
/ 2022
VITA FACTA NON VERBA
IN SERVICE FOR LIFE
TCC SUSTAINABILITY REPORT
TERRA | SOCIETAS | VITA


## COVER STORY

The totem of water flow and greenery intertwined

**— ANKH —**

is an Egyptian hieroglyphic symbol that represents “life.”

ANKH fused amidst all things on earth and flowing water, exhibiting the energy and pulse of life, as all life lives on in the natural circularity.

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The TCC Report this year is themed with “In Service of Life.” Extension and protection of life constitutes the ultimate goal of all existence.

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# In Service for Life

*Water wells in spring; clouds changes in summer; the moon lofts in autumn; mountains delight in winter.*
*Earth's beauty changes in seasons. Earth is the sole blue gem in the universe.*
*Filled with life as much as uncertainty, life is infinite and immense as well as vast and profound.*


***Life is a blessing and a gift from above. The enormous life on Earth gave birth to mankind. Yet, it is the human race that sabotages nature, along with numerous lives! All lives have challenges. The human life is even a challenge in need of solution incessantly. The human life is given a limited time, which shall not be squandered in vain! The meaning of life is mainly to create more possibilities and future for the life yet to come.***

***The life on Earth is the sum of all organisms, including all the flora, fauna, fungi, and microorganisms. The life on Earth is extremely diversified, estimated to be over 8.7 million taxa at minimum.***

***The life on Earth is supported by solar energy. Plants requires the light from the Sun for photosynthesis, thus producing the food and oxygen necessary for the survival of all other organisms. Upon death of flora or fauna, fungi and microorganisms recycle all matters.***

***All life is precious, for each and every life is unique and irreplaceable. All life has their values. However insignificant or trivial it may appear, each life has its purpose in nature.***

*Every life is mutually connected with other lives. Like quantum entanglement, it is beyond a clear explanation. All life is the most precious gift bestowed divinely upon Earth, which should be cherished and respected.*

*All life on Earth is interconnected. Species depend on one another for survival and a balance of the environment.*

*Nevertheless, ever since the Industrial Revolution, humans have been rapidly pumping greenhouse gases (GHGs) into Earth's atmosphere. The massive increase of GHGs led to global warming as well as extreme weather events, rising sea levels, and other impacts to our environment. These changes will have direct impacts to the civilians of humanity tomorrow. For instance, extreme weather events like flood, drought, and heat waves will result in issues such as food shortage, population displacement, and health. A rising sea level may lead to flooding along the coast and displacement of communities by coastlines. In addition, climate change can also bring about changes in the availability of water and other natural resources and possibly changes in disease spread. All these changes can have grave impacts to the human race and its ability to survive and thrive in the future.*

*The human activities on Earth are causing drastic changes in the environment, leading to habitat devastation and species extinction. It is not natural selection proposed by Darwin, nor survival of the fittest claimed by the economist Herbert Spencer. It is even no way near to the notion of the strong prey on the weak; nor is it selfishness or egoism. The opposite makes the truth about survival. In fact, mutual consideration, symbiosis, and altruism make the best path to true survival and development in nature.*

*The world economy in the future must be a circular economy. A circular economy is a social model, in which wastes are minimized, and resources are recycled or reclaimed, to create new products or services. It is defined as "a system that uses resources in the most effective and sustainable fashion via systematic elimination of wastes with all materials recycled or reused ultimately." Circular economy aims to minimize the environmental impacts of products and wastes and improve economy through reducing costs in waste collection and management and improve the natural ecology on Earth in the process.*

*TCC has been committed to reducing the carbon emissions from our cement and concrete products these years. TCC is also engaging in the energy transition efforts in the world to increase the energy efficiency in use and decrease the carbon emissions from energy. Meanwhile, TCC endeavors to support the society in waste treatment and reduction.*

*For energy transition, TCC has also invested in a new energy company listed in France, NHOA (Noah) in Europe. The name implies that the development of new energy shall give the human race a new horizon filled with hope (New Horizons Ahead).*

*Owing to the worldwide outbreak of COVID-19 in the last three years, along with the rocketing number of natural disasters in the world thanks to the accelerated climate change. In the first two months of 2023 in particular, unprecedented natural disasters emerged across the globe, inflicting harms to countless lives.*

*Hence, the theme for the work of the year for TCC is "In Service of Life." With that, TCC seeks to direct public attention more onto the balance of nature and the protection of the stable development of all life in the world.*

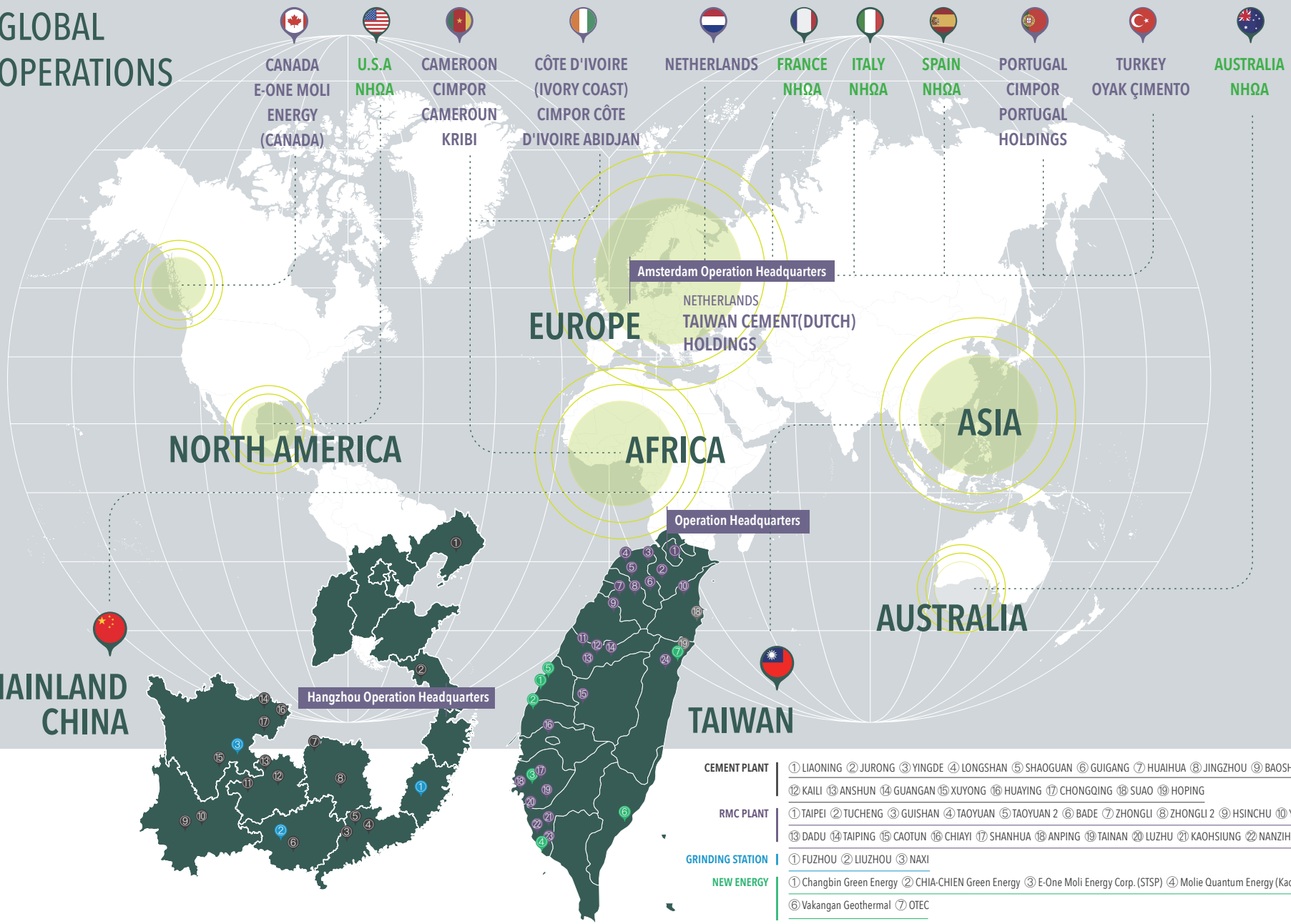
*In parallel with the improving environmental awareness of humanity and circular economy, there is still hope for life on Earth to create a nature, where they are protected and have a future.*

*Nature is borderless, the Sun voiceless, and the wind shadowless.*
*Creation is flowless, fragrance colorless, and life priceless.*
*Benevolence is speechless, love demand-less, and cement formless.*

*Zuo Ren*

*Nelson An-ping Chang*
*Chairman*
*TCC*

# GLOBAL OPERATIONS




## ELECTRICITY AND ENERGY

REVENUE RATIO

29%

## CONSTRUCTION MATERIALS & RESOURCE RECYCLING

REVENUE RATIO

68%

## OTHERS

REVENUE RATIO

3%

**CEMENT PLANT** ① LIAONING ② JURONG ③ YINGDE ④ LONGSHAN ⑤ SHAOGUAN ⑥ GUIGANG ⑦ HUAIHUA ⑧ JINGZHOU ⑨ BAOSHAN ⑩ ANNING ⑪ GANGAN ⑫ KAILI ⑬ ANSHUN ⑭ GUANGAN ⑮ XUYONG ⑯ HUAYING ⑰ CHONGQING ⑱ SUAO ⑲ HOPING

**RMC PLANT** ① TAIPEI ② TUCHENG ③ GUISHAN ④ TAOYUAN ⑤ TAOYUAN 2 ⑥ BADE ⑦ ZHONGLI ⑧ ZHONGLI 2 ⑨ HSINCHU ⑩ YILAN ⑪ TAICHUNG ⑫ SHENGANG ⑬ DADU ⑭ TAIPING ⑮ CAOTUN ⑯ CHIAYI ⑰ SHANHUA ⑱ ANPING ⑲ TAINAN ⑳ LUZHU ㉑ KAOHSIUNG ㉒ NANZIH ㉓ SIAOGANG ㉔ HUALIEN

**GRINDING STATION** ① FUZHOU ② LIUZHOU ③ NAXI

**NEW ENERGY** ① Changbin Green Energy ② CHIA-CHIEN Green Energy ③ E-One Moli Energy Corp. (STSP) ④ Molie Quantum Energy (Kaohsiung) ⑤ Changbin Energy Storage ⑥ Vakangan Geothermal ⑦ OTEC

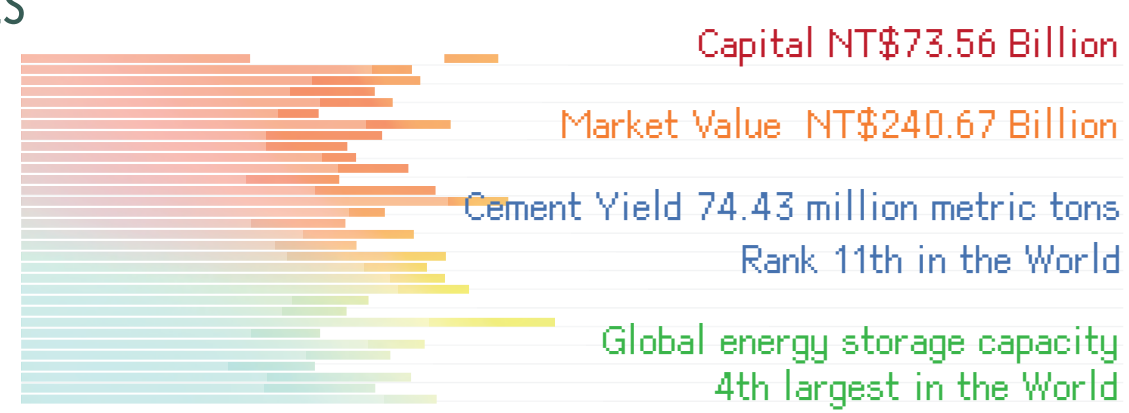
# 3 CORE BUSINESSES & 10 INDUSTRIAL SERVICES

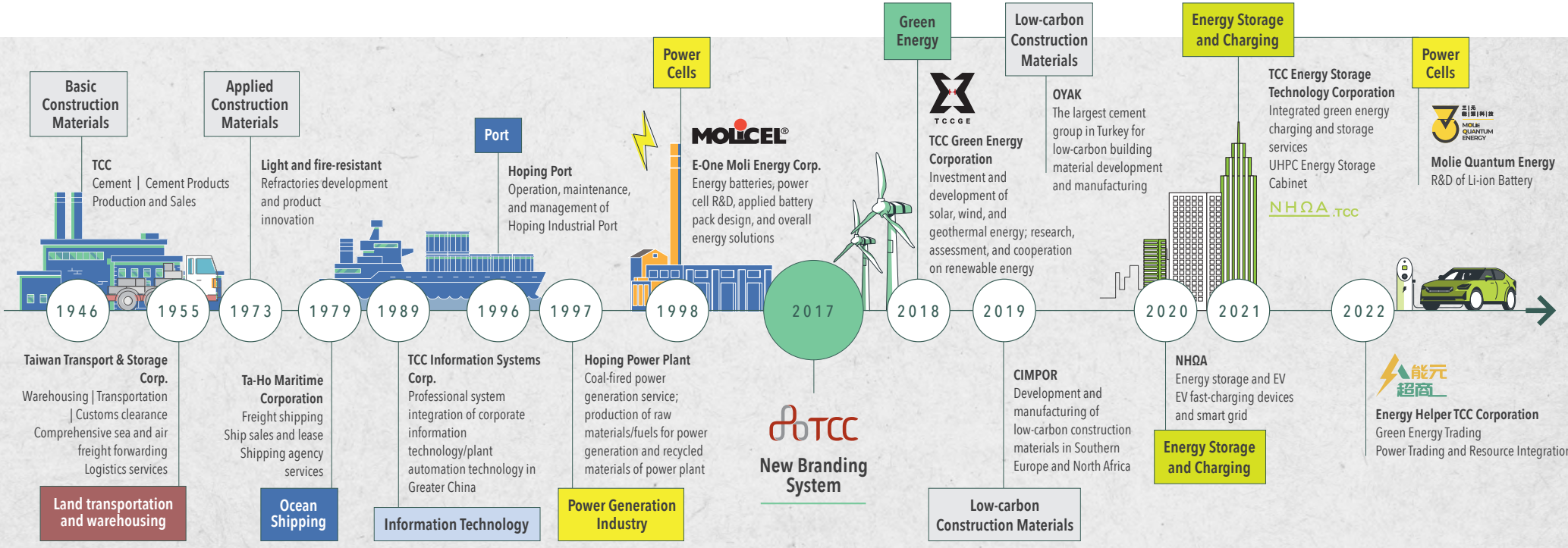
The state-run Taiwan Cement Corporation, TCC, was founded in 1946, officially privatized in 1954, and became the first listed company in Taiwan in 1962. In 1974, the Ten Major Construction Projects commenced. TCC, by expanding our services in line with concerned policies which enabled TCC to grow in sync with the industry and the society, takes pride in being a leading brand in Taiwan.

Mr. Nelson An-ping Chang assumed the office as the Chairman in 2017. TCC undertook a full-scale overhaul in 2018, transforming our characteristics from cement manufacturing and sales into green environmental engineering, dedicated to the handling of the complex relationship between human civilization and Nature. With the three development focuses, i.e.

**Low-carbon Construction Materials** — **Resource Recycling** — **Green Energy**

TCC strives to be an ECO-SOLUTION PROVIDER that actively addresses environmental issues and promotes the sustainability initiative EARTH HELPER.



*Despite the extreme weather events, wars, and pandemic ahead, we strive to construct the archetype for future development, which is embodied in each plan and blueprint through the unceasing actions of TCC."*

*~Nelson An-ping Chang, Chairman*

# Total Climate Commitment– Aiming for Net Zero by 2050

*"In Service of Life" is not morality, not a slogan, not an abstract awareness, but a high-level professionalism, which needs to be incorporated into the everyday work of an enterprise. We should not just passively or reluctantly engage in carbon reduction and sustainability efforts but making these actions into the stem cells of our enterprise following each pulse of our hearts for a natural integration of living, production, ecology, and life." ~Nelson An-ping Chang, Chairman*

March is supposed to be a season of spring warmth and blossoms. Yet, there was an endless heavy snow in March in California, USA, drought and wildfire impacting agriculture in southern Europe, as well as flood and heat waves that led to the demise of schools of fish in Australia. Our homeland, Taiwan, also suffered from centennial droughts in less than two years. The extreme weather events are becoming ever-intensive and drastic.

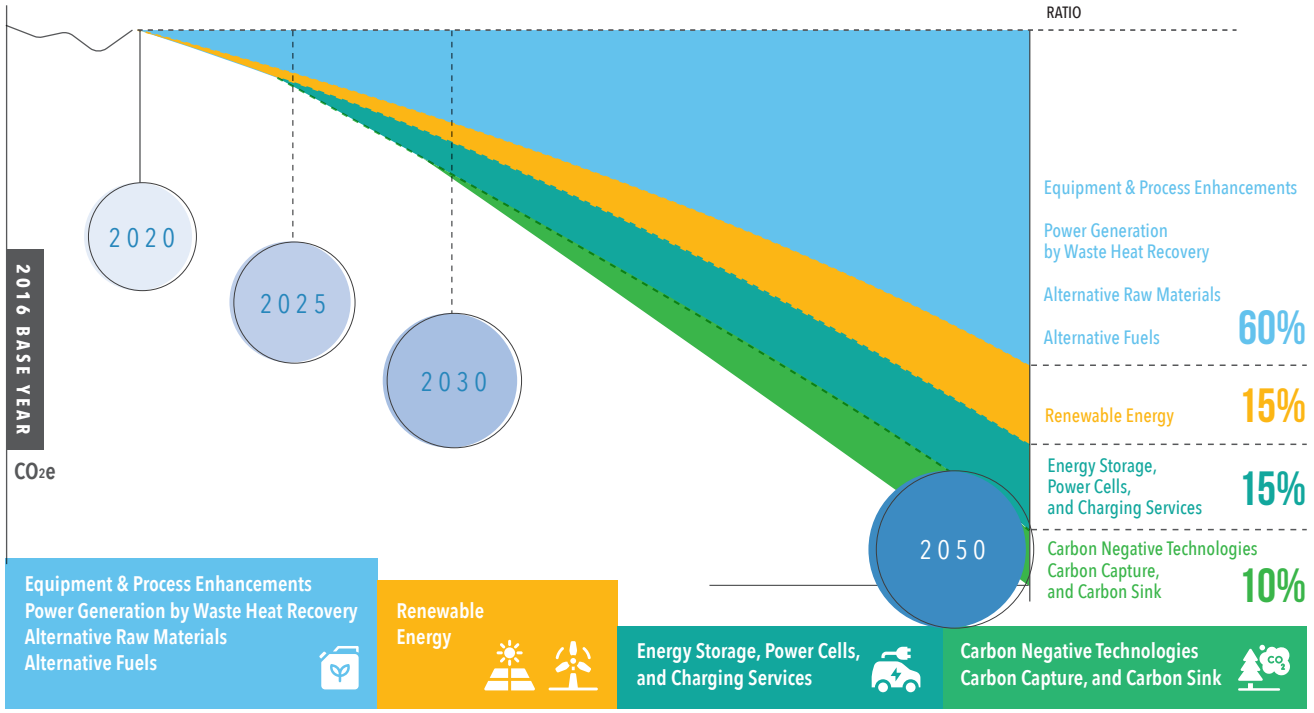
According to the latest climate assessment released by the Intergovernmental Panel on Climate Change (IPCC), we are reaching the tipping point of global warming by 1.5 degrees Celsius. The UN Secretary General António Guterres even warned that the "climate time bomb is ticking." In particular, the Generation Z born in the mid- and late 1990s shall see the age of the gravest global warming.

> *"Urgent climate action can secure a liveable future for all"*
> *~IPCC*

Based on the Science Based Targets (SBTs) and the targets of Global Cement and Concrete Association (GCCA), TCC Group rolled out our Roadmap to Net Zero by 2050 with "Low-carbon Cement," "Resource Recycling," and "Green Energy."

TCC adopts seven strategies such as carbon reduction for basic construction materials, new energy charging/storage optimization, and carbon negative technologies, together with an AI-powered carbon management platform for tracking, to offer optimal carbon reduction recommendations for all business entities.

## TCC Group Roadmap and Strategies for Net Zero by 2050




Note: Energy storage regulating grids can reduce the load of coal-fired power plant units and the use of diesel generators; extend equipment service life; and reduce overall carbon emissions. According to ENERGIES, take the scenario of Italy for 2030 for example, when the annual power supply from energy storage system reaches 10,000 GWh, the carbon footprints of electricity will be reduced by 53%.

## CARBON REDUCTION STRATEGY


60%

**Equipment & Process Enhancements** | As a member of EP100, TCC set the targets of 50% energy efficiency improvement by 2040, equipment and process enhancements, ISO systems introduction, and reductions of GHG emissions and carbon intensity of products.

**Power Generation by Waste Heat Recovery** | All cement plants are installed with the system of power generation by waste heat recovery. The flash distillation technology was introduced to raise the efficiencies in heat recovery and power generation, reducing 20-30% of purchased electricity.

**Alternative Raw Materials** | With the co-processing technology of cement kiln, TCC forms the ecosphere of circular economy with companies like fabs, steel factories, water treatment facilities, and public work companies. Assisting these companies to treat industrial wastes, TCC turns wastes into resources that are harmless and reusable so as to reduce both wastes and carbon.

**Alternative Fuels** | TCC actively reduces the usage of coal in cement manufacturing process, developing alternatives with heating values. Solid recovered fuel (SRF) like coal ash from power plant, wood chips, waste wood, waste oil, and waste fabrics as well as agricultural wastes like rice husks have become the key to carbon reduction.

1 2 3 4


15%

**Renewable Energy Installation** |

PV panels and energy storage systems are installed to the rooftops and idling spaces at the Headquarters, cement plants, and RMC plants to realize renewable energy installation for self-consumption. TCC Green Energy Corporation also invests in solar energy and onshore wind energy. A variety of green energy like the first fishery and electricity symbiosis in Taiwan as well as geothermal energy and OTEC were developed to meet the demands of SMEs regarding RE100. 5

15%

**Energy Storage, Power Cells, and Charging Services** |

Renewable energy requires stable storage owing to intermittency. Energy storage system becomes the pivot to stabilize green energy and regulate the grids in the energy transition process. With green energy, charging, and storage integrated, and EMS, TCC effectively saves energy and lowers the load of coal-fired units and the use of diesel generators, reducing the carbon emissions relatively. 6


10%

**Carbon Negative Technologies-Carbon Capture, and Carbon Sink** | Carbon capture is hailed as the key technology for climate action. TCC has been working with ITRI since 2011 to develop and verify research in calcium-looping $CO_2$ capture technology. After verification and with a solid basis of practical experience, TCC started to work on the next-generation carbon capture technology – oxy-fuel combustion. The technology can optimize the carbon capture process complexity and reduce the energy consumed. Natural carbon sink is the foundation for carbon sequestration on Earth. Aside from mine ecology restoration, TCC initiated the "Ho-Ping Ark Ecological Program" to undertake long-term data monitoring and carbon decomposition experiments on soils and biodiversity that facilitate 50% of the carbon sink on Earth. 7

### SUSTAINABLE FUNDRAISING

TCC's green and sustainable financing amount has been increasing year by year, currently reaching over NT$ 49.5 billion, accounting for over 30% of the group's total financing. The group's subsidiary, NHOA S.A., based in Italy, plans to issue a 5-year, EUR 250 million green convertible bond. The funds will mainly be used for the establishment and operation of EV charging infrastructure by NHOA's subsidiary, Atlante Co., in Southern Europe countries (Italy, France, Spain, and Portugal), as well as the construction and operation of energy storage projects on all four continents.

Since 2021, TCC has raised funds through bank financing and international capital markets. This includes issuing overseas convertible bonds and Global Depositary Receipts (GDRs). The funds were injected into our subsidiaries: TCC Recycle Energy Technology Company received NT$ 22 billion for the production of high-power ternary lithium batteries in newly-built facilities; TCC Green Energy Corp. received NT$ 15.5 billion for renewable energy projects such as solar and onshore wind power; NHOA.TCC received NT$ 2.5 billion for the development of energy storage business. Additionally, a EUR 233 million investment and capital injection were made into NHOA for energy storage, charging infrastructure, and EV charging devices in the new energy sector.

VENUE OF PRACTICE

# Hoping Low-carbon Green Energy Park


### Hoping Energization

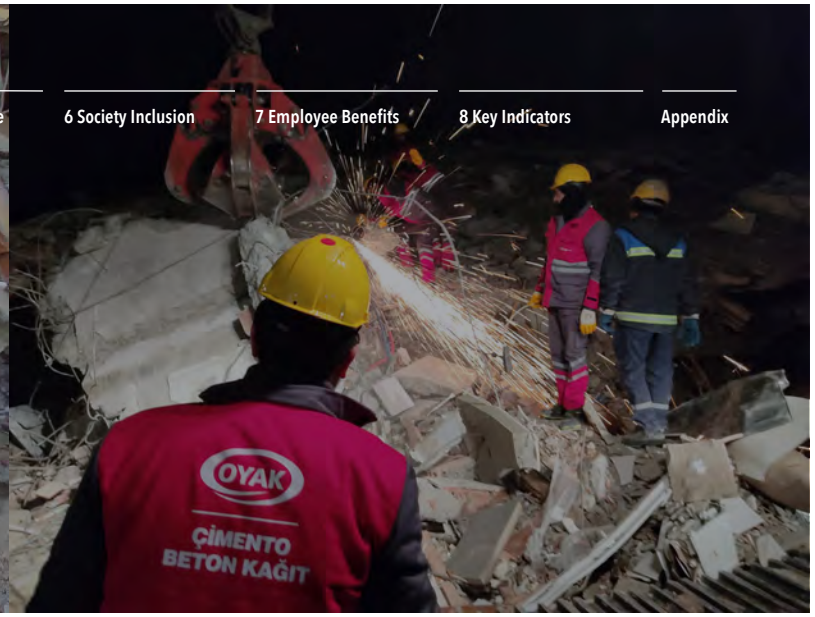
On December 24, 2022, TCC organized the parent-child challenge activity "Hoping Energization Interactive Sports Game" on the day of village-school sports competition at Heping Elementary School. A total of 135 children from Heping Elementary School, the Affiliated Kindergarten, and Heping Branch of Siou Link Kindergarten were invited and accompanied by their parents. Through the interactive experiences, the participants came to realize that Heping has become the Home of Electricity as well as the new energy vision at Heping in the future.

The local villagers attended the activity not only experienced EVs with high-end lithium battery; experimental courses of the first MW-level OTEC base in the world possibly born in the Heping Village in the future; but also appreciated the aquaculture of high economic values using deep sea water, SPA tourism, and other derivative industries. Hence, the villagers were able to better understand the new opportunities of development at Heping.

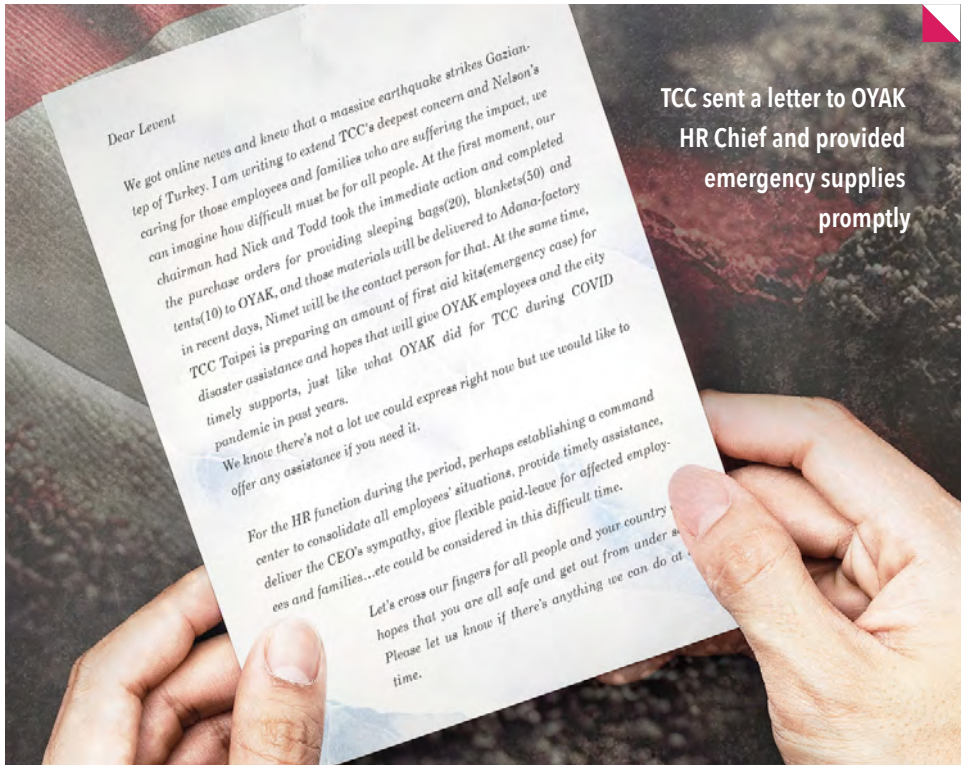
Meanwhile, TCC held the "Hoping Energization Wishing Tree" activity. Through the activity, TCC facilitated the opinion exchange with villagers, capturing the wishes of the villagers for the various developments of Hoping Low-carbon Green Energy Park.

# Total Care Commitment– The Massive Earthquake in Turkey and Relief to OYAK

*Human civilization dawned at the care for each other.*
*The continuation and protection of life is the ultimate goal of all things.*
*~ Nelson An-ping Chang, Chairman*




On February 6, 2023, a 7.8-magnitude earthquake hit Turkey. TCC promptly initiated the "employee placement plan," checked the safety of the employees in Turkey, and properly arranged for the employees and their families affected by the earthquake. Warm-keeping resources like sleeping bags, blankets, and tents were transported to the OYAK plant in Turkey. Also, 100 sets of first aid kits and 50 emergency relief packages were air transported for a timely relief effort and support to the OYAK employees and Turkey. OYAK is a joint venture of TCC with 40% shares in Turkey. Upon the COVID-19 outbreak, OYAK provided epidemic prevention supplies to TCC multiple times. For this massive earthquake in Turkey, TCC Group immediately expressed our concerns. Also, the manager in Netherlands Operation Headquarters was tasked to assist with the needs of OYAK. Meanwhile, all the TCC employees donated supplies for the relief effort. Upholding the spirit of mutual care with people at the core, TCC assisted the local employees and their families, relevant suppliers, and clients to the best of its ability. In addition to participating in the fundraising of relief supplies through the Turkish Representative Office in Taiwan, TCC will also continue to pay attention to the subsequent reconstruction needs of Turkey.




TCC sent a letter to OYAK HR Chief and provided emergency supplies promptly


## Employee Settlement Plan

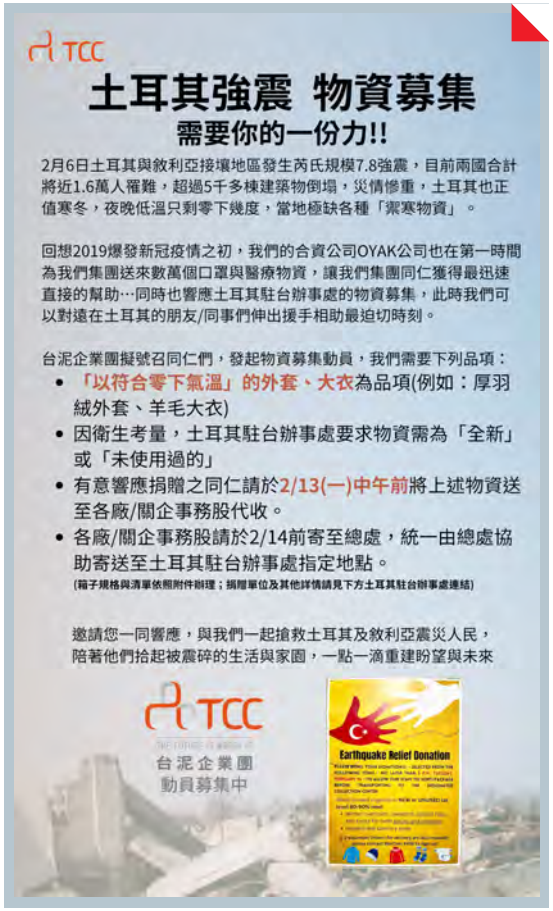
Consolation money was provided to employees with their houses back in hometowns destroyed in the earthquake for material support to meet the basic needs of accommodation and food. Simultaneously, cement plants near the earthquake-affected areas have been opened to provide temporary housing for the disaster victims.

## TCC CAN HELP

Due to the earthquake, countless houses collapsed in Turkey. OYAK of TCC is a leading provider of low-carbon cement and related construction materials in Turkey, has donated 50,000 metric tons of cement for the reconstruction efforts. Roman Cheng, President of TCC said "TCC can help. TCC will support the reconstruction of Turkish cities. Meanwhile, introducing the comprehensive works in green building, green city, green transportation, and green lifestyle. Providing a safer and more livable local environment and building a green and sustainable future."


## Plan of Voluntary Relief Contribution by Employees

Response to the supplies solicitation by the Turkish Trade Office in Taipei, from the first line to the Headquarters, the employees collectively donated 65 boxes of all-new thermal jackets in an attempt to warm the hearts of the people in the impacted area during the cold winter.





**Taiwan Transport & Storage Corp.**
**Supported the Delivery of Relief Supplies from Taiwan to Turkey**

To help the Turkish Trade Office in Taipei to deliver the supplies to Taoyuan International Airport, Taiwan Transport & Storage Corp. not only arranged diesel trucks from southern Taiwan but also asked the fleet of suppliers in the northern Taiwan to join them. In addition, the first 26-mt electric truck was mobilized to transport the relief supplies, which was the first mission of the electric truck as well, so as to exercise the corporate social responsibility.

# ESG Highlights 2022

## Cement Plants

Carbon Intensity

**-5.40%**

0.8033 Metric Tons of $CO_2$ /metric ton of cementitious materials

Base year: 2016 | Scope 1 & 2

## RMC Plants

Total Emissions

**-8.90%**

8,346.6292 Metric Tons of $CO_2e$

Base year: 2020 | Scope 1 & 2

## Water Withdrawal Intensity

**-38.54%**

0.00029 Million Liters/Metric Ton of cementitious materials

## Energy

**EP100**

Power Generation by Waste Heat Recovery

| compared with 2018

**+45.48%**

Cement Plants | Base year 2016

Energy Productivity

**+59.6%**

**0.522** thousand NTD/GJ

Renewable Energy for Self-consumption

| Base year 2021 **+10%**

## Air Pollution Emission Intensity

| Base year 2016 | NOx | SOx | TSP |
|---|---|---|---|
| TAIWAN | -31% | -40% | -63% |
| MAINLAND CHINA | -45% | -54% | -74% |

## Cement Alternative Resources Recycled

Ratio/ Metric tons **24.27%**

Total Carbon Reduced

**135,573** metric tons of $CO_2e$

## Industrial Waste TCC Assisted to Treat

**1.101** Million Metric Tons

Equivalent to the total amount of industrial waste in Taiwan **5.3%**

## Energy Storage

Installed Capacity | cumulatively as of 2023

**Taiwan** 656.1MWh

**Global** >1GWh

## Renewable Energy

Reduced by over **83,332** metric tons of $CO_2e$

Installed **198MW**

| Includes Taiwan & Mainland China

| cumulatively by the end of 2024

Generated **16.6** million kWh

| Includes Taiwan & Mainland China

| cumulatively in 2021-2022

## UHPC Energy Storage Cabinet

MOE **Invention Patent** of portable cabinet and energy storage equipment

NCSIST **CNS 12514-1/-8 Fire-resistance tests certified**

**EARTH HELPER Carbon Reduction Sustainability Action**

| as of March 31, 2023

LINE Official Account

**10,512 Followers**

Carbon Reduction Sustainability Action

**7,363 Participants**

**Hoping Sustainability Charity Foundation**

Contributed Amount

| from October to December 31, 2022

**NT$1,156,750**

**TCC Maternity Allowance** | compared with 2021

Growth of Number of People Received: Nearly 3 Times

Growth of Amount Disbursed: Nearly 4.6 Times

**34** Nationalities of the employees of TCC Group

**3 Insurance Schemes Participation Rate** 59%

**Female in Management** 27%

**Female Directors** 26.66%

**Invention Patent**

40 patents granted

26 patents applying

**Nomination Committee Established Office of Responsibility and Sustainability Created**

**ESG-related Courses** 150.5 HOURS

**Valid data of carbon emissions collected from Critical Tier-1 Suppliers** 64.6%

**NHOA issues Green Convertible Bond 5-yr 250 million euros**

**Top 5% in Corporate Governance Evaluation**

Hoping Mine & Suao Mine Ratio of Indigenous Species **88.88%**

**KBCC** | cumulatively from 2008 to March 31, 2023

For Academic & Medicinal Research over **6,200** PLANTS 60 TAXA

**284** Corals Restored

Survival Rate of Restored Coral **89%**

Reforestation area has increased nearly **3** TIMES

**Hoping EcoPort Bio Cube Coral Restoration Project**

# HONORS /2022

## International Ratings

2022 CDP Climate Change "A-"
Supplier Engagement Rating (SER) "A"
Supplier Engagement Leader
2022 CDP Water "B"

MSCI ESG Ratings "A" Upgraded for 4 consecutive years, 2019-2022

S&P Global CSA adopted in DJSI
2023 Sustainability Yearbook Member
Top 10% S&P Global ESG Score, Construction Materials Industry
Industry Mover

Sustainalytics "ESG Top-Rated Company"
The highest rating for 4 consecutive years

Taiwan Ratings "twA+" / Liquidity Assessment: robust

Greater China Business Sustainability Index "Pace-setter"
TIP Customized Taiwan Dividend Highlight Index Constituent
FTSE4Good TIP Taiwan ESG Index Constituent

Top 5% in the 9th Corporate Governance Evaluation of TWSE

ESG Investing Best Sustainability Reporting: Basic Materials – Top 3

Taiwan Index Company's Taiwan Sustainability Evaluation ranks in the top 25% in the environmental module assessment





## Sustainability Initiatives

Member of Science-Based Targets initiative (SBTi)

TCFD Supporter

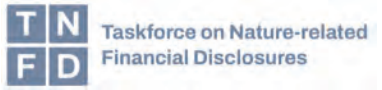
Member of TNFD Pilot Program

EP100 Member
The 1st large manufacturer in Taiwan

Business for Nature
Make it Mandatory & Call to Action signed

Founding partner of BCSD Nature Positive Initiative

Taiwan Alliance for Net Zero Emission
"Green Mark" Net-Zero Label










## Sustainability Recognitions

The 19th CSR and ESG Awards of Global View Monthly in 2023 Honor of the Year
Model Award of Low-carbon Operations

The 18th CSR and ESG Awards of Global View Monthly in 2022
"First Prize" of Traditional Industry
"First Prize" of Environmental Friendly Project

No. 3 in 2022 CommonWealth Excellence in Corporate Social Responsibility

The 15th TCSA in 2022
Top 10 Sustainability Enterprise Paradigms
Sustainability Report Platinum Award
Sustainability Performance Awards in Circular Economy, Growth through Innovation, Social Inclusion, Information Security, etc.

2022 BSI Sustainability Resilience Award - Pioneer

2022 Best Taiwan Global Brands

2022 Taiwan Best-in-Class 100

HR Asia 2022 Best Companies to Work for in Asia

Taiwan iSports, Ministry of Education

Top 10 Circular Economy Manufacturing Pioneers (DailyView)

[TCC Corporate Sustainable Development Committee]
The 15th 100 MVP Managers Super MVP Category, MANAGERToday

[TCC DAKA] No. 5 in the Top 10 Emerging Tourism Factory (DailyView)

[Indigenous Residents in Taibai Mountains]
"Top 10 Sustainable Micro-Movie" in the 2022 Taipei Golden Eagle Micro Movie Festival

Asteroid No. 526460 named "Ceciliakoocen"

NHOA.TCC Charging Services
recognized as LINE Official Account Success Case in Taiwan



## Green Certifications

TCC Hoping Plant
Product Award, Outstanding Award, and Sustainable Category Special Award from the 3rd Taiwan Circular Economy Awards
Golden Award in the Circulation Group in 2022 EPA Resource Circulation Outstanding Enterprises

TCC Suao Plant
Outstanding Enterprises in Industrial GHG Emissions Reduction 2022 from IDB, MEA
2022 Low-carbon Product Awards – Outstanding Award from EPA Taiwan

Hanben Ocean Station
Golden Award, 2022 Outstanding Public Toilet Ratings of Yilan County

Hoping Industrial Port
Certified Environmental Education Facility, EPA Taiwan

TCC Taipei, Taichung, Dadu, Chiayi, Tainan, Kaohsiung RMC Plants
2021 Excellence in Green Procurement from EPA Taiwan
2022 Outstanding Enterprises in Green Procurement Performance of New Taipei City for TCC Taipei RMC Plant

# TCC SUSTAINABILITY TARGETS AND PERFORMANCE TRACKING

| ITEM | PROGRESS ACHIEVED | PERFORMANCES IN 2022 | 2025-TARGET | 2030-TARGET | 2050-TARGET |
|---|---|---|---|---|---|
| ★ GHG Management \| Taiwan | ACHIEVED 97% | 0.803 | 0.758 (SBT -11%) | 0.585 (-31%) | Carbon |
| ★ GHG Management \| Mainland China | ✓ | 0.690 | 0.651 (-11%) | 0.585 (-20%) | Neutrality |
| GHG Management \| Taiwan & Mainland China (Weighted Average) | ▲ | 0.707 | 0.663 | 0.585 | for Concrete |
| Base year 2016 \| Unit metric tons of $CO_2e$/metric ton of cementitious materials | | | | | |
| ★ Water Management-WWI Reduction \| Taiwan | ACHIEVED 99% | 0.000293 | 0.000264 | 0.000240 | 0.000192 |
| ★ Water Management-WWI Reduction \| Mainland China | ✓ | 0.000308 | 0.000263 | 0.000245 | 0.000192 |
| Base year 2016 \| Formula million liters/metric ton of cementitious materials | | | | | |
| ★ Thermal Substitution Rate of Alternative Fuels \| Taiwan | ▲ | 4% | 35% | 45% | 50% |
| ★ Thermal Substitution Rate of Alternative Fuels \| Mainland China | ▲ | 8% | 35% | 45% | 50% |
| ★ Ratio of Alternative Raw Materials \| Taiwan | ▲ | 23% | 28% | 35% | 40% |
| ★ Ratio of Alternative Raw Materials \| Mainland China | ▲ | 25% | 30% | 40% | 45% |
| Air Pollution Management \| Taiwan NOx | ✓ | 1,025 (-31%) | -50% | -70% | |
| Air Pollution Management \| Taiwan SOx | ✓ | 12 (-40%) | -30% | BACT[1] Minimum | BACT[1] Minimum |
| Air Pollution Management \| Taiwan TSP | ✓ | 30 (-63%) | -50% | BACT[1] Minimum | |
| Air Pollution Management \| Mainland China NOx | ✓ | 320 (-45%) | -50% | -70% | |
| Air Pollution Management \| Mainland China SOx | ✓ | 43 (-54%) | -60% | -70% | BACT[1] Minimum |
| Air Pollution Management \| Mainland China TSP | ✓ | 12 (-74%) | -60% | BACT[1] Minimum | |
| Base year 2016 \| Unit grams of emissions/metric ton of clinker | | | | | |
| Renewable Energy Taiwan & Mainland China (UNIT MW) | 198 MW under constitution(by the end of 2024) | | 500MW under Management | 700MW under Management | 1GW under Management |
| Carbon Capture R&D Budget (since 2011 I Unit NT$) | ✓ Cumulative investment of NT$165 million | | Cumulative investment of NT$1.3 billion | – | – |
| Carbon Capture (Unit metric ton) | Planning for the scale up verification of carbon capture technology | | | 100,000 metric tons/year | 1.6 million metric tons/year |
| Conservation of Plant Species (Endangered Plants included)(Unit Taxa) | ✓ | 34,154 | ≧35,000 | ≧40,000 | ≧45,000 |
| Mine Restoration Biodiversity (BMP[2]) | ✓ | 88.88% | – | 90% | 95% |
| Ratio of Indigenous species of Mine Taiwan | | | | | |
| TCC Community Engagement (CEM[3]) (since 2022 I Unit NT$) | ✓ | NT$215 million | Cumulative investment of NT$800 million | Cumulative investment of NT$1.8 billion | Cumulative investment of NT$5.8 billion |
| Education Investment (since 2022 \| Unit NT$) | ✓ | NT$9.5 million | Cumulative investment of NT$33.5 million | Cumulative investment of NT$73.5 million | Cumulative investment of NT$230 million |
| Employee Education & Training (since 2020 \| Unit: NT$) | ✓ | Cumulative investment of NT$45 million | Cumulative investment of NT$125 million | Cumulative investment of NT$250 million | Cumulative investment of NT$750 million |
| ★ Valid Data of Carbon Emissions Collected from Critical Tier-1 Suppliers | ▲ | 64.6% | – | 90% | – |

1BACT：BEST AVAILABLE CONTROL TECHNOLOGY | 2BMP：BIODIVERSITY MANAGEMENT PLAN | 3CEM：COMMUNITY ENGAGEMENT MANAGEMENT ★ CLIMATE-RELATED MANAGEMENT INDICATORS AND GOAL ▲ NEW INDICATORS

# SDGs Targets Reference Table

**SDGs TARGETS OF TCC'S CONCERN**

**4.1**__By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes.

**4.7**__By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

**APPROACHES AT TCC**

EARTH HELPER Carbon Reduction Parent-Child Bankbook, Cement Academy, and Mine Environment Education

**2022 PERFORMANCE DATA**

- With Dong Ao Elementary School added in 2022, the project has grown to include 22 partner schools, benefiting a total of 10,857 students, with 1,324 students supported in 2022.
- TCC DAKA Eco-Tour in 2022: 7,323 participants
- Guided Tour to Hoping EcoPort in 2022: 382 participants
- Vakangan Geothermal Drilling Exhibition 2,848 visitors
- Hoping Carbon Reduction Parent-Child Bankbook: 85 students at Heping Elementary School in Hualien and their 60 parents
  (From 2022.08.27 to 2023.03.31)

4 QUALITY EDUCATION

**SDGs TARGETS OF TCC'S CONCERN**

**7.1**__By 2030, ensure universal access to affordable, reliable and modern energy services.

**7.2**__By 2030, increase substantially the share of renewable energy in the global energy mix.

**7.3**__By 2030, double the global rate of improvement in energy efficiency.

**APPROACHES AT TCC**

For everyone to access the benefits of renewable energy, TCC develops renewable energy and builds energy storage systems to resolve the issue of intermittency in renewable energy supply. In addition, TCC invests in battery R&D and installation of chargers to break the distance limit for renewable energy access. Finally, to solve the predicament of inability to procure green energy by the small and medium-sized enterprises, Energy Helper TCC Corporation was established for all to have the right to renewable energy access.

**2022 PERFORMANCE DATA**

- Renewable Energy Installed: 198 MW
- Renewable Energy Generated: 166 million kWh
- Installed Capacity (Taiwan): 656.1 MWh
- Charging Stations: 1,311
- V2G Charging Capacity: 25 MWh

7 AFFORDABLE AND CLEAN ENERGY

**SDGs TARGETS OF TCC'S CONCERN**

**8.9**__By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products.

**APPROACHES AT TCC**

TCC emphasizes the local development at the Heping Village, establishing TCC DAKA to provide whole new industries, types of works, and opportunities to the Heping area.

**2022 PERFORMANCE DATA**

78 new types of jobs created cumulatively for local employment at the Hoping Village since 2020

8 DECENT WORK AND ECONOMIC GROWTH

**SDGs TARGETS OF TCC'S CONCERN**

**9.4**__By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.

**APPROACHES AT TCC**

TCC has integrated our core capabilities to develop low-carbon products, Ultra-High Performance Concrete (UHPC), and introduce 3D printed construction materials. Concurrently, TCC is promoting carbon capture technologies, including pure oxygen combustion techniques.

**2022 PERFORMANCE DATA**

NT$165 million cumulatively invested in carbon capture R&D since 2011

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

**SDGs TARGETS OF TCC'S CONCERN**

**11.6**__By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

**APPROACHES AT TCC**

Leveraging our own industrial characteristics, TCC assists the governments and enterprises in waste treatment.

**2022 PERFORMANCE DATA**

Industrial waste TCC assisted to treat: 1.101 million metric tons

11 SUSTAINABLE CITIES AND COMMUNITIES

# SDGs Targets Reference Table

**SDGs TARGETS OF TCC'S CONCERN**

**12.2**__By 2030, achieve the sustainable management and efficient use of natural resources.

**12.5**__By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

**12.8**__By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.

**APPROACHES AT TCC**

Zero waste action on the plants

Progress on the EARTH HELPER initiative

**2022 PERFORMANCE DATA**

- Zero waste produced from cement plants
- Recycling resources used

  Ratio of Alternative Raw Materials: 28% for Taiwan & 30% for Mainland China by 2025

  Thermal Substitution Rate: 35% for Taiwan & 35% for Mainland China by 2025
- TCC EARTH HELPER: 7,363 participants

  cumulatively as of March 31, 2023

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

**SDGs TARGETS OF TCC'S CONCERN**

**13.3**__Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

**APPROACHES AT TCC**

With the TCFD framework introduced, TCC identifies risks and opportunities related to climate change and adopts coping strategies to elevate corporate resilience.

**2022 PERFORMANCE DATA**

85% of the revenue is invested in transformational businesses, a 5-year green convertible bond of 250 million euros issued by the Italian energy storage company, NHOA, to meet the needs in energy storage, charging stations, and other sustainable operations. Sustainable fundraising program will be continued in 2023.

13 CLIMATE ACTION

**SDGs TARGETS OF TCC'S CONCERN**

**14.2**__Sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.

**APPROACHES AT TCC**

Attaching great importance to marine ecology, TCC transplants the coral fragments broken by waves outside the embankment of Hoping Industrial EcoPort in Hualien onto artificial reefs to restore coral ecology.

**2022 PERFORMANCE DATA**

- A cumulative amount of NT$8.85 million allocated in coral restoration since 2020
- 284 corals restored by Hoping EcoPort Bio Cube Coral Restoration Project as of 2022

14 LIFE BELOW WATER

**SDGs TARGETS OF TCC'S CONCERN**

**15.1**__By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.

**15.4**__By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.

**15.a**__Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.

**APPROACHES AT TCC**

TCC conducts "Ho-Ping Ark Ecological Program," which is the first in Taiwan for comprehensive soil research, to study the materials needed for the ecological sustainability applications in the future through long-term monitoring of biodiversity in soil.

**2022 PERFORMANCE DATA**

- Biodiversity Management Plan (BMP) Coverage: 100%
- Quarry Rehabilitation Plan (QRP) Coverage: 100%
- 63.13 ha. of mined areas greened
- 51.86% of mined areas are restored

15 LIFE ON LAND

**SDGs TARGETS OF TCC'S CONCERN**

**17.16**__Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries.

**APPROACHES AT TCC**

TCC emphasizes international partnership for collective development and innovation to develop low-carbon cement.

**2022 PERFORMANCE DATA**

- 70% reduction of carbon emissions with the low-carbon cement clinkers of Côte d'Ivoire (Ivory Coast) Plant
- Share of revenue from concrete used on green buildings in the overall revenue: 7.11%

  Investment in public and knowledge-based organization memberships (e.g. GCCA): NT$14,219,241

17 PARTNERSHIPS FOR THE GOALS

# About the Report

This is the 2022 TCC Sustainability Report (hereinafter referred to as the "Report") of the Taiwan Cement Corporation (herein after referred to as "TCC" or the "Company"). Upholding the principle of openness, transparency, and good faith, the Report faithfully discloses TCC's efforts in the communication with stakeholders and its engagements in sustainability issues. With this Report, we endeavor to live out the business philosophy "taking from society and giving back to society" to collectively realize the sustainability vision with stakeholders.

### Reporting Period and Scope of Disclosure

The reporting period ranges from January 1 to December 31, 2022. Apart from the financial performance disclosed in the consolidated financial statement, the scope of disclosure mainly covers TCC's operation sites in Taiwan. The subsidiaries thereof are not in the scope of disclosure. Nevertheless, in light of the sustainable development of the Company, part of the sustainability performances by the subsidiaries are presented in the Report as well. In addition, in consideration of information comparability, the data over the past four years will be disclosed for certain performances. The Report is published annually, available in Chinese and English.

Publication date of the previous issue: June 2022

Publication date of the current issue: June 2023

Publication date of the next issue: June 2024

### Reference Guidelines

This Report was prepared in accordance with the GRI Universal Standards 2021 released by Global Reporting Initiative (GRI), GRI's "Mining and Metals Sector Supplement," the SASB Standards for construction materials companies, and GCCA Sustainability Framework Guidelines, as well as with reference to the IFRS S1 and S2, the Exposure Drafts for sustainability reporting released by the International Sustainability Standards Board (ISSB).

### Information Disclosure

Information of financial performance disclosed in this Report shall be subject to the published consolidated financial statements certified by a certified public accountant. All financial figures are indicated in New Taiwan Dollars (NT$). All TWSE-listed and TPEx-listed companies are required to adopt the International Financial Reporting Standards (IFRSs) in financial statements preparation since 2013. All TCC's financial data are thus disclosed in line with IFRSs. Other data are aggregated and calculated by TCC and are demonstrated in common values that are rounded. This Report is also available on the TCC website.

### Audit and Assurance/Verification

**Internal Audits:** The disclosed data or materials herein are provided by the respective responsible units, verified by the Corporate Sustainable Development Committee, submitted to the executives of departments, and finally reviewed and approved by the Chairman.

**External Assurance/Verification:** A limited assurance is provided by Deloitte in accordance with Assurance Engagements other than Audits or Reviews of Historical Financial Information, formulated and issued by the Accounting Research and Development Foundation with reference to the International Standard on Assurance Engagements 3000 (Revised) (ISAE 3000 Revised). Also, the verification was carried out by BSI Taiwan in accordance with the GRI Standards and with the "Moderate" level of assurance, Type 1 assurance in the AA1000 Assurance Standard (AA1000AS). Please refer to the Appendix for relevant assurance/verification methodologies and results.

### Contact Information

Should you have any comment or suggestion regarding this Report, welcome to contact us at:

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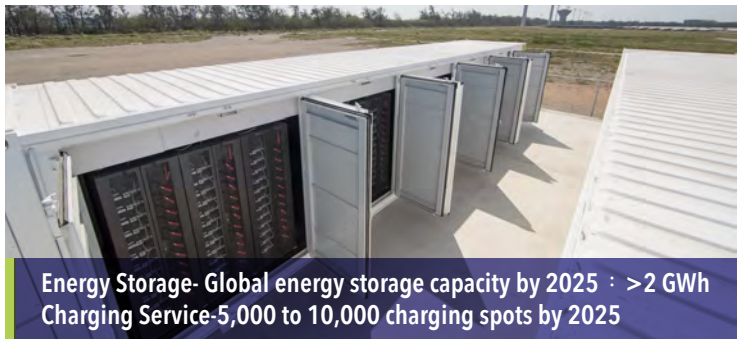
NHOA.TCC_Taipei Zhishan Charging Station

# GREEN ENERGY

01

## TARGETS


Energy Creation-Installed capacity of renewable energy by 2025 ： 500 MW



Energy Storage- Global energy storage capacity by 2025 ： >2 GWh
Charging Service-5,000 to 10,000 charging spots by 2025

Energy Transmission (Power Cells)- Production capacity by 2024: 3.3 GWh/year

## 2022 PERFORMANCE HIGHLIGHTS

### Renewable Energy

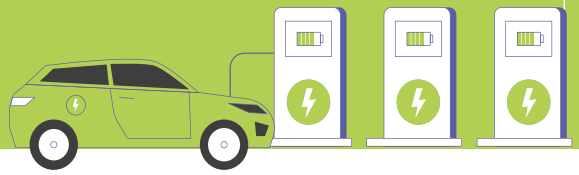
**Installed capacity**
| Including: Taiwan & Mainland China
| by the end of 2024
**198MW**

**Power Generation**
| Including: Taiwan & Mainland China
| 2021-2022 cumulatively
**1.66** /MILLION KWH
Equivalent to more than 83,332 metric tons of $CO_2e$ reduced

### Charging Stations

| by the end of 2022 (grid-connected + installing)
| Including: Globe
**1,311** /SPOTS

**V2G Charging Capacity**
**25MWh**



### Energy Storage

**Energy Storage Capacity**
| by the end of 2023

Taiwan 656.1MWh

Global >1GWh

**Production Capacity of Power Cells** 1.6GWh
| by the end of 2022

**R&D Investment**
**10%** of revenue

### UHPC Energy Storage Cabinet

**MOEA** Invention Patent of portable cabinet and energy storage equipment

**NCSIST** 12514-1/-8 Fire-resistance tests certified

# 1.1 / Special Column **Building All-round EV Low-carbon Cities**

**POLICY** | TCC aims to create new living models of low carbon and green energy, including low-carbon construction materials, energy creation, energy storage, energy transmission, energy supply, and overall energy solution services, plus green logistics system service, so as to build all-round EV low-carbon cities for the future.


## Energy Creation | TCC Green Energy Corporation

Due to the high population density in Taiwan, TCC focuses on planning the very first wind-solar hybrid plant and fishery and electricity symbiosis project site with further engaging research on geothermal energy and marine energy.

## Energy Storage | NHOA.TCC

In 2021, TCC procured European energy storage company and renamed it as NHOA (New HOrizons Ahead). Combining European experience, NHOA.TCC serves from green energy, energy storage equipment, energy management systems (EMS), charging solutions, to integrated services for smart microgrids.

## Energy Transmission | E-One Moli Energy Corp. & Molie Quantum Energy Corp.

E-One Moli Energy Corp. and Molie Quantum Energy Corp. are in the advanced electric vehicle industry chain, focusing on the development of high-power cells. They are exclusive battery suppliers for advanced electric aircrafts.

## Energy Solution | Support to SMEs on RE100

As the renewable energy retailer with the most self-built project sites and the largest green energy available in Taiwan, TCC supports small and medium-sized enterprises and electricity users with small demands to rapidly gain access to renewable energy, and offers flexible and appropriate renewable energy use solutions.

