the Future is worth it

2018 CORPORATE
SUSTAINABILITY REPORT

TCC's New Silk Road
Ushers in a New Age of Exploration

The Carbon Cycle
Offers a New Way of Thinking About CO_2 Economics

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Cement Kilns
Urban Purifiers

-

AI Powers
Smart Manufacturing and Operations

TCC Puts People First Since
The Most Valuable Thing is Life

Solar Wind Thermal
and Other Renewable Green Energy

TOTAL
CLIMATE
COMMITMENT

TOTAL
CARE
COMMITMENT

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Cement and The Blue Magpie

At the beginning of the 15th century, the Portuguese Prince, Henry the Navigator, founded the world's first nautical school. He was the first to use a methodical approach to gain knowledge of the mysterious and strange ocean.

Then a group of sailors including Bartolomeu Dias, Christopher Columbus, Vasco da Gama and Ferdinand Magellan also launched out to explore the unknown geographic worlds across different oceans. It is because of the adventurous spirits of this group of sailors that the human mind opened up to an unprecedented vision. Human beings were finally daring enough to understand and yearn to develop this brave new world in front of their eyes.

In October 1836, the HMS Beagle carried the young Charles Darwin to the Galapagos Islands and returned him to Falmouth, England. The species and notes that Darwin brought back enabled him to write, On the Origin of Species, the scientific edition which is considered the seed of evolutionary thought. This five-year voyage revealed and unraveled the mysterious relationship between Nature and mankind, and once again opened up another completely different perspective to view the world.

Since the Industrial Revolution, the self-awareness of the cement industry comes from its unique production methods and experiences. Now, with the advancement of technology and concepts, the cement industry has begun to reinvent itself, to become a more eco-friendly and people friendly industry. Here, I would like to share my thoughts and experiences of our efforts to explore and attempt to understand the cement industry and "the dialogue between the cement industry and nature."

There is an important book by Diane Ackerman (American naturalist and poet), The Human Age: The World Shaped by Us.

The Human Age

In this book, Ackerman vividly describes the enormous capability of humans and how we have changed the ecology of Earth on all fronts, including the environment and topography. When the world's large cities use their spider web-like roads and lights to illuminate the night of this entire planet, everyone seems to have forgotten how much cement has contributed to the human constructed landscape of our civilization.

The cement industry is the same as the agriculture, fishery, and meat and dairy industries. It uses the Earth's resources for the benefit of human civilization, but it has never been linked to higher values. Invasive, polluting, lifeless, and incompatible with beauty seem to be the values and fate of the cement industry and contribute to the misconception of the majority of the public.

Many industries have also caused damage and pollution. As time passes, some of them disappeared, and some are still irreplaceable like the cement industry.

Objectively speaking, the self-imagination of the cement industry is deeply bounded by its technology and production methods. For example, to produce cement, the industry must mine limestone, burn fossil fuels, and consume energy which generates emissions. This reality, in turn, affects the way society views this industry and the way we operate. But now, technological advancement and breakthroughs have brought about an opportunity for many changes. Cement is no longer a high power consumption and high pollution industry. In the 40 years since I joined the industry, energy consumption has been reduced by approximately two-thirds and PM and SOx emissions have improved dramatically and today are about 1% as compared to 40 years ago!

The popularization of the go-green concept, "Earth-Friendly, Protecting the Ecology" does not have a long history. Before this, humanity's abilities were relatively limited, and we also overestimated Nature's self-healing capabilities. When humans began to realize this, the Earth was already gravely injured. The disappearance of the rainforest, the destruction of Nature, the damage of the Earth, and the hole in the ozone layer have shaken all of us. Like a tidal wave, after much introspection remedial policies came pouring out. The cement industry has been attacked and labeled as working against Nature. This criticism has only been accurate only since the Industrial Revolution - but not before and not now. However, we should not dodge this issue; instead, we should reflect more, review, and take responsibility for our role in this industrial society.

The cement industry takes soil and stones from the land, transforms them, and then creates a space for the sustainable development of human civilization. This contribution is comparable to the ancient Chinese goddess, Nüwa, that created humankind and repaired the roof of Heaven. Coincidentally, Nüwa also used dirt and rocks to build humans and societies and save the Earth. Therefore we could say that Nüwa was, in fact, the first maker of cement!

Very early on, Taiwan Cement started to face environmental protection pressure and shock. With training, we started to rethink the relationship between nature and the cement industry. Taiwan Cement's actions, business philosophy and management methods are all based on the ideas of "nature first" and "benefit to society" as the true purposes of our company. We believe enterprises should establish conscious positive industrial attitudes that are beneficial to society as a whole and to carry more social responsibility when faced with the issue of coexistence with Nature.

All around the world, countries are building zero-waste cities to reduce the volume of solid waste at the source and to strengthen resource utilization and inoffensive methods of treating waste. A "zero-waste city" is the fundamental ideology of advanced urban society. The ultimate goal is to minimize the production of waste, maximize the resource utilization, and have the safest method to thoroughly treat waste that cannot be reutilized again. As a cement company, our high-temperature cement kilns are more advantageous in waste treatment as compared to incinerators. Taiwan Cement strives to do our best and continuously increase our efforts in this field.

In 2018, we saw fruitful results in our cement business:
China continued to deepen supply-side reform by executing off-peak production stoppages and setting stricter environmental protection standards. These actions resulted in an improved market balance and rising cement prices. Our overall net income in 2018 showed significant growth compared to 2017 and continues to create profit for our shareholders.

Cement production: combining clinker and cement

The combined clinker and cement production of TCC in Taiwan and Mainland China were 60.36 million tons in 2018, representing a 5% annual growth compared to 57.47 million tons produced in 2017. Ready-mix concrete (RMC) production was 4.76 million cubic meters in 2018, representing a 9.7% annual growth compared to 4.34 million cubic meters produced in 2017.

Cement sales, including cement, clinker, and ready-mix concrete:
In Taiwan, the annual total revenue was NT$17.9 billion in 2018, an on-year growth of 5.3% compared to NT$17.0 billion in 2017. Adding revenues from Mainland China, the annual total revenue was NT$92.5 billion, an on-year increase of 28.7% compared to NT$71.9 billion in 2017.

Overall, the net income attributable to shareholders of the parent was NT$21.18 billion, achieving 246% of the budget and representing an annual growth of NT$13.58 billion or 179% compared to 2017.

The consolidated net income after tax was NT$22.64 billion, achieving 205% of the budget and representing an annual growth of NT$12.32 billion or 119% compared to 2017.

For 2019, we strive to achieve the targets of 57.44 million tons of clinker (including in-house RMC plants use) and cement in sales volume from Taiwan and Mainland China and 5.55 million cubic meters of RMC in sales volume.

Lastly, one of the best ways to sustain the Earth is recycling. Taiwan Cement has not only set targets for our cement business, but we are also trying to move across a wide range of industries to integrate with other technologies to expand our horizons and to do this quickly. This allows us to continue to expand our vision. However, because the cement industry faces misconceptions from many parts of society, our foremost task is to communicate clearly with the public of the changes in the cement industry and its contributions to building society and community.

In recent years, I personally also entered the field of the tourism and hospitality industry. This is a high-end cultural and creative industry based primarily on service. Learning so-called culturalcreativity does not only refer to special literary and artistic creation, but it is also an attitude and a philosophy of management. It is the business that understands at the human level, people's feelings and desires. The hospitality industry insists on "taking Nature as the core belief" and persisting in the imagination of a better life. With this view, it is enough to teach any industry to become more humane.

The Cement Handicraft Workshop is also our new project. While still quite small in scale, it is extremely innovative. Cooperating with Hualien County Cultural Affairs Bureau, Taiwan Cement's Ho-Ping Cement Plant began hosting creative courses for elementary students, parents and community volunteers to let go of the stereotypes of cement by feeling and understanding cement up close. Participants start with mixing and stirring the cement, pouring cement into molds, shaking and removing the formed cement out of the mold and then painting it. We hope that the participants will get to know cement and understand that this is a material full of life. Not only does it breathe, but it is also warm. Cement can even be an element for creativity, such as creating cement pots for household plants. Cement is bright, lovely, and has the power to spark artistic creations. We're trying to show younger generations new understanding and impressions starting with small groups of people in different communities. Our objective is that perceptions of cement will gradually change. Taiwan Cement also began to promote these workshops in Mainland China.

It is like the Blue Magpie flying on a cement wall, let us feel life and feel the Spring.

Chairman

This is the 2018 Corporate Sustainability Report (referred to hereafter as the "Report") of the Taiwan Cement Corporation (referred to hereafter as "TCC" or the "Company"). Based on the principles of openness, transparency, and good faith, the Report faithfully discloses our efforts to communicate with stakeholders and engage in sustainable development. With this Report, we hope to support the business philosophy of "taking from society and giving back to society" and to improve future living quality in collaboration with our stakeholders.

Reporting period and disclosure boundaries

The reporting period is between January 1 and December 31, 2018. The boundary of financial performance covers both consolidated results and the individual performance of TCC in Taiwan. The business activities of TCC in Taiwan are the focus of other contents; subsidiary companies are not included in the scope of the Report, apart from some of their sustainability achievements that impact the Company's sustainable development. In consideration of information comparability, some data are disclosed together with data from the past three years. We plan to publish a new corporate sustainability report each year.

Publication date of the previous issue: June 2018

Publication date of the current issue: June 2019

Publication date of the next issue: June 2020

Reference guidelines

This report has been prepared in accordance with the "Core" disclosure principle in the GRI Sustainability Reporting Standards (GRI Standards) published by the Global Reporting Initiative (GRI). It also takes into account GRI's "Mining and Metals Sector Supplement."

Information disclosure

Information relating to 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 expressed in New Taiwan Dollars. Since 2013, public companies listed on either the Taiwan Stock Exchange or the Taipei Exchange were required to adopt the International Financial Reporting Standards (IFRS). Therefore, we disclose financial data using IFRS. Other disclosed data were collected and adjusted with commonly used data description methods and disclosed after rounding. The Report was simultaneously published on the TCC website.

Audit and verification

Internal Audits: All data disclosed or provided by individual responsible units were verified by the Report editing team. After submitting to the officers of each department, this Report was reviewed and approved by the chairman.

External Verification: The audit and consulting firm Deloitte provided an independent limited assurance of this Report using the standard for assurance in the "Assurance Engagements Other than Audits or Reviews of Historical Financial Information" announced by Taiwan's Accounting Research and Development Foundation (and based on the International Standard on Assurance Engagements [ISAE] 3000). SGS Taiwan verified and assured report compliance with the Core disclosure principle in the GRI Standards and completed verification using the Moderate Assurance in Type 1, AccountAbility 1000 Assurance Standard. Refer to the appendix for related assurance/-verification methods and results.

Contact

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TCC Official Website | CSR Section | Facebook Page

The TCC Pledge

Besides “Taiwan Cement Corporation”, TCC also stands for “Total Climate Commitment.” It represents our ambition to combat climate change as outlined in the Paris Agreement. In recent years, the Company has endeavored to reduce our environmental impact by adjusting various policies related to environmental cycle management, circular economy approval, and sustainable supply chain management. The core strategy of our environmental mangement management policy is circular economy. As we manage our business, we save energy and protect the environment. The Company also pledges to promote ecological regeneration. Comprehensive restoration plans at old mines include long-term appropriation of resources to protect endangered plants and animals, stimulate and awaken the surrounding ecosystem and maintain the diversity of nature.

TCC also stands for “Total Care Commitment.” We use our excellent human resources base as the foundation of sustainable operations. In order to enhance employee capability and quality, which are prerequisites of long-term competitiveness, we offer training in business management, factory management, and technical skills. To support our global expansion, we provide foreign language lessons. In 2018, we implemented a new performance-based quarterly bonus system that lets employees quickly benefit from strong corporate performance, further extending employee care. The Company also places great importance on social care. We are long-term supporters of programs that strengthen communities. We host cement handicraft workshops as a communication channel with stakeholders. While making handicrafts, we discuss the role of the arts and the environment in our business and cultivate new methods of teaching. Dialogue fosters a warmer link between the Company and members of the communities we operate in.

TCC is a leader in the cement industry. Our embrace of “Total Climate Commitment” and “Total Care Commitment” as core corporate objectives seeks to balance the complex relationships between humans and nature. Using the UN Sustainable Development Goals, we formulate short-, mid- and long-term sustainable development objectives for the Company to pursue, in order to promote positive coexistence with the social environment that we are part of.

Netherlands

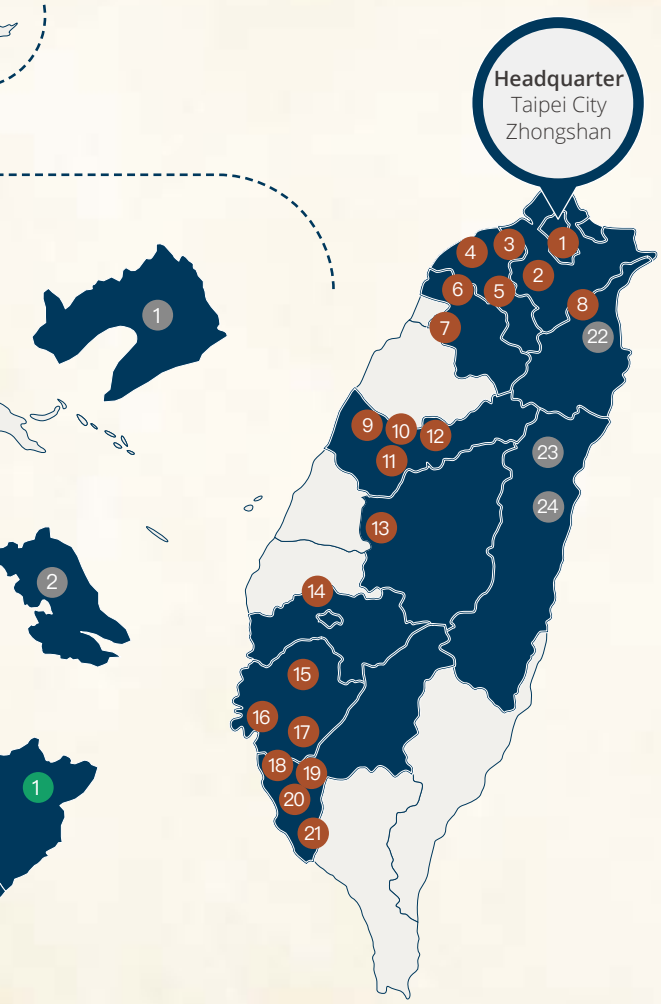
Taiwan Cement (Dutch) Holdings B.V.

TURKEY

OYAK Cement

The Company invested US$1.1 billion to enter the Turkey market. The compound annual growth rate of 5.5% in this region will serve as a strong area of growth for TCC and will provide a platform to expand globally.

TCC's New Silk Road Ushers In A New Age of Exploration



TCC is an environmental engineering company handling the complexrelationships between human civilization and nature. We have always sought to make people's lives safer and more comfortable. As external macroscopic factors change, the light, air and water that sustain us require our attention. Past management methods are insufficient. TCC, therefore, is moving beyond outdated, closed ways of thinking to approach the world with a more open mindset. With new imagination and new techniques, we are welcoming a new age of exploration. We are motivated by not only our own fate but also the fate of the next generation. The future is worth it.

60,364 Million Tonnes
2018 Sales Volume

NT$1,246 Billion
2018 Revenue

Cement Plant

1 Liaoning, 2 Jurong, 3 Shaoguan, 4 Yingde, 5 Hailo, Yingde, 6 Longshan, 7 Guigang, 8 Huihua, 9 Jingzhou, 10 Anning, 11 Baoshan, 12 Gangan, 13 Anshun, 14 Kaili, 15 Suyong, 16 Hanyuan, 17 Yingjing, 18 Chongqing, 19 Guangan, 20 Huaying, 22 Suao, 23 Hoping, 24 Hualien

Premix Plant

1 Taipei, 2 Tucheng, 3 Guishan, 4 Taoyuan, 5 Bade, 6 Zhongli, 7 Hsinchu, 8 Yilan, 9 Taichung, 10 Shengang, 11 Dadu, 12 Taiping, 13 Caotun, 14 Chiayi, 15 Shanhua, 16 Anping, 17 Tainan, 18 Luzhu, 19 Kaohsiung, 20 Nan tzu, 21 Siaogang

Grinding Station

1 Fuzhou, 2 Liuzhou, 3 Naxi

Key Sustainability Achievements In 2018

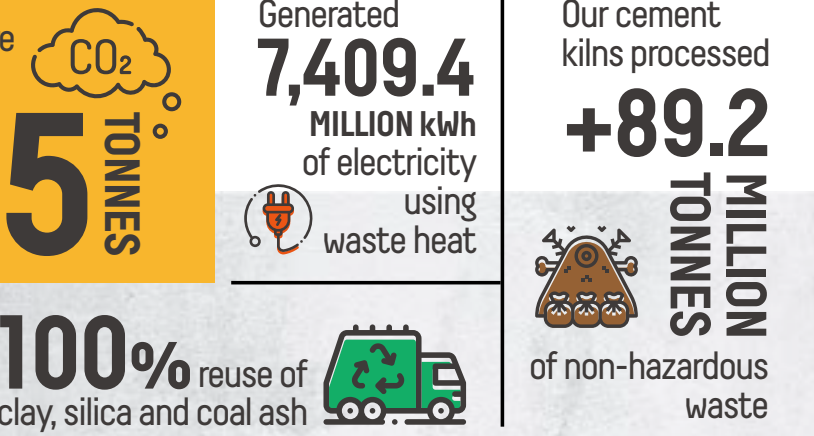
Accumulated capture of CO_2 reached **+355 TONNES**

Generated **7,409.4 MILLION kWh** of electricity using waste heat

Our cement kilns processed **+89.2 MILLION TONNES** of non-hazardous waste

Water consumption at concrete plants decreased by **-27%**

100% reuse of clay, silica and coal ash



Emissions decreased by **-3%** compared to 2017

Employee education and training **NT$25 MILLION**

Disaster relief in Hualien **NT$20 MILLION**

Volunteer participation increased by **+262%**

Preserved DNA samples of **33,008** taxa of plants

Planted close to **10,000 TREES** as part of mine ecological reclamation

The Suao and Hoping plants **ISO 14046** Water Footprint certification

◎ Accumulated to 2018 (or ratio to 2017)

TCC Sustainable Development Blueprint and 2030 Goals

Strategy	2018 Performance Highlights	2030 Goals	SUSTAINABLE DEVELOPMENT GOALS
Asia's largest carbon capture and use experimental plant	Invested NT$150 million in researching calcium-looping technology for CO_2 capture. The Board of Directors approved a NT$600 million budget towards launching the construction of a new-generation plant. Our accumulated capture of CO_2 through 2018 surpassed 355 tonnes.	Commercialization by 2025 Capture of more than 450,000 tonnes of carbon annually by 2030 Benchmark reduction of 30% emissions by 2030	9 11 12 13
The world's only member of the concrete industry to achieve circular economy certification	Obtained BS8001 Circular Economy certification Our cement kilns processed 892,000 tonnes of non-hazardous waste, an increase of 77,800 tonnes compared to 2017.	Continue to help the government and industries solve complex waste management issues. Process 1.57 million tonnes of waste by 2030.	11 12 13
Taiwan's first combo wind and solar power plant	By the end of 2019, we will finish construction of Taiwan's first large-scale combo wind and solar power plant, located in Changhua Coastal Park. It will have a generation capacity of 10.1 MW solar power and 7.2 MW wind power, and is forecast to generate 32,890,000 kWh of electricity in its first year.	Become a major operator in the renewable energy field. By 2025, we plan to build renewable energy plants with a total generation capacity of 300 MW or above.	7 9 13
Taiwan's only water footprint certification in the concrete industry	The Suao Plant achieved ISO 14046 Environmental Management – Water Footprint certification. Our cement plants used 2.79 million cubic meters of water, a decrease of 27% compared to 2017.	Continue to save water, with a goal of reducing consumption by 1% annually.	13
The highest rate of raw material reuse in Taiwan'scement industry	Achieved 100% reuse of clay, silica and coal ash	Continue to search for more types of alternative raw materials to reduce our environmental impact.	12 13
Asia's leading investment in protected species	Preserved the DNA of 33,008 taxa of plants	Preserve tropical and subtropical plants from around the world to support biodiversity. By 2027, we plan to preserve 40,000 taxa of plants.	13 15 17
Launch community dialogues	Held the first cement handicraft workshops to showcase the creative capacity of cement and use culture and creativity as a new mode of dialogue between the Company and society	Continue to increase the depth and variety of communication channels between the Company and general public. By 2020, we hope to reach people 1 million times.	4 11
Cultivate a sustainable workforce	Invested NT$25 million in employee education and training. Total education and training hours reached 118,650.	Continue to invest NT$25 million annually towards employee education and training. Expand employee development courses to build a workforce with an international vision.	4 11
Nurture an international vision	Promoted our first on-site foreign language classes. Foreign teachers come weekly to TCC to teach English, creating a strong English study environment.	Cooperate with international course providers or language training centers to further enhance the English language ability of our staff.	4
Expand programs that give back to local communities	More than 500 people participated in volunteer activities in Taiwan and Mainland China. Total volunteer hours reached 2,000.	Continue to invest NT$6 million annually in the Cement Academy program	1 3 4 10 11

2018 Honors

International certifications

Achieved management level in the CDP

The first member of the cement industry to achieve BS8001 Circular Economy certification

The first member of Taiwan's cement industry to achieve ISO 14046 Environmental Management – Water Footprint certification

Became a member of the Global Cement and Concrete Association (GCCA)

The first traditional industry enterprise in Taiwan to become a Task Force on Climate-related Financial Disclosures (TCFD) supporter

Recognition of sustainability achievements

Won Global Views Corporate Social Responsibility & Social Enterprise awards for traditional industry leadership and eco-friendly practices

Won a Commonwealth Magazine Excellence in Corporate Social Responsibility Top 100 award. Ranked first among manufacturing companies and 17th among large-scale enterprises.

Honored for Green Leadership by the Area Responsible Enterprise Awards (AREA)

Won Best Carbon Disclosure by CR Reporting Awards (CRRA)

Won a Taiwan Top 50 Corporate Sustainability Award, a Top 50 Platinum Corporate Sustainability Report Award, an English Report Award, a Circular Economy Award, a Climate Leader Award, and two Social Inclusion Awards

The "Future Is Worth It" corporate image video won awards for Best Video, Most Outstanding Operations and Governance, Outstanding Filming Creativity, Outstanding Original Screenplay, Outstanding Social Inclusion, and Outstanding Environmental Resources from the Golden Eagle Micro-Movie Festival.

Won an award for being one of Taiwan's best emerging global brands

Taiwan Ratings gave our Long-Term Issue Credit a rating of twA+

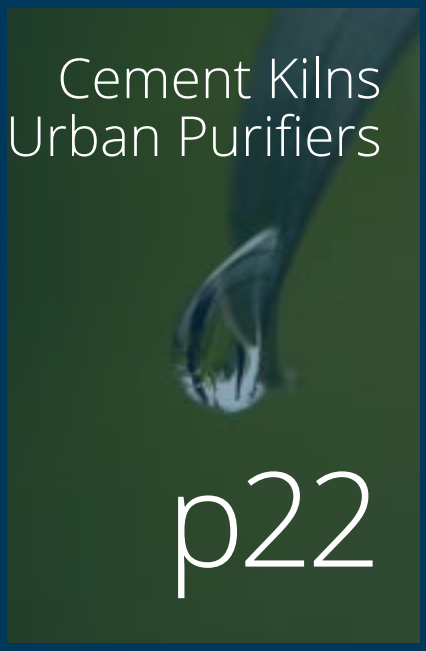
Won a Silver Energy Savings Award from the Ministry of Economic Affairs

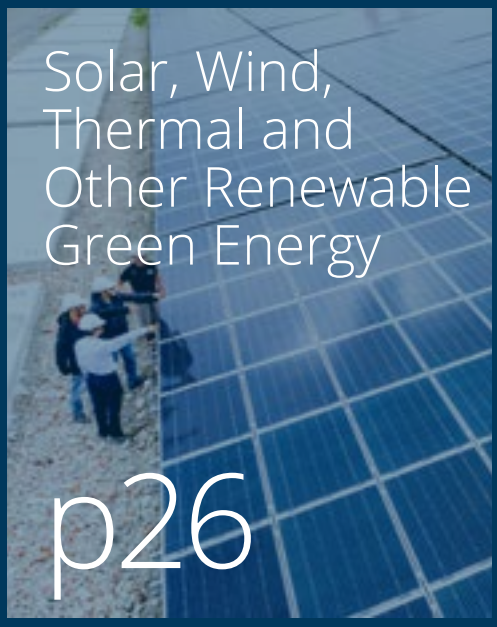
Received two stars for circular economy waste management following an assessment by the Environmental Protection Administration

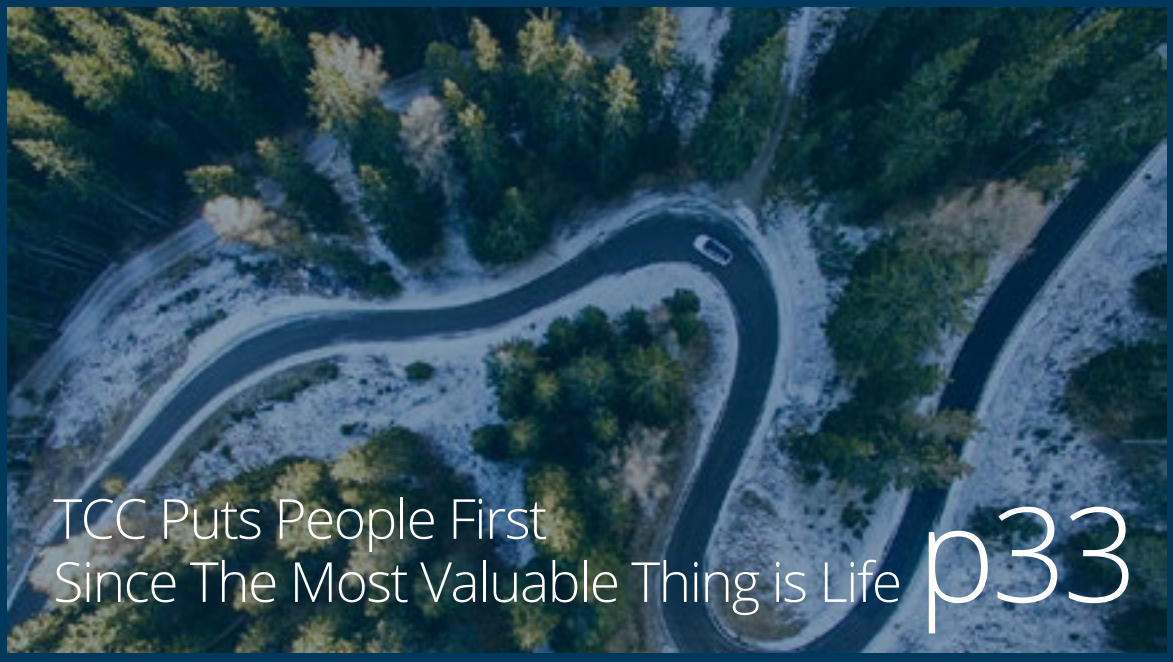
Low Carbon Products

Gold Green Label Cement: Type I Portland Cement passed Environmental Labeling requirements

Silver Green Label Cement: Type I and Type II Portland Cement passed Environmental Labeling requirements







The Carbon Cycle Offers A New Way of Thinking About CO_2 Economics

The Company is fully committed to carbon capture. We invest in this area not to fill our pockets but rather to support this country and society. It is an investment in humankind.

In 2019, extreme climate events topped the list of the World Economic Forum's most likely global threats for a third consecutive year. The United Nation's Intergovernmental Panel on Climate Change warned in 2018 that the pace of global warming could potentially become uncontrollable, threatening the very existence of humankind. To contain global warming, by 2030 the world needs to reduce carbon emissions by 45% (using 2011 as a base year). Carbon capture and storage (CCS) is generally recognized as one of the most feasible methods of achieving this, which is why TCC has actively sought to develop related technologies during the past 10 years.

A Core Cement Ingredient Contributes To A Natural Carbon Capture Method

Since 2011, the Company has cooperated with the Industrial Technology Research Institute to promote the Calcium-Looping Technology for CO_2 Capture Pilot System Collaborative Research Project and the CCS Technology Verification and Maximization Research Project. Limestone, an ingredient for producing cement, is used as the absorbent for its low cost, high absorbency, and ease of access. After losing its absorbency, the limestone is reused for cement making or for producing precipitated calcium carbonate (PCC), which has even higher value. This dual benefit of limestone decreases the costs of both CO_2 capture and cement production, producing a win-win situation.

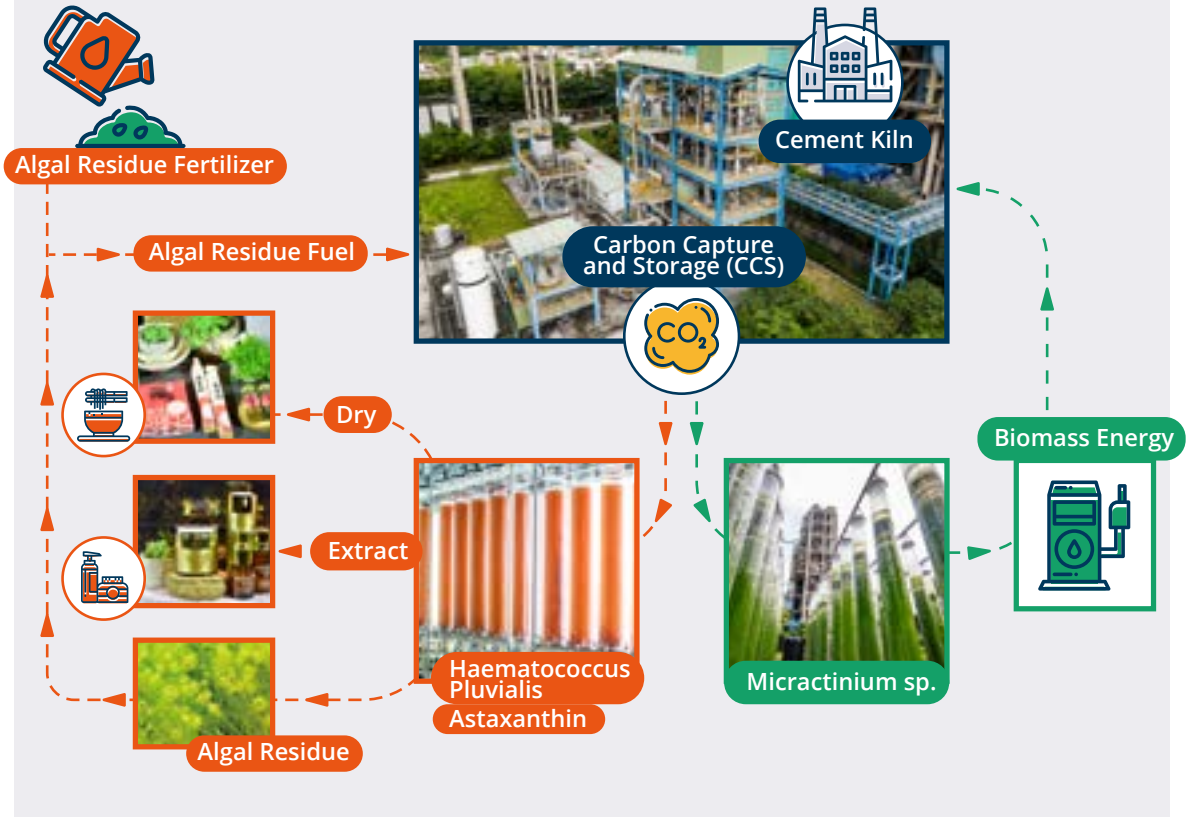
A Pioneering Microalgae Carbon Sequestration System

Hoping Power Plant and Hoping Cement Plant were designed with circular economy concepts in mind. Coal ash and plasters, two combustion byproducts of the power plant, are delivered to the cement plant to be used as raw materials of cement making. Calcium looping capture technology, microalgae low-carbon energy technology, and the use of carbon in the production of astaxanthin products combine to produce innovative carbon capture, utilization and storage (CCUS) methods. In the future, this carbon circular economy model will be applied to high-carbon emitting industries, such as petrochemicals, power generation, and steelmaking to achieve greater synergy.

After capturing carbon, we wanted to find ways to reuse it. We chose a microalgae fixation system due to microalgae's capacity to store 10 times as much carbon as trees and the capacity of the microalgae

Haematococcus pluvialis to use CO_2 as a photosynthetic fuel source to produce the valued chemical astaxanthin. Just 1 kg of Haematococcus pluvialis is able to absorb 1.83 kg of CO_2. The added value of the astaxanthin turns carbon capture into a circular economy process. The Company also cooperated with the Industrial Technology Research Institute's Biomedical Technology Laboratory to research the antioxidant benefits of astaxanthin. Our data showed that the astaxanthin content in Haematococcus pluvialis is 250 times higher than krill and 6,000 times higher than salmon. Preliminary results suggest that astaxanthin has the potential to slow cell ageing, repair retinal damage, and possibly even prevent the onset of Alzheimer's disease.

CCUS



A Pioneering, Innovative B2B Solution For Reducing Carbon Emissions

Astaxanthin-rich Haematococcus algae is a natural health food nurtured by carbon. Seeking ways to use the algae without extracting the astaxanthin, the Company cooperated with the Industrial Technology Research Institute to produce algae infused, carbon cutting green noodles. Seven bowls of noodles are equivalent to eliminating enough carbon to fill a soccer ball, and 15 bowls are equivalent to eliminating the amount of carbon that a tree removes from the atmosphere in one day.

Produced using ground up mountain peppers and other seasonings from Hualien, the tasty buckwheat noodles make an original, carbon-cutting gift. Besides direct consumption of the algae, we used energy efficient methods to extract the astaxanthin and vacuum packed it to preserve its antioxidant properties. We also developed a series of astaxanthin-rich astarose products that use environmentally friendly packaging which ensures that not a single drop of the product is wasted.

