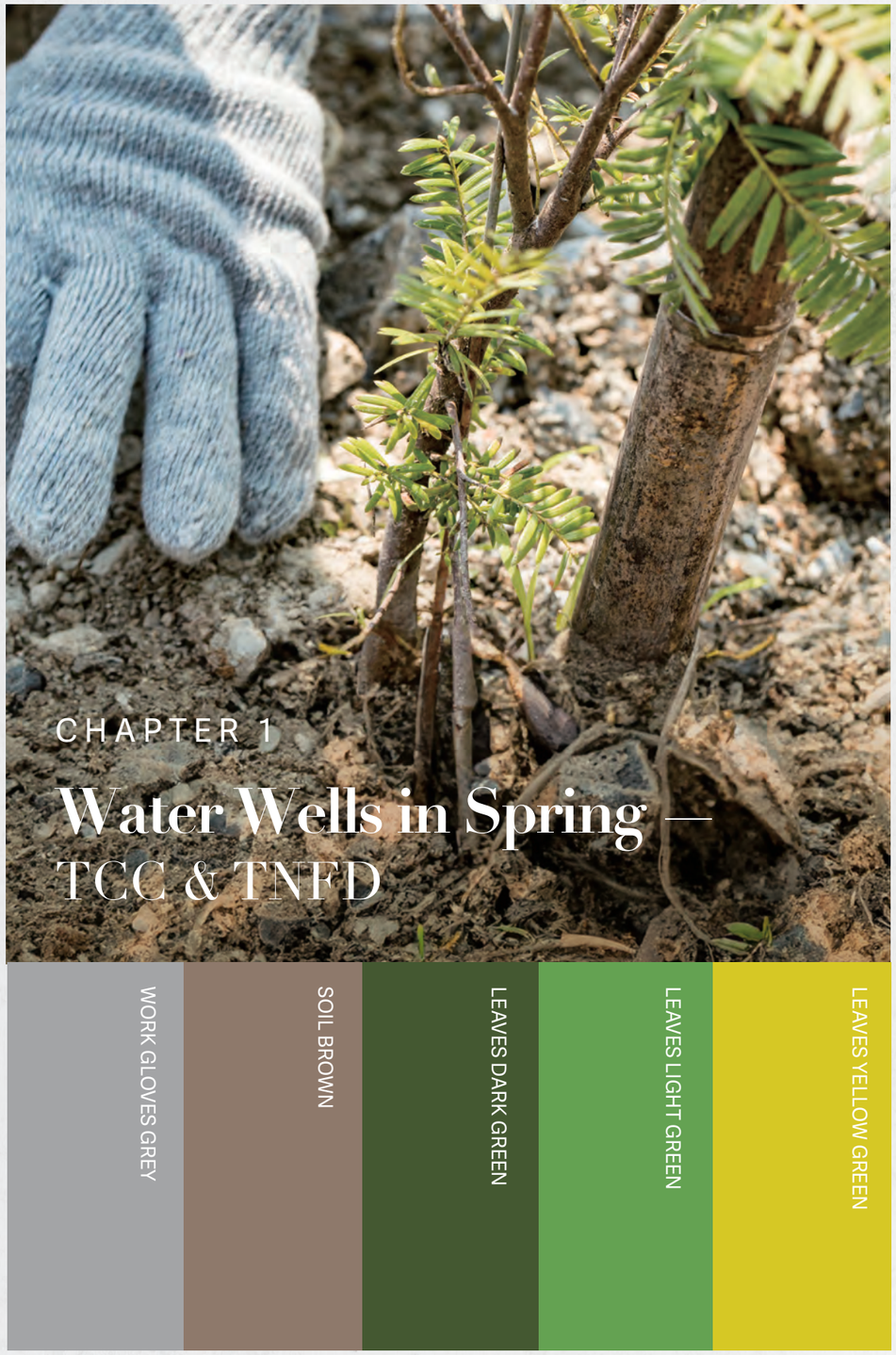


1.1 _ Nature & Biodiversity Management

In accordance with the TNFD framework, the functional committees under the Board of Directors at TCC—the Risk Management Committee and the Corporate Sustainable Development Committee—are tasked with relevant governance. Regarding the business and value chain's footprint, through the LEAP approach, the nature-related dependencies, impacts, risks, and opportunities of operation sites were analyzed. Also, stakeholder input was collected via questionnaire. Finally, a financial assessment of nature-related opportunities was conducted.

1.2 _ Governance

Board of Directors

Includes the management of nature and biodiversity risks in the agenda and supervises and oversees the Company's strategy formulation, execution, and monitoring

Corporate Sustainable Development Committee

Two meetings were convened in 2023

- Formed the Biodiversity Group to tackle biodiversity issues, initiating research on soil carbon sinks and soil fauna.
- Focused on Net Positive Impact (NPI), No Net Loss (NNL), and No Deforestation Commitment in 2024
- Reviewing biodiversity index and progresses in soil research, aiming for Nature Positive

Risk Management Committee

Three meetings were convened in 2023 and 2024

- Inventoried the operational impact of the April 3rd Hualien earthquake and oversaw the recovery progress.
- Included biodiversity risk in the "TCC Risk Management Policy and Principles" and submitted to the Board of Directors for adoption.

Office of Responsibility and Sustainability

Integrates the Company departments' resources to promote research and actions on nature and biodiversity

- Corporate Governance Group
- Comprehensive Care Group
- Sustainable Products and Manufacturing Group
- Sustainable Environment Group
- Green Energy Group
- Sustainability Information Disclosure Group
- **Biodiversity Group**

Biodiversity Group members:

- The President Office
- General Affairs Department
- Engineering Affairs Department
- Finance Department
- Office of Responsibility and Sustainability
- Hoping Plant
- Suao Plant
- KBCC
- Hoping EcoPort
- Hoping Power Plant
- Expert Teams (NTU, NIU, and Eco-Angel EnvironmentConservation Association)

- Responsible for practices of international frameworks and initiatives such as TNFD and SBTN.
- Assesses biodiversity and natural disaster risks; plans and executes corresponding biodiversity conservation programs

1.3 _ The LEAP Approach

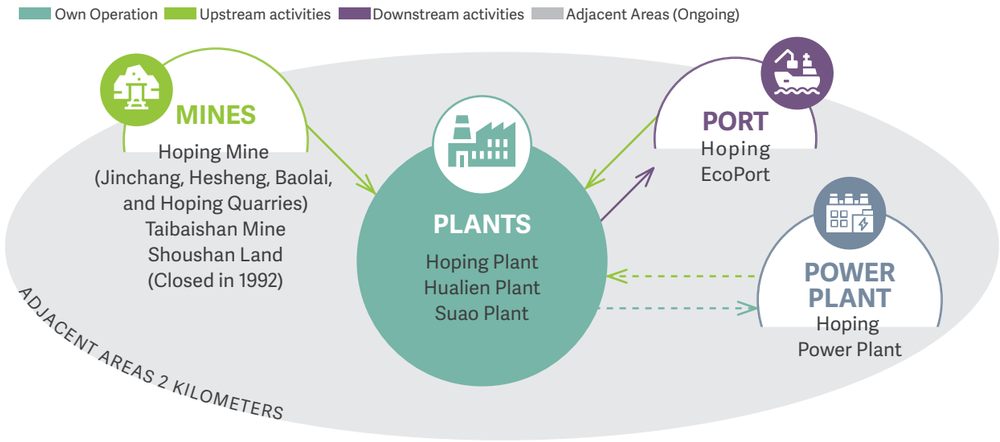
1.3.1 _ Locate

Analysis of TCC's Interface with Nature

TCC operates across 11 sectors, including cement, new energy, resource recycling, and land and maritime logistics, all of which are closely related with nature. The scope of the year includes value chain in Taiwan, extending to a two-kilometer radius for adjacent area evaluation.

- Own operations: Cement Plants in Taiwan
- Upstream activities: mines, the port (158.8 hectares, offering materials of cement)
- Downstream activities: the port (transporting cement and clinker)
- Adjacent areas: the power plant (27 hectares, only the plant itself is assessed, upstream and downstream evaluations will be conducted in the future) and two-kilometer radius of operation sites

Assessment scope of the year



TCC Established Locate Criteria

TCC collaborated with Associate Professor Chyi-Rong Chiou from the School of Forestry and Resource Conservation, National Taiwan University (NTU), to assess the nature sensitivity of its operation sites following the criteria of ecosystem sensitivity and species sensitivity.

The assessment results for ecosystem sensitivity and species sensitivity were classified into four levels, i.e., Very High (VH), High (H), Medium (M), and Low (L). The results were then integrated into a nature sensitivity matrix. Based on the nature sensitivity matrix, sites with a nature sensitivity of VH were prioritized for assessment.

Nature Sensitivity Classification

Nature Sensitivity		Ecosystem Sensitivity			
		VH	H	M	L
Species Sensitivity	VH	VH	VH	H	M
	H	VH	H	M	L
	M	H	M	M	L
	L	M	L	L	L

CRITERION 1

Ecosystem Sensitivity

TCC has implemented a biodiversity policy, pledging not to explore or exploit World Heritage Sites and IUCN Protected Areas I-IV. **Leveraging the IUCN Protected Areas and Ministry of the Interior Functional Zones**, TCC analyzed the ecosystem sensitivity of its operation sites, classifying them into four levels, i.e., VH, H, M, and L.