## Energy Supply | Fields of integrated services with solar, charging and storage application

TCC was the first to introduce the DC-DC charging technology integrated with green energy and energy storage. The supply of mains electricity, green energy, and charging services are regulated via the energy management system (EMS), which allows TCC to develop customized low-carbon charging solutions. This helps in creating a green supply chain.

# 1.2 / Energy Creation Diversified Green Energy of Wind, Solar, Geothermal, and Marine Energy

REN21 pointed out that wind energy and solar energy have become mainstream electricity sources and play a vital role on the path to Net Zero by 2050.

Collaborating with the governments, TCC committed to renewable energy development in wind, solar, geothermal, and marine energy as a pioneer in green energy. TCC had produced over 165 million kWh of green energy cumulatively in Taiwan from 2021 to 2022. Regarding the intermittency issue with solar and wind energy, TCC also invests in energy R&D such as power generation with ocean thermal energy conversion (OTEC), wave energy, tidal energy, and geothermal energy.

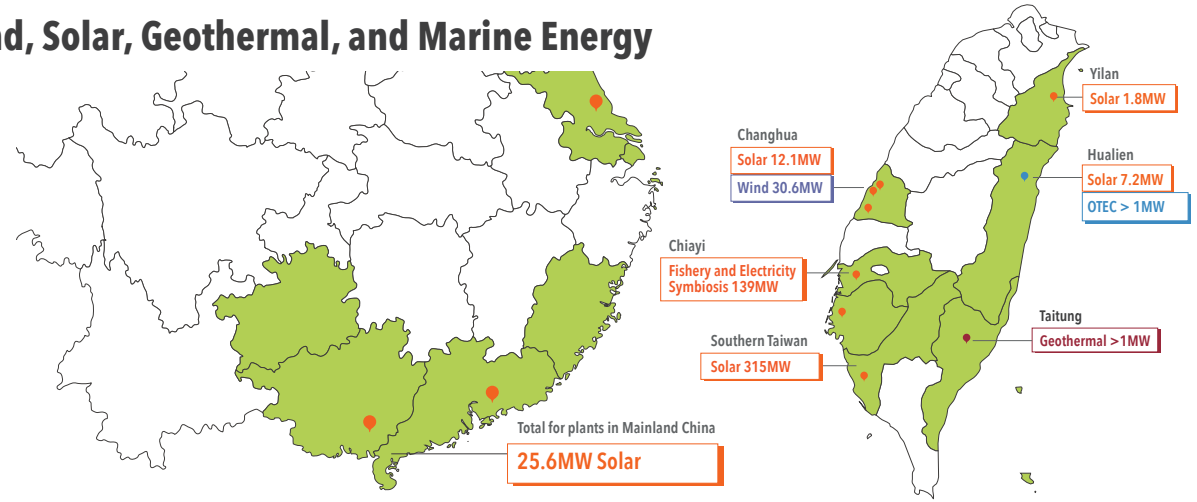
## First Large Wind-Solar Hybrid Power Plant

Changhua has an ample wind energy along its coastline. TCC Green Energy Corp. built 2 wind turbines in the Changbin Wind Power Phase I in 2019. Also, combined with the 12.1-MW PV system of the Changhua Coastal Industrial Park, TCC Green Energy Corp. established the first hybrid power plant with solar and wind energy combined in Taiwan, which has been connected to the public grid for power generation since November 2020.

Starting from 2022, TCC Green Energy Corp. commenced the Wind Power Phase II at Changbin to install 3 wind turbines with the capacity totaled up to 9 MW, expanding the diversified renewable energy project sites.

## First Fishery and Electricity Symbiosis Project Site

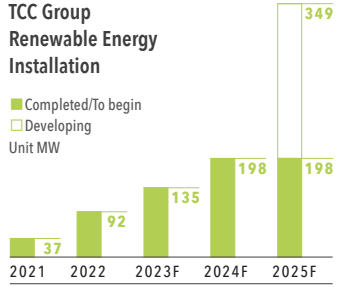
The fishery and electricity symbiosis project site at the border between Yijhu Township and Budai Township, Chiayi, is the first fishery and electricity symbiosis project site in Taiwan. After research, stakeholder feedback, and thorough planning based on scientific data, we have successfully created a win-win-win scenario for the environment, ecology, and energy generation. Upholding the development philosophy of "put agriculture and fishery at the core; add value with green energy," we support the transition of traditional fisheries. TCC Green Energy Corp. established the Fishery Management Foundation and funds the public aquacultural facilities in the community. Upon the completion, the Fishery Management Foundation assisted in promoting smart aquaculture as well. For the recently developed project sites, TCC Energy Corp. visited each landowner before construction to understand the needs. In October 2022, the fishery and electricity symbiosis project site became the first in Taiwan that was fully connected to the grid with an installed capacity of 44.3 MW in total and can generate power up to 54 million kWh annually, equivalent to the power consumption close to 15,000 households. The Phase II at Yijhu, Chiayi, is projected to complete in 2023 with the installed capacity totaled 22 MW, followed by the installation of Longjiang Fishery and Electricity Symbiosis of 60 MW.




## Expanding Solar & Wind Energy System Installation

To put the rooftop spaces of TCC and its subsidiaries to good use, TCC installed PV equipment at the TCC Headquarters, Linyuan Advanced Materials Technology Co., Ltd., E-One Moli Energy Corp. at the Southern Taiwan Science Park (STSP), Dadu Branch and Linyuan Branch of Taiwan Transport & Storage Corp., RMC Plants, Suao Mine, TCC Low-carbon R&D Center, and TCC DAKA, maximizing the benefits of PV installation as well as leveraging the merits of power generation and sunshade and heat insulation. It is expected to expand the rooftop spaces utilization over the Low-carbon R&D Center and the Port of Hoping in 2023.

As for wind energy, TCC Green Energy Corp. plans to develop large wind farm in northern Taiwan in 2023, which is projected to offer 27 MW upon completion.

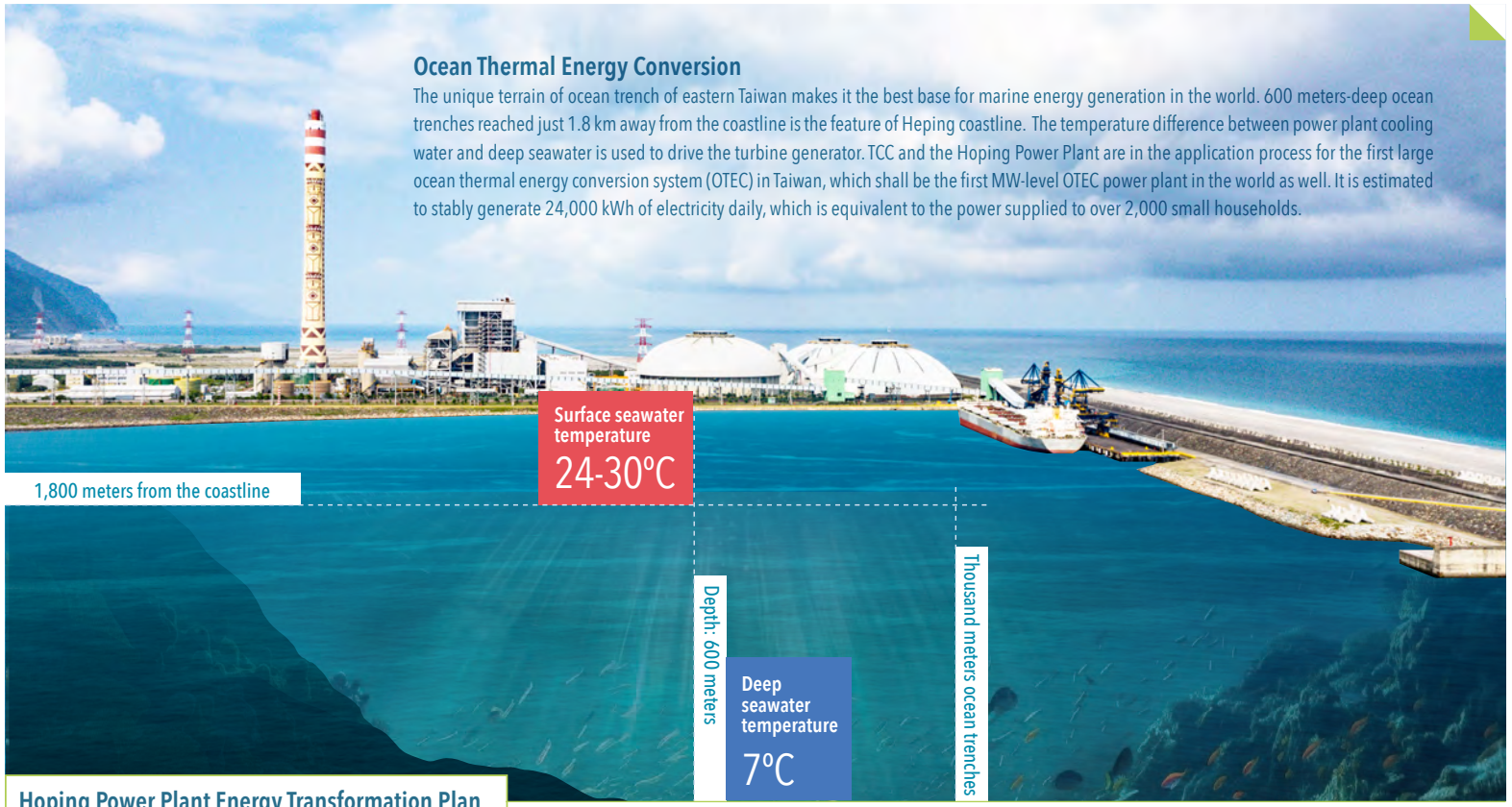



# Foresightedly Research and Development in Sustainable Energy

## First Geothermal Energy Base with Hot Spring in Taiwan

TCC has commenced the development of geothermal potential in East Rift Valley. TCC has been working with CPC Corporation for the drilling of wells for the Vakangan Geothermal project in Taitung. In 2023 Q2, TCC worked with ITRI for capacity testing and geothermal turbine planning. The geothermal power plant construction is expected to complete in 2024 Q4.

Meanwhile, TCC has cooperated with LDC Hotels & Resorts Group to establish the Vakangan Geothermal Green Energy Park in 2022. Upon official operation, it shall become Taiwan's first geothermal energy base with hot spring.




### Ocean Thermal Energy Conversion

The unique terrain of ocean trench of eastern Taiwan makes it the best base for marine energy generation in the world. 600 meters-deep ocean trenches reached just 1.8 km away from the coastline is the feature of Heping coastline. The temperature difference between power plant cooling water and deep seawater is used to drive the turbine generator. TCC and the Hoping Power Plant are in the application process for the first large ocean thermal energy conversion system (OTEC) in Taiwan, which shall be the first MW-level OTEC power plant in the world as well. It is estimated to stably generate 24,000 kWh of electricity daily, which is equivalent to the power supplied to over 2,000 small households.

## Hoping Power Plant Energy Transformation Plan

### Bioenergy

TCC has been researching on the plan for ammonia co-firing and worked with professor Keng-Tung Wu at the National Chung Hsing University on the pilot assessment project of gasifiers. The pre-planning was completed in December 2022, including

(1) survey on the biomass and waste material sources in Taiwan;
(2) means of access, transportation, and storage;
(3) selection of gasification system;
(4) economic benefit analysis and investigation and analysis of pertaining laws and regulations.

### Small Hydropower

Each unit at the Hoping Power Plant has 22 cms height of cooling water, which is to condense the low-pressure steam after turbine work into water, before discharged into the sea via sea cofferdams. Now that the sea cofferdams offer potential energy, we thus planned to set up small hydropower units at the existing warm water discharge canals. The hydraulic model tests and hydraulic analyses for the small hydropower installation at the discharge canals on the south and north side were completed successively in December 2022. Further planning will be executed afterward.

### Emissions Reduction Project

In 2022, a turbine retrofit plan reduced coal usage, leading to a 6.7% drop in carbon emissions compared to 2020. Electrostatic dust collection and air pollution control upgrades are implemented from 2019 to 2022.

Upon completion, both air pollutant concentrations and particulate matter concentrations will be lower than the regulatory standards by 50%, and the maxium performance can be lower than the emission standards for gas-fired power plant. Air pollution emissions decreased by 33% in 2022 compared to 2016.

# 1.3 / Energy Storage Key to Energy Transition

Smart energy storage development is one of the key business at TCC. Through energy storage, green energy can be stored stably and safely despite of the intermittency.

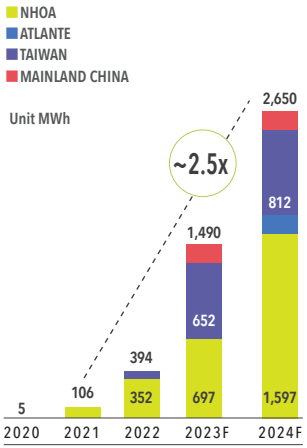
According to BloombergNEF (BNEF), TCC becomes the fourth largest energy storage enterprise in the world in 2021 by establishing NHOA.TCC. With technological resources combined, TCC builds large energy storage systems, effectively storing energy generated in off-peak hours and discharging during peak hours. NHOA.TCC partakes in the electricity trading platform and help stabilize power grids. It is estimated to reach an installed capacity of 500 MWh for the energy storage systems in Taiwan.

The charging stations of NHOA.TCC also combines energy storage system with the DC hybrid charger ("charger" hereinafter), maximizing the energy efficiency. Compared to other charging stations, it mitigates the potential burden of huge power demand to power grid, becoming one of the key technologies to realizing low-carbon charging stations.


## The Only Self-made High-efficiency AFC for Grid Rescue in 0.1 Sec in Taiwan

The first Automatic Frequency Control (AFC) Smart Energy Storage System in Taiwan is connected to the grid and operating. During the blackout incidents on May 13 and May 17 in 2021 as well as the power outage on March 3 in 2022, it swiftly stabilized the grid. We help Taipower improve power supply stability, and resolve issues of power ramping in dispatch in circumstances like instant power spikes and reduced power supply from PV systems at sunset.

**~2.7GWh Global Capacity**
by 2024




## Diversified Applications R&D with Energy Storage Lab

NHOA.TCC is committed to the R&D and, installation of energy storage systems and charging stations. NHOA.TCC sets up a lab to conduct reliability assessment. At present, the lab mainly aims for testing of medium (100-500 kWh) and small (<100 kWh) energy storage products, along with testing of system integration between EV charging and energy storage equipment. Also, the whole container energy storage product has been installed into the lab with the same battery scale for long-term operation testing. In the future, the lab plans to add conditions of various products for behind-the-meter (BTM) energy storage and reverse power flow testing. Scenario simulation of various fields (e.g. electricity uses of commercial buildings, charging stations, heavy electricity consumers, etc.) will be introduced. It shall develop both outdoor and indoor energy storage cabinets with liquid cooling technology integrated and more diversified application scenarios for indoor/outdoor chargers.

**TCC Energy Storage Cabinet Application GCCA Carbon Reduction Case**


# 1.4 / UHPC Energy Storage Cabinet _ Patented Invention

## The First Low-carbon, Fire- and Explosion-resistant Energy Storage Cabinet in the World

### Features of Patented UHPC Energy Storage Cabinet

**Low Carbon**
50% less carbon emissions than metal energy storage cabinet

**Fire-resistant**
CNS 12514-1/-8 of NCSIST (TAF Accreditation Lab) certified; both tests of fire integrity and flame retardancy under burning at 1,000°C passed

**Fire Extinguishing**
Three-staged fire extinguishing Novec1230, water sprinkle, water pipe

**Compressive Strength**
Compressive strength of over 17,000 psi

**Weather Resistant**
High in impermeability and weather resistance Less susceptible to environmental changes

**Structure Safety**
IBC, IEC62933,UL9540


TCC continues to focus on optimizing the UHPC Energy Storage Cabinet products and develops the integrated plug interface with our supplier, Busway. Outdoor and indoor energy storage cabinets are included in standardized products.

**Outdoor Energy Storage Cabinet**

Outdoor Energy Storage Cabinet has modular and containerized design, flexible expansion, and versatile deployment. TCC is confirming the requirement regulations for design. Aside from itself, the outdoor energy storage cabinet can also work with chargers.

**Indoor Energy Storage Cabinet Integrated with Liquid Cooling Technology**

With a better flexibility and rapid cooling property, UHPC Energy Storage Cabinet product complies with building regulations of different periods, making it more friendly and safer to be used indoor. It can also work with indoor chargers combined.

TCC gave birth to the first low-carbon fire-resistant energy storage cabinet in the world. The product employs ultra-high performance concrete (UHPC), reducing approximately 50% of carbon emissions compared to the metal energy storage cabinet of the same size. Also, as UHPC features low thermal conductivity and high compressive strength, it acquired the 2-hour fire-resistance certification of CNS12514-1/-8, and passed both tests of fire integrity and flame retardancy under burning at 1,000°C.

The conventional metal energy storage cabinet cannot be put in a building according to the Fire Services Act in force. Hence, UHPC energy storage cabinet has a great market potential as it may become the best option for buildings. We have applied for multiple patents for this product and have obtained the invention patent of "portable cabinet and energy storage equipment" in 2022.

**Involvement in Energy Storage Fire Certification and Regulation Adjustment**

To pursue a high safety standard, NHOA.TCC worked with the fire department to undergo fire exercises of energy storage system, which has become the teaching materials for firefighting SOPs. The cooperation also helps establish contingency SOPs, and push for the formulation of outdoor energy storage system fire certification.

**Promotion of Indoor Energy Storage Installation Regulations**

The UHPC Energy Storage Cabinet of TCC is certified against CNS 12514-1/-8 and comes with three-staged fire-extinguishing devices to ensure safety. To relieve the load of Taipower, NHOA.TCC pushed for indoor energy storage system. The system supplies emergency power to residential buildings and commercial buildings with distributed energy storage system and reduces the use of power generators, thus achieving power use optimization and carbon reduction.

### TCC's UHPC Energy Storage Cabinet Commercially Applicable in Taiwan; TCC Cooperated with the Convenience Store Giant to Build Asia's 1st "Convenience Store on New Energy"

The first UHPC Energy Storage Cabinet in the world has been deployed in 7-11's 10,000th store in Asia–Yawan Store, Tainan. This model prioritizes the use of solar energy and small energy storage system. In the event of power outage, the microgrid will automatically switch from grid-connected mode to islanded mode, supplying power necessary for emergency and life support with the PV system and energy storage batteries. It is estimated that the Yawan Store can maintain a minimum of 4 to 6 hours of uninterruptible power supply for lighting, surveillance system, cashiers, automatic doors, etc. This energy storage cabinet can significantly reduce carbon emissions as well. Take the Yawan Store for example, it can generate 5,500 kWh of green energy annually, which is equivalent to a carbon reduction of approximately 2,761 kg per year. NHOA.TCC assists 7-11 in building the "Convenience Store on New Energy," which symbolizes the market potential of TCC's UHPC Energy Storage Cabinet.

## 1.5 / Energy Transmission

# Advanced Ultra-High Power Cells

TCC has dedicated to world-class high performance and superior quality rechargeable lithium-ion cells products for years and been focusing on ultra-high power cylindrical cell niche segment. E-One Moli Energy Corp., part of TCC Group, is the leader of ultra-high power cell. Ultra-high power cell is high energy density and its charge-discharge power is 5-10 times larger than ordinary power cell. E-One Moli Energy Corp. regularly invests 8-10% of total sales a year into R&D. High performance and high safety are E-One Moli Energy Corp.'s two focuses to maintain TCC's leadership in the high-end market.

### Research on Battery Materials with Suppliers

The testing platform for graphite as a negative electrode material is under development. The initial R&D progress has reduced the battery impedance by around 4% and improved capacity fading by 5%. In response to the demand for electrode density increase, E-One Moli Energy Corp. is undergoing the second iteration for material optimization, which is expected to raise the electrode density by 10% and the energy density by 2%. Also, E-One Moli Energy Corp. conducts small pouch cell RD assessment in order to offer products feature in high density and high compaction density, and to improve the capacity, first-cycle performance, and impedance. E-One Moli Energy Corp. plans on high power battery product R&D testing and assessment, and QAT for trial production testing. It is projected to mass produce in 2025.


**E-One Moli Energy Corp. and International Aviation Companies Develop eVTOL**

**Capable of 32-km Flight with 10-min Charging**

E-One Moli Energy Corp. cooperated with Archer Aviation in the U.S. and Vertical Aerospace in the U.K. to announce that the Archer's latest aircraft, eVTOL Midnight, is to use the 21700 ternary batteries produced by the new plant of E-One Moli Energy Corp. at Kaohsiung. With a 10-min charge, eVTOL Midnight can carry out flight of 32 km and offer 10,000 trips averagely.

### Investment in Group14, a New Silicon Material Supplier

In March 2022, E-One Moli Energy Corp. signed an MOU with Group14, a new American silicon material supplier, planning for the silicon material used in the future decade. The silicon-carbon material of Group14 offers a capacity of 2,121 mAh/g and a first-cycle Coulombic efficiency of 92.5%. Compared to conventional silicon-oxygen anode battery, the capacity is raised by 30%, and the first-cycle Coulombic efficiency by 6.9%. The materials from Group14 can increase battery life by 17%. It is projected to mass produce in 2025.

### Battery and Quality Assurance System Optimization

E-One Moli Energy Corp. continues to optimize the current process and improve the yield rate, along with innovation on various technologies and development of AI approaches. At present, E-One Moli Energy Corp. has successively improved the production management system, introduced AI-powered smart manufacturing inspection system in the process, and developed the early warning model for equipment health.

The complicated quality management rules, developed by E-One Moli Energy Corp., are compiled into a management database, which reduces human errors and automatically produces statistical process control (SPC) chart in 30 minutes, and issues warnings. Throughout the production process, production elements are carefully managed with the PDCA cycle, i.e. Plan, Do, Check, and Act, improving the Process Capability Index (Cpk) to assure the product yield rate.

In addition, through the introduction of AI-powered machine vision inspection system to Automated Optical Inspection (AOI), the Company are able to automatically detect defects in electrodes in real time, such as the defects in coating shape, exterior, and thickness. Thus, E-One Moli Energy Corp. can reduce issues of invalid manufacturing and waste, ensuring the quality, quantity, and safety of battery products.

### Battery Megafactory in Kaohsiung Expected to Start Production in 2023 H2

Molie Quantum Energy allocated NT$12 billion to establish the first battery megafactory in Taiwan at Siaogang District, Kaohsiung. The main products shall be high-end, high-capacity, and high-charge-discharge ternary batteries. It is planned with an annual production of 1.8 GWh, mainly for high-end clients in the areas of luxurious electric supercars and aerospace technology. In 2023, Molie Quantum Energy established Taiwan's first "high-end lithium battery lab", dedicated to pursue breakthroughs. Meanwhile, big data-powered AI technology and fully-automated process lines are introduced to optimize the performance.

### Gold Level of Taiwan's Green Building Labeling and LEED Gold Certified

The sustainability concept has been incorporated in the design at the start. The systematic designs regarding ecology, green construction materials, solar energy, energy- and water-saving, and waste reduction are introduced to build a green factory in compliance with the Green Building Labeling of Taiwan and LEED certification.

**42+% of energy saving**

high-efficiency air-conditioning system structure with inverter control, combined with the process heat recovery system

**30% of water-saving**

installation of rainwater harvesting ponds; adoption of water-saving toilets and automatic flushing urinals and hydrants.

**The amount of water conserved and carbon sequestrated will be raised by 1 fold and 50% respectively**

native plants will be planted, along with creation of greens and flowerbeds to elevate the rainwater permeability and reduce flooding.

### Molie Quantum Energy Automotive Certifications in 2022

Molie Quantum Energy Automotive has obtained IATF 16949 certification and expects to obtain the Declaration of Conformity in 2023 Q3.

### E-One Moli Energy Corp. STSP Plant II Green Building Labeling Diamond Certified

**About 25% of STSP Plant II are green spaces, cutting 7,597 metric tons of CO2 annually.**

The rainwater harvesting system in STSP Plant II supplies 20-30 metric tons of irrigation water daily. Clad metal sheets are employed to save the power consumption of air-conditioning. Also, eco-friendly materials are extensively used for interior renovation.

### Product Certifications in 2022

UL1642 / IEC62133
Basic requirements of battery pack safety certification

UN38.3
Conformity to battery transportation regulations

ROHS / REACH
Conformity to the compliance with the restricted substances in products and the requirements of green supply chain

## Battery Safety Improvement via R&D

To raise the safety of advanced lithium-ion battery for application in the aerospace industry, E-One Moli Energy Corp. collaborates with KULR Technology Group, Inc. ("KULR") in thermal material development and management technology. In 2022, E-One Moli Energy Corp. and KULR have cooperated to improve battery safety and reduce the risks of accumulated energy and gas when battery fails.

E-One Moli Energy Corp. shall continue cooperate with KULR to introduce materials of heat- and compression-resistance, special additives featuring retarded combustion reaction, unconventional metallic materials, and optimized safety design so as to present the extremely safe ultra-high power batteries.

## The First Year of Battery Recycling

The year 2022 marked the first year of recycling for E-One Moli Energy Corp., which initiated the mid- and long-term R&D plans:

Working with MIT professors, target material restoration of retired batteries and high-safety electrolyte for research while ongoingly develop restoration technology of discarded cathode materials.

Together with Onyx Ta-Ho Environmental Services Co., Ltd., study waste slurry recycling, develop mass-producible recycling technology, and work with the Canadian team for effective waste cathode recycling.

Together with the client eVTOL, study the second-life applications of retired battery modules for TCC's future energy storage plan and to create a sustainable battery ecosystem chain.

### Development of Expandable Battery Module with Williams Grand Prix Engineering Limited

E-One Moli Energy Corp. and Williams Grand Prix Engineering Limited jointly define the specifications and develop expandable battery module for application in multiple areas. The battery module is expected to produce a module of ultra-high power and high degree of freedom, which can be applied to various high-end projects.

In 2023, E-One Moli Energy Corp. plans to post researchers at Williams Grand Prix Engineering Limited to involve in the project firsthand and develop the prototype system for performance and safety tests.

# 1.6 / Energy Supply New Energy, New Lifestyle

TCC creates a lifestyle where people and vehicles can charge together. TCC has expanded into EV and charging markets in Taiwan, Europe, and America in 2021 and aims to build the largest energy storage base in Taiwan at Heping, Hualien, and Suao, Yilan. TCC is the only energy corporation with capabilities in green energy, battery, energy storage as well as EV fast charging R&D and manufacturing.


## First ever DC-DC Charging Station in Taiwan Only 40% of the Power Supply Capacity of Other Suppliers Required

EV charging requires as much grid power as charging four convenience stores at the same time, which significantly influences the grid. Coupled with energy storage, NHOA.TCC will require lower grid power to charge the vehicles. Charging at 180 kW only requires 40 kW, while the rest is supplied by the energy storage system.


LINE

Resolve the Charging Anxiety of EV owners and Raise the Charging Spot Efficiency via **LINE**

**7,612** friends reached
**91%** of push message CTOR

Gender ratio
**80% male & 20% female**
75% of the membership older than age 35

## Charging UI over LINE
## Switch smoothly between Charging and Living

Domestic car brands and third-party charging providers require EV owners to download their apps for charging. The apps are feature-oriented closed UIs and seldom used outside of charging. NHOA.TCC's charging UI is built on LINE, which 95.7% of Taiwanese use daily. This approach is convenient for EV owners and helps NHOA.TCC reach potential customers through LINE's UI, which has a 93% weekly penetration rate. NHOA.TCC offers service information and green living news on its LINE UI before, during, and after charging. This encourages EV owners and potential customers to use the UI even when not charging, allowing for a smoothly transition between charging and daily life.

## Renewable Energy Combined To Create Pure Green Charger 24K Green

Three DAKA Smart Flower PV systems and an energy storage system power 24K Green, the first pure green charger in Taiwan, are established at TCC DAKA Station. Meanwhile, rooftop PV panels are installed onto the charging station to supply renewable energy to the machine room. This charging station not only consumes power, but generates green power. The 24K Green charger cut 1,581 kg CO2e emissions in 2022. In addition, Lequn and Zhishan Stations also have PV panels on their rooftops with an energy storage system stores off-peak energy for peak demand.

## Charging Stations

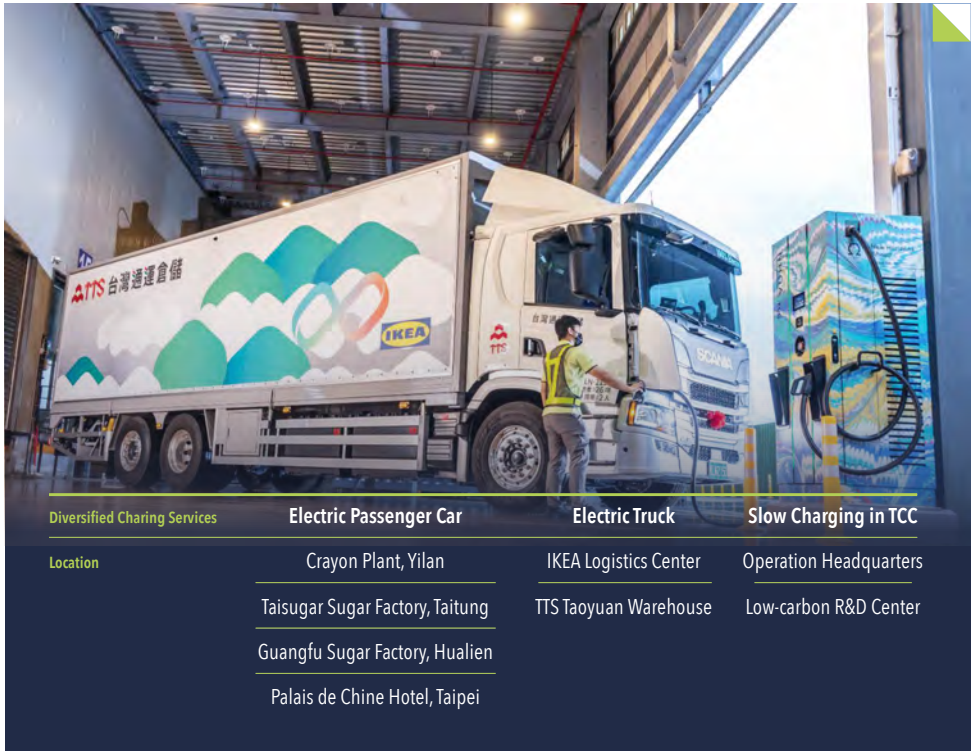
| | |
|---|---|
| STATION | TCC DAKA Station |
| TYPE | Relay station, the first pure green charger in Taiwan |
| FEATURES | "24K GREEN" DAKA smart power PV systems provide energy storage equipments<br>Free access to the shared electric bicycles |

| | |
|---|---|
| STATION | Tainan Yawan Station |
| TYPE | Residential station |
| FEATURES | Collaboration with Uni-president Enterprises Corp.<br>Patented UHPC Energy Storage Cabinet used<br>The first station with green-powered UPS(Uninterruptable Power System) |

| | |
|---|---|
| STATION | Taipei Lequn Station |
| TYPE | Urban station |
| FEATURES | The 1st station launched in the "Pilot Program for EV Fast Charging Stations" cooperated with Taipei City Government<br>"Sustainability Space" created for sustainable ecological image exhibition; the new low-carbon cement art Everlasting Bench made of UHPC<br>The lightening of the station is fully provided from the PV system on its rooftop; complete firefighting equipment available |

| | |
|---|---|
| STATION | Taipei Zhishan Station |
| TYPE | Suburban station |
| FEATURES | Echoing with the EV promotion program of Taipei City Government<br>Observatory on the 2nd floor<br>Complete firefighting equipment available |

| | |
|---|---|
| STATION | Nantou Fleur de Chine Hotel Station |
| TYPE | Hotel-based station |
| FEATURES | A station in partnership with LDC Hotels & Resorts Group<br>6 slow chargers are installed |




| Diversified Charing Services | Electric Passenger Car | Electric Truck | Slow Charging in TCC |
|---|---|---|---|
| Location | Crayon Plant, Yilan | IKEA Logistics Center | Operation Headquarters |
| | Taisugar Sugar Factory, Taitung | TTS Taoyuan Warehouse | Low-carbon R&D Center |
| | Guangfu Sugar Factory, Hualien | | |
| | Palais de Chine Hotel, Taipei | | |

### Cooperation with MIT for Charging Station Site Selection Model Research

In February 2022, TCC collaborated with MIT to conduct studies on charging station site selection using big data and AI algorithms, including EV penetration rate prediction, charging traffic flow prediction, regional load variation prediction, and regional power grid impact assessment. TCC plans to apply the results to select charging station sites in Taiwan, Mainland China, Europe, and the States, thereby expanding TCC's charging service business globally.

### Future Plan

TCC offers charging services integrated with energy storage system. Compared to other AC-DC charging stations, TCC's integrated system reduces grid load by almost 90% during peak hours and 70% during off-peak hours. TCC plans to expand to convenience stores and malls with new products, the "Charging-Storing Hybrid Charger" and "Hybrid UPS." TCC aims to reach 50 stations by the end of 2024 in the first stage of expansion.

# 1.7 / Energy Solution Serve SMEs

In alignment with SDG 7 "ensure universal access to affordable, reliable and modern energy services", TCC established subsidiary Energy Helper TCC Corporation on August, 2022; and we commit to providing a certain percentage of green energy annually to export-oriented SMEs to support them in achieving their carbon reduction goals.

## Energy Helper TCC Corporation – Green Energy Trading Platform

Energy Helper TCC Corporation launched "Green Energy Trading Platform" on November 22, 2022, to establish the one-stop energy management services. TCC has become the renewable energy retailer with the most self-built project sites and the largest green energy available on the platform in Taiwan, thanks to the diversified types of renewable energy available. It is projected to have 103 MW of installed capacity of renewable energy, equivalent to approximately 150 million kWh of green energy, for sale in 2023 first for the local enterprises to be competitive in the international supply chain.

"Online Green Energy Consultant" was initiated over the "Energy Helper TCC Corporation Green Energy Trading Platform." Using the big data computing, the clients can access optimized solutions based on their carbon reduction targets and consumption. Besides buying, other businesses can also sell their energy on the platform for improved allocation of green energy market resources.

TCC has installed multiple green energy systems in our plants for self-consumption and has unbundled Renewable Energy Certificates (RECs) that can be used for both green energy transmission and REC acquisition assistance. For clients facing intermittent issues,"Energy Helper TCC Corporation" is well-equipped to offer stable green energy services and comprehensive tailored integration solutions for enterprises.

**Green Energy Trading Platform**

| As of March 2023

Number of members: **225**

Project sites owned by non-TCC enterprises in negotiation to be commissioned for energy sale: **5**

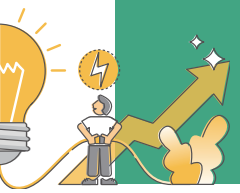
**Online Green Energy Consultant**

Offering various green energy solutions using **AI data analytics**

**1,141** accesses of Green Energy Consultant since the launch in November 2022

**Specialist of Energy Helper TCC Corporation**

**15 clients** have accessed complete planning by professionals



**Energy Helper TCC Corporation Provides Green Energy to ACER**

Energy Helper TCC Corporation entered the green energy trading market and assisted other industries to cut carbon emissions by acquiring green energy. In April 19, 2023, TCC signed Corporate Power Purchase Agreement (CPPA) with Acer Group and provided green energy generated by Chang-Wang wind farm to Acer Group. TCC provides Acer approximately 10 million kh of green energy annually, and takes collaborate actions towards the 2050 net-zero target.


## Future Plans

### Launch of Electricity Trading Platform

- Energy Helper TCC Corporation will add an Electricity Trading Platform Consultant to its website in 2023 to provide clients with resources for demand reduction, energy storage equipment, and generator equipment. The consultant will assess the suitability of client resources, thereby enabling a distributed electricity system and connecting small resources to the grid.

### Convenience in Green Energy Procurement

- Energy Helper TCC Corporation Corporation's platform will be continuously optimized to make green energy procurement as easy as online shopping.

### Achieving RE100 with Energy Storage Resources Combined

- Enterprises can achieve RE100 in various ways, such as purchasing unbundled RECs to compensate for grid energy consumption. TCC offers renewable energy and green energy storage products to assist clients in achieving RE100.

## TCC joined the Energy Trading Platform (ETP) of Taiwan Power Company

Through the ETP, TCC supports the grid stability, obtains service income, and ushers in benefits to the new energy business entity of TCC. The projects TCC is involved in include all the projects on the ETP, including d-Reg and E-dReg in the Regulation Reserve as well as Spin Reserve and Supplemental Reserve. The grid-connected large-scale energy storage projects in Zhangbin and Hoping of Hualien are involved in the d-Reg and E-dReg services. With the 30 MW demand resources integrated with the 2.2 MW behind-the-meter (BTM) energy storage system, the Hoping plant participates in the Supplemental Reserve ancillary service. The STCP Plant of E-One Moli Energy Corp. also participates in the Regulation Reserve ancillary service with a 1.2 MW/1.7 MWh BTM energy storage system. Moving forward, Energy Helper TCC Corporation shall provide proxy services for operations on the energy trading platform.



## NHΩA New Energy Business Overseas

NHOA is a subsidiary to TCC. TCC invested in Engie EPS, an European energy storage company, for 65.15% of its share and renamed it NHOA (New Horizons Ahead).

NHΩA derives its name of "Noah" from the biblical story Noah's Ark. The figure of Noah epitomizes mankind's epoch-making moment after the Great Flood.
The line below the NHΩA brand identifier symbolizes a new vision. Ω, one of the Greek alphabets resembling the rising sun to take the place of O, is also the unit of electrical resistance in Ohm's law. Facing the new horizon of green energy, NHΩA confers on the brand a new beginning and mission.

**NHΩA**
**Live in harmony with the Earth**
**Create a better future**
**for the generation to come**

NHΩA


## NHOA Energy

NHOA Energy is a leading global energy storage system integrator, with many project sites located in developing countries. With the development of markets and technology, there is great market potential in integrating small microgrids with PV panels and small batteries.

According to the plan of NHOA Energy across the five Continents, NHOA Energy plans to connect 1 GWh or more of energy storage capacity to the grid by 2030. Also, NHOA Energy aims to establish the world's largest energy storage project site in Taiwan, with an installed capacity of 400 MWh.

## Free2Move eSolutions

Free2Move eSolutions, under NHOA, is dedicated to developing EV fast charging infrastructure. It has begun deploying the world's largest bidirectional EV fast charging V2G project and building the largest virtual power plant with energy storage.

**Expected to be added by 2025**
**EV fast charging stations**
**Weekly capacity**

**2,750** CHARGING EQUIPMENT

### The Largest Charging Network in Southern Europe

**Across the traffic hubs of Europe**
**Establishing**

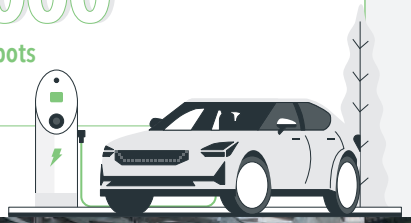
**215** 100% GREEN ENERGY CHARGERS

## Atlante Co.

NHOA's Atlante Co., which is dedicated to the development of EV fast charging infrastructure, has inaugurated or is building 1,300 or more fast and ultra-fast charging stations. In addition, Atlante Co. targets the focused cities, corridors, and neighborhoods of industrial parks in Southern Europe to build a strategic network and has approximately 2,000 new project sites under development.

**Install and operate 5,000~10,000 fast and ultra-fast charging spots in Italy, France, Spain, and Portugal by 2025**

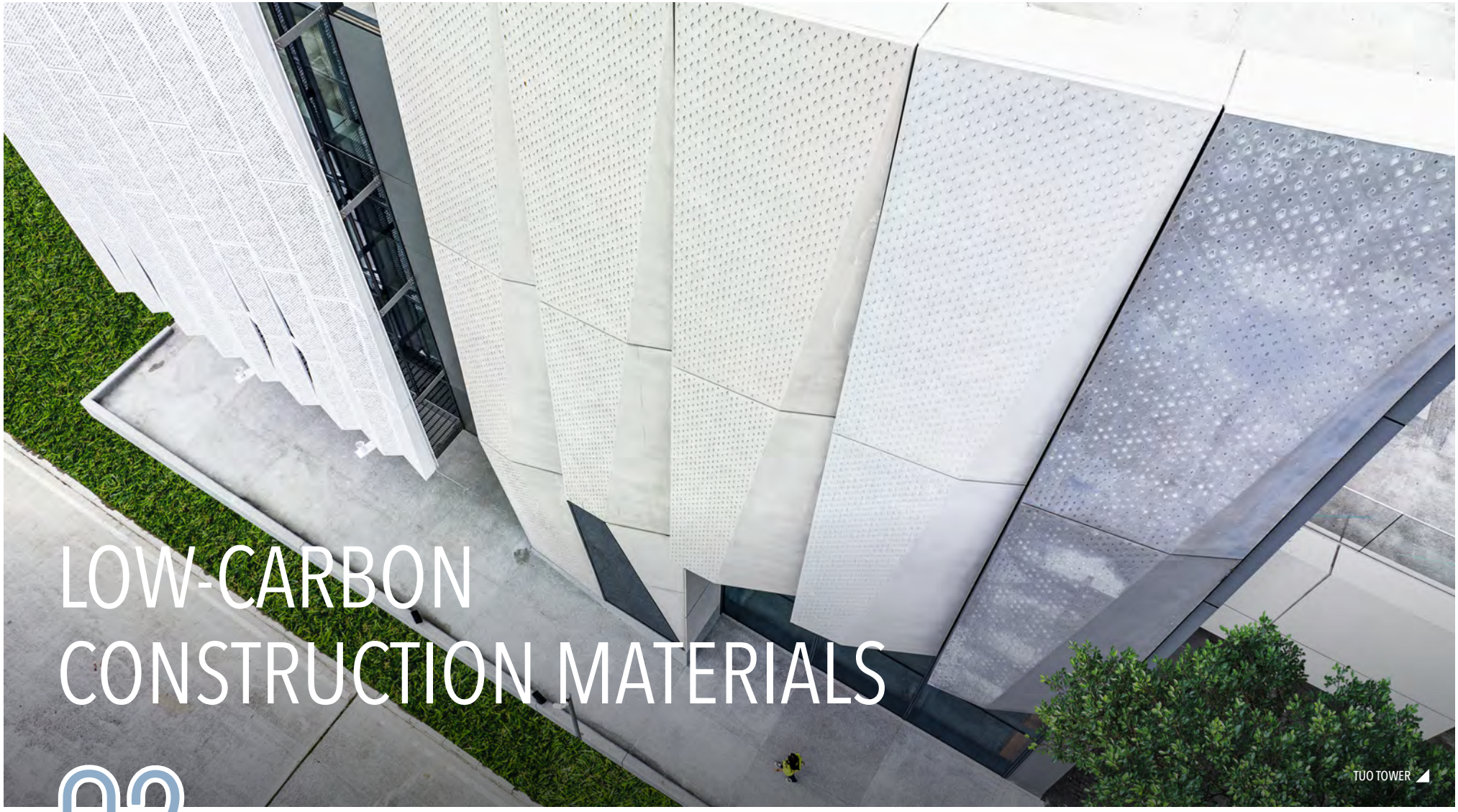
**Install over 35,000 fast and ultra-fast charging spots by 2030**



KLC
ready to go green?

**TCC has expanded our charging landscape to Portugal by acquiring KLC, the largest company of EV fast charging stations in Portugal.**

KLC has established the most EV fast charging stations in Portugal. Acquiring KLC provides several benefits, such as increasing the number of charging stations, gaining European market experience, lowering new platform costs, and making Atlante Co. the leader of the charging business in Iberian Peninsula.

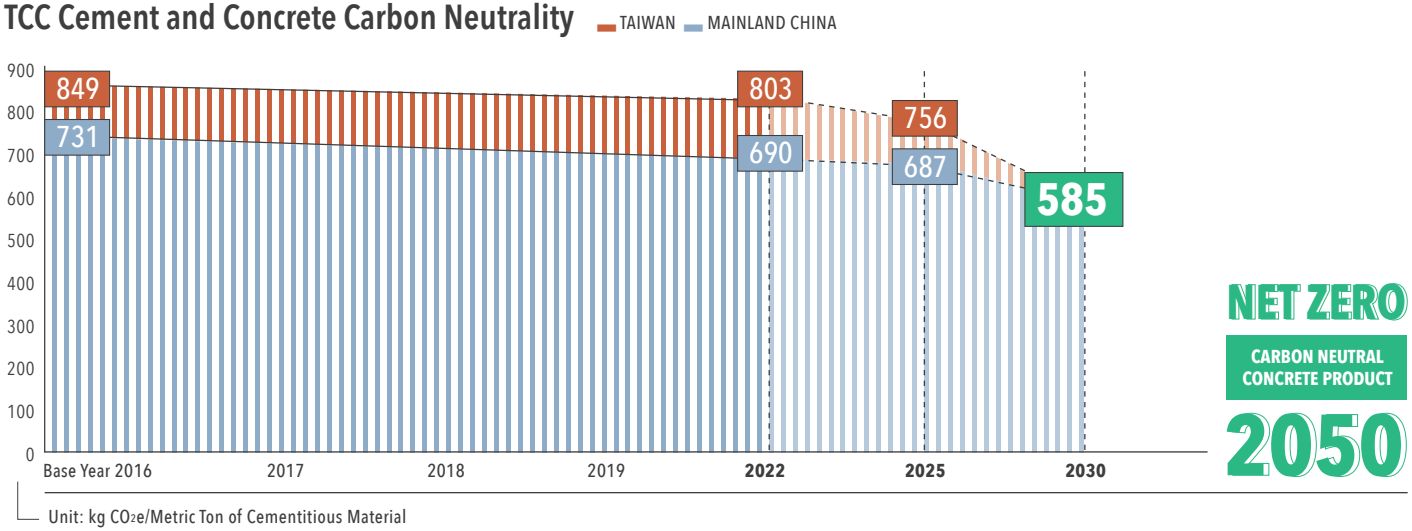



# LOW-CARBON CONSTRUCTION MATERIALS

# 02

## TARGETS

### TCC Cement and Concrete Carbon Neutrality




**NET ZERO**
CARBON NEUTRAL CONCRETE PRODUCT
**2050**

## 2022 PERFORMANCE HIGHLIGHTS

### GHG Emissions

**Carbon Emission Intensity**
**Cement Plants** **-5.40%**
**0.8033** $tCO_2e$/Metric Ton of Cementitious Materials
| Base Year 2016 | Scope 1, 2

**Total Emissions**
**RMC Plants** **-8.90%**
| Base Year 2020 | Scope 1, 2
**8,346.6292** $tCO_2e$

**Operation Headquarters**
**9.68** $tCO_2e$/person

### Energy

**EP100 Commitment**

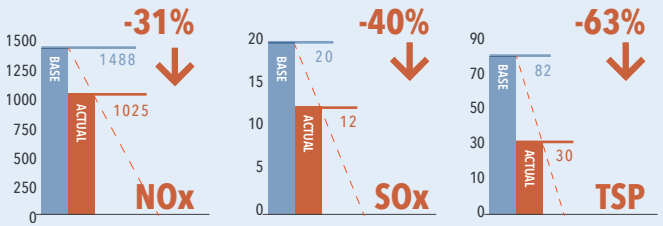
**Cement Plants**
**Energy Productivity** | Base Year 2016
**+59.6%** **0.522** Thousand/GJ

**Power Generation by Waste Heat Recovery**
**Recovery Efficiency**
| Compared to 2018
**+45.48%**

**Renewable Energy Generation for Self-consumption**
| Compared to 2021
**+10%**

### Air Pollution Emission Intensity

| g/t Clinker
| Base Year 2016




### Water Resource

| Base Year 2016
**Cement Plant**
**Water Withdrawal Intensity**
**-38.54%**
**0.00029** Metric Liters/ Metric Ton of Cementitious Materials

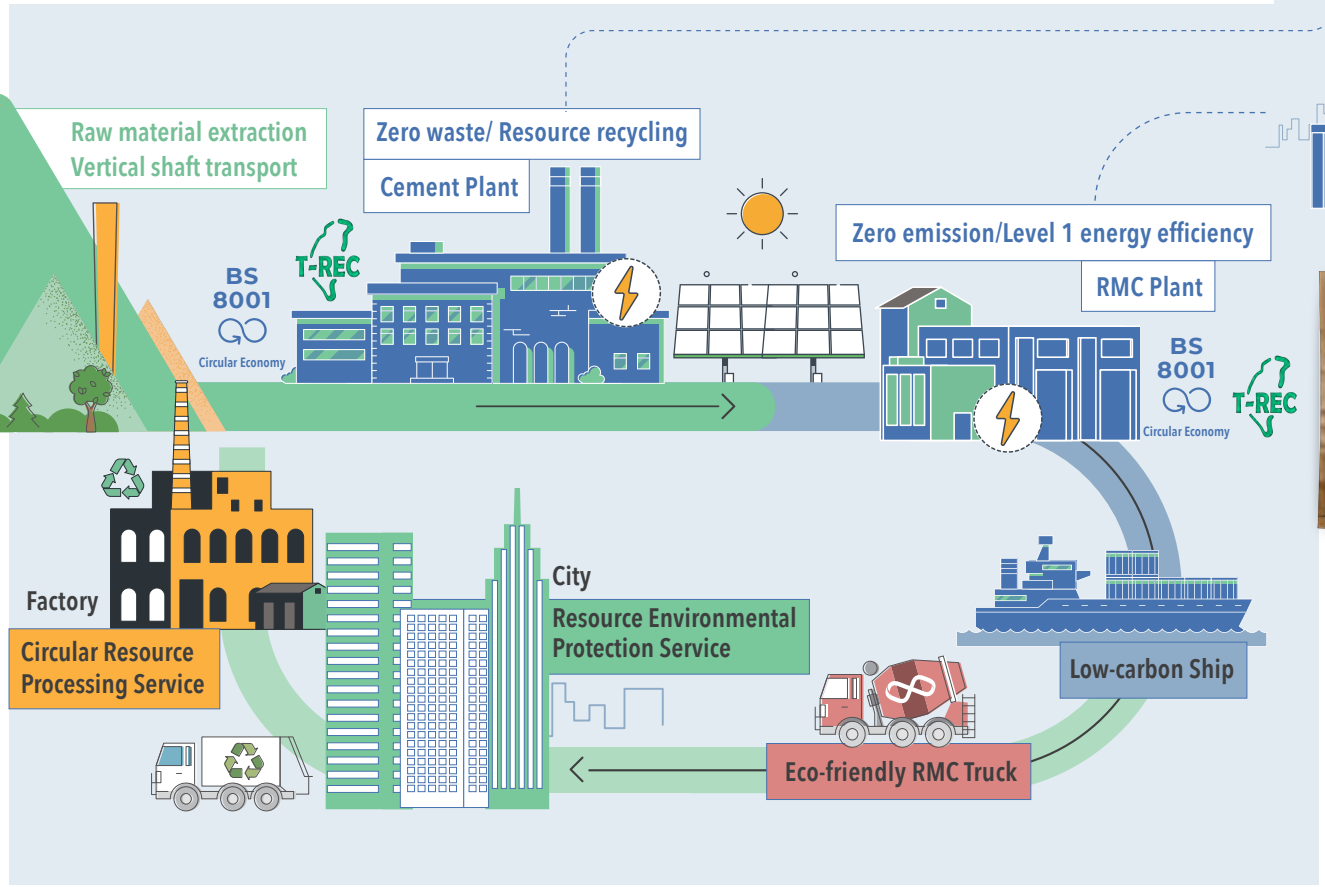
**RMC Plant**
**Water Withdrawal Intensity**
**0.00013** Metric Liters/ $m^3$ of Concrete

**Membrane Bioreactor (MBR)**
**Domestic Sewage 100% Reuse**
Equivalent to water withdrawal volume from June to December 2022
**-5.9%**

# 2.1 / Special Column **The Only Company with Dual Carbon Labels of Cement and Concrete**

**POLICY**

Upholding the goal of "zero waste, zero pollution, and zero emission," TCC introduced international standards, including ISO 14001 Environmental Management, ISO 50001 Energy Management, ISO 14064 GHG Emissions Inventory, ISO 14067 Product Carbon Footprint, ISO 14046 Water Footprint Verification, ISO 46001 Water Efficiency Management System, and BS 8001 Circular Economy. In addition, TCC requires our suppliers, contractors, subcontractors, and joint ventures to implement sustainable management in the processes of production, manufacturing, transportation and services.



**Cement with Carbon Reduction Label**

Carbon Reduction Label on Portland Cement Type I Taiwan EPA Gold-rated Green Mark

**Carbon Footprint Label for Concrete**

4000/5000/6000 psi Carbon Footprint Label

TCRI Product Traceability Certification

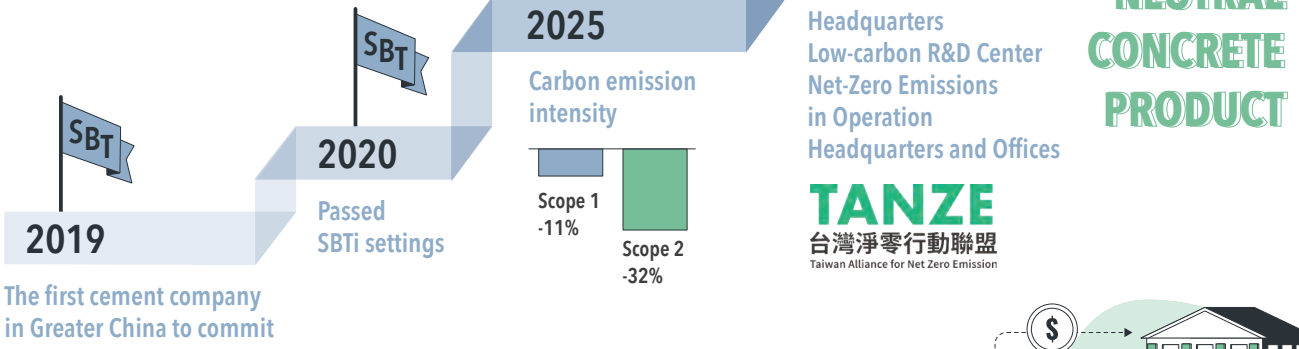
Good Ready-Mixed Concrete (GRMC)

EEWH (ongoing)

## 2.2 / Low-carbon Cement & Concrete

# SCIENCE BASED TARGETS

SCIENCE BASED TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION




### Internal Carbon Pricing

To drive low-carbon investment, improve energy use efficiency, and advance the carbon reducing ambition internally, TCC set an internal carbon price per metric ton at NT$300 as a reference for capital investment strategies and major decision-making. The price was based on the research by the London School of Economics and Political Science, commissioned by the EPA Taiwan in 2020.

### Carbon Reduction System

**Daily -** AI Carbon Reduction Management Platform real-time data, warnings for achievement situation

**Monthly -** Reports on executives' management meetings

**Annually -** Tied with performance bonus

### AI Carbon Reduction Management Platform

Since 2019, TCC has been calculating the carbon footprint of our cement and concrete products using a Life Cycle Assessment (LCA) methodology.

TCC has established a carbon management system that allows for real-time reporting of production data, and automated calculation of carbon emissions. By analyzing emission hotspots, the system provides optimized decarbonization recommendations and decisions to the plant, which are further integrated with KPIs and bonuses for senior executives and employees to ensure GHG reduction targets are met. In the future, TCC plans to extend the carbon emission life cycle management to our core businesses.

**4 Features**

Real-time
Optimization
Internal management
Extensibility

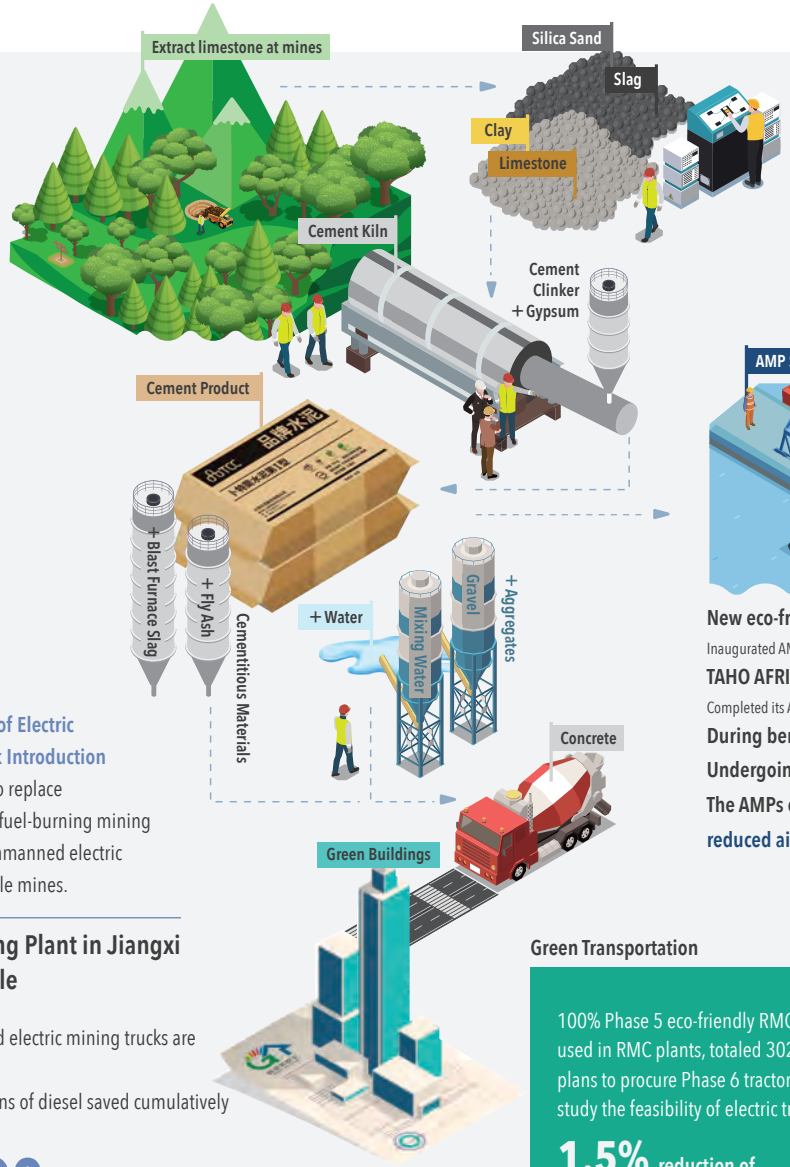
### Carbon Reduction Performance System

- **Targets for the plants**
  - Alternative raw materials/fuels
  - Equipment renovation situation | Local regulations
- **Carbon Trading Platform**


### Internal Carbon Trading Platform

The cement business is the focus of TCC in carbon reduction presently.TCC launched a pilot internal carbon trading platform in July 2022, for the cement plants in Taiwan and Mainland China. The Operation Headquarters allocated allowances based on the respective production capacity of individual plants and stipulated carbon intensity targets and carbon emissions caps. Each plant may present their needs for allowance trading on the platform. The price for transaction conforms to the matched price. The year-end clearance is subject to the current price of the Guangdong carbon market, which is linked with variable compensation. It is expected to be further strengthened in 2023 to drive the carbon reduction internally.