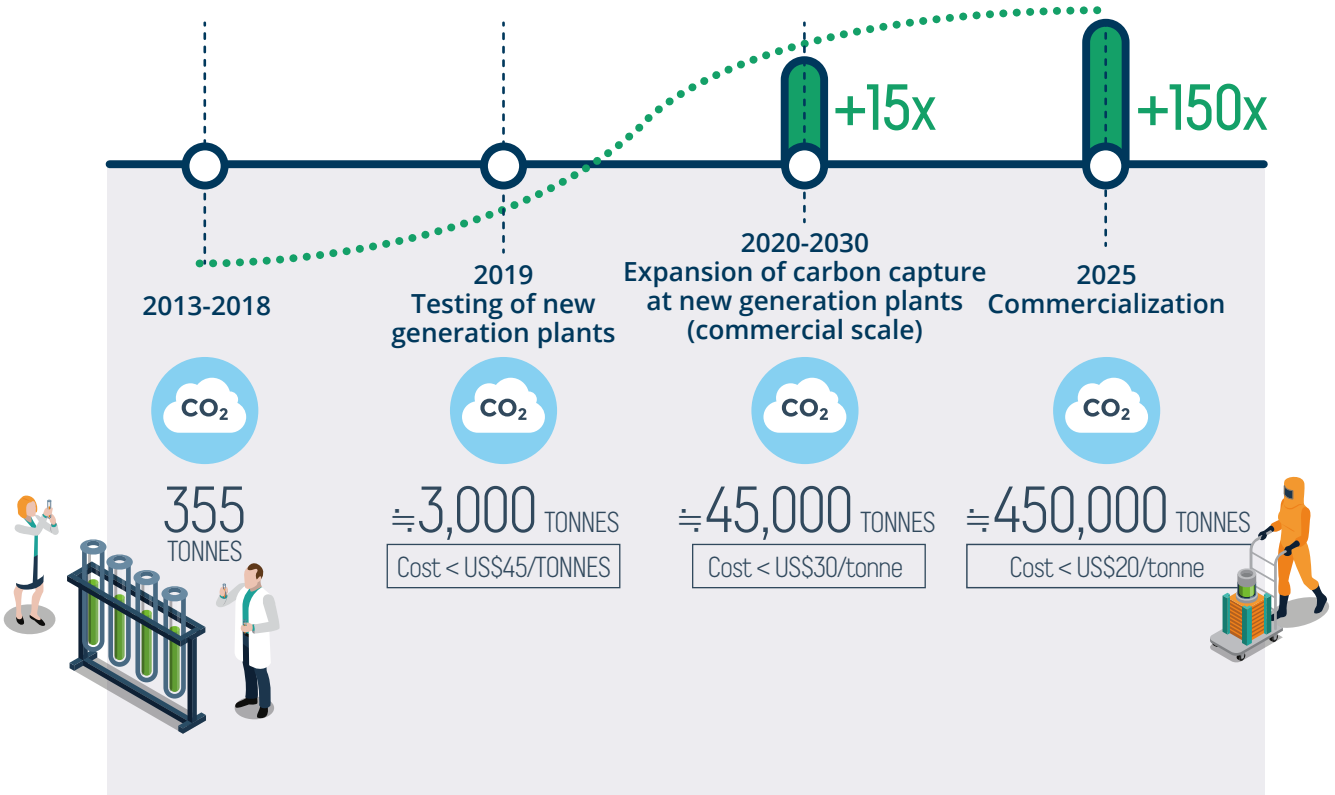
"Believe me, the food that our cement plant produces won't bust your teeth. Everyone should be able to enjoy this creative cuisine,"

said TCC Chairman An-ping Chang, eliciting laughter from the people in attendance at a carbon cycle news conference. As the head of a leading cement enterprise, Chang uses every opportunity he gets to promote industry's responsibility towards sustainability and achievingharmony with nature. He ensures accountability towards the environment, society, and economic development. We make these products not for commercialization or mass production. Rather, we hope to spark discussion about carbon reducing actions. Global carbon cutting needs go far beyond what a single cement plant or enterprise can achieve, which is why we appeal to everyone to join our effort. The Company firmly believes that for the cement industry to be sustainable, it must progress from traditional B2B communication models to an all-new, B2C mode of communication. By spreading to food and other consumer products, we make people think about the carbon cycle in their everyday life.

Commercializing TCC's Carbon Cycle Economic Plan by 2025

In order to expand CCUS, the Company launched a pilot project that will turn Hoping Plant into a model of carbon capture. Using our electrostatic precipitator experience and taking into account the dimensions of each cement plant, we determined the proper design and length of the suction devices in the calcining and carbonation sections of the plant then calculated and verified the suitable flow channel and pressure loss, Reynolds number, and wind velocity of the equipment. This unique design and technology won a 2014 R&D 100 Award, obtained several patents, and was a winner at the 13th National Innovation Awards and the 5th National Industrial Innovation Awards.

The Company also promotes astaxanthin products. At internal monthly meetings, we track carbon capture results and utilization techniques, including R&D and user satisfaction towards astaxanthin products. In 2018, we launched astaxanthin-rich red algae buckwheat noodles, which are infused with red algae cultivated using captured carbon. Additional health products in our "asta series" make carbon capture and use a part of everyday life. In 2019, the Board passed a NT$600 million budget to launch the next stage of our carbon cycle green economy plan. The plan calls for expanding the scope of carbon capture microalgae cultivation at next generation plants based on market planning. We forecast that we will increase carbon capture 15-fold, from 3,000 tonnes a year in 2018 to 45,000 tonnes by 2023. In 2025, when we commercialize carbon capture, we forecast annual capture of 450,000 tonnes of carbon.



Cement Kilns – Urban Purifiers

Cement kilns, which are typically kept at a temperature of above 1,300 degrees Celsius, can break down dioxins and incinerate common waste products. They are a core part of our sustainable strategy.

> Nature abides by the idea that "all living things are part of the circle of life. They multiply without end." People, however, created a new word: "waste." Before people, this word was not part of nature. The volume of waste that we generate is already testing the boundaries of what nature can hold. It is becoming impossible to restore ecological systems that are damaged by waste. In the past, economics viewed sunlight, air, water and energy as limitless resources. Now however, we realize that we have to protect these resources, and reduce the waste that threatens them. To contribute, TCC is relying on a core cement industry tool: the cement kiln. We are using our kilns to process waste in order for "cement, energy, and environmental protection" to join together. The value cycle this creates will enable living things to continue to multiply without end.
> In the future, TCC will become an eco-solution service provider. Incorporating new green production methods into our factories will reduce our environmental impact and bring greater sustainability to the world we live in.

Linear economy vs. circular economy

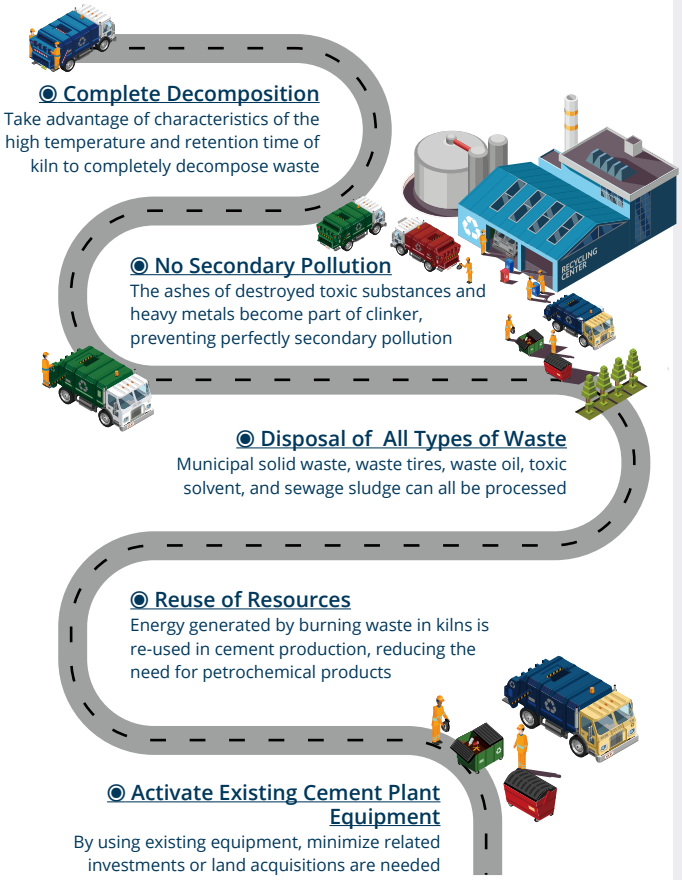
In the natural world, "waste" does not exist. Resources and energy that living creatures use to sustain themselves, including the matter that makes up these organisms, cycle through nature to nourish the land and seas and contribute to the growth of other living creatures. In the past, society adopted a linear economy model. Raw materials were extracted from the earth, modified to make a product then transported to consumers for use.

When consumers no longer wanted the product, they threw it away. A circular economy, on the other hand, breaks free of this way of thinking by finding new uses for discarded materials. Taking a lesson from nature, the circular economy should make “zero pollution” and “zero waste” prerequisites of economic design and operations. The vision is for the output of every item to become an input of something else.

TCC’s Role In The Circular Economy

In the spirit of the circular economy, the Company endeavors to develop waste processing systems. Using technology, we hope to enable resources, raw materials, and waste to return to and endlessly cycle through the industrial supply chain. These systems will significantly decrease energy and resource consumption and reduce the generation of waste.

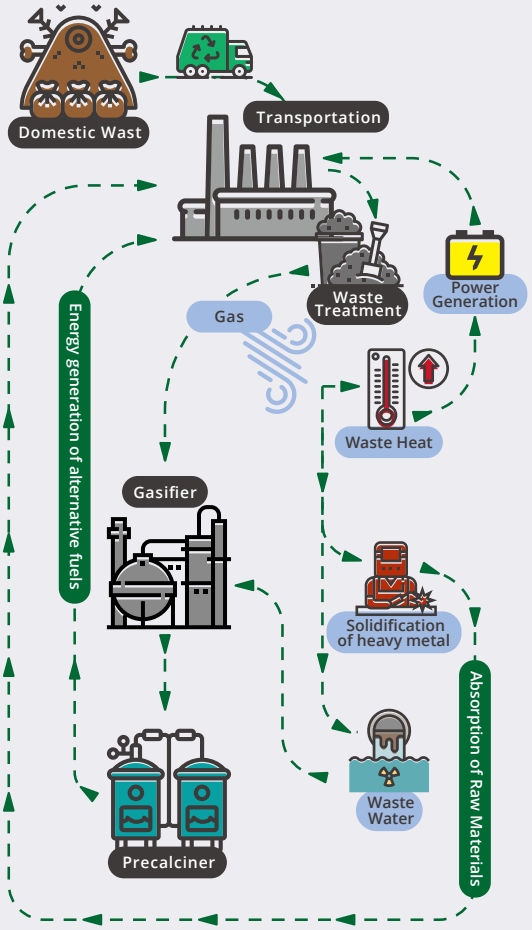
In recent years, the Company has actively promoted using cement kilns to incinerate waste. This method has five major advantages:



Cement production requires high temperatures. Rotary cement kilns reach 1,600 degrees Celsius or higher. Fuel and raw materials that are added to kilns are either completely incinerated or made into finished or semi-finished products.

According to a 2010 European Union report on energy efficiency and CO2 emissions, using discarded tires as fuel produces 0.244 – 0.325 kg of CO2 for every kg of clinker produced. That is better than the amount of CO2 produced using sub-bituminous coal (0.384 kg) or brown coal (0.404 kg).

International-scale cement plants help local environmental agencies to reduce waste by burning discarded tires. At the same time, the plants lower their carbon footprint. This model has the dual benefit of reducing environmental impact and processing a common form of waste.TCC uses a new dry process cement kiln system to aid waste processing. This raises resource reuse and minimizes the impact of emissions.



2018 TCC Circular Economy Performance

For years, the Company has processed waste from many industries, including optoelectronics, semiconductors, papermaking, water purification, chemical engineering, and steelmaking. Our collaborative waste processing offers a comprehensive waste management solution.

In 2018, the Company processed 892,000 tonnes of general waste, underscoring our strong contribution towards implementing circular economic principles. In the future, we will use short-, mid- and long-term plans to gradually expand our waste management capacity and fulfill our mission of becoming a sustainable company.

+89.2 TONNES

of waste Helped to process nontoxic waste

100%

All nontoxic waste weprocessed was reused to make cement

0%

We did not produce any industrial waste

Types of Waste Processed

Optoelectronics
Waste Category
CaF2 sludge

Waste-to-Energy Plant
Waste Category
Combustible waste

Public Construction
Waste Category
Construction waste dirt

Water Purification
Waste Category
Water purifying plant sludge

Electricity
Waste Category
Coal ash
Desulfurized gypsum

Steelmaking
Waste Category
Reduced slag from electric arc and steelmaking furnaces*

Chemical Engineering
Waste Category
Desulfurized MgO inorganic sludge
Coal ash

*Within the scope of the "Waste Reuse Management Act"

Anshun Plant

Anshun Plant Launches The City's First Cement Kiln Municipal Waste Processing Line

In cooperation with the local government, the Company wrote a new chapter in the history of Anshun's ecological development when we drafted plans in 2013 for Anshun Plant to build the city's first cement kiln municipal waste processing line. The project required an investment of NT$80 million to build a new dry process cement kiln system. In 2014, the Guizhou Committee and Guizhou provincial government named it a key private construction project. The waste processing line began operations in December 2015, not only utilizing heat energy from waste but also achieving the goals of reducing emissions and reusing resources.

Regulators in Anshun approved the new Anshun Plant waste processing line, finding that emissions of all pollutants were below national air pollution standards. The line is able to process 200 tonnes of municipal waste per day and 66,000 tonnes of waste per year. In May 2016, China's Ministry of Industry and Information Technology and Ministry of Finance named Anshun Plant a model for processing solid wastes by cement plants. The line's success ushered in a new age of TCC's green development cooperation with local governments in Mainland China.

Harmless Waste Treatment at Yingde Plant

In 2018, the Company's Yingde Plant helped government authorities in Mainland China to process 8,480 tonnes of illegally dumped solid waste (waste mineral oils and distillation residue). The waste in this emergency case was processed based on government direction and expert analysis to ensure that we prevented further pollution.

At Guigang Plant, Mainland China's Largest Cement Kiln Processes Solid Waste

As society and the economy develop, the volume of solid waste in Mainland China is growing. Industrial solid waste generation is increasing by 7% a year. It reached 3.556 billion tonnes in 2017, despite a composite utilization rate of only 46.94%. These data suggest that the challenges the environment faces will become more severe as development continues. On May 6, 2014, Mainland China's National Development and Reform Commission, Ministry of Science and Technology, Ministry of Industry and Information Technology, Ministry of Finance, Ministry of Ecology and Environment, Ministry of Housing and Urban-Rural Development, and National Energy Administration released views on promoting the processing of municipal and industrial waste by factories during production. The ministries wanted to reduce resource consumption andcemissions volume while solving spare capacity issues at cement plants and in other traditional industries. The goal was to achieve a green transformation while assuming social responsibilities and protecting the environment. The benefit to corporate image would strengthen relations between businesses and cities.

Due to Mainland China's push for industry to protect the environment and to support the advance of socioeconomic development through civil construction projects, in 2018 the Guigang Plant helped the local government to process 2,168 tonnes of solid waste. It also entered into a cooperative agreement to process sludge from a waste management plant that processes 300,000 tonnes of toxic waste and 30,000 tonnes of wastewater in the area around Huanglian Gorge, Huanglian Township, Tantang District, Guigang. This was the largest contract for a cement plant to process toxic waste in Mainland China. Work will be carried out at Guigang's four dry process cement kiln lines. In February 2019, Guigang environmental officials completed the environmental impact review and rated the project as excellent. The Company appreciates the support shown by the local government and will begin construction on the new facilities in 2019.

Solar, Wind, Thermal and Other Renewable Green Energy

The Company always puts people first. We work hard to ensure clean water and air for nature and the people who live among it.

As the global population rises and developing countries undergo industrialization, the demand for energy continues to reach new historic highs. Since the start of modern, commercial oil drilling in the 1850s, people have drilled more than 135 billion tonnes of oil. Traditional energy sources, however, are limited, which makes the development of renewable energy a vital area of concern. TCC is actively working to make inroads. Besides building waste heat power generation systems, we are investing in solar, wind, and geothermal power generation. We are analyzing other renewable energy forms in order to further strengthen our influence in this area.

TCC's green energy brand logo is a composite of three Greek letters: "Delta Δ, Sigma Σ, and Theta Θ." "Delta" symbolizes the three main renewable energy sources that the Company is pursuing: solar, wind, and geothermal. "Theta" represents capacity and temperature and describes how new developments that TCC is making in green energy are fueled by nature. "Sigma," used in mathematics for a summation, represents the sum effort of the Company's development

of various types of green energy. The logo represents TCC's green energy promises: to use natural resources to generate power and to not harm the environment when building power generation equipment.

TCCGE

TCC Renewable Energy (solar, wind, geothermal)

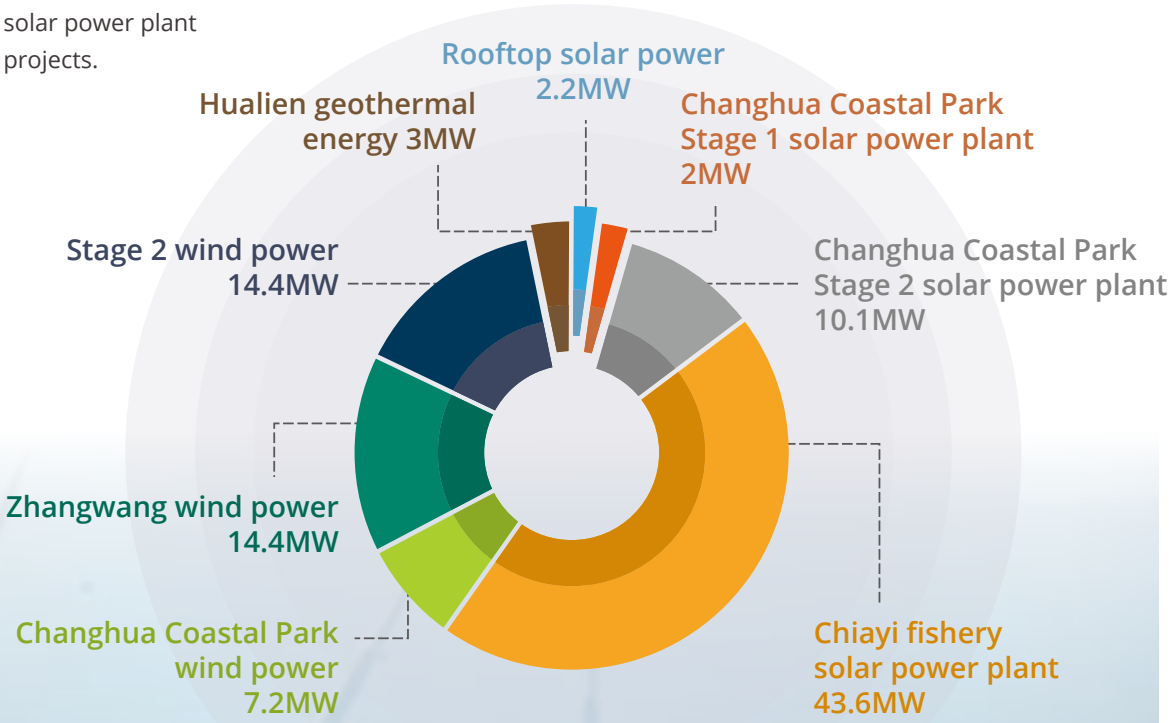
In June 2018, we built our first ground solar power plant. The plant uses two-sided solar cells in order to also capture light that is reflected off the ground, adding another 3 – 7 % of power generation capability and raising land-use efficiency.

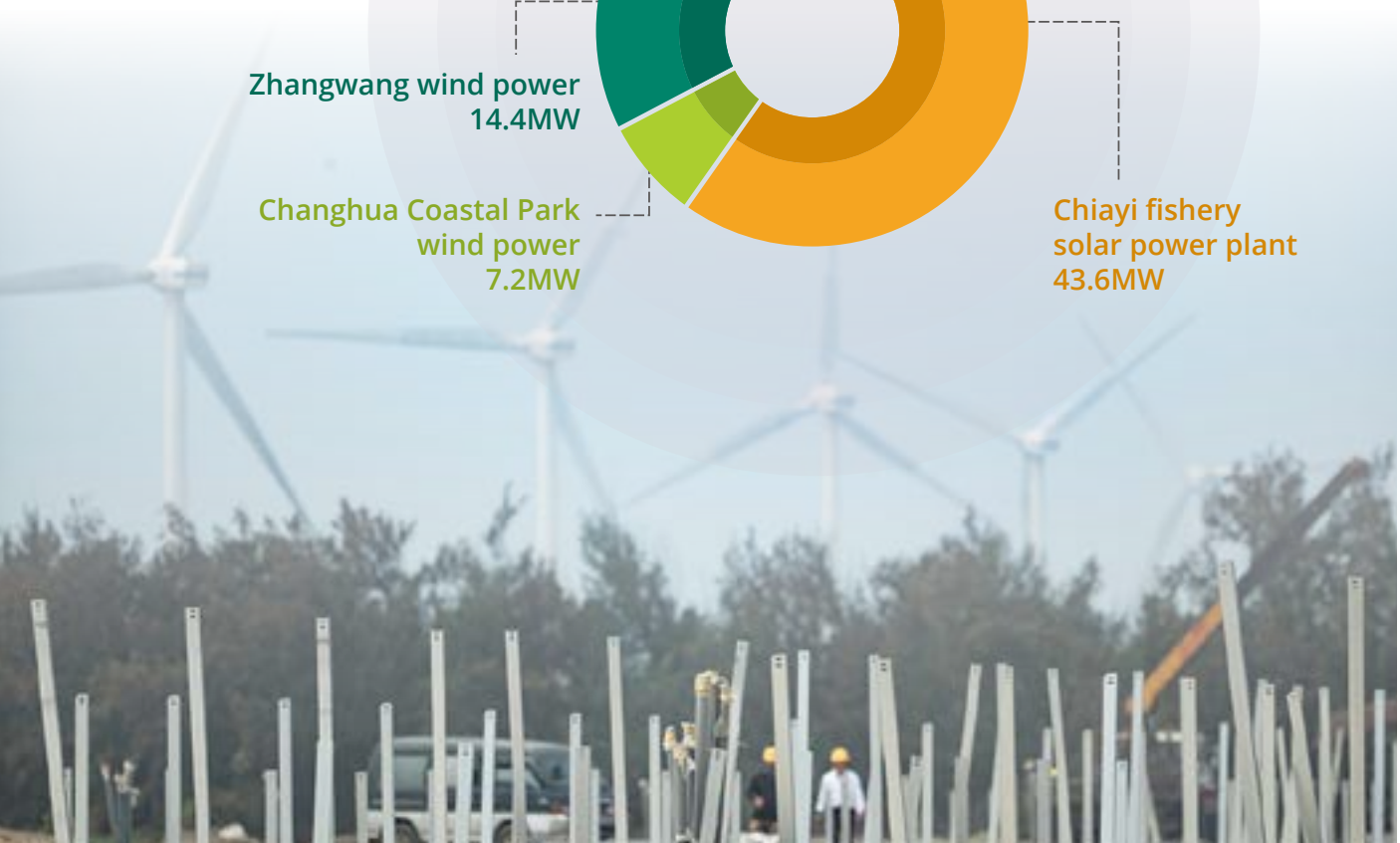
At the end of 2019, the Company will complete 10.1 MW of solar power installations and 7.2 MW of wind power installations at the Changhua Coastal Industrial Park. It will be Taiwan's first large-scale combo wind and solar power plant. The Company is highly committed to raising land-use efficiency. Originally, the land was evaluated as only being able to support 20 MW of solar power installations. Adding wind power to the equation, we expect to be able to install more than 70 MW of electricity capacity at the site.

The Company also contributes to developing joint fishery – solar power plant projects.

We plan to add solar power installations totaling more than 60 hectares to fisheries in Chiayi County. The fisheries can continue operating and even make use of the power benefits to improve their operating environment and obtain favorable land rent terms. Solar power operators benefit from having land available to build large-scale solar plants. By enabling the government to simultaneously support fisheries and solar power operators, this program creates a winning situation for all parties involved.

Geothermal energy is another focus of the Company. Initial plans call for building a 3 MW geothermal plant in eastern Taiwan. We completed feasibility studies using exploration geophysics and held several explanatory meetings, so more people understand renewable energy and support its development.





TCC Renewable Energy Distribution

In the early stages, the Company's renewable energy installations will reach a capacity of about 100 MW and produce close to 200 million kWh of energy per year, equivalent to a reduction of approximately 110,000 tonnes of carbon. By 2025, we expect to manage renewable energy plants with more than 300 MW of capacity. By 2030, our goal is to become a global renewable energy operator.

Contributing towards this goal is a new joint venture that the Company entered into with Turkey's largest cement company, OYAK, in 2018. Turkey has excellent solar power potential and abundant geothermal reserves. The future has enormous development opportunities.

TCC will continue to penetrate the renewable energy field in order to promote the continued reuse of resources. The future is worth it!

AI Powers Smart Manufacturing and Operations

Among traditional industry members, TCC was one of the leading enterprises in Commonwealth Magazine's 2019 Industry 4.0 Survey. This achievement recognizes how we are integrating AI into our core business groups. Using machine learning, we are more ready to respond to quickly changing variables, such as changes to international coal fuel and crude oil prices. This means better control over our operations and a strong supply vs. demand balance that is an important part of achieving a circular economy.

> As the global economy rapidly develops, the populations of cities are likewise quickly growing. Major metropolises, and the challenges they bring, are emerging. Enterprises are adapting by adopting more intelligent operation methods. Besides creating economic value, these changes are leading to more environmental sustainability and new industrial opportunities. The Company began to adopt smart operational methods on our manufacturing lines in 2000. For continuous sampling, robotic arms replaced humans. Computer systems assess the status of each line, conduct analyses, and determine causes of malfunctions. These advances help us maintain higher quality products.

Taiwan's Only AI Cement QC Robot

"Every two hours, our robotic arms get a sample from the cement production line then return to the laboratory." The central control room of TCC's Hoping Plant has two robotic arm QCX systems that are directly linked to our production lines. They serve four primary functions: 1. Automatically gather samples from the production lines then deliver them to the laboratory, 2. Automatically prepare samples, 3. Automatically conduct fluorescence spectrophotometry, 4. Adjust ingredient ratios based on test data. The systems provide feedback, including material shortages or production line deficiencies. Based on conditions, they calculate new mixtures. Compared to other cement operators that manually draw samples, our system is a key part of how we maintain more stable, higher quality products.

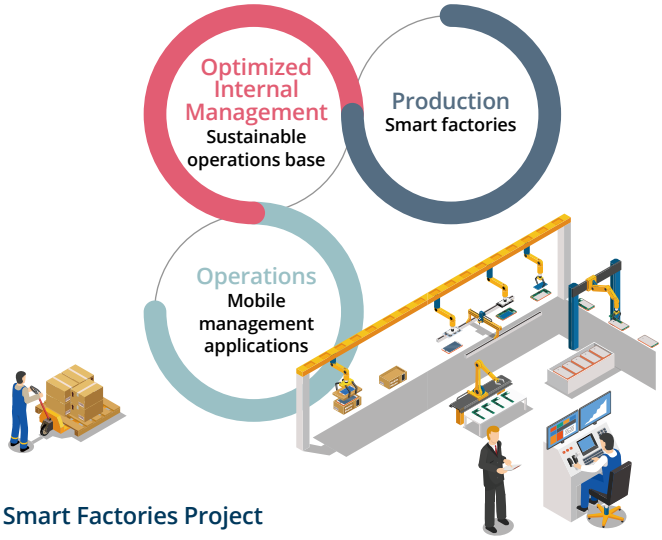
Smart management began on the Company's Management dashboard wall in 2016 with the addition of the latest IT tools and innovative cement marketing models. Big data drawn from 10 years of operations, Internet of Things (IoT) cloud platforms, and digital wearables combine to offer informatization managementplatforms. Executives and supervisors receive updated data to make fast decisions.


戰情牆

Victory is a thousand miles away - TCC's Management dashboard wall

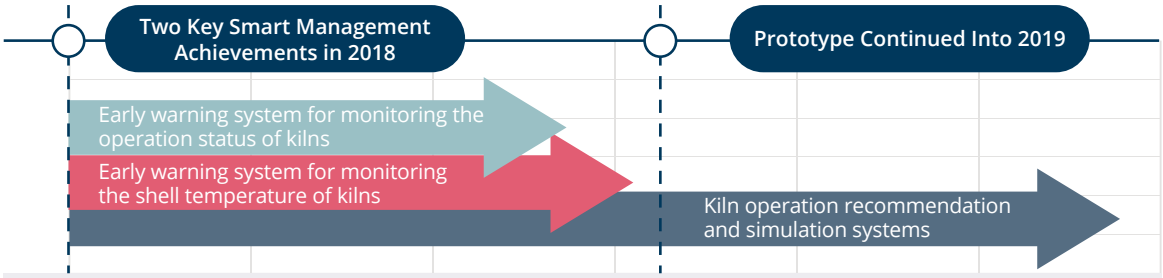
The Administration Division, located on the 12th floor of the Taiwan Cement Building, features a TV wall with eight 55-inch panels. It connects big data covering production, sales, human resources, R&D, and finances to promote communication and aid production and sales management. It even shows unloading progress at docks and a red, yellow and green light system to signal potential hazard levels. Using this information, management is better equipped to make fast responses. In 2018, we added carbon emissions to the wall so that we can continuously monitor emissions intensity and volume to use as a reference for our internal carbon pricing mechanism.

Thus far, the Company's smart management optimizes production, operations, and internal management. It is using data, information, and knowledge to build intelligence and evolve. In the future, we will have the capacity for complete smart management.



Smart Factories Project

Using IoT, we continuously monitor plant production equipment. Using sensor data, we raise production safety and operational efficiency through extract, transform, and load techniques (ETL); data visualization; feature engineering; data analysis; machine learning; and data modeling. As we lower learning curves, we also reduce human error risks.



◉Through the monitoring and analysis of running temperatures of kiln's bearings, the system will send out a warning in advance to alert staffs to inspect the area. It largely raises running efficiency and reduces operational risks.
◉ROC Patent I621822

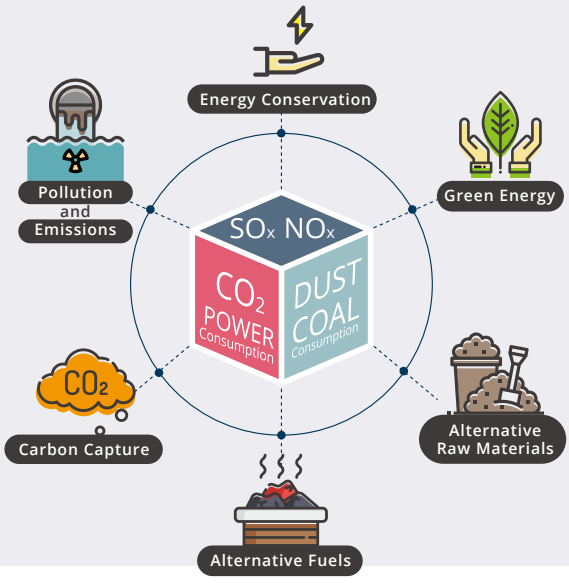
◉A monitoring and analysis system that checks for uniformity of the kiln's temperature. The system continuously monitors the temperature of the kiln's shell and warns of any irregularities. It has been proven to efficiently assit on-site workers be more aware of the possibility of abnormal shell temperature and thus able to prevent catastrophe.
◉ROC Patent I620908

◉Using deep learning, instead of conventional method, this system will learn from historic data to model chemical reactions that take place during kiln operations.
◉Combined with domain knowledge, the prototypes of kiln operationrecommendation and simulation systems will lay the foundation ofcomprehensive smart production.

Mobile Management Tracks Six Key Environmental Indicators

The Company has developed mobile management platforms with various warning functions over the past several years. One such platform, MyGUI Mini, is an executive mobile management platform that provides warnings and keeps top managers informed of plant monitoring data at all times and places. In accordance with the Company's commitment to meeting carbon reduction goals contained in the Paris Agreement, the platform also serves as a tool for tracking six key environmental indicators. The Company's performance in relation to these indicators is reflected in theremuneration of top management and the bonuses of general workers, thus serving as an incentive for stronger management and implementation. We use related data to carry out vertical and horizontal comparisons of the smart systems of each plant and to make intelligent modifications to manufacturing parameters. The resulting energy conservation and emissions reduction lower environmental impact.

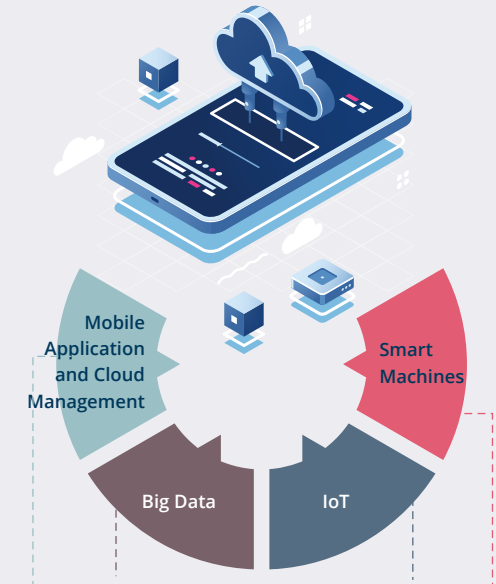
6 Key Environmental Indicators and Applications



Smart Operations and Sustainable Development

In the spirit of developing Industry 4.0, the Company uses AI to manage economic, environmental, and social risks. We continue to optimize internal management and improve corporate management methods in order to build a foundation for sustainable operations.

4 Key Technological Applications



- Web-based and mobile Management dashboard
- Digital signatures and approvals
- Electricity generator monitoring
- Mobile patrol inspection and supervision monitoring
- Mobile supervision for coal inventory and quality
- Smart equipment diagnostics
- Smart manufacturing and production control
- Data analysis of production QA
- Early warning system for monitoring the shell temperature of kilns
- Early warning system for monitoring the operation status of kilns
- Oil and coal price forecasts
- GPS shipment tracking and management
- Automatic monitoring of environmental indicators
- Specimen collecting for the plant species preservation center

Due to the challenges posed by severe changes to the global environment, sustainable development will only be possible for industries that adapt to natural trends. When TCC uses smart management to raise our competitiveness, we also must consider development of the cement industry as a whole. The industry faces geographic, environmental, and supply chain limitations. We must cooperate with other members of our supply chain. Synergy is needed in order to raise the industry's overall operational efficiency. The Company therefore will use smart management for everything from raw material acquisition to product transport. We will adjust supply to meet demand as we seek to bring additional value to this traditional industry.

TCC Puts People First Since The Most Valuable Thing Is Life

Do not limit yourself to existing views. Use a more open approach to looking at the world. TCC is on a global course, eager to start a new age of exploration.

> A company's culture should be human-oriented. When prioritizing material topics and drumming up support around core values, we stay true to our corporate culture. Every quarter we hold a town hall meeting at Company headquarters to promote two-way labor-management communication, inform employees of the organization's business policy, listen to employee suggestions, and strengthen identification with the organization and staff cohesion. We arrange keynote speeches for employees to better understand organizational development, helping them to grow and flourish together with the Company.

Cultural Heritage

The Company's corporate culture has three key traits: cultural heritage, continued growth, and open mind. Cement has played an important role in human development. It is a manmade rock that is hard and lasting like natural stone yet also fast and easy to shape. It fulfills people's dreams of having a home and safe shelter and is a sign of civilization.

Cement, however, is not an eternal answer. When 7.5 billion people are subsisting on the limited resources of this planet and enjoying modern living, the environmental problem becomes both severe and complicated. At this turning point in human history, the evolution of TCC likewise cannot simply follow a straight line. Over time we have spared no effort to explore the complicated

relationships between human beings and their lifestyles and human beings and their living environment in terms of land, geology, air, and water. TCC has always been a believer and a practitioner of the circular economy. Following this philosophy will enable Taiwan to escape the difficult fate of resource depletion.

The concepts of “zero waste, zero pollution, and zero emissions” form a core belief of TCC and describe the direction we need to move in order to become a sustainable business. The Company constantly searches for solutions to the complicated relationships between people and the natural environment. For us, life is always the top consideration. In the future, we will continue to show nature the respect it deserves as we explore new channels for people and nature to coexist in a sustainable way.