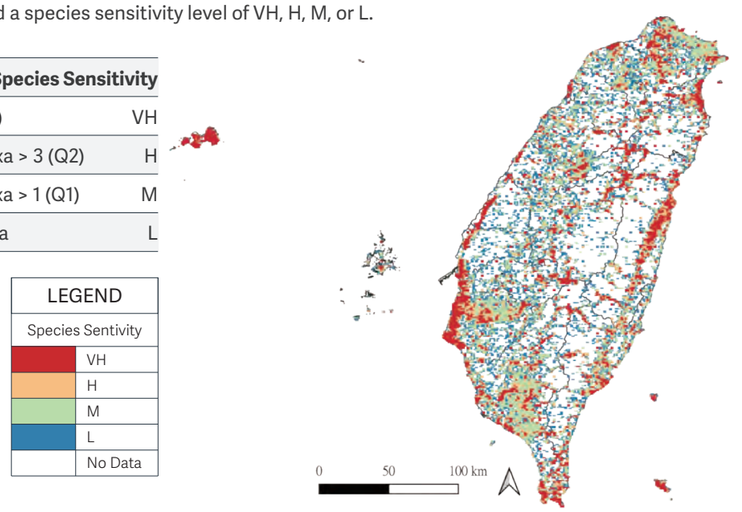
Sensitivity Level	Categories & Examples
Very High (VH)	IUCN Protected Areas I-IV, such as nature reserves, wildlife protected areas, important wildlife habitats, nature protected areas, national parks, national natural parks, important wetlands, and conservation areas for the aquatic flora and fauna.
High (H)	→ Type 1 Environmental Conservation Zone (but not of IUCN Protected Areas I-IV), such as First-Grade Coastal Conservation Zones, National Forest Enterprise Zones within the Protection & Conservation Lands, Protection Forests, other Public Forest Areas, Reservoir Water Storage Areas, and River Areas → IUCN Protected Areas V-VI, such as marine protection areas → Disaster-prone areas, such as geologically sensitive areas and potential debris flow torrents
Medium (M)	→ Type 2 Environmental Conservation Zone, such as timber productive areas with the Protection & Conservation Lands, forest recreation areas, experimental forests of universities and colleges, and forestry experimental forests. → Type 4 Environmental Conservation Zone, such as the zones and land use for protection and conservation related to reservoirs, water sources, and designated scenic areas in the Urban Planning Law.
Low (L)	Items other than the above

CRITERION 2

Species Sensitivity: Monitoring mines for 10+ years

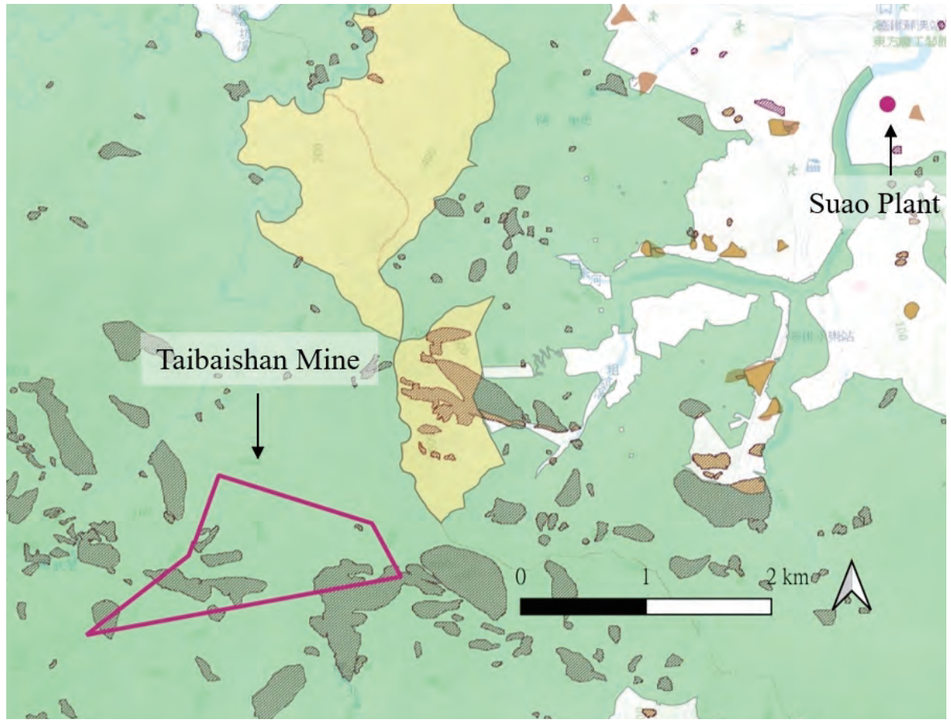
Using the **data from the Taiwan Biodiversity Network (TBN) of the Taiwan Biodiversity Research Institute, Ministry of Agriculture**, TCC analyzed the species sensitivity at its operation sites, assessing if there is presence of the flora and fauna categorized as Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) in the IUCN Red List of Threatened Species1 in the vicinity. TCC divides the TBN atlas species into four quartiles, each assigned a species sensitivity level of VH, H, M, or L.

Classification Basis	Species Sensitivity
Number of Taxa > 5 (Q3)	VH
5 (Q3) >= Number of Taxa > 3 (Q2)	H
3 (Q2) >= Number of Taxa > 1 (Q1)	M
1 (Q1) >= Number of Taxa	L



CRITERION 1 ANALYSIS RESULT

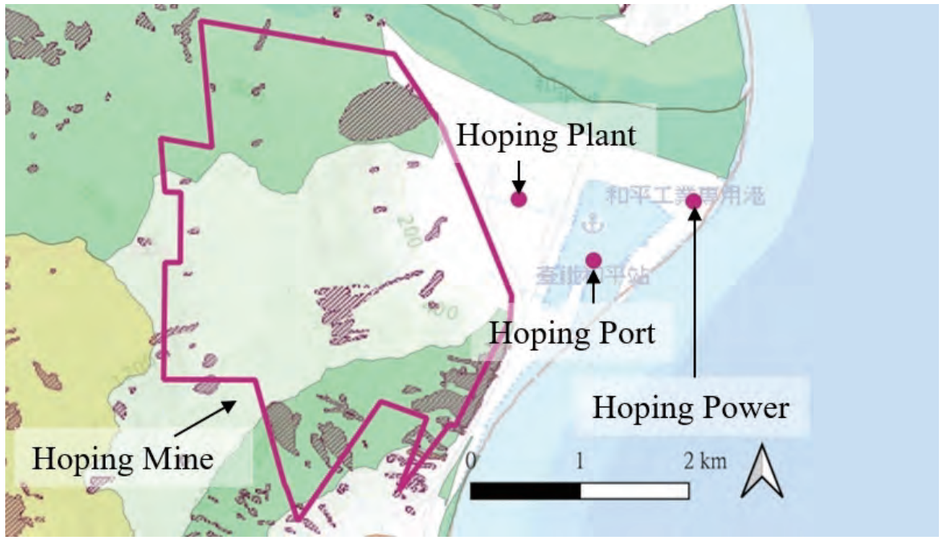
The cement plants, Hoping EcoPort, and Hoping Power Plant are in areas with low ecological sensitivity, not near sensitive locations. Conversely, the Taibaishan Mine in Yilan, Hoping Mine in Hualien, and Shoushan Land in Kaohsiung are in geologically sensitive and environmental conservation areas, indicating high ecosystem sensitivity.



The Suao Plant and the Taibaishan Mine

Both are not located in the IUCN Protected Areas I-IV, as the Suao Plant is in the area of a low ecosystem sensitivity, and the Taibaishan Mine in the Type 1 Environmental Conservation Zone and the geologically sensitive area, presenting a high ecosystem sensitivity.

The Taibaishan Mine has been through the environmental impact assessment (EIA) and rigorously abides by pertaining laws and regulations. See CH2.1.2 Biodiversity Plan.



The Hoping Mine, the Hoping Plant, the Hoping EcoPort, and the Hoping Power Plant

None of the sites are located in the IUCN Protected Areas I-IV, and the Hoping Plant, the Hoping EcoPort, and the Hoping Power Plant are in the areas with a low ecosystem sensitivity.

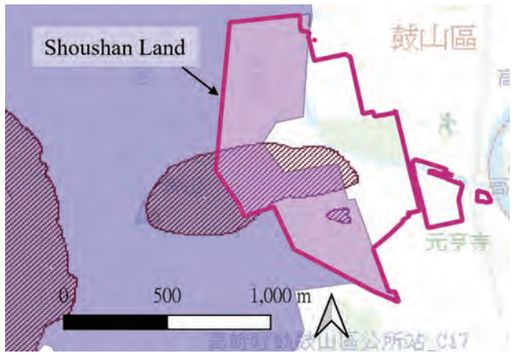
The Hoping Mine is located in the Type 1 Environmental Conservation Zone and geologically sensitive area, presenting a high ecosystem sensitivity. The Hoping Mine has been through the EIA and introduced the low-carbon vertical shaft transport system to reduce impact of development. See CH2.1.2 Biodiversity Plan.

Shoushan Land

It is not located in the IUCN Protected Areas I-IV.

Part of the mine is situated in the conservation areas in urban planning and geologically sensitive areas, presenting a high ecosystem sensitivity. The Shoushan Land, with the mining ceased in 1992, is now a hiking trail and flood detention basin park, connecting the city blue and green spaces and functioning as a flood control facility.

The Shoushan Land is adjacent to Shoushan National Nature Park. TCC plans a collaborate with the National Park Service to conduct nature conservation and integrate regional restoration resources



CRITERION 2 ANALYSIS RESULT

Birds | Fish | Amphibians | Mammals | Plants

Operation Site	No. of Potentially Threatened Species	Species Sensitivity	List of Species
Mines			
Hoping Mine	9	VH	Eurasian Jay; Formosan Bulbul; Long-tailed Shrike; Mountain Hawk-Eagle
			Lilac Daphne; Beach Morning-Glory; Rubus sumatranus; Depressed Orange; Heptapleurum ellipticum var. ellipticum
Taibaishan Mine	2	M	Rubus sumatranus; Small-leaved Distylium
Shoushan Land (non-operational)	18	VH	Black-naped Oriole; Taiwan Hwamei; Black Kite; Fairy Pitta; Chestnut Munia; Green-winged Teal; Formosan Crested Myna (Taiwanese subspecies); Mandarin Duck
			Stejneger's Paddy Frog
			Green Barb
			Argyreia formosana; Epithema taiwanensis var. fasciculata; Siraitia taiwaniana; Scutellaria austrotaiwanensis; Golden Lycoris; Heptapleurum ellipticum var. ellipticum; Acuteleaf Caper; Fan Palm
Cement Plants			
Hoping Plant	0	L	----
Suao Plant	1	L	Black Kite
Hualien Plant	6	VH	Formosan Flying Fox
(non- operational)			Formosan Bulbul; Long-tailed Shrike; Chestnut Munia; Taiwan Hwamei
			Looking Glass Tree
Power Plant			
Hoping Power Plant	1	L	Formosan Bulbul
Port			
Hoping EcoPort	0	L	----

Note: The TBN data was used for analysis.