## The Low-carbon Production Flow at TCC




### The Only Hilltop Platform Phased-excavation with Vertical Shaft Transport System Employed in Taiwan

The Hoping Plant employs the Vertical Shaft Transport System to extract limestone in phases. The raw materials are dumped into the shaft and then crushed before being automatically transported to silos or the plant via enclosed conveyor belts in caves and tunnels with no noise and dust pollution.

**Reduce round trips on a daily basis**
**The amount of diesel consumed**
**by 1,600 truck trips**
**Annual average carbon reduction, around**
**23 THOUSAND METRIC TONS**

### Application of Patented AI Smart Kiln Optimization

TCC has developed a smart consumption reduction model that utilizes big data and AI. The model analyzes historical kiln operational data and sensor data that reflect the status in the field, including environmental monitoring, quality measurement, airflow, heat dissipation, using a machine learning algorithm to provide optimal operational recommendations, increasing production efficiency and reducing energy consumption.

On June 21, 2022, the system was granted
**Taiwan Invention Patent Number I 768545**


### AMP for Vessels

During vessel operation at ports, necessary power supply is still provided by onboard generators. TCC has been introducing Alternative Marine Power (AMP) to vessels and ports since 2022 to reduce emission pollution. In terms of port, TCC installed 9 AMPs at Port of Hoping, with 100% utilization by harbor boats in 2022. TCC-owned vessels accessed the AMPs for 1,155 hours, reducing 1,809.22 metric tons of carbon emissions. Port of Taichung and Port of Kaohsiung will finish installing by June and December 2023, respectively.

**New eco-friendly carrier, TAHO OCEANIA**
Inaugurated AMP in October 2020
**TAHO AFRICA**
Completed its AMP addition and retrofitting in October 2022
**During berthing at the Port of Hoping**
**Undergoing connection verification,**
**The AMPs of TAHO OCEANIA and the Port of Hoping**
**reduced air pollution emissions by 95% and carbon emissions by 43%**


### Assessment of Electric Mining Truck Introduction

TCC intends to replace conventional fuel-burning mining trucks with unmanned electric ones in eligible mines.

**Take Jurong Plant in Jiangxi for example**
November 2022
14 unmanned electric mining trucks are introduced
352 metric tons of diesel saved cumulatively
Equivalent to
**1,100 METRIC TONS**
**of carbon reduction**

### Green Transportation

100% Phase 5 eco-friendly RMC trucks are used in RMC plants, totaled 302 trucks. TCC plans to procure Phase 6 tractor heads and study the feasibility of electric trucks

**1.5% reduction of total fuel consumption in 2022**

Ta-Ho Maritime Corporation has procured 2 new eco-friendly carriers. After a 2.5-year docking overhaul in 2022, cement carrier fuel consumption decreased by about 3%. Ta-Ho also works with a renowned Japanese shipbuilder to design the 3rd generation high-efficiency carriers which will start operation in 2025 Q1.

**The self-developed Smart Ship management system plans the optimal course and speed, saving 3.4% of fuel consumption**

**Cement carrier carbon emissions in 2022 decreased by 19.1% compared to 2018**

# 2.3 / New Green Construction Materials

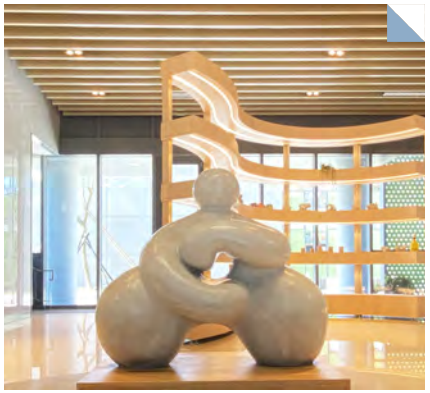
**MANAGEMENT APPROACH**

Continuously develop eco-friendly products and innovations to elevate the added values to products and promote green products.

## Ultra-High Performance Concrete

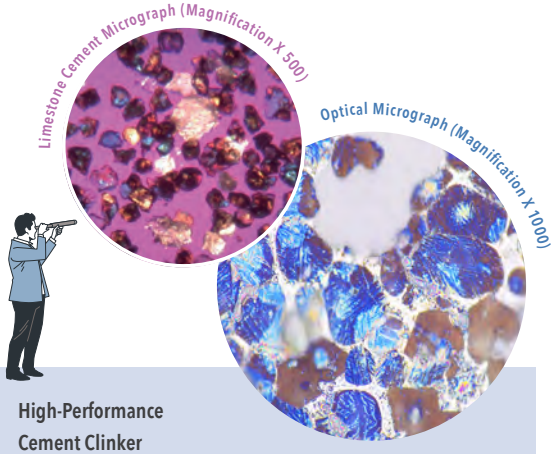
TCC's newly formulated ultra-high performance concrete (UHPC) is an innovative cement material with ultra-high durability and high mechanically-compressive strength, surpassing conventional concrete and marking a significant engineering advancement.

Traditional concrete offers a life span of 50-70 years, yet UHPC construction materials increases indoor structural space and lasts 100-120 years, reducing building reconstruction and the resulting waste. The TCC Low-Carbon UHPC Center is currently under construction and expected to commence trial operations in July 2023. The center aims to produce high-quality, low-carbon materials.



## Fly Ash | Limestone Cement

TCC continues to develop low-carbon products. TCC increases fly ash and limestone mix ratio to reduce clinker ratio, and explores alternative cementitious materials. The successfully developed fly ash cement, Portland Cement Type IP, reduces carbon by 15-30% compared to Type I. The low-carbon fly ash concrete mixed with IP cement cuts carbon by 10-15% compared to existing concrete and has been used in flooring, ground, and infrastructure of the energy storage site at Hoping Plant in Hualien. The Guigang Plant in Guangxi adds limestone powder from its mine in the alternative adjunct experiment, expected to achieve carbon and cost reduction benefits upon completion.




**High-Performance Cement Clinker**

This environmentally-friendly cement is characterized by high durability, late strength, fluidity, and ultra-low heat of hydration. The production process reduces the amount of limestone and lowers the firing temperature, leading to reduced $CO_2$ and NOx emissions and a more efficient use of natural resources and energy.

**Construction Circular Materials and Concrete Recycling**

It is mainly the debris after building demolition and the one recovered from the RMC plants, which is divided into coarse and fine aggregates for the experimentation and research by the Low-carbon R&D Center. Aside from assessment for the self-compacting purpose, it is mainly used to replace the controlled low-strength material (CLSM). Also, the Center conducts planning for the recycling equipment and the hardened cement paste sent to cement sites as alternative materials. In addition, concrete debris is used as the construction materials and floor tiles of TCC plants as well as the car bumpers and sod at charging stations to live up to the ideas of carbon reduction and eco-friendliness.

Test for slump flow of UHPC

## Low-carbon Construction Materials R&D Center

TCC ceaselessly optimizes concrete ratio design based on regional aggregate status and client needs. In January 2023, the Low-carbon Construction Materials R&D Center with thermal, chemical, permeability, durability, and carbon neutral materials laboratories was established to improve aggregate quality, and achieve carbon reduction targets.

### Low-carbon concrete development

Develop low-carbon concrete materials, share relevant technological news, regulatory changes, and publish academic papers to reduce environmental impacts and achieve carbon neutrality in RMC plants.

### Quality control

Randomly inspect plants through quality and EHS checklists, improve and normalize machinery equipment; and improve the effectiveness of quality control in RMC plants for quality assurance.

### Laboratory and trainings

Through obtaining the accreditation from the Taiwan Accreditation Foundation (TAF) to improve laboratory professionalism. The center also provides a learning platform and training courses to monitor the plants' carbon reduction.

### The Only Self-developed 3D Printing Cement Construction Material in Taiwan

The 3D printing material of TCC is cost-effective, strong, colorful and suitable for large-scale printing, with commercial potential. TCC is currently in the experimental phases of 3D printing, which include:

STEP-1

**MATERIAL RATIO**

**FLUIDITY**

**SETTING TIME**

**MATERIAL STRENGTH**

STEP-2

**SMALL-SCALE TESTING**

**EXTRUDABILITY**

**SUPPORT**

STEP-3

**SMALL-SCALE PRINTING**

**BUILDABILITY**
**0.5*0.5*0.5M**

STEP-4

**LARGE-SCALE TESTING**

**PUMPABILITY**
FORCIBLE AND CAPABLE OF CONTINUING SUPPLY IN LONG DISTANCE

**SUPPORT**

STEP-5

**LARGE-SCALE PRINTING**

**BUILDABILITY**

**EXECUTION STAGE**
**3*3*3M**

# 2.4 / Environmental Indicators Management

**MANAGEMENT APPROACH**

TCC strengthens measures on environmental protection and management to avert pollution to water, air, and soil; reduces the negative impacts to human health and the environment to the best of its ability; and adopts measures of the best available pollution prevention and control technology.

## Water Resource Management

TCC utilized the WRI Aqueduct Water Risk Atlas to assess water supply at operation sites. The analysis shows that none of the sites in Taiwan face high water stress. However, TCC proactively implements water-saving solutions, including water use control, rainwater harvesting, and setting a target of 100% zero discharge of wastewater. Verification of ISO 14046 Water Footprint and ISO 46001 Water Efficiency Management System were introduced. With the water footprint management platform and Alliance for Water Stewardship (AWS) standards adaptation, TCC achieves comprehensive water resource management. TCC surpasses the Water Resources Agency's industrial benchmark range for water conservation charges, which is 30-80% for the water conservation rate, released on January 7, 2023.

ALLIANCE FOR WATER STEWARDSHIP | ISO 14046 | ISO 46001

## Shaft Reclaimed Water System

TCC improves water use efficiency by developing the shaft reclaimed water system, adding pipelines, pumps, and tanks, and repairing old pipelines.

**Hoping Mine**

From its completion in May 2021 to 2022

**has reclaimed cumulatively**

**15,721**

**METRIC TONS of water**

## Water Recycling Projects and Repairs

**Suao Plant**

**New pipelines addition and old pipelines repair for cooling water reclamation**
Saved
**157,332**
**metric tons of water**

**Yongle domestic water pipeline modification project**
Saved
**12,240**
**metric tons of water**

**Effluent recycling project**
Saved
**70,280**
**metric tons of water**

## Wastewater Management

Cement plant wastewater comes from production and the employee sewage. The plants have installed wastewater management systems, through centralized processing and silting basins, wastewater is discharged only after meeting effluent standards.
TCC conducts self-inspection regularly. The authority also collects on-site outfalls samples regularly to ensure that discharged wastewater does not harm water, ecology, or human body.

### Hoping plant

Sewage treated: **14,340 $m^3$** in 2022
Discharged to the Pacific Ocean after meeting Hoping Industria Park's standards

**Membrane bioreactor (MBR) processing system**
activated on May, 2022
2022 total recycle amount 28,225 $m^3$
Clean domestic sewage, and reuse it for sprinklers, plant watering, tire cleaning, etc., achieving 100% reuse. The total amount of water withdrawal is reduced by 5.88% compared to the same period in 2021

### Suao Plant

Water flowed through the outfalls:
**377,909 $m^3$** in 2022
Converged process water and rainwater runoff treated at sedimentary pond for treatment before discharging to Baimi River

### RMC plants

Regular construction materials such as granulates, cement, and concrete additives were recovered and reused water after sedimentation, resulting in
**100% no wastewater discharge**

## Renewable Energy for Self-consumption

Currently, T-REC procurement is not used as TCC's means to reduce carbon emissions. Instead, TCC prioritizes renewable energy generation for self-consumption. Spaces available for renewable energy installation in all sites were inventoried. In 2022, the renewable energy generation for self-consumption reached 307,683 kWh, accounting for 0.056% of total electricity consumed.

## Water Footprint Management Platform

TCC adopted water footprint management platform, which monitors data of water withdrawal,consumption, recycling, and discharge. Despite calculating water recovery rate in real-time, the system can also compare consumption intensity with peers to strengthen water management.


## Rainwater and Process Water Recycling and Treatment Equipment

The equipment has been installed in all 25 RMC plants, resulting in 100% water use without discharge or waste.

**Runoff wastewater:**
Rainwater is stored in the rainwater pond for water truck floor cleaning, process water, and tire-cleaning.

**Process wastewater:**
Wastewater from RMC mixers and conveyor belts is treated with a sand separator to remove granulates and sent to the sewage pond for use as reclaimed water in cleaning RMC mixers and tanks.

## Energy Management

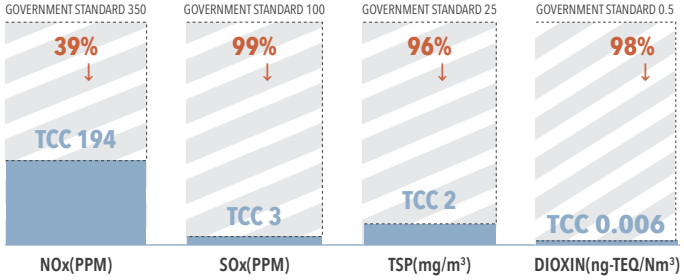
All TCC cement plants are 100% ISO 50001 certified. RMC plants and the Operation Headquarters are in the certification process and expected to be certified in September 2023. Energy-saving plans are also promoted annually to enhance energy efficiency.

### Plants' Energy-saving Plans and Results

| Plant \| Energy-saving Plan | Duration | Energy saved (kWh) | Costs saved (NT$) |
|---|---|---|---|
| **Hoping Plant** | | | |
| Raw mill turbine frequency conversion modulation and modification | 2022/1-9 | 2,443,770 | 5,645,109 |
| Replacement of the shaft system lighting with LEDs | 2022/1-11 | 385,761 | 891,108 |
| Technological transformation of raw mill's triple flap valve | 2022/1-5 | 2,921,318 | 6,748,245 |
| Plant-wise replacement of mill lighting with LEDs | 2022/11-12 | 622,106 | 1,437,065 |
| **Suao Plant** | | | |
| Technological transformation of raw mill's triple flap valve | 2021/5-2022/4 | 1,787,633 | 4,040,051 |
| Replacement of bricklaying air compressors | 2021/6-2022/5 | 827 | 1,869 |
| Lights changed to central-controlled | 2021/5-2022/4 | 136,512 | 308,517 |
| Replacement of air compressors | 2022/1-12 | 307,135 | 694,125 |
| Replacement of the kiln system lighting with LEDs | 2022/9-12 | 67,131 | 151,715 |
| Replacement of the road lighting on the plant with LEDs | 2022/10-12 | 30,321 | 68,524 |
| Replacement with energy-efficient nozzles for kilns | 2021/1-12 | 16,604 (Liters of diesel) | 415,100 |
| **Bade Plant** | | | |
| Process equipment retrofitting | 2022/1-12 | 61,587 | 260,725 |
| **Guishan Plant** | | | |
| Process equipment retrofitting | 2022/1-12 | 79,125 | 306,254 |
| **Dadu Plant** | | | |
| Conveying equipment retrofitting | 2022/1-12 | 591 | 2,181 |
| **Tainan Plant** | | | |
| Process equipment retrofitting | 2022/1-12 | 23,100 | 83,853 |
| **Operation Headquarters** | | | |
| Turn off the lights during lunch break | 2022/1-12 | 74,200 | 737,483 |
| Adjust the water temperature of the ice machine | | | |
| Adjust the operating time of the elevator | | | |

## Air Emissions Management

TCC rigorously manages our air emissions in processes. With standards stricter than government's, air emissions are systematically managed via equipment retrofitting, enclosed conveyor belts, and the relevant NOx control technologies. The emission concentration levels of NOx, SOx, Total Suspended Particulate (TSP), and dioxin in 2022 were far below the government's standards.




### Gaseous Pollutants

- Selective Non-Catalytic Reduction (SNCR) denitrification equipment planned
- Low-sulfur, sub-bituminous coals used
- Low NOx burners adopted
- Multi-stage combustion equipment planned

### Particulate Pollutants

- Optimization of bag dust precipitators to improve filter bags' dust collecting efficiency
- Airtightness improvement of the corridor belt conveyor systems to reduce dust escape
- Ongoing optimization of the electrostatic-bag dust precipitators in the kiln systems

### 24-hours Continuous Emission Monitoring Systems (CEMS)

With the CEMS of stacks, TCC ceaselessly monitors the emissions of flue gases 24/7. Meanwhile, air quality monitoring stations were set up at Heping Village and Aohua Village for a continuous monitoring of the cement plant, so that appropriate measures can be taken to cope with any anomaly or emergency. In addition, TCC commissions a third party to conduct air quality monitoring on a quarterly basis. Also, an environmental impact assessment is conducted for schools in the neighborhood every 6 months. All the monitoring results were in conformity with the regulatory requirements in 2022.

## Waste Management

All wastes at TCC are not hazardous wastes and are conducted with off-site disposal. TCC cement plants have zero waste generation as all waste, including those from employee activities, maintenance waste lubricating oils and filters, etc., are recycled and turned into harmless reusable resources through high temperature in the rotary kiln process. Valuable industrial wastes like iron and metals are recovered by qualified third-party clearing agencies commissioned by TCC on a regular basis. A total of 978.05 metric tons of waste was disposed in 2022.

177.36 metric tons of non-hazardous waste was disposed of in 2022 from RMC plants, mainly comprising of 170.13 metric tons of domestic waste and 7.23 metric tons of inorganic sludge. All wastes were disposed of by qualified agencies. Also, 172.9 metric tons of waste iron from the replaced parts were sold to recyclers.

The Operation Headquarters generates mainly domestic waste. Management regulations are in place for waste sorting and recycling. Qualified recyclers conduct regular clearing services and provide related evidence for TCC to track. In 2022, 35.35 metric tons of domestic waste were generated based on clearing manifests.

## Group Electric Vehicle Replacement Program

TCC inventoried company cars suitable for replacement with EVs. All cars are replaced with EV in Operation Headquarters and Low-carbon R&D Center; Hoping Cement Plant, Kaohsiung RMC, Taichung RMC, Hoping Port, Hoping Power Plant, Ta-Ho Maritime, E-One Moli Energy Corp. are replaced successively. The replacement across all departments and sites will be continued, subject to regulatory requirements for cars with 7 seats or more.

## Installation of Chargers to Operation Sites

NOHA.TCC actively installs slow chargers in our plants and affiliated companies. The charger is primarily for company cars, followed by those for employees and guests. The Company also offers a discounted charging rate of 10% off the market price, encouraging employees to switch to EV.

### Green Office Initiative

TCC joined the Green Office Environmental Label Initiative, banning disposable plastic bottle water in meetings and using glass or porcelain cups instead. TCC also procures certified environmental or FSC labeled copy paper for general affairs, adhering to the green office philosophy.


## Green Building Certification Status of TCC Operation Headquarters & Plants

TCC Operation Headquarters Building: EEWH Diamond-Level Green Building

TCC DAKA Renewable Resource Recycling Center(RRRC): EEWH Green Building and Low-Carbon Building (verifying)

TCC. C. F. Koo Building in Hangzhou: Leadership in Energy and Environmental Design (LEED) Gold and WELL Precertified

# RESOURCE RECYCLING

CIRCULAR ECONOMY, PORT, POWER, CEMENT PLANT OF HOPING, HUALIEN

# 03

## TARGETS

### Ratio of Alternative Raw Materials | 2025

TAIWAN 28%

MAINLAND CHINA 30%

### The Thermal Substitution Rate (TSR) of Alternative Fuels | 2025

TAIWAN 35%

MAINLAND CHINA 35%

bsi. BS 8001

**Certified to the Highest Level of BS 8001 Circular Economy**

## 2022 PERFORMANCE HIGHLIGHTS

### Resource Recycling

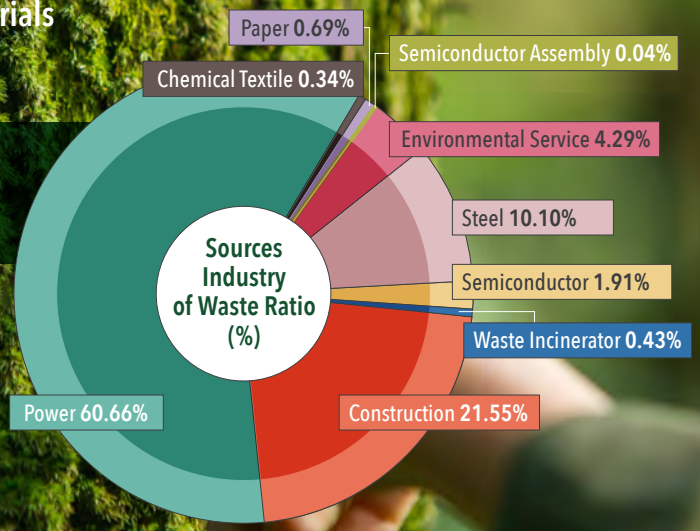
Reuse per metric ton of cement **24.27%**

Ratio of alternative raw materials **23%**

Total carbon reduced **135,573** metric tons $CO_2e$

Wastes treated for industries **110.1** million metric tons

Equivalent to the total amount of industrial waste in Taiwan **5.3%**




### Thermal substitution rate of alternative fuels

CIMPOR

Alhandra Plant Nearly 50%

Souselas Plant 33%

Loule Plant 32%

OYAK

Aslan Plant 53%

Ankara Plant 50%

Bolu Plant 24%

Recycle with Peace (Hoping) Now!

Carbon reduction **1,970.94** KG

# 3.1 / Special Column **TCC DAKA Renewable Resource Recycling Center (RRRC): World-class Iconic Green Building**

**POLICY** TCC aims to increase resource use efficiency and promote sustainable use of Earth's resources by utilizing environmentally friendly recycled materials.

a&d AWARDS 2021

**Gold Award of A&D Awards**
**Application for Green Building and Low-carbon Building Certifications**

TCC DAKA RRRC received the Gold Award of 2021 A&D Awards with its MIXED USE design of future city, following the contour of the Heping Village ecological valley, with the upper and middle parts of the structure overlapping in an elliptical shape, resembling the movement of celestial bodies in the universe. RRRC shall receive green building and low-carbon building certifications, fostering mutual benefits among the building, environment, and society.

**Milestone of Circular Economy**
**Co-processing of Domestic Waste with Cement Kilns, First in Taiwan**

TCC DAKA Phase II Environmental Landmark Building–TCC DAKA Renewable Resource Recycling Center (hereinafter "RRRC") is to engage trial run in Q3 of 2023 and officially complete its construction in 2024. RRRC shall address Hualien City's waste crisis and handle 200 metric tons of waste daily. This will prevent methane pollution from garbage piles, which is equivalent to an annual carbon reduction of 40,000 metric tons. The energy generated from processing the waste can also replace certain portion of fuels, leading to waste and carbon reduction benefits. RRRC will also become the first in Taiwan to use cement kilns for co-processing domestic waste at high temperatures, and achieve carbon reduction through recycling. TCC does not prioritize profit-making and has invested over NT$40 billion. RRRC has been planned by one of the world's top ten design firms, KPF, and utilizes the most advanced design for the equipment from Kawasaki Heavy Industries in Japan.

## World-class Advanced Technology & Equipment | Enjoy Coffee and the Pacific

The co-processing of waste in cement kilns is a highly scientific, efficient and environmentally-friendly method. As the kiln reaches 1,300°C at the process, it minimizes residue production and can eliminate toxic substances like dioxin. Through advanced gasification and the unique characteristics of cement kilns, waste materials can be stabilized in cement clinkers. The facility promises zero odor and smell and visitors can enjoy coffee with a view of the Pacific. TCC aims for the garbage processing venue to be in harmony with the environment and welcoming to residents and visitors alike.

## From Protested to Trusted by the Local | Inclusivity and Co-benefit between Industry and Community

Starting from 2019, TCC has been involved in the "BOO (Build-Own-Operate) Project for Co-processing Waste in Cement Kilns" initiated by the Hualien County Government. TCC attended local forums, briefings, expert group meetings, and environmental impact assessment (EIA) meetings successively as well as communicated with the residents from the villages in the neighborhood through home visit and other forms. Many residents gradually went through the process from protesting and not understanding to consensus and willingness to work with TCC together to build the Heping Village into an iconic green community.

The RRRC project showcases the application breakthroughs of engineering materials performance by using green construction materials and ultra-high-performance concrete (UHPC) produced by TCC.

## TCC DAKA Renewable Resource Recycling Center– World Garden, Mine Rock Garden, and Ferns Garden

Dr. Cecilia Koo Botanic Conservation Center (KBCC) planned to work with TCC DAKA RRRC to build World Garden, Mine Rock Garden, and Ferns Garden on the platforms of 20 and 35 meters high. Aside from the primary focus of world plants conservation in World Garden, Mine Rock Garden and Ferns Garden will present the biodiversity of plants in mines and serve the function of ex situ conservation.

At present, plants like Taiwan urn orchid (Bletilla formosana (Hayata) Schltr.), Formosana begonia (Begonia formosana (Hayata) Masam.), and Taiwan hortensia (Hydrangea longifolia Hayata) have been included in the cultivation project successively. New sapling nursery has also been created in the mine to care for seedlings in the future. It serves the purpose of sapling production, ex situ conservation, and popular science education as well. It has conserved over 1,000 plants of 30 species thus far and aims to collect over 300 species of plants local to mines in the future. TCC plans to offer guided tours to enable more people to appreciate the natural beauty of mine ecology.

# 3.2 / Alternative Fuels & Raw Materials

**MANAGEMENT APPROACH** TCC prioritizes natural resource and energy consumption issues by developing alternative fuels and raw materials, and establishing annual product energy consumption indicators for coal and electricity to avoid unnecessary resource consumption.

The Global Cement and Concrete Association (GCCA) pointed out that alternative fuels & raw materials are vital for sustainable transition of cement industry. Through the circular economy model, TCC will not just reduce carbon emissions and natural resource usage, but further resolve waste issues for society and enterprises, bringing about synergy of circular economy.

### 1,300°C High Temperature of Cement Kiln
### Core Power of Circular Economy

The co-processing with cement kiln is the core competence of the cement industry. It is hailed as the venous industry of circular economy, which can achieve neutralization and recovery of wastes for reuse. According to the World Business Council for Sustainable Development (WBCSD), the average temperature of over 1,300°C of cement kiln can break down dioxin and turn waste into renewable resources to substitute raw materials and fuels for cement, reducing carbon emissions and fossil fuels.

## TCC Circular Economy Model


### Uses of Alternative Fuels at TCC

| Alternative Fuel | Status |
|---|---|
| Waste textiles & used clothes | In use |
| Discarded Tetra Pak and meal boxes, and waste paper | In use |
| Waste plastics | In use |
| Waste wood chips | In use |
| Construction waste | In use |
| Spent mushroom compost bulk bag | |
| **To assess the technology of spent mushroom compost bulk bag processing and its economic benefit in alternative fuel** | **Under assessment** |
| Non-hazardous oil | |
| **Applied for reuse thereof** | **Preparation in progress** |
| Waste cooking oil | |
| **To clarify if waste cooking oil is fit for use as waste** | **Under assessment** |


TCC explores alternative fuels, such as bioenergy, solid recovered fuel (SRF), and application of agricultural residual materials, and studies the transformation of spent mushroom compost, non-hazardous oil, and waste cooking oil into biodiesel in 2022.

In terms of the alternative fuel use in 2022, TCC continued to develop biofuels from agricultural residual materials like waste woodchips, rice husks, and barks, SRF, refuse derived fuel (RDF) from wastes around industries like waste textiles/used clothes, discarded Tetra Pak and meal boxes, and waste paper, waste tires, waste rubber products, etc. as alternative fuels.

In 2023, TCC plans to explore more alternative fuel solutions. For example, TCC will assist the Council of Agriculture with the issues of spent mushroom compost bulk bag as well as CPC Taiwan with oil reuse and assessment of transforming the waste cooking oil from the fast food industry (crude glycerin) into biodiesel.

**The substitution rate of biofuels and SRF, take the use rate in weight in Taiwan for example**

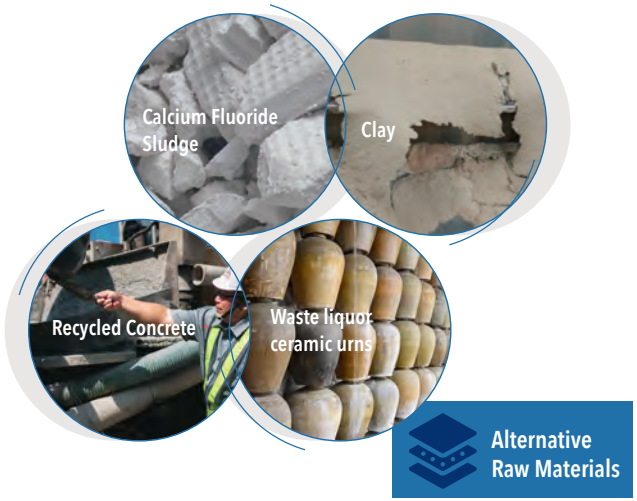
**grew from 0.21% in 2020 to 6.3%**

**cutting 190,000 METRIC TONS of coal use volume overall.**

**It is expected to increase by 2 folds in 2023 compared to 2022.**

### Clearing Alien Species White Popinac and Assessing the Development of Biofuels

The invasive White Popinac, a top 100 global ecological threat, must be completely removed along with its roots and soil for thorough eradication. However, the shattered remains can be processed and used as a partial alternative fuel. The Hualien County Government, in collaboration with TCC, is implementing a removal project in the Mugua River basin and assessing the feasibility of utilizing the removed White Popinac and surrounding soil as alternative fuel.




The International Energy Agency (IEA) stated that the cement industry needs to move towards sustainability, with the use of alternative raw materials in cement manufacturing being one direction. Greenpeace emphasized that cement production is a significant source of GHG emissions globally, and that using alternative raw materials can reduce CO2 emissions.

TCC in 2022 assisted industries to treat wastes and develop alternative raw materials for use. The Hoping Plant started to use calcium fluoride sludge as part of the alternative raw materials in March 2022. The Suao Plant has been using engineering or construction waste soil as a substitute for natural clay. The amount of engineering or construction waste soil treated in 2022 was 237,274 metric tons, accounting for 20.9% of the resources reused by both plants in Taiwan.

TCC aims to assist Hualian Distillery in 2023 with the disposal of waste liquor ceramic urns. An estimated 50-60 metric tons of broken urns are expected, and there will be about 10 metric tons of them to be used as alternative raw materials per year, with TCC exploring new sources to maintain a steady supply.

TCC reused almost 4.06 million metric tons of resources as alternative raw materials in the past 4 years, increasing the substitution rate of alternative raw materials in cement from 19% in 2019 to 22% in 2022.

## Verification of TCC on the Path to Carbon Neutrality
## Highest Level of BS 8001 Circular Economy: Optimizing Certified

**2018/3**

Introduction by Foundation of Taiwan Industry Service **Circular Economy Certification (BS 8001 standard from U.K.) Program**

**2018/12**

Certified against BS 8001: Framework for implementing the principles of the circular economy in organizations with the topic **"Industrial Waste Treatment for Reuse"** Ranked Level 4: Optimizing grade as **the first company in the cement industry with this certification**

**2020/12**

With the topic **"Expanded Use of Alternative Raw Materials/Fuels in the Cement Processes"** Recertified against BS 8001: Framework for implementing the principles of the circular economy in organizations Ranked Level 4: Optimizing grade

**2022/12**

With the topic **"Verification of Alternative Raw Materials/Fuels on the Path to Carbon Neutrality"** Certified against BS 8001: Framework for implementing the principles of the circular economy in organizations Ranked Level 4: Optimizing grade for the 3rd time

### "3-in-1 of Port, Power, Cement Plant" at Hoping

for Low-carbon Manufacturing with Zero Waste
An Average of **33,000** METRIC TONS of Carbon Reduced Each Year

The circular design at TCC Hoping Plant adopts the highest environmental standard for the processes, negative-pressure totally enclosed storage and conveying system, Low-NOx processes and equipment, and Continuous Emission Monitoring System (CEMS) installed to the stacks.
The Hoping Power Plant uses 60,000 metric tons of cement plant-generated limestone annually for eco-friendly desulfurization. An average of up to 420,000 metric tons of coal ash and desulfurization gypsum from power generation wastes are 100% provided to the Hoping Cement Plant as alternative raw materials each year, reducing the use of natural minerals and coal in cement products and replacing clay and gypsum. Furthermore, sea freight shipping reduces carbon emissions by 20 times compared to land transportation.

### Alternative Raw Materials/Fuels Used in 2022 (in metric ton)

| Resource Reused at TCC (Taiwan) | Alternative Type | Amount in 2022 |
|---|---|---|
| Calcium Fluoride Sludge | Alternative Raw Material | 21,026 |
| MgO-based Desulfurized Inorganic Sludge | Alternative Raw Material | 11,291 |
| Coal Ash | Alternative Raw Material | 420,886 |
| Desulfurization Gypsum | Alternative Adjunct | 247,118 |
| Incinerated Recycled Aggregates | Alternative Raw Material | 4,766 |
| Reducing Slag from EAF | Alternative Raw Material | 96,324 |
| Construction Waste Soil | Alternative Raw Material | 237,274 |
| Waste Compression Molding | Alternative Raw Material | 456 |
| Slag | Alternative Raw Material | 78,342 |
| Waste Ceramic | Alternative Raw Material | 5,275 |
| Spent Refractories | Alternative Raw Material | 4,329 |
| Air-cooled Slag | Alternative Clinker | 1,965 |
| Blast Furnace Slag | Alternative Clinker | 7,638 |
| Wood Chips | Alternative Fuel | 43,917 |
| Solid Recovered Fuel (SRF) | Alternative Fuel | 3,305 |
| **Total Resources Reused** | | **1,183,912** |

# 3.3 / Industrial Symbiosis Ecosphere

**MANAGEMENT APPROACH**

TCC proactively develops waste co-processing and partners with industry to build a sustainable ecosphere.

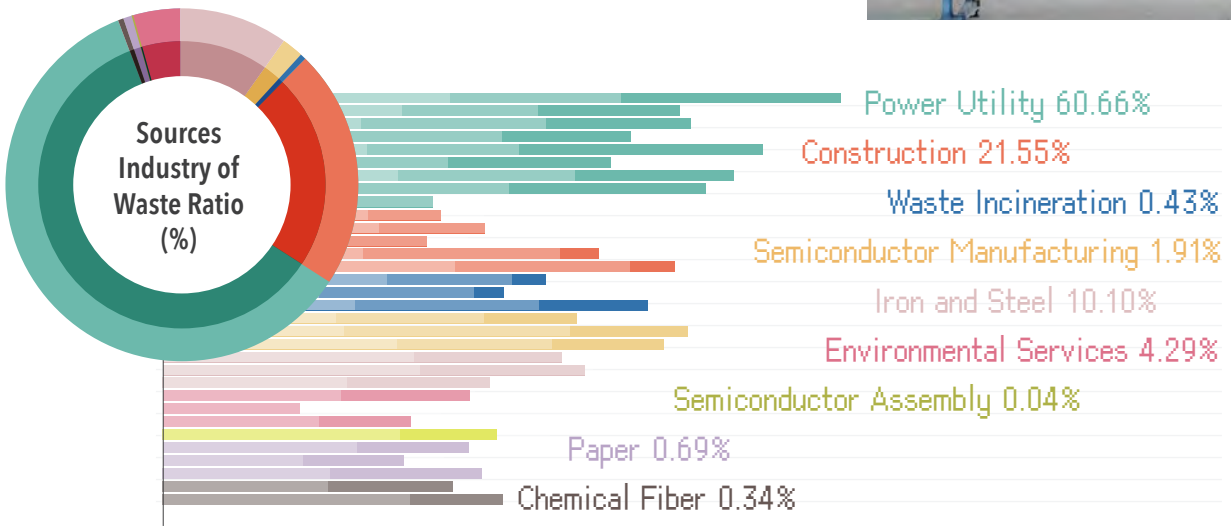
## Resolving the Issue of Industrial Wastes

TCC committed to circular production, working with industries, governments, cities, and society to foster a circular economy sphere.

TCC helps nine industries manage difficult-to-dispose-of wastes and convert them into alternative cement raw materials and fuels, including power utility, construction, iron and steel, semiconductor manufacturing, semiconductor assembly, chemical fiber, paper, waste incineration, and environmental services.

**In 2022, TCC helped dispose of 1.101 MILLION METRIC TONS of waste which accounted for 5.3% of all industrial waste in Taiwan.**

Note: The source of the total amount of the industrial waste in Taiwan is the data of the monthly report on industrial waste from the Environmental Protection Administration in 2022.


### Recycle with Peace (Hoping) Now!

TCC DAKA launched " Recycle with Peace (Hoping) Now!" in February 2021, encouraging visitors to recycle PET bottles, cups, and batteries using the "GEMMA smart recycling machine in the park." By collaborating with startups, social enterprises, and welfare groups, the initiative aims to promote waste resource recovery and turn waste into valuable resources such as gemstone.The DAKA Park has recycled PET bottles over the past three years and will transform them into the official shirts for the 2023 Taroko Gorge Marathon.

**Gemma is "gem" in Italian, which is pronounced close to "decoding" in Mandarin and "today" in Minnan.**

**Total Bottles Recycled**

**26,556**

# OYAK & Cimpor Overseas Cement Businesses

TCC expands our business overseas in Europe, Asia, and Africa. In 2018, TCC established a wholly-owned Dutch subsidiary. Together with OYAK, the largest cement company in Turkey, we expanded into the markets in Asia and Europe and set up Taiwan Cement (Dutch) Holdings as TCC European Operation Headquarters. In 2019, TCC and OYAK's joint venture company, JVC, acquired Cimpor, a Portuguese cement company, extending our cement business into Portugal.


## Accumulate Carbon Credits and Elevate Corporate Resilience

The Carbon Border Adjustment Mechanism(CBAM) is planned to be introduced in October 2023 with phased levy from 2026. In the meantime, free carbon allowances will be phased out between 2026-2034, while the introduction of the CBAM will have a significant impact on carbon costs for enterprises.

CBAM will apply the same carbon costs to imported cement into the EU, affecting Cimpor Portugal, TCC's European subsidiary. This may decrease the amount of imported cement and allow TCC to gain market share and improve our overall benefits in the EU market.

Cimpor Portugal has increased its use of alternative fuels, resulting in a reduction of total carbon emissions. Despite using annual carbon allowances, it still maintains a significant amount of allowances. The Alhandra Plant and Souselas Plant have also undergone upgrades and retrofits, further reducing carbon emissions effectively.

In non-EU regions like the Turkish market, the subsidiary OYAK will have limited impact as it has little sales to the EU. Also, the Aslan Plant in Europe has undergone upgrade and retrofitting, setting a benchmark for energy consumption and electricity consumption and becoming a pioneering beacon for the industry in terms of thermal substitution rate (TSR).

## Cimpor Portugal for the Portuguese Market

Cimpor Portugal has 3 cement plants with an annual clinker production capacity of nearly 5 million metric tons and a market share of nearly 55%. Also, Cimpor Portugal studied the application of Refuse Derived Fuel (RDF), searched for suitable alternative fuels for the plants collaborated with suppliers on alternative fuel pretreatment. Cimpor Portugal also optimized cement manufacturing processes and upgraded equipment for the Alhandra and Souselas Plants. The total TSR reached 31% in 2022.

The Alhandra Plant, with the largest production capacity in Portugal, achieved a close to 50% TSR and underwent an upgrade in 2022 for the clinker production line. Equipment such as the raw mill, preheater, and cooler were replaced to reduce energy and electricity consumption. The Alhandra Plant aims to reach an 80% TSR through overall optimization project completion by 2025.

The Souselas Plant is the second largest production capacity in Portugal. Souselas Plant achieved a TSR of 40% with a new chlorine bypass system in 2022, and plans to add a new alternative fuel feeding system to increase the TSR to 65% by 2024. Loule Plant increased its TSR from 26% to 32% in 2022.


Côte d'Ivoire (Ivory Coast) Plant

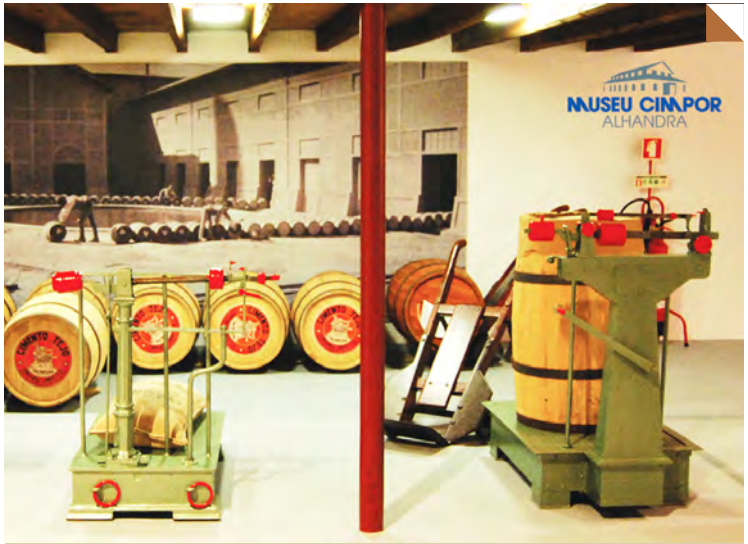
### First Calcined Clay Mass Production Base in the World Certain Clinker Substituted to Reduce 70% of Carbon Emissions

The plant located in Côte d'Ivoire of West Africa is the world's first calcined clay mass production base. Calcined clay was used to substitute certain clinker to reduce carbon emissions in cement manufacturing. The two low-carbon cement products, Low Carbon CEM II 42.5 (21%<natural calcined pozzolana+Limestone<35%) and Ultra Low Carbon CEM IV 32.5 (36% < natural calcined pozzolana < 55%), are currently available. Also, TCC plans to introduce this technology to Portugal for next-generation low-carbon cement.

New Plant in Cameroon

### Expected to Put into Operation in 2023

The Cameroon plant is set to begin operations in 2023 and will use different manufacturing technologies than the Côte d'Ivoire plant. During the initial phase of operation, the plant will focus on equipment debugging to achieve optimal performance in the future.


### Cimpor Museum

The Alhandra Plant was owned by Tejo and is the oldest cement factory in Portugal, built in 1894. The cement museum opened in March 2011, showcasing its historical and cultural significance since the late 19th century. It serves as a testimony to the plant's heritage.

### The Turkish Market with OYAK Group

OYAK owns 7 cement plants with an annual clinker production capacity of 12 million metric tons. The Aslan Plant has been expanding its alternative fuel pretreatment center, which has improved the plants' TSR performance by using RDF.

The Aslan Plant is crucial to our operations in Turkey. In 2022, the average TSR increased to 53%, and kiln head feeding trials were conducted, reaching a daily TSR of 78% in preliminary tests. The feeding system and the dedicated kiln head pretreatment equipment will be added in 2023.

The Ankara Plant also raised its TSR to 50%, and even up to 56% in a single day, thanks to the alternative fuel storage and feeding system designed by OYAK itself.

In addition, due to energy supply shortages and increased demand for alternative fuels, the Bolu Plant converted chicken farm waste into alternative fuels. This increased the annual average TSR to 24% instead of decreasing.

# BIODIVERSITY TNFD

The Suao Taibaishan Mine_Light-vented bulbul's nest (native ring-cupped Oak)

# 04

## TARGETS


## 2022 PERFORMANCE HIGHLIGHTS

Mining Areas (Hoping and Suao) Indigenous Plant Species **88.88%**

### Dr. Cecilia Koo Botanic Conservation Center

Plants Conservation (Endangered Species Incl.) Accum.
As of 2023/3/31 **34,154 taxa**

Providing Academic and Medical Research
**6,200+** | 60 Families
From 2008 to 2023/3/31

### Hoping EcoPort Coral Restoration Project

Corals Restored **284**

Survival Rate of Restored Coral **89%**

Nearly 3 Times of Restoration Area Increased

TNFD Taskforce on Nature-related Financial Disclosures

First Manufacturer in Taiwan Join TNFD Pilot Program

BUSINESS FOR NATURE
MAKE IT MANDATORY
Nature is Everyone's Business — CALL TO ACTION SIGNATORY

# 4.1 / Special Column **Ho-Ping Ark Ecological Program**

*"We believe the lives of all living beings have always been interconnected, coexisted and codependent for survival. In the ecosystem, there are tens of thousands of lives such as germs, insects, animals and plants that rely on one another to survive.*
*Around the world, 95% of food are from the soil and there are 60% of biological species that were discovered within the soil. In a natural environment, one cubic meter of soil is the home of more than 100 million protists, millions of roundworms, 100 thousand mites and insects, spiders and worms. Furthermore, soil is the most important carbon sink in the world."*

*–Nelson An-ping Chang, Chairman of TCC*


## Soil Makes the Largest Carbon Pool on Land, about Which the Humankind Knows Little

In the various ecological environments on Earth, soil provides habitats for flora and fauna. Complicated interactions formed among the profuse creatures on land. In addition, soil also serves as the largest terrestrial carbon pool, storing CO2 from the atmosphere as solids, with twice the carbon storage of surface vegetation .

The significance of soil to humans and nature is self-evident. However, we cannot fully understand the scale of its change so far, and lack systematic knowledge and assessment of its carbon cycling mechanisms. Nor can we effectively evaluate the impacts to the ecological environment and biodiversity of soil.

## "Ho-Ping Ark Ecological Program " for Soil Research Launched by TCC in Response to COP15

TCC acknowledges the importance of soil research and emphasizes the need for long-term studies and data accumulation to understand soil biodiversity. To support this, in 2022, TCC launched the "Ho-Ping Ark Ecological Program," a 10-year project dedicated to soil species, which is globally unparalleled.

The Program is hosted by KBCC's Chia-Wei Li professor and aligns with Target 2 and 4 of the Kunming-Montreal Global Biodiversity Framework (GBF) adopted by COP15 of the UNCBD, aiming to avert the ecological collapse and biodiversity loss. TCC takes concrete actions in response to these targets working towards the vision of "Living in harmony with nature."

TCC invited Dr. Chiao-Ping Wang from Taiwan Forestry Research Institute, and the team led by Professor Chih-Han Chang from the Institute of Ecology and Evolutionary Biology, National Taiwan University (NTU) to work on innovative ecological modeling, long-term monitoring and research on soil, and professional cultivation. This included mine soil sampling and testing, studying interactions between soil and plants, and researching the ecosystem function of soil in material cycles.

## Three Work Axes, the Expected Benefits, and the Preliminary Results

**Work Axis**

### The first semi-closed ecological system experimental base in the world

**Expected Benefits**

By removing alien species and introducing valuable species, TCC actively restores local species and conducts ecosystem rebuilding modeling to address future Earth ecology challenges.

**Work Results**

- "Skynet-based Ark Plan "established at the mine of the Hoping Plant with an area of approximately 1.45 hectares.
- Discarded oil tanks from the mine are repurposed as water tanks for irrigating the plants. The reclaimed water from Section B of Shaft 1 is filtered before use, with 74 metric tons reclaimed as of March 2023.
- 173 plant species transplanted, including 783 orchids like Taiwan urn orchid *(Bletilla formosana), Bulbophyllum taiwanense, Papilionanthe taiwaniana,* and *Vanda lamellata*; 186 bromeliads; and 198 Apocynaceae plants.

### Long-term Monitoring and Research of Soil

Soil biodiversity monitoring, carbon decomposition experiments, mine ecology restoration, and pedogenic properties analysis are conducted at the base to optimize soil ecology restoration in the mine. Long-term research data on soil fauna, microbiota, physico-chemical analysis, and carbon sequestration of soil and forest are accumulated.

- Long-term monitoring of the decomposition of the large stubs on the base, increase of habitat heterogeneity with dead branches and fallen woods, observation of decomposition constants for different wood qualities, investigation of soil nutrients and animal composition, measurement of microbiota in different stages of decomposition, and data estimation of the overall carbon sequestration of soil and forest.
- Expert team conducted soil sampling from the mine and the Ark program venue, with instructions given to TCC employees for follow-up and execution.

### Scholarship Mechanism to Cultivate Soil Professionals

By offering scholarships, TCC cultivates talent for society and the academia in soil environment and biodiversity, raising public awareness of their significance.

### Future Directions of the "Ho-Ping Ark Ecological Program"

The " Ho-Ping Ark Ecological Program" will introduce at least 1,000 plant taxa based on its microenvironment, with ongoing observation and reintroduction. The base will also serve as an environmental education center, alongside TCC DAKA and RRRC, creating a unique venue for environmental education and leisure in Eastern Taiwan.

Long-term monitoring data for soil biodiversity and carbon sequestration research are limited. The Program aims to accumulate data for ecological sustainability, maintain and restore the local ecosystem, reduce conflicts with indigenous species, and support long-term ecological research to protect biodiversity.

# 4.2 / Member of TNFD Pilot Program - The First Large Manufacturer in Taiwan Involved

## Biodiversity Policy

TCC commits to not exploring or exploiting World Heritage Sites or IUCN Protected Areas I-IV. In biodiversity-rich areas of global or national significance, TCC follows local laws and regulations to minimize and mitigate environmental impacts. We adhere to the GCCA Sustainability Guidelines for Quarry Rehabilitation and Biodiversity Management, implementing the Biodiversity Management Plan (BMP).

TCC includes partners in our value chain to address our environmental impact on biodiversity and share pertinent information.

The 23 targets of the GBF, a major resolution adopted by COP15 are taken as the compliance directions for biodiversity management at TCC. With the nature-based solutions (NbS) combined, while mitigating the climate change through nature-friendly action plans, TCC continuously creates positive impacts to nature.

## First to Employ the TNFD Framework

The Taskforce on Nature-related Financial Disclosures (TNFD), established in 2021, provides a framework for businesses and financial institutions to identify, manage, and disclose financial risks associated with nature. By utilizing the framework's methodology, businesses can effectively identify biodiversity risks and opportunities, enabling them to allocate resources for positive impacts on the natural environment.

TCC actively mitigates environmental impacts and addresses potential natural risks, while promoting opportunities for harmonious coexistence with nature. As the first traditional manufacturer in Taiwan to join the TNFD Pilot Program, TCC collaborated with Professor Chyi-Rong Chiou, the Director of the Biodiversity Research Center at National Taiwan University, and worked closely with the consultant team from Deloitte & Touche Consulting Co. to assess the corporation's biodiversity impacts, nature-related risks, and explore nature-friendly opportunities.

## Responses to Various, Domestic and International Biodiversity Initiatives

TCC signed on "Call to Action" and "Make It Mandatory" of Business For Nature to call on governments to enact ambitious policies to halt nature losses. Meanwhile, we partake in the Taiwan Nature Positive Initiative (TNPI) of the Business Council for Sustainable Development of the Republic of China (BSCD-Taiwan) and connect with the collaborative networks on nature topics to jointly address biodiversity issues.

Regarding biodiversity management, TCC aligns with the GCCA Sustainability Guidelines and has developed our BMP in accordance with international standards. With the expertise of Dr. Cecilia Koo Botanic Conservation Center (KBCC) combined, we actively contribute to biodiversity conservation efforts.

# 4.3 / Protection of the Indigenous Species from Mines

## MANAGEMENT APPROACH

TCC upholds strict self-management standards and requirements for nature-related business activities. All TCC-owned mines undergo thorough environmental impact assessments (EIAs), including impact projections and assessments, the proposal of countermeasures, or alternative solutions. Quarterly monitoring of environmental impacts in mining areas is conducted, along with surveys of land flora and fauna to assess species richness. Monthly monitoring of plant growth in selected areas tracks the progress of mine plant restoration efforts. Furthermore, TCC implements ecological restoration projects to enhance local biodiversity.

### No Deforestation Commitment

In line with the zero-deforestation spirit of the COP26 resolution under the United Nations Framework Convention on Climate Change (UNFCCC) and in alignment with SDG 13: Climate Action and SDG 15: Life on Land, TCC has made a No Deforestation Commitment. TCC implements specific management approaches for forest areas within our mines as follows:

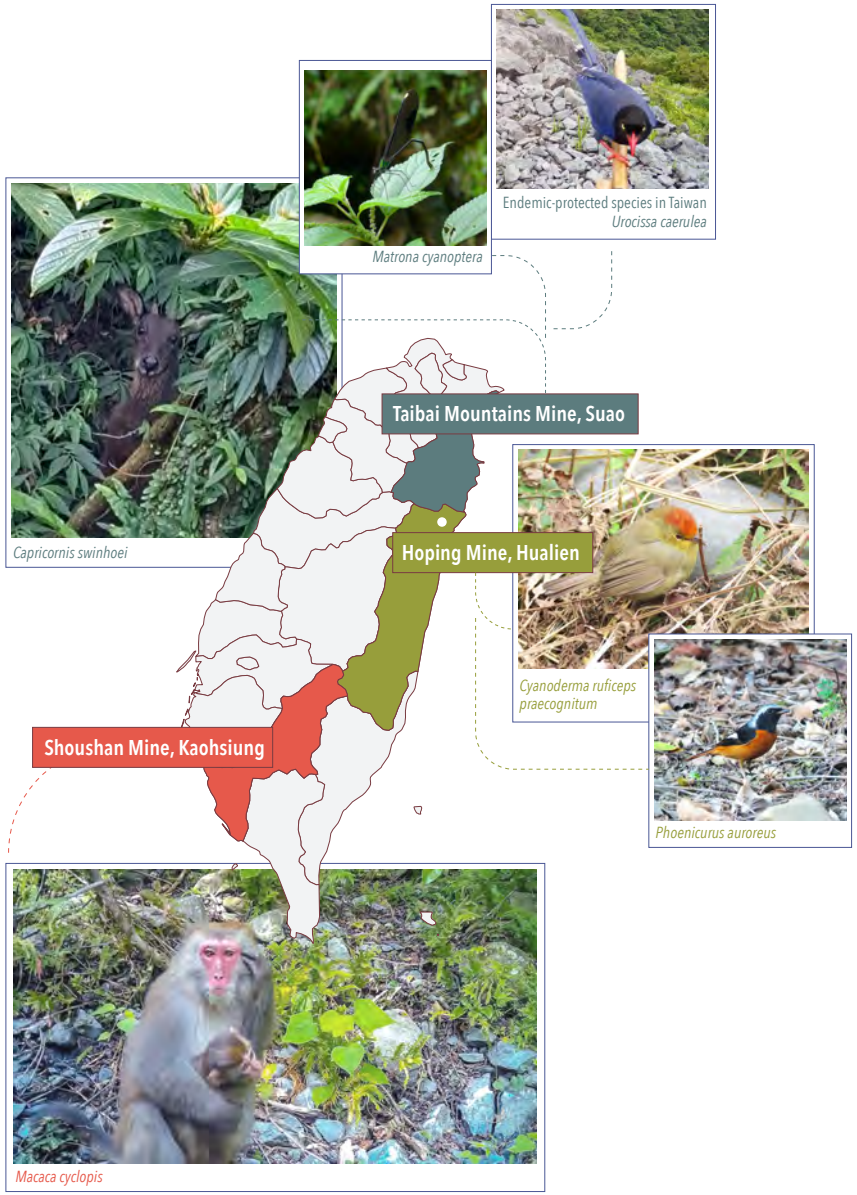
- 100% mining sites not in the nationally protected areas
- 100% zero deforestation beyond the mining areas and commitment to the recovery and restoration in mining areas

UN CLIMATE CHANGE CONFERENCE UK 2021
IN PARTNERSHIP WITH ITALY

### Plant Restoration & Conservation

TCC prioritizes mine restoration and local biodiversity conservation, with a focus on restoring the original limestone landscape in mines. During the initial stages of mine restoration, KBCC adopted six principles for species selection in the restoration process:

1. Indigenous species first; trees fit for the area selected
2. Utilization of soil and seed bank
3. Mid-succession used for estimated seedling required
4. Pilot introduction of pioneer plants for greenification
5. Fast-growing alien tree species replaced by indigenous species
6. Species with economic values first




## The Hoping Mine

The Hoping Mine in Hualien has been conducting survey of the land ecology since 2006. Starting from 2016, the propagation project in the mine was launched step by step for local plants like Taiwan urn orchid (*Bletilla formosana*), Taiwan hortensia (*Hydrangea longifolia*), Oriental chain fern (*Woodwardia prolifera*), and Brush pot tree (*Sphaeropteris lepifera*). Also, the sapling nursery at the Hoping Plant received 2,000 Taiwan urn orchids restored by KBCC in 2022. The two parties worked together to propagate over 3,000 plants of Oriental chain fern and Brush pot tree from the mine via the bulbil cultivation method and seedling method, which are conserved in KBCC's greenhouse.

The botanical restoration survey was conducted in 2022 as well. According to the latest survey, the average coverage of the groundcover plants was 95%, the average tree planting density was 2,040 trees per hectare and the average survival rate was 98%. In addition, nesting boxes for birds and ecological ponds were created for habitats for life. At present, numerous endemic frog species have been recorded, demonstrating the rich biodiversity of the mine.

## The Suao Taibaishan Mine

Due to its special climate, the Suao Taibaishan Mine suffers from typhoons and fierce winds all year around, resulting in no tree growing on the windward side for decades and a harsh condition for restoration. Starting from 2017, TCC has been working with Professor Ji-Wei Huang from the Sustainable Landscape Laboratory, National Ilan University to employ innovative methods like the first solar-powered microirrigation system in Taiwan, precision irrigation, windbreak nets to block strong winds, and rainwater harvesting via 65 rainwater harvesting ponds to overcome the water retention challenges presented in the karst topography. We collaborate with nature to overcome the harsh environment for restoration.