Continued Growth

With markets changing in the blink of an eye, self-study and breakthroughs are needed to maintain corporate competitiveness. TCC therefore puts a great deal of effort towards nurturing an internal environment that supports growth and study. A combination of lectures and courses, small classes, dynamic courses, on-site visits, interactive lessons and other teaching methods strengthens study benefits. The Company regularly gathers feedback and suggestions on course benefits, lesson practicality, and teacher performance. The overall satisfaction rate in 2018 was 93%.

In 2018, besides opening all-new training classrooms to provide students with a more comfortable, professional environment to learn, TCC invested NT$25 million in education and training. This shows that we are sparing no effort in building a corporate culture that supports the continued growth of employees and shared success.

Open mind

Creative people who have an open-minded approach support corporate innovation. The Company therefore places great importance on the views of our employees. Each quarter we hold a town hall meeting to promote two-way communication between general employees and top management and a labor-management meeting to further strengthen communication. At the same time, to guarantee employee rights and interests and strengthen communication, the Company set up an employee opinion mailbox and hotline. Employees use these channels to express their opinions and suggest ways that the Company can improve. These outlets foster meaningful participation in the Company's operations.

2018 Employee Communication Mechanism Performance

Communication Mechanisms	Performance
Labor-management meetings	In 2018, each plant held four labor-management meetings. The meetings offered a formal channel for management and labor to reach a consensus on important issues. Ongoing opportunities for two-way informal communication strengthen employee identification towards the Company.
Factory union	Held four labor-management meetings in 2018 to protect labor rights.
Town Hall Meeting	The Company chairperson personally oversees town hall meetings, which are held in Cement Hall of the Company headquarters. Employees from outside the Taipei area and overseas subsidiary units join via video links. The meetings provide insight into the Company's overall operational performance and policy directions. Employees are encouraged to raise questions, and direct answers are provided. In 2018, the Company held five town hall meetings.
Employee welfare meeting	Each year the Company holds at least four employee welfare meetings to show care towards employees' lifestyles and seek high-quality, comprehensive welfare measures. In 2018, there were four employee welfare committee meetings.
Employee Opinion Mailbox (Designated Email/Hotline)	These channels are not subject to time or location constraints and offer an immediate channel for employees to communicate their views. In 2018, the employee opinion mailbox received zero emails.

Cultural values

When everyone keeps an open mind, both the teacher and student benefit and innovation flourishes. TCC abides by this principle. We encourage continued growth so that our employees can help the Company fulfill our corporate mission. Corporate heritage, meanwhile, propels our employees forward. The Company will continue to invest in human capital to build a corporate culture with an international vision. We will encourage everyone to cooperate to explore all the possibilities that corporate sustainability brings.

CHAPTER 01

Management of Sustainability Topics

IN THIS SECTION

Management of Sustainability Topics

The views of stakeholders are very important to TCC. Through communication and engagement, we learn what sustainability issues are most critical. Using the Global Reporting Initiative (GRI) Standards for sustainability reporting and industrial characteristics as references, we develop and distribute questionnaires to gain insights into stakeholders' views. We consider the degree of impact of each sustainability issue on the Company's operations to determine the issues that are of the greatest significance to the Company, so we can prioritize their handling and respond in a manner that fulfills stakeholders' expectations.

Process for evaluating stakeholders and material issues

1_Identifying Stakeholders

Managers of each department fill out a stakeholder identification questionnaire to determine the importance of each stakeholder to the Company and identify key stakeholders.

2_Determining Areas of Concern

After identifying key stakeholders, the Company distributes questionnaires or conducts interviews to understand stakeholders' views and areas of concern. We then analyze the degree of attention for each issue.

3_Evaluating Impacts on Business Operations

Company management analyzes each issue to determine the degree of impact on Company operations.

4_Establishing Material issues

Based on stakeholders' areas of concerns and the degree of impact of each issue on Company operations, we produce a chart showing the degree of importance of each issue.

5_Issue Analysis

We examine each material issue and compare it to the previous year's major areas of concern to confirm that each issue corresponds to the Company's sustainability objectives and overall goals.

1.1 Stakeholder Communication

Based on the AA1000 Stakeholder Engagement Standard, TCC systematically identifies and groups stakeholders based on five attributes: responsibility, influence, tension, diverse perspectives, and dependency. In terms of order of importance from top to bottom, stakeholder groups include government agencies, employees, shareholders & investors, customers, suppliers & contractors, industry associations, local communities, and non-governmental organizations (NGOs).

To ensure effective and sound communication with stakeholders, TCC arranges diverse communication channels and discloses information openly and transparently. We place great importance on stakeholders' expectations. Areas of concern identified through communication with stakeholders become strategic operational reference points that optimize our promotion of sustainable development and implementation of corporate social responsibility. We believe that smooth and effective communication channels with stakeholders are needed to capture market, economic, social, and environmental trends, thus grasping the insights necessary to improve operations and create value.

Stakeholders	Significance to TCC	Areas of Concern	Communication Methods and Frequency
Government Agencies	An important stakeholder concerned with TCC's economic, environmental, and social legal compliance, and also influences industrial development and policy implementation.	◎Information disclosure and transparency ◎Pollution and emissions management ◎Energy use, energy conservation, and carbon emissions reduction ◎Low carbon circular economy ◎Environmental protection and ecological conservation	◎Regular updates to the Company website and the Market Observation Post System (MOPS) ◎Participation in interviews, seminars, and conferences ◎Correspondence via documents and mail
Employees	A key stakeholder and the Company's most important human capital, our employees are the main reason for the Company's ongoing breakthroughs and innovations.	◎Sustainability strategies ◎Legal compliance ◎Ethical management ◎Workplace safety and employee care ◎Risk control	◎Annual performance evaluations and interviews ◎Quarterly labor-management meetings, union meetings, employee welfare meetings, and town hall meetings ◎Monthly departmental meetings ◎Explanation and signing of the Code of Ethics ◎Responding to employee opinions (employee mailbox) ◎Promotion of human rights policies, including internal announcements and disclosures on the Company website
Shareholders/investors	The stakeholder that is the main financing source of TCC and that is most concerned with the operational performance and sustainable developments of the Company.	◎Operational performance ◎Sustainable strategies ◎Information disclosure and transparency ◎Ethical management ◎Environmental protection and ecological conservation	◎The annual general meeting (AGM) of shareholders ◎Regular updates on the Company website and MOPS ◎Replies to shareholders' questions by phone or mail
Customers	A stakeholder that cares about the quality of TCC's products and services as well as its operations, compliance and environmental protection efforts.	◎Energy use, energy conservation and emissions reductions ◎Ethical management ◎Compliance ◎Management of pollution and emissions	◎Annual customer satisfaction surveys ◎Communication with customers by phone and external mail ◎Customer service team provides "cocktail" style of services to customize and fulfill specific needs of customers
Suppliers/contractors	A stakeholder that works with TCC to manufacture products and raise quality. A business partner that supports TCC's environmental and sustainability efforts.	◎Sustainability strategies ◎Ethical management ◎Operational performance ◎Product quality and product risks ◎Information disclosure and transparency	◎Annual audits ◎Contract tender meetings ◎Addition of a supplier opinion mailbox on the Company website ◎Communication by external mailboxes, phone, and email

2018 Communications Performance	Reflections and Countermeasures	Relevant Sections
◎Participation in conferences and hearings on regulatory and statutory amendments to offer recommendations to competent authorities	Keep track of public policies and laws and regulations. Use our status as an industrial leader to promote legal compliance and support policy implementation.	6.2 Ethical corporate management
◎Held four labor-management meetings ◎Held four collective bargaining agreements ◎Held four employee welfare meetings ◎Held five town hall meetings ◎Completed performance evaluations and interviews for 793 employees ◎Publicized the "Ethical Best Practice Principles and Rules," which were signed by 269 new employees ◎Formulated human rights policies, which were then announced internally and disclosed on the Company website	Recruit suitable candidates, invest in training and educational activities, and provide safe workplaces, so all employees can enjoy working for TCC	4.1 Employee development 4.2 Employee care 4.3 Workplace diversity
◎Held one AGM ◎Held four investors' conferences ◎Held 10 board meetings ◎Replied to all phone enquiries from shareholders about material topics	Use "precision, accuracy and simplicity" as team concepts to maintain steady operational performance in the cement industry. Develop new opportunities suited for our business environment in order to uphold excellent business results.	6.1.1 About TCC 6.1.2 The Board of Directors
◎Conducted one customer satisfaction survey. Results showed that customer satisfaction remained high	Continue to provide products and services that are consistently high quality and comply with safety standards. Conduct business in an ethical manner that does not harm the environment while meeting customer expectations.	6.5.2 Customer recognition
◎Conducted annual audits of 23 suppliers ◎Convened 283 contractor meetings, safety meetings, and educational and training sessions ◎Received 163 emails in the supplier opinion mailbox	Conduct comprehensive and systematic supplier management. Build steady, long-term cooperative relationships that enable our suppliers to continue to grow with TCC.	2.3 Managing sustainable supply chains

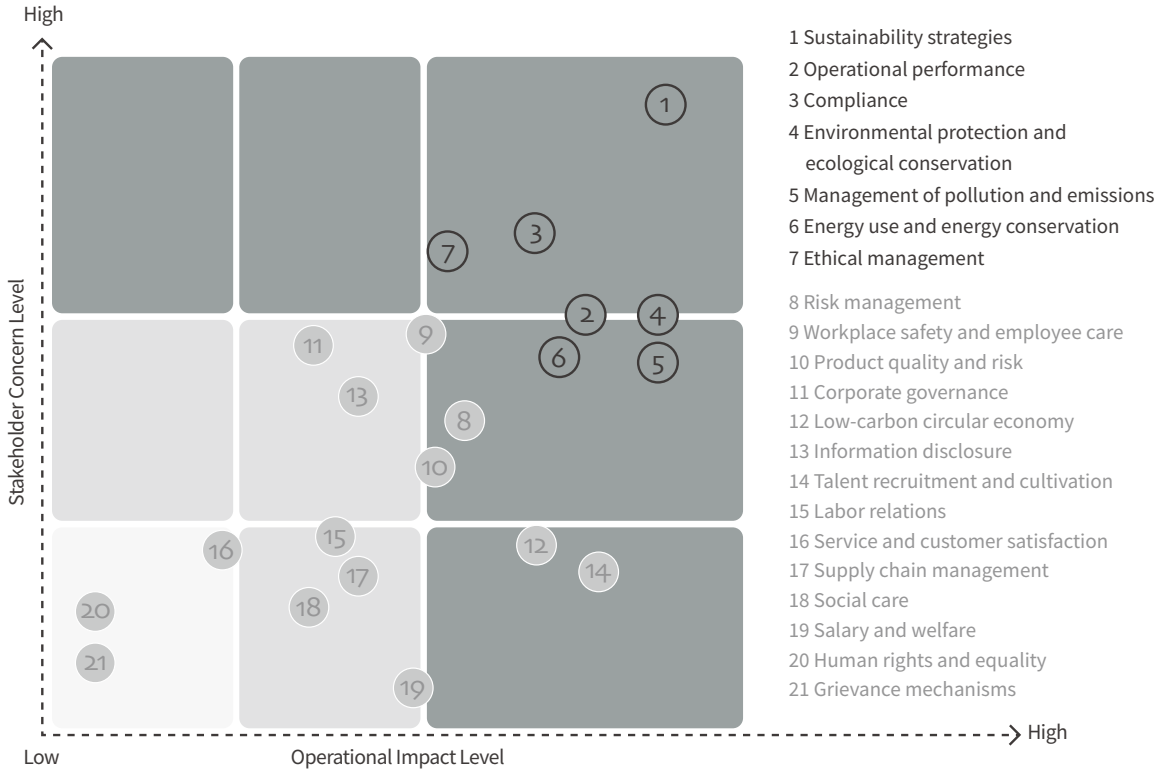
Stakeholders	Significance to TCC	Areas of Concern	Communication Methods and Frequency
Industry associations	A stakeholder that jointly promotes industrial development. A partner offering mutual business consultations and exchanges.	◎Sustainability strategies ◎Corporate governance ◎Ethical management ◎Compliance ◎Workplace safety and employee care	◎Communication by phone, documents or email ◎Attendance at annual Chinese National Standards (CNS) meetings ◎The Company website
Local communities	The stakeholder that lives near TCC cement plants and is most affected by the Company's operations impact	◎Product quality and product risks ◎Sustainability strategies ◎Management of pollution and emissions ◎Service and customer satisfaction ◎Social engagement	◎Annual interviews in local communities ◎Communication by phone and email ◎The Company website ◎Industrial zone meetings
NGOs	A stakeholder that focuses on improvements to TCC's environmental protection, employee care, and communication with local communities.	◎Environmental protection and ecological conservation ◎Sustainability strategies ◎Operational performance ◎Talent recruitment and cultivation ◎Workplace safety and employee care ◎Social engagement	◎Communication by phone or email ◎The Company website

1.2 Identifying Sustainability Topics

After taking into consideration of international sustainability trends, CSR specifications and standards (DJSI, CDP, GRI Standards), industry practices, CSR expert recommendations, and industry characteristics, TCC designed sustainability surveys. These are distributed to stakeholders to determine the topics they care about most. In 2018, we collected back 112 valid surveys. Using the results, five high-level executives analyzed the degree of impact of the cited sustainability issues then listed out the key areas of concern for internal and external stakeholders. Using the sustainability topics matrix, we prioritized our disclosure topics with major concern and high sustainability impact.

In editorial meetings for the 2018 CSR Report, staff considered previous engagements and recent sustainability trends as a basis to determine the sustainability issues that external stakeholders care about most and have the greatest impact. The seven main issues chosen for 2018 were sustainability strategies, operational performance, ethical management, compliance, environmental protection and ecological conservation, management of pollution and emissions, and energy conservation and emissions reduction. In further consideration of sustainability development trends and operational performance, we named three additional material topics: occupational safety and employee care, low-carbon circular economy, and talent recruitment and cultivation. Disclosures related to these three areas showed TCC's sustainable management achievements and our commitment to disclosing information to stakeholders.

2018 Communications Performance	Reflections and Countermeasures	Relevant Sections
◎Completed two CNS evaluations ◎Convened two meetings on chlorine ion content standards in Portland cement ◎Conducted two low carbon project plans ◎Commissioned two research projects on the circular economy	Continue to participate in organizations that promote industrial growth and the communication and exchange of operational performance. Jointly help overcome operational problems.	6.4.1 Membership of associations
◎Arranged two tours of TCC mine operations and tree planting initiatives for Ho-Ping residents ◎Held one summer camp for Ho-Ping Elementary School students ◎The TCC workshop held five cement handicrafts events for local residents ◎Helped local communities plan safety improvements to two local roadways ◎Arranged for visits by 40 people ◎Monthly donations of bento boxes and food ingredients to 200 people	Optimize onsite environmental protection. Continue to interact with local communities so people are aware of TCC's environmental achievements and improvements.	3.1 Making ecological mines part of a green cycle 3.2 Initiatives to make conservation take root 5.1 Engagement
◎Held eight events that brought the Ho-Ping plant together with four universities and colleges and community organizations ◎Cooperated with the New Taipei City Autism Association to have two people with autism operate a coffee truck at a Company family day event. The work provided a feeling of accomplishment and cultivated new skills.	Continued to make environmental improvements and reduce environmental damage. Restored the natural environment and developed environmental protection and green energy business opportunities. Helped coordinate environmental issues.	3.1 Making ecological mines part of a green cycle 3.2 Initiatives to make conservation take root 5.1 Engagement



1 Sustainability strategies
2 Operational performance
3 Compliance
4 Environmental protection and ecological conservation
5 Management of pollution and emissions
6 Energy use and energy conservation
7 Ethical management

8 Risk management
9 Workplace safety and employee care
10 Product quality and risk
11 Corporate governance
12 Low-carbon circular economy
13 Information disclosure
14 Talent recruitment and cultivation
15 Labor relations
16 Service and customer satisfaction
17 Supply chain management
18 Social care
19 Salary and welfare
20 Human rights and equality
21 Grievance mechanisms

Material Topics and Themes

After comparing material topics with the GRI Standards, TCC determined management guidelines and evaluation mechanisms then systematically acted in order to fulfill our sustainable development pledge. Based on stakeholder needs, we disclosed sustainability achievements as part of our communication promise.

Topic Categories	Material Topics	GRI Topics Self-Defined Topics	Significance to TCC
Governance	Sustainability strategies	General disclosure	Since TCC is Taiwan's first listed cement company and a leading brand in the cement industry, its long-term development and operational performance are important to shareholders and the capital market. Therefore, sustainable development is an important issue to TCC, its shareholders, and its upstream and downstream suppliers.
	Operational performance	Economic performance	Steady growth is a TCC commitment that we achieve through quality excellence and a sound corporate image.
	Ethical management	Anti-corruption	Compliance with the Articles of Incorporation and ethical management by all supervisors and staff are key drivers of steady growth.
	Compliance	Environmental compliance and socioeconomic compliance	TCC closely follows legal and regulatory changes. It operates in strict compliance with local laws and regulations.
Environmental topics	Environmental protection and ecological	Water, emissions	TCC closely evaluates the materials in its products and production processes. It searches for ways to reduce its impact on the natural environment and use of natural resources.
	conservation Management of pollution and	Effluents and waste	Production waste and discharge management are important to TCC and its external stakeholders.
	emissions Energy use and energy	Energy	Ongoing efforts to improve the cement production process and implement green management systems enable TCC to incorporate green management concepts into its business operations.
	conservation Low-carbon circular	Materials	TCC closely monitors its consumption of natural resources and energy. We develop alternative fuels to reduce natural resource depletion and enhance energy efficiency.
Social topics	economy Workplace safety and employee care	Occupational Safety and Health (OSH)	Safety management is needed for cement plants to maintain employee safety. TCC emphasizes the operational safety management of employees and contractors. We implement management systems to enhance safety awareness and prevent occupational accidents.
	Talent recruitment and cultivation	Training and Education	TCC relies on hard work together with "precision, accuracy and simplicity" to achieve steady growth. Therefore, talent recruitment, putting people in the right positions, and professional cultivation are indispensable to labor-management harmony, eagerness to work, and building a high-performing team.

Note 1: ● represents direct impact; ○ impacts are indirect

	Impact Boundaries	Relevant Sections
	● TCC ○ Customers ○ Supply chain	6.1 Governance framework
	● TCC ○ Customers ● Supply chain	6.1.1 About TCC
	● TCC ○ Customers ○ Supply chain	6.2.1 Integrity and ethics
	● TCC ○ Customers ○ Supply chain	6.2.2 Legal compliance
	● TCC ○ Subsidiaries	2.1.2 Pollution control and management 2.1.3 Management of water resources and the water cycle
	● TCC ○ Subsidiaries	2.1.3 Management of water resources and the water cycle
	● TCC ○ Subsidiaries	2.1.4 Energy management
	● TCC ● Supply chain	2.1.5 Raw materials management
	● TCC ○ Subsidiaries	4.2.1 Workplace safety
	● TCC ● Subsidiaries	4.1.1 Youth Cultivation (MAP)

CHAPTER 02

Environment and A Low Carbon Supply Chain

Major Topics

Energy
Emissions
Water

| Management Policies

Formulate environmental management policies and incorporate ISO 14001 Environmental Management Systems and ISO 50001 Energy Management Systems to build a comprehensive management mechanism. Pass ISO 14064 Greenhouse Gases and ISO 14046 Water Footprint certifications.

Remain committed to sustainable operations, resource reuse and recycling, and management strategies focused on the air, water, energy, and raw materials. Comply with all regulations and meet self-expectations.

Cement plants made investments and expenditures totaling NT$64.04 million into environmental protection measures.

The Taiwan Cement Building was certified as a Diamond Class Green Building for raising the efficiency of energy resource use.

| Assessment Mechanisms

Develop an online energy reporting and verification system for manufacturing enterprises in order to conduct real-time checks of energy consumption and electricity generation of our plants. Use this information as a reference for internal management meetings and external inspections.

Regularly review environmental management performance in monthly meetings. Incorporate energy conservation and emissions reductions projects, environmental and emissions targets, and GHG management goals into the annual performance assessments and quarterly bonus evaluations of managers and employees at all levels. Implement an internal carbon pricing system. In 2018, the Company's GHG emissions dropped by 2,375,597 tonnes compared to the base year of 2013.

| Short-Term Objectives

Change three air compressors at RMC plants to raise equipment efficiency and conserve energy.

Complete installation of a speed monitoring system at Ho-Ping Port to ensure that vessels entering and leaving the port adhere to speed limits.

Add more piping, water pumps, and water reservoirs to Su-Ao Plant to increase water recycling and reuse.

Complete wastewater recycling and reuse construction at Ho-Ping Plant. After processing, recycled water is used for the roadside sprinkler system and for watering plants.

| Mid- and Long-Term Objectives

Lower 2030 GHG emissions by 30% compared to the base year.

Lower 2030 air pollution emissions by 20% compared to the base year.

Reduce water use by 1% annually.

Circular Economy
Materials
Effluents and Waste

| Management Policies

Pioneer a new "cement + energy + environmental protection" 3-in-1 circular economy combination that includes a joint port, cement plant and power plant. Cross-industrial cooperation and reuse of resources combine to promote a circular economy mode of business.

Be the first cement company to achieve BS 8001:2017 Circular Economy certification. Take waste from the optoelectronics, semiconductor, papermaking, water purification, chemical engineering, and steelmaking industries to use as an alternative raw material for cement production.

Build sustainable supply chain management mechanisms. Promote supplier sustainability evaluations and new supplier sustainability screenings. Incorporate local procurement principles. Pledge collaboration with suppliers to support sustainability of the full supply chain.

| Assessment Mechanisms

Through monitor and measure raw material replacement ratio as a basis for determining the circular economy's performance in reducing use of natural raw materials.

Conduct annual supplier sustainability assessments that include labor, health and safety, environment, ethical scope, and management systems.

| Short-Term Objectives

Continue to promote circular economy business models in order to provide the best solutions to the environmental problems that city governments face.

Continue to search for more alternative raw materials to lower our impact on the environment.

Complete all sustainability documentary reviews of Critical Tier 1 suppliers.
Aim for 80% of suppliers to sign the supplier code of conduct.
Aim for 100% of contractors to sign the OHS Liability Undertaking

| Mid- and Long-Term Objectives

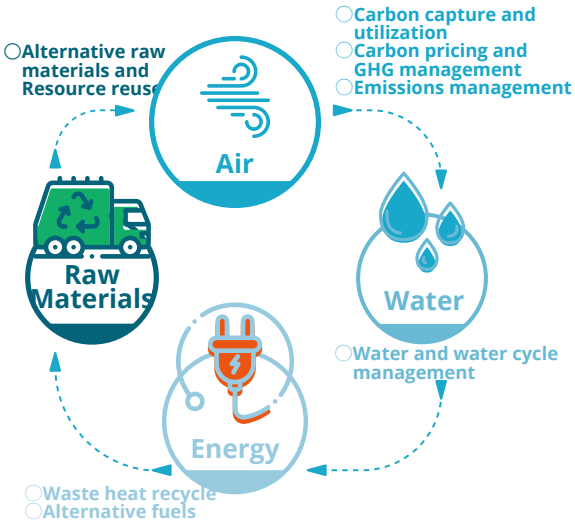
Assist in processing 157 tonnes of waste by 2030.

Implement sustainable supply chain management to strengthen the positive influence of our industrial value chain.

2.1 Environmental Cycle Management

The Company closely monitors the risks and opportunities that climate change brings while formulating countermeasures to slow and adapt to the resulting impacts. To do our part to slow climate change, we promise to operate sustainably and reuse resources. Management strategies focus on four main areas: the air, water, energy, and raw materials. In 2018, our cement plants invested NT$64.04 million on environmental protection measures. In 2019, we plan to spend NT$155 million to upgrade all of our electrostatic dust precipitators to electrostatic-bag composite dust precipitators, in order to meet our goal of emitting no more than 10 mg/m^3 of dust, which is below the required legal standard. When making these changes, we seek innovative, feasible breakthroughs that fulfill our vision of TCC as an environmental engineering company.

Management of 4 Key Cycles



To carry out climate change mitigation strategies, the Company established energy management mechanisms. We set energy conservation targets, standardize energy consumption control, and develop new technologies to improve production processes and equipment. We include energy consumption and power generation data in our war room system to provide real-time references for internal management.

Each year, we establish product energy consumption (coal & electricity) indices, plan energy conservation plans, and develop alternative raw materials and fuels. We will continue to research energy conservation and emissions reduction plans to reduce CO_2 emissions and hold monthly review meetings to check progress. For raw material management, we hold monthly production and sales meetings to evaluate raw material needs. Ensuring proper inventory volumes reduces the frequency of material transportation, which lowers transportation-related greenhouse gas (GHG) emissions produced by our upstream suppliers.

Environmental Management Policies

As a leader in the cement industry, TCC adopts complete environmental protection policies that include providing waste management solutions to society and enterprises. As part of our policy goal to build a circular economy, we create cross-industrial circular economy chains that promote sustainable operations. Obtaining international certifications such as ISO 14001, ISO 50001, ISO 14064, ISO 14046, and BS 8001 has further raised the effectiveness of our energy, water, wastewater, and wastemanagement performance. When formulating energy conservation, environmental protection, and production management improvement plans we aim to exceed regulatory standards in order to fulfill our management philosophies and reduce environmental impact.

2.1.1 Carbon Pricing and GHG Management Carbon pricing

In response to the Carbon Disclosure Project (CDP), the Company established a target of reducing emissions by 30% by 2030, using 2013 as the base year. Each year we plan energy conservation and emissions reduction projects and set targets for emissions control. Related plans and results are incorporated into the annual and quarterly performance assessments of managers at all levels of the Company as well as non-managerial staff. From the top to the bottom of the organization, we endeavor to reduce GHG emissions.

To get closer to real-time readings of cement plant emissions, in 2018 the Company added our carbon

emissions manage ment system to the list of items the management dashboard monitors. Data are updated daily, weekly, and monthly. In 2019, we went a step further by incorporating carbon emissions into performance assessments of the cement plants. We set emissions control targets for each plant, and each month we check the plants' emissions data then incorporate the results into performance assessments. An internal carbon pricing system further shows the Company's resolve towards reducing the impact of climate change and our desire to be a model for the rest of the cement industry to follow.

GHG Management

Since 2007, the Company has conducted internal GHG inventories, and since 2013, the cement plants have commissioned third-party agencies to conduct annual inventories. We obtained ISO 14064-1 certification, which specifies standards for conducting GHG inventories. It distinguishes between direct emissions (Scope I) and indirect emissions, such as those from energy sources (Scope II). Between 2013 and 2018, our combined categories I and II emissions fell by 2,375,597 tonnes, from 6,851,987 tonnes to 4,476,390 tonnes. Emissions per NT$1,000 of sales in 2018 were 0.036 tonnes. In 2017, we added Scope III emissions, which measure the emissions of third parties, including the transport and delivery services used by our upstream suppliers. Each year, we also plan energy conservation projects. In 2018, we carried out 10 conservation projects that reduced emissions by the equivalent of 11,540 tonnes of CO_2.

Cement Plant GHG Emissions Over the Past Four Years

Unit: Tonnes of CO_{2e}

Item	2015	2016	2017	2018
Scope 1	4,614,890	4,396,724	4,144,669	4,228,688
Scope 2	281,362	253,768	241,691	247,702
Total (Scopes 1 and 2)	4,896,252	4,650,492	4,386,360	4,476,390
Scope 3	-	-	8,873	15,041

Note 1: GHG emissions are inventoried in terms of operational control. The equation used is emissions = activity data x emissions factor (EF) x global warming potential (GWP). EF is subject to the EPA GHG Emissions Factor Management Table (v. 6.0.3) and GWP is subject to the IPCC Fourth Assessment Report (2007). GHGs include CO_2, CH_4, N_2O and HFCs.
Note 2: Since at the time of publishing the Bureau of Energy had not announced the electricity EF for 2018, we calculated the 2018 GHG emissions for purchased electricity (Scope 2) using the 2017 EF of 0.554 kg CO_{2e}/kWh.
Note 3: The main activity associated with Scope 3 is transport and delivery by upstream suppliers. Calculations are done using the GHG Protocol-Corporate Value Chain (Scope 3) Accounting and Reporting Standard (WRI & WBCSD). Third-party certification is required.

RMC Plants GHG Emissions Over the Past Four Years

Unit: Tonnes of CO_{2e}

Item	2015	2016	2017	2018
Scope 1	2,298	1,842	1,762	1,992
Scope 2	6,393	6,000	5,956	6,144
Total	8,691	7,842	7,718	8,136

Note 1: GHG emissions are inventoried in terms of operational control. The equation used is emissions = activity data x emissions factor (EF) x global warming potential (GWP). EF is subject to the EPA GHG Emissions Factor Management Table (v. 6.0.3) and GWP is subject to the IPCC Fourth Assessment Report (2007). GHGs include CO_2, CH_4, N_2O and HFCs.
Note 2: The EF of GHG Scope 1 diesel fuel was 2.65 CO_{2e}/l and gasoline was 2.36kg CO2e/l. The EF of GHG Scope 2 purchased electricity was 0.554kg CO_{2e}/kWh.
Note 3: GHG emissions were calculated internally.

GHG Emissions of Headquarters Over the Past Four Years

Unit: Tonnes of CO_{2e}

Item	2015	2016	2017	2018
Scope 2	2,127	2,089	2,172	1,956

Note 1: GHG emissions are inventoried in terms of operational control. The equation used is emissions = activity data x emissions factor (EF) x global warming potential (GWP). EF is subject to the EPA GHG Emissions Factor Management Table (v. 6.0.3) and GWP is subject to the IPCC Fourth Assessment Report (2007). GHGs include CO_2.
Note 2: Since at the time of publishing the Bureau of Energy had not announced the electricity EF for 2018, we calculated the 2018 GHG emissions for purchased electricity (Scope 2) using the 2017 EF of 0.554 kg CO_{2e}/kWh.
Note 3: GHG emissions were calculated internally.

2.1.2 Pollution Control and Management

Pollution control items for cement plants include total suspended particulates, NO_X, and SO_X. Online monitoring systems send these data to Environmental Protection Agency for monitoring. Each quarter, a third-party testing agency measures whether stack emissions data support monitoring data. The Company also listed emissionsstandards as an area for improving internal systems control. Big data support alert mechanisms that let us quickly respond with production adjustments in order to prevent damage to the environment surrounding our cement plants.

Ho-Ping Plant, which is located in the Ho-Ping Industrial Park, brings together a port, a power plant, and a cement plant. In accordance with requirements in the environmental impact assessment, each quarter a third party carries out environmental monitoring at the park to check the air quality, noise, soil, water quality, water ecology, land ecology, and other environmental factors.

Su-Ao Plant undergoes quarterly environmental monitoring of the factory grounds. Each half year, environmental monitoring is carried out at the neighboring Shih-Min Elementary School to check air quality, noise, soil, water quality and other environmental factors.

In 2018, the Company's air pollution emissions totaled 7,472 tonnes, a decrease of 1,196 tonnes compared to 2015.

The cement industry is fairly unique in not producing any industrial waste. Non-industrial waste, such as scrap metal, is gathered and regularly recycled. In 2018, the Company's recycled non-industrial waste totaled 3,668 tonnes.

Air Pollution Emissions at Cement Plants Over the Past Four Years

Unit: Tonnes

Item	2015	2016	2017	2018
Nitrogen Oxides	7,896	7,331	7,035	6,744
Sulfur Oxides	117	111	82	85
Particulate Matter	655	433	587	643
Total	8,668	7,875	7,704	7,472
Emissions Intensity (kg/NT$1,000)	0.18	0.19	0.18	0.06

Note 1: Operations were suspended at Hualien Plant in 2018, so there was not any air pollution from this plant.
Note 2: Starting from the third quarter of 2018, we added heavy metal monitoring data at the request of the Environmental Protection Administration.
Note 3: Starting from the fourth quarter of 2018, cement plants reported mercury vaporization in accordance with legal requirements. Mercury vaporization was 0.056551 tonnes, and there was no mercury vaporization at RMC plants.
Note 4: From 2015 to 2018, volatile organic compound emissions totaled 0.00696, 0.00776, 0.0066 and 0.00644 tonnes, respectively.
Note 5: RMC plants did not have any air pollution emissions during the past four years.

2.1.3 Management of Water Resources and The Water Cycle

Understanding the importance of water conservation, the Company set an annual water savings target of 1% and launched a series of mechanisms to conserve water. In 2018, we began using recycled water in the Su-Ao Plant sprinkler system, modified the sprinkler coverage area, and adjusted sprinkler schedule based on dust propagation. Thesemeasures let us reduce the use of groundwater by about 15 m^3 daily. In 2018, our total water consumption was about 2.79 million m^3, a decrease of 27% compared to 2017. Water intensity was 22.39 m^3/NT$1 million.

In 2019, we planned wastewater recycling facilities at Ho-Ping Plant and began using more recycled water in green areas and roadside sprinkler systems. In 2019, we plan to add more piping, water pumps, and water reservoirs to Su-Ao Plant to increase water recycling and reuse. Using recycled water in the plant's storage areas, roadside sprinklingpollution prevention system, garden watering system and other areas is expected to conserve 300 m^3 of water per day.

To evaluate water use impact and build an effective water management system, in 2019 Su-Ao and Ho-Ping plants became the nation's first cement plants to pass ISO 14046 Water Footprint certification. This showed our improvements in water resources management.

Water Use at Cement Plants Over the Past Four Years

Unit: M^3

Item	2015	2016	2017	2018
Tap Water	654,217	395,554	411,376	-
Groundwater	1,692,894	1,650,335	1,837,214	1,426,603
Industrial Use Water	844,323	1,037,154	978,629	910,927
Reuse of Process Wastewater	756,986	797,749	595,325	452,683
Total	3,948,420	3,880,792	3,822,544	2,790,213

Note: Operations were suspended at Hualien Plant in 2018, so 2018 data is for Su-Ao and Ho-Ping plants.

The Company's RMC plants have sand and gravel separators and wastewater recycling equipment to support the reuse of residual materials and water. Recycled water is used in water sprinkler trucks and automatic sprinkler systems. In 2018, we recycled 152,130 m^3 of water.

Water Use at RMC Plants Over the Past Four Years

Unit: M^3

Item	2015	2016	2017	2018
Tap Water	302,067	282,317	339,173	247,780
Reuse of Process Wastewater	225,847	227,679	203,693	152,130
Total	527,914	509,996	542,866	399,910

Water Use at Headquarters Over the Past Four Years

Unit: M^3

Item	2015	2016	2017	2018
Tap Water	15,234	14,842	19,646	15,503

Wastewater management

Most wastewater at the cement plant comes from cooling water and sewage. It is treated using wastewater collection systems, desilting basins, and other equipment thendischarged in accordance with water pollution prevention regulations. Local environmental officials test the effluent each quarter to ensure it meets required quality standards for discharge.

At Ho-Ping Plant, sewage and wastewater are treated to the discharge standard, sent to the wastewater treatment plant at Ho-Ping Industrial Park for additional treatment, then discharged into the Pacific Ocean. At Su-Ao Plant, process water and rainwater runoff are transported to the sedimentary pond, treated to meet the discharge standard then discharged from the effluent outlet into Baimi River. RMC plants do not produce industrial wastewater, but we treat rainwater and water for cleaning truck tires, mixing machines, and mixer trucks in the buffering pond andsedimentation pond before reusing it for cleaning. In 2018, our cement

plants discharged a total of 751,675 m^3 of wastewater and were not subject to any water discharge quality fines.