The ecological survey data of TCC mines, tracking species sensitivity, shows that the species sensitivity of the mines has been lower than the atlas analysis results since before mining began, and the biodiversity has been maintained for years. (See the Environmental Monitoring Report in the ESG section of the corporate website). For the nature conservation practices of each area, please refer to **CH2 Clouds Changes in Summer | TCC and Forest, Soil, Ocean.**

Locate: Comprehensive Analysis

With the analyses of Criterion 1 and Criterion 2 combined, the Hoping Mine and the Shoushan Land have high nature sensitivity, while the Taibaishan Mine and the Hualien Plant have a medium sensitivity. The remainders have a low nature sensitivity. In order of priority, TCC have conducted long-term restoration projects in the mines and continue to monitor the environments and ecology.

Operation Site		CRITERION I Ecosystem Sensitivity	CRITERION II Species Sensitivity	Nature Sensitivity
Mines	Hoping Mine, Hualian	H	VH	VH
	Taibaishan Mine, Yilan	H	M	M
	Shoushan Land, Kaohsiung (non-operational)	H	VH	VH
Plants	Hoping Plant	L	L	L
	Hualien Plant (non-operational)	L	VH	M
	Suao Plant	L	L	L
Power Plant	Hoping Power Plant	L	L	L
Port	Hoping EcoPort	L	L	L

1.3.2 _ Evaluate

Mines/Cement Plants/Power Plant/Port: Apply TNFD Sector Guidance & ENCORE for Dependency and Impact Assessment

The natural disaster protection indicator was added in response to the April 3rd Hualien earthquake

In accordance with the TNFD's LEAP approach and Sector Guidance, and utilizing the ENCORE jointly developed by the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and the UN Environment Programme Finance Initiative (UNEP FI), TCC has conducted a preliminary screening to identify the potential dependencies and impacts of the mines, cement plants, power plant, and port on nature. Meanwhile, TCC established Biodiversity Group organized Nature-related Dependencies & Impacts Workshop to identify the levels of dependencies and impacts of different sectors on natural capital.

TCC operation sites are primarily located in the Hualien-Taitung region, which is prone to risks of earthquakes and typhoons. On April 3rd, 2024, a magnitude 7.2 earthquake struck Hualien, with the Hualien Hoping Circular Economy Park being at the epicenter. As a result, TCC places emphasis on natural disaster protection services to prevent operational disruptions. The natural disaster protection indicator was added to the analysis results.

The Dependencies and Impacts Aligned with TNFD LEAP Approach and Sector Guidance

	Scope	Mines	Plants	Power Plants	Port
Dependencies Ecosystem Services	1 Surface water	HIGH	VERY HIGH	VERY HIGH	HIGH
	2 Ground water	HIGH	VERY HIGH	MODERATE	HIGH
	3 Water flow maintenance	HIGH		MODERATE	MODERATE
	4 Water quality		LOW	LOW	LOW
	5 Climate regulation	HIGH		VERY LOW	MODERATE
	6 Mediation of sensory impacts		LOW		
	7 Dilution by atmosphere and ecosystems		LOW		
	8 Filtration			LOW	
	9 Bio-remediation			VERY LOW	
	10 Mass stabilisation and erosion control	MODERATE		LOW	MODERATE
	11 Flood and storm protection			MODERATE	MODERATE
	12 Natural disaster protection	VERY HIGH	VERY HIGH	VERY HIGH	VERY HIGH
Impacts Impact Drivers	A Disturbances	HIGH	HIGH	HIGH	HIGH
	B Freshwater ecosystem use	HIGH	HIGH	HIGH	VERY HIGH
	C Marine ecosystem use		HIGH		VERY HIGH
	D Terrestrial ecosystem use	VERY HIGH	VERY HIGH		HIGH
	E GHG emissions	HIGH	HIGH	HIGH	HIGH
	F Non-GHG air pollutants	HIGH	MODERATE	HIGH	
	G Soil pollutants	HIGH		MODERATE	HIGH
	H Solid waste	HIGH	HIGH	HIGH	MODERATE
	I Water pollutants	HIGH	MODERATE	MODERATE	HIGH
	J Water use	VERY HIGH	HIGH	VERY HIGH	

VERY HIGH HIGH MODERATE LOW VERY LOW

Evaluate Comprehensive Analysis & TCC Uniqueness

In 2023, TCC Biodiversity Group organized Nature-related Dependencies & Impacts Workshop to practically identify the dependencies and impacts from operations, along with TNFD Sector Guidance and ENCORE, to illustrate the uniqueness of each operation site.

MINES

ECOSYSTEM SERVICES
- Biomass provisioning
- Global climate regulation
- Storm mitigation
- Natural Disaster protection (strong earthquake, landslide, tsunami, etc.)
- Water supply
- Soil formation & maintenance
- Soil quality regulation
- Water flow regulation | Flood mitigation
- Habitat maintenance
- Visual amenity services
- Education, scientific and research services

ENVIRONMENTAL ASSETS
- Use of biological resources (biofuels)
- Renewable resources
- Atmosphere
- Water resources
- Mineral & underwater mineral
- Terrestrial ecosystems
- Subterranean ecosystems
- Freshwater ecosystems

DEPENDENCIES

Energy
- Oil
- Electricity

Resources
- Water resources
- Minerals

Site stability

Access road clear

IMPACTS (IMPACT DRIVERS)	DRIVERS OF NATURE CHANGE
M GHG emissions	↑ Climate change
H Invasive alien species	↑ Invasive alien species
H Freshwater ecosystem use	
H Terrestrial ecosystem use	↑ Land use change
H Disturbances	
M Non-GHG air pollutants	
L Soil pollutants	
L Solid waste	
M Water pollutants	↑ Pollution
L Other resource use (biological and non-biological)	
M Water use	↑ Resource use/replenishment

Levels HIGH MODERATE LOW

Mines Depend on Environmental Assets, Focusing on Invasive Alien Species and Terrestrial-Marine Disturbances

TCC depends on the ecosystem services provided by the water flow and soil maintenance in the mines. It also highly relies on limestone minerals and energy. The large area of forest within the mines can provide natural disaster protection, such as climate regulation, storm mitigation, and landslide reduction, and serve the functions of water and soil conservation and maintenance of habitats for local species. TCC emphasizes ecosystem services and environmental assets' value. In addition to a strict compliance with EIA, TCC has introduced advanced eco-friendly vertical shaft transport system to avoid pollution and damage, continues to carry out restoration works, prevents invasive species, and reduces light pollution and noise in the mines to reduce the impacts on the mines.

TCC Uniqueness - Education, Scientific and Research Services

Since TCC established Open Eco-factory in 2020, it has been organizing eco-tours at mines to promote industrial-environmental harmony to the public (including local communities and various organizations). The mines are moderately dependent on ecosystem services related to education, scientific and research services.

CEMENT PLANTS

ECOSYSTEM SERVICES
- Biomass provisioning
- Global climate regulation
- Local climate regulation
- Natural Disaster protection (strong earthquake,landslide, tsunami, etc.)
- Water supply
- Soil quality regulation
- Water flow regulation
- Flood mitigation
- Air filtration
- Habitat maintenance
- Noise attenuation

ENVIRONMENTAL ASSETS
- Use of biological resources (biofuels)
- Renewable resources
- Energy resources
- Atmosphere
- Water resources
- Mineral & underwater mineral
- Terrestrial ecosystems

DEPENDENCIES

Energy
- Coal
- Alternative fuel
- Oil
- Electricity

Resources
- Water resources
- Minerals

Site stability

Access road clear

IMPACTS (IMPACT DRIVERS)	DRIVERS OF NATURE CHANGE
H GHG emissions	↑ Climate change
L Invasive alien species	↑ Invasive alien species
L Ocean ecosystem use	
L Freshwater ecosystem use	
H Terrestrial ecosystem use	↑ Land use change
M Disturbances (visual & noise)	
H Non-GHG air pollutants	
L Soil pollutants	
L Solid waste	
M Water pollutants	↑ Pollution
H Other resource use (biological and non-biological)	
M Water use	↑ Resource use/replenishment

Levels HIGH MODERATE LOW

Cement Raw Materials are Minerals, with a Focus on GHG and Air Pollution

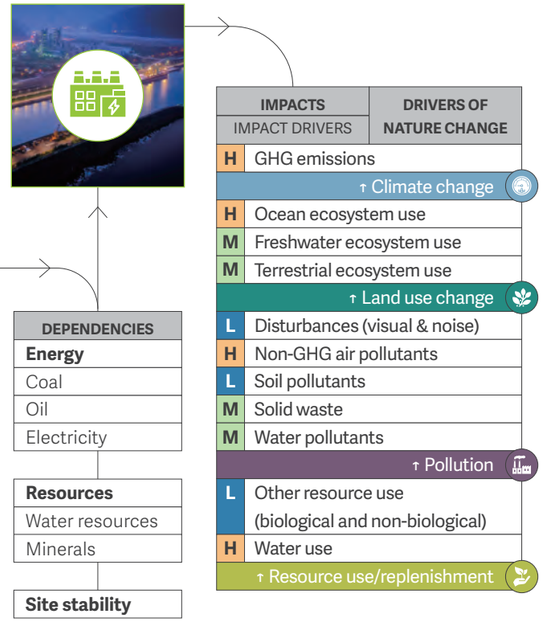
TCC plants depend on natural resources, including water, limestone, and energy resources, and rely on ecosystem services such as air filtration and water supply. The cement manufacturing process requires a large amount of energy to raise the kiln temperature to over 1,300°C. The calcination of limestone releases CO_2, leading to air pollutants and wastewater issues, and directly impacts the climate..

TCC continues to expand the use of alternative raw materials and fuels, install power generation by waste heat recovery, and develop carbon capture technology to reduce the use of natural resources and CO_2 emissions. Meanwhile, the membrane bioreactor (MBR) system is introduced to avoid sewage discharge.