The greenification area in the Taibaishan Mine is 14.91 hectares. Remarkably, the transplant survival rate for big trees has reached 71.81%. In terms of ecology, 5 medium and large mammals species, 7 birds species, and 11 frogs species were observed in the mine area. The Formosan serow (*Capricornis swinhoei*), Formosan rock macaque (*Macaca cyclopis*), and Formosan ferret-badger (*Melogale moschata subaurantiaca*) are the mammals most frequently observed. As for birds, the unique and special Eurasian Woodcock (*Scolopax rusticola*) were witnessed as well. To accelerate species reintroduction, we further adopted habitat recreation as compensation like artificial caves and nesting boxes for the homecoming of Taibai Mountains' "indigenous citizens"!

The Suao Taibaishan Mine goes beyond restoring indigenous species and also focuses on eco-friendly agricultural research to maximize the reutilization of the mining area. TCC's approach emphasizes not only environmental friendliness but also social benefits. Guided by the philosophy of "Respect and Conform to Nature," TCC employs eco-friendly farming methods with zero chemical fertilizers, pesticides, and additives. These methods leverage symbiotic relationships among crops, effectively preventing pests and weeds. Currently, the plan includes the cultivation of fruit trees, vines, root tubers, stem tubers, and hydroponic vegetables to provide food for mammals and gradually rebuild the ecological balance.

## The Kaohsiung Shoushan Mine

Following the termination of mining rights in 1992, the Kaohsiung Plant began its restoration efforts in 1993. Also, it worked with the national park administration to try planting endemic plants like Elephant's Ear(*Macaranga tanarius*), Chinese Soap Berry (*Sapindus mukorossii*), Formosan Ash (*Fraxinus formosana*), and Common Jasmin Orange(*Chalcas paniculata*) in lieu of the alien species White Popinac (*Leucaena leucocephala*). The restored Shoushan Mine enjoys a rich ecology, filled with lush woods and wildlife like snakes, boars, monkeys, and wild birds, which has become a popular hiking destination in Kaohsiung.

Aside from the restoration effort, the Kaohsiung Plant is also a historic site and birthplace of the cement industry in Taiwan, with century-old limestone kilns and red-brick architecture have been listed as historic monuments by the Kaohsiung City Government. TCC also allocated budgets for renovation. In the future, Kaohsiung Plant shall become a venue with history, humanity, and eco-tourism combined.

In 2022, the Kaohsiung Plant partnered with the Bureau of Cultural Affairs, Kaohsiung City Government, to organize tours of the historic Red Buildings, limestone kilns, and detention basin, guided by TCC's consultant Wen-Fu Lin. TCC plans to collaborate further with the Kaohsiung City Government in this regard.

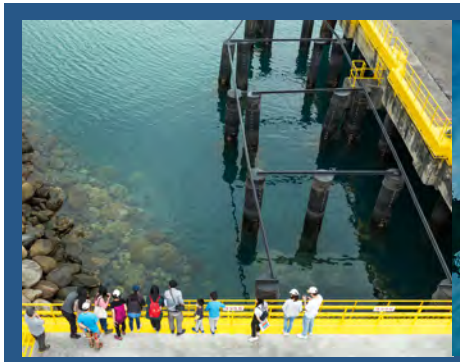
# 4.4 / Industrial EcoPort Coral Restoration Project

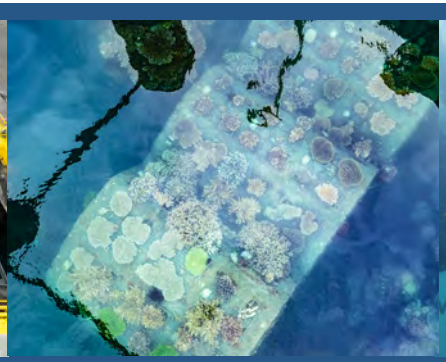
Hoping EcoPort received consecutive Port Environmental Review System of EcoPorts (PERS) certifications in 2019 and 2021 and was recognized for its Class-A waters by the Ocean Conservation Administration and Ocean Affairs Council, equivalent to Penghu waters. Hoping EcoPort has broken free from the typical impression of industrial ports with high pollution and discharge. Its safety infrastructure and rigorous environmental management provide a decent living environment for the coral and marine ecosystems. The port is now a thriving habitat for coral, attracting more marine creatures to the area. TCC utilizes cement bio cubes to provide a solid foundation for coral growth, contributing to a sustainable underwater ecosystem and a diverse marine ecology.

## Bio Cube Coral Creation Project

Corals were discovered in Hoping EcoPort over a decade ago, prompting a life below water survey in 2015. In 2020, TCC conducted a survey of coral species and benthos, identifying broken branches from indigenous corals. Cooperated with Ecoangels, The bio cube coral creation project began in 2021, with nearly NT$10 million invested to transplant broken corals to bio cubes within the port. Currently, 284 corals have been restored, with an overall restoration rate of 89%. The ecological development team also found several coral larvae, including 4 protected Tridacnae with above-average annual growth, and 3 new coral species previously undocumented in Eastern Taiwan. The bio cubes are dominated by 25 species of Acropora, the king of reef-building corals, followed by 9 species of Merulinidae, forming a vibrant and diverse ecosystem that covers 38% of the bio cube area.

In March 2023, TCC worked with Taipei University of Marine Technology to survey fish and shellfish to identify the dominant species and plan for future ecological development. The coral reefs at Hoping EcoPort serve as habitats for a variety of marine species, with visible corals and tropical fish thriving together. “This is our Great Barrier Reef of Hoping,” said by our colleagues in pride.





### Bio Cubes

Bio cubes, including cement reefs, discarded steel pipes, and abandoned ships, are used to create diverse habitats for marine life, with cement reefs being the most stable and durable material based on the team's experience. Cement allows for convenient stacking and sculpting, and the creation of pores that accommodate different species' habits, thereby enhancing habitat diversity. The surface of cement also develops micropores that support algae growth.

Hoping EcoPort utilizes TCC's low-carbon Portland Cement Type II, the core business of TCC, as the base for broken corals and locally-built bio cubes, featuring TCC's circularity symbol. The ecological development team also enhances the surface by chiseling to maximize roughness, promoting algae growth as a food source for fish and animals, fostering complete ecological shelters.

# 4.5 / Environmental Education Promotion

**MANAGEMENT APPROACH**

TCC promotes biodiversity by fostering widespread participation. The Company is dedicated to environmental education, aiming to raise awareness of environmental protection and sustainable development among employees and the public. TCC encourages everyone to take eco-friendly actions and contribute to the sustainable development of nature.


## Over 90% Satisfaction with Our Environmental Education

TCC's Hoping EcoPort was certified as Taiwan's first port-based environmental education facility on Feb 22, 2022. Currently, the certified courses available are "Big Boats Entering the Port," "Tenants of Harbor," and "Port Guards" with 382 accesses as of 2022 and up to 90% satisfaction. Future plans include Land Hermit Crab, Eco-friendly Fishing, and On-campus Environmental Education Outreach-courses to expand the range of topics.


## NSTC Science Train Program Organized in Partnership with the Academia

Invited by the National Dong Hwa University (NDHU), TCC participated in the Science Train Program, offering courses centering around "Great Barrier Reef of Hoping," "Save the Local Hermit Crabs," and "Wild Guess with Corals",drawing 280 participants in total.

TCC filmed educational videos to showcase the creation of bio cubes for corals, aiming to educate the public on coral restoration and water conservation. The videos provide a visual experience and accurately depict the process of promoting biodiversity at Hoping EcoPort, addressing the challenges of presenting the underwater ecosystem.

Due to the success of the Science Train Program, TCC and NDHU extended the partnership to join the National Science and Technology Council (NSTC) Science Train Program, expanding environmental education courses beyond the port. This collaboration allows us to showcase the environmental management efforts of Hoping EcoPort, certified by the PERS, as well as the restored coral ecosystem and diverse fish population in the port. TCC effectively communicates our ocean protection and marine education ideas, inspiring more people to contribute to marine conservation.

In addition, TCC signed the Service Learning Agreement with the College of Environmental Studies and Oceanography, NDHU. Together, we cultivate talents for environmental education, fueling the talent development for nature sustainability.

# 4.6 / World-Class Botanic Conservation Base

**MANAGEMENT APPROACH**

TCC prioritizes ecosystem balance and reconstruction, ceaselessly participates in restoration management, and contributes to international plant conservation efforts. We are dedicated to cultivating endangered species in Taiwan, aiming to protect the ecological environment and biodiversity.

## Over 15 Years of Efforts in Plant Conservation Topics by TCC

The Dr. Cecilia Koo Botanic Conservation Center (KBCC) was established in January 2007 with the support of TCC. Professor Chia-Wei Li from the Ho Chin Tui Lecture Series, National Tsing Hua University (hereinafter NTHU) serves as the CEO. TCC has been allocating budgets and manpower to promote the operations.

Its primary mission is to conserve tropical and subtropical plants globally, preserving the Earth's richest biodiversity. KBCC focuses on ex-situ conservation and places a strong emphasis on academic research. Engaging in international academic exchanges, KBCC strives to become a world-class botanical conservation base.


## Seeds Academy

KBCC, Taipei Zoo, and the Forestry Bureau, Council of Agriculture, organized the "Seeds Academy" campaign on Arbor Day, March 12, 2023, to promote environmental protection and ecological education.

KBCC donated 150 plants, including 15 endangered species, such as Bulbophyllum taiwanense *(Fukuy.)* K.Nakaj. and Bulbophyllum pingtungense S.S.Ying & S.C.Chen, to Taipei City. KBCC has also planned a one-year collaboration with Taipei Zoo. Through "Seeds Academy", KBCC guided the public and students in learning about endangered plants, caring for the environment, and protecting Taiwan's biodiversity.

## Endemic Insect Propagation Project

KBCC worked with Taipei Zoo on the "Endemic Insect Propagation Project" that targeted the endemic inspect species on Lanyu (Orchid Island). Currently, there are successful insect subcultures on Lanyu, including *Pachyrhynchus sarcitis, Phasmotaenia lanyuhensis,* Lan-hsu giant katydid (*Phyllophorina kotoshoensis*), *Salomona ogatai*, dwarf wood scorpion(*Liocheles australasiae*), and tailless whip scorpion (*Amblypygi*). In collaboration with Taipei Zoo, KBCC reintroduced successfully propagated endemic insects back into the wild, ensuring a stable number of species for genetic diversity in the local environment.

## Homecoming of the Endemic Species of Lanyu

Lanyu and Jiteiwan boast unique natural environments, but they face significant environmental threats from climate change, exotic species, and alien species. Jiteiwan, in particular, has the additional challenges of being a former military shooting range and having experienced a major fire incident. To restore the endangered species on Lanyu and Jiteiwan, KBCC worked with the National Museum of Natural Science (NMNS), the NMNS Foundation, Taipei Zoo, Endemic Species Research Institute, National Museum of Marine Biology and Aquarium, and Taiwan Forestry Research Institute. With Lanyu as the operation base, we not only selected Nunyu Bletilla (*Bletilla formosana* (Hayata) Schltr. f. kotoensis (Hayata) T. P. Lin), *Dendrobium miyakei, Tuberolabium kotoense*, and *Vanda lamellata*. endemic to Lanyu for priority restoration, but also continuously engaged the introduction and propagation of other indigenous species as well to accumulate more materials for the future. Through the efforts of KBCC, 10,000 saplings have successfully restored and sent to Lanyu. Also, over 3,000 plants were distributed to schools, institutions, or local citizens via Taipower for adoption, so that these endangered plants may return to Lanyu and foster their growth alongside the local communities.

The once believed extinct indigenous species of Pingtung, "Pyrenaria buisanensis," has been successfully revived with the efforts of KBCC and the National Museum of Natural Science. Over 3,500 seedlings have been cultivated to date. On the eve of Mother's Day in 2023, 60 saplings were planted at the Visitor Center in Majia Township, Pingtung, symbolizing a return to the embrace of Mother Nature.

## Research on Drought-Resistant Millet Planning to Apply for the United Nations' Globally Important Agricultural Heritage Systems (GIAHS)

Millet, with its drought resistance and short growth cycle, is an important famine-resistant food source gaining attention due to climate change. Since 2019, KBCC, Cheng Kung University's laboratory, and Hualien's cultural creative group have been preserving Taiwan's tribal millet germplasm through liquid nitrogen storage. In 2023, National Sun Yat-sen University collaborates with KBCC to conduct comprehensive collection, preservation, classification research, and promotion of indigenous millet germplasm. With over 400 tribes in Taiwan, more than 300 tribes have ceased millet cultivation in the past century, leading to a germplasm disappearance rate of over 75% for this crop. This project will also apply for inclusion in the United Nations' Globally Important Agricultural Heritage Systems (GIAHS).

## Research on Nature Medical Product to Advance Human Well-being

KBCC has been collaborating with Kaohsiung Medical University (KMU) since 2014. KBCC provides botanical samples, while the Graduate Institute of Nature Medical Product at KMU conducts extraction and builds natural product libraries. The libraries currently contain plants from 83 families, totaling 920 botanical taxa. Among the research findings, KBCC has discovered that the Nepenthaceae and the Musaceae exhibit biological activity against HBV, influenza viruses, and cancers. Some findings have been published, and KBCC is pursuing patents and further research. Moving forward, KBCC will continue collaborating with NTHU on ecological conservation research and supplying botanical materials to KMU for medicinal purposes, aiming to develop more natural products for the benefit of humanity together with the academia.

# Sustainable Governance

THE FIRST LARGE-SCALE
UHPC ARTISTIC CREATION IN TAIWAN
TAI CHI INFINITE

05

## TARGETS


## 2022 PERFORMANCE HIGHLIGHTS

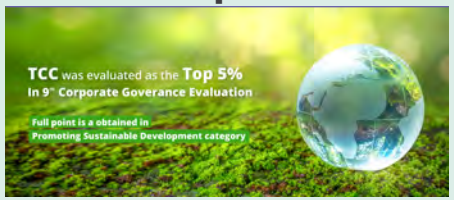
### Board of Directors

ESG -related lessons
150.5 Hours

Female Directors
26.66%

Nomination Committee Established
CSO CHRO
CFO CISO Appointed

### Corporate Governance Evaluation Top 5%




### Invention Patents

40 Granted | 26 Applying

### Client Satisfaction Survey

96.86%

### Total Hours of Integrity & Ethics Trainings

2,129.8 Hours
Coverage100%
(for all TCC employees)

### Information Security Trainings

total of 1,200 hours
for 219 participants

### Sustainable Supply Chain

Effective carbon emission data of Critical Tier-1 Suppliers
64.6%

Green Procurement ratio 4.51%

Critical Suppliers Attending the Online Supplier Convention
52.8%

New Suppliers Signing the Anti-Corruption Statement
100%

# 5.1 / Special Column **Sustainability Governance Workshop**


In response to Net Zero by 2050, TCC actively examines our supply chain and endeavors to help the SMEs on the supply chain to establish their sustainability systems. Through external consulting, TCC reduces the supply chain risks as well as increases the supply chain information transparency and resilience.
TCC organized the first "Supplier Sustainability Governance Workshop" on November 23, 2022, inviting 25 suppliers to participate. The consulting team from Deloitte & Touche Consulting Co. shared on sustainability trends and guided the suppliers with a lower sustainability maturity to establish the basic sustainability governance policies in order to raise the sustainability governance performances of the suppliers. Moving forward, TCC plans to conduct 2 sessions yearly and scale up the coverage step by step.
The TCC Sustainability Governance Workshop included diverse suppliers in raw materials, engineering, equipment and parts, transportation, etc. By means of trend sharing, education, and training, the workshop assisted suppliers to enhance their sustainability policies. Also, through a tracking system, TCC unceasingly monitored the sustainability management outcomes of all suppliers so as to reduce risks and raise the competences of the whole supply chain in response to sustainability-related risks.

## TCC Values Bilateral Communication with Suppliers

TCC values bilateral communication with suppliers. Therefore, a discussion session with the suppliers was specifically arranged in the workshop. Also, a group consultant and TCC buyer were assigned for each group, allowing the suppliers to directly reflect the obstacles in execution and discuss methods for improvement.

## Improving Peer Exchange Together with Suppliers

At the Supplier Sustainability Governance Workshop, TCC specifically assigned suppliers with similar industrial characteristics into the same groups. Through the mutual exchanges, suppliers were able to exchange their experiences. Meanwhile, TCC could probe into the pain points of different industries and assisted the suppliers to resolve relevant issues, elevating the resilience of TCC supply chain.

### Overview of Supplier Sustainability Governance Workshop

- Sustainability governance trend sharing: to establish the sustainability awareness of suppliers
- General discussion on sustainability governance policies: to capture the status of sustainability governance implementation of suppliers via open discussion
- Preliminary establishment of sustainability governance policies: to assist and mentor suppliers to draft their sustainability governance policies, supported by the group consultant and TCC buyer
- Targets for sustainability governance implementation: require suppliers to set their own timetable for the complete establishment of sustainability governance policies

### Benefits Gained from the Sustainability Governance Workshop

- Improved suppliers' corporate governance
- Deepened engagement level
- Strengthened supply chain's sustainable resilience

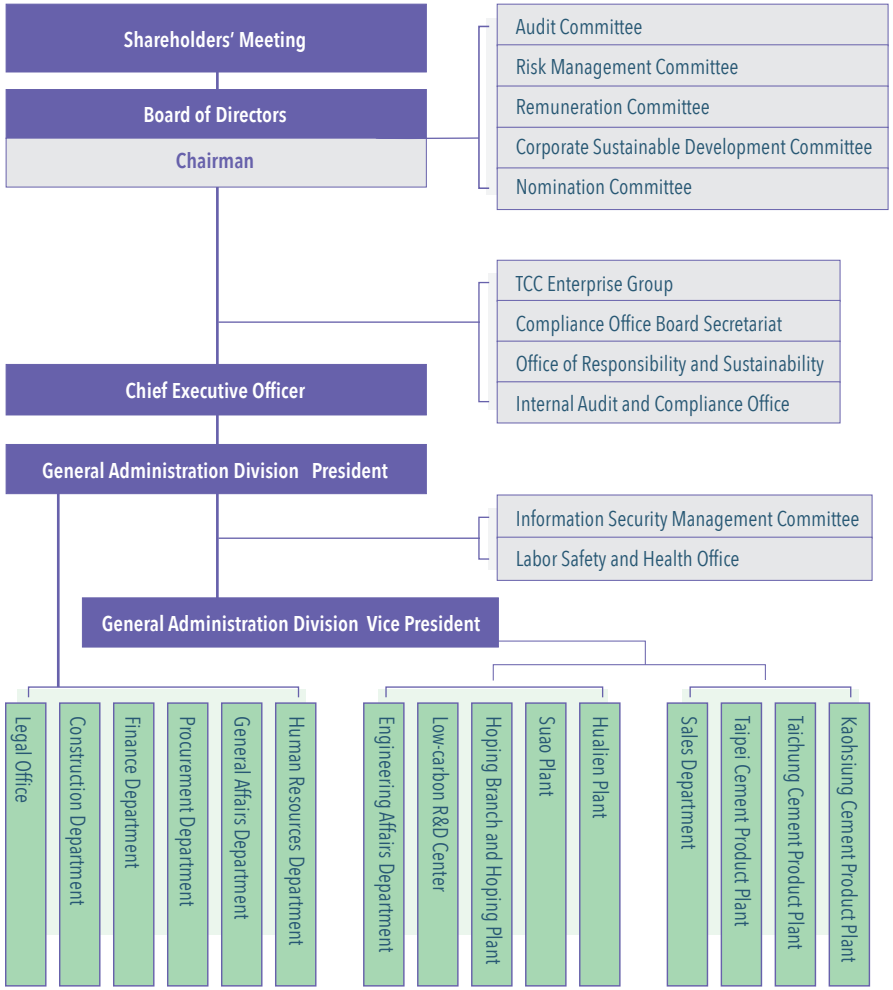

After-session Participation Reflection

Invited to the 1st Sustainability Governance Workshop of TCC on November 23, 2022, as the long-term auxiliary materials supplier to TCC, it was our honor to participate in the session.
Thanks to the mentoring and detailed explanation by the Deloitte consultant as well as colleagues from Materials Management Department, we gained a groundbreaking understanding in the concepts and frameworks of ESG and sustainability governance, carbon inventory, product carbon footprints, corporate governance evaluation, declaration and formulation of corporate policies and regulations, declaration of human rights policy, compliance with all the national labor laws and regulations, provision of a healthy and safe working environment, assurance of harmoniously win-win labor-management relations, green transportation, management of pollution prevention and control, detailed implementation items for net-zero emissions, among others!

Executive Assistant to General Manager, SPLENDID TREASURE CO., LTD
Chi-How Liu
Workshop Ingredient Team

# 5.2 / Board Functions

## Organization Framework



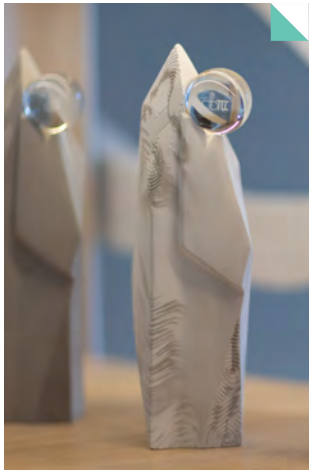

Note1: The Taipei, Taichung, and Kaohsiung RMC Plants include 19 branches and 3 distribution stations.

Note 2: The Hualien Plant includes a ready mixed concrete workshop.

Note 3: Research & Development Department is renamed as Low-carbon R&D Center on June 1, 2023.


### The 24th Board of Directors of the Company Consists of 15 Directors (5 Independent Directors Included) with a 100% Attendance (Presence by Proxy included)

The tenure of the members of the Board of Directors at TCC is 3 years. The incumbent members of (the 24th) Board of Directors were elected on July 5, 2021. The seats were cut from 19 seats to 15 seats, reduced by 21%, among whom 12 seats are replete with practical cement-related experiences. There are 5 seats of Independent Directors with the percentage in the overall seats of the Board of Directors raised from 21% to 33%, among whom 4 Directors have the expertise in accounting or laws. 27% of Board members are female. The percentage of female Independent Directors has even reached 60%. The average attendance of the 24th Board of Directors in 2022 is 93.33%, or 100% by counting in the presence by proxy. Important resolutions adopted by the TCC Board of Directors are released and disclosed faithfully on the Market Observation Post System in a timely manner. In deliberation of matters concerning a Director or the legal entity he/she represents, the Director shall abstain from voting for conflict of interest.



## Profiles of the Members on the Incumbent (24th) Board of Directors

| Title | Representative | Entity Name | Juristic Person | Core Diversity Items | | |
|---|---|---|---|---|---|---|
| | | | Average Tenure | GENDER | AGE | |
| | | | | | 31-50 | 51 OR ABOVE |
| Chairman | An-ping (Nelson) CHANG | Chai Hsin R.M.C. Corporation | 4.7 | M | | ◆ |
| | Kung-Yi KOO | Tai Ho Farming Co., Ltd | 4.7 | M | ◆ | |
| | Jong-Peir LI[1] | C. F. Koo Foundation | 6.7 | M | | ◆ |
| | Eric CHEN Sun Te[1] | C. F. Koo Foundation | 6.7 | M | | ◆ |
| | Por-Yuan WANG | Fu Pin Investment Co., Ltd. | 19.7 | M | | ◆ |
| | Kenneth C.M. LO | International CSRC Investment Holdings Co., Ltd. | 20.7 | M | | ◆ |
| | Kang-Lung (Jason) CHANG | Chia Hsin Cement Corporation | 10.7 | M | | ◆ |
| | Chi-Chia HSIEH | Fu Pin Investment Co., Ltd. | 19.7 | M | | ◆ |
| | Chien WEN | Heng Qiang Investment Co., Ltd. | 19.7 | M | | ◆ |
| | Chi-Te CHEN | Chia Hsin Cement Corporation | 10.7 | M | | ◆ |
| | Chun-Ying LIU | Heng Qiang Investment Co., Ltd. | 19.7 | F | ◆ | |
| | Victor WANG | - | 9.7 | M | | ◆ |
| | Yu-Cheng CHIAO | - | 10.7 | M | | ◆ |
| | Lynette Ling-Tai CHOU | - | 4.7 | F | | ◆ |
| | Mei-Hua LIN | - | 1.6 | F | | ◆ |
| | Sherry S. L. LIN | - | 1.6 | F | | ◆ |

Juristic Person Director Representative | Independent Director

Note 1: The Representative was changed from Mr. Jong-Peir Li to Mr. Eric Chen Sun Te under the notification of C. F. Koo Foundation made on August 12, 2022.

## Functional Committees

### Audit

**Responsibilities**

Stipulation and amendment to the internal control system and protocols for significant financial and business activities, auditing of marketable securities, financial statements, and matters involving Director's conflict of interest, etc.

Attendance(presence in person) **95%**

Attendance(presence by proxy included) **100%**

Charter of Committee

### Remuneration

**Responsibilities**

Formulation and review of policies concerning the performance assessments of the Directors and managers as well as their compensation; evaluation and stipulation of the compensation for the Directors and managers on a regular basis

Attendance(presence in person) **97%**

Attendance(presence by proxy included) **100%**

Charter of Committee

### Risk Management

**Responsibilities**

Execution of the risk management decisions approved by the Board of Directors and supervision of the establishment of TCC's risk management mechanisms; oversight of the execution and coordination of the overall risk management

Attendance(presence in person) **100%**

Attendance(presence by proxy included) **100%**

Charter of Committee

### Corporate Sustainable Development[2]

**Responsibilities**

A decision-making and supervisory body over the Company's relevant efforts in the sustainable development, including Governance (G), Environmental (E), and Social (S), to strengthen the Company's management system, contribute to environmental conservation, and exercise our social responsibilities for the Board of Directors to fulfill its responsibilities in the protection of the interests of the Company as well as our employees, shareholders, and stakeholders

Attendance(presence in person) **100%**

Attendance(presence by proxy included) **100%**

Charter of Committee

### Nomination

**Responsibilities**

Stipulation of the election of the Directors (Independent Directors included) and the senior management; formulation and review of the ESG Professional Development Program for Directors, the management performance of Directors, the evaluation of members of the Board of Directors, and the succession plan of senior management a regular basis

Attendance(presence in person) **90%**

Attendance(presence by proxy included) **100%**

Charter of Committee

Note2: Mr. Jong-Peir Li resigned from the Corporate Sustainable Development Committee on August 12, 2022, which was assumed by Mr. Roman Cheng on December 13, 2022.

## Average Tenure of the Members on the Board of Directors

The average tenure of the members on the Board of Directors in 2022 is 11 years.

## Operation of the Board

Monthly meetings are convened regularly at the Company to discuss focused works, along with quarterly presentation of the work contents and status of improvement of departments by the respective units.

## External Evaluation of the Board of Directors – Excellent

"Rules of Performance Evaluation of Board of Directors" has been stipulated at TCC to evaluate the Board of Directors and the Functional Committees on a regular basis. The areas covered in the evaluation include the involvement in the corporate operation, improvement of the decision-making quality of the Board, composition and structure of the Board, election of Board Members and their continuing knowledge development, and internal controls.

KPMG Advisory Services Co., Ltd. was commissioned by TCC to conduct the evaluation with the 2022 Board Performance Evaluation Report submitted on February 10, 2023. The result of the overall evaluation was excellent, which was submitted and presented to the Board of Directors on February 24, 2023. Please check our corporate website for the Performance Evaluation Report.


## The 9th Corporate Governance Evaluation: 5%

TCC values corporate governance performance and achieved a top 5% ranking in the 9th Corporate Governance Evaluation. TCC also secured a position within the top 10% of non-financial electronic companies with a market capitalization of 10 billion NTD in the corporate governance evaluation. The issues for improvement are constantly brought up on the monthly senior manager meetings for the personnel in charge to plan and execute corrective actions for relevant indicators accordingly. In addition, the targets for improvement are connected with the performances of the responsible unit managers so as to drive the growth of corporate governance performance.

## ESG Professional Development Program for the Board of Directors

TCC arranges development courses for Directors and Independent Directors tailored to their schedule and expertise. In 2022, the Program centered around issues of sustainability and governance, totaled 86.5 hours.

**The total hours of professional development for the members on the Board of Directors in 2022 were 150.5 HOURS**

## Succession Plan for Top Management

To strengthen the knowledge of the top management on the responsibilities and roles of managers, the talent echelon is effectively established at the Company via project/task delegation, middle/senior management evaluations, rotation across business units, and expatriation to companies overseas. Regarding the improvement for the top management functions, TCC arranges manger training programs as well as courses on strategic planning and decision-making for the management, including the Chairman, President, managers and mid-level supervisors in order to attain the performance targets through leadership in teamwork. With the annual performance evaluation combined, it makes the reference for the succession of top management.

TCC formulated the diversity policy as appropriate based on the operation, business model, and developmental needs thereof. The candidate pool of Directors is created on the ground of two criteria as follows:

### Basic Criteria and Values

- Gender, age, nationality, culture, etc. as well as the understanding of the Company's potential in business diversification aside from an in-depth knowledge of the core businesses of TCC.

### Professional Knowledge and Skills

- Diversity in the professional backgrounds (e.g., legal, accounting, industry, finance, marketing or technology, etc.), expertise and industrial experiences of the potential candidates of Directors.

## Remuneration Policy

The President's performance as well as the related wage and remuneration policy, mechanisms, standards, and structure are evaluated by the Remuneration Committee based on the contributions thereof to the Company's operation before submitted to the Board of Directors for approval. Apart from the linkage to performances, the evaluation scope for wage and remuneration also encompasses the non-financial performances, such as corporate governance, green finance, social care, and environmental sustainability. The targets are as follows:

**Profitability performance indicators**
- Net profit after tax
- Growth rate

**Risk indicators**
- Compliance with laws and regulations

**Talent development indicators**
- Talent cultivation
- Enhancement of employee capabilities and qualities
- Cultivation of international perspectives

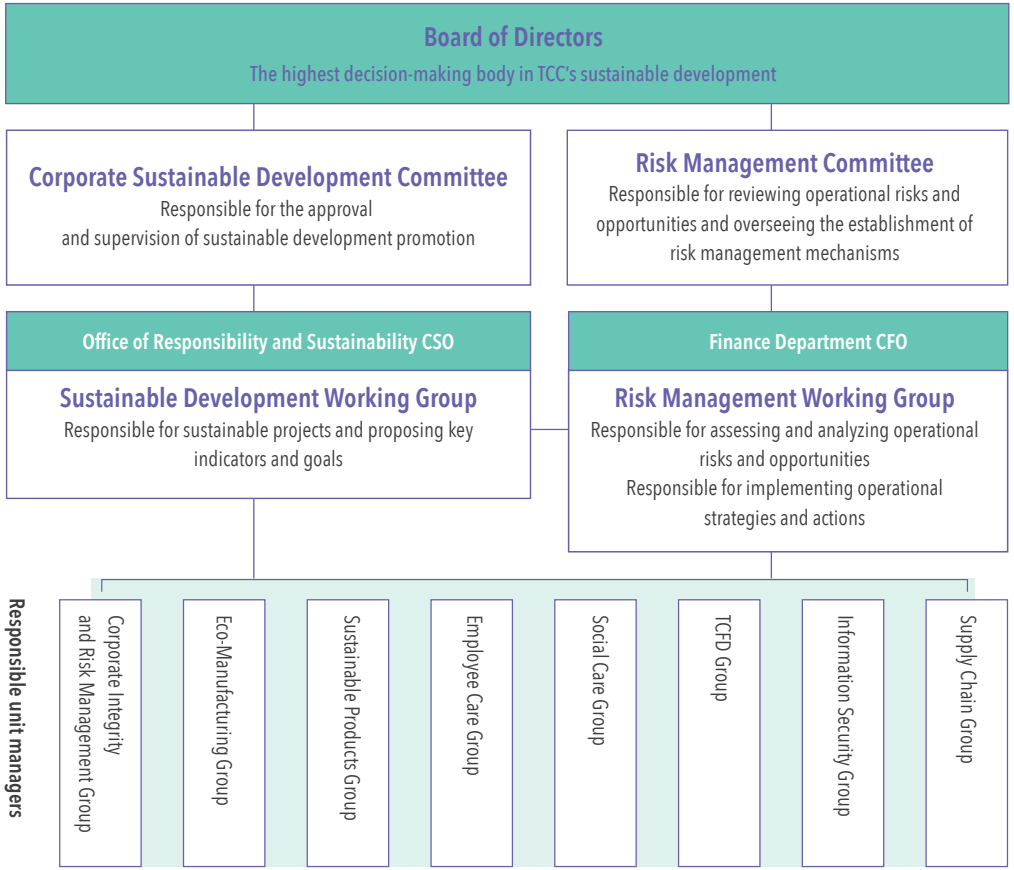
**Strategic goals**
- Achieving circular sustainability through the development of a circular economy

# 5.3 / Sustainability Management Framework

**MANAGEMENT APPROACH** | **Corporate Sustainable Development Committee Charter**

The Board of Directors is the top decision-making and oversight body for the sustainable development affairs of the Company, which directly supervises the promotion and governance framework of sustainable development.

## Sustainability Management Implementation




The Board of Directors approved the establishment of "Corporate Sustainable Development Committee" in 2018, which was promoted into a functional committee in July 2021. The committee is responsible for the approval and supervision of sustainable development promotion. It convenes at least twice a year and reports to the Board of Directors. Through the presentation of the Corporate Sustainable Development Committee each year, the Board verifies the sustainable development and ESG management approaches of the Company, as well as oversees, tracks and reviews the annual sustainable development implementation by the management team and the progresses made on the performance targets to strengthen the constitution of the Company.

To further integrate the resources of TCC for the promotion of sustainability projects, TCC established the Office of Responsibility and Sustainability in 2022, tasked with the coordination of the sustainability promotion at TCC and interdepartmental communication and coordination to present improvement recommendations. The Chief Sustainability Officer (CSO) is to regularly report to the members on the Corporate Sustainable Development Committee.

There are eight functional groups under the Corporate Sustainable Development Committee, including the functional groups of "Corporate Integrity and Risk Management", "Eco-Manufacturing", "Sustainable Products", "Employee Care" and "Social Care", Also, in line with the international trends, three ESG-oriented taskforces, "TCFD," "Information Security," and "Supply Chain" were created as well. The functional groups were composed of level-1 supervisors and senior personnel of relevant departments or subsidiaries, who were assigned with EGS affairs pertaining to their departmental responsibilities.

The Corporate Sustainable Development Committee formulated the execution strategies and targets in accordance with the Sustainable Development Pathway of the Financial Supervisory Commission (FSC) in 2022. Also, the Committee defined the scope, timetable, and targets of GHG inventory for TCC, which were submitted to the Board of Directors for presentation and adoption, so as to materialize the sustainable development directions of TCC. Please check the QR Code for the resolutions adopted by the Corporate Sustainable Development Committee.

## 2022 Sustainability Project Promotion Results

1

**Sustainable Development Pathway of FSC**

The scope and schedule of GHG inventory for TCC and our 147 Subsidiaries

2

**Science-based carbon reduction and management**

Renew SBT in 2024 and promote internal carbon trading

3

**Low-carbon and green products**

TCC's cement has obtained the carbon reduction label from EPA. Furthermore, we are planning to apply for carbon labeling for our main concrete products, develop UHPC, and develop UHPC energy storage containers.

4

**Sustainable Initiatives**

TCC is the first large-scale manufacturing company in Taiwan to become a member of the EP100 initiative. Since March 2022, we have initiated the operation of next-generation charging stations and simultaneously launched the EARTH HELPER initiative.

5

**Sustainable trends assessment**

Follow international trends to plan for TCC's future, such as EV100+ initiatives and TNFD structure.

## Risk Management Implementation

The Board of Directors is the highest decision-making body in risk management that directly oversees the risk governance framework of the Company. To improve risk assessment and strengthen managerial functions, the Board approved the establishment of the "Risk Management Committee" in May 2020. The Committee is responsible for the identification and management of risks associated with corporate operations, including the physical, transition, and emerging risks potentially arising from climate change, and leads the planning for relevant countermeasures.

The "Corporate Social Responsibility Best Practice Principles" of TCC demands that the Company is to conduct assessment of risks related to the environmental, social, and corporate governance issues in relation with the corporate operations pursuant to the materiality principle. The Board adopted "Risk Management Policy and Principles" and "Risk Management Committee Charter" on August 11, 2020, to contain the risks potentially resulted from businesses thereof to a tolerable extent and to establish the risk management principles.

Based on the scope of businesses of different departments, the Risk Management Committee undertakes risk identification and analysis on seven aspects, i.e. operation, finance, states, legal compliance, ESG, personnel, and information security, as well as updates the annual matrix of major risks identified. Then, according to the results, departments shall engage coping strategy planning, integrate and manage risks with potential impacts to operation and profit. The Risk Management Committee presents the execution status and risk management report to the Board of Directors at least once a year as well as monitors, tracks, and reviews the risk management status of the management team to strengthen the constitution of the Company.


## TCC Risk Identification and Impact Analysis

With reference to the global economy risks reports, risks reports of peers in cement or energy, and international trends and in line with the 7 aspects of risk identification and analysis of TCC, TCC identified the critical facets with the greatest impacts possible in 2022, including geopolitics and conflicts, inflation and pressure of interest rate rise, carbon emissions control, pandemic lockdown, structural workforce shortage, and cybersecurity failure. Furthermore, based on the said facets, the 2022 risks matrix of TCC was analyzed. Also, the responsible departments planned the coping strategies for the six high-risk items seen in 2022, such as declines in supply/demand and average selling prices, prices and supply/demand of raw materials and fuels and alternatives, supply chain risks, etc. Please refer to Chapter 5.4-5.9 of this Report for the responding and preventive actions of different departments against risks in their businesses, and the Annual Report for details of financial risks.

In addition, to have a more comprehensive coverage of risk management and issues of concern at TCC, in each material issue identification at TCC, the management of the Company will conduct impact analyses like the impact levels on corporate operation and risk assessment with respect to sustainability issues. Please refer to the chapters pertaining to material issues analysis in this Report.

**Finance risks** | Finance Department
**Legal compliance risks** | Legal Office
**Operations risks** | Engineering Affairs Department, Sales Department, Low-carbon R&D Center
**Personnel risks** | Human Resources Department
**National security risks** | Office of Responsibility and Sustainability, Finance Department
**Information security risks** | Information Security Management Committee
**ESG risks** | Office of Responsibility and Sustainability

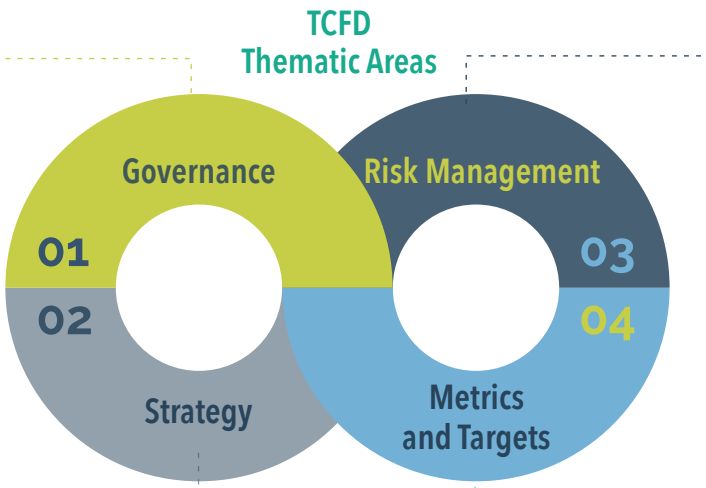
# 5.4 / Climate Risks: TCFD

As a citizen of Earth, TCC is acutely aware of the impacts brought by climate change worldwide. In response to the high uncertainty and policies of climate and rapid changes on markets as well as to capture and estimate the potential impacts of climate scenarios on TCC, we assembled senior managers of various departments for reidentification of material climate risks and opportunities. In addition, we have strengthened the analysis of scenarios for carbon price, carbon emissions control, and extreme weather events. Aside from update of the financial impacts arising from carbon price and carbon emissions control with the scenario parameters released by the latest international science and technology reports, we went further to assess the possible risks to all plants in operation arising from flood, drought, typhoon, and heatwave in an attempt to capture the climate change and market dynamics externally for the consideration of overall operational strategy planning in a more wholistic manner.

## Governance

Board of Directors is the highest decision-making body in climate topics

- The Board of Directors monitors the risks and opportunities related to climate change each year, approves the climate strategies, and tracks the achievement of performance indicators.
- The two functional committees, the "Corporate Sustainable Development Committee" and the "Risk Management Committee" (see 5.2 Board Functions for relevant responsibilities thereof), regularly report to the Board of Directors the statuses of climate strategy implementation and risk responses.
- To capture the progresses on climate topics timely, the Chairman holds regular meetings with the President and the Vice Presidents of functional units to oversee climate actions in practice. There is also a working group composed of the first-level managers under the Committee, which holds cross-departmental meetings from time to time to discuss climate strategies and reports the promotion results to the Chairman or the Board of Directors.




## Strategy

The time frames are defined as three years for the short term, three to five years for the medium term, and over five years for the long term to assess the potential operational and financial impacts of climate-related risks and opportunities on the Company.

Respond to climate-related risks and opportunities via six climate strategy aspects – Low-Carbon Cycle, Natural Disaster Adaptation, Mutually Beneficial Supply Chain, Low-Carbon Products, R&D and Innovation, New Energy Business Development.

In response to the high uncertainty of climate scenarios, analysis of multiple scenarios is performed on the basis of the latest scientific reports so as to capture the development and changes of the climate trends in the medium and long term as a whole and to formulate responses accordingly.

- Transition risks: Assess the financial impacts in three carbon price scenarios, i.e. Stated Policies Scenario (STEPS), Announced Pledges Scenario (APS), and Net-Zero Emissions by 2050 Scenario (NZE2050).
- Physical risks: Assess the physical risks with IPCC's RCP scenarios on an ongoing basis, plan in accordance with the IPCC's latest Shared Socioeconomic Pathway (SSP), estimate the long-term climate change in the future using the Global Climate Model (GCM), which covers the climate change assessments of various regions, and conducts risk assessments of operating sites through downscaling analysis.

## Risk Management

A climate risk identification process is established with the likelihood, level of impact (financial aspect covered), and impact time frames of climate risks and opportunities related to TCC determined cross-departmentally every two years.

The climate change risks have been incorporated into the overall risk management process of TCC.

## Metrics and Targets

Ongoing tracking of climate-related management metrics

- TCC continues to track the management metrics of the six climate actions and performances of various non-financial indicators (see to the ★ marks in TCC Sustainability Targets and Performance Tracking), and links the carbon reduction targets with the annual performance appraisal and the remuneration and reward system.

Setting of carbon-neutrality pathways for cement and concrete

- Please refer to the relevant target setting in this report (please refer to the information on low-carbon cement and concrete in Section 2.2).

Introduction of an internal carbon pricing system

- An internal carbon price has been applied to major capital investment decision-making, with the scope of application assessed to be expanded year by year (see the information of internal carbon pricing in Section 2.2).

## Risk Management in Four Thematic Areas

### Climate Risk and Opportunity Assessment

TCC regularly assesses climate risks and opportunities on the basis of the TCFD framework every two years. Through representatives of various departments and external consultants, it identifies transition risks, physical risks, and relevant opportunities with regard to external changes and trends in policies/regulations, markets, and climate disasters, as well as internal operating strategic directions. Compared with the previous assessment results, the impact of carbon trading/carbon fee/carbon tax on carbon emissions regulation has significantly increased. The main reason lies in the accelerated promotion of carbon pricing system in the areas TCC operates. In terms of opportunities, the impact of securing inventors' willingness for long-term investment is relatively higher as well, signaling that the accelerated transformation at TCC is more likely to win the favor of funds in the capital market.

### Climate Change Risk and Opportunity Identification Process

Update the industry trends, important international initiatives, and legal/regulatory requirements at where it operates, as well as update relevant issues, on the basis of the previous identification.

Execution Results

**13 key risks and 8 derivative opportunities selected pursuant to the TCFD's categories for TCC in 2022**

STEP 1

**Collection of Climate Issues**

Call cross-departmental workshops to probe into the actual impact of each risk/opportunity on TCC, the time of occurrence, the sources, and the possible financial impacts.

Execution Results

**16 internal assessment questionnaires distributed**

STEP 2

**Assessment of Impacts on TCC**

**Analysis and Determination**

STEP 3

Analyze the assessment questionnaire, refer to the perspectives of external experts, and identify key risks/opportunities.

Execution Results

**11 key risks**
**7 derivative opportunities**

**Response Strategies**

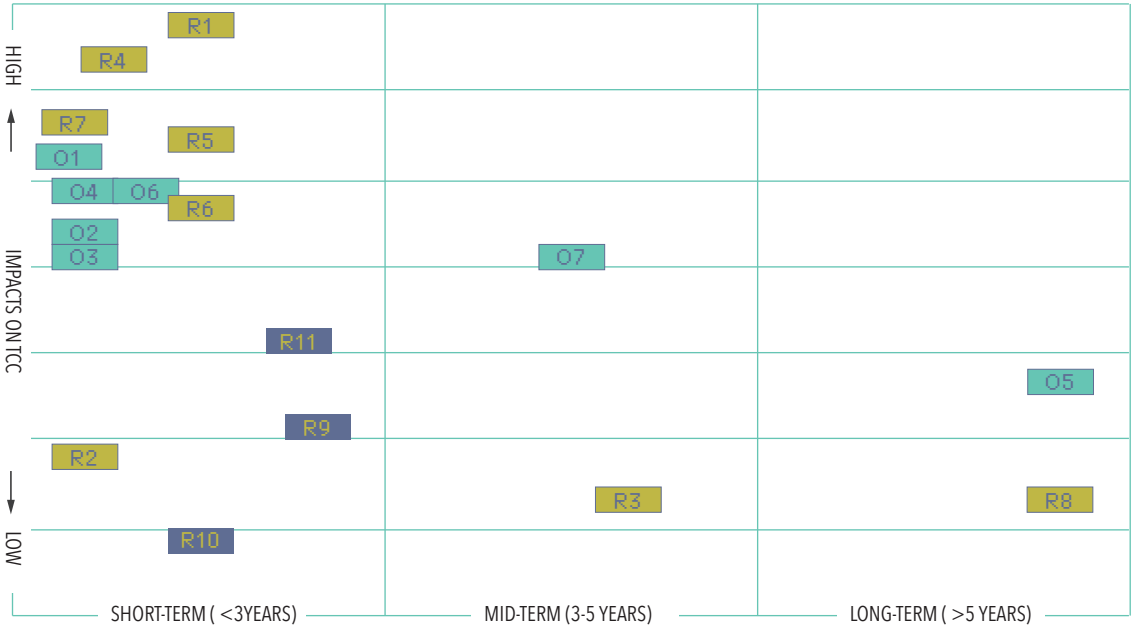
STEP 4

Link the existing mitigation and adaptation strategies to respond to key risks/opportunities.

Execution Results

**Six Climate Strategies**

### Climate Risks & Opportunities Matrix




**Transition Risks**

- R1 Carbon trading/carbon fee/carbon tax for total carbon emissions control
- R2 Regulations and procurement of renewable energy
- R3 Decommission of the coal-fired Hoping Plant
- R4 Costs in the low-carbon technologies, equipment and management
- R5 Impacts to corporate reputation
- R6 Impacts on the strength of supports from financial institutions in investment, financing, and insurance
- R7 Rising prices of raw materials and energy
- R8 Breakthrough in the advanced technology of carbon capture and storage (CCS)

**Physical Risks**

- R9 Flood (production)
- R10 Changes in precipitation patterns and extreme changes in climate patterns (transportation)
- R11 Drought (production)

**Opportunities**

- O1 Smart low-carbon production and waste co-processing
- O2 Involvement in the carbon trading market
- O3 Installation of new energy projects
- O4 Involvement in the electricity trading market
- O5 Application of the oxygen enriched combustion and oxy-fuel combustion technologies to carbon capture and reuse
- O6 Securing inventors' willingness for long-term investment
- O7 Exploration of the market for low-carbon products

## Response Strategies in Four Thematic Areas

### TCC's Actions towards Climate Change Risks and Opportunities

Financial impacts (impacts caused by ▲ Risks and ● Opportunities included)

| ▲ Risks | ● Opportunities | Financial impacts | Responses | Actions |
|---|---|---|---|---|
| Carbon trading/carbon fee/carbon tax for total carbon emissions control | Involvement in the carbon trading market | ▲Rising costs<br>●Increased income | Low-carbon cycling | Promotion of 7 strategies: Equipment & Process Enhancements; Power Generation by Waste Heat Recovery; Alternative Raw Materials; Alternative Fuels; Renewable Energy Installation; Energy Storage, Batteries, and Charging Services; Carbon Negative Technologies (Carbon Capture and Carbon Sink)<br>Construction of the Renewable Resource Recycling Center (RRRC) and the waste co-processing projects<br>Trial internal carbon trading platform internally and involvement in external electricity trading platform externally |
| Regulations and procurement of renewable energy | Involvement in the electricity trading market | ▲Capital expenditures<br>▲Rising costs<br>●Increased revenue<br>●Reduced costs | New energy business development | Establishment of Energy Helper TCC Corporation to provide green power consulting services as well as creation of a green power trading platform and provision of auxiliary services for the bidding power trading platform |
| Decommission of the coal-fired Hoping Plant | Installation of new energy projects | ▲Decreased revenue<br>▲Rising costs<br>●Increased revenue<br>●Reduced costs | Low-carbon cycling<br>New energy business development | Promotion of the Hoping Power Plant Transformation Plan, including the environmental emissions reduction project as well as the planning and assessment for solid recovered fuels, small hydropower, etc.<br>Investment in clean energy and energy storage as well as active development of new energy sources such as solar energy, bioenergy, geothermal energy, and marine energy |
| Breakthrough in the advanced technology of carbon capture and storage (CCS) | Application of the oxygen enriched combustion and oxy-fuel combustion technologies to carbon capture and reuse | ▲Capital expenditures<br>▲Rising costs<br>●Reduced costs | R&D Innovation | Ongoing research and development of carbon capture technology for the long-term scaling and economy |
| Costs in the low-carbon technologies, equipment and management<br>Rising prices of raw materials and energy | Smart low-carbon production and waste co-processing<br>Exploration of the market for low-carbon products | ▲Capital expenditures<br>▲Rising costs<br>●Increased revenue<br>●Reduced costs | Low-carbon cycling<br>Low-carbon products<br>Common good with supply chain | Establishing SBTs and Net Zero by 2050 for the long term<br>Promotion of cement products to obtain dual carbon labels, encouragement to concrete customers to apply for green building certification with TCC's concrete with Carbon Footprint Reduction Label, and investment in research and development of new UHPC products<br>To request suppliers to collect carbon emissions data and implement carbon reduction measures, and to recognize excellent supplier partners. |
| Impacts to corporate reputation<br>Impacts on the strength of supports from financial institutions in investment, financing, and insurance | Securing inventors' willingness for long-term investment | ▲Funds available decreased<br>●Funds available increased | Low-carbon cycling<br>Climate adaptation<br>Common good with supply chain<br>Low-carbon products<br>R&D Innovation<br>New energy business development | Managing climate-related risks & opportunities in accordance with TCFD recommendations<br>Regularly communicating sustainable achievements with institutional investors/media<br>Participating in well-known ESG assessments, such as MSCI, DJSI, and CDP, to demonstrate carbon reduction performances |
| Flood (production)<br>Changes in precipitation patterns and extreme changes in climate patterns (transportation)<br>Drought (production) | | ▲Decreased revenue<br>▲Rising costs | Climate adaptation<br>Common good with supply chain | Assessment of physical risks at respective production sites using climate science models<br>Real-time monitoring of precipitation, water levels and changes, as well as establishment of an emergency response coordination mechanism for production and marketing<br>Leveraging the real-time monitoring of water level information of Water Resources Agency to plan for countermeasures to water shortage<br>War Room Dashboard Management: adoption of optimal inventory and flexible arrangement of transportation<br>Formulation of various water resources management strategies, including:<br>(1)Water use reduction; limiting distribution and shipment (2)A full leverage of meteoric water to support the sedimentary ponds on the plants to raise water storage (3)Transportation of water across regions and increase in the use of reclaimed water (4)Mutual support in material supply with other plants (5)Use of groundwater |

## Assessment of Climate Risk Scenario Analysis

Pursuant to the TCFD supplementary guidelines and recommendations for the Materials and Building Group, TCC conducts analysis and assessment of climate scenarios for carbon price, carbon emissions regulation, and extreme weather events.

**1. Climate risk scenarios of carbon price and carbon emissions regulation:**

The directions of the GHG laws and regulations in the countries where TCC mainly operates in are analyzed. The financial impacts arising from the carbon price trends in three scenarios, i.e. Stated Policies Scenario (STEPS), Announced Pledges Scenario (APS), and Net-Zero Emissions by 2050 Scenario (NZE2050), are assessed.

**2. Climate risk scenarios of extreme weather:**

The possible risks of respective operating plants brought by floods, droughts, typhoons, and heatwaves are taken into consideration on the basis of the geographical locations where TCC operates. The low emissions mitigation scenario (SSP1-2.6) and the extremely high impact emissions scenario (SSP5-8.5) are further selected for assessment of the financial impacts on TCC. After aggregation, the aforementioned scenario analysis results are included in the resilience strategy considerations to actively adjust the response plans for mitigation and adaptation.

**Consolidate the assumptions regarding risk types and different scenarios mentioned**

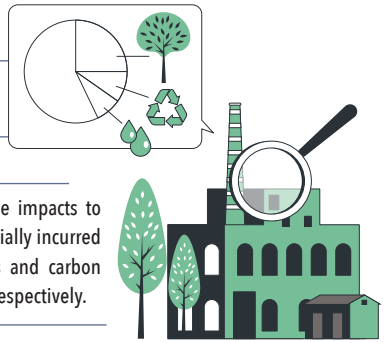
**Risk Category: Transition**

GHG regulations and carbon pricing policies

| Scenario Selected | Key parameters |
|---|---|
| IEA Stated Policies Scenario(STEPS)[NOTE 1] | Hypothetical carbon prices of the locations or regions of operation in different scenarios[note 2] |
| IEA Announced Pledges Scenario(APS)[note 1] | |
| IEA Net Zero Emissions by 2050 Scenario (NZE2050) | |

**Assessment Description**

With the warming managed at 2.5°C, 1.7°C, and 1.5°C, the impacts to operation arising from emissions-related expenditures potentially incurred in 5-10 years from the corresponding carbon price trends and carbon management regulations in the operating sites are assessed respectively.



**Risk Category: Physical**

Floods, Droughts and Long-Term Climate Pattern Changes

| Scenario Selected | Key parameters |
|---|---|
| IPCC – AR5 RCP8.5 | Changes in drought duration and precipitation index arising from extreme weather |
| IPCC - AR6 SSP1-2.6、SSP5-8.5[note 3] (Planning and Assessment) | |

**Assessment Description**

In the scenario of the highest warming level of temperature rise, the potential impacts to operation by the mid-century arising from increased costs in alternative transportation and equipment repair due to intensified droughts and increased number of typhoons brought by extreme weather are assessed.
In the scenario of the ideal warming mitigation or the highest warming level of temperature rise, the changes in the risks of heatwaves, floods, and droughts brought about by extreme weather are assessed.

Note 1: The STEPS and APS in the World Energy Outlook 2022 of the International Energy Agency (IEA) are cited, which respectively represent the carbon price trend and emissions reduction pathway for the global average temperature rise by approximately 2.5°C by the end of the century with the current policy formulation scenario and the specific policies and carbon emissions managed with policies enforced by governments included as well as the global average temperature rise by about 1.7°C with all the climate commitments of governments, including the Nationally Determined Contributions (NDCs) and long-term net zero goals, fulfilled as scheduled by the end of this century.

Note 2: The references for the hypothetical prices are from World Energy Outlook 2022 and the carbon pricing options for Taiwan 2020 of the Environmental Protection Administration, Taiwan, without the preferential rate of carbon fee taken into consideration.

Note 3: The SSP1-2.6 and SSP5-8.5 scenarios in the 2021 Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) are cited. SSP1-2.6 represents a scenario of low greenhouse gas emissions. In this scenario, there will be a significant reduction in the global carbon dioxide emissions, the goal of net-zero emissions to be achieved after 2050, and a global temperature rise by 1.8°C by the end of this century. SSP5-8.5 is a scenario of very high greenhouse gas emissions with the assumption of high emissions and a significant increase in coal use in the future, rendering the impact pathway of a global temperature rise by 4.4°C by the end of this century.

## Financial Impacts after Analysis and Assessment of Climate Scenarios

### Financial Impacts in the Climate Risk Scenarios of Carbon Price and Carbon Emissions Regulation

For the cement industry with high carbon emissions, the impact of GHG emissions control regulations is evident. The most important cement production bases of TCC at this stage have been inventoried, which are located in Taiwan and Mainland China, respectively. In terms of carbon system planning in Taiwan, the Climate Change Response Act was passed in the third reading by the Legislative Yuan on January 10, 2023. The legal basis for the collection of carbon fees is introduced and is expected to come into force as early as 2024. The national carbon trading market in Mainland China has been formally established in 2021, and the cement industry has yet been included in the national carbon trading system. For the carbon emissions regulation of the cement industry in the region, a cap-and-trade system is in force via the regional carbon trading pilot.

Through TCC's assessment of the future changes in the yield of cementitious materials and the carbon emissions that meet the internal reduction targets, with the assumption of the enforcement of the carbon fee system in Taiwan and the inclusion of the cement industry in the national carbon trading system in Mainland China, combined with the three climate scenarios, i.e. STEPS, APS, and NZE2050, taken into account, the carbon prices analysis are as follows:

| | RESPONSE STRATEGIES | |
|---|---|---|
| IEA STEPS<br>Carbon price in the Stated Policies Scenario | | Reduced by approximately NT$4.19 billion<br>Financial impact from carbon price |
| IEA APS<br>Carbon price in the Announced Pledges Scenario | Alternative raw materials input<br>Alternative fuels and biofuels input<br>Production process enhancement | Reduced by approximately NT$6.51 billion<br>Financial impact from carbon price |
| IEA NZE2050<br>Carbon price in the Net-Zero Emissions by 2050 Scenario | Power generation by waste heat recovery<br>Renewable energy installation<br>Carbon capture | Reduced by approximately NT$14.88 billion<br>Financial impact from carbon price |

Note: The financial impacts are comparison results against the failure in adoption of mitigation measures.