2.1.4 Energy Management

Environmental sustainability is a key goal of TCC. Facing the impacts brought by global climate change, we optimize cement production and corporate operations using green management systems and concepts. We obtained ISO 50001 Energy Management Systems certification, which complements our ISO 14000 Environmental Management and ISO 14064 Greenhouse Gases. We continue to search for ways to improve energy performance, reduce energy costs, and raise energy management capability.

Besides energy management, the Company equips each cement plant with a waste heat electricity generation system in order to recover and reuse the heat energy emitted from rotary kilns. We use the latest Japanese flash distillation technology to enhance heat recovery efficiency, thus maximizing system benefits. In 2018, the output of the waste heat generation system was 74.094 million kWh, equivalent to the annual electricity consumption of about 21,000 households[1].

The Company also conserves energy by actively upgrading old equipment, including replacing old air compressors and old waste heat boiler tubes as well as refurbishing kiln systems. In 2018, using these measures we saved approximately 20.83 million kWh of power, equivalent to the annual electricity consumption of about 5,946 households. In 2018, TCC cement plants consumed a total of 17,417,060GJ of electricity. Our electricity intensity was 0.14GJ/NT$1,000, which was lower than 2017, demonstrating the effectiveness of our energy management.

[1]Based on the average household electricity use of 3,504 kWh announced by the Taiwan Power Company in 2018.

Plant Production Management

Tracking energy conservation results

- Plants plan energy conservation projects each year then follow up results.
- The Company sets energy consumption indicators (coal, electricity) for various products each year then regularly follows up and reviews energy efficiency.
- Systems are in place to perform daily checks of energy consumption and generation. Data are included in the daily reports of each plant and provided to the management dashboard to use as a reference for internal management

Alternative fuels and raw materials

- The Company researches alternative fuels and raw materials that can reduce the amount of CO^2 produced during incineration.

Reducing transport frequency

- The Company formulates transportation plans and forecasts raw material needs in monthly production and sales meetings. Ensuring that we have the right amount of inventory to meet sales volume, prevents excess production and avoiding large inventories of finished goods that would cause higher energy use and GHG emissions. We also seek to decrease the frequency of raw material deliveries to reduce transport-related GHG emissions.

Plant General Affairs Management

Trash separation and recycling

- Separate recyclable and non-recyclable waste
- Set up recycling areas at plants to keep the working environment clean and orderly

Reduce paper use

- Use email to send information
- Set up recycling boxes next to photocopiers and print on both sides of the paper

Promotional measures

- Recycle and reuse stationery
- Reduce the use of paper cups at meetings
- Supply reusable bowls and chopsticks
- Encourage employees to use bicycles to transit to and from work when possible

Cement Plant Energy Use Over the Past Four Years

Item	2015	2016	2017	2018
				Energy Use
Coal (Kilotonnes)	1,239	738	690	679
Diesel (Kiloliters)	2,079	1,008	1,521	1307
Purchased Electricity (1,000 MWh)	995	489	470	467
				Converted to Gigajoules
Coal (GJ)	30,548,214	18,195,789	17,012,323	15,689,903
Diesel (GJ)	73,103	35,444	53,482	45,957
Purchased Electricity (GJ)	3,582,000	1,760,400	1,692,000	1,681,200
Total (GJ)	34,203,317	19,991,633	18,757,805	17,417,060

Note 1: For calorific value conversion factors, Su-Ao Plant uses 5,526.65 kcal/kg for coal. Ho-Ping Plant uses 5,520.375 kcal/kg for coal and 8,400 kcal/L for diesel.

In recent years, our RMC plants have accelerated the replacement of old and high fuel consumption concrete mixers in favor of environmentally friendly, energy efficient vehicles. The amount of diesel we use is decreasing annually. At our Taipei Cement Product Plant, in 2013 we scrapped all of our old concrete mixers, from 2013 to 2018 we rented vehicles as a replacement, and in 2019 weplan to purchase 30 new concrete mixers that

meet level 6 emissions standards. At our Taichung Cement Product Plant, in 2019 we plan to purchase 10 new concrete mixers that meet level 6 emissions standards, and in 2020 we plan to scrap all of our concrete mixers that only meet level 2 emissions standards. At our Kaohsiung Cement Product plant, in 2019 we will purchase 30 new concrete mixers that meet level 6 emissions standards, and in 2021 we plan to scrap all of our concrete mixers that only meet level 2 emissions standards. We also plan to replace three old air compressors in 2019 to raise our equipment efficiency and save electricity.

RMC Plant Energy Use Over the Past Four Years

Item	2015	2016	2017	2018
				Energy Use
Diesel (Kiloliters)	867	695	665	645
Gasoline (Kiloliters)	-	-	-	120
Purchased Electricity (1,000 MWh)	11.54	10.83	10.75	11.09
				Converted to Gigajoules
Diesel (GJ)	30,486	24,438	23,383	22,684
Gasoline (GJ)	-	-	-	3,918
Purchased Electricity (GJ)	41,544	38,988	38,700	39,924
Total (GJ)	72,030	63,426	62,083	66,526

Note 1: According to the Emissions Factor Management Table (v. 6.0.3) on the Bureau of Energy's website, calorific values are 8,400 kcal/L for diesel, 7,800 kcal/L for gasoline, and 3,600 GJ/MWh for electricity.
Note 2: RMC plants started collecting data on gasoline use in 2018.

In 2016, the Taiwan Cement Building received Diamond Class Green Building certification in the category of old building refurbishment. Since then, we have continued to find new ways to conserve energy and reduce carbon emissions, including adding solar panels to the building's roof. Between May 2018, when they first started operating, and the end of 2018, the panels are estimated to have generated 24,175 kWh of power.

Diamond Class Green Building Label, TCC Headquarters

- Solar power cells on the roof generate more than 10,000 kWh of electricity per year
- Water from a rainwater recycling system is used for outdoor landscaping and cleaning
- Upgraded to water conserving equipment
- Improved lighting fixtures
- Raised the central air system efficiency

Headquarters Energy Use Over the Past Four Years

Item	2015	2016	2017	2018
				Energy Use
Purchased Electricity (1,000 MWh)	3.84	3.77	3.92	3.53
				Converted to Gigajoules
Purchased Electricity (GJ)	13,824	13,572	14,112	12,708

Note 1: In 2017, following the death of our former chairman, headquarters hosted a memorial that used illumination and air conditioning 24 hours a day. This led to a significant increase in electricity use. In 2018, electricity usage returned to normal.

2.1.5 Raw Materials Management

Limestone, clay, silica sand, iron slag, and coal ash are the main raw materials in our finished products. Since natural resources are limited, we endeavor to minimize their extraction and procurement by finding ways to use recycled raw materials and reduce the amount of resources used in production. In 2018, our total consumption of raw materials was 8.3649 million tonnes. 100% of the clay, silica sand, iron slag, and coal ash we used were recycled, demonstrating our progress in using recycled and alternative materials.

Cement Plant Raw Material Consumption, 2018

Unit: Tonnes

Item	Consumption
Limestone	6,623,452
Clay	940,856
Silica Sand	221,250
Iron Slag	186,769
Coal Ash	392,595
Total	8,364,922

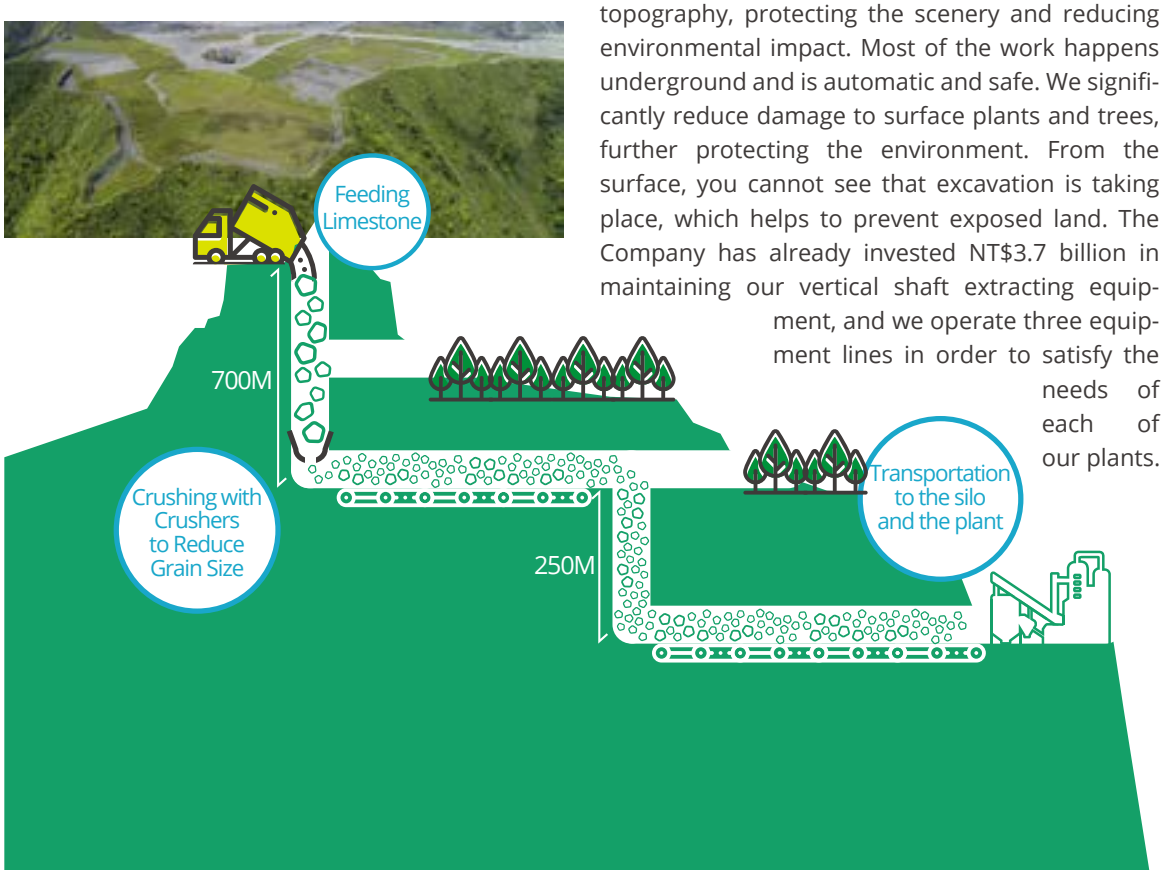
2.2 The Road to A Circular Economy

As urbanization advances and more people migrate to cities, the size of those cities grows. Factors of production and industrial activity gather in these population centers, which raises production and distribution efficiency, thus advancing economic growth. Concentrating so many people and economic activities in these areas, however, is leading to transportation and environmental problems that municipal leaders need to solve.

TCC pioneers a new "cement + energy + environmental protection" 3-in-1 circular economy combo

As climate change and natural disasters become more severe, the circular economy, with its requirement for eco-friendly measures, has become a hot topic of conversation. To solve the many problems that urbanization brings, when establishing a new

plant the Company take into consideration circular economy models. We plan comprehensive approaches that include ports, the plant, and electricity, in order to achieve the most efficient use of available resources. For example, at Ho-Ping Plant, the raw materials required for making cement, including fuel, iron slag, plasters, and slag, are shipped in via Ho-Ping Port, and finished cement products are shipped from Ho-Ping to cement receiving stations at major ports in western Taiwan, saving transportation expenses and lowering environmental impact. Waste produced from power generation can be divided into fly ash and bottom ash, both of which are coal ash substances. We use 100% of the coal ash from Ho-Ping Power Plant as a raw material for the Ho-Ping Cement Plant. The power plant produces about 420,000 tonnes of coal ash each year, showing the extent to which we not only prevent marine pollution but also make waste reuse a reality.



Ho-Ping Cement Plant Uses A Unique Vertical Shaft Extracting Method

When building Ho-Ping Cement Plant, we chose the most advanced equipment that was best at protecting the environment. To protect the landscape and environment, we used a closed storage and transport system and low-NOX processes and equipment. At major exhaust stacks we installed a continuous emissions monitoring system (CEMS) that lets us automatically control emissions quality and ensure that all emissions meet national standards. Since the plant is near Taroko National Park, to preserve the landscape we established a 20-hectare scenic area that fulfills our goal of turning the cement plant into a park-like facility. When mining, we use the most advanced hilltop platform phase-based vertical shaft transport method, and we simultaneously carry out restoration. This minimizes our impact on the land topography, protecting the scenery and reducing environmental impact. Most of the work happens underground and is automatic and safe. We significantly reduce damage to surface plants and trees, further protecting the environment. From the surface, you cannot see that excavation is taking place, which helps to prevent exposed land. The Company has already invested NT$3.7 billion in maintaining our vertical shaft extracting equipment, and we operate three equipment lines in order to satisfy the needs of each of our plants.

dam, the fly ash prevents cracks and strengthens the dam's structural integrity. Sea projects, bridges, and tunnels that use fly ash are better equipped to withstand the corroding power of salt in the seawater or soil. Fly ash can also directly be added to cement to replace a percentage of cement used.

Coal ash in Taiwan is generally added to concrete or used to reclaim coastal land near the plant by using hydraulic fill. The reclaimed land is then used to expand operations. Ho-Ping Power Plant, however only uses fly ash in cement. We do not use it to reclaim land because we want to avoid causing any marine pollution. Ho-Ping Cement Plant also provides limestone powder that the Ho-Ping Power Plant needs for its flue-gas desulfurization system. When high-concentration limestone powder solution mixes with sulfur dioxide it produces calcium sulfite or is oxidized to produce calcium sulfate. Calcium sulfate, or desulfurization gypsum, is used as a cement coagulant, showing the benefits of recycling.

Ho-Ping Coal-fired Power Plant Uses The World's Only Coal Ash Circular System

Ho-Ping Power Plant has two coal-fired, steam-powered electricity generators, each with a capacity of 660MW. They use sealed storage and transport systems for fuel coal, electrostatic precipitators, flue gas desulfurization equipment, selective catalytic reduction equipment, low NOx burners, and continuous emissions monitoring systems to effectively control the SOx and NOx emitted from the exhaust stacks. The plant meets Taiwan's high emissions quality standards.

Waste produced from power generation can be divided into fly ash and bottom ash. Heavier particles, released through the bottom of the boiler, are bottom ash. Bottom ash has a rough, porous surface with lots of edges. It is suited to filling in land, making bricks and artificial aggregate, as well as other construction purposes. Lighter particles, which are carried by smoke to the electrostatic precipitator, are known as fly ash. A high-pressure direct current causes the particles to adhere to a collecting plate, cleaning the smoke. The particles can be used to improve concrete. For example, when added to concrete used to make a

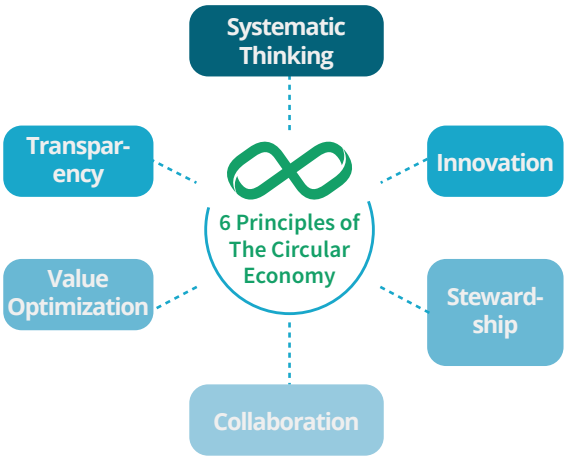
An Exclusive Ecological Port That Saves Energy and Reduces Carbon

The Company built four dedicated wharfs, including a cement wharf, a coal unloading wharf, and multifunctional wharfs that are equipped for vessels 80,000 tonnes and smaller to load and unload materials. The total throughput is 23 million tonnes. All facilities were built for use by plants within the Ho-Ping complex to reduce transportation costs and increase market competitiveness.

The port uses a sealed storage and conveyor belt transport system to reduce scattering of dust. Automatic loading and unloading machines equipped on the harbor reduce transportation volume, which further lowers air pollution. Close to NT$10 million was invested to reduce the port's environmental impact. We purchased marine cleanup vessels that collect trash and other items drifting in the sea. Greenery planted around the facility creates the image of a green port. In 2018, we passed initial EcoPort certification standards. In the future, we plan to achieve EcoPorts certification from ECO Sustainable Logistics Chain to underline our commitment to operating a major eco-friendly port.

The World's First Cement Company to Achieve BS 8001 Circular Economy Certification

In 2018, TCC became the first cement company to achieve BS 8001:2017 Circular Economy certification. We use the six principles of the circular economy: systems thinking, innovation, stewardship, collaboration, value optimization, and transparency, to build a circular economy model. We take waste from the optoelectronics, semiconductor, papermaking, water purification, chemical engineering, and steelmaking industries to use as alternative raw materials. In 2018, TCC's Su-Ao, Ho-Ping, and Hualien plants processed 892,000 tonnes of industrial waste. Through systematic evaluations, feasibility studies, and experimental testing, we enter into cross-industry, collaborative plans that support resource reuse and the circular economy business models. A prerequisite of these innovative partnerships is meeting our requirements for environmental protection and cement quality. In the future, we will continue to promote collaboration between industry, academia and research institutions and search research literature and inquire about experiences both domestically and overseas relating to processing of waste using cement kilns. We will gain a deeper understanding of the components and sources of waste to better help the government and industry solve complicated waste problems, thus making the world a better place through the reuse of waste and circular sustainability.



2.3 Managing Sustainable Supply Chains

TCC endeavors to grow with our suppliers in order to support sustainable supply chain management. We assess a comprehensive set of factors, including legal trends, macro environmental changes, and industrial technology. In addition to prioritizing local procurement, we evaluate the sustainability practices of current and new suppliers. When discussing these issues, we spread our spirit of sustainable development.

Supplier Commitment

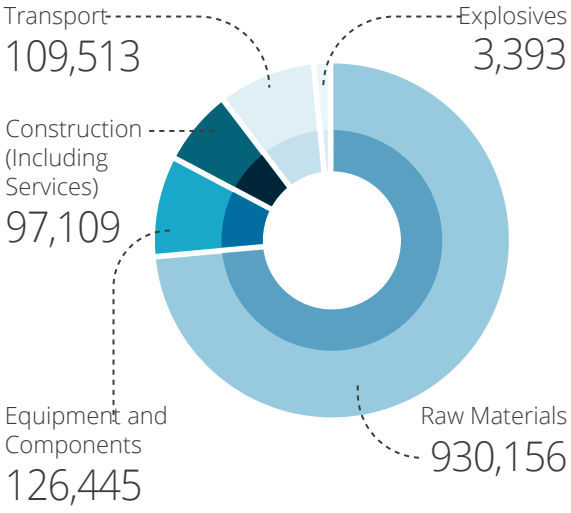
In response to extreme weather, supplier capacity constraints, and the unique properties and characteristics of ore, the Company added regular examination of mine temperatures and precipitation volume to our supplier management scope. We regularly review supplier schedules and delivery volumes in order to reduce or avoid excessive fuel consumption that results from inefficient deliveries.

We also developed a supplier evaluation mechanism and a contractor safety and health pledge.

Modern technology and better equipment reduce SO_X, NO_X, and other stack pollutants. We insist on using minerals from legal sources and suppliers that make environmental improvements. For example, we prioritize the use of green building materials and chemicals with low VOC emissions. We increase interaction with key suppliers and regularly check supplier quality and product attributes, including the sulfur and dust content in coal ash.

Expenditures

NT$10,000s



Current Actions

- ○ Local procurement
- ○ Sustainable procurement standards
- ○ Supplier sustainability evaluations
- ○ Sustainable supplier cultivation
- ○ Supplier integrity pledge
- ○ Supplier grievance mechanisms

Short-Term Goals

- ○ Green procurement policies and practices
- ○ Stronger supplier sustainability evaluations
- ○ Stronger sustainable supplier cultivation

Medium- and Long-Term Planning

- ○ Risk assessment of supplier sustainability

Sorting our supply chains

For better management, the Company differentiates suppliers based on type and level. The sequences that emerge from these evaluations provide a stronger understanding of our overall supply chain. Partners placed into the leading "Critical Tier 1" are suppliers that affect the quality and delivery time of our products or suppliers with a volume or proportion of goods reaching a specific level. These suppliers must be managed and evaluated. Procurement type is another way that we differentiate suppliers. From each type of procurement, we choose key suppliers. Currently, TCC's supply chain can be divided into five major types: raw materials, equipment and components, construction (including services), transport, and explosives. At the end of 2018, we had 956 suppliers, including 23 Critical Tier 1 suppliers that accounted for just 2.4% of the total.

Before cultivating new suppliers, the Material Management Department conducts supplier surveys as necessary in collaboration with the R&D Office, the plant, and the Financial Department. Besides documentary reviews, the team performs an on-site inspection to understand the production lines and mineral sources of new suppliers. It then produces a report that supports sustainable supplier management. The Company requests that new suppliers sign a code of conduct and a safety and health pledge. In 2018, 62 suppliers signed the code of conduct, and our goal is to have 80% of suppliers having signed it by the end of 2019. We aim for 100% of contractors to sign the safety and health pledge. In 2018, we evaluated 70 new suppliers and 100% passed.

Sustainable Supplier Assessments

Besides having a code of conduct for suppliers, the Company uses our procurement choices as a way of giving positive feedback. We created the Plant Supplier Evaluation Regulations and a TCC supplier sustainability evaluation chart. A functional task force consisting of members from the QC, manufacturing and financial departments, or an outside agency carry out annual evaluations. Items covered include quality, service, organization, and financial performance as well as sustainability topics such as labor, health and safety, environment, ethical scope, and management systems. In 2018, we completed all sustainability documentary reviews of our Critical Tier 1 suppliers.

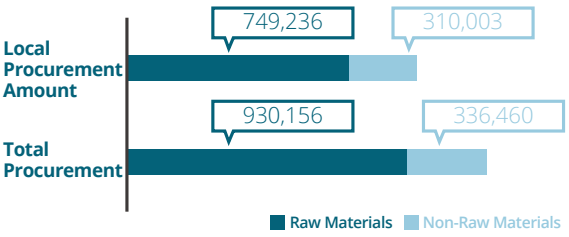
We issue a supplier improvement notice to unqualified suppliers and request that they complete improvements by a deadline. We delist any suppliers that do not comply. One of the primary goals of our supply chain is to grow with our partners. Therefore, we notify and supervise suppliers who are at risk of not qualifying. So far, we have only issued improvement notices to a small number of suppliers.

Local Procurement

The Company adheres to the principles of local development and local supply. We actively cultivate local suppliers to achieve procurement at the right time and place. This lowers management and operational costs, reduces transportation-associated carbon emissions, and creates local job opportunities and economic prosperity. To ensure the timely delivery, quality, and price of raw materials, apart from establishing a sustainable raw material management system, we regularly gather raw material information to support overall procurement management.

Local Procurement in 2018

Unit: NT$10,000s



Local Procurement Amount (Raw Materials)

Total Procurement (Non-Raw Materials)

Local Procurement Proportion (Total Procurement)

Note 1: To achieve local procurement, we buy from Taiwanese suppliers for plants in Taiwan.
Note 2: Non-raw materials include spare parts, construction (including labor), transportation, and explosives.

Supplier Grievance Mechanism: Suppliers may report any offences against the discipline and integrity of work to the complaint mailbox at MP.Buster@taiwancement.com.

CHAPTER 03

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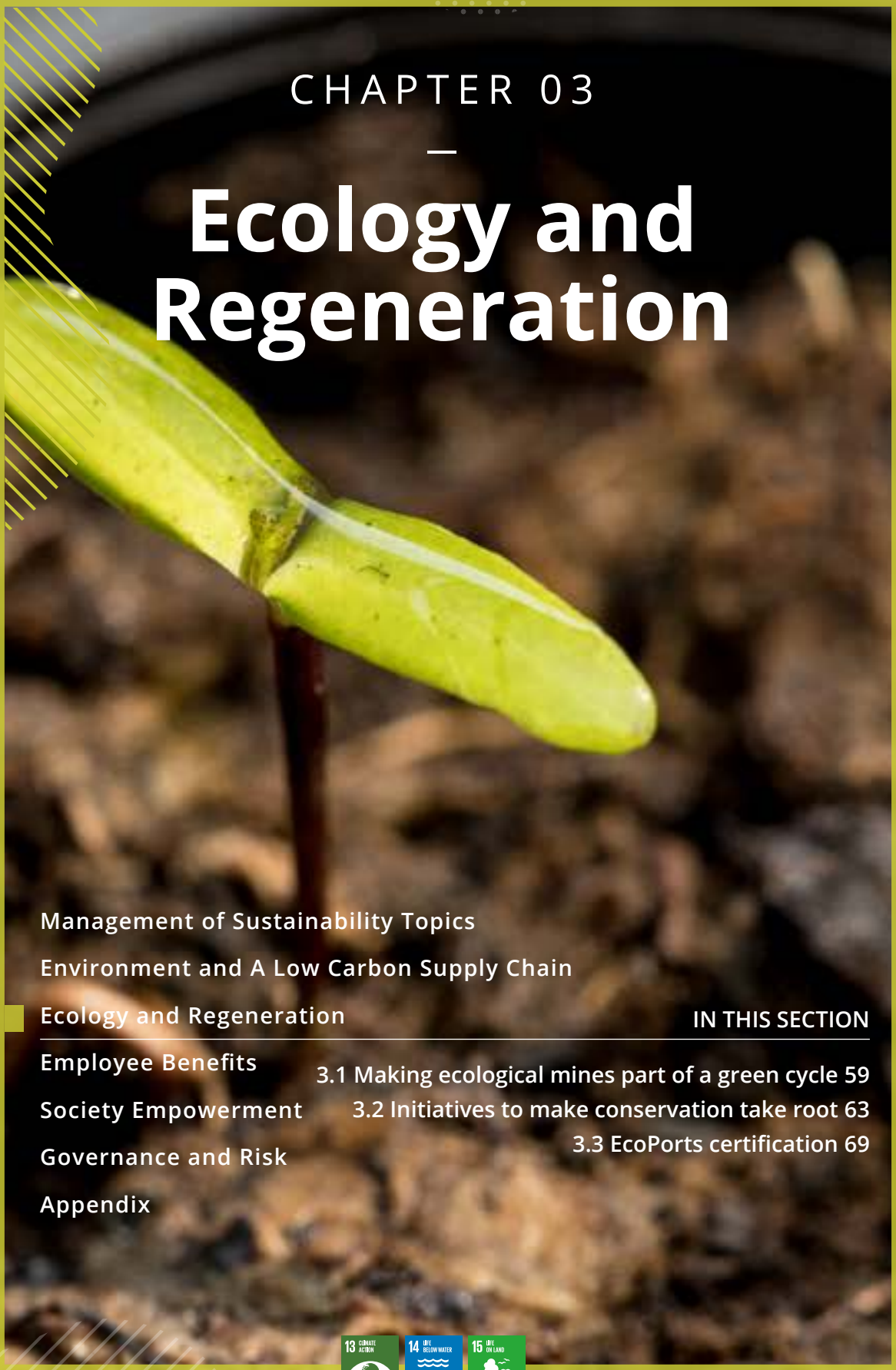
Ecology and Regeneration



IN THIS SECTION

Management Policies

Stay committed to only using extraction methods that protect the environment, to restoring the ecology of mining areas, and to preserving plant species.

Carefully consider ecological balance and restoration and conduct ongoing follow-up restoration management. Aim to return mining areas to their true ecological state and gradually restore lime ecosystem.

Conserve tropical and sub-tropical plants to maintain rich biodiversity on earth. Continue to concentrate on development of three major academic directions: deeper social connections, expanded international influence, and training domestic and international conservationists.

In consultation with a Taiwan green port promotion plan and in line with international sustainability trends, transform Ho-Ping Port into a green EcoPort.

Assessment Mechanisms

Maintain communication channels with stakeholders. Regularly arrange visits to mining areas by local community residents and educational organizations. Ensure that environmental management takes place in accordance with regulations and planning. In 2018, 10 external organizations and close to 400 people visited Ho-Ping Plant, the mining area and the vertical shaft system.

Keep the conservation center open to academic institutions and schools for research. It publicly discloses conservation project results on its website and assesses the return on investment. In 2018, the center joined three major international cooperative plans and its plant conservation collection reached 33,008 taxa.

Short-Term Objectives

Join the Global Genome Biodiversity Network to share ecological conservation results with other international organizations.

Continue to cooperate with city and county governments as well as domestic and international academic organizations to protect endangered plants.

Plan for Ho-Ping Port to achieve EcoPorts certification from the ECO Sustainable Logistic Chain.

Mid- and Long-Term Objectives

By 2030, achieve the following five goals: expand the accumulated mining zone restoration area to 16 hectares, reach a 90% proportion of native trees, achieve an 80% average survival rate for trees and vegetation, successfully grow more than 12,000 trees, and plant at least 25,000 saplings.

By 2027, the conservation center shall collect live specimens from 40,000 taxa.

Share and exchange ecological balance and other environmental information with major international ports to build a major port with strong environmental awareness.

Responding to the risks and opportunities that climate change brings, the Company formulates policies to mitigate and adapt. Mitigation focuses on ecology and renewal. Comprehensive planning includes not only ecological restoration of mines but also long-term investments in protecting endangered plant species. We use the power of plants to awaken us to the full ecosphere and to protect the diversity of life.

Biodiversity Policies

In the places we mine, the Company is committed to sustainable development of the local environment and ecology. Each quarter we commission anexternal organization to carry out environmental monitoring. We divide organisms in mining zones into plants and animals, separate them by type, category, distribution and population, then create an organism directory which includes diversity indicators. Plant growth distribution charts and protected animal sighting locations are kept. Data comparisons, which reveal changes to the mine environment ecology, contribute to surveys of mine ecology restoration and guide industrial-academic cooperative models and planning.

3.1 Making Ecological Mines Part of A Green Cycle

— During mine excavation, we seek to minimize environmental impact. After mining is completed, we must return the site to its natural state.

Mines are a core part of TCC's business. We are committed to only using extraction methods that protect the environment, to restoring the ecology of mining areas, and even go so far as to preserving key plant species of the world. TCC's mining restoration is different from typical hurried greenification models. We do not blindly aim to only achieve high green coverage rates or large quantities of saplings. Through long-term planning, careful consideration of ecological balance and restoration, and ongoing follow-up restoration management, we return mining areas to their original state. We work with academia and the Dr. Cecilia Koo Botanic Conservation Center (KBCC), Asia's largest plant conservation center, to research indigenous plants and gradually restore lime ecosystem.

The Mining Ecosystem

Restoring the Original Ecological Environment

Rather than settling for "ecological pond" or "butterfly park" type installations, we bring back the original ecosystem

Proactively Engaging with Neighboring Communities

In 2018, 10 external organizations and a total of 400 people visited Ho-Ping Plant, its mines, and its vertical shaft system

Su-Ao Taibai Mountain Mine

- Density of 4,000 plants per hectare far exceeds the legal requirement

Hualien Ho-Ping Mine

- Advanced, low carbon excavation techniques
- Industrial-academic cooperation to restore native plants
- More than 4,000 plants

Kaohsiung Shoushan Mine

- Plant and animal habitat
- Limestone kilns and brick cultural zone

Su-Ao Taibai Mountain Mine – A biological Garden of Eden

At 900 meters elevation and directly in the path of the northeast seasonal winds, Suao's Taibai Mountain Mine is frequently hit with Force 7 gusts of wind, making it feel as if a tropical storm is approaching. "First, there are only rocks and no soil, second is the excessive winds, and third is the lack of water," said Huang Ji-wei, a professor of horticulture at National I-lan University. Despite these three traits, which make it difficult for even grass and bushes to grow, the TCC and I-lan University team managed to cultivate a lush botanical environment.

The team used innovative techniques and an "original recipe." Rather than the typical model of planting fast-growing vegetation, we used an ongoing project involving simultaneous excavation and habitat restoration based on the area's original ecology. Native, pioneer species with a reputation for being hardy were favored.

The "original recipe" included drip irrigation and wind-breaking nets. Eventually, there were more than80 taxa of plants growing on the site, including subcostate crape myrtle, Formosan ash, Taiwan incense cedar, single-seed juniper, Yushan juniper, Chinese bonsai, green maple, ring-cupped oak, Taiwan cherry, Autumn maple tree, indigenous cinnamon tree, Formosan michelia, Taiwan Eugenia, camphor tree, Taiwan zelkova, Chinese soapberry, flamegold tree, Taiwan acacia, small-leaved mulberry, common elaeocarpus, Chinese fringe-tree, Ceylon ardisia, Siberian elm, Formosan sweet gum, broad-leaved podocarpus, Taiwan cow-tail fir, Taiwan red cypress, and Taiwan yew. The density of about 4,000 plants per hectare is four times higher than the legal requirement, and at the time of writing the coverage area was about 80%. Hawks soar through the sky, and Swinhoe's pheasants scatter across the ground. Macaques, snakes, wild goats, and Reeves's muntjacs forage in the forest surrounding industrial roads. The makings of the original habitat, and the return of the animals who originally inhabited it, are already underway.

To restore greenery on sloping mine walls, we pioneered a new sloped planting method that was used with 20 plant taxa, including water willow, small-leaved mulberry, and subcostate crape myrtle. Besides restoring native species, we added scenic landscaping and climbing vines on walls. Various types of wild berries growing among the nooks and crannies of these structures add dots of ruby red that resemble fantastic mini-gardens. The Eden Project in the United Kingdom consists of biomes built in a reclaimed mine. Professor Huang, who studied in the UK, plans to use ecological techniques to build Taiwan's own Eden on Taibai Mountain.

Insufficient water

An irrigation system ensures that the plants that need more water get it.

Excessive winds that kill plants

To guard against typhoon damage, some of the plants are tied to bamboo poles. Metal fences with 60% opening protect the plants against heavy winds.

Lack of nutrients in the soil

Nutrient-rich soil that uses mushroom manure, Fu Ciang compost, and fermented chicken excrement provides a good growing environment for the plants.

Hualien Ho-Ping Mine – An Ecological Research and Study Base

On spring afternoons, warm currents and seasonal winds from the Pacific Ocean turn Ho-Ping's Jinchang mining zone into a cloudy, misty wonderland. The Ho-Ping Mine area contains the Tananao Schist, an ancient metamorphic complex. TCC uses a highly mature, highly advanced vertical shaft extracting method. This low-carbon mining technique has a relatively low impact on the environment, is completely underground, and is both automatized and safe. It lowers the impact on the surface, preventing surface scars and exposed areas.

The Company started the plant restoration plan in 1996 and expanded its scope in 2015 to include both rock face ecology and the planting of large mountain terraces. In 2018, we cooperated with the Dahan Institute of Technology to plant a wide variety of native plants and broad-leaved pioneer species. Environmental surveys showed that there are at least 121 families, 307 genera, and 439 species of plants in the area, including 108 trees with a recognizable trunk, 83 shrubs, 61 vines, and 187 grasses and herbs. Included are two rare species, 49 endemic species, 358 native species, 24 naturalized species, and eight cultivars. The mining area also has an 1,100-square meter plant nursery with approximately 4,000 saplings that are 4 years old or above, including white zelkova, Formosan ash, Formosan alder, Chinese soapberry, and ring-cupped oak.

In 2019, we plan to cooperate with the National Hualien Vocational HighSchool of Agriculture to continue with a native plant restoration and nursery project. By combining the professional knowledge of academic organizations with the Company's practical experiences, we conduct plantings and reforestation, animal and plant surveys, and environmental and climatic data gathering. While restoring the mining area's natural environment, contributors gain valuable forestry experience.