TCC Unique – Bioresources

TCC collaborates with local governments to address the alien species White Popinac, reducing the risk of recurrence. The high-temperature co-processing technology of cement kiln is leveraged to convert it into bioenergy. Regarding renewable resources, the domestic waste in Hualien is treated through co-processing as refuse derived fuel (RDF).

POWER PLANT



The Power Plant Depends on Water for Regulation, Focusing on GHG and Water Resource

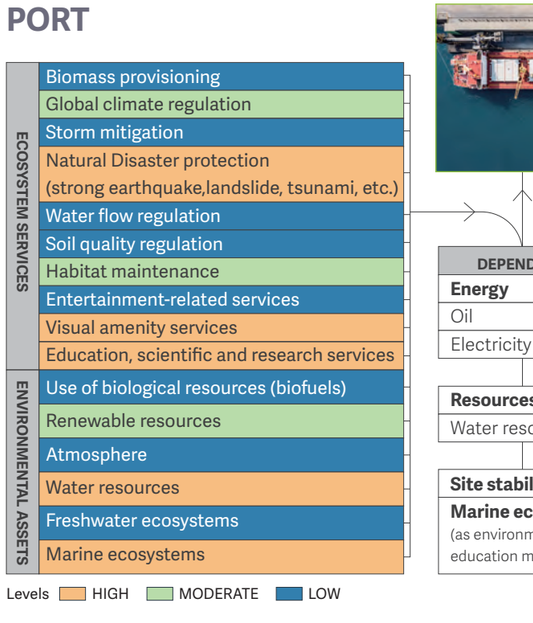
Hoping Power Plant depends on water and energy resources, relying air filtration to regulate greenhouse gas (GHG) emissions and air pollutants from the power generation process, and seawater to regulate generator temperature. The drivers of nature change brought by the Hoping Power Plant include GHG emissions and water use, leading to climate change and disrupting the balance of resource cycles.

In 2024, the Hoping Power Plant initiated a biomass feasibility study and installed renewable energy such as wind energy, solar energy, hydro energy, and ocean thermal energy conversion (OTEC) to reduce GHG emissions. Additionally, the Hoping Power Plant completed the air quality control system (AQCS) upgrade in 2022, reducing air pollution by 34% compared to 2016 levels, and fully installed rainwater harvesting systems to reduce its water withdrawal.

TCC Uniqueness – 3-in-1 Circular Economy Design of Port, Power Plant, and Cement Plant

TCC utilizes the limestone from Hoping Mine for desulfurization at Hoping Power Plant, reducing pollution and GHG emissions. Coal ash and desulfurized gypsum from Hoping Power Plant are converted into raw materials of cement, making it the world's only eco-friendly power plant without ash pond (landfill). The plant sits nearby a port, minimizing coal transport distance, and utilizes indoor coal storage, equipped with an enclosed conveyor system, to eliminate coal dust and water pollution.

PORT



The Port Depends on Marine Ecosystem, Focusing on Water Use and Pollution

The Hoping EcoPort depends on water resources and the marine ecosystem to facilitate ship navigation, cargo handling, and port facility operations. The marine ecosystem also provides essential ecosystem services, such as climate regulation and coastline protection. The Hoping EcoPort strives to avoid water pollution incidents in its operations and is committed to maintaining the ecology in the port and along the coastline, actively engaging in marine ecosystem restoration.

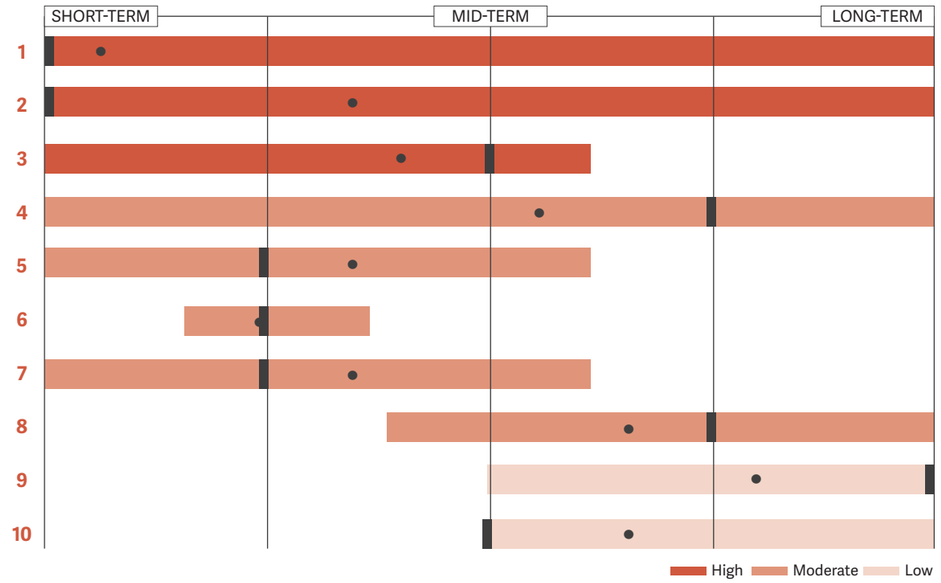
TCC Uniqueness – Education, Scientific and Research Services

In 2021, the port launched Coral Rehabilitation Project. To date, it has successfully restored 1,001 corals. Hoping EcoPort organized Eco-tours as well, offering environmental education to students and the public by environmental education professionals. The port serves as a crucial venue for coral restoration and environmental education, highly depending visual amenity services and education, scientific and research services.

1.3.3 _ Assess

TCC identified 10 nature-related risks and 12 nature-related opportunities, ranking in the order of likelihood. As the impacts of risks and opportunities are continuous, TCC presented them over a continuous timeframe. Based on the averages of the risks and opportunities assessed by the Biodiversity Group members, the metrics were classified as short-, mid-, or long-term risks or opportunities.

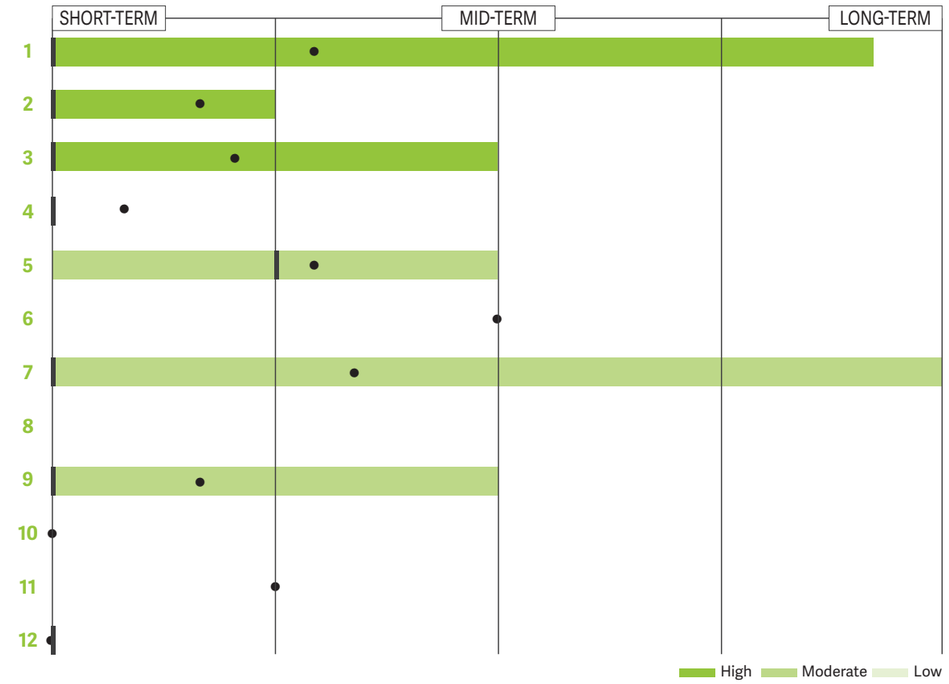
Risk Horizon



1 Required compliance with the Regulations for Consulting Indigenous Peoples or Tribes to Obtain Their Consent and Participation for the Company
2 Mineral extraction quantity restricted
3 Installation of environmental monitoring systems to ensure compliance with the EIA standards in the environment and water quality
4 Market value or brand value of the Company impacted due to nature-related negative news
5 Disturbances to nearby residents owing to business activities of mines or plants (disputes between fishermen and port/power plant)
6 Reduced visitors to the open factory and the port
7 Damage to habitats of flora and fauna, ecological environments, and indigenous communities caused by mining
8 Damage to the environment and equipment in mines and plants caused by typhoons and extreme weather events
9 Search and redevelopment of another mine if the mineral source is depleted
10 Increased costs from adopting more alternative materials

