Tung Kang Wind Power Corp. received a 25-year license for power company issued by the Bureau of Energy, Ministry of Economic Affairs, and began to sell electricity on a wholesale basis.
2018	Jan	We received a certificate from the World Steel Association (WSA) recognizing us as a 10-year climate action member.
	Jul	The Miaoli Works passed the verification by Bureau Veritas (BV) and received a "statement on verification of water footprints" for its products of steel shapes and plates.
	Nov	The Taoyuan Works was certified under the ISO 50001 energy and resource management system.
	Jan	The carbon steel billets from the electric furnaces of the Miaoli Works passed and received the "certification for green products using recycled resources."
		We became a formal member of the World Steel Association (WSA).
	Sep	We took part in the presentation of achievements of energy efficiency service teams at businesses organized by the Bureau of Energy, Ministry of Economic Affairs, and we won the Award for Outstanding Performance in Achievements of Energy Efficiency in 2015–2017.

Milestones in climate change management

2019

- Mar The steel rolling mill of Tung Ho Steel Vietnam Corporation Limited conducted a successful hot trial run of its direct hot charge rolling system and began production, making it the first steel mill in Vietnam adopting a process for direct rolling of hot steel billets without any reheating furnace.
- Jun We made an investment to establish Tung Sugar Energy Service Co., Ltd. as a biomass energy processing center to generate marsh gas power.
- Sep The Board of Directors established a Corporate Governance Committee, under which an "Environmental Sustainability Sub-committee" was set up to manage climate-related issues.
- Oct The Taoyuan Works cooperated with the Water Resources Agency in organizing the 2019 Work Plan for Guidance in Water Conservation by Major Water Consumers in Central Taiwan, and received a certificate of appreciation for the "Observational On-site Visits to Entities with Outstanding Performance in Water Conservation."

  The Taoyuan Works received a statement on verification of material flow cost accounting (MFCA) and won an award for "exemplary businesses in analysis of material flow cost accounting" from the Industrial Development Bureau, Ministry of Economic Affairs.

  The fuel for the reheating furnaces at the steel rolling mill of the Miaoli Works was changed from heavy oil to natural gas. The Miaoli Works also applied for a greenhouse gas offsetting program and was expected to receive an offsetting quota of 144,600 ton-CO_2e.
- Nov The Taoyuan Works received a "statement on verification of carbon footprints" for its products.

2021

- Jan The Miaoli Works was certified by UL in the U.S. and received a certificate of Type III Environmental Product Declaration (EPD) for its steel shapes and plates, making it the first steel producer in Taiwan to receive an EPD for steel shapes and plates.
- Apr Our 2021 report on climate-related financial disclosures (TCFD) was verified by the British Standards Institution (BSI).
- May We set an absolute reduction target, which was a science-based reduction target calculated with the SBTi Tool (SDA_Tool_v1.2.1 using the Sectoral Decarbonization Approach (SDA)) provided by the Science Based Target Initiative.
- Nov We won the platinum award for traditional industries in corporate sustainability reporting from the "2021 Taiwan Corporate Sustainability Awards."
- Dec For the first time, we completed CDP's climate change questionnaires and achieved the level of "Management (B)."

2022

- Jan We received a certificate of Type III Environmental Product Declaration (EPD) for the rebar of the Taoyuan Works and the steel shapes and channels of the Kaohsiung Works.
- Apr Our 2022 report on climate-related financial disclosures (TCFD) was verified by the British Standards Institution (BSI).
- Jun We passed and received the certification of ISO 14064-1:2018 greenhouse gas inventory.

Overview of climate change management

- Science-based reduction targets (SBTi)
- Greenhouse gas emission targets
- Emissions reduction actions
- Low-carbon products
- Carbon pricing
- Climate-related engagement in supply chains

- The Board of Directors is responsible for the governance of climate change issues.
- The competency of the Board of Directors in the governance of climate change issues.
- The representative of climate change issues under the Board of Directors.
- The reward mechanism for climate change issues.

- Application of climate-related scenarios.
- Result of identification of climate-related risks and opportunities.
- Assessment of climate-related material risks and strategies.
- Assessment of climate-related material opportunities and strategies.
- Overall assessment of climate-related material risks, opportunities and strategies.
- 1.5°C low-carbon transition plan.

- The process for management of climate-related risks and opportunities.
- The process for identification and assessment of climate-related risks and opportunities.

2.Climate Change-Related Governance

The Board of Directors is responsible for the governance of climate change issues

The Board of Directors is responsible for reviewing and directing the strategies, action plans and annual targets for climate change, regularly monitoring their implementation on an annual basis, and reviewing the targets of greenhouse gas reduction and the level of their achievement.

The Board of Directors has set up a Corporate Governance and Nominating Committee (a functional committee) consisting of three members appointed by a resolution of the Board of Directors, a majority of whom are independent directors. The Chairman acts as the convener (chairperson) of the committee and is responsible for climate change-related issues, including the establishment, supervision and review of the system and targets for environmental sustainability. The Corporate Governance and Nominating Committee holds at least two meetings each year and submits regular reports on climate-related issues to the Board of Directors. The risk management plan, strategy and targets related to climate change in this report were approved by the 19th meeting of the 24th Board of Directors on May 27, 2022.

The competency of the Board of Directors in the governance of climate change issues

With regard to climate change-related issues, we have hired external instructors in 2021 and 2022 to provide the relevant training. All members of the Board of Directors and senior managers have attended training sessions on corporate climate governance and TCFD disclosure practices for a total of 189 hours.

Additionally, the Board of Directors has actively been involved in engagements between the government and industries regarding corporate issues, while facing the challenges of climate change to sustainable development with a pragmatic and forward-looking approach.

◎ Exchanges and Cooperation

Name of trade association	Position	Our representative
Taiwan Steel and Iron Industries Association	Convener of the Board of Supervisors	Chairman
Chinese National Federation of Industries	Managing director	Chairman

◎ Goverment agency

Government agency	Title of meeting	Date of meeting	Our representative
Ministry of Economic Affairs	Consultative Meeting with Key Steel Manufacturers: Assessing the Pathway to Net-Zero Emissions	February 22, 2021	President
Ministry of Economic Affairs	Consultative Meeting with Major Power Consumers on Net-Zero Emissions	May 3, 2021	Chairman
Ministry of Economic Affairs	Forum on "Strategy to Achieve a Carbon-neutral Taiwan and the Development of Industries"	October 1, 2021	President
Ministry of Economic Affairs	Conference on "Consultation on the Issue of Carbon Fee in the Draft Amendment to the Greenhouse Gas Reduction and Management Act"	October 4, 2021	President

Government agency	Title of meeting	Date of meeting	Our representative
Environmental Protection Administration	"A Conversation between Experts and Academics in Response to EU's Carbon Border Adjustment Mechanism"	October 26, 2021	President
Ministry of Economic Affairs	2nd plenary meeting of the "Committee on Work Circle of Industrial and Energy Efficiency" in 2021	November 5,2021	President
Taiwan Stock Exchange	"2021 Cathay Sustainable Finance and Climate Change Summit"	December 7,2021	President
Office of Energy and Carbon Reduction, Executive Yuan	"Seminar on Inspiration for the Net-Zero Transition Governance Strategy in Taiwan after COP26"	December 15,2021	President
Ministry of Economic Affairs	1st plenary meeting of the "Committee on Work Circle of Industrial and Energy Efficiency" in 2022	January 26, 2022	Chairman

◎ Media organization

Media organization	Title of interview	Date of publication	Our representative
CommonWealth Magazine	A Steel Man Transfers Technologies from America to Taiwan: All Leftover Brewing Residue and Vegetables Can Turn into Green Power	December 2021	Chairman
CommonWealth Magazine Podcast interview	Ep. 45 "Too Much Wind and Sunlight? How to Solve Taiwan's Power Crisis Due to Overconcentration on Green Energy? "	December 2021	President

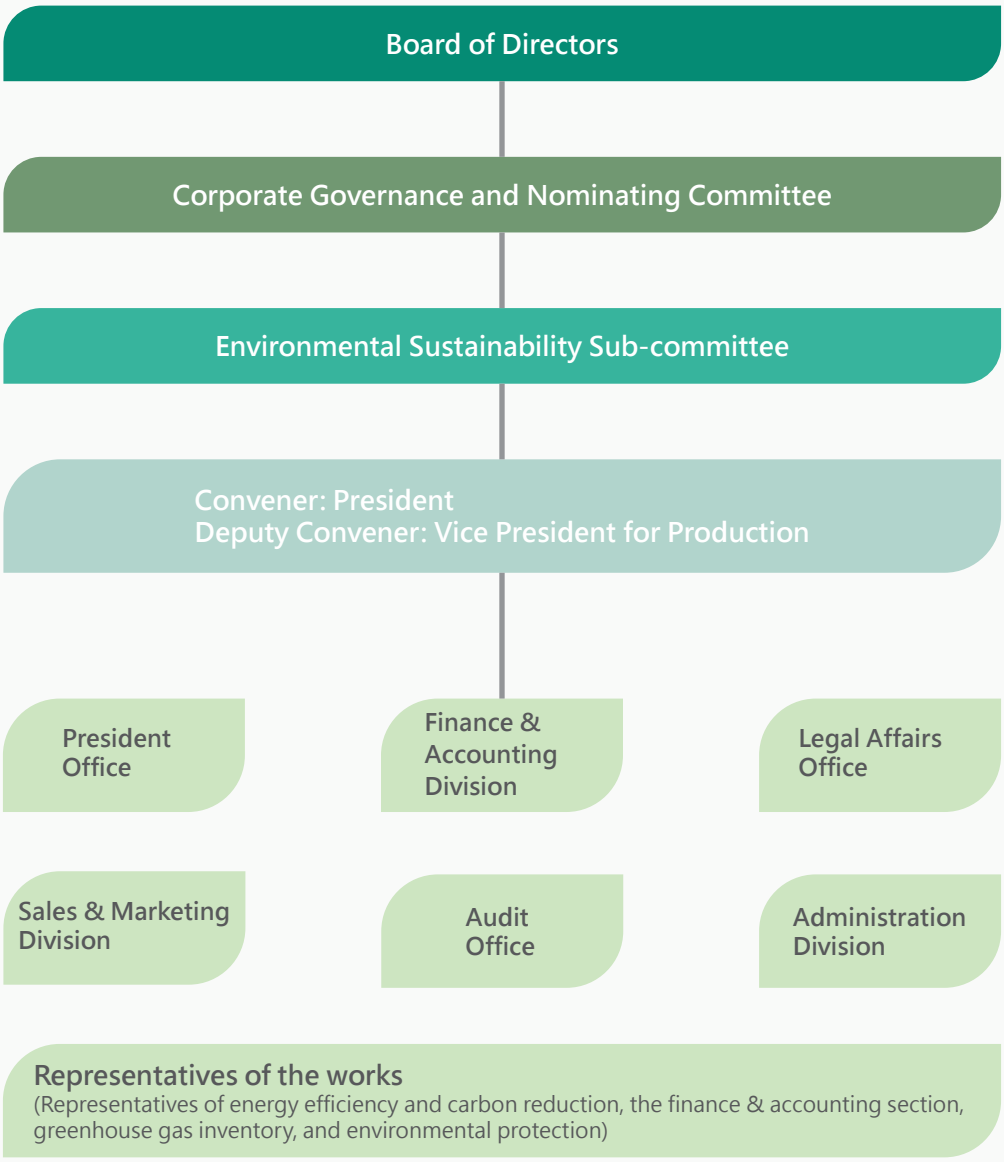
◎ Climate change-related training session

Date of session	Climate change-related training session	Hours	Attendees
May 11, 2022	2021 Guide to Corporate Governance – Corporate Climate Governance and TCFD Disclosure Practices	3 hours	All members of the Board of Directors and senior managers
May 5, 2022	Risks and Opportunities of Climate Change and the Net-Zero Emission Policy for Business Operations	3 hours	All members of the Board of Directors and senior managers

The representative of climate change issues under the Board of Directors

The Corporate Governance and Nominating Committee (a functional committee) of the Board of Directors has set up an Environmental Sustainability Sub-committee, with the President and the Vice President for Production acting as its convener and deputy convener respectively. Consisting of members appointed by the relevant departments, the sub-committee is responsible for assessing and managing climate-related risks and opportunities, establishing the relevant strategies and targets, and conducting continual analysis and control. The Environmental Sustainability Sub-committee submits regular reports to the Corporate Governance and Nominating Committee regarding its performance.

◎ Organization of climate change-related governance at Tung Ho Steel



Board of Directors

Convener : Chairman

Missions in climate change governance

Reviewing and directing the strategies, action plans and annual targets for climate change, regularly monitoring their implementation on an annual basis, and reviewing the targets of greenhouse gas reduction and the level of their achievement.

Performance

- On May 11, 2021, the 9th meeting of the 24th Board of Directors approved the risk management plan, strategy and targets related to climate change in 2021.
- On November 12, 2021, the 14th meeting of the 24th Board of Directors supervised the performance in climate change management and reviewed the targets and plan for greenhouse gas reduction.
- On April 12, 2022, the 17th meeting of the 24th Board of Directors approved the application from the subsidiary Tung Kang Wind Power Corp. for renting the roofs of certain building of the works to install solar PV power generating equipment and peripheral facilities.
- On May 27, 2022, the 19th meeting of the 24th Board of Directors approved the risk management plan, strategy and targets related to climate change in 2022.

Corporate Governance and Nominating Committee

Convener : Chairman

Missions in climate change governance

Climate change-related issues, including the establishment, supervision and review of the system and targets for environmental sustainability, and submitting regular reports on climate-related issues to the Board of Directors.

Performance

- On May 6, 2021, the 2nd meeting of the 2nd Corporate Governance and Nominating Committee approved the publication of the 2021 report on climate change-related financial disclosures and submitted the report to the Board of Directors.
- On November 11, 2021, the 3rd meeting of the 2nd Corporate Governance and Nominating Committee approved the greenhouse gas management strategy, reduction targets and plan and submitted them to the Board of Directors.
- On May 24, 2022, the 4th meeting of the 2nd Corporate Governance and Nominating Committee approved the publication of the 2022 report on climate change-related financial disclosures and submitted the report to the Board of Directors.