A majority of the villagers who live in Hsiulin Township, which neighbors Ho-Ping Mine, are members of the Truku indigenous tribe. In the 17th and 18th centuries, their ancestors headed east, crossing the Qilai, Nenggao, and Hehuan mountains and other peaks of the Central Mountain Range before arriving in Hualien, where they built a new home. In consideration of the spirit of the Truku tribe, the Company planted cherry blossom trees along the mine walking paths. The blossoming of the cherry blossom trees this past year filled the mining area with new life.

Kaohsiung Shoushan Mine – A green Forest Path, Rich In Phytoncides

Luxuriant green scenery, red bricks, and lime kilns combine to produce an original, simple atmosphere. Built in 1917, these are the earliest generation of cement kilns in Taiwan. They silently stand as a testament to past prosperity in the Shoushan mining area. After the Company's mining rights in Shoushan expired in 1992, Shoushan gradually developed into a popular Kaohsiung leisure area with an abundance of wild animals, including snakes, wild boars, monkeys, and birds. The dense green forest includes a green forest path that is rich in phytoncides. Since the Zuoying and Gushan districts are prone to flooding, the Company

supported the construction of on-site retention ponds by the Water Resources Bureau. In 2017, when the area was opened to the general public, it quickly became a popular recreational spot for families to visit and hike on weekends and holidays. Reclamation of the Shoushan Mine is completed, and some historic relics that provide insight into the area's past industrial roots will be preserved, including the lime kilns and brick buildings. Turning Shoushan into a cultural park will add to the richness of this well-known natural site.

A World Class Plant Conservation Center x TCC Mining Zones

"When flowers bloom, butterflies pay visit." TCC deeply cares about restoring the ecology of our mining zones and supporting local plant diversity. We go beyond the short-sighted, fast solution of simply increasing vegetation cover and reject ideas like wetland parks or butterfly zones. Rather, we aim to return limestone mines to their original state.

The Company is a long-term sponsor of KBCC, which for many years has participated in a wide variety of international plant conservation initiatives. At the beginning of December 2018, KBCC visited the Taibai Mountain mining area in Suao and the Hoping mining area in Hualien to conduct on-site surveys and collect plants to bring back for further study. KBCC is expected to have a TCC mining area reclamation plan ready in 2019. Besides adhering to Forestry Bureau recommendations for plant types, greenery coverage, and height, KBCC gave initial recommendations on the restoration of native plants and planting trees suited to the various elevations of our mining areas. Using a systematic approach, we aim to restore at least 50% of the limestone habitat and return the mining zone ecology to its original state.

The climate and environment of the Taibai Mountain mining area in Su-Ao pose distinct challenges to native plant life restoration. After surveying the area, KBCC found that a special variety of miscanthus unique to Taiwan was thriving. Since miscanthus grows very quickly and is used to make biofuel, KBCC recommended planting it when reclaiming mining areas. One of the native plants brought back from Taibai Mountain, Begonia Formosana, was already growing at KBCC.

Senior KBCC director Chen Chun-ming said that since Begonia Formosana was able to grow on local slopes, he recommends gradually transplanting it from mid-mountain elevations to higher zones.

The warmer climate of the Ho-Ping mining zone (when compared to Taibai Mountain) and remaining original soil support better reclamation. KBCC gathered Bletilla striata (a Chinese medicinal ingredient), southern ladies tresses, and Taiwan hibiscus from the surrounding area. Hibiscus is a heliophyte, meaning it can withstand intense sunlight. Its ability to survive in harsh environments gave it an important role during the early stages of reclamation. KBCC recommended that we first plant heliophytes to provide shade then follow with sciophytes (or shade-loving plants).

3.2 Initiatives To Make Conservation Take Root

KBCC was founded in 2007 with the support of Mr. Leslie Koo of the TCC Group and Cecilia Koo. Its mission is to conserve tropical and sub-tropical plants and maintain rich biodiversity on Earth. For the past 12 years, the Company has contributed both funding and manpower to KBCC, so it can focus on research. Through international academic exchanges and participation in global tropical and sub-tropical plant conservation plans, KBCC has become a world-class base for plant preservation.

In 2018, KBCC expanded communication with stakeholders and shared its 12 years of research findings with society.

KBCC continues to concentrate on development of three major academic directions: deeper social connections, expanded international influence, and training domestic and international conservationists. Our goal is to instill plant conservation beliefs into the minds of the general public.

Deeper Social Connections

Besides gathering plant species and preserving living plant specimens, KBCC cooperates with government agencies and domestic medical centers to offer abundant educational and research resources. In the process we show nature's vitality to the general public.

Ark Plan

In 2019, KBCC launched the Ark Plan in cooperation with botanical gardens, science museums, and government agencies. The plan relies on a combination of off-site conservation and on-site preservation of rare regional plants to save Taiwan's endangered species. In the future, cooperative partners will share directory information and send staff to train at their respective organizations in order to strengthen plant preservation efforts and have a greater impact on the environment. In this way, we will preserve life's seeds to support the planet's future.

"The Stunning Natural World" : The 2018 Taichung World Flora Exposition

The 2018 Taichung World Flora Exposition was a major tourist draw, with an average daily attendance of over 100,000 people. KBCC joined the exposition's smart agriculture pavilion by showing the "Green Treasures – Nature's Gems" installation, which featured a 1-tonne orchid and bird's nest fern display taller than the average human height. The rare sight put nature's vitality on full display. On-site commentary and guides offered the chance for direct communication with the general public while teaching conservation techniques.

Social Impact:
Within two months there were 409,406 visits made to the smart agriculture pavilion, and the accumulated number of visitors was increasing by approximately 150,000 people each month.

"Saving Plant Germplasm": A Taichung plant restoration and preservation campus activity

In 2018, cooperating with an elementary school for the first time, KBCC preserved valued plants unique to Taichung. The activity brought teachers and students to the Dadu Mountain area for exploration. Participants separated into teams then played a game to raise awareness of plant conservation and renovated the campus greenhouse. Besides breeding plants already in the greenhouse, they added more native plants found on campus. This valuable resource can support future greenification initiatives at the school or in surrounding neighborhoods and parks.

Social Impact:
From the start of the plan to December 2018, two schools participated. They integrated their regular curriculum and unique school characteristics to hold at least three training classes attended by more than 300 people.

"Taiwan's Spirit of Plant Protection Spreads Around the World": National Geographic Channel records Taiwan's plant survey assistance plan

National Geographic created a documentary on Taiwan's first international plant survey assistance plan, which involved conducting a survey and census of plants found on the Solomon Islands. The exposure promoted our plant protection and cultivation concepts to the world.

Social Impact:
National Geographic Channel is broadcasting the documentary in 37 countries in Greater China, Southeast Asia, and the Middle East. In total, it will reach 171 nations and be broadcast in 45 languages.

Expanded International Influence

KBCC is the world's largest conservation center for tropical and sub-tropical plants. It gathers knowledge, capital, and land, joining these resources with people who are highly passionate about botany.Of allthe world's botanic research institutions, it has the most diverse collection of tropical plants. The center attracts visits by domestic and international scholars and international plant organization members. Through a wide range of cooperative mechanisms, KBCC spreads the Company's philosophy towards using native plant restoration to restore a city's natural roots. At the same time, it lets the world know of Taiwan's passion and ability to preserve its native plant life.

Major International Cooperation Plans In 2018

◉ After signing a memorandum of understanding, KBCC formally launched a joint project to research and conserve the flora of Vietnam's Lang Biang Plateau in conjunction with the National Museum of Natural Science (Taiwan), the Taiwan Forestry Research Institute, the Southern Institute of Ecology (Vietnam), and Bidoup Nui Ba National Park.

◉ KBCC helped to host the 7th Asian Symposium of Ferns and Lycophytes. Before the symposium, KBCC welcomed domestic and international experts and students to a Pteridophyte reproductive biology workshop.

◉ KBCC and Botanical Gardens Conservation International co-organized the Taiwan Plant Conservation Symposium, which was held at National Tsing Hua University. KBCC discussed the potential for plant conservation cooperation in Taiwan with domestic and international conservation agencies.

International visits and exchanges

2009

Welcomed visits by members of the Missouri Botanical Garden, the US Council of Advisors on Science and Technology, the US National Academy of Sciences, the Chinese Academy of Science, and the Kunming Institute of Botany.

2010

Welcomed visits by members of the University of British Columbia, the American Orchid Society, the Xiamen Botanical Garden, the Royal Botanic Garden Edinburgh, the Malaysian Agricultural Research and Development Institute, as well as a Mexican fern ecology expert.

2011

Welcomed visits by members of the Royal Botanic Garden Edinburgh, a live plant specimen management team, the Chen Shan Botanical Garden, the South China Botanical Garden, the Lushan Botanical Garden, the Tibet Institute of Plateau Biology, the Xishuangbanna Tropical Botanical Garden and Research Institute, and the US National Academy of Sciences.

2012

Welcomed visits by an Araceae expert from the Missouri Botanical Garden, as well as members of Kansas University, the National University of Singapore, and the Taiwan Floriculture Development Association.

2013

Welcomed visits by members of the World Orchid Conference and the US National Academy of Sciences as well as a production team from NationalGeographicChannel.

2014

Welcomed visits by members of Sweden's Uppsala University, the Royal Botanic Garden Edinburgh, and the UK's Kew Gardens.

Welcomed visits by members of the Tsukuba Botanical Garden; the American Orchid Society; the Qinghai Province Agriculture and Animal Husbandry Department (Mainland China); the Solomon Islands Botanical Gardens; the South Africa Department of Agriculture, Forestry and Fisheries; the Oman Ministry of Agriculture and Fisheries; the Saudi Arabia Ministry of Agriculture; the El Salvador Ministry of Environment and Natural Resources; the Ivory Coast Ministry of Agriculture; the Sao Tome and Principe Ministry of Agriculture, Rural Development and Fisheries; the Honduras Institute of Forest Conservation; the Columbia City Government; the Paraguay Ministry of Planning for Economic and Social Development; the Mainland China Fairy Lake Botanical Garden; the Malaysia Forest Research Institute; the Sarawak Forest Department; and the Indonesia Bogor Botanical Gardens.

2017

2019

Welcomed visits by members of the Longwood Gardens and the Singapore Botanic Gardens.

Training Domestic and International Conservationists

Climate change is already posing a grave threat to world ecology. Plant diversity is rapidly plummeting and the species extinction rate is rising. Many types of plants and animals are disappearing before even having been identified. Facing such difficult conservation challenges, KBCC cooperates with domestic and international academic and research institutions to combine cross-disciplinary knowledge and educational resources, giving students access to more diverse information. They learn about the world's plant biodiversity from museums, zoos, botanical gardens, plant genetic resource centers, and field studies. As the students develop a strong research foundation, they gain a better understanding of plant interaction and care as well as environmental conservation, turning them into future global conservationists.

2018 Contributions

◉ Investments: Invested hundreds of thousands of NT dollars to provide free accommodation and breakfast to domestic and foreign academics who participated in summer research and study trips. The support helped the academics focus on their plant research.
◉ Course Name: Tropical Plant Conservation Field Work
◉ Course Summary: One week of plant study, three weeks of greenhouse field work, and individualized topic study
◉ Course Objectives: Students have the opportunity to learn about important tropical plants from around the world, including Orchidaceae, Bromeliaceae, Araceae, and Pteridophyta. They gain firsthand experience of tropical plant conservation and restoration strategies and methods, covering topics such as species classification, diversity, cultivation and growth, and artificial breeding.

Conservation Center Staff Interview – Hong Hsin-jie

"Another pair of endemic species," said Hong Hsin-jie, or A-jie, while sitting in his office after returning from the mountains of Taitung. A-jie records the appearance and characteristics of each sample. Yitiao TV, a social media group well known in Taiwan and Mainland China, produced a video about A-jie with the tagline: "After 20 years braving the wilderness, a junior high school graduate is deeply revered by his PhD peers." Featuring exciting footage of A-jie traversing through the forest to collect samples of endangered plants, the video accumulated more than 10 million views and turned A-jie into a well-known figure. Despite having been bitten six times by poisonous snakes, A-jie is still fascinated by the forest and takes great joy in exploring it. He works hard to preserve the world's beautiful natural environments.

Native Restoration to Restore A City's Natural Roots

With the support of KBCC, the Company seeks to achieve "local restoration." The idea behind this concept is to gradually restore local ecological systems that were destroyed by urban development and human damage. The Company relies on KBCC's R&D capacity to make biodiversity a part of mining restoration, and its academic research and training ability to preserve the various native plants found in mining zones. Through industrial-academic cooperative plans, we restore the ecological systems of mining areas to their original appearance while heeding biodiversity. Besides using TCC's organizational strengths and ongoing investments, we promote restoration achievements via multimedia channels to amplify our social communication.

【TCC Community】

To strengthen TCC's promotion of environmental protection and sustainability, we use our social media presence, including the Company's official WeChat account, YouTube channel, and Facebook fan page to support KBCC's activities. For example, in conjunction with the 2018 Taichung World Flora Exposition, for four weeks starting in November 2018 we carried out a special "care for endangered plants" promotional activity. A posting each week introduced a plant endemic to Taiwan that was in danger of extinction. The activity's total online reach was 14,700 hits.

【Resource Investments】

Since 2007, the Company has contributed NT$30-40 million in annual funding to KBCC. Over 12 years, accumulated human resources expenditures have surpassed NT$91 million, which has enabled the conservation center to grow from about five full-time employees to 35 professional research and management staff. With this funding, KBCC has already amassed 32,820 different types of live specimens, making it the world's largest conservation center for tropical plants. The Company's ongoing support will enable KBCC to continue to have a major impact in the field of plant conservation.

【Industrial Media Channels】

Over many years of operations, the Company has developed strong media channels in Taiwan and Mainland China. We use these to help KBCC issue press releases and event news. Using different media channels, we are able to reach all of our stakeholders and expand the effectiveness of our social communication.

KBCC & Kaohsiung Medical University Herbal Medicine Collection Plan

Many key ingredients in the development of medicine come from plants! This key factor led KBCC and the Kaohsiung Medical University Center for Infectious Disease and Cancer Research to establish Taiwan's first plant and herbal medicine collection in 2016. Research is underway on more than 1,400 taxa, and initial results are already available for Nepenthaceae, Musaceae, Araceae, and Palmae. Ryan Kuo, a senior manager at KBCC who is leading the project, said that common diseases like lung cancer, breast cancer, liver cancer, avian influenza, and dengue fever are focal points of the research. KBCC provides a research platform in order to increase cross-disciplinary cooperation in future medicinal research. In the process, it raises quality of health and promotes better ways of life.

Saving A Rare Pingtung Plant: Pyrenaria Buisanensis Restoration Plan

After not being seen for more than 80 years, the rare Pingtung plant Pyrenaria buisanensis was rediscovered then brought back from the brink of extinction by KBCC. At one point fewer than 80 stock plants remained, but now the conservation center has close to 2,000 seedlings. Pyrenaria buisanensis grows in the low elevation hilly region between Machia and Laiyi townships. After the International Union for Conservation of Nature and Natural Resources named it a critically endangered species, in 2017 the Pingtung County Government and KBCC jointly launched a plan to preserve its germplasm. In 2019, Pingtung County and KBCC went a step further with the signing of a letter of intent to preserve the germplasm of more of Pingtung's rare and endangered plants. In the future, the two parties will cooperate more closely in the areas of plant conservation marketing, technology, and investment.

Future Outlook

Through the end of December 2018, we successfully cultivated 33,008 taxa of plants from different parts of the world. They will be a valuable resource when rebuilding ecological systems in the future. Using digital management tools, we tagged the plants with codes for enquiring the name, origin and plantation information at any time.

Since each plant requires a specific growing environment, the greenhouse design must be adjusted based on plant properties. After several expansions, by 2018 we built 17 greenhouses and two constant temperature rooms. Most of the facilities are equipped with shading nets to regulate brightness. A reverse osmosis spray system controls moisture levels and reduces the temperature. Three of the greenhouses have a water curtain with large fans to reduce high temperatures and create a shaded, cool, and humid environment, even in the summer.

In the future, we will continue to promote botanic conservation and restoration by focusing on three key aspects: social bonds, expanded international impact, and training of international and domestic conservationists. From Taiwan to distant corners of the world, our actions will awaken more people to the importance of protecting the environment. In 2018, we continued to expand the collection of live tropical plants specimens and advanced cloud forest species conservation. Our goal is to collect live specimens from 40,000 taxa by 2027.

For more conservation center information, visit

Or conservation work updates, visit our Facebook fan page at

3.3 EcoPorts Certification

The Company carried out the Hoping Cement Plant investment plan in response to the expiration of mining permits in western Taiwan and government policy promoting the eastward movement of mines. When building the main plant, in order to reduce the transportation burden on the Suhua Highway and lower our environmental impact, we invested in building a dedicated port that offers incoming and outgoing deliveries of raw materials and goods for all plants in the industrial zone. In response to international trends to promote green, ecological ports, the Company invests in environmental optimization plans to ensure that Ho-Ping Port meets global sustainability standards.

To launch our eco-ports project, the Company consulted the Taiwan green ports promotion plan. With a focus on four key port aspects: passenger transport, cargo transport, port environment, and development of cities and communities, we hope to turn Ho-Ping into a green port that improves the local environment, develops passenger transport, and raises quality of life. The green port initiative will also raise operational efficiency, lower pollution, and improve the port image, fulfilling our circular economy vision.

In the future, we plan to achieve EcoPorts certification from the ECO Sustainable Logistics Chain. This will support sharing of ecological balance and other environmental information with major international ports (such as the Port of Amsterdam, the Port of London, the Port of Stockholm, and the Port of Oslo), helping us to turn Ho-Ping into a major port with strong environmental awareness.

Ho-Ping Port Ecological Management Achievements

Marine Ecology:

◉ Phytoplankton: 17 genera of Bacillariophyta, one genus of cyanobacteria, one genus of Chrysophyta, and three genera of dinoflagellates, for a total of four divisions and 22 genera of algae.

◉ Fish: 13 families and 15 species

◉ Marine Benthos: Mollusca, arthropoda, and chordate, for a total of three divisions and 16 species

Fisheries Economics:

◉ Local fishermen catch a monthly average of 2,260 to 2,710 kg of fish valued at NT$550,000-580,000. Careful management of Ho-Ping Port enables them to continue in this business.

Key Ecological Management Principles of Ho-Ping Port

- Reduce environmental pollution caused by sea and land transport (carbon emissions, air pollution, noise)
- Promote the replacement of old loading and unloading equipment and conversion to electrical equipment

- Develop recreational facilities at ports that connect cities to water
- Support local government development, promote port-related businesses, and seek support for port infrastructure projects

- Optimize port environmental quality (air, water, greenification)
- Support sustainable operations by fostering a corporate image of environmental protection

Strengthening GHG and Pollution Management by Ports

Ho-Ping Port has four wharfs, including one cement wharf, one coal unloading wharf, and two multifunctional wharfs for vessels up to 80,000 tonnes to load and unload materials. The total throughput is 23 million tonnes. The facilities were built for use by all plants within the Ho-Ping complex to reduce transportation costs and enhance market competitiveness.

The port storage and transportation system has a sealed corridor conveyor belt design to reduce fugitive dust. Automatic loading and unloading machines are equipped to reduce transportation volume and air pollution. Streetlights in the port area and office lighting are gradually being changed to LEDs in order to save electricity.

Ho-Ping Port acts in accordance with air pollution reduction policies to plan ways to eliminate air pollution sources in the port area. When docked at port, ships that use fuel to generate electricity emit both NO_X and SO_X. Therefore, we added an alternative onshore power supply. The port has an automatic identification system installed to check vessel speed and advise vessels to slow down to 12 knots or lower when entering or departing. We also advise that only low sulfur fuel (sulfur content of <0.5%) be used when in the port area, and we replaced all old diesel-powered port utility vehicles that only met level 1 or 2 emissions standards.

We added seven power supply pillars at the wharf to eliminate the pollution caused by the use of premium diesel during berthing. Electric-powered loading and unloading equipment further reduces the pollution caused by fuel-powered equipment used on the ship or wharf.

Effectiveness of Port Energy Conservation Measures

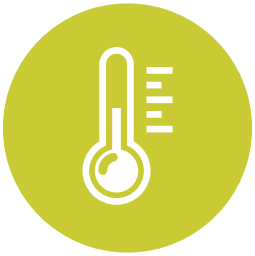
Item	Reduced Fuel Volume (kL)	Reduced NO_X Emissions (L)	Reduced SO_X Emissions (L)	Reduced CO_2 Emissions (kg)
Power Supply Pillars	537	3	-	1,659,330
Electric Coal Unloading Equipment	2,008.1	4,793	1,484	235,424
Electric Ship Loading Equipment	38	283	88	13,902
Electric Loading and Unloading Equipment	1,107	12,381	3,833	608,083
Electric Ship Loading Equipment	160	13,429	4,157	659,550
Switching to LED Illumination at the Port	-	-	-	373,272
Total	3,850	30,889	9,562	3,549,561

Note 1: The fuel conversion factor is 2.596 tonnes of CO_2 per kL Note 2: The electricity conversion factor is 0.000527 tonnes of CO_2 per kWh

Expanded Environmental Monitoring To Promote Ecological Development of Port Areas

The Company is a long-term supporter of environmental protection. In order to better understand the environment surrounding Ho-Ping Port, we voluntarily commissioned National Taiwan Ocean University to implement the Ho-Ping Industrial Zone Integrated Environmental Survey Project. Survey outcomes will serve as a reference point for long-term research and monitoring of the nearby ecology by industry, the government, and academia. In 2018, air quality tests showed no irregularities, and SO_2, NO_2, and CO were far below legal standards. These results showed the effectiveness of the Company's environmental management.

In 2015, we started a three-year monitoring and analysis project covering the Nanao River estuary in the north and the Liwu River estuary in the south. The project scope included analyzing the seabed, littoral drift simulation, the range of influence of warm water discharge by Ho-Ping Power Plant, and heavy metal composition in the bottom sludge of Ho-Ping Port. It also included the creation of a regional environmental database system. In 2018, the project continued by surveying local ecological and fisheries economic productivity, which has an impact on the warm water discharge impact range of Ho-Ping Power Plant. It examined changes to fixed fishing net catch volumes and the influence of Ho-Ping Harbor on sand shift in the south reclamation area (replenished area). The ongoing study of nearby marine ecology optimized the regional environmental database.



The volume of warm water discharge is small, so the impact of the temperature difference compared to the background seawater is limited.

The temperature of water 1,000 m away from the outlet is unaffected by the warm water discharge.

Sand in the seabed near the south replenished area has a relatively large grain size, which makes it difficult to transport to the northern sea area for sedimentation and deposition.

Embankments create better habitats, supporting wider biodiversity.

Port Environment and Greenification

The green area of Ho-Ping Port is 16.7 hectares large, accounting for 10.52% of the port's total area. It consists of approximately 7.9 hectares of ironwood and 8.8 hectares of other plant growth. Its tree population numbers around 26,000 and includes red cedar, Alexandrian laurel, Indian almond, Ficus caulocarpa, Pongamia, orchid trees, Linden hibiscus, camphor wood, fragrant pittosporum, and Cajeuput. Together, they absorb about 317,172 kg of CO_2 each year. Ho-Ping Port also spent close to NT$10 million to purchase vessels to clean up drifting items and trash in the port waters, and we plant greenery throughout the port area to further support our ambition of being a "green port."

CHAPTER 04

Employee Benefits

IN THIS SECTION

Major Topics

Training and Education

| Management Policies

Recognize employees as partners for achieving sustainable growth. Continue to integrate the Company's internal resources to provide comprehensive professional development and training. Internally, build effective training resources that strengthen employee resolve while raising their sense of accomplishment and recognition of the Company. Externally, solicit talented new recruits.

Promote the Management Assistant Program (MAP) to offer comprehensive training to professional management talents in all areas.

Evaluate and plan annual training based on the Company needs. Set annual training themes that fit operational guidelines and development strategies. Design training classes of all levels in order to raise employee management capabilities and professional skills.

| Assessment Mechanisms

Regularly evaluate education and training hours. After courses end, measure student satisfaction. Results shall be used to plan future courses and raise training effectiveness. Total training hours were 118,650 in 2018.

Establish a performance evaluation mechanism and regularly analyze the performance of all employees. Combine overall performance of the Company with individual performance then reward outstanding employees. In 2018, the performance evaluation completion rate was 100%.

| Short-Term Objectives

Promote special training courses to raise employees' skills and foreign language capability, thus strengthening our global competitiveness.

Carry out 4,800 hours of management courses.

| Mid- and Long-Term Objectives

Invest NT$25 million annually towards education and training expenses. Expand talent development courses and build a workforce with a global vision.

Raise the overall English-language ability of our employees. Plan international professional training courses and cooperate with institutions that offer advanced language study courses.

Occupational Health and Safety

| Management Policies

Adhere to worker safety standards, continue to improve workplace safety, and provide employees with a work environment that promotes physical and mental health.

Integrate the OHSAS 18001: 2007 Occupational Safety and Health Management System and the CNS 15506: 2011 Taiwan Occupational Safety and Health Management System (TOSHMS) into the Company's guidelines and achieve certification. Company headquarters shall establish a unit that is responsible for managing and promoting worker safety and health. Each plant shall establish a quality assurance section that is responsible for managing and promoting work environment safety and health.

Carry out hazard identification and risk analysis. Use self-management to eliminate potential hazards. Announce work safety incident standard operating procedures to reduce related harm and losses.

| Assessment Mechanisms

Regularly convene Occupational Safety and Health Committee meetings and report implementation results. If major workplace accidents occur, besides carrying out necessary and appropriate disciplinary actions, review the causes of the accident and follow up on improvement measures.

Make the Administration Division responsible for overseeing the implementation and results of occupational safety measures at each of the Company's plants. The division shall consider occupational risk management when evaluating individual performance and operational management.

| Short-Term Objectives

Continue to strengthen occupational safety and plant safety management measures.

Maintain our promise of zero work-related injuries.

| Mid- and Long-Term Objectives

Cooperate with the labor union to formulate occupational safety and health guidelines for the cement industry. Become a model facility for occupational safety management.

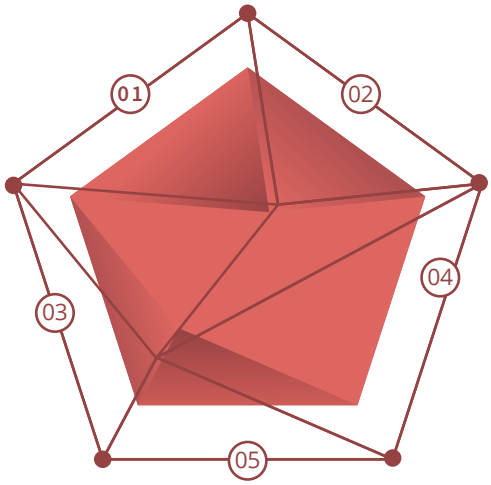
Create a friendly and safe workplace. Achieve zero workplace injuries or occupational accidents for the full year.

4.1 Employee Development

Excellent human resources are the bedrock of sustainable corporate development. In order to improve the competency and quality of our employees, and thus maintain an important long-term competitive advantage, TCC offers business administration and plant administration training. As our business units expand, we conduct technical training classes to enhance employees' technical skills. In 2018, the Company raised training and education expenditures to nearly NT$25 million and provided 118,650 hours of training. We also introduced plans aimed at creating a friendly working environment, so we can recruit and retain employees to face the challenges of future global trends and sustainable corporate developments.

01 Recruit employees with international business experience, hold English language training courses, encourage staff to join internal classes and external training sessions.

02 Offer a profit-sharing mechanism that includes quarterly bonuses and salary structure adjustments.



03 Participate in campus recruiting sessions at major universities and colleges as well as corporate informational meetings and other activities. Promote Company visits and college internships, so prospective employees gain a better understanding of TCC.

04 Encourage all employees to participate in charitable activities by offering volunteer holidays and other incentives.

05 Promote an employee assistance program to help employees and their families resolve physical and mental anguish caused by personal and/or workplace problems.

4.1.1 Youth Cultivation (MAP)

TCC's Management Assistant Program (MAP), which was launched in 2007, aims to train management professionals with a wide range of skills in order to meet the staffing needs of our diversified business operations. In 2018, as MAP entered its 12th year, we established "entering new markets to drive global expansion" as a core development theme. As TCC grows globally, we will cultivate more youths with a global vision.

Through 2018, of the 379 management assistants (including internal staff) recruited to participate in MAP, 193 successfully became managers. Of these, 107 are still at the Company, for a retention rate of 55%.

MAP candidate, 9th session: Lin Yu-rou Currently a QC supervisor at TCC's Yingde Plant

MAP Success Stories

MAP Impressions: In the summer of 2015, in order to improve myself I decided to step outside of my comfort zone and join TCC's MAP. Over the course of 15 months of rigorous training I faced many technical and management challenges, which provided an opportunity to learn how to gradually solve problems and prevent problems from happening in the first place. This process established a foundation that I can rely on when becoming part of the management team in the future. The program provides a channel for non-managers to join the management team. As we apply our skills to our work at the cement plant, we gain a feeling of accomplishment and find a good work-life balance.

MAP is a comprehensive staff cultivation plan. Participants study at multiple plants, undergo learning assessments, and engage in practical study in order to enhance their professional skills and management capabilities. To meet the diverse needs of our organization, we invite trainees with a wide range of skills to engage in cross-departmental and in-depth learning. They study the entire cement production process of cement plants in Taiwan and Mainland China, from raw material input to product output. At the Administration Division they learn about corporate decision-making and risk control strategies.

Instructional lessons cover situational learning anddepartmental drills while offering study groups, on-site technical training, and advisors. Besides professional training, we respect the corporate social responsibility commitment of trainees. Every management assistant has the opportunity to teach children from remote areas by volunteering at the Cement Academy or to learn about the importance of ecological conservation at the botanic conservation center. Management assistants whocompleted the program now work at TCC plants in Taiwan and Mainland China as well as the Administration Division and laboratories. They are continuing to learn how to become outstanding managers.

TCC Sales Staff Five-Stage Training Program — 12 MONTHS

Limestone mining | Raw and cooked water proportion | Product inspection and shipping | Customer service | Market development

Training for Pre-Mix Concrete Professionals

Production and Marketing Processes

- Construction Site Development
- Shipping Dispatch
- Proportion Design

Management Decision-Making

- Business Administration
- Risk Control
- Construction Site Service
- System Design

The Six Stages of MAP

01 **Cross-Plant Study**
The program includes practical study at numerous cement plants in Taiwan and Mainland China. Cooperating with staff from across the Taiwan Strait enables management assistants to gain a well-rounded understanding of the business and cultural differences. By applying this knowledge, they can quickly adapt to new work situations.

02 **Management Practice**
Diverse management courses incorporate practical work. Comprehensive instructional materials and case studies provide management assistants with the knowledge and skills they need to become competent managers.

03 **Course Assessments**
A monthly evaluation meeting is used to assess the training effectiveness based on participants' professional skills, thinking, and adaptability to new management models and work environments.

04 **Diverse Communication Channels**
Course content is not limited to professional skills specific to management assistants' main areas of work. Participants must understand operations at the departments they will communicate regularly with as well as upstream and downstream affiliated divisions. They build channels that promote cooperation and support, thus facilitating division of labor and coordination.

05 **Corporate View**
TCC updates management assistants on Company operational planning and system designs in order to provide insight into how corporate leadership thinks. The management assistants learn how to plan and carry out strategies.

06 **Future Development**
After completing the program, participants are promoted to assistant manager. Following a promotion ceremony, graduates officially become part of the TCC leadership team. Opportunities become available for these new assistant managers to join TCC's subsidiary companies and advance their careers.

Knowledge Sharing and Transfer

MAP ends with a promotion ceremony for participants who successfully completed the program. Besides praising their professional achievements, we welcome these young employees to the ranks of management. We offer them carefully selected gifts with special meaning and encourage the new managers to share their glory with family. Junior trainees help organize the graduation ceremony to make the event especially meaningful for senior trainees, adding to the symbolism of knowledge transfer from one generation to the next.

4.1.2 Talent Development

Employees are at the root of TCC's business and are the Company's most important asset. Their development is crucial to operations. Therefore, based on surveys of corporate needs, TCC develops annual training plans. Combining operational policy and development strategies, we formulate annual training themes then design courses suited for employees of various levels. Our objective is to raise employees' management ability and technical skills so we can sustain a strong workforce that enables sustainable operations.

TCC designed the 2018 education and training courses for employees at each level. We covered topics such as foreign language training, management, technical skills, and safety and health using lectures, small classes, dynamic courses, field trips, interactive teaching, and other presentation methods. New classrooms in 2018 provided more comfortable and professional training environment. To give students an even better experience in the future, TCC gathered feedback on course benefits, lesson practicality, and teacher performance. The overall satisfaction rate was 93%.

Pioneering Foreign Language Training

In 2018, in order to raise the international competitiveness of our employees, TCC invested heavily in hiring English teachers. Each week the teachers come to the plants. Employees ask questions or participate in conversation classes in English.

The English study environment is further enhanced with two-hour weekly classes for entry-level supervisors. After 40 hours of study in a year, based on individual needs employees can choose one-on-one language training, group classes, or external classes, and they can apply for an annual subsidy of up to NT$12,000 These measures are part of a comprehensive approach to raising the English-language competency of our staff.
In the future, TCC plans to use international courses or language training centers to create specialized courses lasting from three months to half a year. These will further enhance the professional skills and foreign language ability of our staff.

In 2018, TCC invested NT$25 million in education and training to cover classroom expenses, paid hours for instruction and after-class appraisals by internal staff, and other fees. Total training hours were 118,650. Included are 818 employees of subsidiary companies and related enterprises, who had a total of 2,495 training hours.

Figure 1: A TCC training session (and town hall meeting). Participants included employees of subsidiary companies and related enterprises.

Education and Training Hours by Level and Gender (unit: hour)

Duty	Training Length (♀)	Training Length (♂)	Total Length	Average Length
High-Level Supervisors	50.1	209.4	259.5	20
Medium-Level Supervisors	221.6	933.4	1155	16
Base-Level Supervisors	119.4	1592.8	1712.2	28.5
Professionals	15577.5	87817.7	103395.3	675.8
Direct Labor	1818.3	10309.2	12127.5	19.9
Total Length	17786.9	100862.6	118649.5	130.2
Average Length	120.2	132.71		

Note 1: High-level supervisors are at the assistant vice president level or above. Mid-level supervisors are managers or deputy managers. Entry-level supervisors are junior managers or section managers. Professionals are engineers, project managers or management associates.
Note 2: Education and training hours include overseas regions.

4.1.3 Performance Evaluations

The Company carries out performance evaluations of all employees then establishes work standards and determines required skills based on job level and position. Managers need to be effective at leading members of their team while arranging work processes and understanding company operations. They must focus on innovation and response. When faced with problems or other situations, they must respond quickly and propose ideas to prevent similar issues from happening again. General employees need to actively discover problems and clearly understand the cause. They must be acute observers of everyday operations and provide constructive solutions to effectively raise job completion rates. Direct labor should focus on execution. They need to establish work priorities and sequences while acting quickly to achieve objectives.

The Company offers competitive salaries and generous performance bonuses. In accordance with rules governing performance bonuses, the Company establishes job objectives and behaviors then combines overall performance of the Company with individual performance to reward outstanding employees. In 2018, the performance evaluation rate was 100%.

The performance evaluation scope does not include employees with fewer than six months of service time or those participating in MAP.