Short-term: 0-3 years; mid-term: 3-5 years; long-term: over 5 years

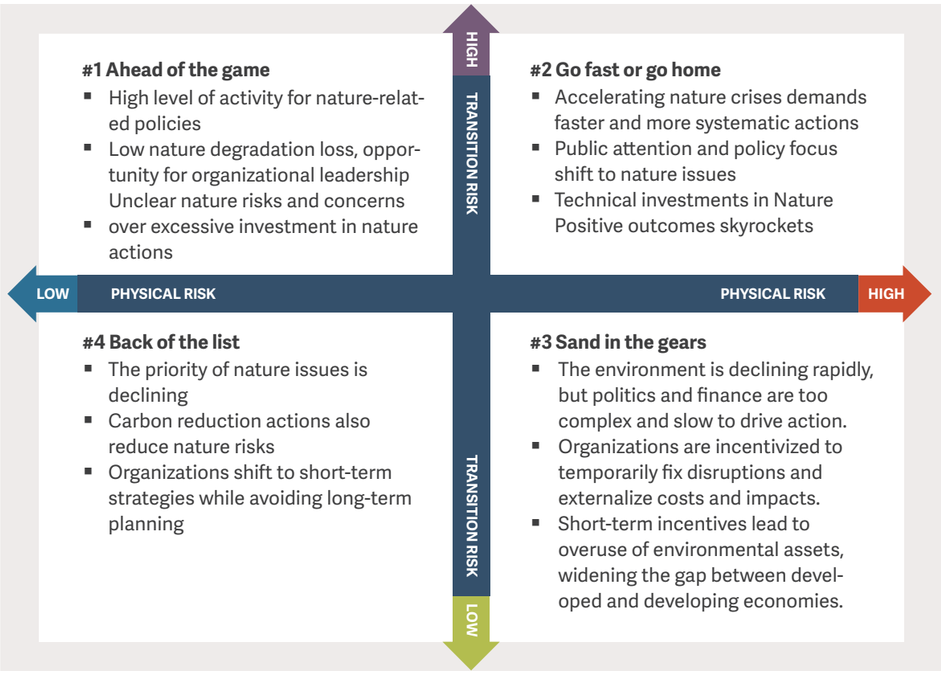
Opportunity Horizon



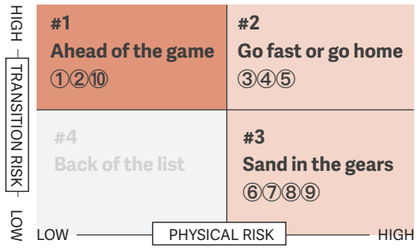
1 Development of new alternative raw materials to reduce mineral demand and equipment energy consumption
2 Restoration of indigenous plant species in mines, increasing the number of indigenous species planted
3 Collaboration with KBCC and universities on restoration projects
4 Increasing the reuse and recycling of natural resources through recycling mechanisms
5 Execution of the Ho-Ping Ark Ecological Program and Soil and Forest Carbon Sink Projects
6 Natural environmental protection and Nature-based Solutions (NbS) to achieve Nature Positive
7 Monitoring the natural environment at operation sites using new technologies, reducing manpower burden and promoting technology replication
8 Soil substrate improvement to increase the survival rate and growth rate of restoring plants
9 Use of renewable resources to establish infrastructure, e.g., solar power PV and microirrigation systems
10 Joining nature-related initiatives and obtaining nature-related certifications
11 Application for mines and port to be OECMs as ecological tourism and education zones
12 Low-carbon product development and eco-friendliness to access green funds, bonds, or loans

Aside from recognizing the significance of nature-related risks and opportunities, TCC also integrated the potential future changes in the natural environment, business, and regulatory landscape for a comprehensive assessment and consideration, identifying the most likely risks and opportunities in each scenario.

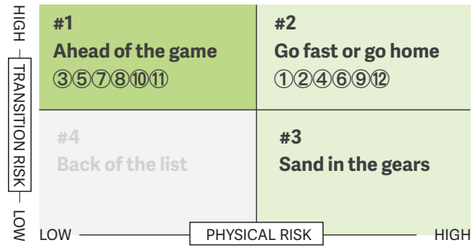
Utilizing the four scenarios in the official TNFD Recommendations, with physical risks (ecosystem services) and transition risks (market forces) as two major variables, TCC delineates four scenarios: Ahead of The Game, Go Fast or Go Home, Sand in The Gears, and Back of The List.



TCC Scenarios and Corresponding Risks



TCC Scenarios and Corresponding Opportunities



After discussion among Biodiversity Group members, it is determined that TCC is in the "Ahead of the game" scenario and may face "Go fast or go home" and "Sand in the gears" scenarios in the future. Based on the results, the potential risks and opportunities that may arise in the current business are examined, and the likelihood of occurrence and the level of potential impact are assessed.

1.3.4 _ Prepare

Response Strategies for the Risks and Opportunities

After identifying nature-related risks and opportunities, TCC coordinated related departments to jointly discuss and develop corresponding response strategies.

Nature-related Risks

Type	Risk	Potential Impacts	Response Strategies
Transition Policy and Legal	Required Compliance with Regulations for Consulting Indigenous Peoples or Tribes to Obtain Their Consent and Participation	▪ **Mining operations disruption** The inability to mine limestone could disrupt TCC production and impact revenue. ▪ **Impact on contractors and employees** Operation disruption will impact the livelihoods of contractors and employees.	▪ **Local employment for co-prosperity** Employ local residents and organize events with local features to raise residents' sense of identity. ▪ **Ongoing communication with local communities and tribes** Engage with local communities via communication and interaction to explain the mitigation and restoration efforts during operation, and continues to support tribes with resources and assistance for their development.
	Mineral Extraction Quantity Restricted	▪ **Business impact from material supply disruption** A restricted extraction quantity may lead to material supply disruptions and impact local supply chains.	▪ **New material sources development** Keep using alternative materials and minimize the use of virgin minerals.
Transition Technology	Installation of Environmental Monitoring Systems to Ensure Compliance with The EIA Standards in The Environment and Water Quality	▪ **Environmental impact reduction required for transformation** The installation of environmental monitoring systems may affect natural ecology and require more resources to avoid environment impact. ▪ **Increased operating costs** The installation of monitoring systems drives operating and labor costs.	▪ **Investment in water treatment equipment** Upgrade water treatment equipment at operation sites to lower environmental impact and ensure compliance of the treated water quality with regulatory requirements

Type	Risk	Potential Impacts	Response Strategies
Transition Reputational	Market Value or Brand Value of The Company Impacted Due to Nature-related Negative News	▪ **Impact on brand image** Negative news may reduce investor confidence. If negative public opinion continues to evolve, it may lead to market boycotts. ▪ **Client cooperation ceased** Nature-related negative news may result in client cooperation reduced or ceased. ▪ **Investment plans hindered** Investors may divest due to negative news.	▪ **Communication with competent authorities** Keep tabs on regulatory amendments and participates in feedback to avoid violations. ▪ **Better product information labeling** Ensure all products comply with regulations and are eco-friendly to boost investor and consumer confidence. ▪ **Improvement of environmental quality** Keep strengthening environmental management in mines and strengthen partnerships with government, industry, and academic experts.
Transition Market	Disturbances to Nearby Residents Owing to Business Activities of Mines or Plants	▪ **Impact on stakeholder rights/interests** Protests at a site can cause hindered investment or operational difficulties.	▪ **Mitigation measures for local residents** Keep providing local residents with employment counseling and backup sites to avoid conflicts. ▪ **Rail and road transportation** Consider alternative means of transportation.
Physical	Reduced visitors to the open factory and the port	▪ **Impact on stakeholder rights/interests** A drop in port visitors for tours or environmental education will reduce local residents' income.	▪ **Support to local residents** Assist local residents in organizing traditional activities to ensure their economic well-being and promote their culture. ▪ **Organizing Nature-related activities** Organize more nature-related activities to enhance the attractiveness of the factory and the port for recreation.
Physical	Damage to Habitats of Flora and Fauna, Ecological Environments, and Indigenous Communities Caused by Mining	▪ **Ecological environment damage** Mining may lead to animals migrating to other habitats. ▪ **Invasive alien species** Alien species, such as White Popinac, threaten indigenous plants and result in a monotonous forest form, leading to ecological imbalance.	▪ **Mine restoration projects** Conduct ecological survey and assessment before mining, collect seedlings, and immediately restore the area after mining. ▪ **Alien species removal** Collaborate with the public sector and local groups to remove alien species and promote forest restoration.
	Damage to The Environment and Equipment in Mines and Plants Caused by Typhoons and Extreme Weather Events	▪ **Significant increase in production costs** Extreme weather events can lead to rising raw material costs or increased investment in disaster prevention. ▪ **Operational disruptions** Extreme weather events can damage plant buildings, machinery, power facilities, and communication systems, or cause transportation disruptions.	▪ **Inventory allocation management** Based on weather forecasts, establish safe raw material and product inventories before typhoons to meet shipping or manufacturing needs. ▪ **Implementation of decarbonization strategies** Reduce GHG emissions via equipment improvements, process optimization, and the use of alternative raw materials/fuels to mitigate climate change and global warming. ▪ **Microirrigation system, windbreak, and detention pond installation** Install microirrigation systems, rainwater harvesting, and shaft water reclamation to cope with climate change. Set up windbreaks to mitigate damage to plants by strong winds. Build detention ponds to tackle heavy rainfall. ▪ **Use of drones for disaster relief** Engage in drone procurement and pilot training to speed up rescue and equipment repair.

Type	Risk	Potential Impacts	Response Strategies
Physical	Search and Redevelopment of Another Mine if The Mineral Source is Depleted	▪ **Significant increase in production costs** Depletion of mineral sources will lead to production disruption and increased costs. ▪ **Impact on the ecological environment** Developing a new mine will render environmental impact and require additional investments. ▪ **Impact on the rights /interests of local stakeholders** Developing new mines will cause local noise and air pollution.	▪ **Joint mining** Adopt a joint mining model to reduce the volume of residual walls. ▪ **Product formula adjustment** Optimize the cement product formula to reduce the demand for clinker, thereby reducing the use of limestone and extending mine lifespan.
Transition Market	Increased Costs from Adopting More Alternative Materials	▪ **Increased product prices** Product prices rise due to increased costs. ▪ **Need to find new supply partners** Adopting alternative materials by new suppliers will increase operational and labor costs.	▪ **Ongoing development of new material sources** Develop new material sources to reduce reliance on a single type of material source. ▪ **Strengthening product R&D and equipment retrofit** Develop and test product quality to ensure product strength and safety. ▪ **Promotion of low-carbon products** Promotes low-carbon and environmental benefits, encouraging clients to consider not only price but also carbon reduction together with TCC.

Nature-related Opportunities

Type	Opportunity	Potential Impacts	Response Strategies
Resource Efficiency	Development of New Alternative Raw Materials to Reduce Mineral Demand and Equipment Energy Consumption	▪ **Extended use of natural resources** Diversify raw material sources and extend the lifespan and use of natural resources of mines. ▪ **Reduced environmental impact** Lower mineral and coal demand.	▪ **Replacing limestone and clinker with alternative raw materials** Recycle waste materials and reduce the demand for natural resources. ▪ **Testing new alternative raw materials** Invest in equipment and talent to maintain product safety through testing, despite potential quality impacts from low-carbon alternative raw materials. ▪ **Ongoing development of new raw material sources** Research new raw material sources to reduce the demand for natural raw materials. ▪ **Feasibility study of alternative fuels, wood pellets, biomass gasifiers, etc.** Study different ways to use alternative fuels, such as adding gasifiers to generate synthetic gas for energy. ▪ **Promotion of low-carbon products** Promote clients to use low-carbon products made from alternative raw materials.
Ecosystem protection, restoration and regeneration	Restoration of Indigenous Plant Species in Mines, Increasing The Number of Indigenous Species Planted	▪ **Restoration to optimal or original ecosystems** Restore ecosystem services in mines and increase biodiversity. ▪ **Gain of stakeholder recognition** Enhance the value of local eco-tourism and the corporate image and promote stakeholder recognition.	▪ **Nature-based restoration strategies** Engage in restoration right after mining, restore the original ecology, plant indigenous species, and promote natural succession. ▪ **Collaboration with external stakeholders for conservation and restoration** Collaborate with governments, academia, and NGOs on restoration, ecological surveys, and research projects. ▪ **Revitalization of operation sites** Add hiking trails in the Shoushan Land; design constructed wetlands at the Hoping EcoPort, revitalizing site spaces to gain natural benefits.