Environmental Sustainability Sub-committee

Convener: President Deputy Convener: Vice President for Production

Missions in climate change governance

Assessing and managing climate-related risks and opportunities, establishing the relevant operational plans and targets, and submitting regular reports to the Corporate Governance and Nominating Committee regarding its performance.

Performance

2021

- Three meetings were held on the plan for installation of new wind turbines.
- A meeting was held on the plan for renewable energy.
- A meeting was held to launch the project for installation of a solar PV system, and bi-weekly meetings were subsequently held to review its progress.
- Two meetings were held to present reports on the trend of development in energy efficiency and carbon reduction with respect to steelmaking using electric furnaces.
- Two meetings were held on the plan for energy storage equipment.
- A meeting was held on the plan for a green energy section in the Longgang Industrial Park.
- A meeting was held to initiate climate-related financial disclosures (TCFD).
- A meeting was held on the identification of climate-related risks and opportunities.

2022

- A meeting was held on the enhancement of management, where the President gave a keynote speech on the "Roadmap for Carbon Reduction by Tung Ho Steel."
- A meeting was held to discuss the methodology for assessing climate-related scenarios and finance.
- A meeting was held to assess climate-related strategies.
- A meeting was held on the project for modification of steel scrap preheating-type electric furnaces.
- A meeting was held to determine climate-related targets.
- A meeting was held to discuss the first draft of the report on climate-related financial disclosures (TCFD).
- A meeting was held on the plan for an energy efficiency and carbon reduction task force, and the three works established a joint task force to start research and assessment on plans of energy efficiency and carbon reduction.

The reward mechanism for climate change issues

Article 10 of the "Regulations Governing Evaluation of the Performance of the Board of Directors" stipulates that the results of evaluation of the performance of the Board of Directors shall be the basis of reference for the election or nomination of directors, and that the results of evaluation of the performance of individual directors shall be the basis of reference for the determination of their salaries and remuneration. In December 2021, we amended the "Regulations Governing Evaluation of the Performance of the Board of Directors" by including climate change-related items for evaluation to strengthen the supervision of the governing hierarchy and participate in climate change management.

In addition, we have established the "Regulations Governing Improvement Proposals" to accepts proposals concerning climate-related strategies, greenhouse gas reduction and energy efficiency. Rewards will be given based on the results of review and the effectiveness of projects. In 2021, the Taoyuan Works and Miaoli Works submitted four proposals concerning greenhouse gas reduction and were given rewards.

3. Management of Climate Change-Related Risks and Opportunities

The process for management of climate-related risks and opportunities

The Board of Directors has set up a Corporate Governance and Nominating Committee consisting of sub-committees on corporate governance, sustainable development, ethical management, environmental sustainability and risk management. The Risk Management Sub-committee is a body responsible for risk management, and is tasked with coordinating with the relevant departments in risk identification, assessment, control and monitoring and submitting regular reports to the Corporate Governance and Nominating Committee regarding its performance. The Corporate Governance and Nominating Committee will submit a report to the Board of Directors regarding the overall performance in risk management at least annually. Each of the relevant departments will assess the likelihood and impact of each risk factor within the scope of its responsibilities and establish and implement necessary measures to properly manage all risks. The Audit Office will establish an annual audit plan according to the risk management policy and the results of risk assessment, conduct audits of the relevant systems according to the plan, assist the Board of Directors in monitoring and controlling the possible risks inherent in the implementation of decisions, ensure the effective control of all operational risks, and provide timely recommendations for improvement.

The Environmental Sustainability Sub-committee under the Corporate Governance and Nominating Committee is a body responsible for climate change-related management. We have understood the information of international initiative campaigns and organizations related to sustainability and climate change, and we have taken the focuses of concern and evaluation criteria of international initiatives into account when establishing our environmental and greenhouse gas policies in order to ensure conformity with the trends of international development and enhance our capability in addressing climate change.

◎ The process for risk management at Tung Ho Steel

Identification and assessment of risks
- The relevant department will assess the likelihood and impact of each risk factor within the scope of its responsibilities.

↓

Planning for risk strategies
- Setting risk scenarios.
- Assessing and planning for risk strategies.
- Making decisions to mitigate, transfer, assume or control the risks.

↓

Implementation of strategies
- The relevant department will implement the risk strategies and plans.
- Establishing necessary procedures to ensure proper management of all risks.

↓

Monitoring and reporting of risks
- Establishing an annual audit plan according to the risk management policy and the results of risk assessment.
- Assisting the Board of Directors in monitoring and controlling the possible risks inherent in the implementation of decisions to ensure the effective control of all operational risks.
- Providing recommendations for improvement.

The process for identification and assessment of climate-related risks and opportunities

The Environmental Sustainability Sub-committee will hold a meeting to identify climate change-related risks and opportunities based on the list of transition risks, physical risks and opportunities recommended by the TCFD, and the relevant departments will assess the response strategies and financial impacts with respect to the major short-, medium- and long-term risks and opportunities identified by the meeting, taking into account the effects of products and services, supply chains, adaptation and mitigation activities, R&D investment and business operations (including the types of business and the locations of facilities) on our business and strategies. The identification and assessment of climate change-related transition risks and physical risks include the level of their impact on business operations, the likelihood of their occurrence and the vulnerabilities in case of their occurrence. The identification and assessment of climate change-related opportunities include the level of their effects on business operations and the likelihood of their occurrence. A matrix analysis will be conducted after identification, and the Environmental Sustainability Sub-committee will hold a discussion to finally identify the material climate change-related risks and opportunities. Then, the Environmental Sustainability Sub-committee will hold a meeting to discuss the response strategies for TCFD risks and opportunities and decide our future climate change-related strategies, and the Corporate Governance and Nominating Committee will review the climate-related risks and opportunities and the relevant strategies and targets. Lastly, the Board of Directors will review and direct the strategies, action plans and annual targets for climate change, regularly monitor their implementation on an annual basis and review the targets of greenhouse gas reduction and the level of their achievement.

Identification and assessment of climate-related risks and opportunities at Tung Ho Steel

Timeline	• Short term: 2022 to 2025 • Medium term: 2026 to 2030 • Long term: 2031 to 2050
Measurement of risks and opportunities	• Likelihood of occurrence. • Level of financial Impact. • Potential vulnerability.
Types of risks and opportunities	• Transition risks: Policies and laws, technology, market, reputation • Physical risks: Acuteness, chronicity. • Opportunities: Resource efficiency, energy sources, products and services, market, resilience.
Setting a climate scenario	• 1.5℃ scenario • NDC scenario • (SSP5-8.5) scenario in IPCC's 6th assessment report on climate change.

4.Climate Change-Related Strategy

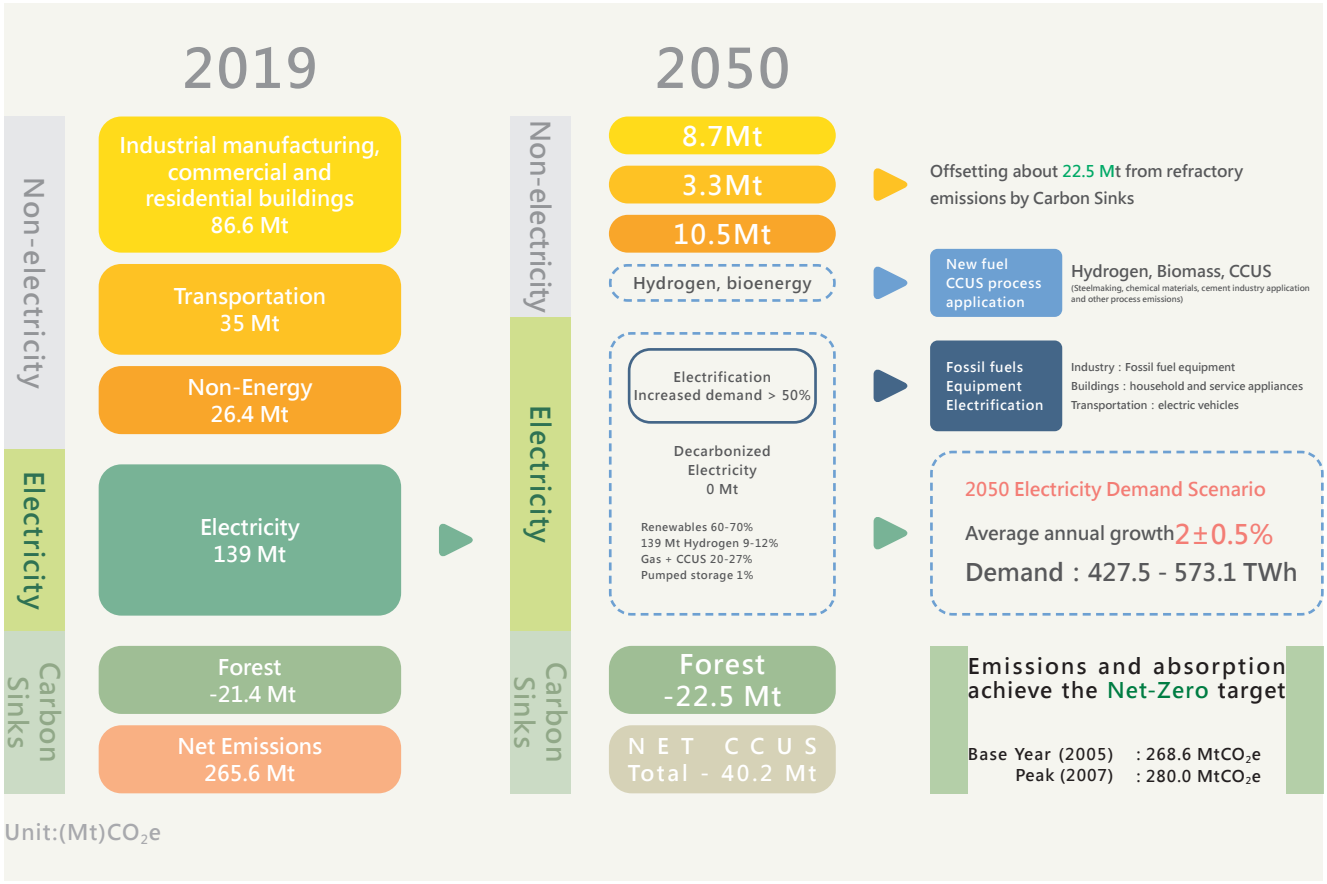
Application of climate-related scenarios

Climate-related risks and opportunities have an effect on our strategies and financial planning, so we have adopted transition and physical risks and the worst-case scenarios faced by climate opportunities for the analysis and assessment of the resilience of our climate strategies based on the recommendations of the TCFD.

Types of climate-related risks and opportunities	Scenarios for the assessment of our strategies	Scenario description
• Transition risks • Opportunities	• 1.5℃ scenario • Taiwan' s pathway and strategy for net-zero emissions in 2050	Net-zero emissions in 2050 have become a global trend. In March 2022 the government of Taiwan published "Taiwan' s Pathway to Net-Zero Emissions in 2050," which is focused on the four areas of "energy transition," "industrial transition," "lifestyle transition" and "social transition" as well as the two foundations of governance in "technology R&D" and "climate legislation" to maintain strong control over greenhouse gas emissions, with likely effects on the operations of Tung Ho Steel and its value chains.
• Physical risks	• The worst-case scenario for global warming (SSP5-8.5) in IPCC' s 6th scientific assessment report	Under a scenario of extremely high greenhouse gas emissions (SSP5-8.5), climate change would exacerbate changes in the average temperature, extremely high temperature, annual total precipitation, annual maximum 1-day intensity of heavy precipitation, annual maximum number of consecutive dry days and percentage of strong typhoons in the future, with likely effects on the operations of Tung Ho Steel and its value chains.

◎ 1.5℃ scenario, Taiwan’ s pathway and strategy for net-zero emissions in 2050

2050 Net-Zero Emissions Plan



2050 Net-Zero Pathway (Key Milestones)

Buildings

Improving in exterior design, energy efficiency and appliance energy efficiency standards.

Transportation

Changing in travel behavior, reducing demand for transportation, and electro-mobility.

Industry

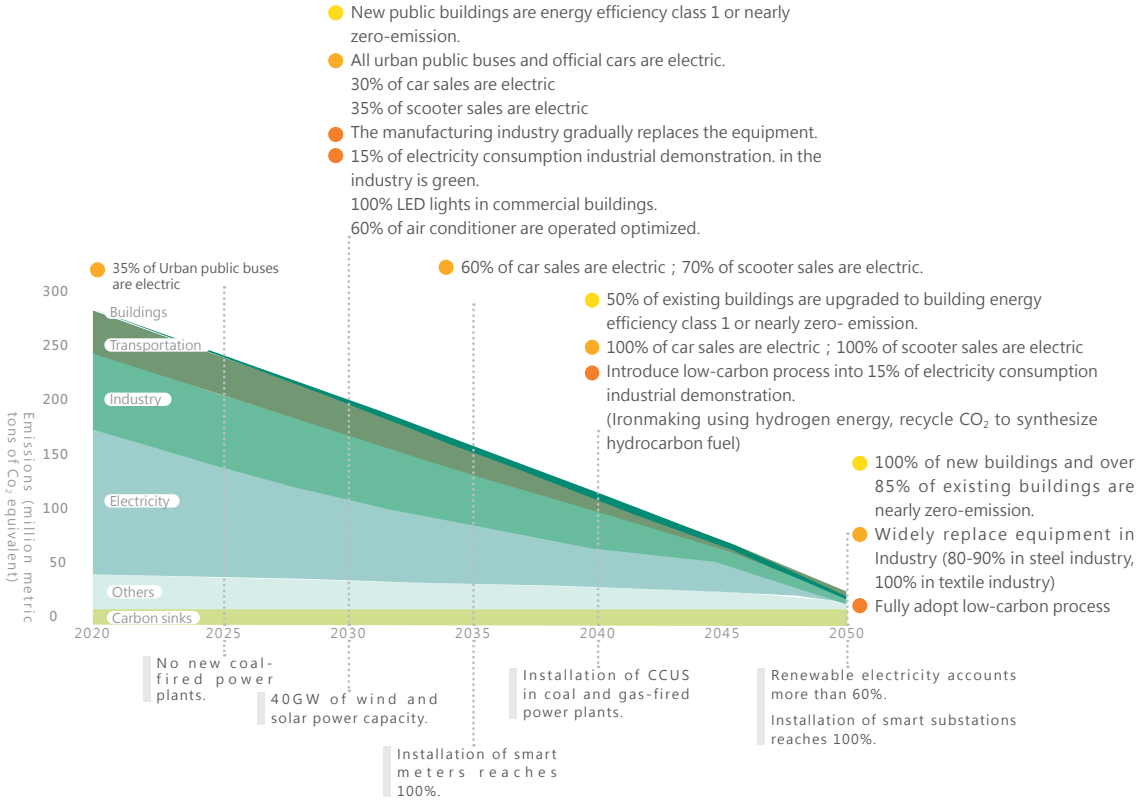
Improving in energy efficiency, fuel switching, circular economy, and innovative technologies.