Excellent human resources are the bedrock of sustainable corporate development and employees are a company's most important asset. The primary concept behind TCC's worker development plan is to continuously raise the ability and quality of our employees. Annual increases to education and training expenditures have led to more classes covering a wider range of topics, which enables a higher percentage of employees to receive training. The average number of training hours per employee has also increased, giving employees of all levels the opportunity to receive the training they need. TCC's investments in human resources provide employees with technical training to continue on their path of development. As the Company grows, demand for managers increases. Training staff to fill these new roles raises the employee retention rate and this joint development of the Company and employees creates a win-win situation.

4.2 Employee Care

Passed the
OHSAS 18001
2007
Occupational Safety and Health Management Sytstem

Passed the
CNS 15506
2011
Taiwan Occupational Safety and Health Management System (TOSHMS)

4.2.1 Workplace Safety

Work environment safety for employees has always been a primary concern of TCC. Therefore, we established the Occupational Safety and Health Management Office to take charge of OSH-related affairs, hold regular OSH Committee meetings, and follow up on task implementation and project progress. Each plant established a Quality Assurance (QA) section to plan the management and implementation of plant ESH work. Headquarters supervises the effectiveness of each plant. All plants regularly report the outcomes of OSH improvement plans, including the handling and prevention of accidents and safety management of contractors, to keep headquarters appraised of OSH status and support continued progress.

In 2018, TCC participated in the Taiwan Cement Manufacturers' Association and completed a safety partnership implementation plan with the Ministry of Labor's Occupational Safety and Health Administration. The plan calls for announcing OSH guidelines for the concrete industry by 2020. In order to raise safety awareness among cement industry workers, TCC was named as a year 2020 model facility for occupational safety management. Our goal is to achieve zero workplace injuries or occupational accidents for the full year. We will use this opportunity to share our management methods and lead the industry towards a safer future.

Work-related Injuries

To raise safety awareness among employees conducting routine work and thereby prevent severe occupational accidents, TCC conducts hazard identification and risk assessments. Self-management eliminates potential hazards. Workplace safety measures are strictly carried out and SOPs for handling industrial safety incidents are announced in order to reduce injuries and losses. When an industrial safety incident occurs, plants shall immediately activate their reporting system to notify related units and the Administration Division. We also organize annual self-defense fire training drills according to the fire safety protection plan. The Company's overall goal is to maintain a record of zero work-related injuries.

Contractors must abide by OSH related laws and regulations and the "Contractor OSH and Environmental Management Rules and Punishment Guidelines" established by the Company. Before entering a TCC plant, contractors are required to fill out the Workplace Environmental Hazards Notice and the Workplace Environmental Hazards Advice to ensure they understand the Company's environmental safety and health guidelines.

Work-Related Injuries in 2018

	Occupational Accidents		Lost Days	Lost Day Rate (LDR)	Work-Related Injury Count	Injury Rate (IR)	Total Length of Absenteeism	Absentee Rate (AR)
	Work-Related Injuries	Work-Related Fatalities						
TCC Headquarters								
●	0	0	0	0	0	0	73	0.45%
●	0	0	0	0	0	0	32	0.15%
Plants								
●	0	0	0	0	0	0	144	0.70%
●	3	0	29	4.40	3	0.40	796	0.48%

Note 1: Work-related injuries are based on the monthly occupational accident reports submitted by each plant.
Note 2: Injury rate = (total number of injuries/actual number of hours worked) x 200,000. Refer to the "Regulations of the Examination of Injuries and Diseases Resulting from the Performance of Duties by the Insured Persons of the Labor Insurance Program" for injury determination criteria.
Note 3: Lost day rate = (total number of lost days/total number of available work hours) x 200,000
Note 4: AR = (total number of work days lost to absenteeism/total number of available work days) x 100. Absenteeism includes sick leave, menstrual leave, work-related injury leave, family care leave, and personal leave.
Note 5: There were no occupational illness incidents in 2018.

Contractors also must sign the OSH Letter of Undertaking to pledge that their workers will abide by OSH rules when working at TCC plants. In 2018, TCC contractors did not report any work-related injuries.

4.2.2 Salary and Benefits

The Company is committed to developing and optimizing comprehensive and sound salary and bonus mechanisms to ensure that we offer competitive salaries. We regularly review remuneration policies and systems in order to recruit and retain outstanding employees. For full-time employees, we set the year-end bonus at two months of salary every year. In 2018, the operational performance of the Company and the performance of individual employees were factored into quarterly performance bonuses for the first time. These timely awards are a strong incentive. We optimize the salary system by using industry standard salary reports to review employee salary and bonus mechanisms. These become a reference for salary adjustments and employee promotions.

For benefits, besides the traditional bonuses provided at the Lunar New Year, Dragon Boat Festival, Mid-Autumn Festival, and employee birthdays, TCC employees receive a NT$3,500 bonus on Labor Day and an end-of-year bonus of around NT$25,000. Employees also receive medical care, travel, education, and advanced studies subsidies. On average, each employee receives around NT$50,000 in annual bonuses and subsidies; some employees receive close to NT$100,000.

Total Salary Amount and Average Salary of Full-Time, Non-Managerial Employees

Comprehensive Welfare Benefits for Employees and Their Families

Since establishment, the Company has spared no effort in taking care of employees and their families. We seek to build a warm and ideal work environment. By planning and implementing a diverse set of benefits, including group insurance as well as scholarships and dormitories for employees' children, we are there to care for employees and their families at all times. We also subsidize clinical care, hospitalization and other expenses for employees' families, so our staff can work with their minds at ease.

Number of Times Welfare Benefits Were Used

- Medical Care Subsidies 1,745
- Health Examination Subsidies 81
- Birth Subsidies 16
- Travel Subsidies 775
- Extended Education Subsidies 19
- Scholarships for Children 490
- Marriage Gifts 13
- Birth Gifts 18
- Retirement Benefits 22
- Funeral Consolation Payments 22

Note: All full-time employees are entitled to the above benefits.

Employee Stock Ownership Trust

To improve employee focus and encourage staff to stay and grow with the Company over the long-term, at the end of 2018, TCC created an employee stock ownership trust plan. Since the plan's launch in March 2019, full-time employees have been able to allocate a fixed portion of their monthly salary to the trust, and the Company deposits a matching amount in the employees' personal trust account. The program strengthens employee retention and helps staff to accrue wealth that supports planning of future retirement expenses.

Health Care

The Company cares about the physical and mental health of employees. We provide annual health examinations that are more extensive and of greater frequency than is required by the law. New employees can undergo the general labor physical checkup and special examination items, including noise, dust, and ionizing radiation, at any TCC contracted hospital located across Taiwan at the Company's expense. Annual medical care subsidies are NT$40,000 per person. In 2018, the subsidies were used 1,826 times.

TCC Student Dormitory and Scholarships for Children

To encourage excellent behavior and school performance from our employees' children, the Company generously provides scholarships. In 2018, total scholarships amounted to NT$2.18 million. Also, to help children of employees enroll in schools in Taipei, TCC built a student dormitory in Xinyi District. The dormitory has air conditioning, television sets, washing machines, refrigerators, and internet, providing the children with a safe and comfortable place to stay.

Insurance Care

The Company not only provides insurance to employees but also offers discounted group insurance to employees' family members. Employees receive term life insurance, personal injury insurance, personal injury medical insurance, hospital insurance, cancer insurance, and occupational accident insurance, with all premiums paid by the Company. Family members of employees qualify for accident insurance, injury medical insurance, and hospital medical insurance at favorable premiums. In 2018, the subsidies were used 2,297 times.

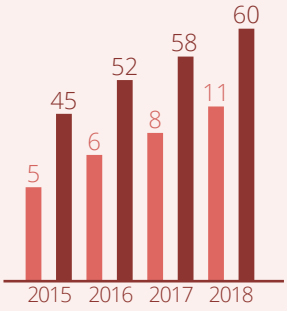
Parental Leave

In order to promote the right-to-work and equal opportunity of all employees while ensuring that workers are able to care for their families while maintaining a career, employees can apply for parental leave and for reinstatement to the previous job they held in accordance with the "Act of Gender Equality in Employment." Based on individual needs, parents can apply to extend their leave or to return to work early. During the period of parental leave without pay, employees may continue to participate in their original social insurance program.

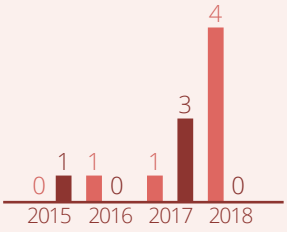
In 2018, four staff in Taiwan applied for parental leave without pay. We protected their right-to-work by prioritizing reinstatement to the previous job they held prior to taking unpaid parental leave. The retention rate was 100%.

Parental Leave Use During the Previous Four Years

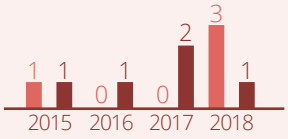
●Females | ●Males



Employees Qualified for Parental Leave Without Pay in the Year (A)

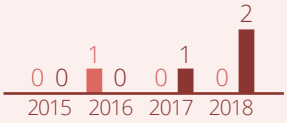


Number of Employees Applying for Parental Leave Without Pay (B)

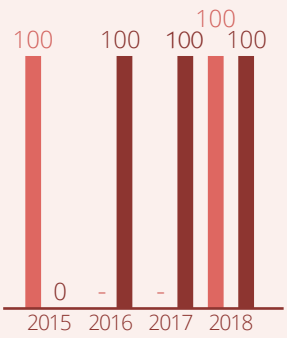


Estimated Number of Employees Reinstating in the Year (C)

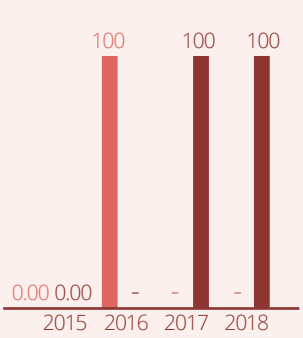
Actual Number of Employees Reinstating (D)



Number of Employees Continuing Work at TCC After Reinstatement for 12 Months (E)



Reinstatement Rate After Parental Leave Without Pay (D/C)



Retention Rate One Year After Reinstatement (E/D in Previous Year)

Note: Only full-time employees who have been at the Company for at least six months qualify to take parental leave without pay.

Fitness Centers

More and more people are aware of the importance of hypertension prevention. The Company therefore installed automatic blood pressure monitors at headquarters and all plants for employees to measure their blood pressure free of charge. To promote exercise, we added a fitness center and recreational facilities at headquarters and all plants. Indoor equipment includes treadmills, upright bikes, elliptical cross-trainers, table tennis, and pool tables. Outdoor basketball courts are available, and we offer massage chairs for employees to release stress. With these extensive facilities, we hope employees remain physically strong and stay healthy at work and in everyday life.

Employee Cafeteria

The Company uses reusable ceramic tableware in the employee cafeteria. Nutritious meals with one serving of meat, three vegetables, a soup, and a dessert meet the four basic principles of a balanced diet, food hygiene and safety, delicious taste, and fair price. Each plant provides educational health knowledge on the Company notice board and updates new health-related information to help employees learn about important topics, such as the prevention of chronic renal disease; the importance of checking for hypertension, hyperlipidemia, and hyperglycemia; and health promotion activities such as “Healthy Life Side by Side.”

Family Day

Employee’s families are important to TCC. Each year we organize a family day event to promote interactionamong employees and enable their families to better understand the Company. In the process, everyonebecomes closer. In 2018, we held “TCC Family Day LOHAS Forest Tour,” which was our first outdoor family day event. Guests challenged themselves in a high-rope exploration area and relaxed on family forest tours. The New Taipei City Autism Association dispatched a coffee truck to the event. Association members who staffed the truck interacted with the crowd, raising their ability to support themselves and offering a feeling of satisfaction.

Strong support from TCC employees, shown by the large numbers of people who purchased coffee, added a charitable element to the event. As participants relaxed and enjoyed the day, they contributed to making the community a better place.

Social Group Activities

The Company founded a basketball club that already has 18 members and meets every week to play. Besides providing a great opportunity to exercise, the friendly interaction helps participants to relax.

Pension System

The Company appropriates labor pension reserve funds in accordance with the "Labor Standards Act" and the "Labor Pension Act" and established a Labor Pension Fund Supervisory Committee and to oversee pension rules. In accordance with regulations, each year the Company allocates sufficient pension reserve funds to a dedicated Bank of Taiwan account in order to guarantee employees' pension rights. The TCC Employee Welfare Committee also formulated a savings consolation payment scheme. Under this scheme, the Company appropriates funds to offer consolation payments to employees who leave their job or retire.

In 2018, we invited all retired employees to a special banquet where they could recall time spent at the Company. The event brought members of the TCC family together in a friendly and caring atmosphere.

4.2.3 Labor-management Relations

The Company values positive communication and mutual trust between labor and management. We promote interaction and harmony on all issues and respect the rights and interests of trade union members. We seek to build a harmonious work environment. Each plant has its own trade union, and 95.8% of the Company's employees are members.

4.2.3 Human rights guarantee

In order to build a harmonious, friendly, and healthy workplace environment, TCC guarantees the rights of workers. We treat each employee with respect and establish human rights policies in accordance with international treaties.

Our human rights policies are applied to the parent company, to all subsidiaries in Taiwan and overseas, to joint ventures, and to all other related enterprises and organizations that we have control over. After approval from the Company chairperson, human rights policies are announced internally via employee information platforms, email, and other methods. The policies are disclosed on the Company website and in the corporate social responsibility report. All new employees are informed of the policies in order to ensure that they understand how the policies are implemented.

Pension Reserve

◉ Every month the Company contributes to each employee's individual labor pension reserve account at the Bank of Taiwan. The Labor Pension Reserve Supervisory Committee, co-established by labor and management, oversees the accounts.

◉ Every month the Company contributes 6% of each employee's monthly wage to their labor pension personal account, which is established by the Bureau of Labor Insurance.

Payment of Employee Pension

◉ For qualifying employees who choose to retire under the terms of the "Labor Standards Act," TCC applies years of service before and after implementation of the act when calculating seniority under the TCC Pension Fund Regulations. This policy exceeds legally required benefits.

◉ Employees who use the "Labor Pension Act" may claim their pension from the Labor Pension Personal Account established by the Bureau of Labor Insurance.

To maintain an equal and healthy work environment, ensure gender equality in employment, and respect personal dignity, we established the Special Regulations for Workplace Sexual Harassment Prevention and related grievance channels. Employees who are sexually harassed in the workplace may report to the head of the Human Resource department via the grievance hotline or email for special staff to confidentially handle their grievance, in order to protect the rights and interests of employees and to maintain a healthy work environment. In addition, we arrange courses on sexual harassment prevention and grievance channels for newcomers in their orientation training. In the future, we will continue to plan mechanisms for preventing human rights violations in order to better protect employees. In 2018, TCC had zero reported human rights violations.

Human rights policy of Taiwan Cement Company

4.3 Workplace Diversity

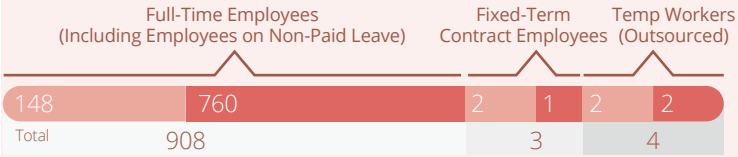
4.3.1 Workforce Composition

Our employees are the most important organizational asset and the source of the Company's continuous growth. In response to new business developments and the expansion of some duties, by December 31, 2018, we had increased our workforce to 908 people, an increase of 90 people compared to 2017. In terms of gender, we had 760 male employees(84%) and 148 females(16%). The number of female employees increased by 30 compared to 2017, which demonstrates our ongoing efforts to achieve gender equality. In terms of age distribution, 88 employees were 30 and under(10%), 535 employees were between 31 and 50(59%), and 285 employees were 51 or older(31%).

Note 1: All TCC employees are full-time employees. The total number of employees disclosed does not include three employees on fixed-term contracts and four temp workers (outsourced).
Note 2: At TCC headquarters, there were 153 employees, including 88 males and 65 females. At TCC plants, there were 755 employees, including 672 males and 83 females.

Females | Males

Total Number of Employees by Work Contract Type and Gender



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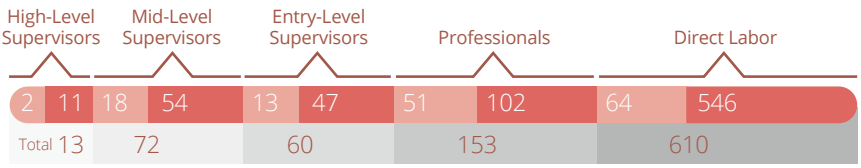
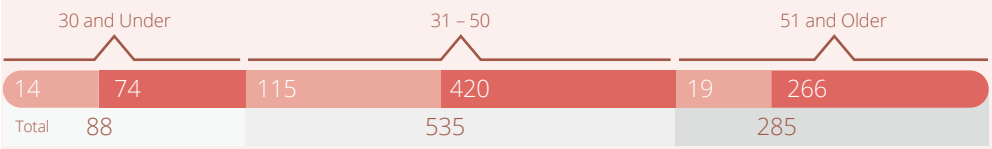
Note 2: At TCC headquarters, there were 153 employees, including 88 males and 65 females. At TCC plants, there were 755 employees, including 672 males and 83 females.

Total Number of Employees by Position Level and Gender



Note 1: High-level supervisors are at the assistant vice president level or above. Mid-level supervisors are managers or deputy managers. Entry-level supervisors are junior managers or section managers. Professionals are engineers, project managers or management associates.

Total Number of Employees by Age and Gender



Total Number of Employees by Education and Gender

	Ph.D.		Master's Degree		Bachelor's Degree		Junior College degree		Senior High School, Vocational School, or Below	
	0	3	18	67	92	246	24	133	14	311
TOTAL	3		85		338		157		325	

Total Number of Employees by Workplace and Gender

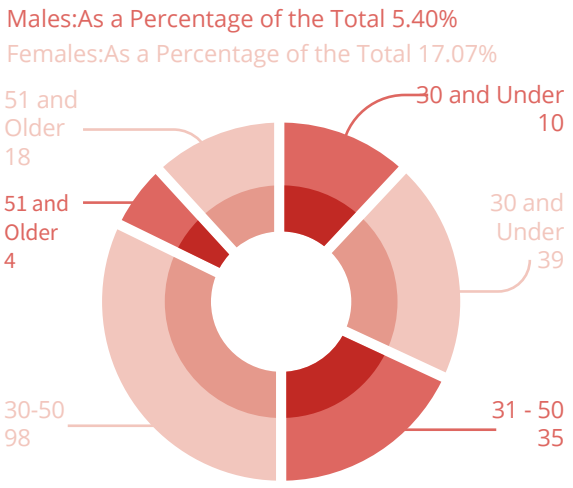
	Headquarters		Su-Ao Plant		Ho-Ping Plant		Hualien Plant		Taipei Cement Product Plant		Taichung Cement Product Plant		Kaohsiung Cement Product Plant	
	65	88	5	149	5	139	5	30	69	126	17	60	21	129
TOTAL	153		154		144		74		156		77		150	

4.3.2 Turnover

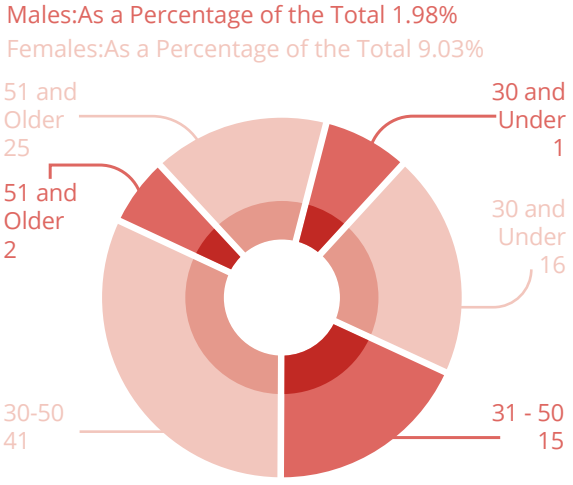
In 2018, TCC added 204 new employees, accounting for 22.47% of the Company's total workforce. Among the new employees were 49 women and 22 persons aged 51 or above. There were 100 employees who left the Company in 2018, accounting for 11.03% of the total workforce. The employee separation rate fell by 2.3% compared to 2017, showing the effectiveness of TCC's employee retention policies.

●Females | ●Males

Total Number of New Employees by Gender and Age



Total Number of Employee Separations by Gender and Age



CHAPTER 05

Society Empowerment

IN THIS SECTION

Management Policies

Hold innovative cement handicraft workshops to create new opportunities to communicate with the general public and change the image of the cement industry.

Continue to promote the Cement Academy and learning - initiatives. Spread education to cultivate the next generation.

Promote employee volunteer days. Each employee receives two volunteer days per year to help disadvantaged members of the society or provide support.

Popularize traditional arts and culture. Build bridges to communicate with people from other countries, initiate artistic dialogues, and promote cultural exchanges.

Assessment Mechanisms

Regularly track implementation of social participation projects and assess social influence. In 2018, we held 10 cement handicraft workshops that had a total of more than 1,000 participants.

In 2018, total attendance at TaipeiEYE shows by foreign travelers was close to 35,000.

Short-Term Objectives

Expand the cement handicraft workshops, including related activities at our Mainland China plants, to showcase our cultural and creative capability.

Continue to participate in educational volunteer activities while increasing both the number of participants and total volunteer hours.

Continue to promote artistic and cultural activities while preserving traditional culture.

Mid- and Long-Term Objective

Continue to invest NT$6 million annually in the Cement Academy to support educational development.

Continue to promote various social participation projects to increase our corporate social influence.

5.1 Engagement

Cement has always been the core of TTC's business. While many people see cement as a material for constructing large buildings, we want to show that it's a versatile substance which can be made into household objects like utensils and pots. "Cement can be beautiful" and with creativity, cement's beauty has therapeutic effects. We communicate with stakeholders through cement handicraft workshops. While making handicrafts, we discuss the role of arts and the environment in our business and cultivate new methods of teaching.

In September 2018, TTC's Ho-Ping Plant together with the Hualien County Cultural Affairs Bureau, T-bone Studio, and stone sculptors jointly held TCC Cement Handicraft Workshops. Using TCC cement as a raw material together with original whale, pig, and other artistic designs, participants mixed, molded, shaped and painted cement pots. Their hands felt cement's distinct softness and temperature. Air flows through cement, allowing it to breathe. Plants grow well and seem to have greater vitality when juxtaposed with a simple cement pot.

The workshops included lessons on the local environment and ecology so that participating students, teachers, parents and others learned more about their surroundings and plant life. These lessons made them aware of the importance of living in harmony with nature. In 2018, we held 10 such workshops that were attended by a total of over 1,000 people. In the future, we plan to hold similar workshops at the Company's plants in Mainland China to further spread our ideas of sustainability. The workshops provide many benefits. They are a valuable employee communication channel.

Environmental topics cause employees to adjust their behaviors and achieve an internal consensus that will drive the Company ahead. Cement handicraft workshops and environmental education courses are like a "TCC value train" that delivers corporate ideals to the society. They also embody the Company's vision to go beyond the traditional B2B communication channel and enter the B2C domain. As society understands the future of the cement industry and its relationship with environmental sustainability, people will learn how it can achieve a balance and be green.

2018/10/20-21 Two workshops at Ho-Ping (beginner and intermediate)
2018/10/27-28-29 Three workshops at Ho-Ping (beginner, intermediate, and advanced)
2018/11/10 Hualien workshop
2018/11/17 Su-Ao workshop
2018/12/11 Su-Ao's Yongle Elementary School
2018/12/19 Su-Ao's Shih-Min Elementary School
2018/12/28 Su-Ao Elementary School

Yongle Monkey – A Conversation Between TCC and Su-Ao's Yongle Elementary School

In December 2018, all 4th and 5th year students at Yongle Elementary School gathered in the auditorium. As they kneaded and pinched warm cement, they listened to folk stories told by employees of TCC's Su-Ao Plant. Next to Yongle Elementary is the Taibai Mountain Mine, one of Taiwan's most important mines. When students hear that this familiar "baldish" mountain is already home to the bug-attracting Formosan ash, the fragrant indigenous cinnamon tree, Chinese chestnut, strawberries, and passion fruit as well as creatures like monkeys, tree frogs and ladybugs their eyes light up. A teaching director who grew up in Yongle seemingly teared up when seeing TCC's video and our promise to "strike a balance between humanity and nature." She told us that the school tries to send this message to the children.
In April 2019, at a TCC Cement Handicraft Workshop at Yongle Elementary School participants made "Yongle monkeys." The principal, Tseng Wen-hsian, called creating the monkey is the best method for the school's neighbor TCC to promote cement creativity and environmental education. Tseng sees the program as a bridge between nature and the sustainable city.



5.1.2 Community Engagement

The Company makes a concerted effort to interact with the communities we operate in. We arrange for local residents and educational institutions to visit our plants and show stakeholders that our plants follow relevant laws and operate according to plan. In 2018, close to 400 people from 10 external organizations visited Ho-Ping Plant or our mining and shaft systems. They learned that the discharge of water from our mining system follows all water and soil conservation laws, and that after extraction from the mine is completed we do an excellent job of restoring the natural environment. Local residents learn that there is no reason to fear environmental impacts associated with our operations, which improves our community relations.

Mining Zone Visits, 2018

Apr.
Visiting Group
Ho-Ping, He-Zhong districts
Topics Covered
Mines, mine shaft system, mining area restoration, disaster prevention
Attendance 25

May.
Visiting Group
National Dong Hwa University, National Ilan University
Topics Covered
Mine shaft system, cement plants, ports, electricity plants
Attendance 55

Jun.
Visiting Group
National Central University (Department of Earth Sciences)
Topics Covered
Mines, mine shaft system, mine pit construction process
Attendance 12

Sep.
Visiting Group
Taiwan Railways Administration – Hualien Transportation Branch
Topics Covered
TCC Ho-Ping Plant, mine shaft viewing platform visit, Ho-Ping power plant, Ho-Ping port.
Attendance 38

May.
Visiting Group
Taipei Tech (Department of Materials and Mineral Resources Engineering)
Topics Covered
Mines, mine shaft system, mine pit construction process
Attendance 45

May.
Visiting Group
National Taiwan Ocean University (Institute of Earth Sciences), National Taipei University (Department of Earth and Life Sciences)
Topics Covered
Mines, mine shaft system, mine pit construction process
Attendance 70

Jul.
Visiting Group
He-Zhong Community
Topics Covered
Mining extraction, restoration and disaster prevention; viewing platform visit
Attendance 9

Plant Communication Performance, 2018

Jun.
Organization
Tzu Chi University
Topics Covered
Introduction and tour of the TCC Ho-Ping plant
Attendance 37

Nov.
Organization
National Dong Hwa University (Department of Sociology)
Topics Covered
Introduction and tour of the TCC Ho-Ping plant
Attendance 33

Nov.
Organization
National Dong Hwa University (Department of Economics)
Topics Covered
Introduction and tour of the TCC Ho-Ping plant
Attendance 49

5.1.3 Food Donation Plan

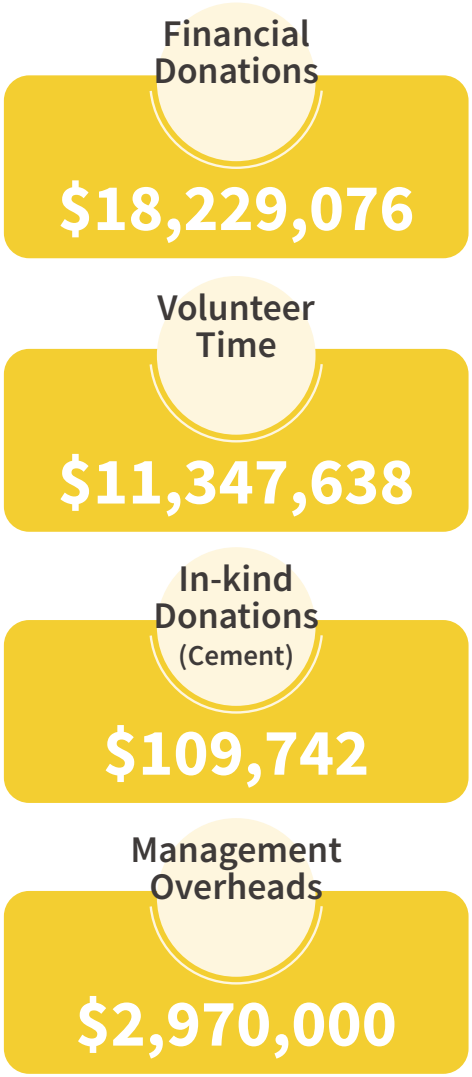
TCC participates in community development and charitable activities through a wide variety of methods and channels, demonstrating our care for the local environment. For many years, we have showed particular concern toward homeless individuals. Our long-term support and corporate resources, together with urging employees to regularly join in providing care, has helped more people find ways to smile again and enjoy life.

In response to the second United Nations Sustainable Development Goal of "Zero Hunger," the Company upgraded a program to provide bento boxes to people living without a proper living situation into a long-term, systematic plan. The new plan gathers employees, the Company and suppliers. Besides encouraging employees to donate meal vouchers, we turn extra food from the Company cafeteria into 50 bento boxes that are donated to a local charity group, which then delivers these hot meals to people living without a proper living situation, low-income households, and disadvantaged groups that are not supported by other social welfare organizations. By the end of 2018, the plan had already supported 200 people. In December, the charity group gave plum juice made by people in its job-training program to the Company as a way of showing thanks for our support.

5.2 Improving Students' Conduct and Learning

The Company's long-term contributions to education have shown us the types of people and the character that society needs. Through our Cement Academy and youth learning assistance program we help schools and families cultivate future citizens of the world. By supporting community development, we enable students, families and the Company to grow together. Among these initiatives, the Cement Academy is the activity most directly focused on supporting children's education in Taiwan and Mainland China. The program targets children from low income households, children who are raised by their grandparents, children of new immigrants facing cultural and language challenges, children from single parent households, children with one or two parents who live away from home, and orphans. It primarily supports remote areas of Taiwan and Mainland China where educational resources are lacking and nutrition is often inadequate or un-balanced. Using language as a key and the internet as a tool, the program broadens students' vision. As it opens up their dreams, the students' hopes and yearnings expand beyond their community to the wide world.

Charitable Donations (NT$)



Note 1: Volunteer time was converted to a monetary expenditure on the basis of the hourly pay of management assistants.

5.2.1 Global Insights

Participating Schools Since Inception
20

Participating Students 2018
1,277

Participating Students Since Inception
5,554

Participating Employees
1,316

Since 2012, the Company's Cement Academy has provided after-school guidance and arts classes at schools that are located near TCC plants. There are already 20 schools that participate, spread across Taiwan, Guangdong, Sichuan, Chongqing, Guizhou, Liaoning, Guangxi, Fujian, and Anhui. More than 5,500 students have taken part and benefited. The name of the program in Chinese, "Shiming," comes from the English for "cement" and an idiom that refers to smart students who are adept at learning. Our goal is to use education as a way of teaching students the importance of morality, learning and character.

Program Content

Cooperation with each school focuses on two main areas: on-campus care (after-school mentoring clubs and care meals) and off-campus care (post-class transportation and community care).

01

On-Campus Care

After-School Mentoring Club:
Using "English" and "Computers" as primary themes in conjunction with arts topics, we teach four classes a week to students of mixed ages. Each class is limited to 30 students.

Care Meals:
After classes end we provide a nutritious meal box to students, and at some schools we offer nutritious snacks during class. This offers students a healthy, balanced meal.

02

Off-Campus Care

Post-Class Transportation:
After the classes end we provide transportation options that enable students to get home safely and easily.

Community Care:
Since 2018, we have expanded our reach beyond the schools to understand the household environment and the life stories of students in the program and graduates. Household interviews reveal information about the students' living environment and family background, enabling us to get closer to the students and better understand their needs.

Program Benefits

Employees spare no efforts to support the Cement Academy. Each week a supervisor, a management assistant, or a general employee participates in one class. Staffmembers lead students on visits of the cement plant, plan Christmas shows and Children's Day events, and organize summer camps to enrich students' extracurricularlearning. In 2018, employees regularly volunteered for a day as activity leaders or storytellers. The experience increased employee empathy while giving the students more care and the opportunity to share. Students who presented what they learned became more self-confident. The theme of our 2018 summer camp was "Global Insight." A treasure hunt that incorporated cultural characteristics and architecture from around the world gave the students the chance to learn through play. As theyexplored the unknown, their curiosity grew and horizons expanded.

5.2.2 Encouraging learning

The Company donates to the Ministry of Education's "School Education Savings Account" to ensure that there are no disruptions to the education of disadvantaged youths. The account helps students of all levels in Taitung, Changhua, and Yunlin counties to continue to grow and learn, which enhances their competitiveness. In 2018, we donated a total of NT$160,000 in scholarships to students at six primary and junior high schools in Meilun District, Hualien County, including Meilun Junior High School, the Experimental Primary School of National Dong Hwa University, Haixing Primary School, Ming Chi Primary School, Fuxing Primary School, and Chu Chiang Primary School. We sponsor activities organized by local charities and temples and donate cement or funds to aid reconstruction of disaster areas or to support small-scale infrastructure projects in communities.

Hualien youth education grants

The Company has showed long-term attention and support towards the development of the Hualien area. We donated NT$720,000 to a World Vision educational action initiative that provides relief to families facing large educational expenses at the start of the school semester. The assistance reduces the learning gap between disadvantaged youths and their peers. Stopping disadvantaged youths from falling behind during their school years gives them a chance to use education as a tool for opening up more opportunities in life.

Jiaxing Chorus (Jianshi) fulfills a dream

At the 2017 Universiade, the Yixing Branch of Jiaxing Elementary School, located in Hsinchu County's Jianshi Township, sang the song "Embrace the World with You," in a performance that was seen by viewers from around the world. The chorus was then invited to join a competition in Vienna, but they did not have sufficient funds to make the trip. The Company donated NT$400,000 to cover the funding gap so the students could fulfill their dream.

Hualien Earthquake Relief Activity

After a major earthquake struck Hualien in February 2018, the Company responded quickly with NT$20 million in funds donated to a special earthquake relief fund to help the local government aid victims of collapsed buildings. We used our cement kiln to process post-quake tile and brick waste. These contributions helped disaster victims return to a normal life as quickly as possible.

Fast Earthquake Relief Showed TCC's Commitment to Social Care

After a major earthquake struck Hualien in 2019, TCC joined a meeting held by the Industrial Development Bureau to discuss the problem of damaged stone building materials and derivatives. At the meeting, we immediately agreed to handle 60% of this waste in the Meilun area, amounting to a total of 33,000 tonnes. By contributing to the government's relief effort, we accelerated the return of local residents to their hometown.

5.3 Cultural conservation

The Company is committed to promoting traditional arts. Using Chinese opera, we build bridges that foster communication with other countries and open up new artistic dialogues. Cultural promotion raises Taiwan's visibility on the global stage by sharing our soft power with the world. The C. F. Koo Foundation, which was founded in 1988, is committed to promoting Taiwan's industrial operational management, medical research, arts and culture, and related activities to the world (including Mainland China). It conserves and spreads culture via three main methods: preserving traditional arts, training theater talents, and international exchanges. The foundation invited famed performing artist Li Bao-chun and leading Peking opera artists from Taiwan and Mainland

China to present operas such as Confidants, Kuangyin Zhao, and The Palace of Eternal Life: A New Expression in Peking Opera and Kunqu. These neo-classics integrate two traditional Chinese opera styles to provide a rich theater experience that fits modern viewers' aesthetic appetites. The troupe, called the Taipei Li-Yuan Peking Opera Theatre, is often invited to perform at leading art festivals in Mainland China, such as the Peking Opera Festival, the China Shanghai International Arts Festival, and the Beijing Music Festival. It tours Europe, the United States, Japan, and Mainland China in order to promote traditional Taiwanese culture.