Type	Opportunity	Potential Impacts	Response Strategies
Sustainable use of natural resources	Increasing The Reuse and Recycling of Natural Resources Through Recycling Mechanisms	▪ **Reduced dependencies on natural resources** Reduce the use of raw resources to lower dependencies on nature and impacts on ecosystem. ▪ **Diversified material sources** Transit to a circular economy model, recycle industrial waste, and strengthen resource use efficiency.	▪ **Use of recycled materials and reclaimed water** Implement water reclamation and construction waste treatment systems to lower water usage and recycle waste, boosting income via waste disposal. ▪ **Fly ash as alternative raw material for cement** Supply Hoping Power Plant's fly ash to the cement plant as an alternative raw material, reducing the use of natural resources and avoid preventing ash ponds that harm marine ecology.
Ecosystem protection, restoration and regeneration	Monitoring The Natural Environment at Operation Sites Using New Technologies, Reducing Manpower Burden and Promoting Technology Replication	▪ **Enhanced monitoring efficiency** New monitoring technologies can increase the number and accuracy of monitoring items while reducing costs. ▪ **In-depth understanding of the natural environment** Utilize new technologies to capture anomalies in real-time and carry out response measures promptly. ▪ **Improved stakeholder relationships** Advanced monitoring technologies aims to reduce and address pollution incidents.	▪ **Restoration experience replication and expansion** Replicate the restoration experience to assist peers in mine restoration and promote exchanges. ▪ **Expansion in the monitoring items at the port** Hoping EcoPort plans to implement a 3-5-year monitoring item expansion project and enforce more conservation measures.
	Collaboration with KBCC and Universities on Restoration Projects	▪ Partnerships to promote habitat restoration Work with academic institutions and environmental groups to accelerate restoration	▪ **Collaboration with multiple parties** Consult and collaborate with KBCC, professors, Eco-Angel Environment Conservation Association, and Taiwan Forestry Research Institute experts.
Sustainable use of natural resources	Execution of the Ho-Ping Ark Ecological Program and Soil and Forest Carbon Sink Projects	▪ **Nature positive impact** Invest resources in research and restore the health of soil and forest ecosystems. ▪ **Obtain carbon credits** Increase carbon removal at operation sites and apply for project-based carbon credits, restoring ecosystems while reducing GHG emissions.	▪ **Implementation of soil and forest carbon sink projects** Investigate carbon sink data of operation sites, increase soil and forest carbon sinks, and restore biodiversity.
	Natural Environmental Protection and Nature-based Solutions (NbS) to Achieve Nature Positive	▪ **Adoption of NbS** Integrate sustainable resource use and climate change mitigation methods in the manufacturing process to achieve Nature Positive.	▪ **Co-processing to handle invasive White Popinac** Handling White Popinac by co-processing in high temperatures cement kilns removes alien species and substitutes coal, aiding in climate change mitigation. ▪ **Restoration with indigenous species** Uphold the principle of restoring while mining, adopt indigenous species locally, and continuously expand restoration areas.
Ecosystem protection, restoration and regeneration	Use of Renewable Resources to Establish Infrastructure, e.g., Solar Power PV and Microirrigation systems	▪ **Installation of infrastructure that benefits nature** Reduce carbon emissions in products, decrease reliance on purchased electricity, and enhance resilience to power crises. ▪ **Improved restoration effectiveness** Restoration facilities assist restoration efforts and increase effectiveness.	▪ **Installation of renewable energy generation and storage equipment** Install solar PV systems and energy storage cabinets at the operation sites and implement diverse renewable energy generation strategies. ▪ **Establishment of solar-powered microirrigation systems** Green power combined with microirrigation systems reduces manpower demands, increases irrigation efficiency, and minimizes resource waste.

Type	Opportunity	Potential Impacts	Response Strategies
Capital flow and financing	Application for Mines and Port to Be OECMs as Ecological Tourism and Education Zones	▪ **Elevated corporate image** Adopt proactive measures to protect ecosystems and increase brand value. ▪ **Enhanced value of ecological education and tourism** Promote environmental education and tourism and increase job opportunities for local communities. ▪ **Increased willingness and interests of multiple stakeholders** (1)Environmental groups: Collaboration opportunities for OECMs (2)Suppliers and partners: Collaboration promotion as a model (3)The public sector: Joint investment of resources to conserve marine ecosystems (4)Local residents: Increase in educational resources	▪ **Mines with indigenous species restoration established as OECMs** Engage in restoration efforts towards mines of indigenous species as OECMs, achieving the 30 by 30 goal and restore ecosystem. ▪ **Establishing tourism and educational parks** Promote OECMs and establish educational parks, such as providing local communities with job and tourism opportunities, exchanging practices with governments or academic institutions, and securing government funding or subsidies. ▪ **Promoting eco-friendly loading /unloading signs** Plan to promote eco-friendly loading/unloading practices at Hoping EcoPort over the next 1-3 years, highlighting how each transaction at Hoping Port aids in coral restoration. ▪ **Establishing a marine education platform** Plan to establish a marine education platform for OECMs in Taiwan, gathering marine education resources. ▪ **The plan for guided tours to the history and culture of mines** Combine the development history of TCC mines, the in-situ preserved production facilities, and historical buildings for cultural tours.
	Low-carbon Product Development and Eco-friendliness to Access Green Funds, Bonds, or Loans	▪ **Access to capital infusion** Secure funding for nature conservation through green and sustainable financing from banks and international capital markets. ▪ **Collaboration with the value chain** Help downstream clients reduce carbon footprint by selling low-carbon products.	▪ **Development of lower-carbon products** Develop low-carbon cement products using alternative raw materials/fuels to reduce carbon footprint. ▪ **Access to green funding** Plan sustainable finance to secure green credit lines and green ECBs. The green credit lines of NT$95.7 billion and green ECBs of NT$13.5 billion have been secured.
Sustainable use of natural resources	Joining Nature-related Initiatives and Obtaining Nature-related Certifications	▪ **Ongoing monitoring the latest nature conservation trends** Track international trends and optimize biodiversity management practices. ▪ **Offering positive impact on the value chain** Communicate the latest nature-related initiatives with value chain partners and contribute to Nature Positive.	▪ **Extending influence to enhance the positive impact of the value chain on nature** Extend nature issues to the value chain, exerting its influence to broaden the attention of all sectors to nature issues.
Ecosystem protection, restoration and regeneration	Soil Substrate Improvement	▪ **Restoration promotion** Improved healthy soil can promote plant growth and enhance restoration effectiveness. ▪ **Increased carbon sink** Healthy soil can establish a decent ecosystem, increase the proportion of organic matters and carbon sinks in soil.	▪ **Use of organic fertilizers for soil improvement** Retain soil during mining and backfills the restoration area, using organic fertilizers to improve soil properties.

Applying the Methodology for the Net Impact Assessment of Biodiversity in the Cement Sector
Aim for Net Positive Impact by 2040

The Hoping Mine initiated a long-term restoration project in 2016. To assess the restoration progress, TCC referred to the GCCA Sustainability Guidelines for Quarry Rehabilitation and Biodiversity Management and employed the Methodology for the Net Impact Assessment of Biodiversity in the Cement Sector (NIA) released by the World Business Council for Sustainable Development (WBCSD) to analyze the changes in biodiversity index curves since mining began in, and predict the trends of, the Hoping Mine.

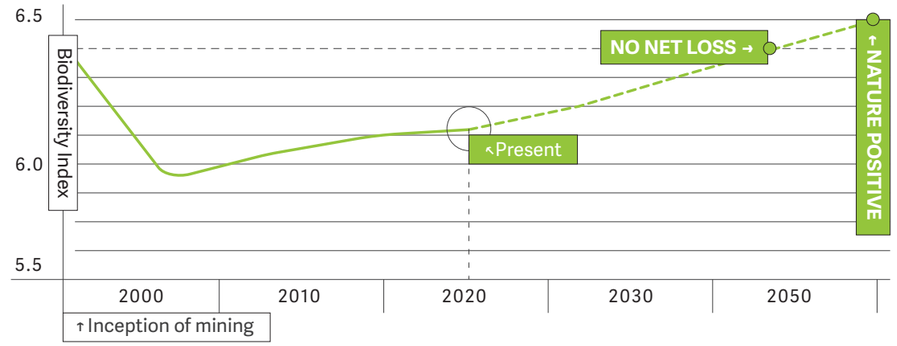
STEP 1
Use GIS software to interpret aerial photographs since the start of mining and classify the area of a mine into different types of habitats such as high-, medium-, and low-density forests, rocky habitats, extraction areas, restoration areas, farmland, and buildings.

STEP 2
Utilize EIA reports and ecological monitoring reports to assess the importance of habitats in mine, from both perspectives of location and species. If the habitat is located in a protected area or contains endangered and rare flora or fauna, the habitat importance is rated higher.

STEP 3
Assess the habitat condition using EIA reports and ecological monitoring reports, in terms of 4 main aspects: maturity and structure, likely species diversity, invasive species, and degree of threats.

- Maturity and structure: Assess the stability, complexity, and diversity of the habitat.
- Likely species diversity: Compare and assess the biodiversity of the habitat with similar surrounding environments.
- Invasive species: Assess the proportion and number of invasive species in the habitat.
- Degree of threats: Assess the level of disturbances in the habitat.