Electricity

Scaling up renewable energy, developing new energy technologies, energy storage, and power grid upgrade.

Negative emissions technologies

Demonstration by 2030.
At scale by 2050.



Taiwan's 2050 Net-zero transition

Strategies for transition

4 strategies + 2 foundations

- Energy transition
- Industrial transition
- Lifestyle transition
- Social transition

Foundations in governance

Technology R&D

net-zero technology
negative-emission technology

Climate legislation

regulation and policy
carbon pricing and green finance

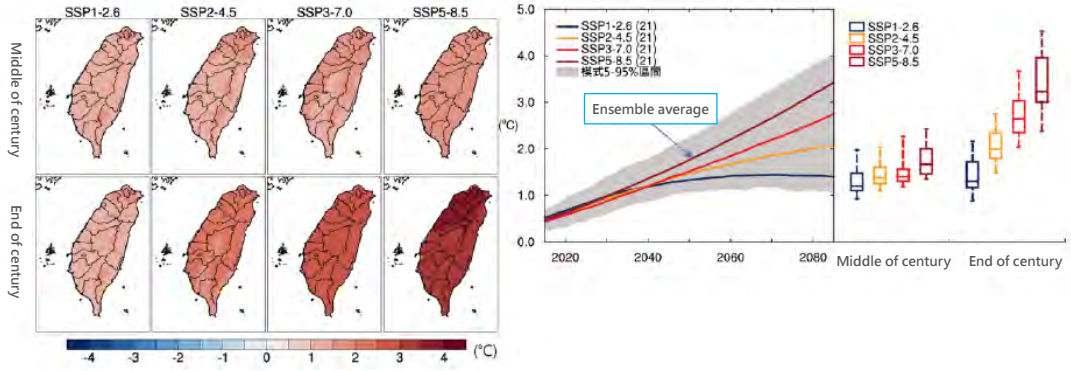
◎ The worst-case scenario for global warming (SSP5-8.5) in IPCC's 6th scientific assessment report

It is estimated that the temperature in Taiwan will continue to rise.

Under the worst-case scenario for global warming (SSP5-8.5), the average temperatures in the middle and at the end of the 21st century are likely to rise by more than 1.8°C and 3.4°C, respectively.

a. Estimated future spatial distribution of the annual average temperature in Taiwan

b. Estimated future annual average temperature in Taiwan

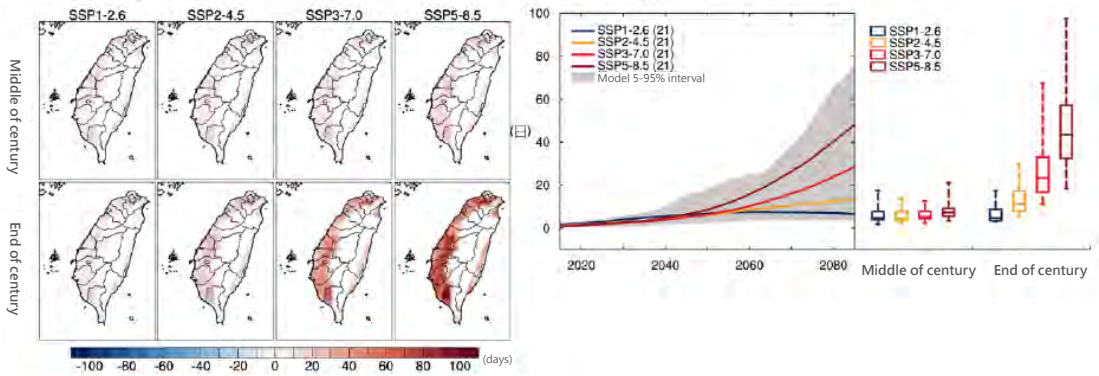


In future events of extremely high temperature, the number of days with maximum temperature above 36℃ would increase.

Under the worst-case scenario (SSP5-8.5), the numbers of days in the middle and at the end of the 21st century would increase by approximately 8.5 and 48.1, respectively.

a. Estimated future spatial distribution of the number of days with maximum temperature above 36℃ in Taiwan

b. Estimated future number of days with maximum temperature above 36℃ in Taiwan

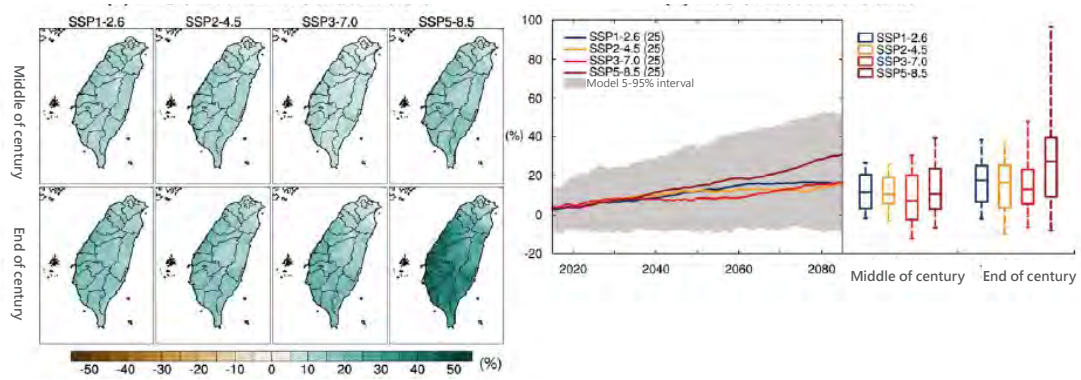


It is estimated that the annual total precipitation in Taiwan is likely to increase in the future.

Under the worst-case scenario (SSP5-8.5), the average amounts of annual total precipitation in Taiwan in the middle and at the end of the 21st century would increase by approximately 15% and 31%, respectively.

a. Estimated future spatial distribution of the annual total precipitation in Taiwan

b. Estimated future annual total precipitation in Taiwan

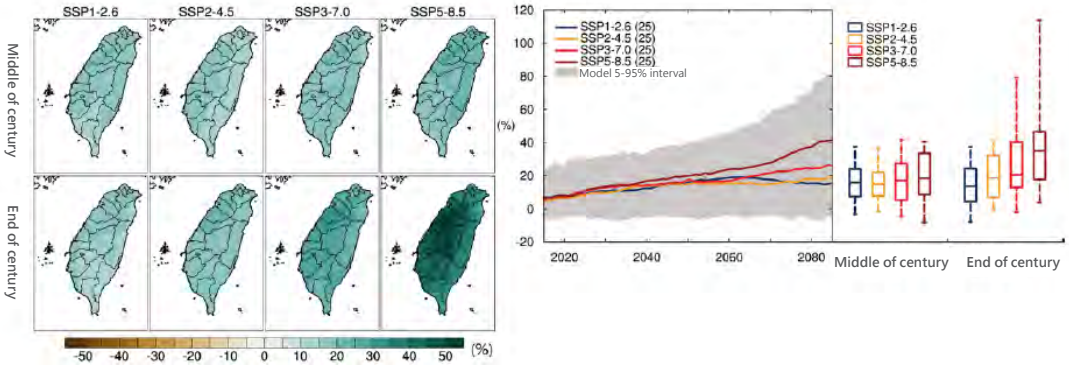


The annual maximum 1-day intensity of heavy precipitation in Taiwan is likely to increase.

Under the worst-case scenario (SSP5-8.5), the average annual maximum 1-day intensity of heavy precipitation in the middle and at the end of the 21st century would increase by approximately 20% and 41.3%, respectively.

a. Estimated future spatial distribution of the annual maximum 1-day intensity of heavy precipitation in Taiwan

b. Estimated future annual maximum 1-day intensity of heavy precipitation in Taiwan

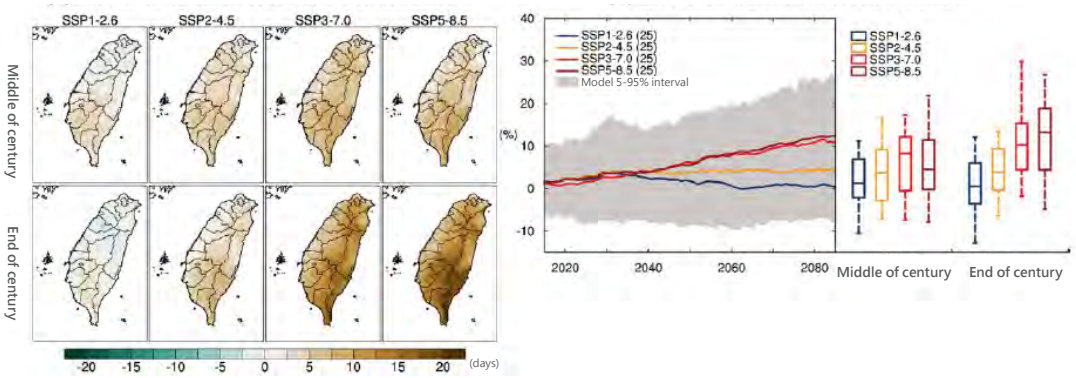


The annual maximum number of consecutive dry days is likely to increase.

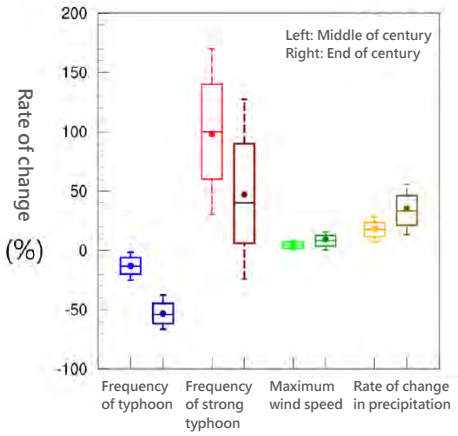
Under the worst-case scenario (SSP5-8.5), such numbers of days in the middle and at the end of the 21st century would increase by an average of approximately 5.5% and 12.4%, respectively.

a. Estimated future spatial distribution of the annual maximum number of consecutive dry days in Taiwan

b. Estimated future annual maximum number of consecutive dry days in Taiwan



Under the worst-case scenario (RCP8.5), the numbers of typhoons affecting Taiwan in the middle and at the end of the 21st century would decrease by approximately 15% and 55% respectively, and the percentages of strong typhoons would increase by approximately 100% and 50% respectively, while the rates of change in typhoon precipitation would increase by approximately 20% and 35% respectively.

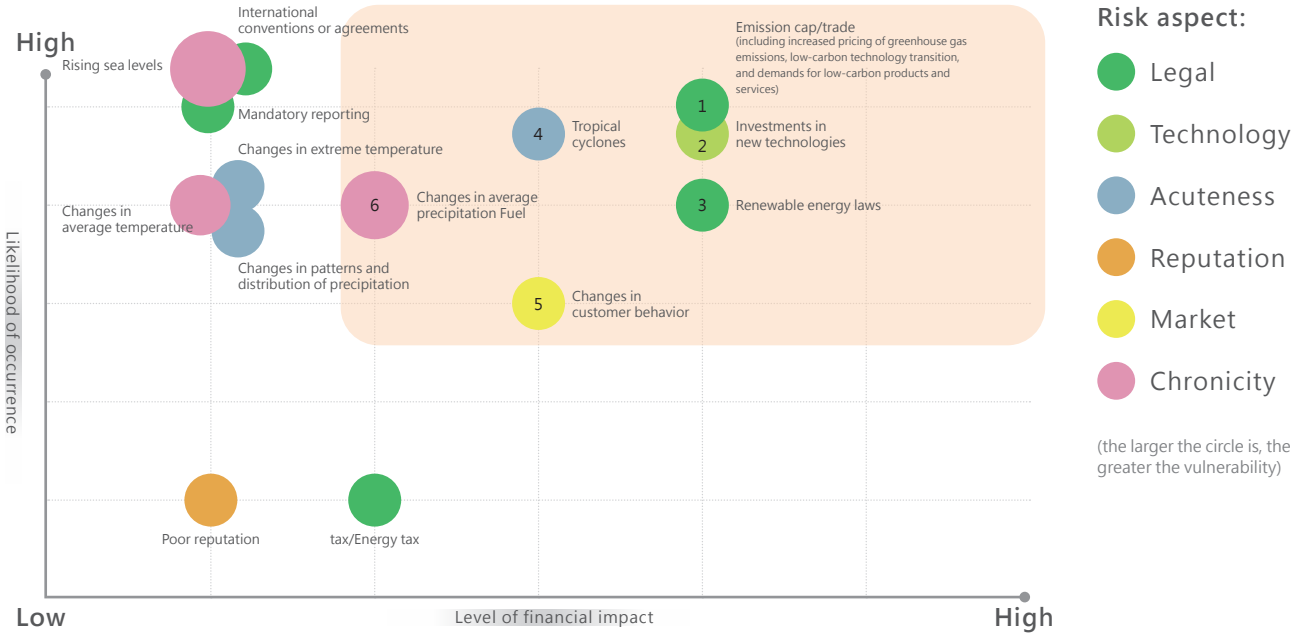


Result of identification of climate-related risks and opportunities

The Environmental Sustainability Sub-committee has held a meeting on identification of climate change risks and opportunities, and has identified six climate-related material risks and four climate-related material opportunities after conducting an assessment based on the framework of TCFD recommendations.