Faced with the major transition risk of "carbon trading/carbon fee/carbon tax for total carbon emissions control," TCC has initiated the transition as early as 2017, planning for the increase in the alternative raw materials and fuels, production process enhancement, and ongoing research and development of carbon capture technology , renewable energy installation, improvement to the efficiency of power generation by waste heat recovery, among other mixed resilience strategies, so as to reduce carbon emissions generated from the cement process to increase the potential in operational reduction, effectively controlling the risks brought about by carbon pricing policies. Meanwhile, carbon emission intensity is incorporated as the key performance indicator (KPI) for plants in order to improve the reliability of internal carbon reduction targets. Moving forward, TCC shall not only continue to strengthen the carbon reduction efforts of the above-mentioned strategies, but also consider moderate production reduction and cement price transfer, so as to minimize the financial impacts of such risk on TCC.

### Financial Impacts in the Climate risk scenarios of extreme weather

Through internal discussion, inventory, and assessment, TCC identifies potential risks in the production or transportation phases arising from extreme changes in climate patterns like floods, droughts, and changes in precipitation patterns. A flood caused by heavy rainfall will lead to plant shutdown and equipment damage. In 2022, the Yingde plant had seen a once-in-a-century flood hazard. Back then, the facilities at the Beijiang port were submerged, resulting in a temporary shipment failure. Drought and water shortage will affect the normal operation of the concrete plants in Taiwan. When there is a shortage of water, it requires water use reduction, transporting water across regions by water trucks, or transferring goods from other plants, which result in an increase in operating costs. The extreme changes in precipitation patterns and climate patterns mainly render impacts on the cement production sites in the southern region of Mainland China, which relies on river transportation. The increased rainfall intensity and the concentrated rainy season will increase the variation in the water level of the river for transportation. An excessive water level will flood the facilities at the port, while a low water level will reduce the transportation capacity. Either one is not conducive to the transportation of raw materials and finished products. Consequently, they are to be transported via land transportation, resulting in poor efficiency and increased transportation costs.

To address the risk of flooding arising from typhoons, changes in precipitation patterns, and extreme changes in climate patterns, on the basis of the research data from Taiwan Climate Change Projection Information and Adaptation Knowledge Platform (TCCIP) and from the Chinese Academy of Sciences of Mainland China and with reference to the worst warming scenario of RCP8.5 in the IPCC Fifth Assessment Report (AR5), TCC has analyzed the operational and financial impacts on the plants of TCC. In such scenario, the number of typhoons affecting Taiwan will decrease by 15% in the middle of the century, but the proportion of strong typhoons will increase by 100%; the dry season in the southern China, the locations where the Yingde and Longshan Plants are, will increase by 54% in the middle of the century, extending from the average of 2.67 months at present to 4.11 months. The analysis results show rises in all the risks faced.

TCC shall continue to improve on the analysis of physical risk scenarios. In the future, the SSP1-2.6 ideal mitigation scenario and SSP5-8.5 very high emission scenario in the latest IPCC Sixth Assessment Report (AR6) will be used to perform the assessment of changes in risks for operating sites. In addition, aside from assessment of the existing risk issues, the risk of heatwaves is expected to be included as well, so as to strengthen TCC's climate adaptation management and strategies. The relevant analysis results will be presented in the 2022 TCFD Report of TCC.

# 5.5 / Sustainable Supply Chain

**MANAGEMENT APPROACH**

TCC ensures consistency among suppliers in terms of quality, cost, delivery time, service quality, environmental safety and health, and production. TCC collaborates with suppliers to promote environmental protection, human rights, and sustainable development through resource recycling, driving the sustainable development of our supply chain.

TCC adopts two strategies, namely "sustainable supplier management" and "local and green procurement." TCC creates the model of mutual support and benefit that is publicly transparent and eco-friendly by working hand in hand with our suppliers. In 2022, 100% new suppliers signed the Anti-Corruption Statement and Supplier Code of Conduct.

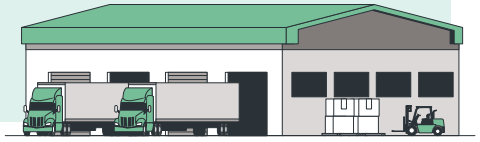
In addition, TCC improved the supply chain intelligence. AI technology was applied to the supply chain. From supplier selection, logistics to warehousing, these processes are supported with the new technology to optimize carbon reduction and reduce possibility of corruption.

## Critical Tier-1 Suppliers

A Critical Tier-1 Supplier is defined as a supplier that is critical to the quality and delivery of the Company's product manufacturing, or that reaches a certain procurement amount or ratio, which is a critical supplier required to be managed and evaluated, along with implementation of supplier evaluation.

**As of the end of 2022**
**892 suppliers in total**
**Critical Tier-1 Suppliers were 88**

**accounting for 87.81% of the procurement amount.**



## Join hands towards a sustainable supply chain

To capture TCC Scope 3 emissions for the following management and engagement, TCC planned the short-, mid-, and long-term managing strategies by 2030 with reference to the Greenhouse gas management document released by SBTi in 2018*, including the short-term emissions inventory data collection, together with mid- and long-term reduction as well as ongoing information disclosures and supplier communication.

In 2022, TCC completed the design and distribution of the supplier carbon questionnaire. Written review was conducted for each questionnaire collected. Then, on-site inspections were carried out for certain Critical Tier-1 Suppliers to collect the supplier GHG emissions firsthand. Also, in response to the carbon inventory with bigger businesses to lead smaller businesses promoted by the Chinese National Federation of Industries (CNFI), TCC plans to continue to distribute carbon questionnaires yearly in the future and aims to complete on-site inspections to 30 Critical Tier-1 Suppliers cumulatively in 2023.

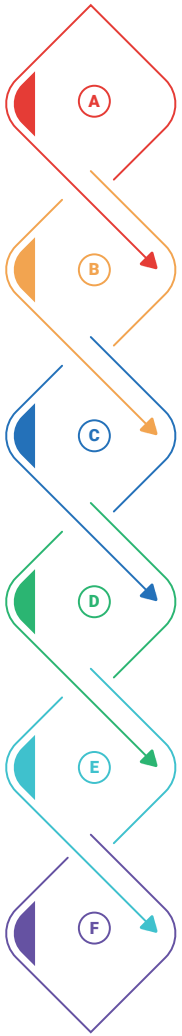
**64.6% completed**
**Critical Tier-1 Suppliers**
**Emissions Inventory Data Collection**

**Value Change in the Value Chain: BEST PRACTICES IN SCOPE 3 GREENHOUSE GAS MANAGEMENT,* Version 3, SBTi, 2018

## Sustainable Supplier Management

TCC values sustainable supplier management. With reference to the guide for supply chain of the United Nations Global Compact (UNGC), TCC strengthens our influence on suppliers via six steps, including target setting and risk and impact assessments. Please refer to the Supply Chain Management of TCC for details of supplier evaluation metrics (e.g. environment, human rights, legal compliance, etc.) and Supplier Code of Conduct.

United Nations Global Compact




### Target Setting

Five targets were set for the sustainable supplier management at TCC.

The Critical Tier-2 Suppliers identification commenced in 2022 so as to broaden the supplier management scope.

### Risk and Impact Assessment

TCC assigns suppliers into different categories and ratings and assesses the sustainability exposures and impact levels in each category.

### Sustainability Performance Evaluation

Through the Supplier Sustainability Self-Evaluation Questionnaire, TCC regularly conducts reviews on paper and on site to the existing suppliers each year and undertakes evaluation via inspection and correction tracking.

Issue of biodiversity was added to the Supplier Sustainability Evaluation Forms in 2022.

### Correction and Improvement

Suppliers with excellent performance are listed as priority suppliers for procurement and are publicly recognized.

High-risk suppliers will be issued with correction notice. Then, the sustainability resilience of the suppliers are to be improved via education, training, workshops, etc.

### Training, Empowerment, and Cooperation

The 1st Supplier Sustainability Governance Workshop was organized by TCC on November 23, 2022, inviting professional consultant team to share on sustainability trends.

### Supervision, Assessment, and Mutual Learning

TCC tracks and assesses the sustainability actions of suppliers in the sustainability review of the following year.


## 331 Sustainability Partners Gathered for Supplier Convention

To strengthen the partnership with our suppliers and communicate the idea of corporate sustainability, TCC organizes "Supplier Convention." The theme for 2022 was "Low-Carbon Cycling & Sustainable Future." A total of 331 suppliers from Taiwan and Mainland China attended the convention. Meanwhile, to encourage commitment to ESG actions, 10 excellent suppliers were recognized this year. Also, "Sustainability Progress Award" was created to recognize the top 3 partners with the most progresses made in the sustainability evaluation, to which TCC cement trophy was presented as acknowledgement.

## New Supplier ESG Assessment

TCC conducts background check for all new partners and demands signing of the Supplier Code of Conduct. Meanwhile, the suppliers are required to fill out TCC Supplier Sustainability Evaluation Forms, so that TCC can verify the ESG performances of new suppliers. Also, the quantified criteria are set for the preliminary partner screening. As a result, the suppliers will meet the basic requirements in sustainability prior to becoming a supplier to TCC.

## Local and Green Procurement

Through supply chain localization, suppliers' service efficiencies are elevated; delivery time is shortened; transport distance and carbon emissions of raw materials are reduced. Also, opportunities of local employment are increased to promote social and economic development. Meanwhile, the "Green Procurement Policy" has been formulated at TCC to prioritize the procurement of products and services in alignment with the policy standards, including but not limited to low energy consumption, low pollution, recyclability, etc. In 2022, the local procurement ratio was 77.01%, the non-raw material local procurement ratio was 93.79%, and the green procurement ratio was 4.51%.

## Intelligent Supply Chain – Procurement Portal

TCC introduced the AI technology for our supply chain. The self-developed "Procurement Portal" carries out supplier selection, electronic bidding, and risk management of material quality. Hence, the smart manufacturing is expanded to the upstream of the industry, accelerating the next upgrade for the industry. Meanwhile, suppliers are able to access information in real-time via the platform for a bilateral communication. Blacklisted suppliers were 100% blocked by the screening in 2022. Also, the group code verification is added. A 100% was achieved regarding the associated suppliers screening block rate. In 2024, further optimization of raw material procurement, including coal, will be implemented.

## Smart Warehouse

The smart warehouse at TCC Hoping Plant was inaugurated in July 2020 with PV panels to generate power for self-consumption. There is zero paper and carbon footprint throughout the process. The warehousing is guided by the intelligent lighting control, cutting working hours by 87% and elevating the reception and requisition efficiencies.

## AI Smart Logistic System

The AI Smart Logistic System firstly created by TCC innovated the transportation mechanism for the cement industry. The raw materials and products of the cement industry are mostly transported with vehicles and vessels. Also, now that the transport characteristics are varied for suppliers and customers, TCC developed a system to help automatically collect information of vehicles and vessels of TCC plants, customers, and suppliers that voluntarily participate in the matchmaking. The bilateral matchmaking is made with vehicle plate number and vessel registration number. Transportation needs with varied limits are met through the algorithm to reduce trips of no load for vehicles and vessels, thus achieving carbon reduction.

**In 2022, through the AI Smart Logistic System, matchmaking was made for a total of 1,267 trips of vehicles and 850 trips of vessels, reducing 24,660.8 km and 485,935.6 km of no load, respectively.**

**Equivalent to approximately 1,584.3 metric tons of carbon emissions reduced.**

# 5.6 / Client Communication

While selling products, TCC also engages carbon reduction promotion to the clients, elaborating on the great emphasis of TCC on carbon reduction in raw materials, processes, and product transportation and the results of low-carbon product development. In addition, promotion of ideas like using low-carbon concrete and carbon emissions reduction to the clients is enhanced as TCC engages client communication and education as an industrial leader ahead of regulatory standards.


## Carbon Emissions Disclosed on Delivery Notes

Aside from promotion of low-carbon sales to the clients, TCC began to exercise low-carbon ratio disclosure promotion via disclosure on delivery note in 2023, expecting the clients to shoulder the responsibility of carbon reduction together with TCC.

TCC values sustainable business and ethical service of clients. The ratio and amount of usage are disclosed on the delivery note of each RMC transaction, together with the 50%-ratio carbon label for the cement products of 280, 350, 420, etc.

## Excellent client feedback, TCC has been highly recognized by customers

Through the low-carbon sales promotion and client feedbacks, it is evidently that the low-carbon products of TCC are recognized by various sectors. The clients approve and support the carbon reduction direction of TCC, and advise their customers to use the low-carbon products of TCC.

## Product Health and Safety Management

With the ISO 9001 system, TCC ensures the health and safety of our cement and concrete products. The voluntary inspection system is instituted, and six quality assurance and certifications are proposed, including six raw materials inspections, six third-party certifications, and the Carbon Footprint Reduction Label certification from EPA Taiwan. TCC ensures not only the product strength of, but also zero negative impact on health or safety from, the products. TCC maintains certified to the Good Ready-Mixed Concrete (GRMC) label, which embodies the extraordinary quality of TCC products.

| Management Mechanism | Verification System |
|---|---|
| TCC Cement | Carbon Footprint Reduction Label certification from EPA Taiwan |
| Six Raw Materials Inspections | Cement, sand and gravel, slag, fly ash, chemicals, and mixing water, passed the tests by TAF laboratories like those of TCC, SGS, etc. |
| Six Third-party Certifications | ◤ Cement specimen compressive strength report<br>◤ Good Ready-Mixed Concrete (GRMC) Label<br>◤ ISO 9001<br>◤ ISO 14001<br>◤ ISO 45001<br>◤ TCRI product traceability certification |

## Product Health and Safety Communication

TCC seeks to provide products and services to clients' satisfaction, to achieve a win-win scenario.

TCC conducts education and training pertaining to product health and safety for employees to ensure that any employee is capable of communication on issues of product health and safety.

TCC offers good field services to clients, including on-site cement applications and ready-mixed concrete formula adjustment to resolve issues at the construction sites for clients. In addition, the client service groups arrange the monthly client services schedule to proactively care for clients' use of products. The Client Service Planning and Follow-Up Charts have been created for tracking and improvement. TCC offers the convenient order service via the e-commerce app as well, in which "TCC News" is available for clients to check the TCC's latest news. Also, results of TCC practicing science-based carbon reduction and a circular economy are released via the platform.

**Aggregates Control:**
**A Three-Tier Internal Quality Control System**

| | |
|---|---|
| Tier 1 | Branch plants conduct material inspections according to SOP |
| Tier 2 | The parent plant goes to the branch plant for regular random inspections |
| Tier 3 | The independent third-party research laboratory performs irregular visits to plant for random inspections |

**Cement Compressive Strengths (MPa) of TCC Cement**

| CEMENT TYPE | 3 Days | 7 Days | 28 Days |
|---|---|---|---|
| Type I Cement | 23.5 | 31.2 | 41.3 |
| Low-alkali Cement (Type I) | 23.8 | 31.6 | 41.9 |
| Low-alkali Cement (Type II) | 22.1 | 29.6 | 39.3 |

TCC's cement products exhibit superior strength compared to the CNS standard values, regardless of the 3-day, 7-day, or 28-day.

## GRMC – Product Safety Traceability System

Through TCC's AI-powered system, the clients can scan the QR-Code to access the Customer Relationship Management (CRM) system to inquire raw materials and product inspection information. The sources of products and raw materials are completely disclosed. Also, together with the low-carbon products of concrete, the carbon emissions data are disclosed on the delivery note as well.

## Traceability System

Standard UI

A user-friendly UI from the clients' perspective

Smart Connection

Inquiry of raw materials and product inspection in the CRM system by scanning the QR-CODE

Transparent Management

- To completely trace sources of products and raw materials, carbon intensity, and quality certifications
- Raw materials quality and traceability of concrete, external certification certificates, and TCRI traceability certification.

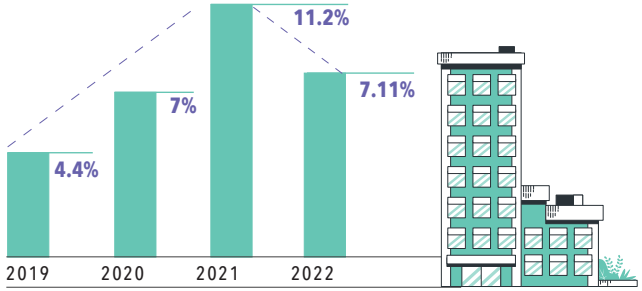
| | | |
|---|---|---|
| Strength information | Sand and Gravel | Carbon Emissions Information |
| Cement | Fly ash | Chloride reports |
| Slag | Aggregates | 28-day strength test report |
| Chemical admixtures | | |
| Quality assurance certificates | | |

## Green Building Promotion

TCC encourages concrete clients to apply for green building certifications. Through the voluntary disclosures of concrete carbon emissions and ratio data, TCC helps our clients to align themselves with the green building $CO_2$ reduction indicator of the Ministry of the Interior, facilitating the mutually beneficial relationship between construction and the environment.

By 2025, TCC aims to achieve a revenue share of concrete used in green buildings that accounts for over 5% of the overall concrete revenue. By 2030, strive to surpass 6% revenue share. As of 2022, the revenue share has already reached 7.11%.

Note: The percentage of green building applications returned to normal because the huge construction projects came to their ends and that some clients from the tech sector postponed the progresses of plants under construction in 2022.




## Client Satisfaction Survey

TCC regularly conducts customer satisfaction survey each year. After weighted average of the scores, up to 96.86% of the customers were Satisfied in 2022. This year, TCC shall further conduct satisfaction survey on the carbon emissions disclosure on delivery note and the faithful disclosure of ratio information in products.

**Satisfaction Survey Results in 2022**

| | | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Corporate Brand and Reputation | Corporate Reputation | 92.31% | 93.26% | 93.11% | 93.11% |
| | Cement Brand | 91.21% | 93.04% | 92.22% | |
| Disclosure of Carbon Emissions on Delivery Note to Promote Carbon Reduction and Sustainability | | – | – | – | 90.00% |
| Cement Quality Stability | | 89.89% | 93.26% | 90.44% | 91.78% |
| Convenience of Concrete Distribution | | 83.08% | 86.74% | 85.33% | 90.22% |
| Service Affinity | | 88.79% | 90.87% | 88.22% | 92.22% |
| Client Complaint Response Time | | 87.91% | 88.26% | 87.11% | 90.44% |
| After-sales Service | | 87.47% | 89.57% | 87.56% | 91.11% |
| Total | | **88.63%** | **90.60%** | **89.03%** | |
| Overall Satisfaction with Products Offered | | 87.03% | 89.57% | 88.44% | 90.44% |
| Overall Satisfaction with Services Offered | | 86.15% | 88.91% | 88.00% | 90.44% |
| Clients Rating "Satisfied"in the Satisfaction Survey (%) | | 96.70% | 95.11% | 96.67% | 98.33% |
| Clients Responding to the Satisfaction Survey (%) | | 99.97% | 99.90% | 99.98% | 99.98% |

Note 1: The denominator of the product satisfaction is the number of questionnaires recovered multiplying by the full score (5), and the numerator thereof is the total of the scores responded by the clients.

Note 2: "Satisfied" is defined as 4 points or above.

Note 3: The denominator for the Clients Responding to the Satisfaction Survey (%) is the annual sales of the domestic clients (sales from the clients under other cement companies or their affiliates and from small purchases of 100 metric tons or less excluded), and the numerator thereof is the aggregated annual sales from clients in the questionnaires recovered.

Note 4: The item "Corporate Reputation" and "Cement Brand" are integrated as "Corporate Brand and Reputation" in 2022.

Note 5: "Disclosure of Carbon Emissions on Delivery Note to Promote Carbon Reduction and Sustainability" is a newly added item in 2022.

Note 6: The calculation of the weighted average of customer satisfaction in 2022 (numerator: total number of cement customers and concrete customers reporting scores of Satisfied; denominator: total number of cement customers and concrete customers that responded to the questionnaire)

# 5.7 / Information Security

**MANAGEMENT APPROACH**

TCC regularly reviews the risk management mechanisms for an effective implementation of risk management processes.

TCC has formulated our information security organizational framework in 2020. The "Information Security Management Committee" has been established, which maintains certified to the ISO 27001 Information Security Management System. Committed to the protection of the confidentiality, integrity, and availability of critical information system and data of the Group, the Committee is responsible for the promotion and review of the information security management system of TCC as well.

The Chief Information Security Officer (CISO) and Information Security Management Committee are instituted at TCC. The Information Security Management Committee is responsible for the promotion and review of the information security management system of TCC, including responses to the global trends of information security and optimization of information security management processes. Also, the top information security supervisor serves as the Chairperson to report to the Board of Directors on a regular basis. There is 1 Director on the Board with background in information security, who prudently oversees the management works. The Information Security Management Committee convened 4 meetings in 2022 and listed the information security with the TCC energy business as the focus for improvement.

## Information Security Enhancement Project

Through measures such as public folder access restrictions, VPN connection security settings, two-factor authentication for sensitive area access, private electronic device connection access control, enhanced database access, and no storing of data in endpoints etc., the information security management is enhanced throughout TCC.

### Non-camera Smartphones

Starting from August 2022, electronic devices with camera are prohibited for employees of information department when accessing sensitive areas and offices. Through distribution of non-camera corporate phones and storage cabinet installation, TCC prevents breach of sensitive information. Relevant measures are to be implemented to TCC subsidiaries in the future with the battery business as the priority for introduction.

### Expanded Endpoint Information Security Review

Malicious connection detection and endpoint protection tools have been introduced. Together with Managed Extended Detection and Response (MxDR), the protection status at TCC is monitored 24/7. The group-wise endpoint device protection measures were introduced in July 2022, which are expected to be deployed to the subsidiaries like the Hoping Power Plant and Molie Quantum Energy in 2023.

## Information Security Education and Training

The information security unit regularly conducts information security awareness education and training each year. The slides and footages of relevant programs are uploaded to TCC Lyceum for employees to access. Also, through the professional information security seminars by external experts as well as the information security policy and protection measures sent from the information security mailbox from time to time, the information security protection awareness of all TCC employees is strengthened. There will be six social engineering drills arranged in 2023. Information security related activities will be organized as well to improve the information security literacy of employees.

### Performances in 2022

**Recovery Simulation**

- Completion of the annual simulation; regular data back-up(s) to ensure business continuity

**Data Security Checks**

- Completion of 4 data security checks; ongoing improvement of the security capabilities in networks, information systems, and personal computers
- 4 social engineering drills

**Information Security Awareness**

- 3 sessions of information security awareness training delivered; an external consulting firm commissioned for the information security management system (ISMS) of TCC affiliates and the provision of ISMS-related trainings
- 219 accesses of information security training with around 1,200 training hours in total

**Information Security Mailbox**

- 2 group-wise promotions; 1 phishing incident notice, and 6 information security measure announcements to the energy business (E-One Moli Energy Corp./NHOA.TCC)

## Information Security Incident Handling Mechanism

The information security reporting and handling process has been stipulated clearly at TCC. Pursuant to the Flow Chart for Notification of Information Security Incidents, an incident is analyzed as to whether it is a system misjudgment. Should an incident be verified, a corresponding response will be activated in line with the information security incident level (Level 1 to 4 at present). Monitoring, reporting, and correction will follow after the incident is addressed to avoid any reoccurrence.

TCC unceasingly strengthens our information security management. Hence, there were only 2 internal information security incidents in 2022, including installation of external software and massive downloading of corporate data. TCC promptly blocked and reported the incidents at the onset, eliminating the risk of information breach. There was no critical information security incident.

Definition of Critical Information Security Incident at TCC:

- Breach of sensitive information or trade secrets
- Ransomware attack that leads to business discontinuity that cannot resume within a specified period due to encryption of a large number of devices or large-scale system or network paralysis

# 5.8/ Intellectual Property Management System

## MANAGEMENT APPROACH

In combination with the existing areas of building material technology, TCC develops the renewable energy and energy storage businesses with an innovative thinking, realizing the ideas of sustainable development and circular economy.

**TCC emphasizes intellectual property management pertaining to trademarks, patents, copyrights, and trade secrets and thus takes active protection and management measures.**

**Protection and Management Measures |** To uphold the mission of being a green environmental engineering company, TCC actively enhances our technical capabilities. Through application, maintenance, and added-value utilization of relevant rights, TCC puts the ideas and plans of circular economy into practice, strengthens our leadership in the industry, and maintains the fruits of advanced technology gained from hard work.

**Trademarks |** Issues concerning trademarks are incorporated along with new business promotion to protect the rights of TCC brands.

**Patents |** Collaborates with external consultants periodically to conduct analysis and strategy discussions on research and application. Additionally, stays updated and engages in exchanges regarding relevant international technology trends.

**Copyrights |** Employees are required to abide by the Copyright Act during employment; promotions are made from time to time to establish the right copyright awareness.

**Trade Secrets |** Business partners are required to sign Non-Disclosure Agreement (NDA) for any business partnership involving technology development, technology collaboration, or any other trade secret information.

## Performances in 2022

**Trademarks**

472 trademark applications made by TCC were approved in 25 jurisdictions globally like Taiwan, Mainland China, Europe, and USA. There were 125 trademark applications pending across the globe.

**Patents**

TCC updated the procurement process and standard procurement order provisions to ensure that TCC, as an investor, effectively obtains the intellectual property rights of entrusted development results and engages discussions of patent arrangement involving developing technologies with external consultants and senior managers from time to time. There were 5 sessions conducted by 2022. As of December 31, 2022, there were 40 invention patents granted and 26 invention patents applications pending.

**Trade Secrets**

TCC has been certified to ISO 27001 information security management system. The electronic document system is managed on a real-name basis, and the sensitive materials pertaining to core technologies are listed for management. Meanwhile, TCC bans technical R&D units from sending information to free-of-charge personal mailboxes or email addresses of competitors.

## Future Plans

In 2023, TCC aims to establish an energy storage cabinet patent group and patent family, while enhancing management planning to protect and solidify our niche in the green product line. Meanwhile, TCC will organize periodic education and training for project personnel to enhance their understanding of intellectual property ownership in outsourced and entrusted development projects.

**Establish the international patent family**

Establish 1 or more patent families for energy storage products and file applications in jurisdictions beyond Taiwan (e.g. USA, Europe, or Mainland China).

**Improve the thinking of management planning**

1 or more summit meetings are convened for the application and maintenance of intellectual property rights.

# 5.9 / Ethical Management

**MANAGEMENT APPROACH**

**TCC prevents graft and corruption, continuously monitors information from competent authorities, evaluates and adjusts ethical management policies and regulations, and ensures that business activities adhere to the highest principles of ethics; 100% of all new recruits sign the Statement of Integrity and Ethical Conduct.**

TCC values corporate integrity and ethics. With an attitude of zero tolerance for corruption and bribery, Code of Ethical Conduct, Ethical Corporate Management Best Practice Principles, Anti-Corruption and Anti-Bribery Policy, Procedures for Anti-Corruption and Anti-bribery Management, Anti-Corruption and Anti-bribery System Management Manual, and other related regulations have been stipulated. TCC requires employees, business partners, directors, and managers to adhere to anti-corruption and anti-bribery policies and regulations in their duties. These aspects are included in employee performance appraisals. TCC is the first domestic enterprise to obtain ISO 37001 Anti-bribery Management Systems certification. The annual review was completed by an external verification body (BSI) in June 2022 to ensure the validity of the ISO 37001 system.

ISO 37001

To ensure a better alignment of the practical operations of the Company with the ISO 37001 systems, the directions and forms related to ISO 37001 systems were amended respectively in 2022. For instance, TCC added "Integrity Code" to differentiate the contents of the code; to perform due diligence prior to any employee transfer or promotion; and added "Business Partner Corruption Risk Assessment and Due Diligence Procedures" as the necessary procedures for ongoing improvement of ethical management.

The overall structure of ethical management at TCC is composed of three lines of defense, i.e. governance, legal compliance, and audit management.

## Governance Structure

The Audit Committee oversees the achievement of management system goals at TCC. An "Anti-Corruption and Anti-Bribery Operation Team" has been established. The Legal Office leads and supervises the promotion, planning, and consultation of the management system in different departments, as well as audits the assessment of management system design and implementation effectiveness. The President takes overall responsibility for the operation and compliance of the management system, delegates tasks to relevant parties, and maintains effective communication with personnel at all levels within the organization. Department managers are responsible for managing and monitoring corruption or bribery risks in their respective departments' daily operations. The implementation of the system is reported to the Board of Directors at least once a year.

## Legal Compliance

TCC's Legal Office conducts regular identification of "Internal/External Issues Registry" at the beginning of each year, monitors law amendments and competent authority requirements, and reviews previous year's risk responses. Emerging legal compliance issues, including anti-money laundering, anti-corruption, and environmental health and safety, are incorporated into standard contract provisions.

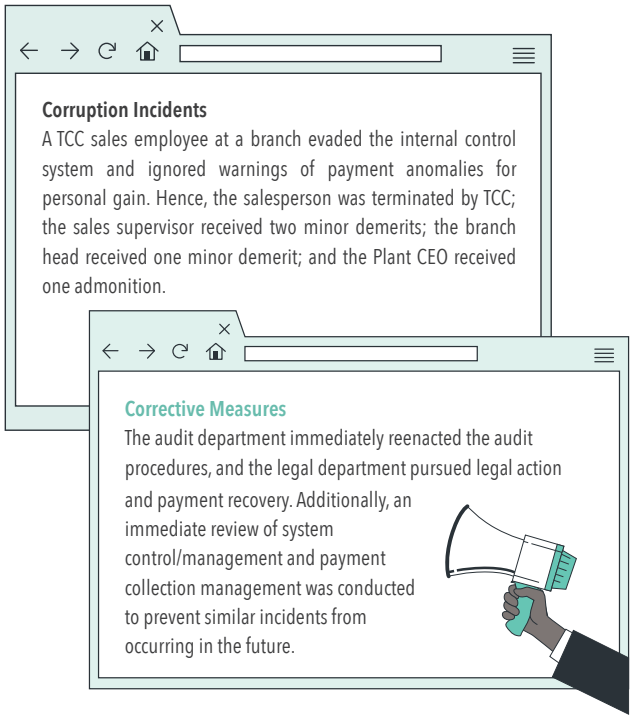
TCC departments and plants update their records of controversies to the Legal Office on a monthly basis. They are required to promptly notify the Legal Office of any legal case or compliance issue, allowing for risk understanding, case follow-up, and assessment of necessary system adjustments to ensure legal compliance.

In addition, TCC requires employees to sign the Statement of Integrity and Ethical Conduct, and holds annual readings of the ethical conduct policy. Actions of legal compliance and measures to address violations are promoted and incorporated into employee remuneration, performance, awards/punishments, and performance appraisals. The rewarding mechanism for legal compliance actions by employees is specified in the Reporting Mechanism for Violation of Code of Conduct.

All TCC employees have 100% signed the Statement of Integrity and Ethical Conduct. In addition to the Statement of Integrity and Ethical Conduct, suppliers involved in the business and managers of medium/high-risk clients are required to sign the Integrity Code, achieving a 100% signing rate as well. Meanwhile, a maximum gift value of NT$2,000 is enforced, and any gift exceeding this amount requires assessment and approval from the department supervisor. Prior approval from the President is mandatory for any gift presented to a government agency or official, regardless of the amount.

## Audit Management

TCC is continuously improving our internal regulations in phases. By implementing an effective audit system, incidents of corruption can be promptly detected, leading to timely corrective measures.




In 2022, TCC implemented the remote audit mechanism, which resulted in a higher number of units audited while reducing carbon emissions and travel costs associated with on-site audits. A total of 117 units were audited in 2022, an increase of 77 units compared to 2021. Especially, the number of units in the cement business went up from 8 units audited in 2021 to 22 units. Aside from the aspect of ethical management, the formats and data were optimized in 2022 as well, and quantified targets for ESG audits were introduced to facilitate internal sustainability management at TCC.

### Key ESG Audit Items

| Item | Corrective Measures |
|---|---|
| Air Pollution | Electrostatic precipitators added; air purifiers improved; maintenance conducted regularly |
| Water Pollution | Regular checks of water meters; pipeline redesigned; wastewater reduced; wastewater flow redirected |
| Noise Pollution | Regular items for inspection |
| Renewable Energy | Inspection mechanism redesigned; SOPs and personnel training reenacted |

## Reporting System & Whistleblower Protection Mechanism

TCC encourages individuals both within and outside the company to report any corruption, bribery, unethical behavior, or misconduct. TCC has established a "Reporting Mechanism for Violation of Code of Conduct" to facilitate such reporting. The company is committed to ensuring the confidentiality of the investigation process and providing protection for whistleblowers. Dedicated personnel are responsible for securely storing and accessing whistleblower information, and TCC is committed to preventing any retaliation, such as severance, dismissal, or salary reduction, against whistleblowers. The company also has emergency protection measures in place to address any potential risks to whistleblowers resulting from their reporting.

TCC has enhanced our reporting system by adding a channel for reporting senior management. In cases of misconduct involving senior management, whistleblowers have the option to report directly to the Audit Committee. Furthermore, TCC has established an independent reporting mailbox and hotline for individuals within and outside the Company to report any concerns.

Reporting Mailbox: **mp.buster@taiwancement.com**
Reporting Mailbox for matters involving ethical issues of senior management: **tccwhistle@taiwancement.com**

### Table of Reports and Grievances in 2022

| Reporting and Grievance Channel | Number of Cases |
|---|---|
| Reporting Mailbox | 9 |
| Audit Committee Mailbox | 6 |
| Employee Grievance Mailbox | 15 |
| Cases involving ethical management violation | 12 |
| Cases involving discrimination or harassment | 1 |

**The employee education and trainings on ethical management delivered in 2022 were**

**2,129.8 HOURS**

**Throughout the TCC operation sites in Taiwan, including all the subsidiaries thereof in Taiwan**

## All-round Ethical Management Education & Trainings

**Directors**

Directors regularly receive anti-corruption and anti-bribery training materials via mail or hardcopy and are required to sign the "Letter of Commitment for Compliance with Ethical Management, Anti-corruption, and Anti-Bribery." In 2022, all Directors received the necessary education and training and signed the Letter of Commitment.

**Business Partners**

**Suppliers** | TCC requires all suppliers to sign the Supplier Code of Conduct, in which items related to ethical management are included.

**Contractors** | The contractors to the cement business (e.g., outsourced personnel like security guards, cleaning services, etc.) were prioritized for introduction, and promotions to all the sites of cement business in Taiwan were completed in 2022.

**Clients** | Credit evaluation is conducted to cement clients, in which provisions of ethical management are included.

**Active Employees**

Active employees are required to participate in the anti-corruption and anti-bribery training courses at least once a year with records kept to fully understand related regulations and the possible risks and consequences of any violations.

*Active employees: senior managers, part-time and casual employees included.

**New Recruits**

Required to sign the Statement of Integrity and Ethical Conduct on the date of employment and receive promotion of the anti-corruption and anti-bribery policies within 90 days thereafter with records kept.

*New recruits: part-time and casual employees included.

**Interns**

Required to sign the Statement of Integrity and Ethical Conduct on the date of employment and receive promotion of the anti-corruption and anti-bribery policies within 90 days thereafter with records kept.

There were 1 environmental and 4 social penalties against TCC in 2022 with a total amount of NT$300,000 fined. There was no significant penalty with a penalty amount over NT$300,000, and relevant violations have been corrected. As for the case of concerted action made by the Fair Trade Commission on February 15, 2023, TCC has filed the administrative appeal. Please refer to the Material Information and the ESG – Ethical Management section of TCC Corporate Website for more information.

### Table of Penalties in 2022

**TYPE OF PENALTY**

Violation of environmental laws/regulations
Number of Cases 1
Responses | The engineering improvement plan proposed on the system of EPA Taiwan

Violation of social laws/regulations
Number of Cases 4
Responses | Immediate improvement to the protection equipment on the scene of accident and investigation for hotspots of similar risks for correction and improvement; education, training, and test arranged to strengthen employees' awareness and discernment in workplace hazards, on-site daily inspection implemented, and work-related communication and adjustment enhanced

Major information security incidents in violation of information security, resulting in breach of customer information and penalty fines
Number of Cases 0

Violation of anti-competition or anti-trust
Number of Cases 0

**TYPE OF INTERNAL REGULATIONS VIOLATION**

Violation of ethical management
Number of Cases 1
Responses | The audit procedures reenacted, and system control/management and payment collection management reviewed, to avert reoccurrence.

Violation of sexual harassment or discrimination
Number of Cases 1
Responses | Increased the scope and frequency of educational training and strengthened inspection procedures.

# Society Inclusion

TCC DAKA-Cement History Exhibition Area

# 06

## TARGETS


**EARTH HELPER, the Carbon Reduction Sustainability Action:**
**585 metric tons of carbon reduction in 2023**

**TCC Community Plan:**
**Cumulative investment of NT$ 0.8 billion in 2025_From 2022**

**Education Investment:**
**NT$ 33.5 million invested cumulatively by 2025 _From 2022**

## 2022 PERFORMANCE HIGHLIGHTS

### EARTH HELPER the Carbon Reduction Sustainability Action

cumulatively as of March 31, 2023

LINE Official Account

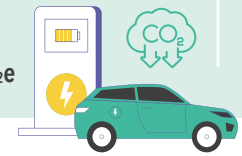
**10,512** PEOPLE joined


Carbon Reduction and Sustainable Action

**7,363** PEOPLE joined

NHOA.TCC energy storage charging station carbon reduction in 2022

**53,242.36** KG $CO_2e$




### Social Inclusion

cumulatively as of December 31, 2022

| TCC DAKA | Hanben Ocean Station |
|---|---|
| **6.06** MILLION VISITORS | **39,838** VISITORS |
| ECO tour Satisfaction **96.8%** Accesses to the Tour 7,323 PEOPLE | Convenient Beach Cleaning **143** PARTICIPANTS |

Approval from tribal consultation ( Knlibu Tribe) **97.6%**

### Public Welfare Fund

**Hoping Sustainability Charity Foundation**

from Oct to Dec 31, 2022

**NT$1,156,750** contributed

**Aw-Hwa Elementary School Education Fund**

from Jan to Dec 31, 2022

**NT$28,390** contributed

**Community Development Contributions**

cumulatively from 2017 to Dec 31, 2022

**NT$12.08** BILLION

**Cement Academy**

**10,857** Students Benefited

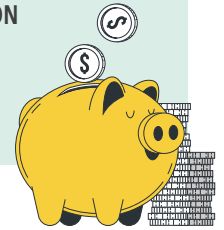
cumulatively from 2012 to Dec 31, 2022

**Social Welfare Contributions**

cumulatively from 2016 to Dec 31, 2022

**NT$4.77** BILLION

C.F. Koo Foundation **877,995** Views of Koo Cloud Theater



Hanben Ocean Station
Marine Debris Painting


2023 World Earth Day
DAKA Green Market

2023 World Earth Day
Hanbean Ocean Station
Beach Cleanup

# 6.1 / Special Column **Life Transition Practices**

Net-zero transition encompasses 4 facets: industrial, energy, social, and lifestyle. The lifestyle facet needs public participation to achieve sustainability in transportation, diet, housing, and more.

TCC's sustainability initiative, EARTH HELPER, promotes charging during off-peak hours and features a carbon-reducing lifestyle bankbook project to encourage children to form daily carbon reduction habits. Through these actions, TCC aims to cultivate public awareness of carbon reduction and achieve Taiwan's Net Zero by 2050 vision.

## Two Lifestyle Transition Sustainability Initiatives of TCC

### Sustainability Education Program

**ACTION**

**Hoping Carbon Reduction Parent-Child Bankbook**

**PURPOSE**

TCC collaborates with local communities near plants to promote sustainability. It starts with local elementary schools to instill carbon-reducing habits in daily life, such as waste reduction, resource recycling, and energy-saving, to foster a sustainable lifestyle attitude.

**TARGETS & RESULTS**

Aiming for **206kg $CO_2e$** reduced in total in the 1st semester (60 school days from March 4 to May 31, 2023)

### EARTH HELPER

**Carbon Reduction Sustainability Action**

EV owners lead the green lifestyle movement and can inspire their friends and families to join the transition towards a carbon-reducing lifestyle, planting the seeds of change.

Aiming for
**586 METRIC TONS**
of carbon reduced
in 2023

**Cherish Earth via Off-peak Charging**


Guide EV owners to change their charging habits.

The average off-peak charging rate effectively raised to 56%, and the power delivered during off-peak hours increased by 6 times, across all stations during the two-week period in December 2022

**Reducing 4 METRIC TONS of carbon**
Ongoing in 2023

# 6.2 / EARTH HELPER, the Carbon Reduction Sustainability Action

## MANAGEMENT APPROACH

TCC's EARTH HELPER initiative upholds UN SDG Target 12.8 "ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature," and communicates such with sustainability partners.


In March 2022, TCC initiated a collaborative action called "EARTH HELPER," urging EV owners and the public to shift to low-carbon green vehicles or begin energy-saving and carbon reduction efforts. The initiative also encourages responsible consumption, waste/carbon reduction, and species conservation. Participants can earn sustainability points through the actions.

In 2023, TCC expanded the EARTH HELPER initiative and partnered with 8 iconic enterprises and groups, including LDC Hotels & Resorts Group and Zerova Technologies, to connect 30 physical EV charging stations such as AUDI and Volvo in Taiwan to create Taiwan's largest carbon reduction network.

The top 10 EARTH HELPERs with the highest sustainability points of the year receive the "Sustainability Honor" award. The first-place winner gets to go on a carbon-neutral tree-planting trip to A.ROMA in Italy, while the second to tenth place winners can stay at Fleur de Chine in Nantou with a carbon-negative package, becoming net-zero travelers of sustainability.

Furthermore, TCC uses the widely known messaging app, LINE, to promote easy sustainability practices in daily life. The app pushes monthly messages about fun and easy sustainability activities that everyone can have fun engaging their sustainable living.

## Results of EARTH HELPER

**Result in 2022**

**289,091.39** Charged (in kWh)

**-167** Carbon Reduced (the sustainability initiative included) (in metric tons)

**Target for 2023**

**739,050.72** Charged (in kWh)

**-586** Carbon Reduced (the sustainability initiative included) (in metric tons)

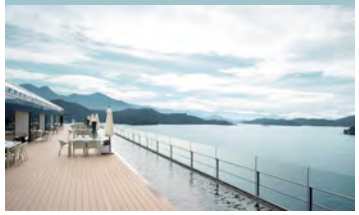
## Earth Helper Sustainability Actions in 2022


### My Low-carbon Travel

Through interactions like the carbon reduction challenge game at TCC DAKA in Hualien and the Sustainable Traveler Survey online, TCC educates people on the carbon emissions of travel and encourage them to become carbon-reducing travelers, making sustainable choices wherever they go.

### Fleur de Chine Lake Cleaning Activity

Travelers are encouraged to stay at the world's first five-star hotel with GSTC (Global Sustainable Tourism Council) Certification from Control Union–Fleur de Chine. Participate in lake cleaning at 7-8 a.m. and contribute to keeping Sun-Moon Lake beautiful!

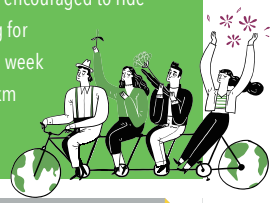


### Taroko Gorge Marathon

Taroko Gorge Marathon encourages participants to use eco-friendly cups during the event and to avoid using disposable cups.

### Sustainable 99: Green to Work

In response to green commuting, commuters are encouraged to ride bicycles aiming for 111, i.e. once a week for at least 10 km per month.



### The Ultimate Glory for Inclusion with Earth: ZEUS Medal

TCC will award the "ZEUS" medal to any participant who achieves a carbon reduction of 2,000 kg and plant an endangered orchid in their name at its original habitat on Lanyu (Orchid Island).

# 6.3 / Hoping Carbon Reduction Parent-Child Bankbook

**MANAGEMENT APPROACH**

Through education, TCC transforms Heping Elementary School into Taiwan's first semi-carbon-trading elementary school.

## Cultivate carbon reduction habits with the Hoping Parent-Child Carbon Reduction Bankbook

TCC starts with school education and promotes the Carbon Reduction Parent-Child Bankbook program, which converts resource recycling efforts on campus into carbon coins on a bankbook. This helps children learn about Net Zero through carbon reduction, waste reduction, and resource recycling, while cultivating everyday carbon reduction habits such as energy-saving. The program instills in children the attitude of cherishing resources for environmental sustainability.

On March 4, 2023, TCC and Heping Elementary School collaborated on the "Hoping Carbon Reduction Parent-Child Bankbook" program. Students and parents earn carbon coins for their carbon reduction actions, which can be exchanged for semester carbon labels or Carbon Reduction Label Award from TCC DAKA.

TCC promoted the program to help students understand the connection between their behavior and sustainability, emphasizing the importance of individual actions for Earth's sustainability. The program also raised awareness of sustainability in the local community of Heping, creating a paradigm of carbon reduction action from individual behavior to community impact and ultimately to societal change.




### Hoping Carbon Reduction Parent-Child Bankbook

**TARGET PARTICIPANTS**

85 students and 60 parents from Heping Elementary School in Hualien

**TIME**

Phase I: March 4, 2023 to the end of semester in June

Note: Two-year program with planning underway for the following phases

**FEATURE**

Collaborate with The Society of Wilderness (SOW), Industrial Technology Research Institute (ITRI), ecoco, and Greenpeace, to deliver sustainable living courses.

# 6.4 / Co-prosperity with Local Communities

**MANAGEMENT APPROACH**

**TCC engages in community development and philanthropic activities to demonstrate TCC's local care in various forms.**

TCC DAKA Eco-Factory (TCC DAKA) opened to the public on January 9, 2020, as the first open cement plant in Taiwan, reflecting on the relationship between industry, cement sector, and nature. TCC's actions are communicated through a variety of activities transparently, promoting sustainable development and interacting with different communities.

## Green Shopping at TCC DAKA Market

Vendors for TCC DAKA Market in 2023 will be reselected based on criteria such as reducing the use of disposable utensils and plastic bags/packaging, or offering a NT$5 discount to travelers who bring and use eco-friendly utensils.


## Establishment of Hoping Sustainability Charity Foundation

TCC DAKA is a non-profit organization that directs stall cleaning fees from DAKA Market vendors, guided tour fees, and a percentage of revenue from Uni-President Group on-campus stores to the Heping Elementary School Education Fund. The fund, which has received nearly NT$4 million in cumulative contributions as of 2022, aims to improve the learning environment and provide more educational resources, such as subsidies for field trips or hiring teachers with expertise from other areas, for more diverse learning opportunities in the rural elementary school.

TCC established the "Hoping Sustainability Charity Foundation" in October 2022, with village leaders and tribal chairs on the Board of Directors. The foundation includes the Hoping Emergency Relief Fund, which provides aid to families facing poverty or emergency situations. Nelson An-ping Chang, TCC Chairman, further envisages Hoping Emergency Relief Fund to provide long-lasting resources for the tribes and the generations to come.

**NT$1,156,750**
**cumulatively as of the end of 2022**

## Hanben Ocean Station at Aohua, Working to Protect 30% of the Ocean of the UN Biodiversity Conference (COP 15)

TCC's Hoping Power Plant collaborated with the Coast Guard Administration in 2021 to revitalize the first floor of the inspection office by Hanben Beach, providing a place for travelers to rest and care for ocean conservation. The station also worked with Aohua Village, offering marine activities and tribal itineraries, and established the Ocean Marketplace to provide job opportunities. In 2022, two tour guides from Aohua Village obtained their SUP Coaching License through the Station's assistance. Income from the station was directed to the Aw-Hwa Elementary School Education Fund, which totaled NT$28,390 as of 2022.

TCC launched "Convenient Beach Cleaning" on World Oceans Day 2022, in response to the UN theme of the year "Revitalization: Collective Action for the Ocean," allowing travelers to borrow beach cleaning tools and participate in marine debris painting activity for free.

**143 participants as of 2022**

## Package-free Laundry Detergent and Dishwashing Detergent Smart Refill Station

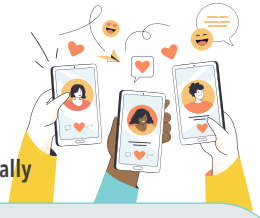
In November 2022, TCC DAKA supported the Hualien County Environmental Protection Bureau's project by installing a package-free laundry detergent refill station on campus. The station offered an eco-friendly detergent from a biomedical company and aimed to encourage customers to bring their own containers. In addition, TCC DAKA and the 7-ELEVEN Lienhe Store on campus collaborated to provide empty milk bottles for use at the refill station. Thanks to the success, the first dishwashing detergent refill station in Taiwan was further added in 2023.

## English Teaching Assistant (ETA) Program to Cultivate Multilingual Proficiency at Heping Elementary School

Since 2020, TCC has sponsored the English Teaching Assistant (ETA) Program at Heping Elementary School, which introduces a foreign English teacher each semester to create an immersive English environment. The ETA, Nick, enjoyed the local life and often participated in tribal activities.

Heping Elementary School further uses TCC DAKA's education fund to support Mr. Nick in opening a weekly 2-hour English course in tribes after school in helping parents offer after-school English tutoring and foster a foreign language learning environment.

## All Hanben Ocean Station Staff elected as OCA Volunteers to Protect the Ocean More Professionally




## 50% of Local Employment at Vakangan Green Energy Hot Spring Park

TCC collaborated with Fleur de Chine to create Vakangan Green Energy Hot Spring Park, which had a soft opening on August 27, 2022. The park offers geothermal power generation, hot springs, and gourmet experiences. Over half of the shops are local businesses from Pasikau, and as of 2022, 50% of the employees are Pasikau villagers. The park provides job opportunities and estimated to attract nearly 100,000 visitors per year.

TCC introduced the first geothermal power generation tour in Taiwan, Vakangan Geothermal Drilling Exhibition. It started on August 27, 2022, and was open to the public during the drilling process. The exhibition aimed to showcase the geothermal project and drilling process and educate people about geothermal energy. As of March 31, 2023, there were 2,848 visitors.

## Home Repair Project to Solve Home Repair Difficulties in the Rural Area

Heping village is 30 minutes away from downtown Hualien, and repair costs are two to three times higher for villagers, which could not be delivered to the villagers on the day, either. Many repair issues in the tribe were pending for years as a result. TCC DAKA established the Home Repair Service Center in July 2022 to offer free home repair services to the Heping Village. In 2022, the service has delivered 761.5 hours of services and completed 183 repair works.

A 60-year-old church in Heping tribe had a monthly water bill of NT$7,000 recently. The church member that helped contact the home repair services said: "After I contacted the home repair team, they came to check it out shortly, proposed recommended solutions, and even took care of the lighting issue in the process. They made several trips, not shying away from troubles and were careful in their works. They were like angels sent by God. We're deeply grateful!"

The home repair team consists of three members, two of whom are local youth who returned to work in their homeland. The third member worked for over 20 years as a contractor for TCC Hoping Plant, making him a semi-villager of Heping! Let's have a look at these gentlemen.

## TCC Care Bus Assist the Tribe Elders to Seek Medical Treatment in Urban Area

The Heping Village had limited transportation options, including the local train and community bus. Disabled villagers often had to rely on family to drive them to downtown. To address this, TCC Hoping Plant created the Heping Village Care Bus with a dedicated wheelchair section and elevator. The bus runs daily between Heping Village and downtown Hualien, stopping at key locations like the Township Office, major hospitals, and Hualien Train Station. Service began on July 6, 2022, and 452 passengers had accessed the service by the end of the year.

# 6.5 / Philanthropic Actions

**MANAGEMENT APPROACH**

TCC is committed to supporting underprivileged communities and creating a sustainable society through proactive philanthropic efforts.

## Five Supporting Measures of Cement Academy

**After-school Courses**

Children are offered after-school classes in English, computers, and talents to encourage diverse interests and holistic development, promoting a focus on learning and growth.

**Nutritious Food**

Children are provided with box meals, bread, desserts, and nutritious milk to support their health and well-being.

**Children's Day Activities & Summer Camps**

Children can participate in Children's Day activities and summer camps to promote further growth and learning.

**Result Presentation**

The Christmas celebration presents the learning results of the year.

**Donation**

Stationery and basic supplies are donated to schoolchildren in rural areas.

## Cement Academy for All Children's Right to Elementary Education

Since 2012, TCC has been implementing the Cement Academy, a philanthropic project that supports underprivileged school children near cement plants in Taiwan and Mainland China. With Dong Ao Elementary School added in 2022, the project has grown to include 22 partner schools, benefiting a total of 10,857 students, with 1,324 students supported in 2022.

## Inauguration of Cement Academy Jointly by Dong Ao Elementary School and TCC Suao Plant

On the inauguration ceremony in October 2022, Cheng-Min Wu, the Principal of Dong Ao Elementary School, said in a sentimental tone: Although TCC Suao Plant is on the other side of the mountains, it does not give up the care for the children in the rural area here. I'm appreciative for the spaces Cement Academy provided to school. Aside from mathematics and English, Cement Academy allows the school to freely open art classes for archery, dance, and indigenous theater for children to not just learn their mother tongue in acting, but also learn about their tribal culture.

During the TCC Building Christmas Lighting Ceremony in December, students and faculty from Dong Ao Elementary School brought Christmas caroling with their flute and xylophone melodies and Atayal singing. Passers-by were also captivated by their performances.

# 6.6 / Low-carbon Theater

C.F. Koo Foundation preserves traditional dramas and other performing arts that are in danger of extinction, using restoration, adaptation, and incubation to ensure cultural inheritance in the modern world.

For decades, the C.F. Koo Foundation has been promoting traditional theater, both old and new plays, to increase the visibility of this cultural form. Through software and hardware improvements, the Foundation not only promotes Chinese opera but also low-carbon energy conservation in theatrical performances.

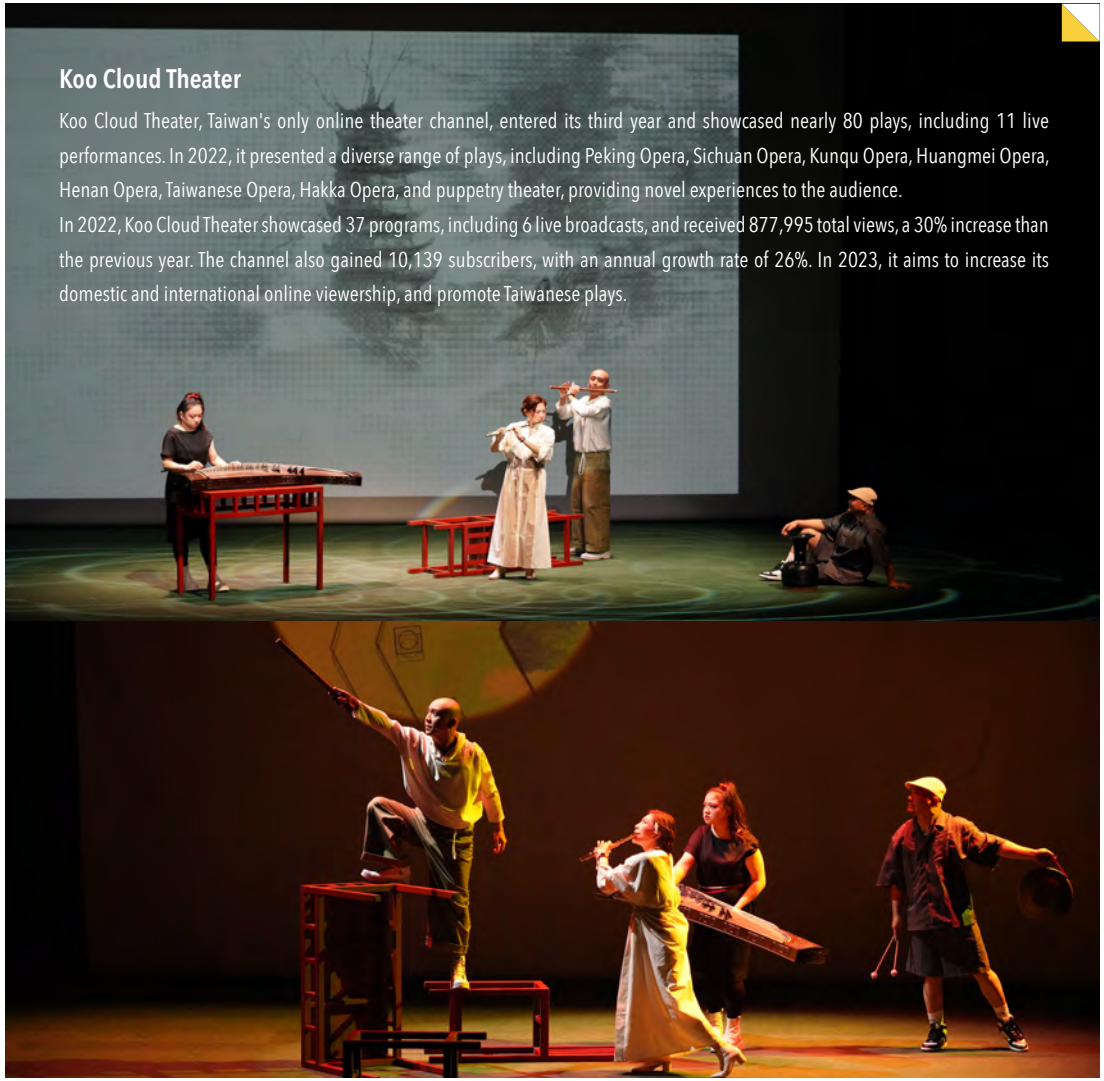
TCC Cement Hall upholds the principle of energy conservation, replacing all equipment with LED lights, increasing brightness (from 750W to 1,300W per light) and reducing total power consumption to one seventh of the previous level. In addition, since LED lights do not emit heat, air-conditioning can be reduced to one third of the original load for each 2-hour performance at full brightness.

Regarding software, the Peking Opera at TCC Cement Hall employs a virtual performance style, emphasizing space over solid objects. Symbolic objects are used, combined with postures and movements, for performances in variety. Also, repeated costumes are used to reduce unnecessary making of props and costumes.

### Outreach Lecture of Peking Opera

In 2022, Peking Opera outreach lectures were organized in schools and communities in collaboration with Taipei City Reading and Writing Association. Allowing the public to witness the members' demonstration performance up close.

**A total of 13 lectures were organized with 747 participants in 2022**



### Koo Cloud Theater

Koo Cloud Theater, Taiwan's only online theater channel, entered its third year and showcased nearly 80 plays, including 11 live performances. In 2022, it presented a diverse range of plays, including Peking Opera, Sichuan Opera, Kunqu Opera, Huangmei Opera, Henan Opera, Taiwanese Opera, Hakka Opera, and puppetry theater, providing novel experiences to the audience.

In 2022, Koo Cloud Theater showcased 37 programs, including 6 live broadcasts, and received 877,995 total views, a 30% increase than the previous year. The channel also gained 10,139 subscribers, with an annual growth rate of 26%. In 2023, it aims to increase its domestic and international online viewership, and promote Taiwanese plays.