STEP 4
After calculating the biodiversity index for each type of habitat in terms of area, importance, and condition, a weighted average is calculated and summed to obtain the overall biodiversity index for the mine.



Note: The biodiversity is calculated as: ∑(habitat area × habitat importance × habitat condition) ÷ mine area

After starting mining at the Hoping Mine, biodiversity decreased due to mining activities. TCC began restoration in 2016, reintroducing native species and focusing on pollution control and soil and water conservation. TCC has continuously monitored the environment and ecology since mining began. Results show increasing biodiversity at the mine. Based on current data and trends, TCC continues to increase the area of restoration and forests, improving habitat conditions, aiming to achieve No Net Loss (NNL) by 2040, Net Positive Impact (NPI) thereafter.

TCC plans to successively and comprehensively introduce NIA for the operation sites across Taiwan and Mainland China to assess, track, and monitor the changes of biodiversity index in mines in a scientific and quantitative manner, while continuously reflecting on and improving the execution of restoration works.

The SBTN AR3T Action Framework

Transform

Transform the Shoushan Plant into detention basins
TCC collaborated with the Kaohsiung City Government to establish flood control facilities like detention basins, open channels, and pumping stations at the old Shoushan Plant, transforming it into a flood detention park. Additionally, hiking boardwalks were constructed to provide an ecological recreational space for citizens.

Scholarships, disadvantaged grants, and the Cement Academy
TCC values the co-prosperity with stakeholders, providing local communities with scholarships, student transportation subsidies, and emergency relief funds. TCC also cares for students' sustainable education through the Cement Academy and the Carbon Reduction Parent-Child Bankbook.(RCA).

A Circular Economy with Waste Management
TCC actively practices waste recycling. Apart from assisting in the disposal of industrial and household waste, TCC also develops means to converting waste concrete into recycled concrete aggregates (RCA).

Regenerate Restore

Indigenous plant restoration
Hoping mine collaborates with KBCC for restoration on the principle of selecting species fit for the area and reduce human disturbances and encourage natural succession.

Nesting box installation
TCC installs nesting boxes varied in size for bird reproduction and restoration.

Soil regeneration and carbon sinks
TCC uses natural organic fertilizers in the restoration areas to improve the physical and chemical properties of soils for regeneration and to increase carbon sinks, thereby promoting plant growth in mines.

Reduce

Wastewater treatment facilities
Wastewater from plants is treated to meet standards before being discharged, reducing water pollution.

Invasive species removal
TCC endeavors to work with the public sector and relevant parties to remove White Popinac and mitigate the threats of alien species to original habitats.

Slope Protection
Slope protection and windbreak nets are set up at Taibaishan Mine to mitigate soil erosion and the impact of strong winds.

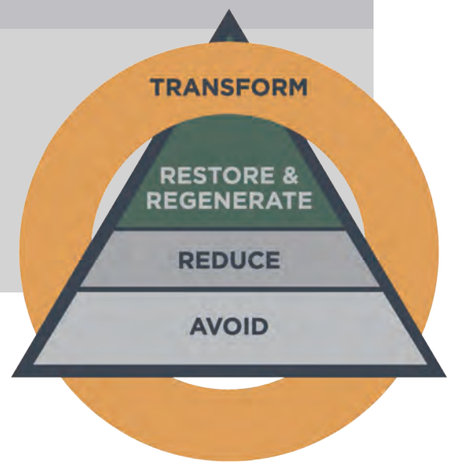
Light and noise pollution reduction
An automatic switch system at the Hoping Mine adjusts streetlights based on sunrise, and lights in the manufacturing area are centrally controlled based on need to minimize light pollution.
Plant equipment such as blowers and exhaust fans have silencers, and green belts and embankments near main roads are used to lessen noise transmission.

Vertical shaft transport
A vertical shaft transport system is installed at the Hoping Mine to cut emissions and reduce air pollution, fugitive dust, and disturbances caused by truck transportation.

Avoid

Use of reclaimed water
TCC actively installs water reclamation system and improves water use efficiency. Hoping Mine has set up a vertical shaft tunnel rainwater reclamation system. Hoping Plant has initiate water reclamation from branch lines and the MBR system to filter sewage. Taibaishan Mine has built rain harvesting ponds. Suao Plant reclaims effluents and wastewater from power generation by waste heat recovery.

100% EIA passed, with no mining in protected areas
Both Hoping Mine and Taibaishan Mine have passed EIA. TCC is committed to no mining within national protected areas and to the restoration and rehabilitation of the mine ecology to ensure a sustainable use of resources.



1.4 _ Stakeholders

The official TNFD Recommendations emphasizes that human society is an integral part of nature, and a company's positive/negative impacts on nature will also affect relevant stakeholders. Hence, assessing a company's impact on nature-related stakeholders is a crucial step towards the harmony between humans and nature.

TCC operates in Hualien and Taitung, closely connected to the tribes and heavily reliant on local talents. Referencing the TNFD Guidance on Engagement with Indigenous Peoples, Local Communities and Affected Stakeholders, TCC identified nature-related significant stakeholders in its business activities through a nature-related significant stakeholder workshop. The identification process for the nature-related significant stakeholders for TCC is as follows:

- List the nature-related stakeholders of TCC with reference to domestic and international nature-related trends, the TNFD framework, and TCC operation conditions;
- Identify important stakeholders in line with the three principles, Responsibility, Influence, and Diverse Perspectives, from the AA1000 Stakeholder Engagement Standards (SES);

Assessed Facet	Definition
Responsibility (TCC → Stakeholders)	The company currently, or in the future, may have responsibilities towards these stakeholders in the areas of natural environment conservation, prevention of biodiversity loss, and protection of habitat or living environment's rights/interests
Influence (Stakeholders → TCC)	Stakeholders who can have a nature-related impact or have decision-making power over the company
Diverse Perspectives (Stakeholders → TCC)	Different opinions from stakeholders give the company new insights into special conditions or introduce opportunities

- Select the top 2/3 of nature-related stakeholders as the nature-related significant stakeholders in terms of the relationship, importance, and level of impact of the nature-related stakeholders.

2023 Nature-related stakeholders for TCC

LEVEL OF RELATIONSHIP: HIGH / LOW

1. Government Agencies
2. Local Communities/Indigenous Peoples
3. Advocacy Organizations with Influence
4. Non-profit Organizations
5. Academic Institutions
6. Financial Institutions
7. Employees

High Correlation of Analysis Results and Operation, Meeting Stakeholder Expectations

The nature-related significant stakeholders consider that TCC risk analysis results are consistent with actual operating conditions. Most of the stakeholders believe that the risks identified are highly correlated with the operating activities, except for local communities/indigenous peoples, who consider that the correlation is low except for the Regulations for Consulting Indigenous Peoples or Tribes to Obtain Their Consent and Participation.

Category	Addition of environment monitoring system to ensure compliance with EIA standards	Mineral extraction quantity restricted	Required compliance with the Regulations for Consulting Indigenous Peoples or Tribes to Obtain Their Consent and Participation	Market value or brand of the Company impacted due to nature-related negative news	Disturbances to nearby residents owing to business activities of mines or plants
Government Agencies	M-H	M-H	M	M	M-H
Local Communities /Indigenous Peoples	L-M	L-M	M-H	L-M	L-M
Advocacy Organizations	H	M-H	H-VH	H-VH	H
Non-profit Organizations	H	H	H	M	M
Academic Institutions	H	M-H	M-H	M-H	M-H
Financial Institutions	M	M-H	M	M-H	M
Employees	M	M-H	M-H	M-H	M-H

Category	Development of new alternative raw materials to reduce mineral demand and equipment energy consumption	Collaboration with KBCC and universities on restoration projects	Restoration of indigenous plant species in mines, increasing the number of indigenous species planted	Increasing the reuse and recycling of natural resources through recycling mechanisms	Execution of the Ho-Ping Ark Ecological Program and Soil and Forest Carbon Sink Projects
Government Agencies	M-H	M-H	H	M-H	M-H
Local Communities /Indigenous Peoples	M-H	M-H	M-H	M-H	M-H
Advocacy Organizations	H-VH	VH	VH	H-VH	H
Non-profit Organizations	H	H	H	H	VH
Academic Institutions	H-VH	H-VH	H-VH	H-VH	H-VH
Financial Institutions	M	M	M	M	M-H
Employees	M-H	M-H	M-H	M-H	H

Note: VH: Very high; H: High; M: Moderate; L: Low; VL: Very low

Regarding nature-related opportunities, all nature-related significant stakeholders consider that the results identified by TCC have a highly correlation, suggesting that TCC takes into account the needs and perspectives of the stakeholders while identifying its own nature-related opportunities, which is highly aligned with future strategic directions in nature-related mitigation, adaptation, and protection.

Stakeholders recognized TCC's conservation efforts and suggested collaborating with the national park on OECMs, holding local activities, transparently disclosing species restoration, using a cloud system for timely updates, advancing "blue carbon" verification at Hoping EcoPort, and improving media collaboration.

TCC aims to create better communication with stakeholders, fostering mutual understanding and collaboration for sustainable ecological development.

TCC Stakeholder Feedback

1.5 Nature-related Financial Impact & Ecosystem Services Value

As part of nature, TCC considers mitigation and restoration of natural environment as one of its core business values. Aside from addressing the potential nature-related risks it may face, TCC proactively creates various nature-related opportunities that have positive impacts on nature. Also, through assessment and disclosures of the financial impacts from nature-related opportunities, TCC aims to provide its stakeholders, various industries, and society with a comprehensive understanding and evaluation of the actions and financial performance of TCC in relation to natural value creation.