In 2021, the 2°C and RCP2.6 scenarios were adopted for the scenarios in the strategy of assessment of climate risks and opportunities. In 2022, taking into consideration the 26th Conference of the Parties (COP26) to the "United Nations Framework Convention on Climate Change" (UNFCCC) and the changes in climate-related laws in Taiwan, the 1.5°C scenario, Taiwan's pathway and strategy for net-zero emissions in 2050 and the worst-case scenario for global warming (SSP5-8.5) in IPCC's 6th scientific assessment report have been adopted. In 2022, "investments in new technologies" and "changes in customer behavior" have been added as climate-related material risks, and "adoption of incentive policies" and "incentives from financial institutions" have been added as climate-related material opportunities.

◎ Matrix of climate-related risks at Tung Ho Steel

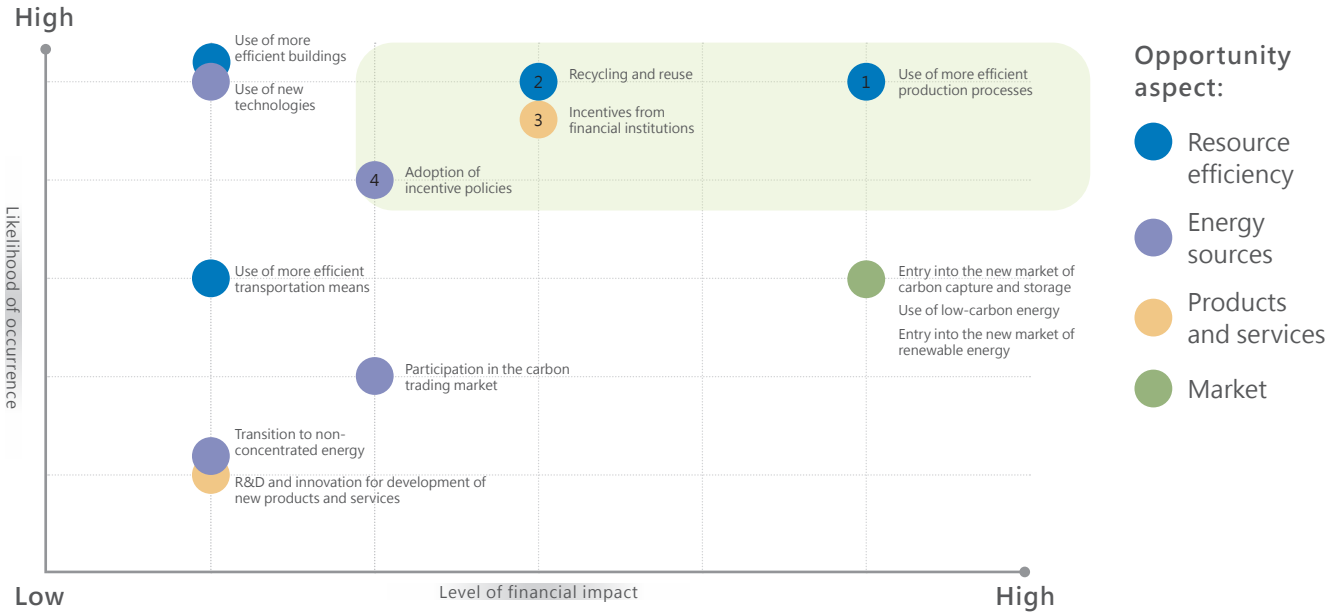


◎ Identified climate-related material risks

Risk ranking	Risk type	Risk description	Risk scope	Timing	Likelihood of occurrence	Level of financial Impact
1	Transition risks	【Legal】 Emission cap/trade (increased pricing of greenhouse gas emissions + low-carbon transition services + demands for low-carbon products and services)	Tung Ho Steel	Short term	Very Likely	Likely
2	Transition risks	【Technology】 Investments in new technologies	Tung Ho Steel	Medium term	Very Likely	Likely
3	Transition risks	【Legal】 Renewable energy laws	Tung Ho Steel	Medium term	Likely	Likely
4	Physical risks	【Acuteness】 Tropical cyclones	Tung Ho Steel	Long term	Very Likely	Possible
5	Transition risks	【Market】 Changes in customer behavior	Tung Ho Steel, Customers	Long term	Possible	Possible
6	Physical risks	【Chronicity】 Changes in average precipitation	Tung Ho Steel	Long term	Likely	Unlikely

Note: The levels of financial impact are based on the risk management policy and procedures of Tung Ho Steel.

◎ Matrix of climate-related opportunities at Tung Ho Steel



◎ Identified climate-related material opportunities

Opportunity ranking	Opportunity description	Opportunity scope	Timing	Likelihood of occurrence	Level of financial Impact
1	【Resource efficiency】 Use of more efficient production means	Tung Ho Steel	Medium term	Very Likely	Very Likely
2	【Energy efficiency】 Recycling and reuse	Tung Ho Steel	Short term	Very Likely	Possible
3	【Market】 Incentives from financial institutions	Tung Ho Steel financial institutions	Short term	Very Likely	Possible
4	【Market】 Adoption of incentive policies	Tung Ho Steel	Medium term	Very Likely	Unlikely

Note: The levels of financial impact are based on the risk management policy and procedures of Tung Ho Steel.

Assessment of climate-related material risks and strategies

Risk 1

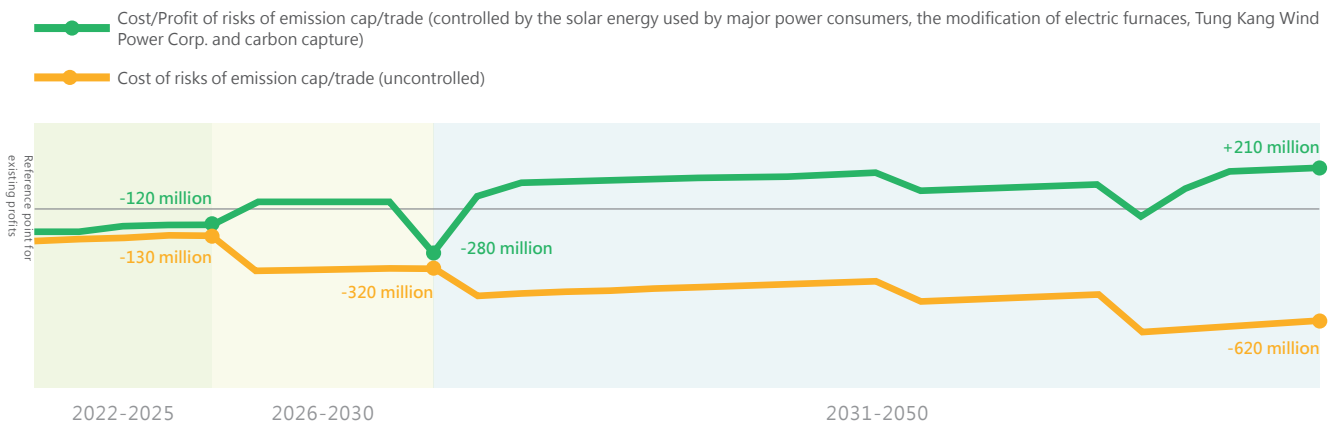
【Legal】 Emission cap/trade (increased pricing of greenhouse gas emissions + low-carbon transition services + demands for low-carbon products and services)

Due to increasingly strict requirements concerning emission cap/trade, renewable energy laws, increased pricing of greenhouse gas emissions, low-carbon transition services and demands for low-carbon products and services, in the future we will use low-carbon energy including wind power, solar energy, modification of electric furnace and will seek to enter the new market of carbon capture and storage.

Description of financial impact

Term	Financial impact (NT$/year)	Impact of risks on the existing basis of profits	Financial impact (NT$/year)	Impact on the existing basis of profits after implementation of the risk response strategy
Short	-130 million	【Cost increase】 The carbon fee per ton in 2022–2025 is estimated to be NT$200	-120 million	【Capital expenditure】Installation of solar power facilities 【Cost decrease】 Carbon fee offset/waiver, decrease in the cost of externally purchased electricity 【Cost increase】 Launch of an industry–academia collaborative research project on carbon capture, utilization and storage (CCUS)
Medium	-320 million	【Cost increase】 The carbon fee per ton in 2026–2030 is estimated to be NT$500	-280 million	【Capital expenditure】 Establishment of an experimental works for carbon capture, utilization and storage (CCUS) 【Capital expenditure】 Launch of a project on modification of electric furnace No. 1 at the works 【Cost decrease】 Carbon fee offset/waiver, decrease in the cost of externally purchased electricity
Long	-620 million	【Cost increase】 The carbon fee per ton in 2031–2040 is estimated to be NT$750 The carbon fee per ton in 2041–2045 is estimated to be NT$1,000 The carbon fee per ton in 2046–2050 is estimated to be NT$1,500	+210 million	【Capital expenditure】 Establishment of a mass production works for carbon capture, utilization and storage (CCUS) 【Capital expenditure】 Launch of a project on modification of electric furnace No. 2 at the works 【Capital expenditure】Installation of new wind power facilities 【Cost increase】 Cost of termination of the existing wind power contracts 【Cost decrease】 Carbon fee offset/waiver, decrease in the cost of externally purchased electricity

Risk 1 Financial impacts of short-, medium- and long-term risks and the strategies in response to them



Note: In "Financial impact (NT$/year)," "-" means a decrease in the profit relative to the existing basis of profits, and "+" means an increase in the profit relative to the existing basis of profits.

◎ Risk 2

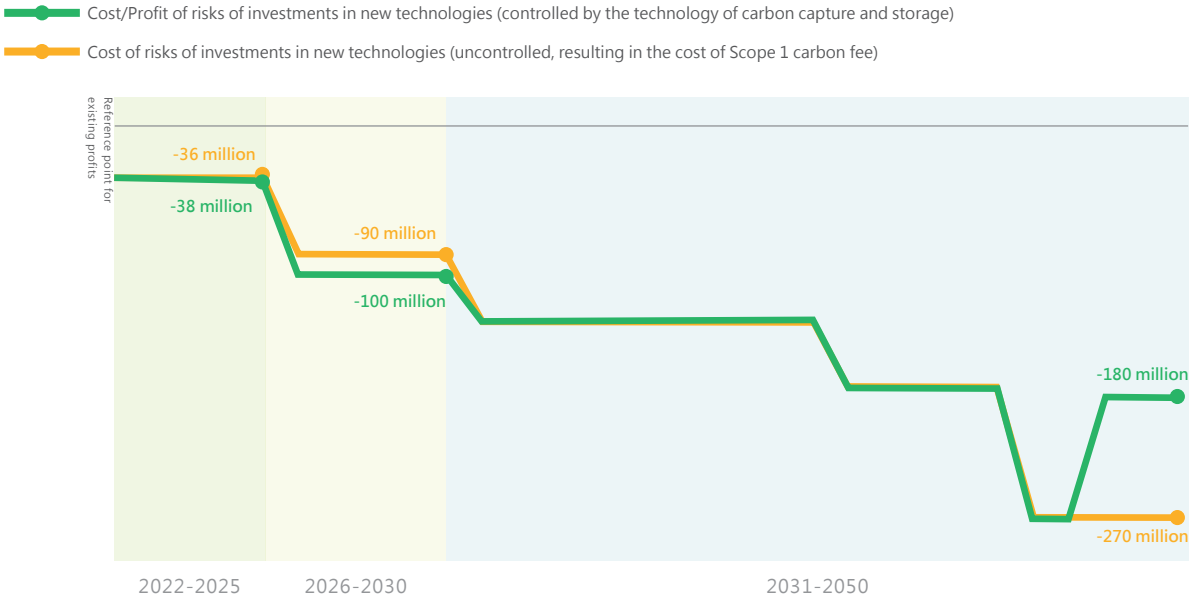
【Technology】Investments in new technologies

We are required to develop technologies related to carbon capture, utilization and storage (CCUS).

◎ Description of financial impact

Term	Financial impact (NT$/year)	Impact of risks on the existing basis of profits	Financial impact (NT$/year)	Impact on the existing basis of profits after implementation of the risk response strategy
Short	-36 million	【Cost increase】 The Scope 1 carbon fee per ton in 2022–2025 is estimated to be NT$200	-38 million	【Cost increase】 Launch of an industry–academia collaborative research project on carbon capture, utilization and storage (CCUS)
Medium	-90 million	【Cost increase】 The Scope 1 carbon fee per ton in 2026–2030 is estimated to be NT$500	-100 million	【Capital expenditure】 Establishment of an experimental works for carbon capture, utilization and storage (CCUS) 【Cost increase】 Costs of depreciation, amortization and operation of the experimental works for carbon capture, utilization and storage (CCUS)
Long	-270 million	【Cost increase】 The Scope 1 carbon fee per ton in 2031–2040 is estimated to be NT$750; The Scope 1 carbon fee per ton in 2041–2045 is estimated to be NT$1,000; The Scope 1 carbon fee per ton in 2046-2050 is estimated to be NT$1,500	-180 million	【Capital expenditure】 Establishment of a mass production works for carbon capture, utilization and storage (CCUS) 【Cost increase】 Costs of depreciation, amortization and operation of the mass production works for carbon capture, utilization and storage (CCUS) 【Cost decrease】Carbon fee offset/waiver

◎ Risk 2 Financial impacts of short-, medium- and long-term risks and the strategies in response to them



Note:

1. In "Financial impact (NT$/year)," "-" means a decrease in the profit relative to the existing basis of profits, and "+" means an increase in the profit relative to the existing basis of profits.
2. The amount of "Impact of risks on the existing basis of profits" under this risk is already covered by "Impact of risks on the existing basis of profits" under Risk 1.
3. The amount of "Impact on the existing basis of profits after implementation of the risk response strategy" under this risk is already covered by "Impact on the existing basis of profits after implementation of the risk response strategy" under Risk 1.

