



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

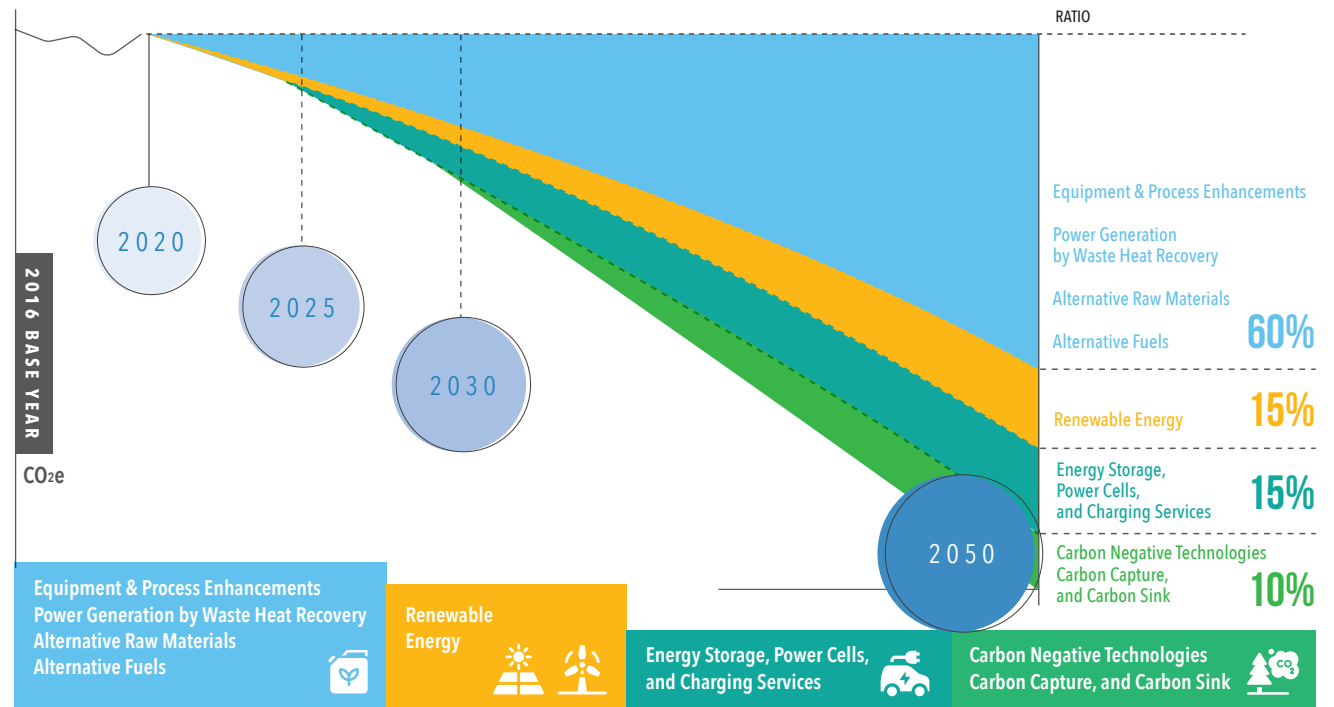
March is supposed to be a season of spring warmth and blossoms. Yet, there was an endless heavy snow in March in California, USA, drought and wildfire impacting agriculture in southern Europe, as well as flood and heat waves that led to the demise of schools of fish in Australia. Our homeland, Taiwan, also suffered from centennial droughts in less than two years. The extreme weather events are becoming ever-intense 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 CO₂ 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

Taking root and growing tall at Heping (Hoping), Hualien, for 20 years, TCC puts "sustainability" at the core of all developments. Moving forward, Hoping shall be the venue to practice low-carbon construction materials, resource recycling, and new energy business for TCC, becoming a greener and better base of greenification, eco-friendliness, and technology!



▶ 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.



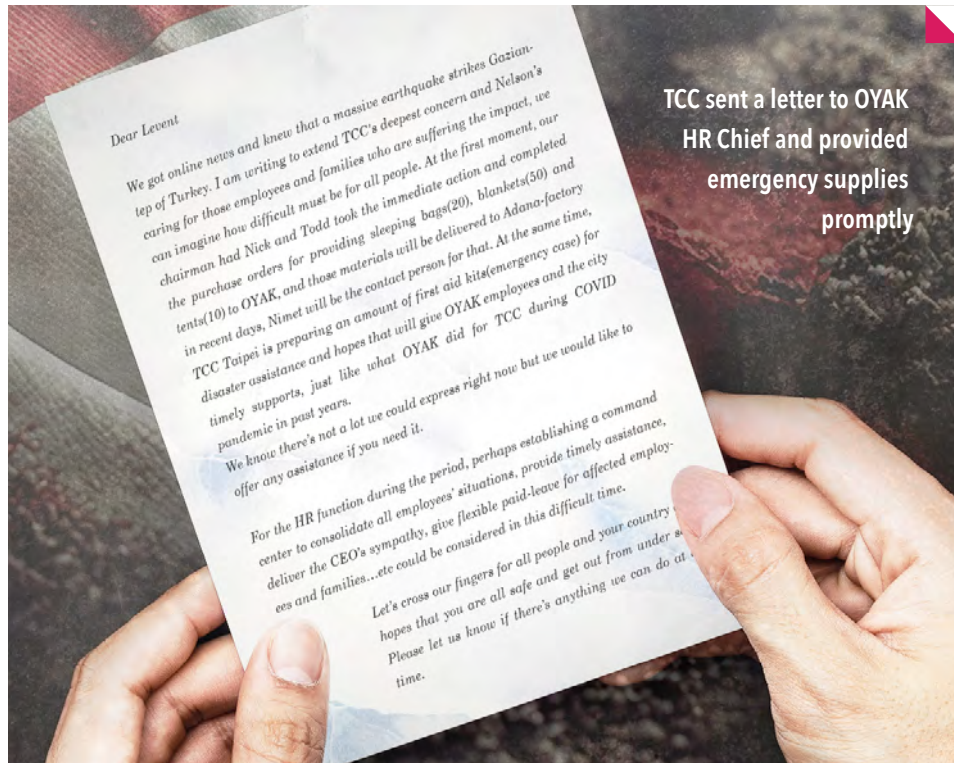
Total Care Commitment— The Massive Earthquake in Turkey and Relief to OYAK

Human civilization dawned at the care for each other.