The nature-related opportunities TCC has invested are categorized as follows:

ALTERNATIVE RAW MATERIALS	Reduce the dependencies and withdrawal of natural resources with cross-industrial circular economy of symbiosis, including the use of recycled materials to replace the natural raw material in cement—limestone—to raise the proportion of alternative raw materials.	
ALTERNATIVE FUELS	Reduce the use of fossil fuels and carbon emissions with cross-industrial circular economy of symbiosis, including the increase in the proportion of alternative fuels to reduce air pollution and carbon emissions.	Construct reclamation facilities for rainwater, process water, and wastewater, including construction of vertical shaft water reclamation, membrane bioreactor (MBR), and rainwater harvesting systems for water recycling.
ALTERNATIVE ENERGY	Reduce the use of grey energy and carbon emissions, including installation of solar and wind energy systems, active investment in the feasibility study of using renewable energy like geothermal energy, small hydropower and OTEC for power generation, and use of 100% power generation by waste heat recovery in the cement manufacturing process.	WATER RECLAMATION
NATURAL ECOSYSTEM CONSERVATION	Restore and conserve natural environments and species and invest in social and environmental education, including the monitoring and collaboration programs, the hydroseeding on the residual wall slope at the Taibaishan Mine, the restoration program of industrial-academic collaboration with the National Ilan University, Ho-Ping Ark Ecological Program, the coral rehabilitation project at Hoping EcoPort, the survey of the marine ecology nearby the Hoping Power Plant with the National Taiwan Ocean University, fund for KBCC since 2007, etc.	

TCC has chosen nature-related opportunities for financial assessment due to their long-term investment potential. By quantifying these efforts, TCC aims to showcase its performance in reducing natural raw materials, energy, and resources, while using alternative raw materials, fuels, energy, and water reclamation to create new opportunities and enhance competitiveness. Additionally, investments in ecosystem conservation not only fulfill environmental and social responsibilities but also have positive financial impacts.

Comprehensive Description of Nature-related Financial Performance

TCC is committed to the research, development, and application of nature-related opportunities, in which it has invested huge monetary and human capitals. The financial assessment was carried out with 5 nature-related opportunities, i.e., alternative raw materials, alternative fuels, alternative energy, water reclamation, and natural ecosystem conservation:

Nature-related revenue
over
NT$40.5 billion
accounting for 37%of total consolidated revenue

In 2023, a revenue of NT$39,279,069 thousand generated from low-carbon-related products, NT$496,301 thousand from renewable energy trading revenue, and NT$748,807 thousand from industrial waste and domestic waste services, totaled NT$40,524,177 thousand, accounting for 37% of the consolidated total revenue of NT$109,314,335 thousand.

Internal cost savings
over
NT$2.7 billion

This encompasses cost savings of approximately NT$2,791,036 thousand in raw material sourcing, electricity bills, and water bills through reduced use of limestone, coal, solar power generation for self-consumption, power generation by waste heat recovery, and increased use of reclaimed water.

Pro forma

TAIWAN Carbon Fee Cost
MAINLAND CHINA
Carbon Trading Revenue
over
NT$500 million

In Mainland China, the reduced carbon emissions from using alternative fuels is estimated to be converted into a carbon trading gain of NT$336,042 thousand; the reduced carbon emissions from using alternative energy is estimated to be converted into a carbon trading gain of NT$153,023 thousand; in Taiwan, the pro forma carbon fee cost savings from using alternative fuels and alternative energy reached NT$47,972 thousand, totaling a pro forma revenue of NT$537,037 thousand.

Ecosystem Positive Impact Value

Approx. NT$108 million worth of ESV of the Jinchang Quarry, Hoping Mine

The Hoping Plant of TCC worked with Associate Professor Chyi-Rong Chiou from the School of Forestry and Resource Conservation, NTU, in 2020 to perform an ecosystem services valuation for the Jinchang Quarry, including the carbon sink, water conservation, air purification, and supportive services, extending to prevention of soil and sand loss, biodiversity, and other items, in which the ecosystem services value (ESV) within Jinchang Quarry was estimated at NT$ 108,371,802.

2.2 million metric tons of carbon reduced internally/externally

The internal coal use reduction and power generation by waste heat recovery is equivalent to a reduction of 1.05 million metric tons of carbon emissions, while the adoption of alternative resources, circular economy practices, and renewable energy products and services have contributed to a reduction of 1.15 million metric tons of CO_2e.

Plant conservation for pro bono sharing to create priceless benefits

Plant DNA is provided free of charge for R&D, academic, and medical institutions, creating whole new values for human living and life. Take the brain injury drug patent of the NTHU for example. If the new drug is successfully developed, it could potentially benefit 4.45 million individuals, who seek medical treatment for neurological diseases annually, according to the latest data from the Ministry of Health and Welfare. Calculated in terms of the National Health Insurance costs, it could potentially reduce societal costs by NT$2.2 billion.

Summary of Natural-related Opportunities Financial Evaluation	
Evaluation Period	2023
Scope	TCC Group Holdings and its subsidiaries Group organization, Dr. Cecilia Koo Botanic Conservation Center
Unit	NT$ thousand

TCC shall continue to invest in natural conservation, restoration, and regeneration efforts, actively participate in organizations and projects dedicated to sustainable natural resources, as well as elevate human well-being and create ecosystem benefits and values.

Nature-related Opportunity	Costs and Expenditures	Cost Savings	Revenues	Positive Impacts on Ecosystem[1]
Alternative Raw Materials Reduce the dependencies and withdrawal of natural resources with cross-industrial circular economy of symbiosis	NT$2,021,922 thousand as the costs for the access of recycled raw materials	An estimated NT$38,769 thousand saved through the reduced use of natural resource of limestone	Operating revenue from low-carbon related products: NT$39,279,069 thousand **See CH7.7 in the 2023 Annual Report** Low-carbon products include: • Portland Type I cement and Portland Type II (MH) cement with carbon reduction labels and Low-carbon Recycled Materials certification by the Ministry of the Interior • Portland limestone cement; Portland limestone cement concrete • Cementitious materials with cement accounting for 50% or less in ratio • Low-carbon concrete with carbon reduction labels and green building material certification • Low-carbon cement with the low-carbon cement certification of Mainland China	• 223,226 metric tons of limestone usage saved • Approximately 1.09 million metric tons of avoided emissions delivered by low-carbon products **See P.17 in the 2023 Sustainability Report of TCC Group Holdings**

Nature-related Opportunity	Costs and Expenditures	Cost Savings		Revenues		Positive Impacts on Ecosystem[1]
Alternative Fuels Reduce the use of fossil fuels and carbon emissions with cross-industrial circular economy of symbiosis	NT$959,893 thousand as the expenditures for the access of alternative fuels	1,190,466 thousand in the coal procurement costs saved after reducing the usage of coal	Pro Forma Carbon Fee in Taiwan: An estimated NT$38,554 thousand of carbon fee costs saved [2]	NT$748,807 thousand in operating revenue, as the result of increased services of industrial waste and domestic waste services in 2023 ,	Pro Forma Potential Revenue from the Carbon Trading in Mainland China: An estimated gain of RMB 336,042 thousand in carbon trading converted from the reduced carbon emissions [3]	➧ Approximately 537.2 thousand metric tons of coal usage saved ➧ An estimated 650,635 tCO_2e reduced
Alternative Energy Reduce the use of grey energy and carbon emissions	➧ NT$11,539,175 thousand as the capital investment for the installation of alternative energy like renewable energy See CH7.7 in the 2023 Annual Report ➧ NT$27,226 thousand as the costs for marine energy and small hydropower ➧ NT$366,975 thousand for power generation by waste heat recovery	Electricity Bills: NT$1,560,313 thousand saved with the use of alternative energy, reducing the dependency on purchased electricity **See CH7.7 in the 2023 Annual Report**	Pro Forma Carbon Fee in Taiwan: An estimated NT$9,418 thousand of carbon fee costs saved [2]	NT$496,301 thousand of revenue from renewable energy trading **See CH7.7 in the 2023 Annual Report**	Pro Forma Potential Revenue from the Carbon Trading in Mainland China: An estimated gain of RMB 153,023 thousand as the revenue in carbon trading [3]	➧ 60,000 tCO_2e of avoided emissions with renewable energy installation **See P.17 in the 2023 Sustainability Report of TCC Group Holdings** ➧ An estimated 452,064 tCO_2e reduced with power generation by waste heat recovery
Water Reclamation Construct reclamation facilities for rainwater, process water, and wastewater	NT$50,162 thousand as the equipment costs to enhance resiliency and adaptability **See CH7.7 in the 2023 Annual Report**	NT$1,488 thousand of water bills saved as the result of water recycling to lower the expenses of using external water resources at TCC		--		➧ 72,392.31 megaliters of water reclaimed in total **See P.168 in the 2023 Sustainability Report of TCC Group Holdings**
Natural Ecosystem Conservation Restore and conserve natural environments and species and invest in social and environmental education	NT$169,941 thousand as the investment	--		A total of NT$428,276 thousand of revenue generated from TCC DAKA Open Eco-Factory, with partners, Market, and guided tour itineraries included, from 2020 to May 2024; a portion of the funds contributed by partners, along with the income from the DAKA Market and the guided tours, 100% invested in the Hualien Heping Elementary School Education Fund from 2020 to 2022; the Hoping Sustainability Charity Foundation, established in August 2022, for the purpose of emergency relief in Heping **Please see:** **https://www.tccgroupholdings.com/en/esgSocialEngagement.html**		➧ NT$550 thousand of emergency relief funds in total contributed by the Hoping Sustainability Charity Foundation to support 21 individuals of children and households encountering emergencies, domestic calamities, or livelihood difficulties in 2023 ➧ A cumulative total of 6,500 medicinal materials provided, and a gene bank of 62 plant families preserved, as of 2023, by KBCC **See P.113 in the 2023 Sustainability Report of TCC Group Holdings**
Subtotal	**NT$15,135,294 thousand**	**NT$2,791,036 thousand**	**NT$47,972 thousand pro forma**	**NT$40,524,177 thousand**	**NT$489,065 thousand pro forma**	

Note [1]: The positive impacts on ecosystem encompass beneficial impacts on ecosystems and humans, such as lowered withdrawal of natural resources, reduced CO_2 emissions, increased water recycling rate to reduce water withdrawal, and assistance to stakeholders.
Note [2]: The cost savings are calculated as the reduced carbon emissions with the use of alternative fuels at TCC in Taiwan × the carbon fee rate (estimated at NT$300 per metric ton)

Note [3]: The estimated revenue is calculated as the reduced carbon emissions with the use of alternative fuels in Mainland China × the closing price of the carbon trading market in Mainland China on 2023/12/29 (RMB 79.42 per metric ton), converted to NT$ at an exchange rate of 4.396.