◎ Risk 3

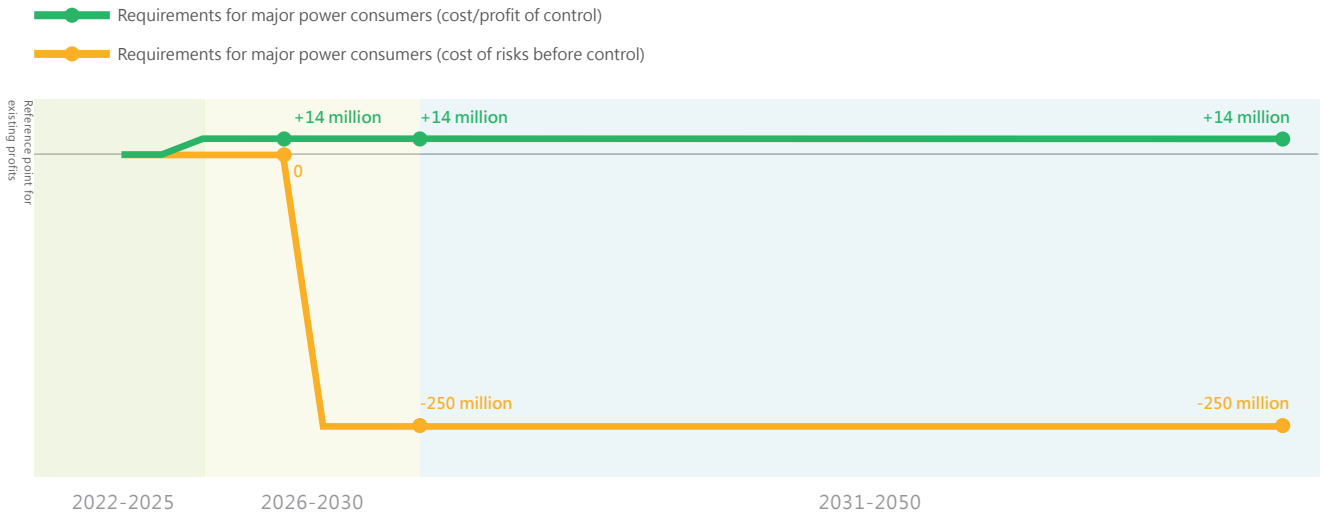
【Legal】 Renewable energy laws

To meet the requirements for major power consumers under the Renewable Energy Development Act, we will install solar power equipment.

◎ Description of financial impact

Term	Financial impact (NT$/year)	Impact of risks on the existing basis of profits	Financial impact (NT$/year)	Impact on the existing basis of profits after implementation of the risk response strategy
Short	0	【Cost increase】 None	+14 million	【Capital expenditure】 Installation of solar power facilities 【Cost decrease]】 Offset/waiver of the substitute fee under the requirements for major power consumers, decrease in the cost of externally purchased electricity 【Cost increase】 Costs of depreciation, amortization and operation of solar power facilities
Medium	-250 million	【Cost increase】 The contracted capacity of power consumed by Tung Ho Steel is 250,000 kW. If we fail to deploy renewable energy in accordance with the requirements for major power consumers, we have to pay an annual substitute fee from 2026.	+14 million	【Cost decrease】 Offset/waiver of the substitute fee under the requirements for major power consumers, decrease in the cost of externally purchased electricity 【Cost increase]】 Costs of depreciation, amortization and operation of solar power facilities
Long	-250 million	【Cost increase】 The contracted capacity of power consumed by Tung Ho Steel is 250,000 kW. If we fail to deploy renewable energy in accordance with the requirements for major power consumers, we have to pay an annual substitute fee from 2026.	+14 million	【Cost decrease】 Offset/waiver of the substitute fee under the requirements for major power consumers, decrease in the cost of externally purchased electricity 【Cost increase】 Costs of depreciation, amortization and operation of solar power facilities

◎ Risk 3 Financial impacts of short-, medium- and long-term risks and the strategies in response to them



Note: In "Financial impact (NT$/year)," "-" means a decrease in the profit relative to the existing basis of profits, and "+" means an increase in the profit relative to the existing basis of profits.

◎ Risk4

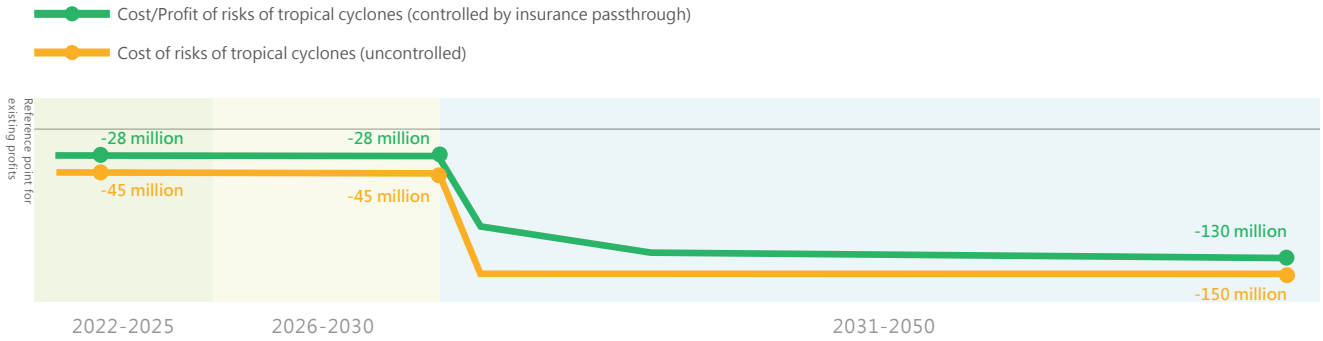
【Acuteness】Tropical cyclones

The number of strong typhoons affecting Taiwan would increase by 100% in the future, and it is estimated that there would be two typhoons causing losses to all production works each year from 2030.

◎ Description of financial impact

Term	Financial impact (NT$/year)	Impact of risks on the existing basis of profits	Financial impact (NT$/year)	Impact on the existing basis of profits after implementation of the risk response strategy
Short	-45 million	【Cost increase】 Losses to the property of the works (repair costs) caused by typhoons	-28 million	【Cost increase】 Losses to the property of the works (repair costs) caused by typhoons 【Cost increase】Our insurance expense 【Income increase】Insurance compensation
Medium	-45 million	【Cost increase】 Losses to the property of the works (repair costs) caused by typhoons	-28 million	【Cost increase】 Losses to the property of the works (repair costs) caused by typhoons 【Cost increase】Our insurance expense 【Income increase】Insurance compensation
Long	-150 million	【Cost increase】 Losses to the property of the works (repair costs) caused by typhoons 【Profit decrease】 Suspension of operations at the works due to typhoons 【Cost increase】 Losses of labor costs of the works caused by typhoons 【Cost increase】 Losses of depreciation of the property of the works caused by typhoons	-130 million	【Cost increase】 Losses to the property of the works (repair costs) caused by typhoons 【Profit decrease】 Suspension of operations at the works due to typhoons 【Cost increase】 Losses of labor costs of the works caused by typhoons 【Cost increase】 Losses of depreciation of the property of the works caused by typhoons 【Cost increase】Our insurance expense 【Income increase】Insurance compensation

◎ Risk 4 Financial impacts of short-, medium- and long-term risks and the strategies in response to them



Note: In "Financial impact (NT$/year)," "-" means a decrease in the profit relative to the existing basis of profits, and "+" means an increase in the profit relative to the existing basis of profits.

◎ Risk5

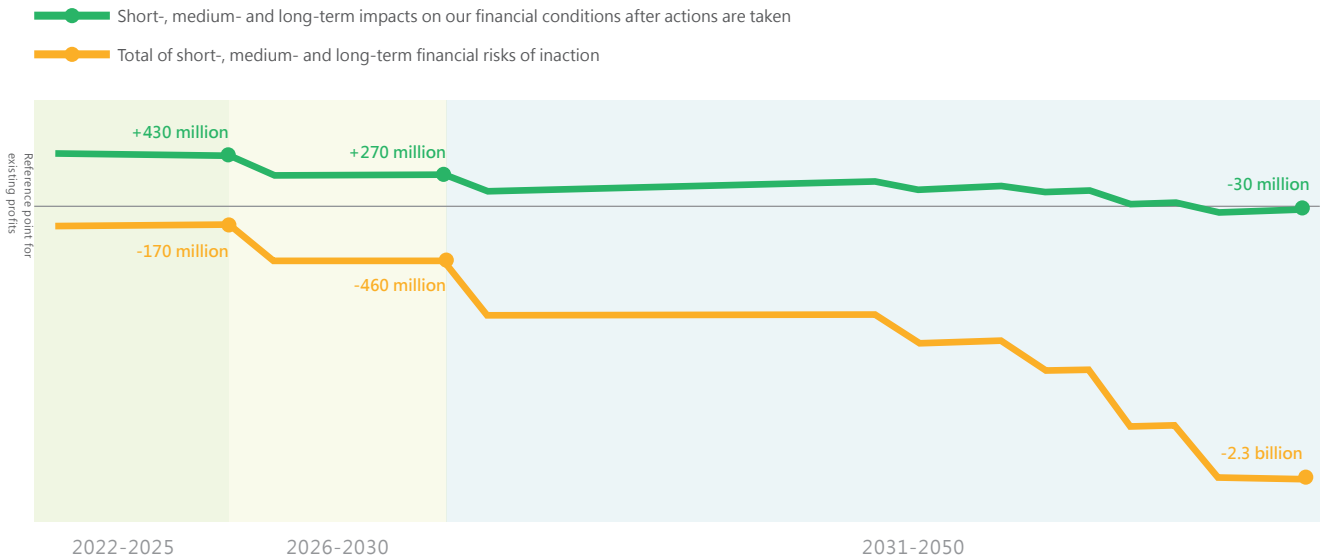
【Market】 Changes in customer behavior

To fulfill the requirements for delivery, a customer will require an EPD certificate in the short term and a carbon neutrality certificate for rebar in the medium- and long-term.

◎ Description of financial impact

Term	Financial impact (NT$/year)	Impact of risks on the existing basis of profits	Financial impact (NT$/year)	Impact on the existing basis of profits after implementation of the risk response strategy
Short	-170 million	【Profit decrease】 Loss of customer orders requiring carbon labels for products	+430 million	【Cost increase】 Guidance and certification for introduction of EPD carbon labels 【Profit increase】 Acquisition of customer orders requiring carbon labels for products
Medium	-460 million	【Profit decrease】 Loss of customer orders requiring carbon labels for products 【Profit decrease】 Loss of customer orders requiring carbon neutrality for products	+270 million	【Cost increase】 Guidance and certification for introduction of EPD carbon labels 【Profit increase】 Acquisition of customer orders requiring carbon labels for products 【Cost increase】 Purchase of carbon credits to achieve carbon neutrality for products 【Profit increase】 Acquisition of customer orders requiring carbon neutrality for products
Long	-2.3 billion	【Profit decrease】 Loss of customer orders requiring carbon labels for products 【Profit decrease】 Loss of customer orders requiring carbon neutrality for products	-30 million	【Cost increase】 Guidance and certification for introduction of EPD carbon labels 【Profit increase】 Acquisition of customer orders requiring carbon labels for products 【Cost increase】 Purchase of carbon credits to achieve carbon neutrality for products 【Profit increase】 Acquisition of customer orders requiring carbon neutrality for products

◎ Risk 5 Financial impacts of short-, medium- and long-term risks and the strategies in response to them



Note: In "Financial impact (NT$/year)," "-" means a decrease in the profit relative to the existing basis of profits, and "+" means an increase in the profit relative to the existing basis of profits.

◎ Risk6

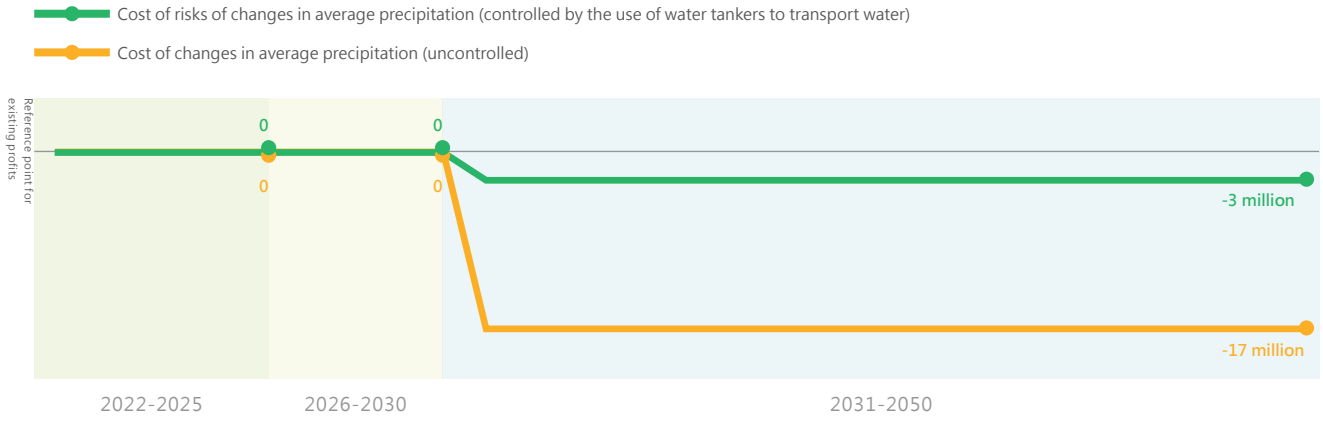
【Chronicity】 Changes in average precipitation

In Taiwan, the annual total precipitation would increase by 15%, but the number of consecutive dry days would increase by 5.5%, leading to a cutoff of water supply from Taiwan Water Corporation and seven days of water outage at the works.