5.3.1 Preserving traditional arts

The Taipei Li-Yuan Peking Opera Theatre, formed by performing artist Li Bao-chun and like-minded professional youths from Taiwan and abroad, is a talented group of artists committed to preserving Peking opera. All members graduated from professional Peking opera academies and have extensive stage experience.

1 **Winner of a special award, a gold award, and a silver award at the Ministry of Culture's Art & Business Awards**

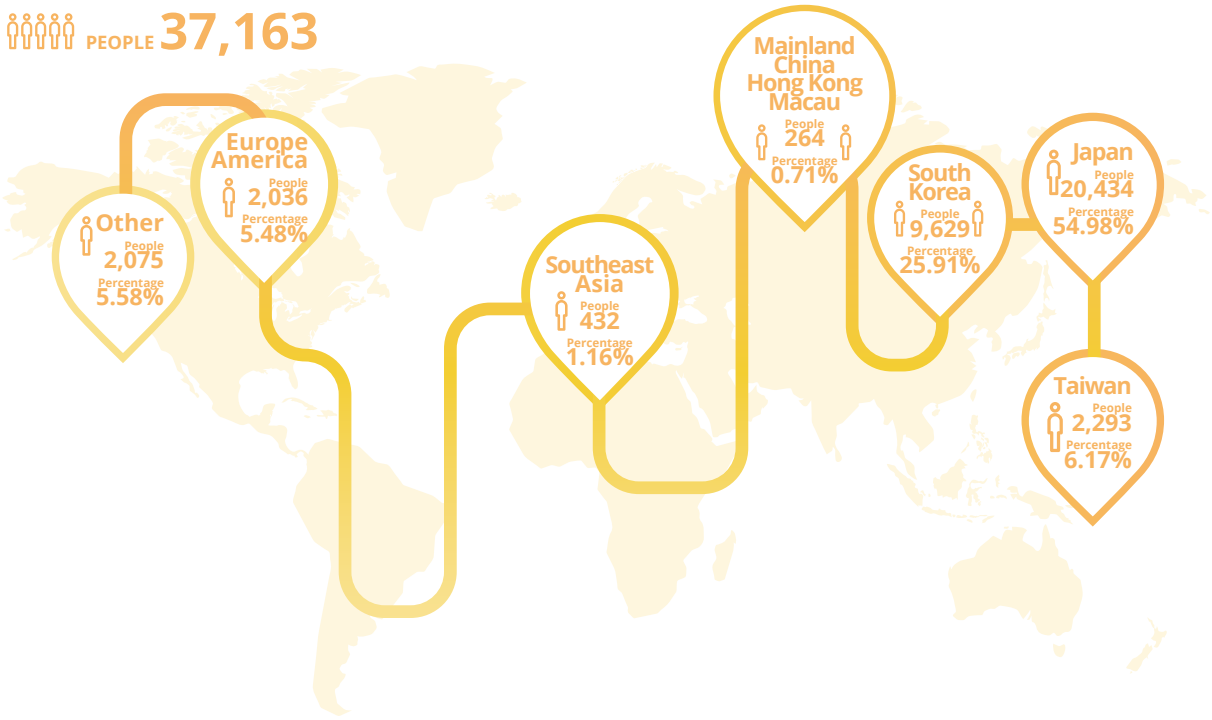
2 **Voted Taipei's best theater service troupe in an online poll**

In 2018, Li's opera troupe performed three classic operas: Qin Xianglian, The Orphan of Zhao, and The Dragon and Phoenix Chamber. The troupe presented a total of 15 shows in Hefei, Wuhan, Nanjing, Wuxi, Shanghai, and Yantai.

TaipeiEYE

Every Monday, Wednesday, Friday and Saturday evenings audiences seemingly as diverse as the United Nations gather at Taiwan Cement Building in Taipei. Their annual numbers exceed 30,000, with tourists from Japan, Europe, and America making up a large number of the visitors. One excited viewer said the following after seeing a show: "This is a great place for foreigners to learn, admire and experience what makes traditional Taiwanese cultural and arts performances so great." The C. F. Koo Foundation founded TaipeiEYE in 2002. Each year it hosts close to 200 Taiwanese folk art and classical Chinese performances, such as hand puppets, marionette, lion dance, indigenous songs and dances, and Peking opera. In 2018, total attendance reached 37,163 viewers. What sets the performances apart from traditional shows is that the actors leave the proscenium stage before and after the show and during intermissions to interact with the audience both in and out of character. The interaction even extends to outside the theater and into the make-up rooms and photo areas. Subtitles in Chinese, Japanese, and English reduce language barriers, leading the Tourism Bureau and the travel and tourism industry to praise and recommend the shows. Past audience members include Nicaraguan ambassador W. M. Tapia Aleman, Saint Lucia ambassador Edwin Laurent, and German Trade Office Executive Director Axel Limberg. The foreign audience reached 34,870 people in 2018, showing TaipeiEYE's important role in spreading Taiwanese arts and culture and communicating soft power to the world.

Nationalities of TaipeiEYE Audiences, 2018



Cultural Conservation Performances, 2018

Date	Unit	People
2018/2/27	3rd Asia Pacific Research Integrity (APRI) Network Meeting	45
2018/9/11	Kobe Ryukoku Senior High School	257
2018/10/16	Maebashi South Senior High School	274
2018/10/20	Narita Kokusai International High School	340
2018/10/23	Tokyo Metropolitan OIZUMI Senior High School	220
2018/10/25	Kokubu High School	340
2018/10/27	Mikunigaoka High School	257
2018/11/1	Tokyo Metropolitan Institute Fuji Senior High School	211
2018/11/20	Hyogo Prefectural Kaibara High School	253
2018/11/26	Hyogo Prefectural Ashiya Upper Secondary School	340
2018/12/6	Totori Prefectural Tottori Nishi High School, 2018 school trip	301
2018/12/9	Kyoto Prefectural KOYO High School	209
2018/12/12	Kobe Municipal Fukiai High School, 2018 school trip	258
TOTAL		3,305

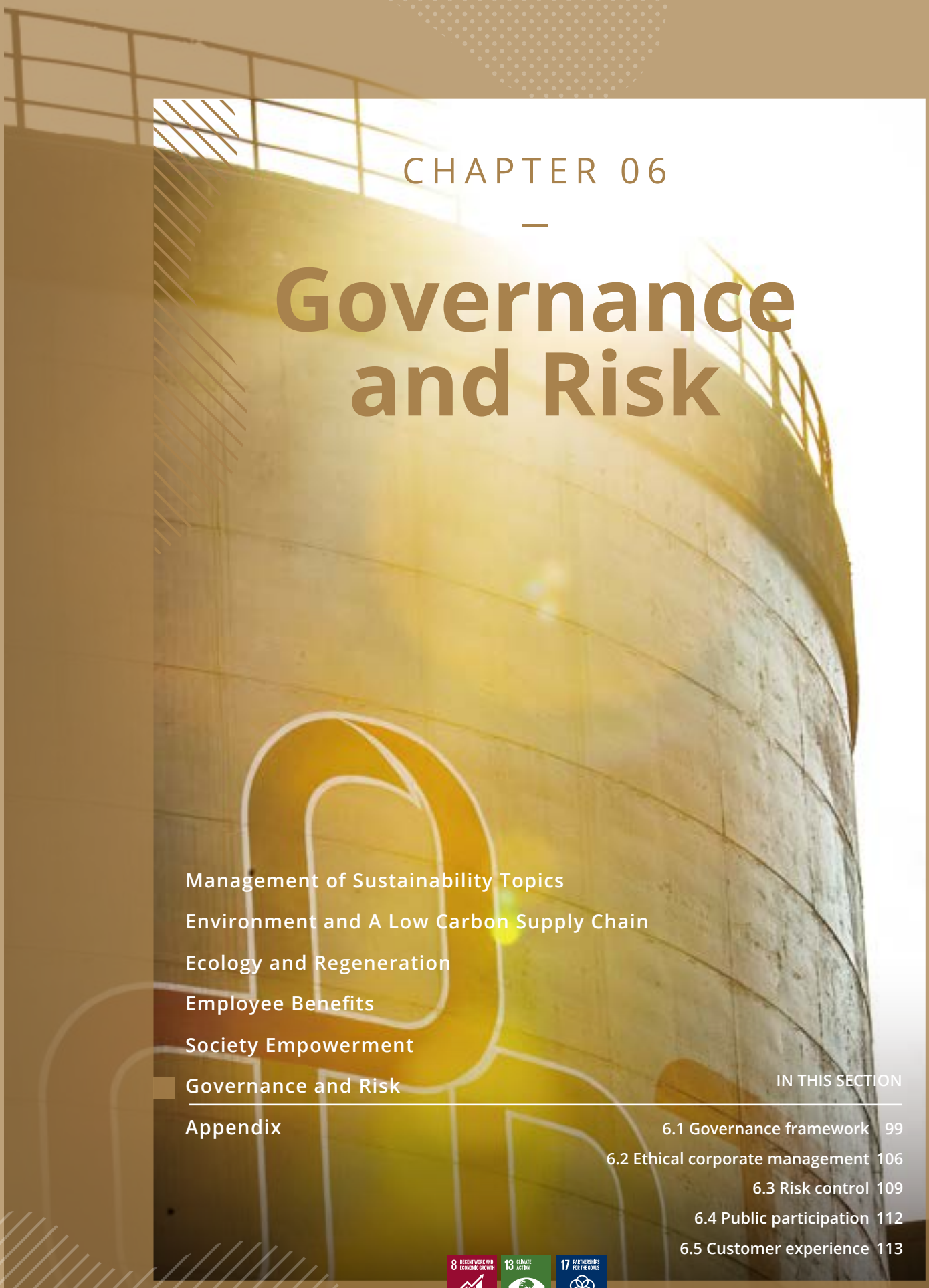
5.3.2 Training theater talents

The foundation has long promoted Peking opera at schools of all levels to encourage future generations to preserve this important cultural treasure. Recently, it brought the Peking Opera Showcase for Young Artists to Family Theater, in Taipei's Metropolitan Hall, so young artists could demonstrate their talents and leadership. In 2018, these young artists performed a crossover opera with time travel elements called Whose Fault Is It? Written and directed by Li, the story blends modern stage play and Peking opera. Juxtaposing traditional and modern elements as well as the front and back stage, the story's original performance mode belongs to today's youths and represents TCC's success in cultivating talented young artists.

Since taking over the front and back stage technical and service management of Family Theater, the foundation has built a reputation for excellent performance and activity production, management, and advising. In recent years, it has served as a technical advisor for 16 newly constructed theaters in Taiwan and has held theater management classes in Taiwan and Mainland China in order to cultivate a new generation of theater management experts. In 2018, it carried out the Taipei City Government Family Theater front and back stage technical and service management project. In 2019, it was commissioned to conduct art appreciation activities for youths and front and back stage technical and service management at Dadaocheng Theater. These projects show how the foundation continues to expand its cultural influence while training more people in the arts.

5.3.3 International exchanges

In order to increase the depth of international exchanges, the foundation applied and became a senior member of several international performance arts organizations. Among the most important are the Association of Performing Arts Presenters (APAP), the International Society of Performing Arts (ISPA), and the Federation for Asian Cultural Promotion (FACP). The foundation even was selected to host the ISPA 2020 Congress, again demonstrating the success of its cultural exchange initiatives.



CHAPTER 06

Governance and Risk

IN THIS SECTION

Material Topics

Economic Performance

| Management Policies

Serve as an "environmental engineering company handling the complex relationship between human civilization and nature." Become a sustainable enterprise that equally heeds cement production and the environment.

Formulate Corporate Social Responsibility Best Practice Principles and Corporate Governance Best Practice Principles.. While pursuing sustainable development, seek a balance between economic, environmental, and social issues.

Voluntarily establish the Corporate Sustainable Development Committee. This functional committee, headed by the Company chairperson, shall create issue-based working groups and fully implement corporate sustainable development strategies.

Continue to profit in order to fulfill promises made to shareholders and employees. Use comprehensive corporate governance measures, strict risk control, and stable financial planning to continue to produce economic value.

| Assessment Mechanisms

Each department shall make proposals and report material operational issues to the Board. Reports shall include implementation of major proposals and estimated timetables.

Regularly evaluate financial allocation to reduce financial risks. Reports and adjustments shall be made during internal meetings of high-level supervisors.

Carry out annual customer satisfaction surveys to use as a reference for improvements and oversight. Understand current market trends and customer needs in order to make timely adjustments so we can continue to meet customer expectations. The customer satisfaction ratio was 91.38% in 2018.

| Short-Term Objectives

Continue to expand globally by entering new European and African markets while raising the Company's international profile.

Continue to raise production capacity and reduce costs. Develop market strategies and new markets, so the Company can remain as an industry leader.

Complete improvement plans that are based on customer satisfaction feedback.

| Mid- and Long-Term Objectives

Become an eco-friendly, eco-solution provider. Use innovative technology and thinking to develop new energy sources. Work towards achieving the circular economy goals of "zero waste, zero pollution, and zero emissions."

Anti-Corruption
Environmental Compliance
Socioeconomic Compliance

| Management Policies

Strictly adhere to domestic laws and standards. Formulate Code of Ethical Conduct and Ethical Corporate Management Best Practice Principlesthat require adherence to the principles of integrity, fairness, and rationality. Management shall seek to achieve zero violations.

Establish a claims mailbox and channels for staff to report any illegal activities or behaviors that violate ethical standards.

Use education, training and various forms of propaganda to strengthen employee understanding and raise awareness of economic, environmental, and social regulations.

| Assessment Mechanisms

Heed the latest information from competent authorities in order to evaluate and adjust policies and rules that relate to ethical operations. Ensure that corporate behaviors adhere to the highest ethical principles.

Appoint an external legal firm to carry out a legal compliance optimization plan to ensure the feasibility of legal compliance mechanisms.

| Short-Term Objectives

Continue to develop ethical operations management mechanisms. Establish the Company as a model of ethical behavior.

Eliminate violations and complete improvements underway at each plant.

| Mid- and Long-Term Objectives

Build a corporate culture that values ethical operations and legal compliance. Continue to maintain Company resources and protect the rights and interests of stakeholders.

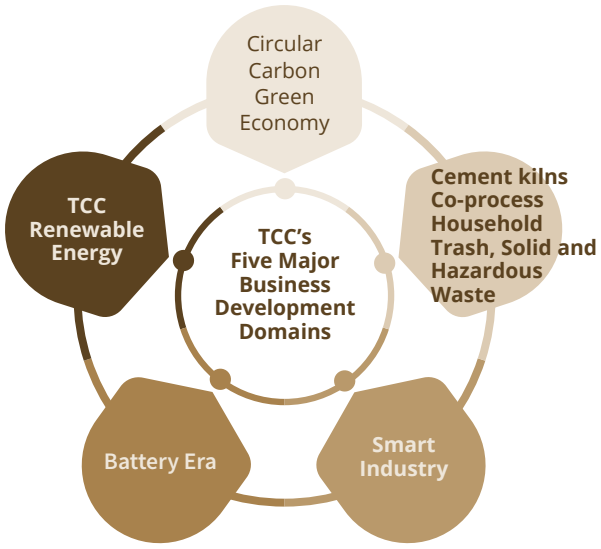
6.1 Governance Framework

THE FUTURE IS WORTH IT

We combined a Möbius strip and a mathematical infinity symbol to create a logo that represents circulation and sustainability. This new corporate image conveys our vision of "The Future Is Worth It."

6.1.1 About TCC

Cement is the glue that holds civilization together and the force that propels human civilization forward. In 1954, when state-run TCC was privatized, we became the first brand to represent Taiwan. In 1962, when we took stock code 1101 with a registered capital of NT$60 billion, we became Taiwan's first company to list publicly. These pioneering achievements show our commitment to advancing industrial business operations and social interest. Over the past 60 years, we have grown with Taiwan. We expanded our territory in pace with national policies and participated in infrastructure and major national construction projects. In the process, we contributed to Taiwan's social and economic miracles.



*Data from www.ccement.com
*Global Cement published the 2018 global cement research and company reports

TCC is one of Taiwan's representative brands. In the past, we manufactured to demand. In the future, we will voluntarily focus on eco-friendly manufacturing and becoming an eco-solutions provider. Using innovative technology and thinking, we will develop new energy and contribute toward building a "zero waste, zero pollution, and zero emissions" circular economy. We will achieve our vision of becoming a sustainable enterprise.

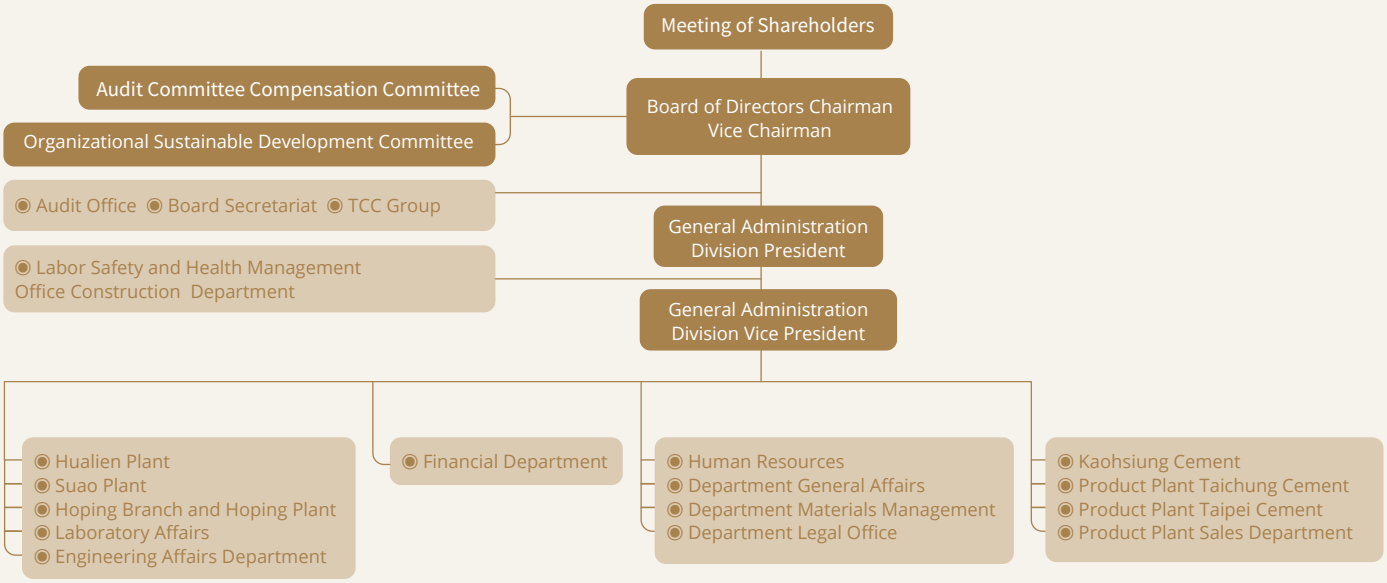
Organization Framework

Adhering to the Confucian entrepreneurial spirit, we make sure that our benefits are in accord with honorable practices.

Externally, we maintain integrity and transparency and focus on shareholder interests. Internally, we require accuracy and efficiency and insist on correct goals along with fast and appropriate methods.

We established the Audit Committee, Remuneration and Compensation Committee, and Corporate Sustainable Development Committee, which regularly report their activities and resolutions to the Board of Directors and assist the Board in performing supervisory duties.

TCC Organizational Chart



1.There are 19 branch plants and three distribution stations under the Taipei, Taichung, and Kaohsiung cement product plants. 2.There is a ready mixed concrete workshop in the Hualien Plant. 3.Gushan cement product plants are renamed as Kaohsiung cement product plant in 2018. 4. Construction Department is added in 2018.

Global Market Deployment

Strong R&D and stringent process control are the formula behind our high-quality products and reputation for excellence. TCC products are distributed worldwide, including to Taiwan, Mainland China, Japan, South Korea, Hong Kong, the United States, the Philippines, Kuwait, Saudi Arabia, Palau, Honduras, Bangladesh, India, Singapore, Malaysia, Brunei, Vietnam, Nigeria, and West African countries. We provide customized products and services for our customers. Production in 2018 is 60,364,000 tons. In support of the government's 2025 national export policy that calls for reducing national export volume to 20% of total output, currently we only sell a small portion of our products to Southeast Asian countries.

In response to new cement plants and milling plants in Mainland China, the Company will invest in building aggregate plants and ready-mix concrete plants to extend our product range to higher-value downstream cement products. We will incorporate independently developed decision-making support systems, such as an internal control alert system and a war room system, as well as an e-commerce app that accelerates the integration of sales, production and logistics. By sharing information and experiences, we will raise TCC's integrity, efficiency, and reliability. In 2018, as part of the Company's ongoing response to globalization, we will enter new European and African markets to raise TCC's international profile.

Turkey OYAK Investment Project

TCC has set up a new subsidiary, Taiwan Cement (Dutch) Holding B.V, and entered into a joint venture company (JVC) with Turkey's largest cement group, OYAK Cement. TCC holds 40% of the JVC and OYAK holds 60%. JVC would operate OYAK's cement business in Turkey, giving Taiwan its first presence in the cement industry outside of Asia.

OYAK's annual capacity is around 12 million tonnes of clinker per year. Its cement subsidiaries include Aslan, Bolu, Unye, Mardin, Adana and Denizli and the ready-mix concrete maker Beton. OYAK has 13 cement clinker production lines and 45 ready-mix concrete plants spread across Turkey's key markets, including the Marmara Sea, the Black Sea, the Mediterranean Sea, and the Anatolia Plateau.

Tax Policy

The Company is committed to meeting all tax obligations. We support government initiatives to promote corporate innovation, R&D, economic growth, and tax reform.

In order to achieve sustainable development and meet our corporate social responsibility obligations, we set strict tax policies and abide by the tax law.

1.Truthful tax reporting and payment:
The Company follows tax law in each of the countries we operate in. We fulfill our social responsibility as a taxpayer by truthfully reporting our income and paying required taxes. We do not engage in transactions that are conducted solely to avoid tax payments.

2.Information transparency:
Tax disclosure should be conducted in accordance with related regulations and standards.

3.Mutual trust and honesty:
The Company builds mutual trust and honesty with tax agencies and engages authorities in tax-related discussions when needed. We endeavor to maintain good relations with officials responsible for tax-related affairs.

4.Rigorous evaluation of tax risks and impacts:
When carrying out major transactions and decisions, the Company rigorously evaluates the tax risks and impacts. Management mechanisms are used to control any risks.

5.Raising employees' tax professionalism:
When tax rules change, employees responsible for tax-related issues must be able to analyze the impacts and appropriate responses with strategies.

Taiwan Cement Corporation Tax Information

Unit: NTD, in thousands

	Taiwan	Others	Total
Operating Revenue	49,982,370	74,612,232	124,594,602
Income from Operations	5,426,706	22,754,195	28,180,901
Income Tax	1,946,950	5,953,400	7,900,350

Taiwan Cement Corporation Effective Tax Information

Unit: NTD, in thousands

	2017	2018
Pre-Tax Income	13,824,659	30,544,421
Reported Taxes	3,501,859	7,900,350
Effective Tax Rate (%)	25.33	25.87
Cash Taxes	2,837,020	4,355,775
Cash Tax Rate (%)	20.52	14.26

Financial performance

The Company reduces costs, raises production capacity, develops market strategies, and continues to enter new markets. In 2018, consolidated revenues reached a record high of NT$124.6 billion, for growth of 26.73% compared to 2017.

Taiwan domestic sales of **3.76 million tons**

Mainland China sales of **52.57 million tons**

Export sales of **1.45 million tons**

TCC Consolidated Financial Performance in 2018

Unit: NT$1,000s, Except for Earnings Per Share (EPS) and Dividends Per Share (DPS), Which Are Shown in NT$)

Type	Item	Amount
Economic Value Generated	Operating Revenue	124,594,602
	Income (Loss) from Operations	28,180,901
	Non-Operating Income and Expenses	2,363,520
Economic Value Allocated	Operating Cost	91,003,063
	EPS	4.37
	DPS	4.0
	Cash Dividend per share	3.3
	Stock Dividend per share	0.7
	Income Tax (TW)	1,946,950
	Income Tax (CN)	5,742,006
	Income Tax (Others)	211,394
	Employee Salary and Benefits	6,816,979
	Social Expenditure	272,231
Economic Value Residual	Retained Earnings	44,732,394

6.1.2 The Board of Directors

As part of our commitment to upholding the rights and interests of shareholders, the Company optimizes the Board of Directors command, supervision, and management functions. We enhance information transparency, strengthen internal audits, and faithfully present financial data to ensure the rights and interests of stakeholders. In order to build mechanisms to process and disclose material information, prevent inappropriate leaks, and ensure the consistency and accuracy of information disclosed to the public, we established the Internal Material Information Processing Standard Operating Procedures.

These define and regulate the accuracy, completeness, timeliness, reliability, and fair disclosure of information.

Board of Directors

In 2018, we held a Board election. The current Board consists of 19 directors (including four independent directors), two of whom are female. Four directors, or 21% of the total, are between the ages of 30 and 50, and 15 directors, or 79%, are above 50 years old.

Members of the 2018 Board of Directors

Title	Institutional Investor	Representative	Gender	Finance	Law
Director	Chia Hsin R.M.C. Corp	An-ping Chang	Male	v	
Director	Taihe Industrial Corp.	Kung-yi Koo	Male	v	
Director	C.F. Koo Foundation	Jong-Peir Li	Male	v	
Director	China Synthetic Rubber Corp.	Kenneth C.M. Lo	Male	v	
Director	Fu Pin Investment Co., Ltd.	Por-yuan Wang	Male	v	
Director	Chung Cheng Development & Investment Co., Ltd.	Tzun-yen Yu	Male	v	
Director	CTCB Investments Co., Ltd.	Yvonne Liu	Female		v
Director	Xin Hope Investment Co., Ltd.	Chi-Wen Chang	Male	v	
Director	Shinkong Synthetic Fibers Corp.	Eric T. Wu	Male	v	v
Director	Sishan Investment Co., Ltd.	Nan-chou Lin	Male	v	
Director	Chia Hsin Cement Corp.	Jason Kang-lung Chang	Male	v	
Director	Fu Pin Investment Co., Ltd.	Chi-chia Hsieh	Male	v	
Director	Chia Hsin Cement Corp.	Chi-te Chen	Male	v	
Director	Heng Qiang Investment Co., Ltd.	Jian Wen	Male	v	
Director	Heng Qiang Investment Co., Ltd.	Zhi-Zhong Cai	Male	v	
Independent Director	-	Arthur Yu-cheng Chiao	Male	v	
Independent Director	-	Victor Wang	Male	v	
Independent Director	-	Emile Chih-jen Sheng	Male	v	
Independent Director	-	Ling-Tai Chou	Female	v	

Board elections are held in accordance with the "Company Act" and the Company's Articles of Incorporation. Each term is three years. On average, general Board members serve five years and independent directors serve two years.

The Company formulated the Board of Directors Performance Evaluation Regulations in accordance with the scope of regulations established by competent authorities. On March 28, 2018, the Board passed a rule for Board (functional committee) members to hand their completed performance self-evaluation questionnaires to the Board Secretary Office, which then conducts a combined evaluation according to each director's attendance rate and performance. In 2018, results were reported to the full Board on March 22, 2019, then posted on the Company website. They showed a Board performance score of 4.5 (out of 5).

The Board carries out its duties in accordance with related laws and regulations, the TCC Articles of Incorporation, and Board procedural rules.

With expertise in a wide range of fields and rich industry experience, directors exercise their supervision and management duties in good faith and assume responsibility for optimizing operational systems and protecting the rights and interests of investors.

The Board conducts its duties with self-discipline and prudence and faithfully implements major operational resolutions. Certified public accountants attend Board meetings to present financial reports and offer opinions to directors.

In accordance with regulations, the Board holds at least one meeting each quarter. In 2018, the Board held 11 meetings and the attendance rate of the new Board was 83.46%. When directors face a conflict of interest, whether personal or related to the institutional investors they represent, they explain the conflict to the Board then abstain from voting. Important resolutions are quickly posted on the Market Observation Post System (MOPS) to ensure transparency.

Business	Technology	Banking	Investment, Mergers and Acquisitions	Information	Risk Management	Operational Management	Lecturer	Cement Industry
v		v	v	v	v	v	v	v
v		v	v		v	v		v
v		v	v	v	v	v		v
v		v	v		v	v		
v	v		v	v	v	v		
v	v		v		v	v		
v			v		v	v	v	
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v	v		v	v	v	v		
v			v		v	v		v
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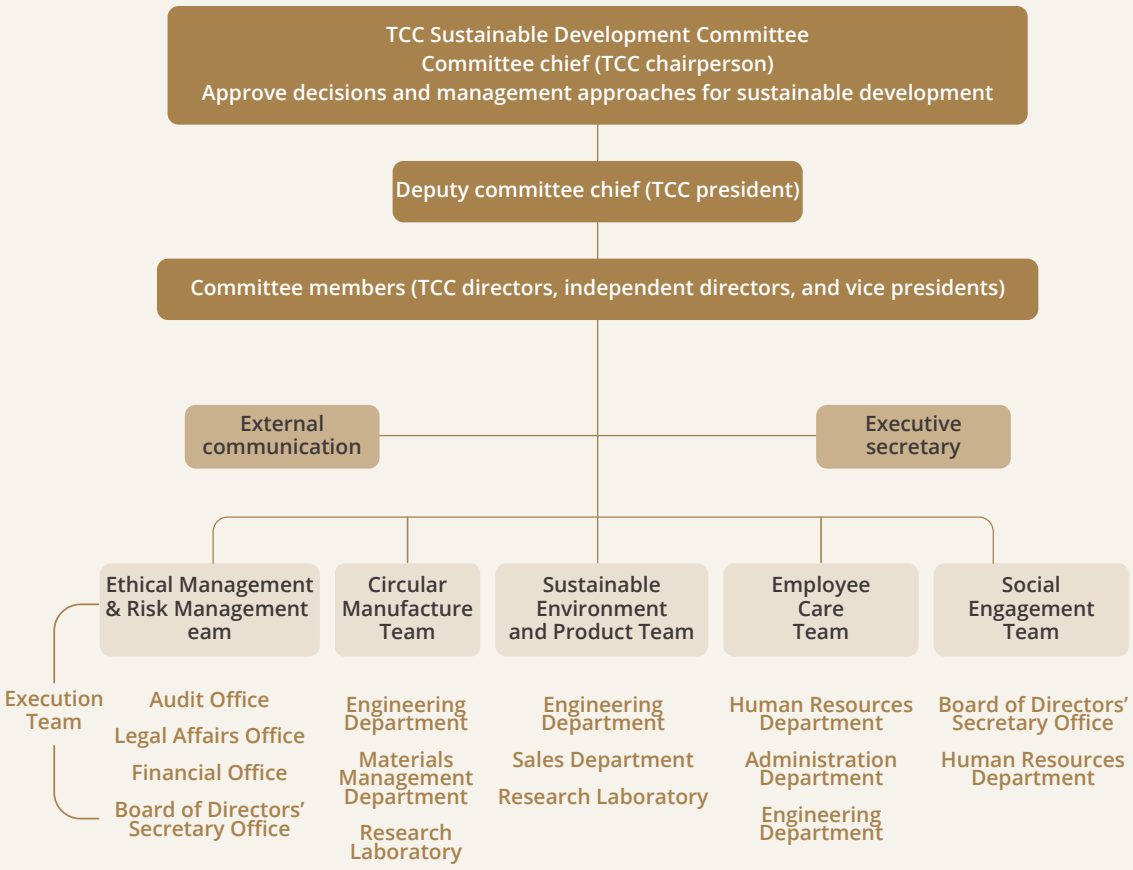
v					v	v		
v	v		v	v	v	v		
v			v		v	v	v	
v			v		v	v		
v					v		v	

Audit Committee and Compensation Committee

To help the Board evaluate and supervise the compensation of directors and managers, we established the Audit Committee in 2015. The committee took over several duties from supervisors: the formulation and revision of internal control systems; the procedures for handling significant financial actions; and the auditing of marketable securities, financial statements, and directors' conflicts of interest. The Remuneration and Compensation Committee was established to formulate and review policies for assessing the performance and compensation of directors, independent directors, and managers. In 2018, the attendance rate of the new members of the Audit Committee was 82.14%. Their attendance rate was 100% when including authorized representatives. The attendance rate of the new members of the Compensation Committee was 86.2%. Their attendance rate was 100% when including authorized representatives.

Corporate Sustainable Development Committee

In 2018, in line with the Company's values, the Board approved the establishment of the Corporate Sustainable Development Committee. This functional committeewhich is chaired by the Company chairperson, established five working groups that oversee ethical governance and risk management, circular manufacturing, sustainable environment and products, employee care, and social care. The working groups plan and implement strategies aimed at achieving corporate sustainable development. Theyregularly disclose effectiveness of the strategies and compile the Company's corporate sustainability report.



6.2 Ethical Corporate Management

6.2.1 Integrity and Ethics

The Company values discipline and honesty. To strengthen ethical corporate management, we formulate related policies and regulations, sign contracts with suppliers, and set up channels for grievances and reporting. These measures enable us to maintain organizational assets and protect the rights and interests of stakeholders.

TCC employees are required to sign the "Statement of Integrity and Ethical Standards" on their first day of work. They take part in one-on-one sessions to ensure a complete understanding of the Company's code of conduct.

In 2018, a total of 269 employees of the Company (including the Company's subsidiaries and JV companies) completed these sessions and signed the statement.

After a case of bribery was uncovered in 2016, the Company terminated the employee and took legal actions. To prevent a repeat occurrence, we strengthened internal control mechanisms and

01

Formulating Policies and Regulations

Formulated the "Code of Ethics" and "Ethical Corporate Management Best Practice Principles" to specify that directors and managers are obliged to maintain honesty and trust when carrying out their duties. They also shall observe the "Political Donations Act," "Anti-Corruption Act," and other laws and regulations governing business practices.

02

Signing Contracts with Suppliers

For material procurement contracts with an amount above NT$300,000, we shall request suppliers to sign a standard procurement contract to ban undue or improper advantage.

03

Setting Up Channels for Grievances and Reporting

We encourage employees to report any alleged or confirmed unethical conduct to management. Any suppliers or contractors, investors, or employees may report work discipline or integrity violations to the complaint mailbox (MP.Buster@taiwancement.com).

6.2.2 Legal Compliance

Overview of Legal Compliance

The Company abides by the law when carrying out all business activities. For product sales and marketing, we observe sales and labeling regulations and insist on high quality standards. For environmental protection, we observe the "Air Pollution Control Act" and related regulations to protect the environment with due diligence.

We strengthen awareness of the law by organizing training camps, educational activities, and talks for employees. Internal audit mechanisms prevent risks and enhance business operational effectiveness.

To continue to maintain compliance and raise legal awareness of employees, in 2018 the Company appointed an external legal firm to carry out a compliance optimization plan. Additional training and education further raised awareness.