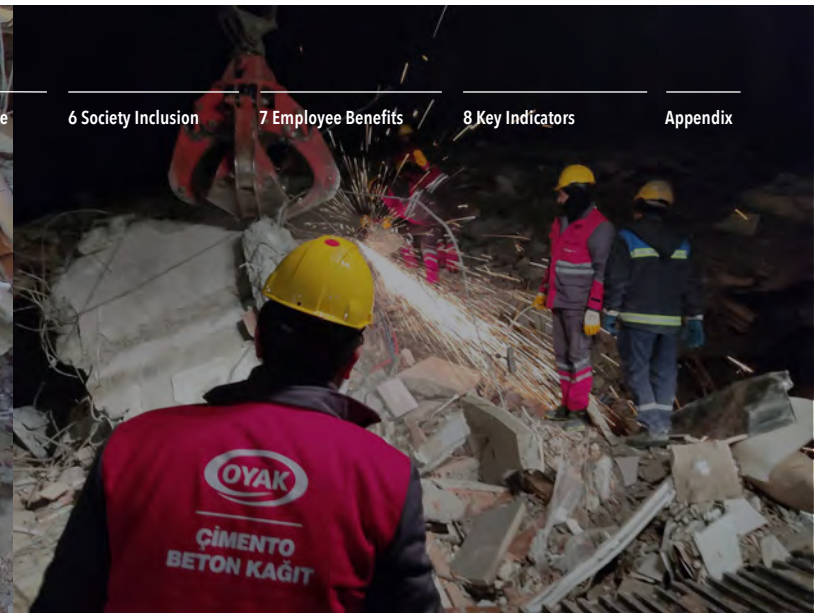
The continuation and protection of life is the ultimate goal of all things.

~ 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.

土耳其強震 物資募集 需要你的一份力!!

2月6日土耳其與敘利亞接壤地區發生芮氏規模7.8強震，目前兩國合計將近1.6萬人罹難，超過5千多棟建築物倒塌，災情慘重，土耳其也正值寒冬，夜晚低溫只剩零下幾度，當地極缺各種「禦寒物資」。

回想2019爆發新冠疫情之初，我們的合資公司OYAK公司也在第一時間為我們集團送來數萬個口罩與醫療物資，讓我們集團同仁獲得最迅速直接的幫助...同時也響應土耳其駐台辦事處的物資募集，此時我們可以對遠在土耳其的朋友/同事們伸出援手相助最迫切時刻。

台泥企業團擬號召同仁們，發起物資募集動員，我們需要下列品項：

- 「以符合零下氣溫」的外套、大衣為品項(例如：厚羽絨外套、羊毛大衣)
- 因衛生考量，土耳其駐台辦事處要求物資需為「全新」或「未使用過的」
- 有意響應捐贈之同仁請於**2/13(一)中午前**將上述物資送至各廠/關企事務股代收。
- 各廠/關企事務股請於2/14前寄至總處，統一由總處協助寄送土耳其駐台辦事處指定地點。

(箱子規格與清單依照附件辦理；捐贈單位及其他詳情請見下方土耳其駐台辦事處連結)

邀請您一同響應，與我們一起搶救土耳其及敘利亞震災人民，陪著他們拾起被震碎的生活與家園，一點一滴重建盼望與未來

TCC
台泥企業團
動員募集中

Earthquake Relief Donation



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 CO₂ /metric ton of cementitious materials
Base year: 2016 | Scope 1 & 2

Water Withdrawal Intensity
-38.54%
0.00029 Million Liters/Metric Ton of cementitious materials

Energy Productivity
+59.6%
0.522 thousand NTD/GJ

RMC Plants

Total Emissions
-8.90%
8,346.6292 Metric Tons of CO₂e
Base year: 2020 | Scope 1 & 2

Power Generation by Waste Heat Recovery | compared with 2018
+45.48%

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 CO₂e

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 CO₂e

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

Hoping EcoPort Bio Cube Coral Restoration Project

288 Corals Restored

Coral Larvae Survival Rate **100%**

Reforestation area has increased nearly **3** TIMES

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
 Sustainabilitytics "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 "Ceciliakocoon"
 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

PERFORMANCES IN 2022

2025-TARGET

2030-TARGET

2050-TARGET

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 Neutrality for Concrete
★ GHG Management Mainland China	🟢	0.690	0.651 (-11%)	0.585 (-20%)	
GHG Management Taiwan & Mainland China (Weighted Average)	▲	0.707	0.663	0.585	
Base year 2016 Unit metric tons of CO ₂ e/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	🟢	1,025 (-31%)	-50%	-70%	BACT ¹ Minimum
NO _x	🟢	12 (-40%)	-30%	BACT ¹ Minimum	
TSP	🟢	30 (-63%)	-50%	BACT ¹ Minimum	
Air Pollution Management Mainland China	🟢	320 (-45%)	-50%	-70%	BACT ¹ Minimum
NO _x	🟢	43 (-54%)	-60%	-70%	
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 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 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