# Employee Benefits


2022 TCC CHRISTMAS EVENT

07

## TARGETS


Diverse and friendly workplace

- Cumulative Investment in Employee Development by 2025 **125 MILLION**
- **0** human rights violations per year

- Female in Senior Management by 2025: 25%
- Female Managers in Revenue-Generating Functions by 2025: 5%
- Females with STEM-Related Background by 2025: 38%

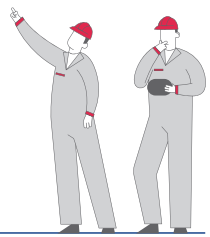
- Occupational safety and health

  Zero work-related injury and death for employees and contractors

  TRIR | LTIR

  Lowered by **35%** in 2023

  | compared to the average of 2016-2018



## 2022 PERFORMANCE HIGHLIGHTS


**Females in Management** 27%

**Females in STEM-Related Backgrounds** 36.6%

**Employees of Indigenous Origin** +16%

**TCC Employee Nationalities** 34 COUNTRIES (Taiwan & Mainland China excluded)

**Talent Development**

Promotion of Employee's Sustainable Learning Passport

Enhancement of ESG in Corporate Culture

**Investment in Employee Education & Trainings** NT$21,838,716

**Total Hours of Employee Education & Trainings** 84,425

**Employee Care**

Childbirth Subsidies, Childbirth Bonuses & Maternity Allowance over NT$1.3 MILLION

| January to December 31, 2022

TCC Maternity Allowance: Nearly 3 Times; Growth of Amount Disbursed: Nearly 4 Times

| Compared to the levels in 2021

TCC 3 Insurance Schemes Participation Rate 59%

**ESOP Launched** | In 2019

Employee Coverage 100%

Participation Rate 97.7%

HR Asia BEST COMPANIES TO WORK FOR IN ASIA 2022

Taiwan i Sports

# 7.1 / Special Column **Workplace of Diversity and Inclusion**

TCC promotes inclusivity, diversity, and equality in our culture for corporate sustainability. This is achieved through three pillars: Diverse Communication Channels, Career Women Empowerment, and Cultural Exchange Activities.


### Diverse Communication Channels

On quarterly Town Hall Meetings, the Chairman presents a keynote speech and answers questions from employees on site and through anonymous online channels, responding to their needs and recommendations in a timely manner.

### Career Women Empowerment

Organizing thematic lectures

### Cultural Exchange Activities

Festivals, technical exchanges, and cultural tours are organized for employees to experience Taiwanese cuisine and traditional arts, and to exchange cultural ideas.

### New Women Workshop: Instilling Power of Life

On the International Women's Day 2023, TCC invited senior female manager to share their career experiences and talk about how career women strike a balance among life, work, and family, with over 300 TCC employees participating in the event.

*I highly encourage the young generations in Taiwan to join TCC and work together with people around the world in the international teamwork environment, which can open your mind and offer new perspectives.*

*Gabriele, an Italian Technical Sales Engineer, stationed in TCC Headquarters since 2022*

### Inclusive, Diversified Workforce across Borders to Build the New Image for Talent Recruitment

TCC recruits talents globally and has established the Foreign Employee Life and Work Support program to help foreign employees adapt to life in Taiwan, while fostering emotional bonds between foreign and Taiwanese employees. TCC also organizes events such as parties and technical exchanges to bring our employees from different countries closer together.

Overseas Elites Employed in Taiwan **14**

# 7.2 / Sustainable Talent Cultivation Strategies

**MANAGEMENT APPROACH**

**As talent is the bedrock for a sustainable corporate operation, TCC aims to develop our employees' potentials through diverse training programs and evaluate the effectiveness through performance assessments.**

TCC focuses on circular economy, developing the core businesses of cement, energy, and environmental protection. TCC actively acquires international talents in civil engineering, electrical engineering, mechanical engineering, geology, and even aquaculture to promote renewable energy and energy storage sectors. TCC also recruits professionals in computer science, electrical engineering, and information management to promote smart development through solutions like AI management and smart manufacturing.

TCC cultivates sustainability talents through in-depth campus communication, enhanced industry-academia collaboration, local youth cultivation, and internal transfer mechanism.

## Self-actualization Value Talent Recruitment Program

Through diversified on-campus talent acquisition activities, e.g. on-campus talent recruitments, matchmaking events, job fairs, briefing sessions, and topical lectures, etc.; TCC helps students understand the three core businesses of TCC. Through bilateral communication, TCC achieves cultivation of future talents with potential, in-depth school relations management, and outreach to brilliant students, benefiting the future recruitment.

In 2023, TCC targets professionals in 9 areas, including electricity trading, renewable energy, lithium battery, energy storage, EV charging, carbon management, low-carbon construction materials, green resources cycling, and ESG strategies. Also, TCC launches expatriation programs in Italy, Portugal, France, Netherlands, and Turkey, providing a stage for collaboration between young students and international talents.

## Electrical Engineering Talents Industry-Academia Collaboration Program Launched

In 2022, TCC Hoping Plant collaborated with National Dong Hwa University to launch an "Electrical Engineering Talents Industry-Academia Collaboration Program" at Szu-Wei Senior High School in Hualien. Each year, 15 students from junior high schools in Heping and Aohua are granted admission without examination and are assisted in obtaining professional certificates during their schooling. The program also offers scholarships and priority job application to TCC vacancies, cultivating future talents for the new energy sectors like renewable energy and energy storage.

## Internal Transfer System

TCC promotes internal transfer, facilitating talents to explore multiple expertise and resources within the corporation. Departments and plants can open vacancies for internal transfer as needed, and the internal staff filled 18.3% of the open vacancies in 2022.


**Talent Recruitment with Big Data: AI Smart CV System Developed by TCC**

TCC uses AI to reduce CV screening time, increase the talent pool, and elevate the success rate of recommendations of candidates. As of the end of 2022, the smart CV system has saved 2,788 hours for HR by automatically extracting 33,452 e-CVs, improving efficiency and accuracy of talent selection.


**Grassroots Local Youth Incubation Program from Elementary to Graduate Schools**

**Elementary Schools**

- Cement Academy – Shih Min Elementary School, Yongle Elementary School, and Dong Ao Elementary School in Yilan; Heping Elementary School in Hualien
- Hualien Heping Elementary School English Teaching Assistant (ETA) Program

**Senior High and Vocational Schools**

- Electrical Engineering Talents Program at Szu-Wei Senior High School
- Peking Opera Outreach Lecture of C.F. Koo Foundation

**Universities**

- Internship (Summer/In-semester)
- Topical lectures
- Corporate visits
- Matchmaking
- TCC Elite Talent Scholarship Program
- Hsing Academy with the National Chung Hsing University

**Graduate Schools**

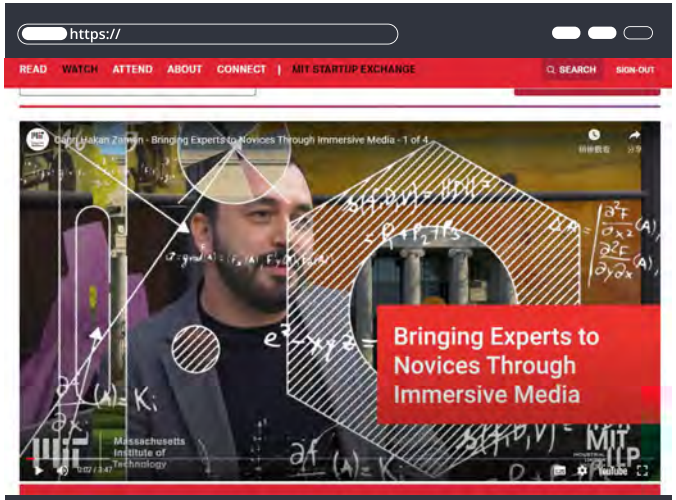
- Career Coach Program – Thesis instruction at NCCU College of Commerce, Dean's Award for Graduates at NTU College of Engineering, etc.
- NTU EMBA ESG Practice Management Consulting
- MIT Battery recycling research project
- Master's and Ph.D. Graduation Thesis Exhibition of Chemical Engineering, NTU

## TCC Talent Development and Training System


### Sustainable Learning Passport Program

The Sustainable Learning Action Program began in 2023 and offers ESG programs, volunteering services, sustainable action proposal competitions, Earth Day, and diversity and inclusion certification actions. These actions are compulsory or elective with corresponding points available. Employees must obtain a minimum number of points per year, and certification badges are awarded based on the points earned. The badges are tied to annual appraisal indicators, and those with a golden badge or above are presented with an honorary certificate "TCC Sustainability Ambassador" at Town Hall Meeting. TCC also designed a LINE Official Account for the Sustainable Learning Passport, which presents points earned, the TCC Leaderboard, and sends a sustainability news via LINE app at least once a week, to help employees internalize sustainable thinking.

**Hsien-Te Lin, Professor from the Department of Architecture, National Cheng Kung University, shared on the trends of low-carbon architecture domestically and internationally.**




### Massachusetts Institute of Technology (MIT) – Industrial Liaison Project

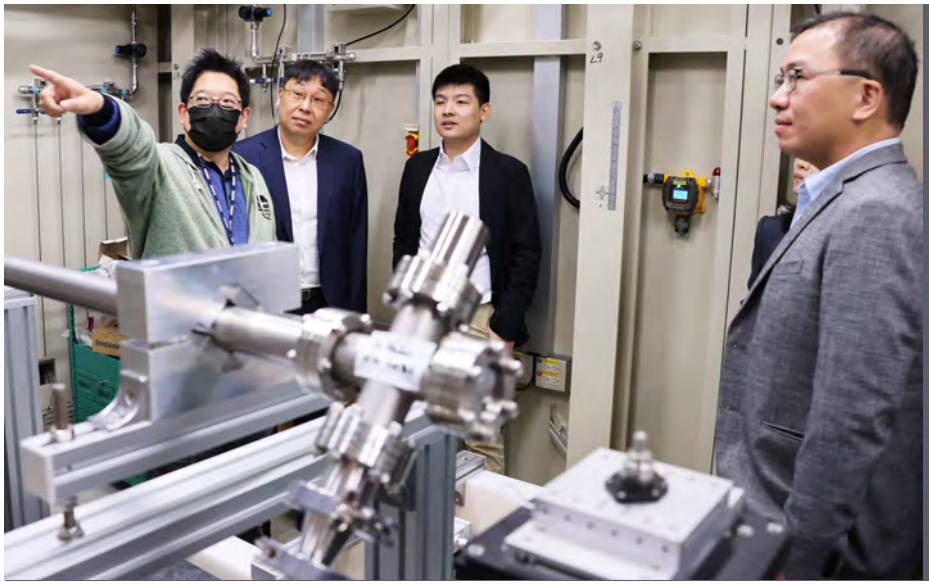
TCC's MAs are enrolled in the MIT Industrial Liaison Project to stay abreast of new knowledge of technology in the world through seminars, lectures, and courses online, cultivating extensive and innovative perspectives. Senior employees are arranged to be mentors for regular meetings and instructions. With the bilateral and effective training mechanism, TCC helps the MAs build successful careers.

### Battery Recycling Project in Partnership with MIT to Cultivate Battery Professionals

TCC collaborates with MIT professors to restore retired batteries and develop high-safety electrolytes. TCC aims to develop discarded cathode materials, focusing on Ni-rich ternary materials.

### Reemployment after Retirement for Experience Inheritance

TCC values the experience inheritance from retired employees. 11 retired employees were reemployed in 2022, and topical training courses are organized for them.



## Advanced Lithium Battery Technology Talent Cultivation Jointly with NSRRC and NASA

In 2023, TCC collaborates with the National Synchrotron Radiation Research Center (NSRRC) in Taiwan and the National Aeronautics and Space Administration (NASA) in the U.S. to develop high-efficiency lithium-ion batteries. TCC also researches lithium batteries for aeronautics, contributing to the field of high-efficiency batteries and cultivating talents.

## Incubation of Talents in EV Power Cell Technology Applications

TCC cultivates talents in power cell technology applications. Through the sponsorship to NTHU Racing, TCC supports students in application module development and performance optimization. NTHU Racing excelled in student formula competitions in Germany and Croatia.

## Performance Appraisal

TCC employed the four levels of Response, Learning, Behavior, and Results proposed by Donald L. Kirkpatrick to assess the performance of talent development. In 2022, 100% of employees underwent appraisal, excluding those onboard for less than 3 months during probation.

### Employee Development Programs

| Development Program | Means of Education/Trainings |
|---|---|
| New Generation Energy Management Program | Enhancing and reaching collective consensus on energy development via mutual exchanges among supervisors and employees |
| Core Management Competency Program | Establish team accountability<br>Drive objective-management awareness |

### Talent Development (Training) Indicators

**HR Training Performance-Donald L. Kirkpatrick Assessment Model**

| Level | Criteria | Performance |
|---|---|---|
| L1.Response | INDICATOR \| The average satisfaction level of the training contents | |
| | The average value of satisfaction survey results for the conducted courses | 94.45% |
| | INDICATOR \| The average satisfaction level of the trainers | |
| | The average value of satisfaction survey results for the trainers | 95.02% |
| L2.Learning | INDICATOR \| Professional certification training completion rate for 6 plants | |
| | The actual record of professional certification training for 6 plants | 97.01% |
| | INDICATOR \| Annual training plan achievement rate | |
| | Based on the annual training plan: Actual course offerings/Planned course offerings | 89.29% |
| | INDICATOR \| Employee attendance rate | |
| | Annual training plan: Actual course attendance/Planned course attendance | 98.13% |
| L3.Behavior | INDICATOR \| Employee engagement | |
| | Statistics on employee engagement - Level of identification with the work development aspect | 87.80% |
| L4.Results | INDICATOR \| High-performance employee retention rate | |
| | Retention rate = 1 – Employee turnover rate | 91.95% |
| | INDICATOR \| Employee turnover rate | |
| | Number of employee departures (voluntary + involuntary) in 2022 / Number of employees in service as of the end of 2022 | 8.05% |

# 7.3 / Remuneration & Benefits

**MANAGEMENT APPROACH**

TCC offers attractive pay and bonuses to attract and retain top talents, based on a performance-sharing principle. Adjustments are made as necessary to ensure that leading directors and managers do not take excessive risks to achieve rewards, in accordance with regulations and the company's long-term objectives.

TCC's management practices prioritize sustainability and corporate social responsibility, integrating these principles into all aspects of governance and operations, including management indicators, departmental objectives, and individual performance evaluations.

Hence, TCC has an incentive and reward system for 100% of our employees that includes monthly salaries, quarterly bonuses, year-end bonuses, and performance bonuses. Meanwhile, to fulfill the commitment to Net Zero by 2050, all plants in Taiwan will examine, set, and track the carbon intensity targets on a yearly basis. Progress towards these targets is factored into bonuses, incentivizing all employees to take action on carbon reduction.



## Variation Compensation

**Quarterly bonus:**

The quarterly bonus system was introduced in 2018 to reward employees, and progress towards the company's Net Zero by 2050 commitment is factored into these bonuses for an ongoing integration of social responsibilities into the corporate operation.

**Performance bonus:**

TCC includes risk and sustainability management indicators in employee appraisals to align individual performance with the Company's governance, operations, and sustainable development goals.

## Employee Stock Option Program (ESOP)

TCC offers a 100% ESOP to employees, who can also apply for additional contributions in June and December every year. The Company contributes 10% of that amount to individual trust accounts.

**ESOP participation reached 97.7% in 2022**

## Treasury Shares Program

TCC introduced the Treasury Shares Program as a long-term incentive, with performance appraisal indicators linked to sustainable development goals such as carbon capture, microalgae cultivation, and green energy development. Any employee in Taiwan or in an overseas subsidiary with outstanding performance is entitled to the program. There were 55.3% outstanding employees in Taiwan eligible to the ESOP in 2022.

**Number of Full-Time, Non-Managerial Employees and Their Total Salary, Mean Salary, and Median Salary**

| ITEM | 2021 | 2022 | DIFFERENCE |
|---|---|---|---|
| Total Number of Full-Time, Non-Managerial Employees (People) | | | |
| | 1,092 | 1,139 | 47 |
| Total Salary of Full-Time, Non-Managerial Employees (NT$1,000) | | | |
| | 1,181 | 1,174 | -7 |
| Mean Salary of Full-Time, Non-Managerial Employees (NT$1,000) | | | |
| | 1,082 | 1,030 | -52 |
| Median Salary of Full-Time, Non-Managerial Employees (NT$1,000) | | | |
| | 958 | 922 | -36 |

## Employee Savings Mutual Fund

TCC encourages employee savings by adjusting the deposit amount based on age and contributing to their savings every six months. The sum, along with a 50% contribution from the Employee Welfare Committee, is deposited into an employee benefit trust account.

### 2-track Retirement Benefits & 3 Insurance Schemes

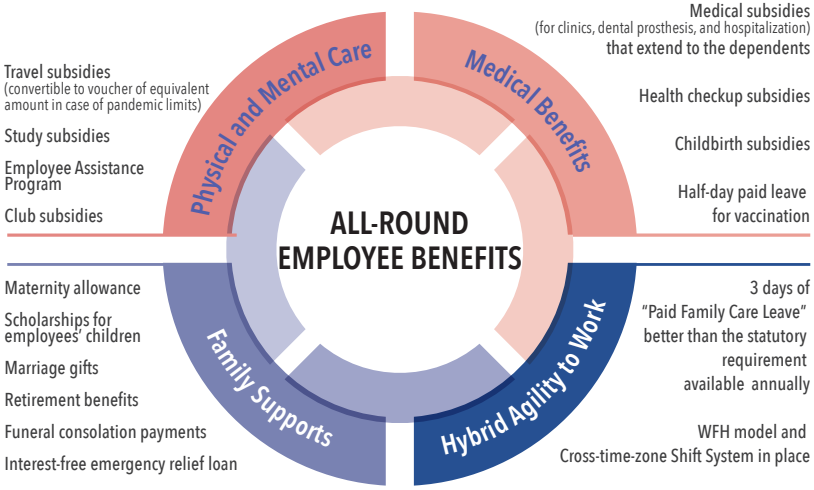
TCC offers Two-track Retirement Benefits System. The Company contributes to the contribution fund in the ratio of 1:1. Employees eligible for retirement at age 60 can contribute further to accumulate their pension fund faster. TCC also provides a retiree insurance plan with automatic renewal, covering life and accident insurance, while retired employees merely need to pay for their medical insurance.

## Employee Health Promotion Activities

TCC is committed to providing quality benefits to employees. Since 2020, medical staff has been contracted by TCC to offer on-site health services. Each employee is entitled to a free 20-minute individual health consultation session per year. Meanwhile, with plans for ergonomics, excessive loads, workplace violence, and maternal health protection, health conditions are rated via checkups and surveys, and recommendations are provided to employees with mid-to-high health risks. A total of 649 individuals accessed the services in 2022. In addition, TCC also organizes health care lectures on various topics such as "Shoulder and Neck Relief for Office Workers and How to Relieve Shoulder and Neck Pains at Home," "Recovery for New Life," and "Self-care for Ergonomic Risk Factors like Musculoskeletal Risks in the Post-pandemic Age" to offer health-related recommendations to employees.

## Childcare Benefits and Subsidies

TCC concerns with the low birth rate issue and offers the childcare support plan. In 2022, 67 employees applied for maternity bonuses and over NT$1.3 million was disbursed. TCC also signed nursery contracts to alleviate employee burdens.




### Green Transport Subsidies

Every employee who passes the probationary period evaluation is eligible for a one-time electric motorcycle subsidy of NT$15,000 and a shared motorcycle allowance of NT$200 per year. As of March 2023, there were 80 applicants for the electric motorcycle subsidy and 131 applicants for the shared motorcycle allowance.

### Smart Vending Machine

TCC provides a healthy beverages vending machine at the Company for employees to purchase at discounted prices. The average monthly sales volume in 2022 was around 200 bottles. TCC plans to introduce 3-in-1 vending machines with meals, snacks, and beverages in the future.

### TCC Accommodations

TCC offers affordable accommodations at the Xinyi District for employees and their children who are not citizens of the Greater Taipei, to work and study in Taipei. Prices range from NT$600 to NT$1,200.

### Overtime Home Late Plan

TCC provides the Overtime Home Late Plan to pay for taxi rides home for employees who work late due to project emergencies or ad-hoc tasks. As of April 2023, there is a total of 253 drives.

### Sports Games Encouraged to Ignite Workplace of Vitality

There are three major sports games at TCC, i.e. "Dragonboat Race," "Taroko Gorge Marathon," and "Sun Moon Lake Cross-lake Swimming," along with employee clubs including sports clubs for baseball, badminton, basketball, aerobics, etc. For major sports games, TCC reserves slots for registration and offers F&B and accommodation at 5-star hotels, free of charge. TCC also sponsors registration fees, F&B, and accommodation for employees who team up for the games.

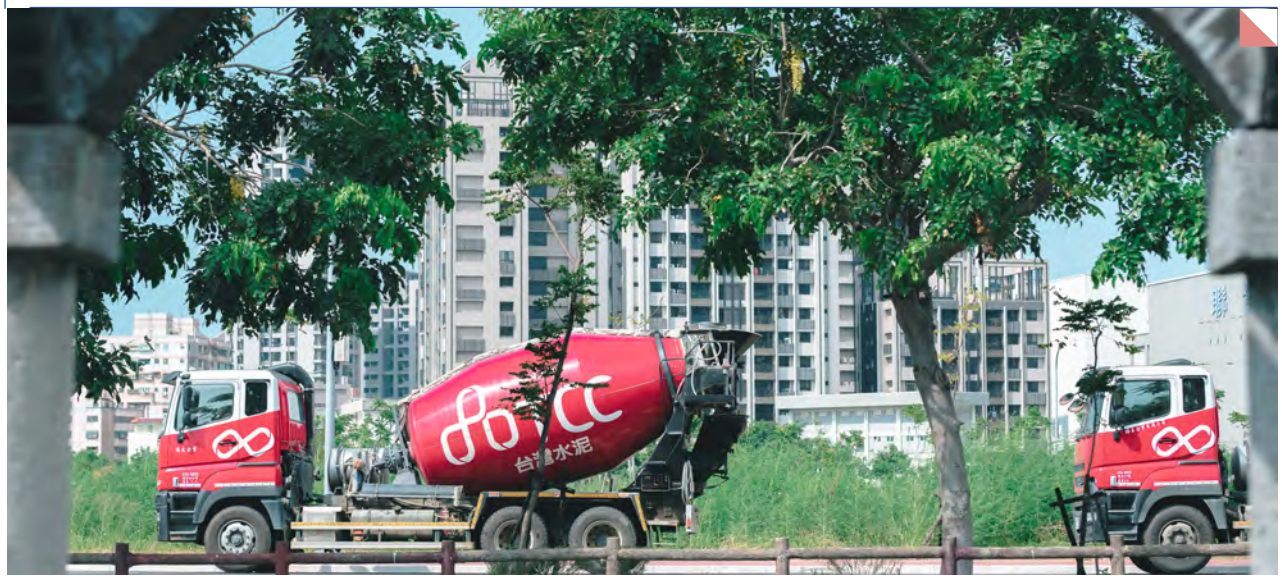
## Low-carbon Walking Exercise Together

TCC promotes exercise among our employees through various activities. TCC received the Taiwan iSports label in 2022 and organized the "EARTH HELPTER Walking Exercise" with lottery incentives for employees to participate. A total of 361 employees joined, walking a total of 109,722,086 steps, which is equivalent to circling Earth 2.2 times. Furthermore, there was an employee that was 8 months pregnant walked about 18,000 steps daily. TCC will continue to design competitions in 2023 to promote a work-life balance for employees.

# 7.4 / Care for Employee Safety

## MANAGEMENT APPROACH

TCC strives for a best healthy workplace by enforcing a comprehensive occupational health and safety policy, 100% applied to all employees and contractors. All cement plants, RMC plants, and Operation Headquarters are 100% certified to ISO 45001 occupational health and safety management systems.




The Labor Safety and Health Office (LSH Office) monitors occupational safety progress and outcomes at TCC, presenting quarterly reports to the President and Chairman during Occupational Safety and Health Committee meetings. Corrective measures are implemented and reviewed in cases of critical accidents, along with disciplinary actions in line with respective responsibilities.

TCC prioritizes occupational safety and aims for zero work-related injuries among employees and contractors. TCC established the LSH Office and Occupational Safety and Health Management System to manage labor health and safety matters. Also, through the mechanism "Occupational Safety Monthly Report," TCC tracks occupational safety cases and corrective measures on a monthly basis. Annual education and trainings align with government regulations in force to improve health and safety performance of all employees as well as suppliers and contractors.

TCC conducts yearly reviews of laws and regulations to comply with, and even exceed, health and safety standards, both domestically and internationally. The safety management regulations in force include "Occupational Safety and Health Management Regulations," "Occupational Safety and Health Management Plan," "Occupational Safety and Health Code of Practice," "Human Factor Hazard Prevention Program," and "Prevention Plan for Ailments Induced by Unusual Workload." In addition, TCC joined Taiwan Cement Manufacturers' Association and drafted "Formulating Safety Partnership Implementation Plan" with the Occupational Safety and Health Administration, Ministry of Labor, to elevate the safety awareness of the workers in the cement industry with external partners.

### Occupational Safety and Health Committee

| | Operation Headquarters | Cement Plants | RMC Plants |
|---|---|---|---|
| Chairperson | 1 | 2 | 3 |
| Number of Executives and Professionals | 5 | 21 | 28 |
| Number of Labor Representatives | 3 | 15 | 17 |
| Percentage of Labor Representatives | **33%** | **39%** | **35%** |

## Occupational Safety-related Risk Assessment Process Incident Investigation and Improvement Process

**INCIDENT OCCURANCE** 01

An immediate report is submitted to the LSH Office and superiors after a significant occupational accident occured. Contractors must also notify the supervising unit via phone within 30 minutes and inform firefighting and medical services as required by regulations. The local labor inspection institution must be notified within 8 hours of a major occupational accident.

**INCIDENT CAUSE INVESTIGATION** 02

The LSH Office is to set up "Occupational Disaster Investigation and Handling Taskforce" after a major occupational accident. Together with department supervisors, it goes to the site for investigation and inspection. After compiling the "Incident Prevention Report" to the President, a major occupational accident investigation report review meeting is called within 1 week. The LSH Office shall brief on the process and handling of the major occupational accident.

**INCIDENT REVIEW AND IMPROVEMENTS** 03

All units at TCC are required to track improvement progress until completion based on proposals from the "Occupational Disaster Investigation and Handling Taskforce." A thorough review is conducted to prevent similar incidents from recurring.

Photos of major occupational accident scenes are taken and submitted, along with investigation reports, to the LSH Office as case study materials for education and training, aimed at preventing similar incidents from recurring.

In 2022, TCC experienced 5 work-related injuries. The Company investigated the causes and implemented measures, including increased inspections, education, and trainings, to prevent reoccurrence of similar incidents and achieve the goal of zero work-related injuries.

**TAIWAN TRIR:0.39; LTIR:0.23**

## Safety Management of Contractors

TCC has established "Contractor OSH and Environmental Management Rules and Punishment Guidelines" to strengthen contractor management, requiring compliance with relevant labor safety and health regulations. Contractors must complete OSH education and training, fill out Workplace Environmental Hazards Notice and the Workplace Environmental Hazards Advice, and sign a Letter of Undertaking for Health, Safety, and Environment (HSE) before entering TCC plants, to ensure adherence to OSH rules.

## Health and Safety Education and Trainings

TCC conducts regular training programs for labor safety and accident prevention in accordance with government regulations. Also, new training and retraining for certificates related to first aid personnel, hypoxia operations, hazardous equipment, or occupational safety and health business supervisor are arranged in accordance with the laws. In addition, through inventory of the potential factors of safety hazard in the work environment, TCC conducts safety promotions and fire drills as well as partakes in the various accident prevention briefings and certificate trainings organized by the government, including air pollution prevention and control seminar, trainings for fire prevention manager, and seminar for diagnosis and case studies of pneumoconiosis.

**In 2022, 1,651 participants received education and training on environmental safety and health for a total of 5,753 training hours. There were no reported cases of occupational disease in 2022.**

1 Identify all hazardous sources

2 Identify hazards and consequences

3 Confirm existing protective measures

4 Assess the risk of hazards and perform risk classification and management

5 Implement control measures to reduce risks

6 Verify the residual risk after implementing control measures

## Employee Health Checkup

TCC provides regular employee health checkups including noise, dust, and ionizing radiation tests covered by the Bureau of Labor Insurance. Additionally, TCC tracks employees' health conditions and adjusts their work accordingly to protect their health and safety.

### Health Promotion Programs

| Hoping Plant | Suao Plant | Operation Headquarters |
|---|---|---|
| Health lectures | In-service education for occupational safety and health | Monthly provision of on-site services |
| Education and trainings for operations | Monthly on-site health services provided by contracted medical staff | Influenza vaccination for all employees |
| Education and trainings for work overload or musculoskeletal injuries | Personnel health checkup by commissioned medical institution | |
| Community medical station | Influenza vaccination for all employees | |
| Influenza vaccination for all employees | | |

# 7.5 / Human Rights Protection

**Human Rights Policy**

TCC is committed to creating a harmonious, friendly, and healthy working environment, and safeguarding the human rights of our employees. To foster a human-centered, healthy workplace environment, in line with international conventions like United Nations Global Compact, UN Universal Declaration of Human Rights, and ILO Declaration of Fundamental Principles and Rights at Work and the local labor regulations in the areas where TCC operates around the world, TCC promulgated human rights policies to safeguard the legal rights of employees. All paid personnel are treated equally with respect. The scope of coverage encompasses contract workers, interns, among others. Also, relevant information is disclosed on TCC corporate website, the internal bulletin board, and *Sustainability Report*.

## Anti-discrimination & Implementation of Diversity, Equality, and Inclusion

### Online Care Platform to Protect Rights of Employees

TCC values employee feedback and rights, with a focus on creating a friendly and healthy workplace. An online care platform and employee feedback e-mail box have been set up to protect employees' human rights. Confidentiality is ensured to protect the health of employees, mentally and physically. In addition, regulations and channels have been established to prevent workplace discrimination and harassment. In 2022, 8 feedback and grievances were filed, including 1 recommendation and 1 grievance related to workplace discrimination and harassment.

### Human Rights Policy Education and Trainings

TCC mandates annual education and training for all employees on significant policies such as Human Rights Policy, Statement of Integrity and Ethical Conduct, and Sexual Harassment Prevention Policy. These policies are included in the mandatory courses and all personnel must complete the tests after reading the policy documents. In 2022, the online reading rate of employees reached 98.14%, and a total of 3,005 hours of training were delivered (based on the reading time of 15 minutes per document).

### Employee Engagement Survey

TCC conducts annual employee engagement surveys covering organization recognition, work environment, career development, and team relations.

The scope of the engagement survey in 2022 encompassed the whole Group (Mainland China and affiliates included) with a coverage rate of up to 97.6% and an engagement score of 4.5 points (out of 5 points). The coverage rate of Taiwan (affiliates included) is 98.2% with an engagement score of 4.44 points; the coverage rate of Mainland China is 97.3% with an engagement score of 4.52 points. Furthermore, TCC's gender identity analysis found no difference in the level of identification between male and female employees.

| JOB LEVEL | ENGAGEMENT |
|---|---|
| General Employees (Direct Labor) | 4.33 |
| General Employees (Indirect Labor) | 4.35 |
| Low-level Managers | 4.58 |
| Mid-to-senior-level Managers | 4.68 |

| SENIORITY | ENGAGEMENT |
|---|---|
| Less than 3 Years | 4.41 |
| 3-10 Years | 4.43 |
| More than 10 Years | 4.50 |

TCC conducts multifaceted difference analysis based on job levels and seniority and communicates with supervisors and employees regarding survey results. Follow-up items are listed in meeting reports and solutions are formulated for HR supervisor's approval.

### Human Rights Due Diligence

TCC implemented human rights due diligence in 2019 to ensure the effectiveness of our Human Rights Policy. Potential human rights issues and risk assessment were identified based on "frequency of human rights risks" and "level of impact to the Company and employees", with mitigation and compensation measures designed accordingly. The 2022 survey covered 39 operation sites, subsidiaries and joint ventures included, with a response rate of 98.14%.

**No Significant Human Rights-related Risks Found**

### Summary of Human Rights Protection

RIGHTS

**TCC Employees**

- Safe feedback channels
- Human rights education and trainings
- Employee engagement survey
- Human rights due diligence
- ISO 45001 Occupational health and safety management systems certification

**Suppliers**

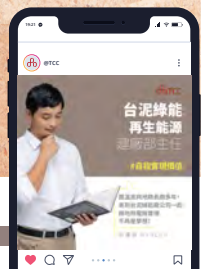
- Plant Supplier Evaluation Regulations
- TCC Supplier Sustainability Questionnaire
  The main areas evaluated include performances on quality, services, organization, finance, and sustainability. The assessment items for the sustainability performance include areas of labor, health and safety, environment, ethics, and management systems.
- Supplier Sustainability Governance Workshop

**Contractors**

- "Zero Work-related Injury" goal
- Occupational Safety and Health Management System
- Occupational Safety and Health Management Office
- Contractor OSH and Environmental Management Rules and Punishment Guidelines
- Occupational health and safety education and training
- Letter of Undertaking for Health, Safety, and Environment (HSE)

**Community Residents**

- TCC DAKA
- Hanben Ocean Station
- Increase of employed population



# 7.6 / Workplace Diversity

TCC has a diverse employee composition and is committed to upholding human rights. Compared to the previous year, the female managers at TCC grew by 3% in 2022; the percentage of employees with disability by 1.47% (2021: 1.70%); and the indigenous employees by 7.45% (2021: 6.44%).

### Total Number of Employees by Contract and Gender

| | FEMALE | MALE | TOTAL |
|---|---|---|---|
| Employees with an Open-Ended Contract (Including Employees on Leave Without Pay) | 227 | 928 | **1,155** |
| Employees with a Fixed-Term Contract (Including Temp Workers & Interns) | 5 | 13 | **18** |

Note 1: There is no non-guaranteed hours employee nor part-time employee at TCC.
Note 2: Based on the data of non-fixed term contract personnel as of December 31, 2022.
Note 3: The 18 fixed-term contract employees include 10 employees at the Operation Headquarters, 7 at the Hoping Plant, and 1 at the Hualien Plant, responsible for carbon reduction projects, hazardous solid waste projects, concrete practices, environmental safety projects, etc.

### Total Number of Employees by Age and Gender

| | FEMALE | MALE | TOTAL |
|---|---|---|---|
| 30 or under | 33 | 101 | **134** |
| 31-50 | 166 | 545 | **711** |
| 51 or above | 28 | 282 | **310** |

### Number of Managers by Age and Gender

| | FEMALE MANAGERS | MALE MANAGERS | MANAGERS IN TOTAL |
|---|---|---|---|
| 30 or under | 1 | 3 | **4** |
| 31-50 | 44 | 96 | **140** |
| 51 or above | 13 | 58 | **71** |

Note 4: Managers are the Section Chiefs or above.

### Total Number of Employees by Operation Site and Gender

| SITE | FEMALE | MALE | TOTAL |
|---|---|---|---|
| Operation Headquarters | 93 | 91 | **184** |
| Suao Plant | 12 | 172 | **184** |
| Hoping Plant | 31 | 245 | **276** |
| Hualien Plant | 1 | 8 | **9** |
| Taipei Plant | 37 | 178 | **215** |
| Taichung Plant | 22 | 77 | **99** |
| Kaohsiung Plant | 31 | 157 | **188** |

### Total Number of Employees by Department and Gender

| | FEMALE | MALE | TOTAL |
|---|---|---|---|
| Sales Department | 95 | 416 | **511** |
| Other Departments (except the Sales Department) | 132 | 512 | **644** |

### Total Number of Employees by Education and Gender

| | FEMALE | MALE | TOTAL |
|---|---|---|---|
| Ph.D. | 1 | 3 | **4** |
| Master's Degree | 45 | 85 | **130** |
| Bachelor's Degree | 125 | 354 | **479** |
| Associate Degree | 30 | 152 | **182** |
| Senior High School, Vocational School, or Below | 26 | 334 | **360** |

### Total Number of Employees by Job Levels and Gender

| | FEMALE | MALE | TOTAL |
|---|---|---|---|
| Senior managers | 4 | 18 | **22** |
| Mid-level Managers | 28 | 79 | **107** |
| Low-level Managers | 26 | 60 | **86** |
| Professionals | 72 | 125 | **197** |
| Direct Labor | 97 | 646 | **743** |

Note 5: Senior managers are the Assistant Vice President or above. Mid-level managers are Managers or Deputy Managers. Low-level managers are Section Chiefs. Professionals are Engineers, Specialists, or Management Associates.

### New Recruits and Former Employees by Gender and Age

| | | GENDER | | AGE | | | |
|---|---|---|---|---|---|---|---|
| | | Female | Male | 30 or under | 31-50 | 51 or above | TOTAL |
| New Recruits | No. | 31 | 83 | 37 | 72 | 5 | **114** |
| | Ratio | 2.68% | 7.19% | 3.20% | 6.23% | 0.43% | **9.87%** |
| Former Employees | No. | 16 | 77 | 21 | 51 | 21 | **93** |
| | Ratio | 1.39% | 6.67% | 1.82% | 4.42% | 1.82% | **8.05%** |
| Voluntary Separation | No. | 12 | 44 | 15 | 37 | 4 | **56** |
| | Ratio | 1.04% | 3.81% | 1.30% | 3.20% | 0.35% | **4.85%** |

Note 6: Employees in the probationary period/retired/dismissed/-deceased are not accounted for voluntary separation.
Note 7: Based on the data of non-fixed term contract personnel as of December 31, 2022.

# ESG KEY INDICATORS

# 08

# 8.1 / ESG Data Sheet

## TCC KEY INDICATORS | ENVIRONMENTAL

### GHG Emissions in 4 Years | Unit: metric ton of $CO_2e$

| ITEM | | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Scope 1 | Cement Plants TAIWAN | 4,266,390 | 4,411,086 | 4,797,296 | 4,312,390 |
| | RMC Plants TAIWAN | 2,088 | 2,059 | 1,517 | 1,776 |
| | Operation Headquarters TAIWAN | 142 | 140 | 132 | 146 |
| | TOTAL \| TAIWAN | 4,268,620 | 4,413,285 | 4,798,945 | 4,314,312 |
| Scope 2 | Cement Plants TAIWAN | 223,096 | 202,312 | 212,407 | 210,273 |
| | RMC Plants TAIWAN | 5,010 | 7,101 | 6,866 | 6,571 |
| | Operation Headquarters TAIWAN | 1,240 | 1,199 | 1,119 | 1,636 |
| | TOTAL \| TAIWAN | 229,346 | 210,612 | 220,392 | 218,480 |
| Scope 1+2 Total | Cement Plants TAIWAN | 4,489,486 | 4,613,398 | 5,009,703 | 4,522,663 |
| | RMC Plants TAIWAN | 7,098 | 9,160 | 8,383 | 8,347 |
| | Operation Headquarters TAIWAN | 1,382 | 1,339 | 1,251 | 1,782 |
| | TAIWAN | 4,497,966 | 4,623,897 | 5,019,337 | 4,532,792 |
| Scope 1 | Cement Plants MAINLAND CHINA | 31,362,071 | 31,255,633 | 25,867,678 | 20,715,305 |
| | Grinding Stations MAINLAND CHINA | - | - | - | 2,815 |
| | TOTAL \| MAINLAND CHINA | 31,362,071 | 31,255,633 | 25,867,678 | 20,718,120 |
| Scope 2 | Cement Plants MAINLAND CHINA | 1,313,966 | 1,257,882 | 1,094,397 | 846,574 |
| | Grinding Stations MAINLAND CHINA | - | - | - | 6,487 |
| | TOTAL \| MAINLAND CHINA | 1,313,966 | 1,257,882 | 1,094,397 | 853,061 |
| Scope 1+2 | Cement Plants MAINLAND CHINA | 32,676,037 | 32,513,515 | 26,962,075 | 21,561,879 |
| | Grinding Stations MAINLAND CHINA | - | - | - | 9,302 |
| | MAINLAND CHINA | 32,676,037 | 32,513,515 | 26,962,075 | 21,571,181 |
| Scope 3 | Cement Plants TAIWAN | 21,083 | 22,427 | 28,761 | 16,709 |
| | Operation Headquarters TAIWAN | 942 | 907 | 814 | 719 |
| | Grinding Stations MAINLAND CHINA | - | - | - | 0 |

Note 1: The GHG emissions were inventoried in terms of operational control. The formula used is emissions = activity data × emissions factor (EF) × global warming potential (GWP). ((The EF used for Taiwan is subject to the EPA GHG Emissions Factor Management Table (v. 6.0.4); the GWP for the Cement Plants is derived from the IPCC Fourth Assessment Report (2007); the GWP for RMC Plants and Operation Headquarters is derived from the IPCC Sixth Assessment Report (2021). The EF for Mainland China is subject to "Guidelines for Accounting and Reporting Greenhouse Gas Emissions: China Cement Production Enterprises (Trial)", the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and the 2019 Refinement, and the GWP is derived from the IPCC Sixth Assessment Report (2021).)

Note 2: For the data of cement plants in Taiwan in 2022, the Scope 1 draws reference from the EPA GHG Emissions Factor Management Table (v. 6.0.4); the Scope 2 draws reference from the electricity EF of 0.509 kg of $CO_2e$/kWh from the Bureau of Energy, MOEA in 2021. Note 3: Since 2018, we have been inventorying the most important activity associated with Scope 3 emissions: Upstream Transportation and Distribution, which is verified by a third-party entity and calculated based on the GHG Protocol - Corporate Value Chain (Scope 3) Accounting and Reporting Standard (WRI & WBCSD). Note 4: The GHG emissions from the RMC Plants only factor in the $CO_2$ emissions from gasoline, diesel (added in 2022), and purchased electricity. Note 5: The disclosure of the GHG emissions from the grinding stations in Mainland China started from 2022, so the data for the previous three years are not available. Note 6: Based on the cementitious materials yield of 5,629,943.3250 metric tons in Taiwan in 2022, the emission intensity in 2022 (Scope 1 & Scope 2) is 0.8033 $tCO_2e$/metric ton of cementitious materials. Note 7: The base year for GHG inventory in Taiwan is 2016 with the GHG emissions of 4,621,312 metric tons of $CO_2e$. Note 8: The GHG emissions from Operation Headquarters in Taiwan in 2022 goes up compared to the 2021 level due to the addition of Low-carbon R&D Center in the inventory scope.

### Energy Use in 4 Years

| ITEM | | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| **Energy Use** | | | | | |
| Coal (thousand metric ton) | Cement Plants TAIWAN | 708 | 699 | 757 | 703 |
| Diesel (KL) | Cement Plants TAIWAN | 946 | 460 | 981 | 1,235 |
| | RMC Plants TAIWAN | 664 | 634 | 450 | 538 |
| | Operation Headquarters TAIWAN | - | - | 4 | 111 |
| Gasoline (KL) | Cement Plants TAIWAN | - | - | - | 22 |
| | RMC Plants TAIWAN | 158 | 180 | 152 | 165 |
| | Operation Headquarters TAIWAN | - | - | 2 | 8 |
| Purchased Electricity (GWh) | Cement Plants TAIWAN | 433 | 412 | 439 | 428 |
| | RMC Plants TAIWAN | 9 | 14 | 14 | 13 |
| | Operation Headquarters TAIWAN | 4 | 3 | 3 | 4 |
| Power Generation by Waste Heat Recovery (GWh) | Cement Plants TAIWAN | 100 | 119 | 138 | 108 |
| Natural Gas ($m^3$) | Operation Headquarters TAIWAN | 7,073 | 5,150 | 3,750 | 1,723 |
| Coal (thousand metric ton) | Cement Plants MAINLAND CHINA | 5,515 | 5,424 | 4,446 | 3,369 |
| Diesel (KL) | Cement Plants MAINLAND CHINA | 14,413 | 17,749 | 16,991 | 13,239 |
| | Grinding Stations MAINLAND CHINA | 35 | 32 | 34 | 15 |
| Gasoline (KL) | Cement Plants MAINLAND CHINA | 301 | 271 | 340 | 252 |
| | Grinding Stations MAINLAND CHINA | 13 | 12 | 12 | 10 |
| Purchased Electricity (GWh) | Cement Plants MAINLAND CHINA | 2,710 | 2,584 | 2,272 | 1,601 |
| | Grinding Stations MAINLAND CHINA | - | - | - | 15 |
| Power Generation by Waste Heat Recovery (GWh) | Cement Plants MAINLAND CHINA | 1,278 | 1,283 | 1,034 | 811 |

Note 1：Starting from 2022, the energy consumption will be recorded as whole numbers (rounded to the nearest integer).

## Energy Use in 4 Years

| ITEM | | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| | | In terms of Gigajoule (GJ) | | | |
| Coal | Cement Plants TAIWAN | 16,157,228 | 16,300,593 | 17,632,953 | 16,355,419 |
| Diesel | Cement Plants TAIWAN | 33,264 | 16,168 | 34,505 | 43,426 |
| | RMC Plants TAIWAN | 23,348 | 22,293 | 15,823 | 18,917 |
| | Operation Headquarters TAIWAN | - | - | 81 | 3,903 |
| Gasoline | Cement Plants TAIWAN | - | - | - | 718 |
| | RMC Plants TAIWAN | 5,159 | 5,877 | 4,963 | 5,387 |
| | Operation Headquarters TAIWAN | - | - | 134 | 261 |
| Purchased Electricity | Cement Plants TAIWAN | 1,558,800 | 1,481,726 | 1,580,660 | 1,540,800 |
| | RMC Plants TAIWAN | 33,696 | 50,219 | 48,636 | 46,800 |
| | Operation Headquarters TAIWAN | 13,064 | 12,420 | 11,700 | 14,400 |
| Power Generation by Waste Heat Recovery | Cement Plants TAIWAN | 361,206 | 428,486 | 497,725 | 388,800 |
| Natural Gas | Operation Headquarters TAIWAN | 261 | 251 | 139 | 58 |
| Coal | Cement Plants MAINLAND CHINA | 126,966,755 | 124,879,180 | 102,356,312 | 77,566,859 |
| Diesel | Cement Plants MAINLAND CHINA | 506,807 | 624,110 | 597,427 | 465,515 |
| | Grinding Stations MAINLAND CHINA | 1,216 | 1,126 | 1,197 | 527 |
| Gasoline | Cement Plants MAINLAND CHINA | 9,818 | 8,857 | 11,115 | 8,228 |
| | Grinding Stations MAINLAND CHINA | 435 | 393 | 386 | 327 |
| Purchased Electricity | Cement Plants MAINLAND CHINA | 9,756,450 | 9,303,773 | 8,179,002 | 5,763,600 |
| | Grinding Stations MAINLAND CHINA | - | - | - | 54,000 |
| Power Generation by Waste Heat Recovery | Cement Plants MAINLAND CHINA | 4,600,887 | 4,620,139 | 3,723,552 | 2,919,600 |
| Total | Cement Plants TAIWAN | 18,110,498 | 18,226,973 | 19,745,843 | 18,329,162.56 |
| | RMC Plants TAIWAN | 62,203 | 78,389 | 69,422 | 71,105 |
| | Operation Headquarters TAIWAN | 13,325 | 12,671 | 12,054 | 18,622 |
| | Cement Plants MAINLAND CHINA | 141,840,718 | 139,436,059 | 114,867,408 | 86,723,802 |
| | Grinding Stations MAINLAND CHINA | 1,651 | 1,519 | 1,584 | 54,854 |

Note 1: Heating values of coal for the cement plants in Taiwan are converted per the respective settings of the plants. The converted heating value of coal for the Suao Plant: 5,532.69 kcal/kg; the converted heating value of coal for the Hoping Plant: 5,570.14 kcal/kg; the converted heating value of coal for other plants: 5,500 kal;/kg ： The values for other items are converted based on the heating values in the Emissions Factor Management Table (v. 6.0.4) released on the Bureau of Energy's website. The values are 5,500 kcal/kg for coal, 8,400 kcal/l for diesel, 7,800 kcal/l for gasoline, 3,600 GJ/GWh for electricity, and 8,000 (kcal/$m^3$) for natural gas. The scope 2 draws reference from the electricity EF of 0.509 kg of $CO_2e$/kWh from the Bureau of Energy, MOEA in 2021. Note 2: The data of energy use is subject to the reported data to the Bureau of Energy. Note 3: The Cement plants in Taiwan started collecting data on gasoline use in 2022, which were used all by corporate cars. Note 4: The RMC plants in Taiwan started collecting data on gasoline use in 2018. Note 5: The Operation Headquarters in Taiwan started to collect data on natural gas use in 2019, estimated as the natural gas fee of the year/unit fee per kWh. Note 6: Based on the cementitious materials yield of 5,629,943.3250 metric tons in Taiwan in 2022, the unit energy consumption in cementitious materials production is 3.1863 GJ/metric ton of cementitious materials. Note 7: The use of alternative fuels in Taiwan in 2022 increased by approximately 3.5 times compared to the 2021 levels due to the increase in diesel consumption by forklifts in short-barge transportation of feed. Note 8: Based on the concrete yield of 5,061,765 $m^3$ in Taiwan in 2022, the unit energy consumption in concrete production is 0.0140 GJ/$m^3$ of concrete. Note 9: Based on the 184 employees on the Operation Headquarters in Taiwan in 2022, the energy consumption per capita is 99.9630 GJ per capita. Note 10: The purchased electricity includes the electricity consumed by the mining system; nevertheless, now that the mining system is owned by the subsidiary, Ho Sheng Mining Co., Ltd., it is not included in the ISO 14064 GHG inventory data.

## Air Pollutant Emissions on Cement Plants | Unit: metric ton

| ITEM | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| **TAIWAN** | | | | |
| NOx | 6,388 | 6,164 | 6,473 | 5,427 |
| SOx | 79 | 106 | 113 | 65 |
| VOCs | 0.00616 | 0.00457 | 0.00422 | 0.00428 |
| Particulate Matters | 305 | 249 | 214 | 158 |
| Total | 6,772 | 6,519 | 6,800 | 5,650 |
| Direct Mercury Emissions | 0.221723 | 0.27546 | 0.27876 | 0.226347 |
| **MAINAND CHINA** | | | | |
| NOx | 14,973 | 12,089 | 9,908 | 8,207 |
| SOx | 1,632 | 1,293 | 997 | 1,096 |
| Particulate Matters | 1,051 | 827 | 569 | 317 |
| Total | 17,656 | 14,209 | 11,474 | 9,621 |
| Direct Mercury Emissions (Unit mg/$m^3$) | <0.0001 | <0.0001 | 0.005 | 0.005 |

Note 1: The emissions were calculated as the emission factors of the third-party testing multiply by the usage data. Note 2: Starting from Q3 of 2018, heavy metal monitoring data was added at the request of the Environmental Protection Administration. The heavy metals (lead, cadmium, mercury, arsenic, and hexavalent chromium) emitted in 2022 was 0.94517 metric ton. Note 3: Starting from Q4 of 2018, the cement plants reported mercury emissions in accordance with legal requirement. There was no mercury emitted by RMC plants. Note 4: The Hualien Plant did not operate in 2022 and thus had no air emissions. Note 5: The dioxin emissions at the cement plants in Taiwan in 2022 were 0.7576 g I-TEQ. Note 6: The business of our RMC plants was cement product ingredients mixing and transportation and thus had no air pollutant emission. Note7: Shaoguan Cement Plant in Mainland China was completed construction in November, 2021, thus Shaoguan Plant's air pollution data was included from 2022.

## Water Resources Use in 4 Years | Unit: million liters

| ITEM | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| **TAIWAN** | | | | |
| Municipal Water \| Cement Plants | 0 | 0 | 0 | 0 |
| Groundwater \| Cement Plants | 1109.18 | 1,014.34 | 822.52 | 829.44 |
| Industrial Water \| Cement Plants | 991.05 | 1,051.01 | 1,039.03 | 819.37 |
| Reclaimed Process Water \| Cement Plants | 23.22 | 93.48 | 102.43 | 112.81 |
| Total \| Cement Plants | 2,123.45 | 2,158.83 | 1,963.98 | 1,761.62 |
| Municipal Water \| RMC Plants | 316.83 | 368.32 | 309.77 | 295.15 |
| Groundwater \| RMC Plants | 85.73 | 212.58 | 279.79 | 343.19 |
| Reclaimed Process Water \| RMC Plants | 247.28 | 307.39 | 430.20 | 448.61 |
| Total \| RMC Plants | 649.84 | 888.29 | 1,019.76 | 1,086.95 |
| Municipal Water \| Operation Headquarters | 17.28 | 14.96 | 12.69 | 13.60 |

### Water Resources Use in 4 Years | Unit: million liters

| ITEM | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| **MAINLAND CHINA** | | | | |
| Municipal Water \| Cement Plants | 419.41 | 438.19 | 405.19 | 363.81 |
| Groundwater \| Cement Plants | 124.45 | 33.60 | 520.47 | 350.27 |
| Industrial Water \| Cement Plants | 851.30 | 634.30 | 516.49 | 455.50 |
| Surface water (rivers) \| Cement Plants | 15,590.86 | 16,184.48 | 12,318.97 | 8,324.64 |
| Lake / reservoir \| Cement Plants | 768.03 | 816.29 | 348.21 | 135.32 |
| Rain \| Cement Plants | 0.15 | 0.16 | 0.11 | 6.00 |
| Reclaimed Process Water \| Cement Plants | 14,926.16 | 15,510.87 | 11,773.31 | 9,609.60 |
| Total \| Cement Plants | 32,680.35 | 33,617.88 | 25,882.75 | 19,245.15 |
| Municipal Water \| Grinding Stations | 68.59 | 62.68 | 71.22 | 45.03 |
| Industrial Water \| Grinding Stations | 0 | 0 | 4.45 | 1.43 |
| Total \| Grinding Stations | 68.59 | 62.68 | 75.67 | 46.45 |

Note 1: The water use data on cement plants is the sum of the reported data. The municipal water use on RMC plants is the sum of water used on the water bills, and the groundwater data is the sum of the reported data, as the water use data is subject to the actual months of water use. The municipal water use data on Operation Headquarters is the sum of water used on the water bills. Note 2: The scope of disclosure is the water for which TCC holds water rights. Disclosure of groundwater began in 2019. The water use data for the water for which TCC holds no water rights in 2020 is estimated on the basis of sales. Note 3: All the sources of water are freshwater. Note 4: TCC employed WRI's Aqueduct Water Risk Atlas to conduct analysis with the distribution of water resources in Taiwan taken into account. The result revealed that all the operation sites in Taiwan are not located in the regions of high-water stress. Note 5: Since the Hualien Plant did not operate in 2022, the scope of data disclosure for 2022 covers Suao Plant and Hoping Plant. Note 6: Based on the cementitious materials yield of 5,629,943.3250 metric tons in 2022, the water withdrawal intensity per unit cementitious materials is 0.000293 million liters per metric ton of cementitious materials. Note 7: The increase in water use data in Taiwan's RMC Plants in 2022 compared to 2021 is attributed to the expansion of scope. Note 8: The water discharge from cement plants in Mainland China amounted to 2,125.67 million liters, while the water discharge from grinding plants amounted to 5.20 million liters.

### 2022 Water Conservation Projects

| Conservation Project | Total Water Saved (Unit: 1 cubic meter) | Cost saved (Unit: NT$) |
|---|---|---|
| **TAIWAN** | | |
| Membrane Bio-Reactor (MBR) | 28,225 | 1,932,847 |
| Recycling of water in shaft tunnels | 8,732 | 98,322 |

### Consumption of Alternative Raw Materials and Fuels in 2022 | Unit: metric ton

| Resource Reused at TCC | Alternative Type | Amount in 2022 |
|---|---|---|
| **TAIWAN** | | |
| Calcium Fluoride Sludge | Alternative Raw Material | 21,026 |
| MgO-based Desulfurized Inorganic Sludge | Alternative Raw Material | 11,291 |
| Coal Ash | Alternative Raw Material | 420,886 |
| Desulfurization Gypsum | Alternative Adjunct | 247,118 |
| Incinerated Recycled Aggregates | Alternative Raw Material | 4,766 |
| Reducing Slag from EAF | Alternative Raw Material | 96,324 |
| Construction Waste Soil | Alternative Raw Material | 237,274 |
| Waste Compression Molding | Alternative Raw Material | 456 |
| Slag | Alternative Raw Material | 78,342 |
| Waste Ceramic | Alternative Raw Material | 5,275 |
| Spent Refractories | Alternative Raw Material | 4,329 |
| Air-cooled Slag | Alternative Clinker | 1,965 |
| Blast Furnace Slag | Alternative Clinker | 7,638 |
| Wood Chips | Alternative Fuel | 43,917 |
| Solid Recovered Fuel (SRF) | Alternative Fuel | 3,305 |
| Total Resources Reused | | 1,183,912 |

### Consumption of Raw Materials in 2022 | Unit: metric ton

| CATEGORY | Raw Material | Consumption |
|---|---|---|
| **TAIWAN** | | |
| Non-recycled Raw Materials | Limestone | 6,610,316 |
| | Silica Sand | 33,184 |
| | Imported Low-alkali Cement | 140,013 |
| Recycled Raw Materials | Reducing Slag | 96,324 |
| | Calcium Fluoride Sludge | 21,026 |
| | Construction Waste Soil | 237,274 |
| | Alternative Clay | 874,649 |
| | Desulfurization Gypsum | 247,118 |
| | Coal Ash | 420,886 |
| | Slag | 176,988 |
| | Others – Industrial Wastes | 35,954 |
| Total Amount of Raw Materials | | 8,893,732 |
| Ratio of Recycled Raw Materials (Recycled Raw Materials/Total Raw Materials) | | 23.73% |

# TCC KEY INDICATORS | SOCIAL

## Overall Social Welfare Contribution | NT$

| Contribution Type | Amount |
|---|---|
| TAIWAN & MAINLAND CHINA | |
| Monetary Contribution | 33,341,735 |
| Volunteering Hours Contribution | 1,314,790 |
| In-kind (Cement) Contribution | 1,773,796 |
| Management Costs | 3,330,000 |
| Total | 39,760,321 |

Note 1: The volunteering hours are monetized on the basis of the hourly wage of MAs.
Note 2: The scope of data aggregated covers Taiwan and Mainland China.