◎ Description of financial impact

Term	Financial impact (NT$/year)	Impact of risks on the existing basis of profits	Financial impact (NT$/year)	Impact on the existing basis of profits after implementation of the risk response strategy
Short	0	None	0	None
Medium	0	None	0	None
Long	-17 million	【Profit decrease】 Suspension of operations at the works due to water outage 【Cost increase】 Losses of labor costs of the works caused by water outage 【Cost increase】 Losses of depreciation of the property of the works caused by water outage	-3 million	【Cost increase】 Use of water tankers to transport water

◎ Risk 6 Financial impacts of short-, medium- and long-term risks and the strategies in response to them



Note: In "Financial impact (NT$/year)," "-" means a decrease in the profit relative to the existing basis of profits, and "+" means an increase in the profit relative to the existing basis of profits.

Assessment of climate-related material opportunities and strategies

Opp 1

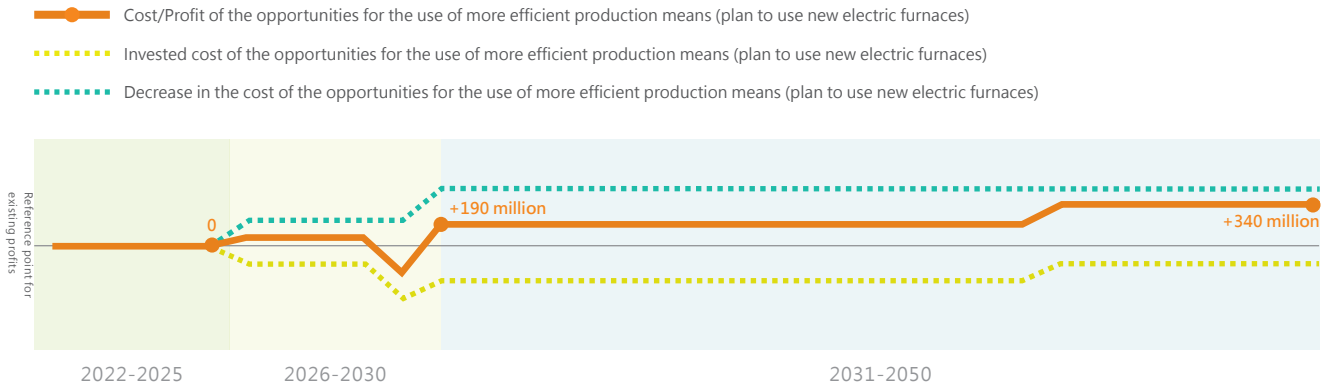
【Resource efficiency】Use of more efficient production means

We will install new steel scrap preheating-type electric furnaces to replace the old electric furnaces, with the unit power consumed for smelting expected to decrease by 100-120kWh.

Description of financial impact

Term	Financial impact (NT$/year)	Description of financial impact
Short	0	None
Medium	+190 million	【Capital expenditure】Installation of new high-efficiency electric furnaces 【Cost increase】Cost of depreciation of new electric furnaces 【Cost decrease】Decrease in the cost of externally purchased electricity
Long	+340 million	【Capital expenditure】Installation of new high-efficiency electric furnaces 【Cost increase】Cost of depreciation of new electric furnaces 【Cost decrease】Decrease in the cost of externally purchased electricity

Opp 1 Financial impacts of short-, medium- and long-term opportunities and the strategies in response to them



Note:

1. In "Financial impact (NT$/year)," "-" means a decrease in the profit relative to the existing basis of profits, and "+" means an increase in the profit relative to the existing basis of profits.
2. The amount of "Impact on the existing basis of profits after implementation of the opportunity response strategy" under this opportunity is already covered by "Impact on the existing basis of profits after implementation of the risk response strategy" under Risk 1.

◎ Opp 2

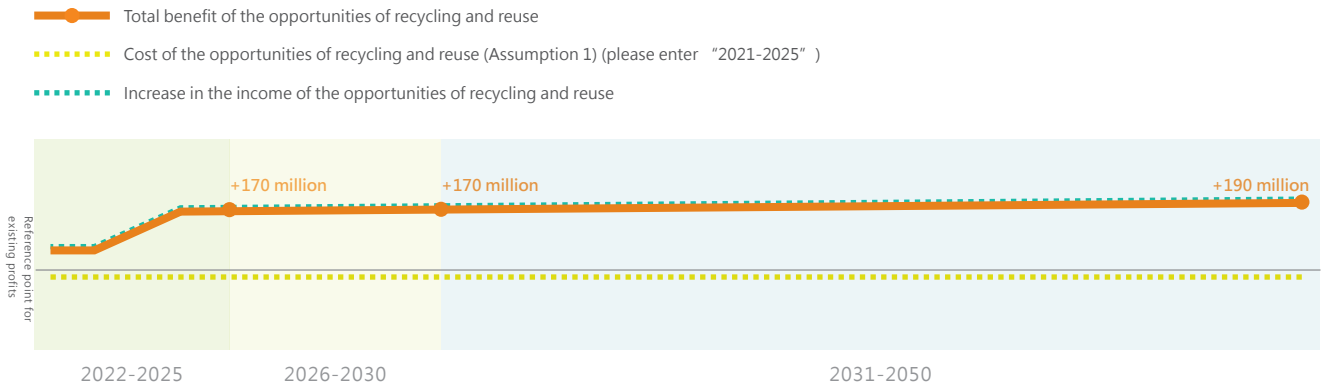
【Energy efficiency】Recycling and reuse

Investments in the recycling and reuse business of Taiwan Steel Union Co., Ltd. and Katec Creative Resources Corp.

◎ Description of financial impact

Term	Financial impact (NT$/year)	Description of financial impact
Short	+170 million	【Profit increase】 Acquisition of profit from the investments in recycling and reuse business 【Opportunity cost】 Opportunity cost of the amount invested
Medium	+170 million	【Profit increase】 Acquisition of profit from the investments in recycling and reuse business 【Opportunity cost】Opportunity cost of the amount invested
Long	+190 million	【Profit increase】 Acquisition of profit from the investments in recycling and reuse business 【Opportunity cost】Opportunity cost of the amount invested

◎ Opp 2 Financial impacts of short-, medium- and long-term opportunities and the strategies in response to them



Note: In "Financial impact (NT$/year)," "-" means a decrease in the profit relative to the existing basis of profits, and "+" means an increase in the profit relative to the existing basis of profits.

◎ Opp 3

【Market】Incentives from financial institutions

Since we have reports related to TCFD and CDP, we are able to increase our opportunities of acquiring credits, low interest rate loans and financing from the financial market.

◎ Description of financial impact

Term	Financial impact (NT$/year)	Description of financial impact
Short	-820,000	【Cost decrease】 Saved interest of the opportunities of incentives from financial institutions 【Cost increase】 Invested costs for TCFD and CDP
Medium	+1 million	【Cost decrease】 Saved interest of the opportunities of incentives from financial institutions 【Cost increase】 Invested costs for TCFD and CDP
Long	+150 million	【Cost decrease】 Saved interest of the opportunities of incentives from financial institutions 【Cost increase】 Invested costs for TCFD and CDP

◎ Opp 3 Financial impacts of short-, medium- and long-term opportunities and the strategies in response to them

Note: In "Financial impact (NT$/year)," "-" means a decrease in the profit relative to the existing basis of profits, and "+" means an increase in the profit relative to the existing basis of profits.

◎ Opp 4

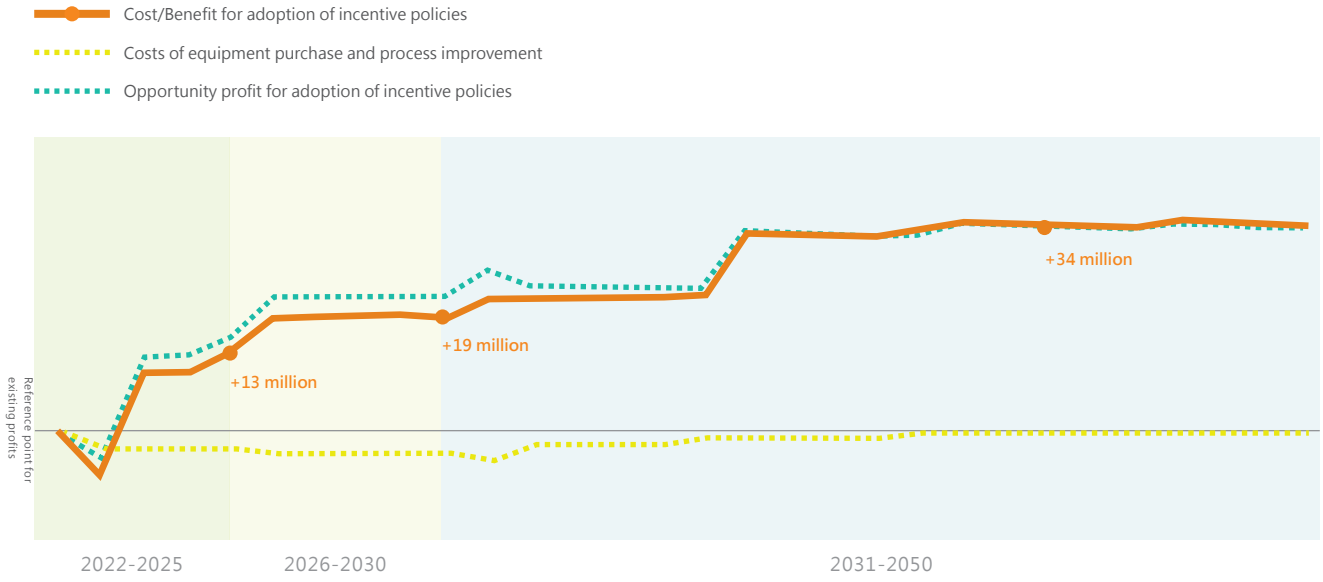
【Market】 Adoption of incentive policies

Application for subsidies for application of low-carbon technologies in industries from the Industrial Development Bureau, Ministry of Economic Affairs, and for subsidies for marsh gas power generators from the Bureau of Energy, Ministry of Economic Affairs.

◎ Description of financial impact

Term	Financial impact (NT$/year)	Description of financial impact
Short	+13 million	【Income increase】 Subsidies for marsh gas power generators 【Capital expenditure】 Installation of marsh gas power generators 【Income increase】 Income from marsh gas power
Medium	+19 million	【Income increase】 Income from marsh gas power 【Capital expenditure】 Installation of public facilities or equipment for process improvement 【Cost decrease】 Decrease in the cost of externally purchased electricity
Long	+34 million	【Income increase】 Income from marsh gas power 【Income increase】 Subsidies for public facilities or process improvement 【Capital expenditure】 Installation of public facilities or equipment for process improvement 【Cost decrease】 Decrease in the cost of externally purchased electricity

◎ Opp 4 Financial impacts of short-, medium- and long-term opportunities and the strategies in response to them

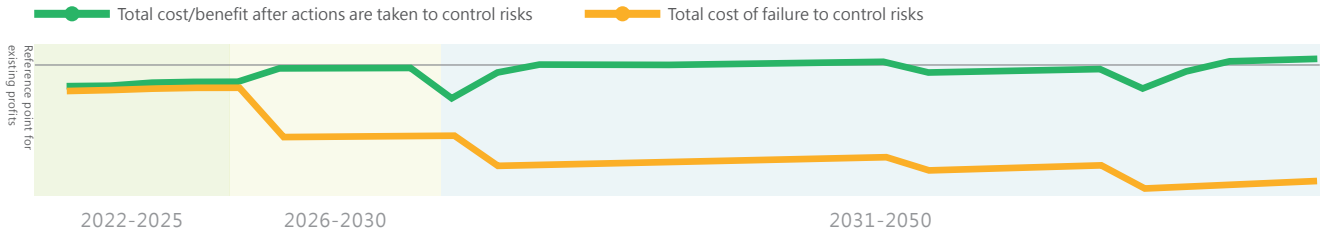


Note: In "Financial impact (NT$/year)," "-" means a decrease in the profit relative to the existing basis of profits, and "+" means an increase in the profit relative to the existing basis of profits.

Overall assessment of climate-related material risks, opportunities and strategies

Overall assessment of climate-related material risks and strategies

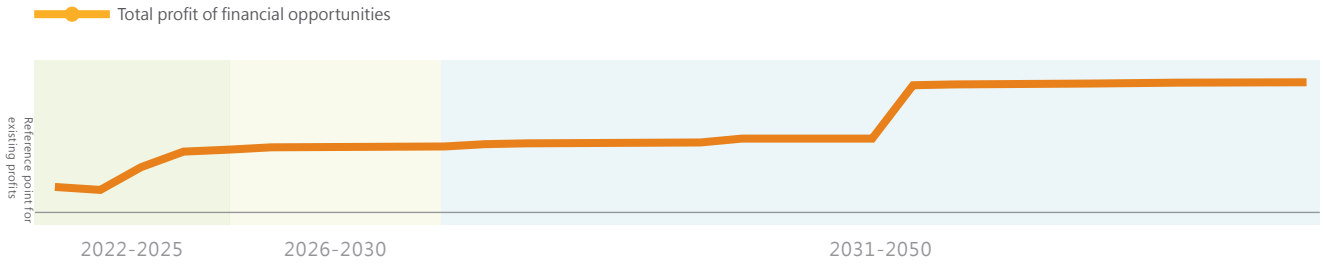
The challenges of climate change faced by Tung Ho Steel include emissions cap/trade (increased pricing of greenhouse gas emissions + low-carbon transition services + demands for low-carbon products and services), renewable energy laws, investments in new technologies, tropical cyclones, changes in customer behavior, changes in average precipitation and other risks. Our team has conducted a practical assessment of the strategies and financial impacts, and its result indicates that based on our short-, medium- and long-term financial conditions, we are still able to maintain stable and sustainable operations and generate more profits in the future.



Note: The financial impacts of inaction and action against risks do not include the "Impact of risks on the existing basis of profits" and "Impact on the existing basis of profits after implementation of the risk response strategy" under Risk 5: "[Market] Changes in customer behavior."

Overall assessment of climate-related material opportunities and strategies

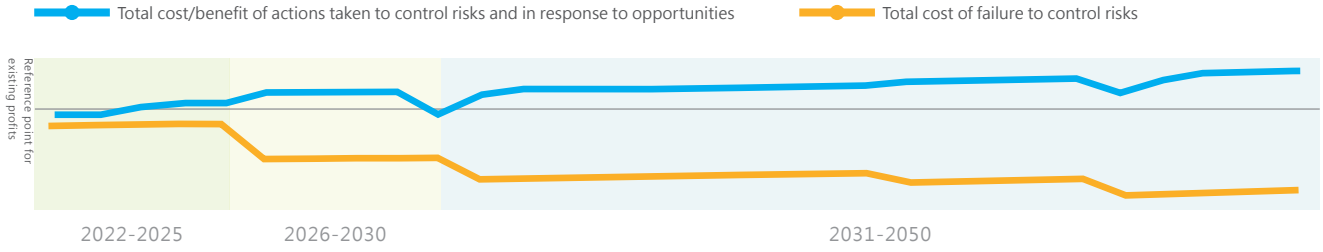
The opportunities of climate change faced by Tung Ho Steel include the use of more efficient production means, recycling and reuse, incentives from financial institutions, the adoption of incentive policies and other opportunities. Our team has conducted a practical assessment of the strategies and financial impacts, and its result indicates that we are able to take advantage of the opportunities arising from climate change, maintain sustainable development and generate more profits in the future.



Note: The opportunity benefit under "Opp 1: [Resource efficiency] Use of more efficient production means" is already covered by the financial impact of actions taken against risks, and thus the total benefit of financial opportunities do not include "Opp 1: [Resource efficiency] Use of more efficient production means."

Overall assessment of climate-related material risks, opportunities and response strategies

Regarding the risk challenges and opportunities of climate change faced by Tung Ho Steel, our team has conducted a practical assessment of the response strategies for risks and opportunities and financial impacts, and its result indicates that based on our short-, medium- and long-term financial conditions, we are still able to maintain stable and sustainable operations and generate more profits in the future.

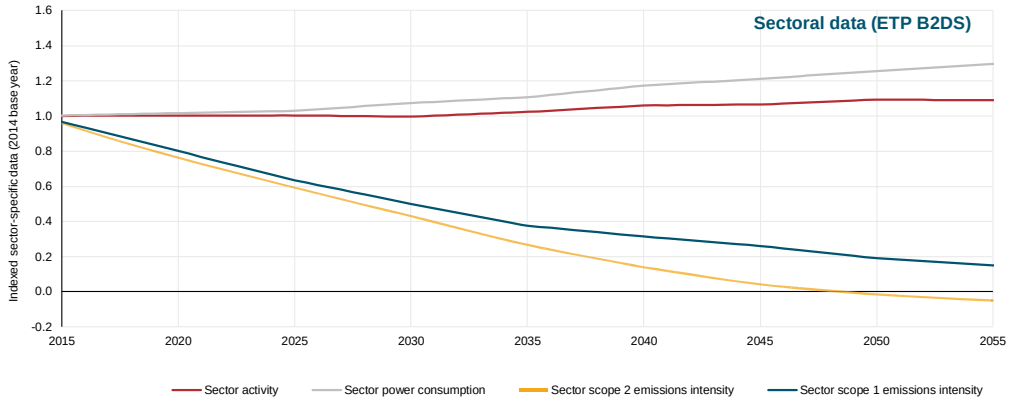


5. Climate Change-Related Metrics and Targets

Science-based reduction targets (SBTi)

We use science-based reduction targets as the basis for assessment of climate change-related metrics and targets at Tung Ho Steel, and we hold a target meeting each month, where the President follows up on and reviews the “difference between the performance and target of greenhouse gas emission intensity at each works” and determines the necessary measures.

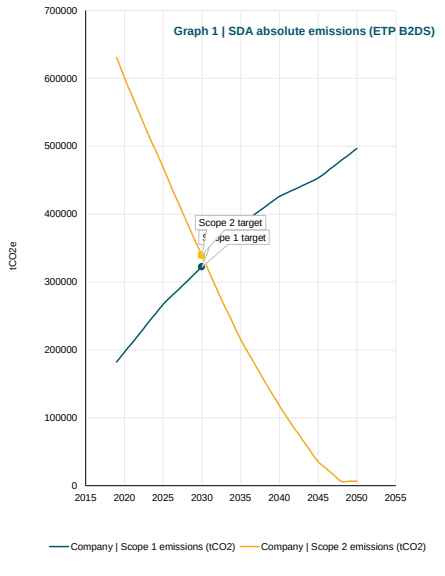
◎ Climate change-related science-based reduction targets (SBTi) at Tung Ho Steel

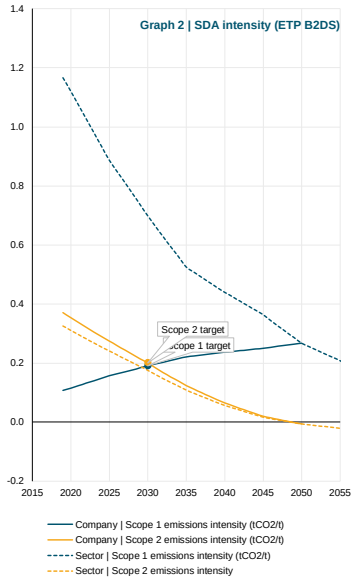


IEA ETP B2DS scenario

Review all target modelling data

	Base year (2019)	Target year (2030)	% Reduction
Company | Scope 1 emissions (tCO2)	181,832.00	322,077.06	-77.1%
Company | Scope 2 emissions (tCO2)	630,931.00	339,224.11	46.2%
Company | Scope 1+2 emissions (tCO2)	812,763.00	661,301.17	18.6%
Company | Scope 1 emissions intensity (tCO2/t)	0.107	0.190	-78.1%
Company | Scope 2 emissions intensity (tCO2/t)	0.370	0.200	45.9%
Company | Scope 1+2 emissions intensity (tCO2/t)	0.477	0.368	22.8%





Description of greenhouse gas emission targets

We have set absolute reduction targets, which are science-based reduction targets calculated with the SBTi Tool (SDA_Tool_v1.2.1 using the Sectoral Decarbonization Approach (SDA)) provided by the Science Based Target Initiative, and with reference to the pathway for net-zero emissions in 2050 published by the government of Taiwan in March 2022. Using 2005 as the reference year, we have set the percentage of emission reduction to 28% for the medium-term target in 2030, and the long-term carbon reduction target is in line with Taiwan's pathway to net-zero emissions in 2050.

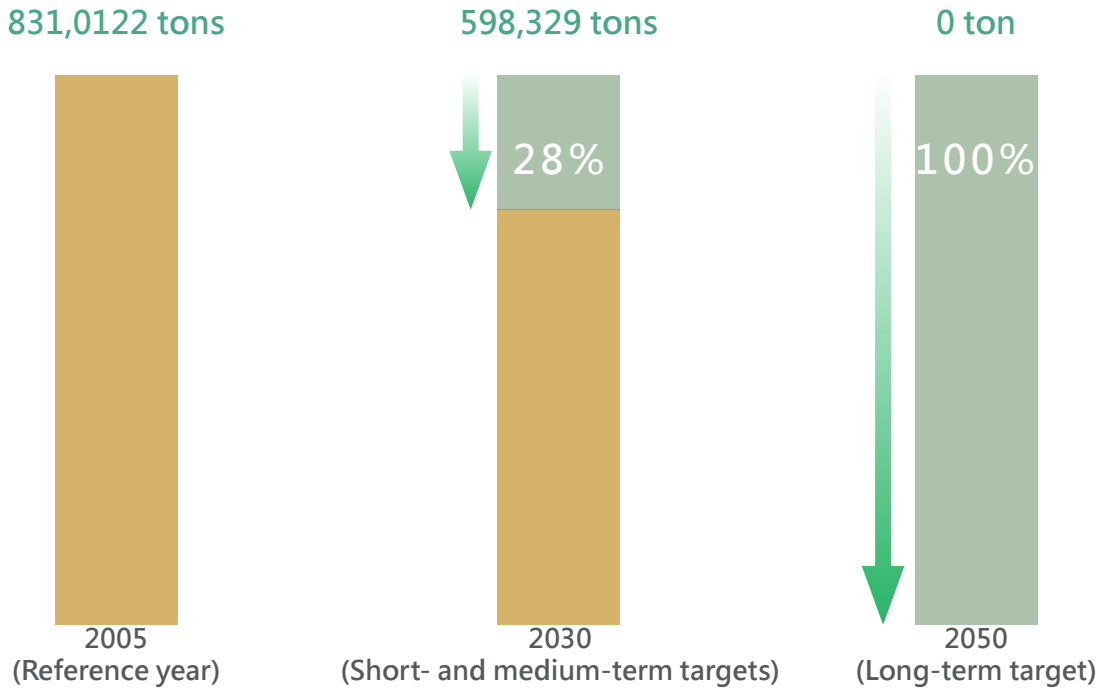
In 2021, due to a significant increase in production, the emissions of Scope 1 (Category 1) and Scope 2 (Category 2) amounted to 216,292 ton-CO_2e and 666,107 ton-CO_2e respectively, with the total emissions of Scope 1 (Category 1) and Scope 2 (Category 2) amounting to 882,400 ton-CO_2e. For comparison of the trends in emissions and a description of their differences, please see "4-2 Use of energy and resources" in our 2021 Sustainability Report. Our greenhouse gas emissions in 2021 were higher than in 2005, and in the future we will continue to seek alternative renewable energy and improve the performance of electric furnaces to move toward the emission reduction target of 28% in 2030.

Year	Carbon emission (ton-CO_2e) set according to "Taiwan's Pathway to Net-Zero Emissions in 2050"	Percentage of emission reduction (%)
2005 (Reference year)	831,012	-
2030 (Short- and medium-term targets)	598,329	28%
2050 (Long-term target)	0	100%

Note:

1. Based on the carbon reduction pathway for 2025–2050 in "Taiwan's Pathway to Net-Zero Emissions in 2050," we estimate that the percentage of carbon reduction in 2030 would be 28% compared with 2005.
2. Greenhouse gas emissions are the total of Scope 1 and Scope 2 emissions.

Targets of greenhouse gas emissions ($MtCO_2e$)



Description of other climate-related targets

Using 2019 as the reference year, we set the short- and medium-term percentages of use of renewable energy.

Year	Percentage of use of renewable energy	Status
2019 (Reference year)	0%	-
2021 (Data of the reporting year)	0%	We are currently drawing up a plan for inventorying all the renewable energy deployment projects that are executable by us and summarizing the predictions of the trends in government' s energy policies, the trends of development in wind power/solar energy technologies and the comparison between the long-term benefits of efficiency of own use/lease, in order to determine the order in which the projects will be executed and estimate the timing of their implementation.
2030 (Short- and medium-term targets)	2.1%	We will meet the requirements for major power consumers to install a 20MW renewable energy (solar energy) system by the end of 2023, with a generation capacity equivalent to 2.1% of the total electricity demand (compared with the reference year of 2019).
After 2031 (Long-term target)	9.8%	In comparison with the reference year of 2019, the generation capacity of the newly installed solar energy system in 2030 will be equivalent to 2.1% of the total electricity demand, and the generation capacity of the newly installed wind power system in 2031 will be equivalent to 5.3% of the total electricity demand. In 2032, the generation capacity of the existing wind power system in will be equivalent to 2.4% of the total electricity demand, so the generation capacity after 2032 will be equivalent to 9.8% of the total electricity demand.

6.Emission Reduction Actions

In order to support the development of national greenhouse gas reduction strategies and the targets for development of sustainable energy that taken into account resource efficiency, energy efficiency and environmental protection, Tung Ho Steel has been promoting the ISO 50001 energy management system, ISO 14064-1 greenhouse gas inventory, PAS 2050 product carbon footprint and ISO 14067 product carbon footprint certification. At the same time, we have invested Capital expenditures and the relevant human resources and materials with respect to the resource demands under energy efficiency plans with the expectation to keep track of the production costs and use energy in an effective and appropriate way. In 2021, the total energy saved and carbon reduced by the works amounted to approximately 49,226 ton-CO_2e.

Actions for energy efficiency and carbon reduction

Works	Measures for energy efficiency and carbon reduction	Estimated amount of energy saved (GJ)	Estimated amount of carbon reduced (ton-CO_2e)
Taoyuan Works	• The number of oxygen generators running during peak time was decreased to three.	3,676	513
	• In accordance with Taipower' s policy during summer, measures were implemented for planned reduction of power consumption: 6 hours less daily.	286,974	40,017
	• The amount of chemical energy used by electric furnaces was increased, leading to a decrease of 3.6 kWh/t in power consumption per unit.	45,667	6,368
	• The power consumed for reheating the hot steel billets of rolling mill No. 2 was decreased.	1,205	168
Miaoli Works	• The power supply equipment for electric arc furnaces was repaired to improve the efficiency of power supply.	9,067.2	1,264.4
	• Plan for energy efficiency by reducing the failure time of machine equipment.	4,236.9	590.8
	• A new well was drilled to replace deep well No. 2 whose efficiency was poor, and the water pump motors were equipped with inverters to save energy.	1,057.1	147.4
	• The 400W mercury lamps used by approximately 107 street lights at the Miaoli Works were replaced with 80W LED lamps.	494.9	69.0
	• The LED lights on 2-4F of the administrative building were replaced.	82.5	11.5
Kaohsiung Works	• Plan for replacement and improvement of the air compressors for rebar shearing lines (52,837kWh was saved).	190.2	26.50
	• 17 1000W high-pressure sodium lamps used by the cooling section of the steel shapes mill were replaced with 250W high-efficiency LED lamps (73,440kWh was saved).	264.4	36.90
	• The old 6.4KW water-cooled air conditioner in the computer room was replaced with a new 4.2W air-cooled variable-frequency air conditioner (24,309kWh was saved).	87.5	12.20
	• The lights at all offices of the works were replaced, by changing the 80W T8 lamps to LED lamps (2,702kWh was saved).	9.7	1.4
	Total	**353,011.9**	**49,225.6**

Note:

1. Emissions from electricity are based on the factor of 0.502 kg-CO_2e of carbon emissions from electricity as published on September 27, 2021 by the Bureau of Energy, Ministry of Economic Affairs, which is used to calculate the reduction of Scope 2 emissions from electricity.
2. The scope of calculation includes: CO_2, CH4, N_2O, HFCs, PFCs, SF6, NF3 and other types of gases.
3. The scope of reduction only includes indirect emissions from energy (Scope 2).
4. Basis for calculation of energy consumption and greenhouse gas reduction at the Taoyuan Works, Miaoli Works and Kaohsiung Works: Based on the amount of consumption in the previous year.
5. The capacity and operating time of equipment and the production volume are used for calculation.
6. The two measures taken by the Kaohsiung Works for energy efficiency and carbon reduction are cross-year projects.