## Parental Leave in 4 Years

| ITEM | 2019 | | 2020 | | 2021 | | 2022 | |
|---|---|---|---|---|---|---|---|---|
| | F | M | F | M | F | M | F | M |
| Employees Eligible for Parental Leave without Pay in the Year (A) | 18 | 59 | 16 | 73 | 22 | 70 | 20 | 74 |
| Employees Applying for Parental Leave without Pay in the Year (B) | 1 | 0 | 2 | 1 | 1 | 2 | 6 | 2 |
| Employees Scheduled to Resume Work in the Year (C) | 1 | 0 | 3 | 0 | 2 | 2 | 4 | 3 |
| Actual Employees Resuming Work (D) | 1 | 0 | 3 | 0 | 1 | 2 | 4 | 1 |
| Employees Continuing Work at TCC after Resumption of Work for 12 Months (E) | 3 | 1 | 1 | 0 | 3 | 0 | 1 | 2 |
| Resumption Rate after Parental Leave without Pay (D/C) | 100% | 0% | 100% | - | 50% | 100% | 100% | 33% |
| Retention Rate One Year after Resumption of Work (E/D in Previous Year) | 100% | 100% | 100% | - | 100% | - | 100% | 100% |

Note 1: Full-time employees who have been onboard for at least six months in the year are entitled to parental leave without pay.

## Work-related Injuries of Employees in 2022

| Occupational Accidents | | | | | | | | | | Working Hours | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fatalities | Work-related Injuries | Recordable Incidents | Near Misses | Fatality Rate | Work-related Injury Rate | Recordable Incident Rate | Near Misses Rate | Lost Days | Lost Days Rate | Stipulated | Actual |
| Operation Headquarters | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 366,528 | 372,973 |
| Plants in Taiwan | | | | | | | | | | | |
| 0 | 5 | 5 | 0 | 0 | 0.4675 | 0.4675 | 0 | 179 | 18.5 | 1,934,232 | 2,138,921 |
| Plants in Mainland China | | | | | | | | | | | |
| 0 | 14 | 14 | 0 | 0 | 0.1620 | 0.1620 | 0 | N/A | N/A | N/A | 17,279,817 |

Note 1: Work-related injuries are based on the monthly occupational accident reports submitted by each plant.
Note 2: Fatality Rate = (total number of fatalities / total actual working hours) × 200,000
Note 3: Work-related Injury Rate = (total number of work-related injuries – number of fatalities / total actual working hours) × 200,000. The criteria for work-related injuries are subject to "Regulations of the Examination of Injuries and Diseases Resulting from the Performance of Duties by the Insured Persons of the Labor Insurance Program."
Note 4: Recordable Incident Rate = (number of recordable incidents / total actual working hours) × 200,000
Note 5: Near Misses Rate = (number of near misses / total actual working hours) × 200,000
Note 6: Lost Days Rate = (lost days due to work-related injuries / stipulated working hours) × 200,000
Note 7: The number and rate of critical occupational injuries is 0.
Note 8: The scope of disclosure will expand in 2023 to the disclosures of the data of work-related injuries of employees in Mainland China, and the number of lost working days is scheduled to be disclosed in the 2023 Report.

## Work-related Injuries of Contractors in 2022

| Occupational Accidents | | | | | | | | Working Hours | |
|---|---|---|---|---|---|---|---|---|---|
| Fatalities | Work-related Injuries | Recordable Incidents | Near Misses | Fatality Rate | Work-related Injury Rate | Recordable Incident Rate | Near Misses Rate | Stipulated | Actual |
| Contractors Taiwan | | | | | | | | | |
| 0 | 3 | 3 | 0 | 0 | 0.3181 | 0.3181 | 0 | 1,886,035 | 1,886,035 |
| Contractors Mainland China | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,141,193 | 2,141,193 |

Note 1: Work-related injuries are based on the monthly occupational accident reports submitted by each plant.
Note 2: Fatality Rate = (total number of fatalities / total actual working hours) × 200,000
Note 3: Work-related Injury Rate = (total number of work-related injuries – number of fatalities / total actual working hours) × 200,000. The criteria for work-related injuries are subject to "Regulations of the Examination of Injuries and Diseases Resulting from the Performance of Duties by the Insured Persons of the Labor Insurance Program."
Note 4: Recordable Incident Rate = (number of recordable incidents / total actual working hours) × 200,000
Note 5: Near Misses Rate = (number of near misses / total actual working hours) × 200,000
Note 6: Certain stipulated working hours and actual working hours are calculated as persons entering the plants × 8 hours
Note 7: The number and rate of critical occupational injuries is 0.

## TCC Key Indicators | Governance

### 2022 TCC Group Tax Information | Unit: NT$1,000

| JURISDICTION | TAIWAN | ASIA | OTHER | TOTAL |
|---|---|---|---|---|
| Operating Revenue | 60,875,665 | 51,513,531 | 1,540,510 | 113,929,706 |
| Profit before Tax | 4,953,305 | 2,690,478 | (997,686) | 6,646,097 |
| Tax Expense | 926,468 | 1,260,851 | 301,693 | 2,489,012 |
| Effective Tax Rate | 19% | 47% | (30%) | 37% |
| Income Tax Paid | 1,540,388 | 2,345,262 | 270,547 | 4,156,197 |
| Effective Tax Rate of the Income Tax Paid | 31.10% | 87.17% | (27.12%) | 62.54% |
| Cost-to-income Ratio | 37 | 51 | 12 | 100 |

### Expenditures on Public Participation in 4 Years | Unit: NT$

| TOTAL AMOUNT ALLOCATED | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Political Lobbying, Interest Representation | 0 | 0 | 0 | 0 |
| Local, Regional, or National Political Campaigns, Organizations, and Candidates | 0 | 0 | 0 | 0 |
| Chambers of Commerce or Tax-Exempt Organizations (e.g. thinktank) | 10,936,559 | 11,832,811 | 12,286,514 | 14,340,841 |
| Matters Related to Election or Referendum | 0 | 0 | 0 | 0 |
| Total | 10,936,559 | 11,832,811 | 12,286,514 | 14,340,841 |
| Information Coverage | 100% | 100% | 100% | 100% |

### 2022 Financial Performance | Unit: NT$ for EPS & DPS; NT$1,000 for the remainders

| CATEGORY | ITEM | 2021 | 2022 |
|---|---|---|---|
| Economic Value Generated | Operating Revenue | 107,041,452 | 113,929,706 |
| | Operating Income (Loss) | 19,786,475 | 1,162,138 |
| | Non-operating Income and Expenses | 6,291,609 | 5,483,959 |
| Economic Value Distributed | Operating Costs | 80,391,353 | 103,794,557 |
| | EPS | 3.3 | 0.74 |
| | DPS | 2.0 | 0.5 |
| | Cash Dividend per Share | 1.0 | 0.5 |
| | Stock Dividend per Share | 1.0 | 0 |
| | Income Tax (TW) | 1,421,315 | 926,468 |
| | Income Tax (Asia) | 4,302,206 | 1,260,851 |
| | Income Tax (Other) | 206,866 | 301,693 |
| | Employee Wages and Benefits | 8,561,808 | 9,769,560 |
| | Community Investments | 426,333 | 276,550 |
| Economic Value Retained | Retained Earnings | 6,824,620 | 66,527,594 |

Note 1: The DPS, Cash Dividend per Share, and Stock Dividend per Share are to be adopted in the Shareholders' Meeting of 2022.

Note 2: The financial data in the 2020 CSR Report encompasses Taiwan Prosperity Chemical Corp., and the financial data such as the operating cost, income taxes, employee salaries and benefits of the company are thus included. Nevertheless, after the disposal of Taiwan Prosperity Chemical Corp.in 2021, Taiwan Prosperity Chemical Corp. would no longer be a business under the TCC Group per IFRS. As such, in compiling the 2021 financial statement, the data of 2020 was required to be adjusted for readers' comparison.

### Table of Supply Chain Procurement Amount in 2022 | Unit: NT$

| 6 CATEGORIES | PROCUREMENT AMOUNT |
|---|---|
| Raw Materials | 12,190,310,808 |
| Outsourcing & Subcontracting | 439,700,683 |
| Equipment & Parts | 3,601,764,009 |
| Transport | 1,428,610,201 |
| Construction | 808,748,775 |
| Explosives | 31,436,664 |
| Total | 18,500,571,140 |

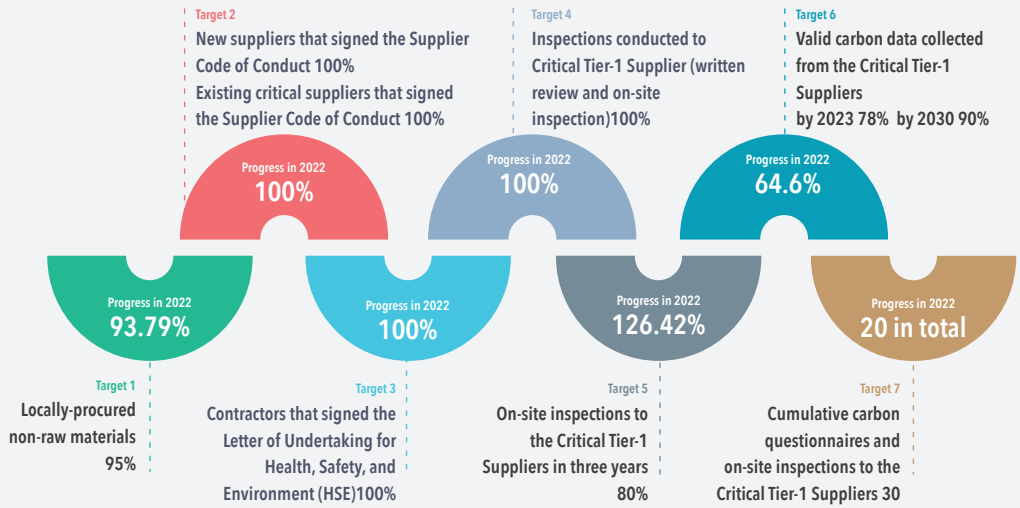
### Education and Training Hours by Age, Gender, and Job Levels in 2022

| | | TRAINING HOURS (UNIT: HOURS) | | TOTAL HOURS | AVERAGE HOURS |
|---|---|---|---|---|---|
| | | FEMALE | MALE | | |
| Age | 30 or under | 4,647.50 | 17,486.50 | 22,134.00 | 165.18 |
| | 31-50 | 6,273.50 | 53,916.00 | 60,189.50 | 84.65 |
| | 51 or above | 277.50 | 1,824.00 | 2,101.50 | 6.78 |
| Job Levels | Executives | 81.50 | 557.00 | 638.50 | 29.02 |
| | Mid-level Managers | 459.50 | 1,089.00 | 1,548.50 | 14.47 |
| | Low-level Managers | 2,446.00 | 7,428.50 | 9,874.50 | 114.82 |
| | Professionals | 7,194.00 | 56,889.00 | 64,083.00 | 325.29 |
| | Direct Labor | 1,017.50 | 7,263.00 | 8,280.50 | 11.14 |
| Total | | | | 84,425.00 | |
| Total Hours | | 11,198.50 | 73,226.50 | 84,425.00 | 73.10 |
| Average Hours | | 49.33 | 78.91 | | |

Note 1: Executives are the Assistant Vice President or above. Mid-level managers are Managers or Deputy Managers. Low-level managers are Assistant Managers or Section Chiefs. Professionals are Engineers, Specialists, or Management Associates.
Note 2: The scope of education and training hours covers overseas regions.

### 7 Targets for Sustainable Supplier Management

Note 1: State-owned businesses are excluded from the scope of the existing critical suppliers in Target 2.




## 8.2 / TCC GHG Inventory Progress Table

**Company Profile**

- ■ A Company with a capital of more than NT$10 billion operating in the steel industry and the cement industry
- ☐ A Company with a capital of more than NT$5 billion but less than NT$10 billion
- ☐ A Company with a capital of less than NT$5 billion

**Sustainable Development Guidemap for TWSE- and TPEx-Listed Companies**

- ■ Inventory of the parent company entity
- ☐ Inventory of the consolidated financial statements of subsidiaries
- ☐ Assurance for the parent company entity
- ☐ Assurance for the consolidated financial statements of subsidiaries

| Scope 1 | **Total Emissions** (metric tons of $CO_2e$) | **Intensity** (metric tons of $CO_2e$ thousand NTD) (Note 1) | Assurance Provider | Assurance Description |
|---|---|---|---|---|
| Parent Company | **4,314,312** | **0.1701** | Deloitte | Please refer to the section concerning the ISAE 3000 assurance report |
| Scope 2 | **Total Emissions** (metric tons of $CO_2e$) | **Intensity** (metric tons of $CO_2e$ thousand NTD) (Note 1) | Assurance Provider | Assurance Description |
| Parent Company | **218,480** | **0.0086** | Deloitte | Please refer to the section concerning the ISAE 3000 assurance report |
| Scope 3 (Voluntary Disclosure) | **17,428** | | | |

Note 1: Based on TCC's revenue in 2022 is 25,360,898 thousand dollars.

# 8.3 / Material Topic Analysis

## Dialogues with Sustainability Stakeholders

Pursuant to the AA1000 Stakeholder Engagement Standard (SES), TCC employs the five principles, i.e. Responsibility, Influence, Tension, Diverse Perspectives, and Dependency in identifying 10 stakeholders and ordering the stakeholder significance as follows: government agencies, clients, employees, local communities, shareholders/investors, environmental groups/NGOs, the media, industry associations/industrial and academic organizations, suppliers/contractors, and sustainability associations.

## Sustainability Topic Identification

In line with the results of the material topics in 2021 as well as in consideration of the international trends of sustainable development, ESG ratings and benchmarks (MSCI, DJSI, and CDP), ESG standards (GRI Standards and SASB Standards), industry characteristics, and benchmark corporate practices, TCC compiled a list of sustainability topics covering facets of corporate governance, economy, environment, and society.

In 2021, a total of 225 valid stakeholder questionnaires were collected, with which 5 executives of the Company assessed their levels of impact on the Company from the respective topics, financially and non-financially, in the short-/mid-/long-term, producing a list of concerned topics of stakeholders and a list of topics with operational impact. The Corporate Sustainable Development Committee convened a meeting. Based on the results of questionnaire analysis, combined with experiences of stakeholder engagement and the recent trends of sustainable development, the topics include climate actions and net-zero emissions; pollution control and management; legal compliance; resource co-processing; ethical management; local inclusion; green energy and energy storage; sustainable products; workplace health and safety; risk control; operational performances; talent cultivation and development; and biodiversity. Hence, a total of 13 material topics were identified for TCC in 2022.

## Assessment Process for Stakeholders and Material Topics

| STEP | STEP-1<br>Identify stakeholders | STEP-2<br>Compile topics of concern | STEP-3<br>Assess impact topics | STEP-4<br>Determine material topics | STEP-5<br>Examine topics |
|---|---|---|---|---|---|
| ACTION | Heads of various departments in the Company fill in the stakeholder identification questionnaire to determine the importance of stakeholders to the Company and identify key stakeholders. | Based on the results of stakeholder identification, the opinions and areas of concern of the stakeholders are obtained via questionnaires or interviews, so as to analyze the levels of impact of the respective topics. | The management of the Company conduct impact analysis for the impacts to corporate operation and risks from various sustainability topics to determine the levels of impact of these topics on the Company. | Based on the topics of stakeholders and their impacts on the Company, the result of topic assessments is mapped out in a materiality matrix as a reference to determine the materiality thereof. | The results of material topic identification are examined and compared to the material topics of the previous year to ensure compliance with the sustainability context and comprehensiveness. |
| QUANTIFIED PERFORMANCE | 10 categories of stakeholders identified | 225 valid questionnaires / 1 face-to-face seminar | Opinions of 5 executives / resolution of Corporate Sustainable Development Committee | 13 material topics identified | 100% conformity of the topics to the sustainability and comprehensiveness requirements |

## Materiality Matrix

**Corporate Governance**

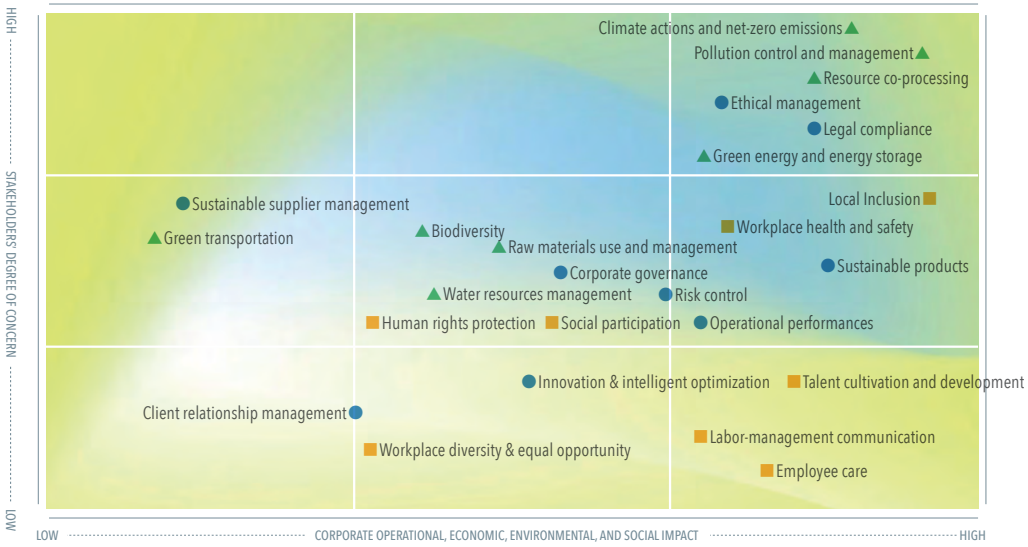
● Ethical management ● Operational performances ● Risk control
● Legal compliance ● Innovation & intelligent optimization
● Sustainable products ● Sustainable supplier management
● Client relationship management ● Corporate governance

**Environment**

▲ Climate actions and net-zero emissions ▲ Resource co-processing
▲ Green energy and energy storage
▲ Raw materials use and management
▲ Pollution control and management ▲ Water resources management
▲ Biodiversity ▲ Green transportation

**Society**

■ Human rights protection ■ Workplace diversity & equal opportunity
■ Workplace health and safety ■ Talent cultivation and development
■ Labor-management communication ■ Local Inclusion
■ Social participation ■ Employee care



# 8.4 / Stakeholder Engagement

## Stakeholder Policy

TCC seeks a balanced relationship between human civilization and nature and stresses on the communication between industry and society. The three cornerstones are Reasonable Profits (G), Mutual Benefit with Earth (E), and Human Well-Being (S).

The purpose of the stakeholder engagement policy is to offer an overall framework for TCC to engage in communication and interaction with stakeholders across all the activities of TCC.

1. Respond and protect the legal rights and interests of stakeholders.
2. Encourage stakeholders to participate in the corporate businesses and the communities the Company operates in to bring about shared sustainable values for all.
3. Strengthen the bilateral communication with stakeholders, build the sense of trust, and establish long-term, stable, and firm relationships via various channels.
4. Improve stakeholders' level of identity with the sustainable development and ESG of the Company, including items pertaining to professional development diversity.
5. Maintain sustainable actions in different countries and industries through the above mentioned framework.

In addition to the rules stated above, the Board of Directors may approve any other corporate policy concerning specific stakeholder(s) as well.

Pursuant to the GRI Standards and AA1000 SES, TCC employs the five principles, i.e. Responsibility, Influence, Tension, Diverse Perspectives, and Dependency, as well as the three steps of Identify, Analyze, and Determine to examine the sustainability topics, perform materiality analysis, and align the strategies and long-term goals of TCC on sustainability management. Meanwhile, they serve as the guidelines for the preparation of Sustainability Report so as to inventory the status of sustainability of the Company, promote ongoing improvement of various organizations, and create shared values for the society and the Company.

TCC values the opinions of our stakeholders, actively communicating and engaging to capture material sustainability topics, which are incorporated in the corporate sustainable development blueprint. In line with the nature of the industry and with reference to the GRI Standards, SASB Standards, and Dow Jones Sustainability Index (DJSI) as well as AA1000 SES, it employs the five principles, i.e. Responsibility, Influence, Tension, Diverse Perspectives, and Dependency in the identification and ordering of stakeholder significance. Upholding the spirit of open transparency, TCC discloses information through a variety of communication channels, ensuring effective and quality communication results with our stakeholders. TCC systematically designed sustainability topic survey questionnaires, with which it collects and analyzes feedbacks of stakeholders; meanwhile, TCC evaluates the impacts and risk levels of sustainability topics on corporate operation, identifying material topics to prioritize responses and reactions to meet the expectations of stakeholders toward TCC. In addition, TCC values expectations of our stakeholders for the Company and incorporates the topics of concern as the reference for corporate operation and sustainable development blueprint, so that TCC may better promote sustainable management, fulfilling our corporate social responsibility. TCC is convinced that only with smooth and effective communication channels with our stakeholders can TCC capture the pulses in the markets, economy, society, and environment, and ultimately put TCC's sustainability missions of "Nature First" and "Benefit to Society" into action.

## Industry Associations/Sustainability Initiatives & Organizations

TCC supports and participates in the initiatives relevant to the issues of climate change, circular economy, biodiversity, and new technology R&D. Also, TCC proactively engages with various associations on sustainability topics. For instance, TCC presented on GCCA as well as formulated the carbon neutrality route for the cement industry together with our fellow peers worldwide. In addition, TCC has been actively involved in the seminars and the domestic public hearings on laws and regulations concerning sustainability, assisted in the development of Guidelines for Safety and Heath at Work for the Cement Industry, and translated the Circular Transition Indicators (CIT) and Water Circularity Metric (WCM). Meanwhile, echoing with the international trends, TCC joined the Taiwan Nature Positive Initiative and signed the Business for Nature "Make it Mandatory" aligned with the UN SDGs. Together with experts, scholars, peers, and predecessors, TCC learns and exchanges on sustainability practices.

| Association | Board of Directors /Supervisors | Professional Committee | Membership | Topic(s) for Collaboration |
|---|---|---|---|---|
| Climate Group | | | ▲ | EP100 |
| Global Cement and Concrete Association (GCCA) | | | ▲ | Green procurement issues<br>Low-carbon products<br>Net-zero emissions issues |
| International Corporate Governance Network (ICGN) | | | ▲ | |
| Morgan Stanley Capital International (MSCI) | | | ▲ | Information of international ratings |
| The Third Wednesday Club | ▲ | | ▲ | |
| Chinese National Association of Industry and Commerce, Taiwan | ▲ | | ▲ | |
| Chinese Institute of Mining & Metallurgical Engineers | | | ▲ | |
| Taiwan Corporate Governance Association | | | ▲ | |
| Taiwan-Turkey Business Association | | | ▲ | |
| CNS Certification Mark Association | | | ▲ | |
| Chinese Arbitration Association, Taipei | | | ▲ | |
| Cranes and Hoist Equipment Association, R.O.C. | | | ▲ | |
| Kaohsiung City Renwu Industrial Park Manufacturers' Association | | | ▲ | |
| The Institute of Internal Auditors –Chinese Taiwan | | | ▲ | |
| CWS | | | ▲<br>▲ | Team Leader of "Social Participation",<br>Sustainability Capacity-building Workshop |

| Association | Board of Directors /Supervisors | Professional Committee | Membership | Topic(s) for Collaboration |
|---|---|---|---|---|
| Taiwan Photovoltaic Industry System Association | ▲ | | ▲ | Assist the association members to promote fishery and electricity symbiosis |
| Tainan City General Industrial Association | | | ▲ | |
| Taiwan Institute for Sustainable Energy | | | | |
| Taiwan Bio-energy Technology Development Association | | | | |
| Taiwan Cement Manufacturers' Association | ▲ | ▲ | ▲ | Guidelines for Safety and Heath at Work for the Cement Industry |
| Taiwan Marble Association | ▲ | ▲ | ▲ | |
| Taiwan Concrete Institute | ▲ | ▲ | ▲ | Concrete quality/engineering specifications |
| Taiwan Institute of Directors | ▲ | | ▲ | |
| Taiwan Electric Power Association | | ▲ | ▲ | |
| Taiwan Carbon Capture Storage and Utilization Association | | | ▲ | |
| Taiwan Business Council for Sustainable Development | | ▲ | ▲ | Founding member of Taiwan Nature Positive Initiative<br>Traditional Chinese translation of the Circular Transition Indicators (CIT)<br>Traditional Chinese translation of the Water Circularity Metric (WCM) |
| Monte Jade Science and Technology Association of Taiwan | | | ▲ | |
| Taiwan Accreditation Foundation | | | ▲ | |
| Cross-Strait CEO Summit | ▲ | | ▲ | |
| Yilan County Industrial Association | | | ▲ | |
| Chinese Alliance for Solidarity Association in Canada | | | ▲ | |
| Chinese Blood Donation Association | | | ▲ | |
| Taiwan Society for Circular Economy | | | ▲ | |
| Taiwan Stock Affairs Association | | | ▲ | |
| Hualien County Industrial Association | | | ▲ | |
| Kaohsiung Chamber of Industry | | | ▲ | |
| Chinese International Economic Cooperation Association | | | ▲ | |

| Association | Board of Directors /Supervisors | Professional Committee | Membership | Topic(s) for Collaboration |
|---|---|---|---|---|
| Association of Taiwan Net Zero Emissions | ▲ | | ▲ | Involvement in Cement Industry Net Zero Symposium |
| New Taipei City Industrial Association | | | ▲ | |
| Accounting Research and Development Foundation | | | ▲ | |
| Chiayi Hsien Industrial Association | | | ▲ | |
| Minsyong (with Touciao) Industrial Park Manufacturers Association | | | ▲ | |
| Kaohsiung Linhai Industrial Park Manufacturers Association | | | ▲ | |
| Taiwan Ready-Mixed Concrete Industry Association | ▲ | ▲ | ▲ | Business/technical exchange |
| Taichung City Ready-Mixed Concrete Industry Association | ▲ | | ▲ | Business/technical exchange |
| ACPAC | | | ▲ | Exchange of information on the Asian cement market |
| Taiwan Electrical and Electronic Manufacturers' Association | | | ▲ | |
| Taiwan Photovoltaic Industry Association | ▲ | | ▲ | Support to the association members in solar power plant development |
| Center for Corporate Sustainability | | | ▲ | Participation in the climate change simulator workshop |
| Business for Nature | | | ▲ | Business For Nature "Call to Action"<br>Business For Nature "Make it Mandatory" |
| Taiwan Electric Vehicle (EV) Power Charging Technology Promotion Alliance | | | ▲ | Understanding the latest developments in EV charging system specifications and regulations and communication with peers to capture the development trends |
| ESG Global Views Common Good Ecosphere | | | ▲ | |

## Participation Concerning Policies and Regulations

| Organization | Topic for Participation | Contributions of TCC |
|---|---|---|
| Environmental Protection Department | Air Pollution Emission Standards | The actual emissions of airborne particulate matters from the manufacturing process of TCC are registered through the system on a quarterly basis. |
| National Fire Agency<br>Industrial Technology Research Institute | NFPA855, UL9540A,<br>and other fire safety and safety standards | After communicating and explaining the contents and concepts of fire safety and safety standards such as NFPA855 and UL9540A with the National Fire Agency, the Fire Prevention Division agreed to amend the fire safety guidelines for outdoor energy storage. The contents amended include:<br>◤The proviso was added to the capacity limit specified in Article 7 of the guidelines; the original regulation was limited to only 50 kWh per unit.<br>◤Explanation was made concerning the illogicality and issues with design and installation in Article 4 to 6 of the guidelines, and approval was obtained from the NFA for exemption (performance-based regulations) by means of risk assessment or emergency contingency, or certification against the international standards like IEC62933 or UL9540.<br>◤Article 7 of the guidelines stipulates that installation of a firewall with 2-hour fire rate can reduce the distance required for the installation of energy storage system to a location away from buildings, public roads, or parking lots from thirty meters to three meters, allowing compliance by NHOA.TCC with the use of UHPC plates with fire-resistance in line with the 2-hour curve of temperature increase of CNS12514-1/-8, certified by a TAF-accredited laboratory with report presented. |
| Taipei City Government | Safety of energy storage cabinet | TCC participated in the seminar on fire safety regulations, suggested that the fire safety certification for UHPC cabinets could be proposed by the American UL Standards, with UL 263: Fire Tests of Building Construction and Material + UL 10C: Standard for Positive Pressure Fire Tests of Door Assemblies and UL 1479 Standard Method of Fire Tests Through-Penetration Firestops + NFPA 5000: Building Construction and Safety Code for certification, along with assessments with the corresponding European Standards, in an attempt to sold the products worldwide. |
| Industrial Development Bureau, MOEA | The Program for Green Factory Label System and Clean Production Assessment Mechanism | The Green Factory Program was executed by the Foundation of Taiwan Industry Service, which TCC assisted in the evaluation and discussion of the green environment sustainable optimization indicators questionnaire. |
| Financial Supervisory Commission<br>Environmental Protection Administration<br>Ministry of Economic Affairs<br>Ministry of Transportation and Communications<br>Ministry of the Interior | Taiwan Sustainable Taxonomy | TCC was involved in the pilot, including the on-site interviews and fill-out of the pilot questionnaire to firstly understand the material content of the taxonomy and the policy direction of the competent authority, followed by feedbacks on the fill-out of the questionnaire to help optimize the content of the guidebook and Q&A content. |

## Participation in International Organizations and Initiatives

### Global Cement and Concrete Association - Low Carbon Procurement Task

**Performance in 2022**

- Definition of low-carbon products for manufacturers
- Procurement regulations stipulated by policy makers to assist in carbon reduction purposes
- Green building and procurement policies for the proportion of green construction materials used formulated by governments

**Contributions of TCC**

TCC exchanged with the concrete manufacturers and experts in the world and worked together to define appropriate low-carbon procurement to achieve carbon reduction.

### BCSD Taiwan

**Performance in 2022**

- Review of the Chinese Version of WBCSD Circular Economy Program 3.0
- Sharing of TCC experience on the BCSD workshop

**Contributions of TCC**

TCC experience was aligned with international standards for improvement; TCC discussed and promoted the concept of circular economy with corporate partners to accelerate the transition of the enterprises of Taiwan; TCC engaged in interactions across sectors in the circular economy workshop for mutual exchanges and brainstorming for new cooperation models.

### Asian Cement Producers Amity Club

**Performance in 2022**

- Annual joint meeting to discuss demands and trends on the market
- Joint discussion for issues on the market and negotiation
- Exchange on cement production and demand volume in various countries

**Contributions of TCC**

The cement manufacturers and associations as well as representatives from various countries met together for market exchanges and international market trend forecast to establish harmonious market operations.

### CDP Climate Change

**Performance in 2022**

- 2022 Carbon Disclosure Project CDP Climate Change A-
- 2022 Supplier Engagement Rating (SER) Supplier Engagement Leader "A"

**Contributions of TCC**

| | |
|---|---|
| Government agencies | TCC actively participated in discussions and meetings of the Environmental Protection Administration, provided industry experience and relevant activity data, and assisted the competent authority in formulating corresponding climate policies. |
| Clients | TCC actively promoted low-carbon products and encouraged ready-mixed concrete (RMC) customers to apply for green building certification. |
| Suppliers | Suppliers were required to complete the annual $CO_2$ calculations to ensure suppliers' carbon emissions performance |
| Domestic/International industrial associations | In response to the Global Cement and Concrete Association (GCCA), TCC has been funding the Taiwan Cement Manufacturers' Association (TCMA), Taiwan Concrete Institute (TCI), and Taiwan Institute for Sustainable Energy (TAISE) to promote the achievement of the national sustainable development goals. |

### CDP Water Security

**Performance in 2022**

- 2022 CDP Water "B"

**Contributions of TCC**

| | |
|---|---|
| Government agencies | TCC complied with the water management policies and relevant actions of governments in a timely manner through official documents and active attention to changes in laws and regulations. |
| Clients | TCC provided information related to water resources when customers visited the plants for customers to understand the importance of water resources use reduction and recycling, and reduced water use by recycling of water resources. |
| Suppliers | All new suppliers were required to sign the Supplier Code of Conduct, which includes environmental objectives related to water resources management. |
| Local communities | TCC participated in relevant meetings of industrial parks to communicate directly with residents of local communities, made the water use of TCC transparent, and explained the water management reduction targets and the related action plans of TCC. |

## Stakeholder Engagement in 2022

Stakeholder

### Government Agencies

Quantified Communication Performance in 2022

**3**

**SIGNIFICANCE TO TCC**

A significant stakeholder that cares about TCC's legal compliance results in economy, environment, and society and has influences on the industry's development and policy implementation

**TOPICS OF CONCERN**

- ▲ Legal compliance
- ▲ Local Inclusion
- ▲ Climate actions and net-zero emissions
- ▲ Client relationship management
- ▲ Pollution control and management

**MEANS OF ENGAGEMENT TO IDENTIFY THE POSITIVE AND NEGATIVE, ACTUAL AND POTENTIAL IMPACTS**

- ▲ Updates of information on the corporate website and the Market Observation Post System (MOPS) to actively communicate the actions of TCC externally
- ▲ Active participation in interviews, seminars, conferences to capture stakeholders' needs
- ▲ Bilateral communication with stakeholders via official document and correspondence from time to time

**ENGAGEMENT PERFORMANCE IN 2022**

- ▲ Promotion of "Introduction to Controlled Foreign Company (CFC)" by the Zhongnan Office, National Taxation Bureau of Taipei, Ministry of Finance organized
- ▲ 2 meetings with the researchers and specialists from the Central Bank annually

STAKEHOLDER

### Employees

Quantified Communication Performance in 2022

**725**

**SIGNIFICANCE TO TCC**

A key stakeholder and the crucial human capital to TCC for ongoing breakthroughs and innovations

**TOPICS OF CONCERN**

▲ Ethical management ▲ Operational performances ▲ Employee care ▲ Corporate governance
▲ Climate actions and net-zero emissions

**MEANS OF ENGAGEMENT TO IDENTIFY THE POSITIVE AND NEGATIVE, ACTUAL AND POTENTIAL IMPACTS**

- ▲ Human rights due diligence conducted regularly to capture the human rights risks for employees for implementation of mitigation and compensation strategies
- ▲ Employee engagement survey executed annually to probe into the actual needs of employees and enhance their sense of identity
- ▲ Annual performance appraisal and interviews to establish communication channels between two parties
- ▲ Quarterly labor-management meetings, union meetings, employee welfare meetings, and Town Hall Meetings
- ▲ Employee mailbox set up to check employee feedbacks and respond to employee needs in a timely manner
- ▲ Publication of TCC Technology Journal to deepen employees' understanding of the Company

**ENGAGEMENT PERFORMANCE IN 2022**

- ▲ 1 Employee due diligence per year
- ▲ 1 performance appraisal per year
- ▲ Overtime Home Late Plan to pay for the taxi home by TCC to take care of the employees that clock out late due to project emergency or ad-hoc tasks with 253 accesses to date (as of April 2023)
- ▲ 42 TCC retirees invited from all over Taiwan for a two-day and one-night visit to learn about the latest development at TCC
- ▲ Various types of sports activities held to promote the health of employees with a total of 361 people participating in the walking competition, walking 109,722,086 steps, in 2022
- ▲ 21 labor-management meetings called
- ▲ 25 employee welfare meetings called
- ▲ 17 union meetings called
- ▲ 3 Town Hall Meetings convened
- ▲ TCC Technology Journal: "Cement Fantasy Technology Journal" published on a yearly basis and distributed to departments for employees to read and better understand the direction of corporate operations and the short-, mid-, and long-term focused works

STAKEHOLDER

## Clients

Quantified Communication Performance in 2022

**325**

### SIGNIFICANCE TO TCC

A stakeholder that cares about the quality of TCC's products and services as well as our operations, compliance, and environmental protection efforts

### TOPICS OF CONCERN

▲ Sustainable products ▲ Ethical management ▲ Green transportation
▲ Pollution control and management ▲ Client relationship management

### MEANS OF ENGAGEMENT TO IDENTIFY THE POSITIVE AND NEGATIVE, ACTUAL AND POTENTIAL IMPACTS

▲Annual client satisfaction survey on a regular basis, with the results of which to optimize client interactions
▲Bilateral communication with clients via telephone and external mailbox from time to time
▲Annual response to CDP questionnaire to disclose the sustainability information of TCC

### ENGAGEMENT PERFORMANCE IN 2022

▲1 Client Satisfaction Survey

STAKEHOLDER

## Shareholders /Investors

Quantified Communication Performance in 2022

**12**

### SIGNIFICANCE TO TCC

The stakeholder that is the main financing source of TCC and that cares the most for the operational performance and sustainable development of the Company

### TOPICS OF CONCERN

▲Operational performances ▲Ethical management ▲Risk control ▲Green energy and energy storage
▲Pollution control and management

### MEANS OF ENGAGEMENT TO IDENTIFY THE POSITIVE AND NEGATIVE, ACTUAL AND POTENTIAL IMPACTS

▲Annual general meeting (AGM)
▲Updates of information on the corporate website and the MOPS on a regular basis
▲Replies to shareholders' questions by phone or mail from time to time

### ENGAGEMENT PERFORMANCE IN 2022

▲1 AGM held ▲8 board meetings held ▲1 institutional investor conference organized by TCC
▲1 public institutional investor conference attended ▲1 NDR organized
▲Information on the corporate website and the MOPS updated on a regular basis
▲Inquiries from shareholders answered

STAKEHOLDER

## Local Communities

Quantified Communication Performance in 2022

**1,544**

### SIGNIFICANCE TO TCC

The most concerned stakeholder that lives close to TCC operation sites and thus is most affected by TCC's operations

### TOPICS OF CONCERN

▲Social participation ▲Ecological restoration ▲Resource co-processing
▲Pollution control and management ▲Raw materials and water resources management
▲Legal compliance ▲Local Inclusion

### MEANS OF ENGAGEMENT TO IDENTIFY THE POSITIVE AND NEGATIVE, ACTUAL AND POTENTIAL IMPACTS

▲Social Return on Investment (SROI) for community impact assessment
▲Annual visits to local communities and schools to better bilateral communication
▲Promotion of sustainability ideas via featured program (Hoping Energization)
▲Communication via phone and email from time to time
▲Timely update of information on the corporate website and social media (LINE, fan page, etc.) to deepen the knowledge of stakeholders on TCC's actions
▲Active participation in the industrial park meetings to communicate the impact of TCC's actions with stakeholders

### ENGAGEMENT PERFORMANCE IN 2022

▲Annual semester result presentation organized at the 4 Cement Academies in Taiwan, attended by a total of 345 students, parents, and teachers, in 2022
▲Cement Academy Scholarship disbursed to 112 students
▲The collaboration with Dong Ao Elementary School (IYO Tribe, Dongyue Village in Dongao), Nanao Township, officially inaugurated in 2022 with "After-school Mentoring Program" launched to support the 52 students of the school
▲Home Repair Service with 761.5 hours of service delivered for a total of 183 cases
▲Hoping Care Bus between the Heping Village and the Downtown Hualien, serving 452 passengers in total
▲Hoping Energization co-organized with Heping Elementary School with 400 villagers and 134 groups of children and parents reached

STAKEHOLDER

## Environmental Groups/NGOs

Quantified Communication Performance in 2022

**177**

### SIGNIFICANCE TO TCC

A stakeholder that cares for TCC's effort in environmental protection, employee care, and communication with neighboring communities while pushing TCC for improvement

### TOPICS OF CONCERN

- Legal compliance
- Social participation
- Green transportation
- Ecological restoration/Biodiversity
- Corporate governance and ethical management
- Resource co-processing
- Climate actions and net-zero emissions
- Green energy and energy storage

### MEANS OF ENGAGEMENT TO IDENTIFY THE POSITIVE AND NEGATIVE, ACTUAL AND POTENTIAL IMPACTS

- Communication via phone or email from time to time for better bilateral communication
- Timely update of corporate website for transparent disclosures on the sustainability actions of TCC

### ENGAGEMENT PERFORMANCE IN 2022

- "Our National Park Taroko Event" organized by Jane Goodall Institute Taiwan at TCC DAKA, attended by approximately 150 people from Heping Elementary School, Hualien Tongmen Elementary School, Sanzhan Elementary School, Jingmei Elementary School, and Si Pao Primary School to interact with the booths
- Engagement with Kids' Bookhouse, Taiwan Sea Turtle Conservation Society, Green Bunny Studio, Taiwan Marine Education Center of Yilan County, Environmental Protection Bureau of Yilan County, and the Northern Branch, Coast Guard Administration, Ocean Affairs Council on the Hundred People Waste Reduction Beach Cleanup Event at Hanben
- 27 group tours to TCC DAKA

STAKEHOLDER

## Media

Quantified Communication Performance in 2022

**768**

### SIGNIFICANCE TO TCC

A stakeholder that helps TCC disclose sustainable measures

### TOPICS OF CONCERN

- Operational performances
- Innovation & intelligent optimization
- Circular economy
- Sustainable products
- Climate actions and SBTs
- Waste co-processing
- Raw materials and water resources management
- Ecological restoration
- Human rights protection and employee care

### MEANS OF ENGAGEMENT TO IDENTIFY THE POSITIVE AND NEGATIVE, ACTUAL AND POTENTIAL IMPACTS

- Media delegation tour organized to deepen stakeholders' knowledge of TCC
- Communication via phone or email from time to time
- Corporate website, Facebook Page/WeChat official account/Instagram for timely communication of the sustainability actions of TCC

### ENGAGEMENT PERFORMANCE IN 2022

- 3 press conferences
- 38 press releases
- Media delegation of 20 journalists to the inauguration ceremony for NHOA.TCC charging station at TCC DAKA
- 40 people from Wealth Magazine arranged for the visit to TCCGE Changbin Plant and Tainan Plant of E-One Moli Energy Corp.
- Posts on Facebook Page: 321 posts
- Instagram: 5 posts
- TCC Group YouTube: 13 videos
- Attendance to "ESG Summit" organized by Accounting Research and Development Foundation
- Attendance to "Asia-Pacific Forum & Exposition for Sustainability" organized by TAISE

STAKEHOLDER

## Industry Associations /Industrial & Academic Organizations

Quantified Communication Performance in 2022

**3**

### SIGNIFICANCE TO TCC

A stakeholder that is a fellow partner to jointly promote the industry's development and offer advice and exchange ideas in business operation

### TOPICS OF CONCERN

- ▲Innovation & intelligent optimization
- ▲Sustainable products
- ▲Circular economy
- ▲Waste co-processing
- ▲Climate actions and SBTs
- ▲Climate actions and net-zero emissions
- ▲Green energy and energy storage
- ▲Legal compliance

### MEANS OF ENGAGEMENT TO IDENTIFY THE POSITIVE AND NEGATIVE, ACTUAL AND POTENTIAL IMPACTS

- ▲Bilateral communication through topical meetings or via phone, official document, and email from time to time
- ▲Regular attendance in the meetings of the CNS Technical Committee annually
- ▲Regular attendance in the association board of directors' engagement/sales/ technical committee to share the industrial practices of TCC
- ▲Timely update of corporate website information

### ENGAGEMENT PERFORMANCE IN 2022

- ▲Participation in GCCA meetings on carbon reduction pathways; discussion and amendment to the 2050 Roadmap for concrete in response to COP26; and SBT for cement on the 1.5°C net-zero emissions pathway guidelines; totally over 36 video conferences
- ▲Participation in the government's meetings on strategies for Net Zero by 2050 and carbon reduction pathways to offer recommendations on regulation amendments
- ▲Participation in the revision of CNS15286 Blended hydraulic cements, adding Type IL (Portland Limestone Cement) and Type IT (Ternary Blended Cement), besides the existing Type IS (Portland Blast Furnace Cement) and Type IP (Portland Pozzolan Cement), totally 4 types of cement

STAKEHOLDER

## Suppliers /Contractors

Quantified Communication Performance in 2022

**1,173**

### SIGNIFICANCE TO TCC

A business partner to TCC in product manufacturing and quality improvement as well as a stakeholder to work together on environmental sustainability issues

### TOPICS OF CONCERN

- ▲Supplier management
- ▲Corporate governance and ethical management
- ▲Client relationship management
- ▲Operational performances
- ▲Workplace health and safety

### Means of Engagement to Identify the Positive and Negative, Actual and Potential Impacts

- ▲2 Sustainability Governance Workshops organized annually to communicate sustainability-related practices with stakeholders and boost the sustainability management intensity of suppliers
- ▲Bilateral communication via external mailboxes, phone, and email from time to time
- ▲Annual audits to ensure sustainability practices of suppliers
- ▲A supplier suggestion mailbox on the corporate website for timely response to suppliers' needs
- ▲Tender meetings from time to time

### Engagement Performance in 2022

- ▲Supplier Convention on Sept. 14, 2022, attended by 331 suppliers
- ▲Annual written audit to 216 suppliers completed
- ▲255 contractor meetings, safety meetings, and education and trainings organized
- ▲169 sessions of ethical management trainings organized for contractors
- ▲170 mails received by the supplier suggestion mailbox in 2022
- ▲The 1st Supplier Sustainability Governance Workshop organized on Nov. 23, 2022, divided into 2 sessions in the morning and afternoon, respectively, attended by 25 suppliers (32 individuals)

STAKEHOLDER

## Sustainability Associations

Quantified Communication Performance in 2022

**31**

### SIGNIFICANCE TO TCC

A stakeholder that focuses on TCC's awareness of sustainability trends and builds a sustainable future with TCC

### TOPICS OF CONCERN

- ▲Climate actions and SBTs
- ▲Waste co-processing
- ▲Raw materials and water resources management
- ▲Pollution control and management
- ▲Workplace health and safety

### MEANS OF ENGAGEMENT TO IDENTIFY THE POSITIVE AND NEGATIVE, ACTUAL AND POTENTIAL IMPACTS

- ▲Active participation in sustainability exchange activities to share on the sustainability practices of TCC
- ▲Bilateral communication via phone and email from time to time

### ENGAGEMENT PERFORMANCE IN 2022

**Company Information Exchange**

- ▲Information sharing via My Low-carbon Travel
- ▲Information sharing on TCC Shareholders' meeting to exchange on the three axes of the sustainable transition at TCC
- ▲Information sharing on TCC DAKA charging station opening

**Event Participation**

- ▲4 sessions of CWS sustainability capacity-building workshop as the team leader for the social participation session
- ▲CSRone 8th International Conference on Sustainability Trends 2022
- ▲BCSD Taiwan's "Taiwan Nature Positive Initiative Platform Presentation" as a speaker to talk on a company's role in the global biodiversity framework after 2020
- ▲BCSD Taiwan's "Circular Transition Indicators Workshop" as a speaker to talk on the corporate circular strategies
- ▲BCSD Taiwan's "Net-zero Transition Strategy Results Forum" and "2021 CDP Presentation in Taiwan"
- ▲International Climate Development Institute (ICDI) "COP27 Nature-based Solutions Carbon Trading Trend Forum"
- ▲Review of the Chinese version of WBCSD Circular Economy Program 3.0; sharing of TCC experience on the BCSD workshop based on the experience of a large traditional manufacturer

# APPENDIX

# Appendix

## Sustainability Accounting Standards Board (SASB) Reference Table/ IFRS S2 – Construction Materials Reference Table

| Topic | Code | Category | Metric | PAGE | DESCRIPTION |
|---|---|---|---|---|---|
| Greenhouse Gas Emissions | EM-CM-110a.1 | Quantitative | Gross global Scope 1 emissions | 107 | No TCC operation sites is located in the areas of emissions-limiting regulations. |
| | | | Percentage covered under emissions-limiting regulations | 107 | |
| | EM-CM-110a.2 | Qualitative | Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets | 08-09 | |
| Air Quality | EM-CM-120a.1 | Quantitative | Air emissions of the following pollutants: (1) NOx (excluding $N_2O$), (2) SOx, (3) particulate matter (PM10), (4) dioxins/furans, (5) volatile organic compounds (VOCs), (6) polycyclic aromatic hydrocarbons (PAHs), and (7) heavy metals | 108 | The scope of disclosure covers mainly the stationary sources. |
| Energy Management | EM-CM-130a.1 | Quantitative | Total energy consumed | 107-108 | 19,084,652 GJ The total energy consumed in the organization in 2022 was 18,415,845 GJ, in order to comply with the disclosure requirements of SASB energy management, the SASB total energy consumption was additionally plus alternative fuel consumption 668,807GJ. |
| | | | Percentage grid electricity | - | 8.38% The proportion of grid electricity was the proportion of purchased electricity in total energy consumption. |
| | | | Percentage alternative | - | 3.50% The proportion of alternative energy was the proportion of alternative fuels (including woodchips, SRF, and waste paper) in total energy consumption. |
| | | | Percentage renewable | - | 0.006% The proportion of renewable energy was the proportion of self-generated renewable energy in total energy consumption, converted with 3.6 GJ per MWh. |
| Water Management | EM-CM-140a.1 | Quantitative | Total fresh water withdrawn | 108-109 | Process water recycled/total water used: 19.62 % |
| | | | Percentage recycled | 108-109 | |
| | | | Percentage in regions with High or Extremely High Baseline Water Stress | 40 | |
| Waste Management | EM-CM-150a.1 | Quantitative | Amount of waste generated | 42 | No hazardous wastes at TCC |
| | | | Percentage hazardous | 42 | |
| | | | Percentage recycled | 49 | |
| Biodiversity Impacts | EM-CM-160a.1 | Qualitative | Description of environmental management policies and practices for active sites | 57-63 | |
| | EM-CM-160a.2 | Quantitative | Terrestrial acreage disturbed | | 121.74 hectares have been mined, and 63.13 hectares have been regreened with a restoration ratio of 51.86%. |
| | | | Percentage of impacted area restored | | |
| Workforce Health & Safety | EM-CM-320a.1 | Quantitative | Total recordable incident rate (TRIR) for full-time employees and contract employees | 110 | |
| | | | Near miss frequency rate (NMFR) for full-time employees and contract employees | 110 | |
| | EM-CM-320a.2 | Quantitative | Number of reported cases of silicosis | | No cases of silicosis reported at TCC in 2022 |
| Product Innovation | EM-CM-410a.1 | Quantitative | Percentage of products that qualify for credits in sustainable building design and construction certifications | 80 | Of the TCC concrete products sold to clients in 2022, the sales for green building applications accounted for 7.11% of the total revenue. |
| | EM-CM-410a.2 | Quantitative | Total addressable market and share of market for products that reduce energy, water, and/or material impacts during usage and/or production | | 79%[note] |
| Pricing Integrity & Transparency | EM-CM-520a.1 | Quantitative | Total amount of monetary losses as a result of legal proceedings associated with cartel activities, price fixing, and anti-trust activities | | None |
| Activity Metrics | EM-CM-000.A | Quantitative | Production by major product line | | Clinker yield in 2022: 5,296,895.8320 metric tons |
| | | | | | Cement yield in 2022: 4,789,802.7340 metric tons |
| | | | | | Cementitious materials yield in 2022: 5,629,943.3250 metric tons |

Note: The sustainable products defined by TCC are cement products with the Carbon Reduction Label of the Environmental Protection Administration. The percentage is calculated as the revenue of cement products with carbon reduction label / the revenue of TCC Taiwan cement products. The revenue statistics above do not include the cement used by TCC RMC Plants.

## GRI Standards Reference Table

| | |
|---|---|
| Statement of Use | **Taiwan Cement Corporation has prepared the Report in line with the GRI Standards for the period from January 1, 2022 to December 31, 2022.** |
| GRI 1 for Use | **GRI 1: Foundation 2021** |
| Applicable GRI Sector Standards | **No cement sector standards available yet** |

| Code | Disclosure | Corresponding Section | Page | Description (Synopsis included) |
|---|---|---|---|---|
| **GRI 2：General Disclosures 2021** | | | | |
| **The organization and its reporting practices** | | | | |
| 2-1 | Organizational details | Global Operations | 05 | |
| | | 3 Core Businesses & 10 Industrial Services | 06 | |
| | | About the Report | 18 | |
| 2-2 | Entities included in the organization's sustainability reporting | Global Operations | 05 | |
| | | 3 Core Businesses & 10 Industrial Services | 06 | |
| | | About the Report | 18 | |
| 2-3 | Reporting period, frequency and contact point | About the Report | 18 | |
| 2-4 | Restatements of information | | | No restatement of information at TCC in 2022 |
| 2-5 | External assurance | About the Report | 18 | |
| **Activities and workers** | | | | |
| 2-6 | Activities, value chain and other business relationships | Global Operations | 05 | No significant changes to the operations of TCC in 2022 |
| | | 5.5 Sustainable Supply Chain | 77-78 | |
| | | 5.6 Client Communication | 79-80 | |
| 2-7 | Employees | 7.6 Workplace Diversity | 105 | |
| 2-8 | Workers who are not employees | 7.6 Workplace Diversity | 105 | |
| **Governance** | | | | |
| 2-9 | Governance structure and composition | 5.2 Board Functions | 67-69 | |
| 2-10 | Nomination and selection of the highest governance body | 5.2 Board Functions | 67-69 | Please refer to Nomination Committee in Corporate Governance |
| 2-11 | Chair of the highest governance body | 5.2 Board Functions | 67-69 | Mr. Nelson An-ping Chang is the Chairman of Taiwan Cement Corporation, overseeing the TCC Group (encompassing the affiliated enterprises related to cement and new construction materials, waste treatment, and energy). Mr. Roman Cheng is the President of Taiwan Cement Corporation, in charge of the operation and management thereof. As such, the Chairman and the President are not the same individual. (Mr. Jong-Peir Li left the office on August 10, 2022, which was assumed by Mr. Nelson An-ping Chang concurrently before being assumed by Mr. Roman Cheng on November 21, 2022.) |
| 2-12 | Role of the highest governance body in overseeing the management of impacts | 5.2 Board Functions | 67-69 | |
| 2-13 | Delegation of responsibility for managing impacts | 5.2 Board Functions | 67-69 | |
| 2-14 | Role of the highest governance body in sustainability reporting | 5.2 Board Functions | 67-69 | |
| 2-15 | Conflicts of interest | 5.2 Board Functions | 67-69 | Please refer to TCC's official website and 2022 Annual Report. |
| 2-16 | Communication of critical concerns | 5.2 Board Functions | 67-69 | |
| | | 5.9 Ethical Management | 83-84 | |

| Code | Disclosure | Corresponding Section | Page | Description (Synopsis included) |
|---|---|---|---|---|
| 2-17 | Collective knowledge of the highest governance body | 5.2 Board Functions | 67-69 | |
| 2-18 | Evaluation of the performance of the highest governance body | 5.2 Board Functions | 67-69 | |
| 2-19 | Remuneration policies | 5.2 Board Functions | 67-69 | Please refer to Taiwan Cement Corporation's Annual Report for the remunerations paid to Directors, Supervisors, President, and Vice Presidents. In addition, there is no clawback mechanism in place at TCC. |
| 2-20 | Process to determine remuneration | 5.2 Board Functions | 67-69 | Please refer to the Remuneration Committee Charter of Taiwan Cement Corporation. |
| 2-21 | Annual total compensation ratio | 5.2 Board Functions | 67-69 | The ratio of the annual total compensation for the organization's highest-paid individual to the median annual total compensation for all employees in 2022 is 37:1 (compensation includes: salary, year-end bonus, and variable bonus). The ratio of the percentage increase in annual total compensation in 2022 is 13.2. |
| **Strategy, policies and practices** | | | | |
| 2-22 | Statement on sustainable development strategy | Chairman's Address | 03 | |
| | | Total Climate Commitment– Aiming for Net Zero by 2050 | 08 | |
| 2-23 | Policy commitments | 7.5 Human Rights Protection | 104 | |
| 2-24 | Embedding policy commitments | 7.5 Human Rights Protection | 104 | |
| 2-25 | Processes to remediate negative impacts | 5.4 Climate Risks: TCFD | 72 | |
| | | 7.5 Human Rights Protection | 104 | |
| 2-26 | Mechanisms for seeking advice and raising concerns | 5.9 Ethical Management | 83-84 | |
| 2-27 | Compliance with laws and regulations | 5.9 Ethical Management | 83-84 | |
| 2-28 | Membership associations | 8.4 Stakeholder Engagement | 114-116 | |
| **Stakeholder engagement** | | | | |
| 2-29 | Approach to stakeholder engagement | 8.4 Stakeholder Engagement | 114-116 | |
| 2-30 | Collective bargaining agreements | 8.4 Stakeholder Engagement | 114-116 | The labor union has been established across all TCC plants in Taiwan, and collective bargaining agreements were signed. The coverage rate of collective bargaining agreements is 100%. The percentage of TCC employees joining the labor union in 2022 accounted for 96.36% of the total number of the personnel. As for the rest 3.64% that did not join the labor union, their labor terms follow the work rules. |
| **GRI 3：Material Topics 2021** | | | | |
| 3-1 | Process to determine material topics | 8.3 Material Topic Analysis | 113 | |
| 3-2 | List of material topics | 8.3 Material Topic Analysis | 113 | |
| **GRI 200: Economic** | | | | |
| **GRI201：Economic Performance 2016** | | | | |
| 3-3 | Management of material topics | 8.3 Material Topic Analysis | 113 | |
| 201-1 | Direct economic value generated and distributed | 8.1 ESG Key Indicators | 111 | |
| 201-2 | Financial implications and other risks and opportunities due to climate change | 5.4 Climate Risks: TCFD | 72 | |
| 201-3 | Defined benefit plan obligations and other retirement plans | 7.3 Remuneration & Benefits | 100 | TCC did not receive any financial assistance from government in 2022. |
| 201-4 | Financial assistance received from government | | | |

| Code | Disclosure | Corresponding Section | Page | Description (Synopsis included) |
|---|---|---|---|---|
| **GRI 205: Anti-corruption 2016** | | | | |
| 3-3 | Management of material topics | 8.3 Material Topic Analysis | 113 | |
| 205-2 | Communication and training about anti-corruption policies and procedures | 5.9 Ethical Management | 84 | |
| 205-3 | Confirmed incidents of corruption and actions taken | 5.9 Ethical Management | 84 | |
| **GRI 206: Anti-Competitive Behavior 2016** | | | | |
| 3-3 | Management of material topics | 8.3 Material Topic Analysis | 113 | |
| 206-1 | Legal actions for anti-competitive behavior, anti-trust, and monopoly practices | 5.9 Ethical Management | 84 | |
| **GRI 300: Environmental** | | | | |
| **GRI 301: Materials 2016** | | | | |
| 301-1 | Materials used by weight or volume | 8.1 ESG Data Sheet | 109 | |
| 301-2 | Recycled input materials used | 8.1 ESG Data Sheet | 109 | |
| **GRI 302: Energy 2016** | | | | |
| 3-3 | Management of material topics | 8.3 Material Topic Analysis | 113 | |
| 302-1 | Energy consumption within the organization | ESG Highlights 2022 | 13 | The total energy consumed in the organization in 2022 was 18,415,845 GJ, of which the non-renewable fuel consumption accounted for 18,027,806 GJ, and the renewable fuel consumption accounted for 1,108 GJ. The renewable fuel consumption was calculated based on the 308 MWh of renewable energy used in power production for self-consumption. Converted with 3.6 GJ per MWh, it was equivalent to 1,108 GJ. |
| | | 8.1 ESG Data Sheet | 109 | |
| 302-3 | Energy intensity | 8.1 ESG Data Sheet | 108 | |
| 302-4 | Reduction of energy consumption | 2.4 Management of Environmental Indicators | 41 | The plants' energy-saving plans in 2022 reduced consumption of 8,941 MWh in total. Converted with 3.6 GJ per MWh, it was equivalent to 32,188 GJ. |
| **GRI 303: Water and Effluents 2018** | | | | |
| 303-1 | Interactions with water as a shared resource | 2.4 Management of Environmental Indicators | 40-41 | |
| 303-2 | Management of water discharge-related impacts | 2.4 Management of Environmental Indicators | 40-41 | |
| 303-3 | Water withdrawal | CH2 Low-carbon Construction Materials | 34 | |
| | | 2.4 Management of Environmental Indicators | 40-41 | |
| | | 8.1 ESG Data Sheet | 109 | |
| **GRI 304: Biodiversity 2016** | | | | |
| 3-3 | Management of material topics | 8.3 Material Topic Analysis | 112 | |
| 304-1 | Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas | CH4 Biodiversity: TNFD | 54-63 | TCC had no operational site in protected areas or areas of high biodiversity value outside protected areas. |
| 304-2 | Significant impacts of activities, products, and services on biodiversity | CH4 Biodiversity: TNFD | 54-63 | TCC conducts biodiversity survey and observation of environmental changes yearly as well as environmental monitoring and survey quarterly. Please refer to TCC official website for the survey results. |
| 304-3 | Habitats protected or restored | CH4 Biodiversity: TNFD | 54-63 | |
| 304-4 | IUCN Red List species and national conservation list species with habitats in areas affected by operations | CH4 Biodiversity: TNFD | 54-63 | No TCC operational site was situated in areas of IUCN Red List species and national conservation list species. |

| Code | Disclosure | Corresponding Section | Page | Description (Synopsis included) |
|---|---|---|---|---|
| **GRI 305: Emissions 2016** | | | | |
| 3-3 | Management of material topics | 8.3 Material Topic Analysis | 113 | |
| 305-1 | Direct (Scope 1) GHG emissions | Total Climate Commitment– Aiming for Net Zero by 2050 | 08-10 | Greenhouse gases include $CO_2$, $CH_4$, $N_2O$, and HFCs; no GHG emissions of PFCs, $SF_6$, and $NF_3$. |
| | | ESG Highlight 2022 | 13 | |
| | | CH2 Low-carbon Construction Materials | 34 | |
| | | 8.1 ESG Data Sheet | 107 | |
| 305-2 | Energy indirect (Scope 2) GHG emissions | Total Climate Commitment– Aiming for Net Zero by 2050 | 08-10 | |
| | | ESG Highlight 2022 | 13 | |
| | | CH2 Low-carbon Construction Materials | 34 | |
| | | 8.1 ESG Data Sheet | 107 | |
| 305-3 | Other indirect (Scope 3) GHG emissions | Total Climate Commitment– Aiming for Net Zero by 2050 | 08-10 | |
| | | ESG Highlight 2022 | 13 | |
| | | 2.4 Management of Environmental Indicators | 34 | |
| | | 8.1 ESG Data Sheet | 107 | |
| 305-4 | GHG emissions intensity | 8.1 ESG Data Sheet | 107 | |
| 305-6 | Emissions of ozone-depleting substances (ODS) | | | No ozone-depleting substance was emitted by TCC in 2022. |
| 305-7 | Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions | 2.4 Management of Environmental Indicators | 34 | |
| | | 8.1 ESG Data Sheet | 108 | |
| **GRI 306: Waste 2020** | | | | |
| 3-3 | Management of material topics | 8.3 Material Topic Analysis | 113 | |
| 306-1 | Waste generation and significant waste-related impacts | 2.4 Management of Environmental Indicators | 42 | |
| 306-2 | Management of significant waste-related impacts | 2.4 Management of Environmental Indicators | 42 | |
| 306-3 | Waste generated | 2.4 Management of Environmental Indicators | 42 | |
| 306-4 | Waste diverted from disposal | 2.4 Management of Environmental Indicators | 42 | |
| 306-5 | Waste directed to disposal | 2.4 Management of Environmental Indicators | 42 | |
| **GRI 400: Social** | | | | |
| **GRI 401: Employment 2016** | | | | |
| 3-3 | Management of material topics | 8.3 Material Topic Analysis | 113 | |
| 401-1 | New employee hires and employee turnover | 7.6 Workplace Diversity | 105 | |
| 401-2 | Benefits provided to full-time employees that are not provided to temporary or part-time employees | 7.3 Remuneration & Benefits | 100-101 | |
| 401-3 | Parental leave | 7.3 Remuneration & Benefits | 100-101 | |
| | | 8.1 ESG Data Sheet | 110 | |
| **GRI 403: Occupational Health and Safety 2018** | | | | |
| 3-3 | Management of material topics | 8.3 Material Topic Analysis | 113 | |

| Code | Disclosure | Corresponding Section | Page | Description (Synopsis included) |
|---|---|---|---|---|
| 403-1 | Occupational health and safety management system | 7.4 Care for Employee Safety | 102-103 | |
| 403-2 | Hazard identification, risk assessment, and incident investigation | 7.4 Care for Employee Safety | 102-103 | In compliance with Article 18 of the Occupational Safety and Health Act, TCC offers procedures for laborers to report occupational hazards or danger as well as policies and procedures for them to withdraw from conditions that may lead to harm or illness, and the laborers shall be free from any unfavorable treatment as a result. |
| 403-3 | Occupational health services | 7.4 Care for Employee Safety | 102-103 | |
| 403-4 | Worker participation, consultation, and communication on occupational health and safety | 7.4 Care for Employee Safety | 102-103 | |
| 403-5 | Worker training on occupational health and safety | 7.4 Care for Employee Safety | 102-103 | |
| 403-6 | Promotion of worker health | 7.4 Care for Employee Safety | 102-103 | |
| 403-7 | Prevention and mitigation of occupational health and safety impacts directly linked by business relationships | 7.4 Care for Employee Safety | 102-103 | |
| 403-9 | Work-related injuries | CH7 Employee Benefits | 95 | |
| | | 7.4 Care for Employee Safety | 102-103 | |
| | | 8.1 ESG Data Sheet | 110 | |
| 403-10 | Work-related ill health | 7.4 Care for Employee Safety | 102-103 | |
| **GRI 404: Training and Education 2016*** | | | | |
| 3-3 | Management of material topics | 8.3 Material Topic Analysis | 113 | |
| 404-1 | Average hours of training per year per employee | 7.2 Sustainable Talent Cultivation Strategies | 97 | |
| | | 8.1 ESG Data Sheet | 112 | |
| **GRI 405: Diversity and Equal Opportunity 2016*** | | | | |
| 405-1 | Diversity of governance bodies and employees | 5.2 Board Functions | 67 | |
| | | 7.6 Workplace Diversity | 105 | |
| 405-2 | Ratio of basic salary and remuneration of women to men | | | 2022 Ratio of basic salary and remuneration of women to men |

| Employee Type | Base salary | Annual remuneration |
|---|---|---|
| Management level | 104:100 | 106:100 |
| Middle management level | 103:100 | 94:100 |
| General staff | 99:100 | 94:100 |

Note 1.Management level: Manager and above ; Middle management level: Supervisor ; General staff: All other employees not included in the management or middle management level
.2.Base salary: Monthly salary (including year-end bonus) ; Annual remuneration: Base salary and variable performance-based bonus.
3.The scope of TCC's significant locations of operation is consistent with the scope of disclosure in 2022 TCC Sustainability Report.

| | | | | |
|---|---|---|---|---|
| **GRI 413: Local Communities 2016** | | | | |
| 3-3 | Management of material topics | 8.3 Material Topic Analysis | 113 | |
| 413-1 | Operations with local community engagement, impact assessments, and development programs | | | The Hoping Plant has engaged a comprehensive communication and impact assessment of local communities, which accounted for 50% of the cement plants. |
| 413-2 | Operations with significant actual and potential negative impacts on local communities | 6.1 Special Column–Life Transition Practices | 87 | TCC has introduced the Social Return on Investment (SROI) and been accredited by Value UK. In December 2021, TCC was accredited by Value UK that for every NT$1 invested by TCC DAKA, social value worth of NT$3.54 was generated. Please refer to TCC SROI Report for relevant information. |
| | | 6.2 EARTH HELPER, the Carbon Reduction Sustainability Action | 88 | |
| | | 6.3 Hoping Carbon Reduction Parent-Child Bankbook | 89 | |
| | | 6.4 Co-prosperity with Local Communities | 90 | |

## Taiwan Stock Exchange Corporation Rules Governing the Preparation and Filing of Sustainability Reports by TWSE Listed Companies: Sustainability Disclosure Indicators for the Cement Industry

| Code | Indicator | Category | Section for Refere | Page | Note |
|---|---|---|---|---|---|
| 1 | Total energy consumption, percentage of purchased electricity, and rate of renewable energy use | Quantitative | 8.1 ESG Data Sheet | 107-108 | The total energy consumed in the organization in 2022 was 18,028,914 GJ, of which the non-renewable fuel consumption accounted for 18,027,806 GJ, and the renewable fuel consumption accounted for 1,108 GJ. The renewable fuel consumption was calculated based on the 308 MWh of renewable energy used in power production for self-consumption. Converted with 3.6 GJ per MWh, it was equivalent to 1,108 GJ, with a renewable energy percentage of 0.006%. |
| 2 | Total water withdrawal and total water consumption | Quantitative | 8.1 ESG Data Sheet | 108-109 | |
| 3 | Weight of waste generated, percentage of hazardous, and percentage of recycled | Quantitative | 2.4 Management of Environmental Indicators | 42 | No hazardous wastes at TCC |
| 4 | Number and rate of individuals subject to occupational accidents | Quantitative | 8.1 ESG Data Sheet | 110 | |
| 5 | Production of major products by product line | Quantitative | | | Clinker yield in 2022: 5,296,895.832 metric tons<br>Cement yield in 2022: 4,789,802.7340 metric tons<br>Cementitious materials yield in 2022: 5,629,943.3250 metric tons |

## Climate-related Information of TWSE- and TPEx-Listed Companies

**Risks and opportunities for companies arising from climate change and the relevant responses taken thereby**

| Item | Section for Reference | Page |
|---|---|---|
| 1. Description of the oversight and governance of climate-related risks and opportunities by the Board of Directors and the management | 5.3 Sustainability Management Framework | 70-71 |
| | 5.4 Climate Risks: TCFD | 72-76 |
| 2. Description of how the identified climate risks and opportunities impact the business, strategies, and finance of the company (in short-, medium-, and long-term) | 5.4 Climate Risks: TCFD | 72-76 |
| 3. Description of the financial impacts of extreme weather events and transition actions | 5.4 Climate Risks: TCFD | 72-76 |
| 4. Description how the identification, assessment and management of climate risks are integrated into the overall risk management system | 5.3 Sustainability Management Framework | 70-71 |
| 5. Description of the scenarios, parameters, assumptions, analysis factors and major financial impacts used if scenario analysis is employed to assess the resilience against climate change risks | 5.4 Climate Risks: TCFD | 72-76 |
| 6. Description of the content of the plan and the indicators and targets used to identify and manage physical risks and transition risks if there is any transition plan to respond or manage climate-related risks | Total Climate Commitment– Aiming for Net Zero by 2050 | 08-10 |
| 7. Description of the basis for price setting if internal carbon pricing is employed as a tool for planning | 2.2 Low-carbon Cement & Concrete | 36-37 |
| 8. Description of the activities covered, scope of greenhouse gas emissions, planning time horizons, annual progress, and other information if climate-related goals are set; description of the sources and quantity of carbon credits | TCC Sustainability Targets and Performance Tracking | 15 |
| offset or the number of renewable energy certificates (RECs) if carbon offsets or RECs are used to achieve relevant targets | GRI Standards Reference Table | 122 |
| 9. GHG inventory and assurance (also supplied in 1-1) | 8.2 TCC GHG Inventory Progress Table | 112 |

## IFRS S1

| | Disclosure / Item | Section in the Report |
|---|---|---|
| GOVERNANCE | **Governance** | |
| | **The objective of sustainability-related financial disclosures on governance is to enable users of general purpose financial reporting to understand the governance processes, controls and procedures used to monitor and manage sustainability-related risks and opportunities.** | |
| | The identity of the body or individual within a body responsible for oversight of sustainability-related risks and opportunities | 5.3 Sustainability Management Framework |
| | How the body's responsibilities for sustainability-related risks and opportunities are reflected in the entity's terms of reference, board mandates and other related policies | 5.3 Sustainability Management Framework |
| | How the body ensures that the appropriate skills and competencies are available to oversee strategies designed to respond to sustainability-related risks and opportunities | 5.2 Board Functions<br>5.3 Sustainability Management Framework |
| | How and how often the body and its committees (audit, risk or other committees) are informed about sustainability-related risks and opportunities | 5.3 Sustainability Management Framework |
| | How the body and its committees consider sustainability-related risks and opportunities when overseeing the entity's strategy, its decisions on major transactions, and its risk management policies, including any assessment of trade-offs and analysis of sensitivity to uncertainty that may be required | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | How the body and its committees oversee the setting of targets related to significant sustainability-related risks and opportunities, and monitor progress towards them, including whether and how related performance metrics are included in remuneration policies | 5.2 Board Functions<br>5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | A description of management's role in assessing and managing sustainability-related risks and opportunities | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | **Sustainability-related risks and opportunities** | |
| | **An entity shall disclose information that enables users of general purpose financial reporting to understand the significant sustainability-related risks and opportunities that could reasonably be expected to affect the entity's business model, strategy and cash flows, its access to finance and its cost of capital, over the short, medium or long term.** | |
| | A description of significant sustainability-related risks and opportunities and the time horizon over which each could reasonably be expected to affect its business model, strategy and cash flows, its access to finance and its cost of capital, over the short, medium or long term | Under Assessment |
| | How it defines short, medium and long term and how these definitions are linked to the entity's strategic planning horizons and capital allocation plans | Under Assessment |
| | A description of the current and anticipated effects of significant sustainability-related risks and opportunities on its value chain | Under Assessment |
| | A description of where in its value chain significant sustainability-related risks and opportunities are concentrated (for example, geographical areas, facilities or types of assets, inputs, outputs or distribution channels) | Under Assessment |
| | **Strategy and decision-making** | |
| | **An entity shall disclose information that enables users of general purpose financial reporting to understand the effects of significant sustainability-related risks and opportunities on its strategy and decision-making.** | |
| | How it is responding to significant sustainability-related risks and opportunities | 5.4 Climate Risks: TCFD |
| | Quantitative and qualitative information about the progress of plans disclosed in prior reporting periods | TCC Sustainable Targets & Performance Tracking<br>5.4 Climate Risks: TCFD |
| | What trade-offs between sustainability-related risks and opportunities were considered by the entity (for example, in a decision on the location of new operations, a trade-off between the environmental impacts of those operations and the employment opportunities they would create in a community, and the related effects on enterprise value) | Under Assessment |

| | Disclosure / Item | Section in the Report |
|---|---|---|
| GOVERNANCE | **Financial position, financial performance and cash flows** | |
| | **An entity shall disclose information that enables users of general purpose financial reporting to understand the effects of significant sustainability-related risks and opportunities on its financial position, financial performance and cash flows for the reporting period, and the anticipated effects over the short, medium and long term–including how sustainability-related risks and opportunities are included in the entity's financial planning. An entity shall disclose quantitative information unless it is unable to do so. If an entity is unable to provide quantitative information, it shall provide qualitative information. When providing quantitative information, an entity can disclose single amounts or a range.** | |
| | How significant sustainability-related risks and opportunities have affected its most recently reported financial position, financial performance and cash flows | Under Assessment |
| | Information about the sustainability-related risks and opportunities identified in the preceding paragraph for which there is a significant risk that there will be a material adjustment to the carrying amounts of assets and liabilities reported in the financial statements within the next financial year | Under Assessment |
| | How it expects its financial position to change over time, given its strategy to address significant sustainability-related risks and opportunities, reflecting: (i) its current and committed investment plans and their anticipated effects on its financial position (for example, capital expenditure, major acquisitions and divestments, joint ventures, business transformation, innovation, new business areas and asset retirements); (ii) its planned sources of funding to implement its strategy | Under Assessment |
| | How it expects its financial performance to change over time, given its strategy to address significant sustainability-related risks and opportunities | Under Assessment |
| | **Resilience** | |
| | **An entity shall disclose information that enables users of general purpose financial reporting to understand its capacity to adjust to the uncertainties arising from significant sustainability-related risks. An entity shall disclose a qualitative and, when applicable, a quantitative analysis of the resilience of its strategy and cash flows in relation to its significant sustainability-related risks, including how the analysis was undertaken and its time horizon. When providing quantitative information, an entity can disclose single amounts or a range.** | |
| | An entity shall disclose a qualitative and, when applicable, a quantitative analysis of the resilience of its strategy and cash flows in relation to its significant sustainability-related risks, including how the analysis was undertaken and its time horizon. When providing quantitative information, an entity can disclose single amounts or a range. | Under Assessment |
| RISK MANAGEMENT | **Risk management** | |
| | **The objective of sustainability-related financial disclosures on risk management is to enable users of general purpose financial reporting to understand the process, or processes, by which sustainability-related risks and opportunities are identified, assessed and managed. These disclosures shall enable users to assess whether those processes are integrated into the entity's overall risk management processes and to evaluate the entity's overall risk profile and risk management processes.** | |
| | The process, or processes, it uses to identify sustainability-related<br>(i) risks; and<br>(ii) opportunities | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | The process, or processes, it uses to identify sustainability-related risks for risk management purposes, including when applicable:<br>(i) how it assesses the likelihood and effects associated with such risks (such as the qualitative factors, quantitative thresholds and other criteria used);<br>(ii) how it prioritises sustainability-related risks relative to other types of risks, including its use of risk-assessment tools;<br>(iii) the input parameters it uses (for example, data sources, the scope of operations covered and the detail used in assumptions); and<br>(iv) whether it has changed the processes used compared to the prior reporting period | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | The process, or processes, it uses to monitor and manage the sustainability-related:<br>(i) risks, including related policies; and<br>(ii) opportunities, including related policies | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | The extent to which and how the sustainability-related risk identification, assessment and management process, or processes, are integrated into the entity's overall risk management process | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |

| Disclosure / Item | | Section in the Report |
|---|---|---|
| METRICS AND TARGETS | **Metrics and targets** | |
| | **The objective of sustainability-related financial disclosures on metrics and targets is to enable users of general purpose financial reporting to understand how an entity measures, monitors and manages its significant sustainability-related risks and opportunities. These disclosures shall enable users to understand how the entity assesses its performance, including progress towards the targets it has set.** | |
| | How the metric is defined, including whether it is an absolute measure or expressed in relation to another metric (such as revenue or floor space) and any sources that have been used to construct the metric | 5.4 Climate Risks: TCFD<br>TCC Sustainable Targets & Performance Tracking |
| | Whether measurement of the metric is validated by an external body and, if so, which body | BSI Taiwan |
| | Explanations of the methods used to calculate the targets and the inputs to the calculation, including the significant assumptions made and the limitations of those methods | 5.4 Climate Risks: TCFD<br>TCC Sustainable Targets & Performance Tracking |
| | The metric used | 5.4 Climate Risks: TCFD<br>TCC Sustainable Targets & Performance Tracking |
| | The period over which the target applies | 5.4 Climate Risks: TCFD<br>TCC Sustainable Targets & Performance Tracking |
| | The base period from which progress is measured | 5.4 Climate Risks: TCFD<br>Total Climate Commitment– Aiming for Net Zero by 2050 |
| | Any milestones or interim targets | 5.4 Climate Risks: TCFD<br>TCC Sustainable Targets & Performance Tracking |
| | Performance against its disclosed targets and an analysis of trends or significant changes in its performance | No significant changes in 2022 |
| | Revisions to its targets and the explanation for those revisions | No restatement of information in 2022 |
| | Explanation of the changes | No restatement of information in 2022 |
| | Explanation of the reasons for those changes, including why any replacement metric provides more useful information | No restatement of information in 2022 |
| | Provision of restated comparative figures, unless it is impracticable to do so | No restatement of information in 2022 |

## IFRS S2

| | Disclosure / Item | Section in the Report |
|---|---|---|
| GOVERNANCE | **Governance** | |
| | **An entity shall disclose information about the governance body or bodies (which can include a board, committee or equivalent body charged with governance) with oversight of climate-related risks and opportunities, and information about management's role in those processes. Specifically, an entity shall make 7 disclosures.** | |
| | The identity of the body or individual within a body responsible for oversight of climate-related risks and opportunities | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | How the body's responsibilities for climate-related risks and opportunities are reflected in the entity's terms of reference, board mandates and other related policies | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | How the body ensures that the appropriate skills and competencies are available to oversee strategies designed to respond to climate-related risks and opportunities | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | How and how often the body and its committees (audit, risk or other committees) are informed about climate-related risks and opportunities | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | How the body and its committees consider climate-related risks and opportunities when overseeing the entity's strategy, its decisions on major transactions, and its risk management policies, including any assessment of trade-offs and analysis of sensitivity to uncertainty that may be required | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | How the body and its committees oversee the setting of targets related to significant climate-related risks and opportunities, and monitor progress towards them, including whether and how related performance metrics are included in remuneration policies | 5.2 Board Functions<br>5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | A description of management's role in assessing and managing climate-related risks and opportunities, including whether that role is delegated to a specific management-level position or committee and how oversight is exercised over that position or committee. The description shall include information about whether dedicated controls and procedures are applied to management of climate-related risks and opportunities and, if so, how they are integrated with other internal functions. | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| STRATEGY | **Climate-related risks and opportunities** | |
| | **An entity shall disclose information that enables users of general purpose financial reporting to understand the significant climate-related risks and opportunities that could reasonably be expected to affect the entity's business model, strategy and cash flows, its access to finance and its cost of capital, over the short, medium or long term. Specifically, the entity shall disclose:** | |
| | A description of significant climate-related risks and opportunities and the time horizon over which each could reasonably be expected to affect its business model, strategy and cash flows, its access to finance and its cost of capital, over the short, medium or long term | Under Assessment |
| | How it defines short, medium and long term and how these definitions are linked to the entity's strategic planning horizons and capital allocation plans | Under Assessment |
| | Whether the risks identified are physical risks or transition risks. For example, acute physical risks could include the increased severity of extreme weather events such as cyclones and floods, and examples of chronic physical risks include rising sea levels or rising mean temperatures. Transition risks could include regulatory, technological, market, legal or reputational risks | 5.4 Climate Risks: TCFD |
| | **An entity shall disclose information that enables users of general purpose financial reporting to understand its assessment of the current and anticipated effects of significant climate-related risks and opportunities on its business model. Specifically, an entity shall disclose:** | |
| | A description of the current and anticipated effects of significant climate-related risks and opportunities on its value chain | Under Assessment |
| | A description of where in its value chain significant climate-related risks and opportunities are concentrated (for example, geographical areas, facilities or types of assets, inputs, outputs or distribution channels) | Under Assessment |

| | Disclosure / Item | Section in the Report |
|---|---|---|
| STRATEGY | **Strategy and decision-making** | |
| | **An entity shall disclose information that enables users of general purpose financial reporting to understand the effects of significant climate-related risks and opportunities on its strategy and decision-making, including its transition plans. Specifically, an entity shall disclose:** | |
| | How it is responding to significant climate-related risks and opportunities including how it plans to achieve any climate-related targets it has set. This shall include:<br>(i) information about current and anticipated changes to its business model, including<br>(1) about changes the entity is making in strategy and resource allocation to address the risks and opportunities identified in paragraph 12. Examples of these changes include resource allocations resulting from demand or supply changes, or from new business lines; resource allocations arising from business development through capital expenditures or additional expenditure on operations or research and development; and acquisitions and divestments. This information includes plans and critical assumptions for legacy assets, including strategies to manage carbon energy- and water-intensive operations, and to decommission carbon-energy- and water-intensive assets.<br>(2) information about direct adaptation and mitigation efforts it is undertaking (for example, through changes in production processes, workforce adjustments, changes in materials used, product specifications or through introduction of efficiency measures).<br>(3) information about indirect adaptation and mitigation efforts it is undertaking (for example, by working with customers and supply chains or use of procurement). | 5.4 Climate Risks: TCFD |
| | Information regarding climate-related targets for these plans including:<br>(i) the processes in place for review of the targets;<br>(ii) the amount of the entity's emission target to be achieved through emission reductions within the entity's value chain;<br>(iii) the intended use of carbon offsets in achieving emissions targets. In explaining the intended use of carbon offsets the entity shall disclose information including:<br>(1) the extent to which the targets rely on the use of carbon offsets;<br>(2) whether the offsets will be subject to a third-party offset verification or certification scheme (certified carbon offset), and if so, which scheme, or schemes;<br>(3) the type of carbon offset, including whether the offset will be nature-based or based on technological carbon removals and whether the amount intended to be achieved is through carbon removal or emission avoidance;<br>(4) any other significant factors necessary for users to understand the credibility and integrity of offsets intended to be used by the entity (for example, assumptions regarding the permanence of the carbon offset). | TCC Sustainable Targets & Performance Tracking<br>5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | **Financial position, financial performance and cash flows** | |
| | **An entity shall disclose information that enables users of general purpose financial reporting to understand the effects of significant climate-related risks and opportunities on its financial position, financial performance and cash flows for the reporting period, and the anticipated effects over the short, medium and long term–including how climate-related risks and opportunities are included in the entity's financial planning. An entity shall disclose quantitative information unless it is unable to do so. If an entity is unable to provide quantitative information, it shall provide qualitative information. When providing quantitative information, an entity can disclose single amounts or a range. Specifically, an entity shall disclose:** | |
| | How significant climate-related risks and opportunities have affected its most recently reported financial position, financial performance and cash flows; | Under Assessment |
| | Information about the climate-related risks and opportunities identified in paragraph 14(a) for which there is a significant risk that there will be a material adjustment to the carrying amounts of assets and liabilities reported in the financial statements within the next financial year; | Under Assessment |
| | How it expects its financial position to change over time, given its strategy to address significant climate-related risks and opportunities, reflecting:<br>(i) its current and committed investment plans and their anticipated effects on its financial position (for example, capital expenditure, major acquisitions and divestments, joint ventures, business transformation, innovation, new business areas and asset retirements);<br>(ii) its planned sources of funding to implement its strategy; | Under Assessment |
| | How it expects its financial performance to change over time, given its strategy to address significant climate-related risks and opportunities (for example, increased revenue from or costs of products and services aligned with a lower-carbon economy, consistent with the latest international agreement on climate change; physical damage to assets from climate events; and the costs of climate adaptation or mitigation); | Under Assessment |
| | If the entity is unable to disclose quantitative information for paragraph 14(a)–(d), an explanation of why that is the case | Under Assessment |

| Disclosure / Item | | Section in the Report |
|---|---|---|
| STRATEGY | **Climate resilience** | |
| | **An entity shall disclose information that enables users of general purpose financial reporting to understand the resilience of the entity's strategy (including its business model) to climate-related changes, developments or uncertainties–taking into consideration an entity's identified significant climate-related risks and opportunities and related uncertainties. The entity shall use climate-related scenario analysis to assess its climate resilience unless it is unable to do so. If an entity is unable to use climate-related scenario analysis, it shall use an alternative method or technique to assess its climate resilience. When providing quantitative information, an entity can disclose single amounts or a range. Specifically, the entity shall disclose:** | |
| | The results of the analysis of climate resilience, which shall enable users to understand:<br>(i) the implications, if any, of the entity's findings for its strategy, including how it would need to respond to the effects identified in paragraph 15(b)(i)(8) or 15(b)(ii)(6);<br>(ii) the significant areas of uncertainty considered in the analysis of climate resilience;<br>(iii) the entity's capacity to adjust or adapt its strategy and business model over the short, medium and long term to climate developments in terms of:<br>(1) the availability of, and flexibility in, existing financial resources, including capital, to address climate-related risks, and/or to be redirected to take advantage of climate-related opportunities;<br>(2) the ability to redeploy, repurpose, upgrade or decommission existing assets; and<br>(3) the effect of current or planned investments in climate-related mitigation, adaptation or opportunities for climate resilience. | 2021 TCFD Report p.26-28 |
| | How the analysis has been conducted, including:<br>(i) when climate-related scenario analysis is used:<br>(1) which scenarios were used for the assessment and the sources of the scenarios used;<br>(2) whether the analysis has been conducted by comparing a diverse range of climate-related scenarios;<br>(3) whether the scenarios used are associated with transition risks or increased physical risks;<br>(4) whether the entity has used, among its scenarios, a scenario aligned with the latest international agreement on climate change;<br>(5) an explanation of why the entity has decided that its chosen scenarios are relevant to assessing its resilience to climate-related risks and opportunities;<br>(6) the time horizons used in the analysis;<br>(7) the inputs used in the analysis, including–but not limited to–the scope of risks (for example, the scope of physical risks included in the scenario analysis), the scope of operations covered (for example, the operating locations used), and details of the assumptions (for example, geospatial coordinates specific to entity locations or national- or regional-level broad assumptions); and<br>(8) assumptions about the way the transition to a lower-carbon economy will affect the entity, including policy assumptions for the jurisdictions in which the entity operates; assumptions about macroeconomic trends; energy usage and mix; and technology.<br>(ii) when climate-related scenario analysis is not used:<br>(1) an explanation of the methods or techniques used to assess the entity's climate resilience (for example, single-point forecasts, sensitivity analysis or qualitative analysis);<br>(2) the climate-related assumptions used in the analysis including whether it includes a range of hypothetical outcomes;<br>(3) an explanation of why the entity has decided that the chosen climate-related assumptions are relevant to assessing its resilience to climate-related risks and opportunities;<br>(4) the time horizons used in the analysis;<br>(5) the inputs used in the analysis, including–but not limited to–the scope of risks (for example, the scope of physical risks included in the analysis), the scope of operations covered (for example, the operating locations used), and details of the assumptions (for example, geospatial coordinates specific to entity locations or national- or regional-level broad assumptions);<br>(6) assumptions about the way the transition to a lower-carbon economy will affect the entity, including policy assumptions for the jurisdictions in which the entity operates; assumptions about macroeconomic trends; energy usage and mix; and technology; and<br>(7) an explanation of why the entity was unable to use climate-related scenario analysis to assess the climate resilience of its strategy. | 2021 TCFD Report p.26-28 |

| | Disclosure / Item | | Section in the Report |
|---|---|---|---|
| RISK MANAGEMENT | **Risk management** | | |
| | **The processes for management of climate-related risks and opportunities used by a company are required, specifically in 6 disclosures.**<br>**Identify management process of climate risks and opportunities -> establish risk and opportunity management items -> prioritize risks and opportunities -> monitor and manage -> integrate into company's management processes and review the integration results.**<br>**To this end, the entity shall disclose:** | | |
| | the process, or processes, it uses to identify climate-related risks and opportunities | | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | The item, or items, to identify climate-related risks for risk management purposes, including when applicable:<br>(i) how it assesses the likelihood and effects associated with such risks (such as the qualitative factors, quantitative thresholds and other criteria used);<br>(ii) how it prioritizes climate-related risks relative to other types of risks, including its use of risk-assessment tools (for example, science-based risk-assessment tools);<br>(iii) the input parameters it uses (for example, data sources, the scope of operations covered and the detail used in assumptions);<br>(iv) whether it has changed the processes used compared to the prior reporting period | | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | The process, or processes, it uses to identify, assess and prioritize climate-related opportunitie | | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | Monitor and manage climate-related risks and opportunities | | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | The extent to which and how the climate-related risk identification, assessment and management process, or processes, are integrated into the entity's overall risk management process | | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| | The extent to which and how the climate-related opportunity identification, assessment and management process, or processes, are integrated into the entity's overall risk management process | | 5.3 Sustainability Management Framework<br>5.4 Climate Risks: TCFD |
| METRICS AND TARGETS | **Metrics and targets** | | |
| | **GHG emissions** | Greenhouse gas emissions–the entity shall disclose:<br>(i) its absolute gross greenhouse gas emissions generated during the reporting period, measured in accordance with the Greenhouse Gas Protocol Corporate Standard, expressed as metric tons of CO2 equivalent, classified as:<br>(1) Scope 1 emissions; (2) Scope 2 emissions; (3) Scope 3 emissions;<br>(ii) its greenhouse gas emissions intensity for each scope in paragraph 21(a)(i)(1)–(3), expressed as metric tons of CO2 equivalent per unit of physical or economic output;<br>(iii) for Scope 1 and Scope 2 emissions disclosed in accordance with paragraph 21(a)(i)(1)–(2), the entity shall disclose emissions separately for:<br>(1) the consolidated accounting group (the parent and its subsidiaries); (2) associates, joint ventures, unconsolidated subsidiaries or (3) affiliates not included in paragraph 21(a)(iii)(1);<br>(iv) the approach it used to include emissions for the entities included in paragraph 21(a)(iii)(2) (for example, the equity share or operational control method in the Greenhouse Gas Protocol Corporate Standard);<br>(v) the reason, or reasons, for the entity's choice of approach in paragraph 21(a)(iv) and how that relates to the disclosure objective in paragraph 19;<br>(vi) for Scope 3 emissions disclosed in accordance with paragraph 21(a)(i)(3):<br>(1) an entity shall include upstream and downstream emissions in its measure of Scope 3 emissions;<br>(2) an entity shall disclose the categories included within its measure of Scope 3 emissions, to enable users of general purpose financial reporting to understand which Scope 3 emissions have been included in, or excluded from, those reported;<br>(3) when the entity's measure of Scope 3 emissions includes information provided by entities in its value chain, it shall explain the basis for that measurement;<br>(4) if the entity excludes those greenhouse gas emissions in paragraph 21(a)(vi)(3), it shall state the reason for omitting them, for example, because it is unable to obtain a faithful measure; | 8.1 ESG Performance |

| Disclosure / Item | | | Section in the Report |
|---|---|---|---|
| METRICS AND TARGETS | **Transition risks** | The amount and percentage of assets or business activities vulnerable to transition risks | Under Assessment |
| | **Physical risks** | The amount and percentage of assets or business activities vulnerable to physical risks | Under Assessment |
| | **Climate-related risks** | The amount and percentage of assets or business activities aligned with climate-related opportunities | Under Assessment |
| | **Capital deployment** | The amount of capital expenditure, financing or investment deployed towards climate-related risks and opportunities | Under Assessment |
| | **Internal carbon prices** | (i) The price for each metric ton of greenhouse gas emissions that the entity uses to assess the costs of its emissions;<br>(ii) An explanation of how the entity is applying the carbon price in decision-making (for example, investment decisions, transfer pricing and scenario analysis) | 2.2 Low-carbon Cement & Concrete |
| | **Remuneration** | (i) The percentage of executive management remuneration recognized in the current period that is linked to climate-related considerations; and<br>(ii) A description of how climate-related considerations are factored into executive remuneration (also see paragraph 5(f)). | 2.2 Low-carbon Cement & Concrete |
| | **An entity shall disclose its climate-related targets. For each climate-related target, an entity shall disclose:** | | |
| | Metrics used to assess progress towards reaching the target and achieving its strategic goals | | 5.4 Climate Risks: TCFD<br>TCC Sustainable Targets & Performance Tracking |
| | The specific target the entity has set for addressing climate-related risks and opportunities | | 5.4 Climate Risks: TCFD<br>TCC Sustainable Targets & Performance Tracking |
| | Whether this target is an absolute target or an intensity target | | 5.4 Climate Risks: TCFD<br>TCC Sustainable Targets & Performance Tracking |
| | The objective of the target (for example, mitigation, adaptation or conformance with sector or science-based initiatives) | | 5.4 Climate Risks: TCFD<br>Total Climate Commitment– Aiming for Net Zero by 2050 |
| | How the target compares with those created in the latest international agreement on climate change and whether it has been validated by a third party | | BSI Taiwan |
| | Whether the target was derived using a sectoral decarbonization approach | | 5.4 Climate Risks: TCFD<br>Total Climate Commitment– Aiming for Net Zero by 2050 |
| | The period over which the target applies | | 5.4 Climate Risks: TCFD<br>TCC Sustainable Targets & Performance Tracking |
| | The base period from which progress is measured | | 5.4 Climate Risks: TCFD<br>TCC Sustainable Targets & Performance Tracking |
| | Any milestones or interim targets | | 5.4 Climate Risks: TCFD<br>TCC Sustainable Targets & Performance Tracking |

## GCCA Key Performance Indicators | 2022 GCCA Charter Compliance Verified by a Third-Party

| $CO_2$ and Climate Protection ($CO_2$ emissions & energy consumption) | | FY2020 | FY2021 | FY2022 |
|---|---|---|---|---|
| **TAIWAN** | | | | |
| Number of facilities using GCCA's Cement $CO_2$ and Energy Protocol | | 19 | 19 | 19 |
| Percentage of facilities using GCCA's Cement $CO_2$ and Energy Protocol (%) | | 100% | 100% | 100% |
| Total $CO_2$ emissions (million metric tons/year) | Scope 1 Gross emissions | 4.41 | 4.80 | 4.31 |
| | Scope 1 Net emissions | 4.41 | 4.80 | 4.31 |
| Carbon intensity of cementitious materials (kg-$CO_2$/metric ton of cementitious materials) | Specific $CO_2$ emissions-gross | 778 | 772 | 766 |
| | Specific $CO_2$ emissions-net | 777 | 772 | 765 |
| Scope 2 emissions (million metric tons/year) | | 0.202312 | 0.212407 | 0.210273 |
| Scope 3 emissions (million metric tons/year) | | 0.023 | 0.029 | 0.017 |
| Energy consumption intensity of clinker (MJ/metric ton of clinker) | | 3,242,602 | 3,307,762 | 3,471,811 |
| Proportion of alternative fuels: the ratio of alternative fuels used in kilns (as the percentage in the thermal energy consumption) | | 0.14% | 1.11% | 6.18% |
| Proportion of biofuels: the ratio of biofuels used in kilns (as the percentage in the thermal energy consumption) | | 0.13% | 0.99% | 5.67% |
| Clinker/cement ratio: the ratio of total clinker consumption to cement production calculated in accordance with the GCCA's Cement $CO_2$ and Energy Protocol | | 0.9341 | 0.9306 | 0.9305 |
| **MAINLAND CHINA** | | | | |
| Number of facilities using GCCA's Cement $CO_2$ and Energy Protocol | | 146 | 146 | 153 |
| Percentage of facilities using GCCA's Cement $CO_2$ and Energy Protocol (%) | | 100% | 100% | 100% |
| Total $CO_2$ emissions (million metric tons/year) | Scope 1 Gross emission | 31.26 | 25.87 | 20.72 |
| | Scope 1 Net emissions | 31.23 | 25.83 | 20.36 |
| Carbon intensity of cementitious materials (kg-$CO_2$/metric ton of cementitious materials) | Gross emission | 695 | 680 | 663 |
| | Specific net emissions | 695 | 679 | 651 |
| Scope 2 emissions (million metric tons/year) | | 1.26 | 1.09 | 0.85 |
| Scope 3 emissions (million metric tons/year) | | N/A | N/A | N/A |
| Energy consumption intensity of clinker (MJ/metric ton of clinker) | | 3,278,788 | 3,251,523 | 3,254,227 |
| Proportion of alternative fuels: the ratio of alternative fuels used in kilns (as the percentage in the thermal energy consumption) | | 0.18% | 1.50% | 7.97% |
| Proportion of biofuels: the ratio of biofuels used in kilns (as the percentage in the thermal energy consumption) | | 0.02% | 0.49% | 1.55% |
| Clinker/cement ratio: the ratio of total clinker consumption to cement production calculated in accordance with the GCCA's Cement $CO_2$ and Energy Protocol | | 0.8137 | 0.8067 | 0.7892 |
| **Use of Alternative Raw Materials** | | | | |
| **TAIWAN** | | | | |
| Proportion of alternative raw materials: the percentage of alternative raw materials used in the total amount of raw materials for cement and clinker production (%, by dry weight) | | 22.0% | 24.3% | 23.2% |
| **MAINLAND CHINA** | | | | |
| Proportion of alternative raw materials: the percentage of alternative raw materials used in the total amount of raw materials for cement and clinker production (%, by dry weight) | | 22.0% | 23.3% | 25.3% |

| Health and Safety | | FY2020 | FY2021 | FY2022 |
|---|---|---|---|---|
| **TAIWAN** | | | | |
| **Fatalities** | Number of fatalities, directly employed | 0 | 0 | 0 |
| | Fatality rate, per 10,000 direct employees | 0 | 0 | 0 |
| | Number of fatalities, indirectly employed (contractors & sub-contractors) | 1 | 1 | 0 |
| | Number of fatalities of third parties (not employed) | 0 | 0 | 0 |
| **Lost time injuries (LTI)** | Number of LTI, directly employed | 1 | 1 | 5 |
| | LTI frequency rate, directly employed (per 1 million hours worked) | 25.4 | 8.94 | 92.5 |
| | Number of LTI, indirectly employed (contractors & sub-contractors) | 1 | 1 | 3 |
| **MAINLAND CHINA** | | | | |
| **Fatalities** | Number of fatalities, directly employed | 0 | 0 | 0 |
| | Fatality rate, per 10,000 direct employees | 0 | 0 | 0 |
| | Number of fatalities, indirectly employed (contractors & sub-contractors) | 0 | 0 | 0 |
| | Number of fatalities of third parties (not employed) | 0 | 0 | 0 |
| **Lost time injuries (LTI)[1]** | Number of LTI, directly employed | N/A | N/A | N/A |
| | LTI frequency rate, directly employed (per 1 million hours worked) | N/A | N/A | N/A |
| | Number of LTI, indirectly employed (contractors & sub-contractors) | N/A | N/A | N/A |
| **Emissions Monitoring & Reporting** | | | | |
| **TAIWAN** | | | | |
| Percentage of "kilns of clinker production" covered by the monitoring systems for main emissions and other emissions | | 100% | 100% | 100% |
| Percentage of "kilns of clinker production" covered by the continuous monitoring systems for main emissions | NOx | 100% | 100% | 100% |
| | SOx | 100% | 100% | 100% |
| | PM | 100% | 100% | 100% |
| Total emissions (metric ton/year) | NOx | 6,164 | 6,473 | 5,427 |
| | SOx | 106 | 113 | 65 |
| | PM | 249 | 214 | 158 |
| Emission intensity per unit (g/metric ton of clinker) | NOx | 1,146 | 1,105 | 1,025 |
| | SOx | 19.6 | 19 | 12 |
| | PM | 46 | 36 | 30 |

| Emissions Monitoring & Reporting | | FY2020 | FY2021 | FY2022 |
|---|---|---|---|---|
| **MAINLAND CHINA** | | | | |
| Percentage of "kilns of clinker production" covered by the monitoring systems for main emissions and other emissions | | 100% | 100% | 100% |
| Percentage of "kilns of clinker production" covered by the continuous monitoring systems for main emissions | NOx | 100% | 100% | 100% |
| | SOx | 100% | 100% | 100% |
| | PM | 100% | 100% | 100% |
| Total emissions (metric ton/year) | NOx | 12,089 | 9,908 | 8,207 |
| | SOx | 1,293 | 997 | 1,096 |
| | PM | 827 | 569 | 317 |
| Emission intensity per unit (g/metric ton of clinker) | NOx | 314 | 313 | 320 |
| | SOx | 33 | 32 | 43 |
| | PM | 19 | 18 | 12 |
| **Community Impact** | | | | |
| **TAIWAN** | | | | |
| Coverage of Community Engagement Management Plan | | 100% | 100% | 100% |
| Coverage of Quarry Rehabilitation Plan (QRP) | | 100% | 100% | 100% |
| Number of Plants with Biodiversity Management Plan (BMP) | | 100% | 100% | 100% |
| **Water** | | | | |
| **TAIWAN** | | | | |
| Water withdrawal (thousand $m^3$) | Freshwater | 2,065 | 1,862 | 1,648 |
| Reclaimed Process Water (thousand $m^3$) | | 93 | 102 | 113 |
| Water discharge (thousand $m^3$) | Freshwater | 474 | 369 | 392 |
| Water usage (thousand $m^3$) | | 1,685 | 1,595 | 1,369 |
| **MAINLAND CHINA[2]** | | | | |
| Water withdrawal (thousand $m^3$) | Freshwater | 18,107 | 14,109 | 9,636 |
| Reclaimed Process Water (thousand $m^3$) | | 15,511 | 11,773 | 9,610 |
| Water discharge (thousand $m^3$) | Freshwater | 330 | 280 | 2,126 |
| Water usage (thousand $m^3$) | | 33,288 | 25,602 | 17,119 |

Note 1: The pertaining complete data of lost time injuries in Mainland China is expected to be disclosed in the 2023 Report.

Note 2: The data related to water use in Mainland China has been collected and disclosed since 2021.

Note 3 ： In Taiwan Area, based on the cementitious materials yield of 5,629,943 metric tons in 2022, the unit water intensity was 0.00055 million liters per metric ton of cementitious materials.
In China Area, based on the cementitious materials yield of 31,250,634 metric tons in 2022, the unit water intensity was 0.00024 million liters per metric ton of cementitious materials.

## ISAE 3000 ASSURANCE REPORT

Deloitte.

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**INDEPENDENT AUDITORS' LIMITED ASSURANCE REPORT**

The Board of Directors and Stockholders
Taiwan Cement Corp.

We have performed a limited assurance engagement on the selected subject matter information (see Appendix) in the Sustainability Report ("the Report") of Taiwan Cement Corp. ("the Company") for the year ended December 31, 2022.

**Responsibilities of Management for the Report**

Management is responsible for the preparation of the Report in accordance with Taiwan Stock Exchange Corporation Rules Governing the Preparation and Filing of Sustainability Reports by TWSE Listed Companies and Universal Standards, Sector Standards and Topic Standards published by the Global Reporting Initiative (GRI), and for such internal control as management determines is necessary to enable the preparation of the Report that are free from material misstatement.

**Auditors' Responsibilities for the Limited Assurance Engagement Performed on the Report**

We planned and conducted our work on the selected subject matter information (see Appendix) in the Report in accordance with the International Standard on Assurance Engagements 3000 (Revised), Assurance Engagements Other Than Audits or Reviews of Historical Financial Information, issued by the International Auditing and Assurance Standards Board to issue a limited assurance report on the preparation, with no material misstatement in all material respects, of the Report. The nature, timing and extent of procedures performed in a limited assurance engagement are different from and more limited than a reasonable assurance engagement and, therefore, a lower assurance level is obtained than a reasonable assurance.

We applied professional judgment in the planning and conduct of our work to obtain evidence supporting the limited assurance. Because of the inherent limitations of any internal control, there is an unavoidable risk that even some material misstatements may remain undetected. The procedures we performed include, but not limited to:

- Obtaining and reading the Report.
- Inquiring management and personnel involved in the preparation of the Report to understand the policies and procedures for the preparation of the Report.
- Inquiring the personnel responsible for the preparation of the Report to understand the process, controls, and information systems in the preparation of the selected subject matter information.
- Analyzing and examining, on a test basis, the documents and records supporting the selected subject matter information.



**Inherent Limitations**

The subject information included non-financial information, which was under more inherent limitations than financial information. The information may involve significant judgment, assumptions and interpretations by the management, and the different stakeholders may have different interpretations of such information.

**Independence and Quality Controls**

We have complied with the independence and other ethical requirements of the Norm of Professional Ethics for Certified Public Accountant in the Republic of China, which contains integrity, objectivity, professional competence and due care, confidentiality and professional behavior as the fundamental principles. In addition, the firm applies Statement of Quality Management Standard 1 "Quality Management for Public Accounting Firms" issued by the Accounting Research and Development Foundation of the Republic of China and, accordingly, requires the firm to design, implement and operate a system of quality management, including policies or procedures regarding compliance with ethical requirements, professional standards, and applicable legal and regulatory requirements.

**Conclusion**

Based on the procedures performed and evidence obtained, nothing has come to our attention that causes us to believe that the selected subject matter information in the Report is, in all material respects, not prepared in accordance with the above mentioned reporting criteria.

**Other Matters**

We shall not be responsible for conducting any further assurance work for any change of the subject matter information or the criteria applied after the issuance date of this report.

Deloitte & Touche

Deloitte & Touche
Taipei, Taiwan
Republic of China

June 28, 2023

## ISAE 3000 ASSURANCE REPORT

APPENDIX

SUMMARY OF SELECTED SUBJECT MATTER INFORMATION

| # | Assurance Subject Matter (GRI Standards/SASB[1] Standards) | Descriptions of Indicators | Corresponding Section | Applicable Criteria |
|---|---|---|---|---|
| 1. | GRI 205-3: 2016 | Confirmed incidents of corruption and actions taken | 5.9 Ethical Management | Total number of confirmed corruption incidents related to the organization, its employees or business partner. |
| 2. | GRI 302-1: 2016 | Energy consumption within the organization | ESG Highlights 2022<br>8.1 ESG Data Sheet<br>Appendix-GRI Standards Reference Table | Amount of renewable energy and non-renewable energy consumed from coal, gasoline, diesel, electricity, and natural gas. |
| 3. | GRI 303-3: 2018 | Water withdrawal | 8.1 ESG Data Sheet | A breakdown of water withdrawal from produced water, groundwater and industrial-use water. |
| 4. | GRI 305-2: 2016 | Energy indirect (Scope 2) GHG emissions | Total Climate Commitment - Aiming for Net Zero by 2050<br>8.1 ESG Data Sheet<br>Appendix-GRI Standards Reference Table | Energy indirect (Scope 2) GHG emissions. |
| 5. | GRI 305-7: 2016 | Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions | 8.1 ESG Data Sheet | Air emissions of nitrogen oxides, sulfur oxides, particulate pollutants, and volatile organic compounds. |
| 6. | GRI 306-3: 2020 | Waste generated | 2.4 Environmental Management | Total weight of non-hazardous waste (both recyclable and non-recyclable) |
| 7. | GRI 403-9: 2018 | Work-related injuries | 8.1 ESG Data Sheet | The number and rate of fatalities as a result of work - related injury of employees and workers (contractors); the number, rate and hours of recordable work-related injurie. |
| 8. | GRI 403-10: 2018 | Work-related ill health | 7.4 Care for Employee Safety | The number and rate of fatalities as a result of work-related ill health of employees and workers; the number and rate of recordable work-related ill health cases. |
| 9. | GRI 413-1: 2016 | Operations with local community engagement, impact assessments, and development programs | Appendix-GRI Standards Reference Table | Percentage of operations with implemented local community engagement, impact assessments, and development programs. |
| 10. | SASB EM-CM-000.A | Production by major product line | Appendix - Sustainability Accounting Standards Board (SASB) Reference Table | Yield of clinker, cement, and cementitious materials. |
| 11. | SASB EM-CM-110a.1 | 1) Gross global Scope 1 emissions<br>2) Percentage of emissions covered under emissions-limiting regulations | 8.1 ESG Data Sheet<br>Appendix - Sustainability Accounting Standards Board (SASB) Reference Table | Gross global Scope 1 emissions, percentage covered under emissions-limiting regulations. |
| 12. | SASB EM-CM-120a.1 | Air emissions of the following pollutants: (1) NOx (excluding N2O), (2) SOx, (3) particulate matter (PM10), (4) dioxins/furans, (5) volatile organic compounds (VOCs), (6) polycyclic aromatic hydrocarbons (PAHs), and (7) heavy metals | 8.1 ESG Data Sheet<br>Appendix- Sustainability Accounting Standards Board (SASB) Reference Table | Air emissions of nitrogen oxides (NOx), sulfur oxides (SOx), particulate pollutants, and volatile organic compounds (VOCs). |
| 13. | SASB EM-CM-140a.1 | 1) Total fresh water withdrawn, (2) percentage recycled, (3) percentage in regions with High or Extremely High Baseline Water Stress | 8.1 ESG Data Sheet<br>Appendix- Sustainability Accounting Standards Board (SASB) Reference Table | Total amount of water withdrawal from produced water, groundwater and industrial-use water, percentage recycled, and percentage in regions with High or Extremely High Baseline Water Stress. |

[1] Refers to the SASB standards formulated by the Sustainability Accounting Standards Board.

## AA 1000 ASSURANCE OPINION STATEMENT

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By Royal Charter

# INDEPENDENT ASSURANCE OPINION STATEMENT

## Taiwan Cement Corporation 2022 Sustainability Report

The British Standards Institution is independent to Taiwan Cement Corporation (hereafter referred to as TCC in this statement) and has no financial interest in the operation of TCC other than for the assessment and verification of the sustainability statements contained in this report.

This independent assurance opinion statement has been prepared for the stakeholders of TCC only for the purpose of assuring its statements relating to its sustainability report, more particularly described in the Scope below. It was not prepared for any other purpose. The British Standards Institution will not, in providing this independent assurance opinion statement, accept or assume responsibility (legal or otherwise) or accept liability for or in connection with any other purpose for which it may be used, or to any person by whom the independent assurance opinion statement may be read.

This independent assurance opinion statement is prepared on the basis of review by the British Standards Institution of information presented to it by TCC. The review does not extend beyond such information and is solely based on it. In performing such review, the British Standards Institution has assumed that all such information is complete and accurate.

Any queries that may arise by virtue of this independent assurance opinion statement or matters relating to it should be addressed to TCC only.

### Scope

The scope of engagement agreed upon with TCC includes the followings:

1. The assurance scope is consistent with the description of Taiwan Cement Corporation 2022 Sustainability Report.
2. The evaluation of the nature and extent of the TCC's adherence to AA1000 AccountAbility Principles (2018) in this report as conducted in accordance with type 1 of AA1000AS v3 sustainability assurance engagement and therefore, the information/data disclosed in the report is not verified through the verification process.

This statement was prepared in English and translated into Chinese for reference only.

### Opinion Statement

We conclude that the Taiwan Cement Corporation 2022 Sustainability Report provides a fair view of the TCC sustainability programmes and performances during 2022. The sustainability report subject to assurance is free from material misstatement based upon testing within the limitations of the scope of the assurance, the information and data provided by the TCC and the sample taken. We believe that the performance information of Environment, Social and Governance (ESG) are fairly represented. The sustainability performance information disclosed in the report demonstrate TCC's efforts recognized by its stakeholders.

Our work was carried out by a team of sustainability report assurors in accordance with the AA1000AS v3. We planned and performed this part of our work to obtain the necessary information and explanations we considered to provide sufficient evidence that TCC's description of their approach to AA1000AS v3 and their self-declaration in accordance with GRI Standards were fairly stated.

### Methodology

Our work was designed to gather evidence on which to base our conclusion. We undertook the following activities:

- a top level review of issues raised by external parties that could be relevant to TCC's policies to provide a check on the appropriateness of statements made in the report.
- discussion with managers on approach to stakeholder engagement. However, we had no direct contact with external stakeholders.
- 40 interviews with staffs involved in sustainability management, report preparation and provision of report information were carried out.
- review of key organizational developments.
- review of the findings of internal audits.
- review of supporting evidence for claims made in the reports.
- an assessment of the organization's reporting and management processes concerning this reporting against the principles of Inclusivity, Materiality, Responsiveness and Impact as described in the AA1000AP (2018).

### Conclusions

A detailed review against the Inclusivity, Materiality, Responsiveness and Impact of AA1000AP (2018) and GRI Standards is set out below:

#### Inclusivity

This report has reflected a fact that TCC has continually sought the engagement of its stakeholders and established material sustainability topics, as the participation of stakeholders has been conducted in developing and achieving an accountable and strategic response to sustainability. There are fair reporting and disclosures for the information of Environment, Social and Governance (ESG) in this report, so that appropriate planning and target-setting can be supported. In our professional opinion the report covers the TCC's inclusivity issues.

#### Materiality

TCC publishes material topics that will substantively influence and impact the assessments, decisions, actions and performance of TCC and its stakeholders. The sustainability information disclosed enables its stakeholders to make informed judgements about the TCC's management and performance. In our professional opinion the report covers the TCC's material issues.

#### Responsiveness

TCC has implemented the practice to respond to the expectations and perceptions of its stakeholders. An Ethical Policy for TCC is developed and continually provides the opportunity to further enhance TCC's responsiveness to stakeholder concerns. Topics that stakeholder concern about have been responded timely. In our professional opinion the report covers the TCC's responsiveness issues.

#### Impact

TCC has identified and fairly represented impacts that were measured and disclosed in probably balanced and effective way. TCC has established processes to monitor, measure, evaluate and manage impacts that lead to more effective decision-making and results-based management within the organization. In our professional opinion the report covers the TCC's impact issues.

#### GRI Sustainability Reporting Standards (GRI Standards)

TCC provided us with their self-declaration of in accordance with GRI Standards 2021 (For each material topic covered in the applicable GRI Sector Standard and relevant GRI Topic Standard, comply with all reporting requirements for disclosures). Based on our review, we confirm that sustainable development disclosures with reference to GRI Standards' disclosures are reported, partially reported or omitted. In our professional opinion the self-declaration covers the TCC's sustainability topics.

#### Assurance level

The moderate level assurance provided is in accordance with AA1000AS v3 in our review, as defined by the scope and methodology described in this statement.

#### Responsibility

The sustainability report is the responsibility of the TCC's chairman as declared in his responsibility letter. Our responsibility is to provide an independent assurance opinion statement to stakeholders giving our professional opinion based on the scope and methodology described.

#### Competency and Independence

The assurance team was composed of Lead auditors experienced in relevant sectors, and trained in a range of sustainability, environmental and social standards including AA1000AS, ISO 14001, ISO 45001, ISO 14064 and ISO 9001. BSI is a leading global standards and assessment body founded in 1901. The assurance is carried out in line with the BSI Fair Trading Code of Practice.

For and on behalf of BSI:

Peter Pu, Managing Director BSI Taiwan

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2023-05-11

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