7.Low-Carbon Products

Our products are low-carbon products categorized by emission intensity, and low-carbon products account for 100% of the profits in the reporting year. We manufacture products by melting steel scrap using electric arc furnaces. Compared to products made with blast furnaces using the method of basic oxygen steelmaking, our products are more environmentally competitive than products made with blast furnaces because of their low-carbon characteristics.

The steel materials for electric furnaces are low-carbon, recycled materials. Their primary material, steel scrap, is a valuable recycled resource from what is called the "urban mine." A large quantity of steel scrap is collected from different parts of Taiwan for smelting and refining into steel. Compared to the steel materials produced by blast furnaces, each ton of crude steel produced can reduce emissions by approximately 1.5 ton-CO_2e. To achieve the goal of zero emissions, besides actively promoting the contributions to society of the expansion of low-carbon recyclable steel, we will continue to introduce the latest practical technologies to significantly reduce carbon emissions to become the leader in the global industry of electric furnaces.

Currently, most rebar makers need to reheat steel billets for rolling and forming. In 2006, we invested a large amount of resources to improve the production process. In 2010, the Taoyuan Works was established and became the first steelmaker in Taiwan to adopt new processes using electric furnaces. By integrating refining with the modern rolling process, the Taoyuan Works adopted the direct rolling process without using reheating furnaces to become Taiwan's first rebar maker without using reheating furnaces.

When no reheating furnace is required, no fuel such as crude oil or natural gas will be consumed for heating. Compared to traditional processes, this process can significantly reduce energy consumption and air pollution. The low-energy consumption and near-zero pollution performance of the production processes of the Taoyuan Works is a new milestone in the steelmaking industry. The method of direct rolling without reheating furnaces has been adopted and introduced by many domestic and foreign steelmakers.

Benefits of non-use of reheating furnaces (direct rolling) compared with those of a traditional rolling process

Energy consumption	Particulate matters	Carbon emissions	NOx · SOx
Reduced by 85%	Reduced by 100%	Reduced by 60%	Reduced by 100%

Compared with a rolling mill, a direct rolling process without reheating furnaces can save approximately 29.8 (liters – heavy oil/ton – rebar) in energy consumption and reduce the consumption of heavy oil by 23,840,000 liters annually, equivalent to the annual energy consumption of 22,495 cars (15,000km/year at 12km/liter per car).

According to the statistics of the Bureau of Energy, Ministry of Economic Affairs, the annual amount of CO_2 absorbed by the Daan Park is 389 tons.

Note: The data in the table above is based on the comparison between the performance values of the Taoyuan Works and the Bade Works (the old Taoyuan Works), and calculated at an annual production of 800,000 tons of rebar.

8.Future Outlook

Climate-related engagement in supply chains

In February 2022, the Trading Division and the Materials Section distributed questionnaires to survey the current status of greenhouse gas inventory and verification conducted by suppliers. Statistics indicate that out of a total of 197 suppliers, 9 have conducted a greenhouse gas inventory verified by a third party, accounting for 4.6%.

Internal carbon pricing

To promote climate change adaptation and mitigation activities, we have been active in managing carbon risks and establishing operating procedures and regulations concerning climate-related financial disclosures and internal carbon pricing. For internal carbon pricing, we have adopted the price of national carbon fee to help achieve the set targets of greenhouse gas reduction and promote clean energy transition.

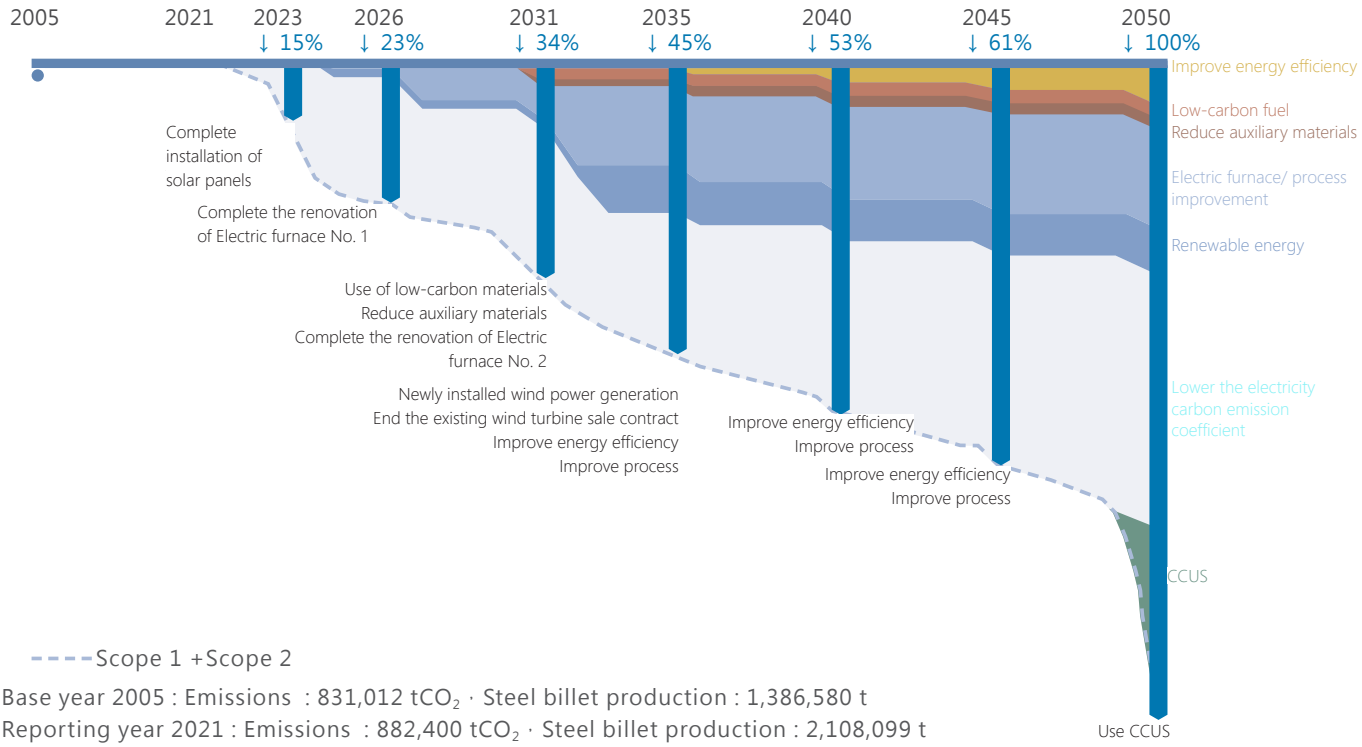
Plan for contributions to a carbon reduction fund

For the purposes of actively managing carbon risks and lessening the impact on our operations, we are currently developing the relevant operating procedures for a fund. With reference to the internal carbon pricing, we will determine the carbon price for a carbon reduction fund and make contributions to the fund based on the CO_2 equivalents of Scope 1 and Scope 2 emissions.

1.5℃ low-carbon transition plan

The GHG emissions at Tung Ho Steel are mainly indirect emissions (Scope 2) caused by electricity use. Therefore, the 1.5°C low-carbon transition plan is currently working on the planning of carbon reduction pathway targeting at the electricity using items, followed by the use of CCUS technology to reach the goal of net zero.

◎ Tung Ho Steel Carbon Reduction Pathway



Base year 2005 : Emissions : 831,012 tCO_2 · Steel billet production : 1,386,580 t
Reporting year 2021 : Emissions : 882,400 tCO_2 · Steel billet production : 2,108,099 t

Carbon reduction pathway in the current stage		Target of carbon reduction	Description
Reduction of power consumption	Decarbonization technologies and modification of equipment – modification of electric furnaces	↓ 12%	Electric furnaces can be modified into steel scrap preheating-type ones to reduce carbon emissions. If steel scrap preheating-type electric furnaces are adopted, it is estimated that the unit power consumed by electric furnaces for smelting could decrease by 100–120 kWh /ton of steel. This carbon reduction target is based on the assumptions that modification of the electric furnaces at the Miaoli Works is completed by the end of 2025 and that modification of the electric furnaces at the Taoyuan Works is completed by the end of 2030.
	Development of renewable energy	↓ 7%	The deployment and use of renewable energy (solar power, wind power and marsh gas power) could reduce carbon emissions by 7%. This carbon reduction target is based on the assumption that renewable energy accounts for 9.8% (power generated/power consumed) of power consumption at Tung Ho Steel in 2050.
	Lower factor of carbon emissions from electricity	↓ 37%	Based on the assumptions that renewable energy accounts for 50% (of power consumption) in Taiwan and that the factor of carbon emissions from electricity becomes lower in 2050.
Execution of energy efficiency and carbon reduction plans	Increasing energy efficiency	↓ 4%	Increasing energy efficiency: High-performance energy efficient motors, control of frequency variation, recycling of residual heat, etc.
	Improving processes	↓ 4%	Smart combustion control of reheating furnaces, introduction of combustors for reheating furnaces, an oxygen-enriched combustion system for the preheaters of ladles, etc.
Utilization of low-carbon fuels		↓ 1%	Such as the use of low-carbon fuels including CH4, CO_2-free fuels and hydrogen.
Reduced use of coke and other recarburizer		↓ 3%	Such as the use of waste synthetic resin and biofuel.
Technology of carbon capture, utilization and storage (CCUS)		↓ 32%	Tung Ho Steel plans to introduce the technology of carbon capture, utilization and storage (CCUS) to achieve the remaining carbon reduction target of 32%. The CCUS technology will be introduced in an incremental and phased manner, including a preliminary research project, the construction of an experimental works and the final establishment and operation of the works.

Tung Ho Steel is closely following the trend of global climate change and the direction of global responses, and has included climate change as a material issue in corporate sustainable development and one of the key material risks. We have continued to conduct analysis and maintain control, and have been committed to carrying out activities for the adaptation and mitigation of greenhouse gases. In April 2022, we set up the Tung Ho Steel Task Force for Energy Efficiency and Carbon Reduction. The task force has compiled a preliminary list of around 20 energy efficiency and carbon reduction plans for assessment, and the execution of these plans will be the focus in the next stage. We hope to actively meet the expectations of all stakeholders through concrete actions to ensure the sustainable management of Tung Ho Steel.

Appendix 1: References

• IPCC(2021), Sixth Assessment Report of Intergovernmental Panel on Climate Change 2021: The Physical
• Science Basis
• Report on abstract of key scientific points in IPCC's 6th assessment report on climate change and updated analysis of climate change in Taiwan
• Taiwan's Pathway to Net-Zero Emissions in 2050

Appendix 2: TCFD Disclosures and Corresponding Chapters

Aspect	TCFD-recommended disclosure	Corresponding chapter in this report	Page
Governance	• Describe the board' s oversight of climate-related risks and opportunities.	Climate Change-Related Governance	8
	• Describe management' s role in assessing and managing climate-related risks and opportunities.	Climate Change-Related Governance	10
Strategy	• Describe the climate-related risks and opportunities the organization has identified over the short, medium and long term.	Climate Change-Related Strategy	15
	• Describe the impact of climate-related risks and opportunities on the organization' s business, strategy and financial planning.	Climate Change-Related Strategy	20
	• Describe the resilience of the organization' s strategy, taking into consideration different climate-related scenarios (including a 2° C or lower scenario).	Climate Change-Related Strategy	20
Risk Management	• Describe the organization' s processes for identifying and assessing climate-related risks.	Management of Climate Change-Related Risks and Opportunities	13
	• Describe the organization' s processes for managing climate-related risks.	Management of Climate Change-Related Risks and Opportunities	113
	• Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organization' s overall risk management system.	Management of Climate Change-Related Risks and Opportunities	13
Metrics 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.	Climate Change-Related Metrics and Targets	35
	• Disclose Scope 1, Scope 2 and Scope 3 (if appropriate) greenhouse gas emissions and the related risks.	Climate Change-Related Metrics and Targets	35
	• Describe the targets used by the organization to manage climate-related risks and opportunities and its performance in achieving the targets.	Climate Change-Related Governance Climate Change-Related Metrics and Targets	8 39

Appendix 3: Statement of External Verification

Conformity Statement

Climate related Financial Disclosure

This is to conform that

Tung Ho Steel Enterprise Corporation
6F.
No. 9, Sec. 1, Chang-an E. Rd.
Zhongshan Dist.
Taipei City, 104003
Taiwan

東和鋼鐵企業股份有限公司
臺灣
台北市
中山區
長安東路一段 9 號
6 樓
104003

Holds Statement Number CFD 761133

As a result of carrying out conformity check process based on TCFD requirement, BSI declares that:

- Tung Ho Steel Enterprise Corporation follows Recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) to disclose climate-related financial information which is clear, comparable and consistent about the risks and opportunities and its financial impact. The disclosures cover four core elements and have been prepared by seven principles for effective disclosures.
- The maturity model for the Climate-related Financial Disclosures is **Level 5+: Excellence** grade.

For and on behalf of BSI

Managing Director BSI Taiwan, Peter Pu

Latest issue: 2022-05-18 Expiry date: 2023-05-18

...making excellence a habit.™

Statement number: CFD 761133

Location:	**Conformity Check Overall Result:**
Tung Ho Steel Enterprise Corporation 6F. No. 9, Sec. 1, Chang-an E. Rd. Zhongshan Dist. Taipei City, 104003 Taiwan 東和鋼鐵企業股份有限公司 臺灣 台北市 中山區 長安東路一段 9 號 6 樓 104003	The maturity model for the Climate-related Financial Disclosures is **Level 5+: Excellence** grade.

Latest issue: 2022-05-18 Expiry date: 2023-05-18