No environmental, social, or economic sanction involving significant fines was reported in 2018. There were 19 minor fines totaling NT$1,270,000, and we corrected all environmental non-compliance incidents. To reinforce the prevention of potential threats to industrial safety and environmental pollution, we implemented the Industrial Safety and Environmental Improvement Project. Plants in Taiwan proposed a total of 332 items requiring improvement. We hold monthly industrial safety and environmental protection meetings and follow up on progress in order to prevent recurrence of non-conformities.

Note 1: The Company designates NT$300,000 as the threshold for a significant fine. In 2018, no fine reached this threshold.

Internal Audits

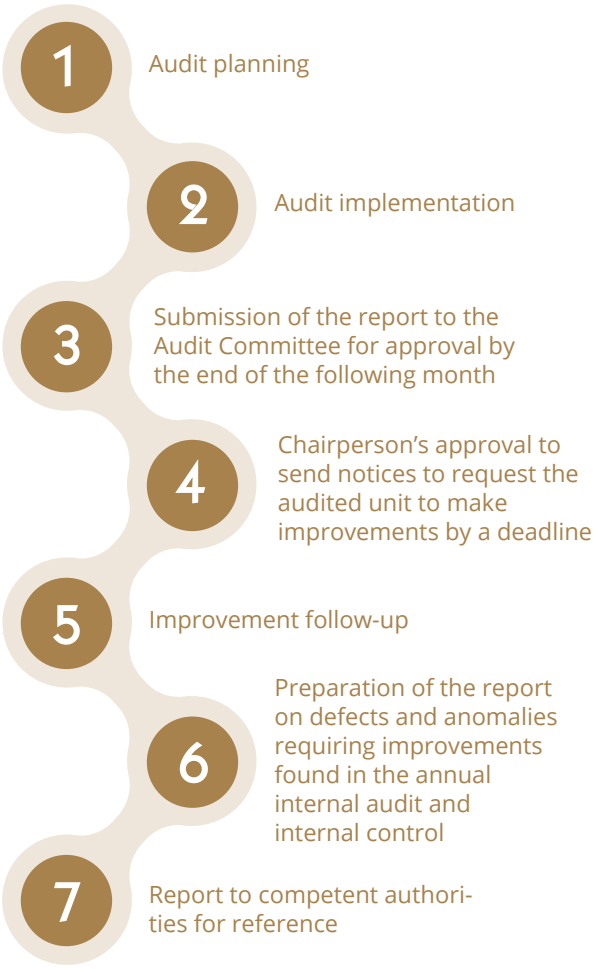
The Audit Office carries out audits according to the annual audit program. The process includes pre-audit meetings, audit implementation, internal recommendations, closure meetings, and submission of the audit report. Based on past experience and future trends, the Audit Office formulates and carries out projects to help audited business units discover opportunities to make the organizational structure more robust.

In 2018, the Audit Office carried out 17 primary tasks, including listing energy conservation, internal warning systems, and port shipment loading of cement and cement clinker as items requiring checks. In the past, each functional department of headquarters conducted annual reviews of the Company's Mainland China plants to check operations. To ensure more in-depth audits and better improvements of deficiencies, since March 2018 the Audit Office has taken over this task. When problems are uncovered, on-the-spot review and improvement meetings are held. Deadlines are set for making improvements, and employees responsible for deficiencies are subject to supervisor reviews. Results have generally been positive.

Audit Follow-up Mechanisms

After audits are concluded, a written report of suggested improvements is issued. Results are discussed with supervisors from the audited unit and other key managers, who have ample opportunity to explain any issues. The audited unit shall propose improvement methods and timelines, and the Audit Office shall follow up on progress until the improvements are completed.

Audit Process



Audit Methods

Online Audits

The Company gathers supervisors from functional department to discuss and evaluate all problems. After analyzing related information, they establish internal control systems, certification management systems, amphibious materials systems, PDA examination systems, and equipment management systems, in order to systematically manage anomalies. They also create suitable notice cycles for each anomaly (immediate, daily, weekly, monthly) then send mail via the information system to notify the responsible supervisor or functional department of headquarters. After receiving notification, the supervisor shall respond via the information system so responsible staff at headquarters can check results to ensure that anomalies are quickly handled and records are kept. These procedures ensure that a proper control environment is maintained.

Offline Audits

Responsible supervisors shall first handle any anomalies or problems. On-site audits are then arranged based on the audit plan. Auditors evaluate related procedures, verify anomaly status and responses, and determine effectiveness of improvement measurements. They shall also check items that current systems cannot control or detect, such as asset verification (inventory) or operations that are outside of the Company's general scope.

Key Audit Items

Procurement Procedures

Check all procurements to ensure that price comparisons were made in accordance with Company regulations, that the procurements were authorized, and whether any collusion or rigging took place.

Bank Deposits

Check whether bank reconciliations and an inventory of the bank's acceptance bills were carried out in accordance with regulations.

Warehouse Management and Inventory

Check whether warehouse storage locations and material codes were completed, whether the quantities of stored materials match inventory records, and whether inventory is used first.

Cement and Raw Material Inventory

Check whether the quantities of stored cement, cement clinker, coal, and plasters match inventory records.

6.3 Risk Control

6.3.1 Risk Management Mechanisms

Risk management is key to business operations. By identifying internal and external management risks then measuring and analyzing the short, medium, and long-terms impacts, the Company improves decision making and enhances enterprise value. To continue to optimize risk management mechanisms, the Company completed a comprehensive risk roadmap covering existing financial, operational, and product aspects. It emphasizes disaster and work safety management as well as corresponding implementation plans and strategies.

Risk Management Organization

Understanding the challenges that risks bring to business operations, the Company set up a risk management organization. The CEO, vice presidents, and plant managers participate in monthly meetings to investigate key risk management topics, risk assessments, and countermeasures. Reports covering the risk environment and management strategies are given to the Board.

Risk Identification and Assessment Process

Risk Factor Identification

Each year, the Company compiles a list of risk factors then uses the PESTEL framework (political, economic, social, technological, environmental, and legal) to identify and classify risk types then determine risk factors.

Risk Assessment Procedures

The CEO, vice presidents, and plant managers assess risk factors.

Risk Response Strategies

The Company determines risk management strategies for all identified risks then determines management methods and tracks effectiveness.

Operation Risks

◉ The scope of risk management covers responses to laws and legal amendments, market supply and demand, product and raw material prices, production and manufacturing, and product research and development.
◉ Establish a production alert system to prevent, monitor, and warn of anomalies so that plant side manufacturing problems can quickly be resolved.
◉ Implement the MyGUI Mini mobile information platform to display operational information including sales, procurement, and production on mobile devices to capture anomalies and take immediate actions.

Financial Risks

◉ The scope of financial risks covers financing, investment, liquidity management, dividend allocation, and hedging of exchange rates and interest rates.
◉ Report lease transactions according to IFRS 16. Systematize lease information and the management right-of-use assets and accounts. These procedures raise operational effectiveness and reduce internal control risks.
◉ Conduct thorough evaluations of all major capital expenditures to raise the likelihood of realizing benefits and to determine countermeasures for potential risks. Setting countermeasures in advance reduces the impact of problems that emerge.

Disaster Risks

◉ The scope of disaster risks covers natural disasters including fires, typhoons, and earthquakes.
◉ Participate in various exercises and training activities organized by government agencies.
◉ Regularly perform internal disaster prevention and rescue exercises to improve the disaster prevention awareness and response abilities of employees.

OSH Management Risks

◉ The scope of OSH management risks covers work environment safety and employee awareness of occupational hazards prevention.
◉ Regularly identify and assess risks, conduct self-management to eliminate potential hazards.
◉ Implement industrial safety regulations and publicize incident handling procedures in-house.
◉ Organize related courses every year to enhance the daily safety awareness of employees.
◉ Activate the reporting system immediately after a work safety incident to notify related departments and the general administration.

6.3.2 The Emerging Climate Change Risk

Climate Risk Governance

In 2018, the Company voluntarily responded to the Task Force on Climate-related Financial Disclosures (TCFD) by disclosing the financial impacts of climate change on the Company and future response strategies. The Company's Corporate Social Responsibility Committee is responsible for monitoring sustainable development and climate management topics. Ethical governance and risk management task forces under the committee evaluate emerging risks and opportunities related to sustainability and climate. The task forces report strategic planning implementation results to the Company CEO, and the Company sets climate change performance indicators. Carbon management actions are included in performance reviews to encourage all employees to reduce emissions and create a more sustainable future.

Analysis of Climate Change Risks and Opportunities

As global attention on climate change grows, the Company CEO, vice presidents, and plant managers discuss and evaluate potential impacts. They use external expert opinions, internal and external research reports, and the latest market development observations to assess coming risks and opportunities and the changes that climate change may bring. After financial impact analysis and discussion, we set short, mid and long-term action plans. These serve as the foundation of the future development directions, annual plans, and operational strategies that the Company sets each year.
In 2018, the Company identified three important climate change risks and two important climate-related opportunities. We formulated effective countermeasures to strengthen management of the risks.

Climate Change Risk Identification and Countermeasures

Climate Change Risks	Impacts	Response Strategies
Rising global temperatures raise the cost of doing business	Insufficient water feeding hydroelectric power plants and insufficient cooling water for nuclear power plants or fossil fuel power stations will make local power sources unstable, destabilizing operations of the Company's plants. If unstable operations cause production delays, the plants could face claims or fines, raising the cost of doing business.	Plants research the area where they operate. They stagger operations to move production to off-peak electricity times.
Rising cost of carbon emissions taxes raise the cost of doing business	In the future, Taiwan's greenhouse gas emissions regulations will call for managing emissions by levying a carbon tax. The tax will raise the cost of doing business.	The Company continues to develop low carbon production methods to reduce the emissions per unit of production.
Stricter environmental policies and laws raise the cost of doing business	Changing policies will lead to early decommissioning of plants. The equipment replacement rate will rise, which will raise the cost of doing business.	The Company carries out comprehensive analysis of how climate change and policy change impact demand and production capacity. Based on these analysis we create short- and mid-term plans.

Climate Change Opportunity Identification and Responses

Climate Change Opportunities	Impacts	Response Strategies
Use R&D and innovations to develop new products and services	Based on Taiwan's carbon cutting commitments and policies of the Environmental Protection Administration, the Company strategizes what corporate transformations and green energy investments are needed. Besides contributing to Taiwan's renewable energy, we reduce the carbon footprint of the products we make.	The Company used an old factory at the Changhua Coastal Park to establish a new TCC Green Energy plant. The plant will generate both wind and solar power. TCC production plants also added solar power generation equipment.
New business models and revenue generators	In 2017, the Company announced a complete overhaul of operations. The goal was to advance from a traditional cement manufacturer to a green company. Climate change is an increasingly serious issue. Many countries and regions are becoming stricter at regulating emissions. TCC therefore plans to establish a global carbon asset management enterprise. This new venture will be able to manage the impact of emissions on TCC and create new revenue-generating opportunities.	The Company has extensive carbon rights development and management experience. Using financial engineering of carbon allowances and voluntary carbon rights development plans, the Company will be better prepared to mitigate the impact of emissions restrictions. These business models could also serve as new revenue generators.

6.4 Public Participation

6.4.1 Membership of Associations

TCC is not only a leading industrial company and a market leader in the cement industry but also an executive director of the Taiwan Cement Manufacturers' Association. At association meetings, we have long proposed policies to protect the environment and shared our operational results with other industry members. At our urging, the association carries out related investigations and research, including circular economy research, low carbon manufacturing, and management of greenhouse gases, in order to jointly work on behalf of the climate, environment and society. We also help to gather related information that the government can use as a policymaking reference.

Fulfilling our role as an industry leader, we participate in activities organized by cement guilds and associations. All functional units participate in activities relating to their operations in order to promote communication within regional communities. The Company has used guilds and associations for many years as channels to investigate environmental protection topics. In 2018, we commissioned the NCKU Research and Development Foundation to conduct the research project "Circular Economics and Development Strategies for the Cement Industry" to develop a prototype of a circular economic system for Taiwan's cement industry. We also commissioned the Taiwan Cement Institute and the Taiwan Construction Research Institute to carry out the Industrial Circular Economy Implementation Project. The project investigates how the cement industry can raise the consumption of domestic waste and studies the feasibility of achieving EU carbon reduction targets, so we can make positive contributions to Taiwan's environment.

In 2018, in response to the Science Based Targets initiative, the Company established carbon reduction targets. In the same year, we joined the Global Cement and Concrete Association (GCCA) established by the World Business Council for Sustainable Development (WBCSD). We shared our research outcomes and best practices in cement sustainable development in terms of five major aspects: health and safety, climate change and energy, social responsibility, environment and nature, and circular economy. Our objective was to help promote sustainable growth of the international cement industry.

2018 Plans Carried Out by the Taiwan Cement Manufacturers' Association

● Internal Plans:

①2018 Industrial Greenhouse Gas Management and Adaptation Plan: Promotes the voluntary reduction of greenhouse gas emissions by cement industry association members.

②2018 Low Carbon Manufacturing Promotion Plan and Subcontracting Plan for Manufacturing Departments: A platform to communicate low carbon manufacturing in the cement industry.

● Outsourced Plans:

①Taiwan Concrete Institute: Promotes the Construction Industry Circular Economy Implementation Project.

②NCKU Research and Development Foundation:Conducts research on the circular economy and development strategies for the cement industry.

Membership of Associations

Association	Board of Directors	Professional Member	Member
Taiwan Cement Manufacturers' Association	V	V	V
Taiwan Ready-Mix Concrete Association	V	V	V
Taiwan Marble Association	V		V
Chinese Institute of Mining & Metallurgical Engineers			V
Taiwan Concrete Institute	V	V	V
Chinese National Federation of Industries	V		V
Chinese National Association of Industry and Commerce	V		V
Taiwan Corporate Governance Association			
Chinese International Economic Cooperation Association	V		V
Cross-Strait CEO Summit	V		V
Monte Jade Science and Technology Association of Taiwan	V		V

Association	Board of Directors	Professional Member	Member
Taiwan Stock Affairs Association	V		V
The Third Wednesday Club			V
Audit Bureau of Circulations			V
Bio-App Biotechnology Industry – Academia Research Alliance			V
CNS Certification Mark Association	V		V
Chinese Arbitration Association, Taipei			V
Taiwan Accreditation Foundation			V
The Institute of Internal Auditors –Chinese Taiwan			V
Taiwan Carbon Capture Storage and Utilization Association	V		V
Taiwan Institute for Sustainable Energy			V
Center for Corporate Sustainability	V		V
Taiwan Institute of Directors			V

Note: The Company is a supervisor of the CNS Certification Mark Association and offers a NT$20,000 advertising sponsorship each year.

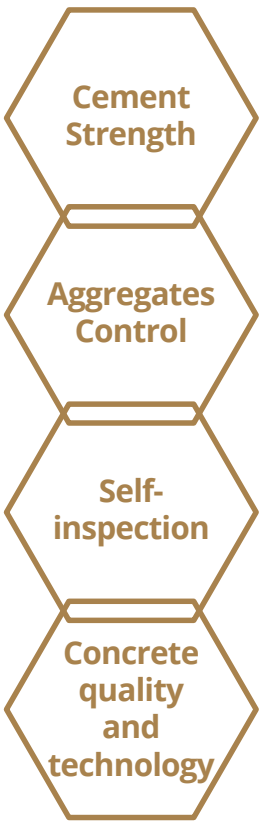
6.5 Customer Experience

6.5.1 Product Quality

Excellent brand image and quality lead the Company's products to be designated for major infrastructure projects across Taiwan. Our quality requirements are widely known and make us the best choice in the market.

TCC's New Solar Plant at the Changhua Coastal Park

Four Basic Principles of Product Quality



Good Ready-Mixed Concrete Certification issued by the Taiwan Construction Research Institute
The Guigang Plant won the Guangxi Leading Brand and the China Best Quality awards.

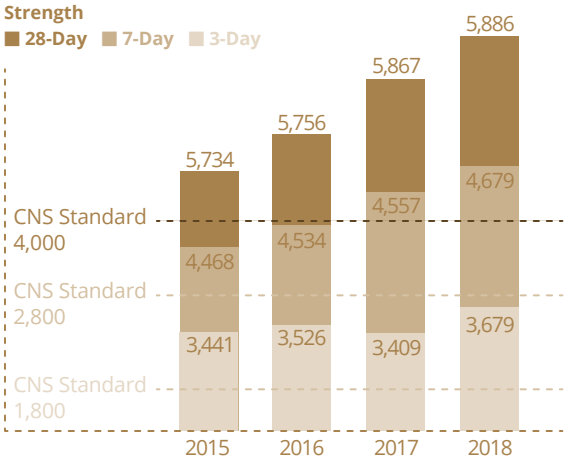
CNS61

According to the Environmental Protection Administration, the ratio of recycled materials in cement admixtures for the Gold Cement Green Label under CNS61 must be higher than 15%. From 2017, we began using 186 kg of replacement raw materials for each ton of cement.

Important quality attributes of cement in recent years: TCC cement's compressive strength of all ages beats competitors and exceeds the national standard.

The Company continues to improve the quality of all TCC products to ensure they exceed the national standards of major countries around the world. We start from cement strength, aggregates control, self-inspection, and concrete quality and technology to assure that all products pass quality and safety assessments to guarantee end-user safety.

Cement Strength



Note: All values are the average of the monthly inspection results in 2018 measured by the TAF-accredited (No. 0539) laboratory of TCC.

Aggregates Control

A multi-step control is applied to aggregates to maintain quality and prevent changes or mixing with hazardous industrial substances from causing quality deterioration.

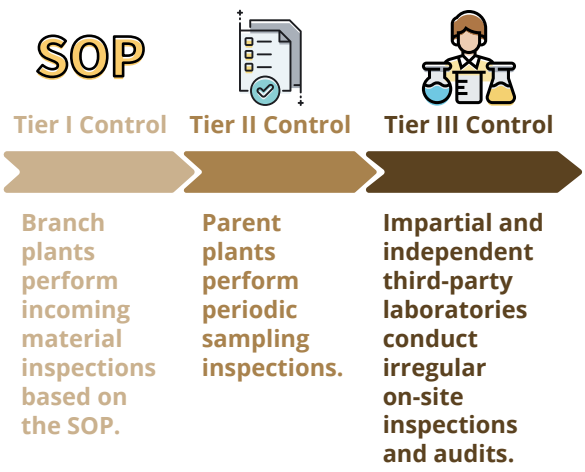
Unannounced aggregate selection and material source assessment.

Suppliers receive TCC professional training and obtain related certificates.

Become a qualified supplier to supply raw materials to TCC.

Self-Inspection

Quality is vital to TCC. Through a three-tier self-control system, we assure product quality and minimize the possibility of hazardous substances in admixtures to ensure safety for end-users.



Concrete Quality and Technology

To enhance building quality, maintain residential safety, and reduce the carbon footprint of construction and use, when formulating concrete we use high-quality TCC cement and maintain proper gradation design without cutting corners on ingredients.

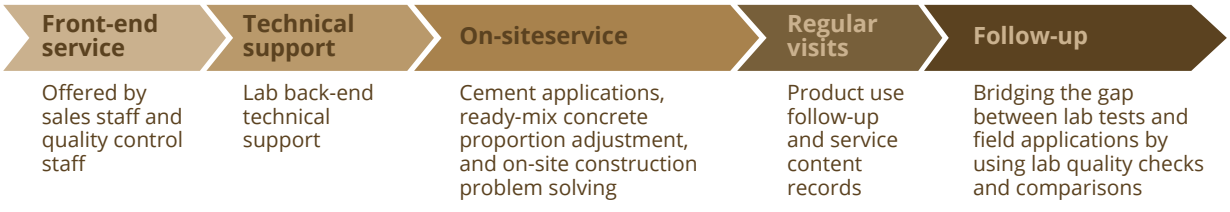
In response to market demands, we successfully developed products such as self-compacting, high-flowing, and high-strength concrete for specific construction needs, such as the Taipei 101 World Financial Center and Taiwan High Speed Rail stations. In addition to their excellent performance, these products reduce energy consumed during construction and enhance safety.

Types of Concrete	Special Characteristics
Conventional Concrete	Use for Common Structures: The gradation design maintains a balance among fillers (aggregates), water, and cementitious materials (cement, fly ash, and slag). Optimal Specifications: Slump of 15 – 18 cm and compressive strength of 2,000 – 5,000 psi.
Self-Compacting Concrete (SCC)	Reduces Product Carbon Footprints: Replaces cement with a large quantity of industrial byproducts such as slags and fly ash and uses high-quality flow agents. Our SSC is characterized by its high flowability and high formwork filling ability. It casts itself by gravity without the need of compacting, which reduces energy consumption and noise from construction equipment to improve the quality of life and safety. With sufficient consistency, SCC resists segregation during construction. Its high strength leads to an impressive improvement of overall quality and durability of reinforced concrete structures.
High-Flowing Concrete (HFC)	Reduces Energy Use and Noise During Construction: Apart from water-free workability and low slump loss and bleeding, HFC is characterized by high flowability, high water-tightness, and high resistance to segregation. It is an excellent solution for problems that are commonly found in conventional concrete, such as the need to add water when pumping, honeycombed concrete, bleeding, crust, shrinkage and cracking. It also reduces energy consumption and noise from construction equipment.
Ultrahigh Strength Concrete	High Standards: 90-day design compressive strength above 10,000 psi. Best Technology: Concrete casting inside of steel columns (CFT method) for Taipei 101 represented an impressive improvement of Taiwan's concrete manufacturing technology.
Non-Shrinkage Concrete	Special Techniques and High Standards: Characterized by its bleeding free, shrinkage free, and high-strength performance, non-shrinkage concrete is suitable for steel structure foundations, foundation piles, bridge support pads, machine bases, bridge expansion joints, and repairs.
High Permeability-Resistant Concrete	Best Technology: Superior water-tightness and permeability resistance. Best Quality: High flowability, high workability, low water consumption, small shrinkage and creep, and longer durability.
High-Strength Concrete	Best Technology and Special Standards: Customizable at the customer's request to meet project-specific construction needs.

6.5.2 Customer Recognition

The Company has always endeavored to provide exceptional products and services. Putting ourselves into the shoes of our customers, we provide customized items. On-site services include cement use applications, ready-mix concrete proportion adjustments, and problem solving.

Customer service task groups plan monthly customer service trips to proactively understand product use and share technical knowledge. Their Customer Service Planning and Follow-Up Charts help to maintain long-term, positive interactions with customers, thus creating more value. In 2018, there were no customer privacy complaints.



Placing Digital Orders

The Company recognizes the importance of managing dealer (customer-side) relations. An app for placing orders significantly saves time for customers and uses technology to optimize the customer experience. A built-in "TCC Developments" link connects to the Company's official fan group and Wechat account, which promote the Company's latest news and services and announce environmental protection developments in product intros (obtaining low-carbon certifications), R&D achievements (carbon capture results) and other posts. Automatic push notifications provide more info to customers, including progress on emissions reductions initiatives and information on optimal product use, such as production wastewater management, power generation from waste incineration, and use of cement kilns to process waste. These insights help customers to understand the end-to-end environmental sustainability concepts that are part of a circular economy.

Customer Care

TCC is an "environmental engineering company handling the complex relationship between human civilization and nature." To uphold this commitment in our cooperative sales channels, the Company recruits exclusive agents for bagged cement. Agents assigned to districts near TCC plants participate in Company-run community care activities. These include river maintenance, youth counseling, physical and mental counseling for autism patients, education services, and assistance/donations for disadvantaged groups. Active participation by the local agents promotes good interaction and relationships. The agents become key advocates of the Company's culture and our mission to promote charitable activities.

Customer Satisfaction

Each year, the Company distributes customer satisfaction surveys to all customers that engaged in a transaction with TCC, excluding subsidiaries and related enterprises. Responses are used as a reference for making improvements and oversight. They reveal market trends and customer needs. Transaction terms and conditions are adjusted based on the survey results to improve cooperation between customers and TCC and to increase the Company's overall profits. In 2018, the Company gave surveys to 90 domestic customers and received 87 valid responses. The percentage of customers who responded was 99.91% (based on sales volume). Based on responses, the Company conducted a complete analysis of the delivery of goods and costs then designed a delivery timetable for each plant and station. For customers with projects requiring large deliveries, each plant and station extended the delivery time or shipped goods on weekends or holidays. The Port of Taichung station purchased a new packing machine and automatic palletizer. Based on the equipment delivery date, this new packing line is expected to begin operating in October 2019. Cleaning and equipment maintenance of the No. 3 Cement Warehouse was completed in October 2018. Improved repairs and maintenance will keep the Company's equipment running strong. In 2018, we received seven customer claims, four of which related to quality and three of which related to packaging and packing list weight gaps. All claims were settled following negotiation with the customer.

Results of Customer Satisfaction Surveys from the Last Four Years

Items	Satisfaction Ratings			
	2015	2016	2017	2018
Company Image	89.51%	88.00%	90.27%	90.11%
Cement Brand	89.84%	88.86%	90.27%	89.89%
Cement Quality Stability	87.54%	84.57%	88.11%	87.59%
Cement Price	74.75%	71.43%	77.03%	72.18%
Payment Terms	76.72%	75.71%	79.73%	73.56%
Delivery Plant Convenience	75.74%	71.71%	78.92%	78.62%
Service Attitude and Sincerity	86.56%	85.71%	87.03%	85.98%
Customer Complaint Response Time	83.93%	81.43%	84.05%	84.14%
After-Sales Service	83.93%	81.14%	83.78%	82.30%
Total	83.17%	80.95%	84.35%	82.71%
Overall Product Satisfaction[1]	83.61%	80.29%	85.68%	83.91%
Overall Service Satisfaction	83.28%	81.43%	85.14%	82.99%
Percentage of Customers Who Rated as "Satisfied" in Satisfaction Surveys[2]	85.25%	85.71%	92.57%	91.38%
Percentage of Customers Who Responded to the Satisfaction Survey[3]	98.79%	99.41%	99.52%	99.91%

Note 1: Product satisfaction rates were calculated using the following formula: Total survey points divided by (Total number of survey responses x 5)
Note 2: "Satisfied" was classified as score of four or more
Note 3: The percentage of customers who responded to the satisfaction survey was calculated using the following formula: Total domestic sales volume accounted for in survey responses divided by domestic sales volume (excluding sales to concrete manufacturers and related enterprises, sales used directly by TCC and related enterprises, and small purchases of 200 tonnes or fewer).


THE FUTURE IS WORTH IT

Appendix

GRI Standards Index and Guidelines *Voluntary disclosure

No	Disclosure	Related Section /Explanatory Notes	Page No	Note(including omissions)
GRI 102: General Disclosures 2016				
102-1	Name of the organization	Report Profile 6.1.1 About TCC	09 99	Subsidiary companies are not included in the scope of the Report
102-2	Activities, brands, products, and services	6.1.1 About TCC	99-102	
102-3	Location of headquarters	TCC's new silk road ushers in a new age of exploration	11-12	
102-4	Location of operations	6.1.1 About TCC	99	
		TCC's new silk road ushers in a new age of exploration 6.1.1 About TCC	11-12 99-100	
102-5	Ownership and legal form	6.1.1 About TCC	99	For details, please refer to the 2018 Annual Report
102-6	Markets served	TCC's New Silk Road Ushers in a New Age of Exploration 6.1.1 About TCC	11-12 99-100	
102-7	Scale of the organization	TCC's New Silk Road Ushers in a New Age of Exploration 4.3 Workplace Diversity 6.1.1 About TCC	11-12 85 99-102	
102-8	Information on employees and other workers	4.3.1 Workforce Composition	85	
102-9	Supply chain	2.3 Managing Sustainable Supply Chains	54-56	For details, please refer to the 2018 Annual Report
102-10	Significant changes to the organization and its supply chain			There is no significant changes to the organization and our supply chain
102-11	Precautionary Principle or approach	6.3 Risk Control	109-111	
102-12	External initiatives	6.4.1 Membership of Associations	112	
102-13	Membership of associations	6.4.1 Membership of Associations	112	
102-14	Statement from senior decision-maker	Chairman Address	05-08	

No	Disclosure	Related Section /Explanatory Notes	Page No	Note(including omissions)
102-16	Values, principles, standards, and norms of behavior	Chairman Address 6.1.2 The Board of Directors 6.2.1 Integrity and Ethics	05-08 103 106	
102-18	Governance structure	6.1.2 The Board of Directors	103-105	
102-40	List of stakeholder groups	1.1 Stakeholder Communication	39-42	
102-41	Collective bargaining agreements			We have corporate union but we haven't had collective bargaining agreements
102-42	Identifying and selecting stakeholders	1.1 Stakeholder Communication	38	
102-43	Approach to stakeholder engagement	1.1 Stakeholder Communication	39-42	
102-44	Key topics and concerns raised	1.1 Stakeholder Communication	39-42	
102-45	Entities included in the consolidated financial statements	Report Profile 6.1.1 About TCC	09 99-101	
102-46	Defining report content and topic Boundaries	Report Profile 1.1 Stakeholder Communication 1.2 Identifying Sustainability	09 38-42 41-42	
102-47	List of material topics	Topics 1.2 Identifying Sustainability Topics	41-42	
102-48	Restatements of information			There is no restatements of information in 2018
102-49	Changes in reporting			There is no changes in reporting
102-50	Reporting period		09	
102-51	Date of most recent	Report Profile	09	
102-52	report	Report Profile	09	
102-53	Reporting cycle Contact point for questions regarding the report	Report Profile Report Profile	09	
102-54	Claims of reporting in accordance with the GRI Standards	Report Profile	09	
102-55	GRI content index	Appendix	119-124	
102-56	External assurance	Report Profile Appendix	09 126-130	

No	Disclosure	Related Section /Explanatory Notes	Page No	Note(including omissions)
Material Topics				
GRI 201: Economic Performance 2016				
103-1	Explanation of the material topic and its Boundary	1.2 Identifying Sustainability Topics	43-44	
103-2	The management approach and its components	1.2 Identifying Sustainability Topics CH6 Governance and Risk	43-44 98	
103-3	Evaluation of the management approach	CH6 Governance and Risk	98	
201-1	Direct economic value generated and distributed	6.1.1 About TCC	102	
GRI 205: Anti-corruption 2016				
103-1	Explanation of the material topic and its Boundary	1.2 Identifying Sustainability Topics	43-44	
103-2	The management approach and its components	1.2 Identifying sustainability topics CH6 Governance and risk	43-44 98	
103-3	Evaluation of the management approach	CH6 Governance and risk	98	
205-3	Confirmed incidents of corruption and actions taken		106	There is no confirmed incidents of corruption and actions taken in 2018
GRI 301: Materials 2016				
103-1	Explanation of the material topic and its Boundary	1.2 Identifying Sustainability Topics	43-44	
103-2	The management approach and its components	1.2 Identifying Sustainability Topics CH2 Environment and a Low Carbon Supply Chain	43-44 46	
103-3	Evaluation of the management approach	CH2 Environment and a Low Carbon Supply Chain	46	
301-1	Materials used by weight or volume	2.1.5 Raw Materials Management	51	
301-2	Recycled input materials used	2.1.5 Raw Materials Management	51	

No	Disclosure	Related Section /Explanatory Notes	Page No	Note(including omissions)
Material Topics				
GRI 302: Energy 2016				
103-1	Explanation of the material topic and its Boundary	1.2 Identifying Sustainability Topics	43-44	
103-2	The management approach and its components	1.2 Identifying Sustainability Topics CH2 Environment and a Low Carbon Supply Chain	43-44 46	
103-3	Evaluation of the management approach	CH2 Environment and a Low Carbon Supply Chain	46	
302-1	Energy consumption within the organization	2.1.4 Energy Management	50-51	
302-3	Energy intensity	2.1.4 Energy Management	50	
GRI 303: Water 2016				
103-1	Explanation of the material topic and its Boundary	1.2 Identifying Sustainability Topics	43-44	
103-2	The management approach and its components	1.2 Identifying Sustainability Topics CH2 Environment and a Low Carbon Supply Chain	43-44 46	
103-3	Evaluation of the management approach	CH2 Environment and a Low Carbon Supply Chain	46	
303-1	Water withdrawal by source	2.1.3 Management of Water Resources and the Water Cycle	50	
GRI 305: Emissions 2016				
103-1	Explanation of the material topic and its Boundary	1.2 Identifying Sustainability Topics	43-44	
103-2	The management approach and its components	1.2 Identifying Sustainability Topics CH2 Environment and a Low Carbon Supply Chain	43-44 46	
103-3	Evaluation of the management approach	CH2 Environment and a Low Carbon Supply Chain	46	
305-1	Direct (Scope 1) GHG emissions	2.1.1 Carbon Pricing and GHG Management	48	
305-2	Energy indirect (Scope 2) GHG emissions	2.1.1 Carbon Pricing and GHG Management	48	
305-3	Other indirect (Scope 3) GHG emissions	2.1.1 Carbon Pricing and GHG Management	48	
305-4	GHG emissions intensity	2.1.1 Carbon Pricing and GHG Management	48	
305-7	Nitrogen oxides (NOX), sulfur oxides (SOX), and other significant air emissions	2.1.2 Pollution Control and Management	48-49	

No	Disclosure	Related Section /Explanatory Notes	Page No	Note(including omission
Material Topics				
GRI 306: Effluents and Waste 2016				
103-1	Explanation of the material topic and its Boundary	1.2 Identifying Sustainability Topics	43-44	
103-2	The management approach and its components	1.2 Identifying Sustainability Topics CH2 Environment and a Low Carbon Supply Chain	43-44 46	
103-3	Evaluation of the management approach	CH2 Environment and a Low Carbon Supply Chain	46	
306-1	Water discharge by quality and destination	2.1.3 Management of Water Resources and the Water Cycle	49-50	
306-2	Waste by type and disposal method	2.1.2 Pollution Control and Management	48	
GRI 307: Environmental Compliance 2016				
103-1	Explanation of the material topic and its Boundary	1.2 Identifying Sustainability Topics	43-44	
103-2	The management approach and its components	1.2 Identifying Sustainability Topics CH6 Governance and Risk	43-44 98	
103-3	Evaluation of the management approach	CH6 Governance and Risk	98	
307-1	Non-compliance with environmental laws and regulations	6.2.2 Legal Compliance	107	
GRI 401: Employment 2016*				
401-1	New employee hires and employee turnover	4.3.2 Turnover	86	
401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	4.2.2 Salary and Benefits	80-84	
401-3	Parental leave	4.2.2 Salary and Benefits	82	
GRI 403: Occupational Health and Safety 2016				
103-1	Explanation of the material topic and its Boundary	1.2 Identifying Sustainability Topics	43-44	
103-2	The management approach and its components	1.2 Identifying Sustainability Topics CH4 Employee Benefits	43-44 73	
103-3	Evaluation of the management approach	CH4 Employee Benefits	73	
403-2	Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	4.2.1 Workplace Safety	79	

No	Disclosure	Related Section /Explanatory Notes	Page No	Note(including omission
Material Topics				
GRI 404: Training and Education 2016				
103-1	Explanation of the material topic and its Boundary	1.2 Identifying Sustainability Topics	43-44	
103-2	The management approach and its components	1.2 Identifying Sustainability Topics CH4 Employee Benefits	43-44 73	
103-3	Evaluation of the management approach	CH4 Employee Benefits	73	
404-1	Average hours of training per year per employee	4.1.2 Talent Development	78	
GRI 405: Diversity and Equal Opportunity 2016*				
405-1	Diversity of governance bodies and employees	4.3.1 Workforce Composition 6.1.2 The Board of Directors	85 103-105	
GRI 419: Socioeconomic Compliance 2016				
103-1	Explanation of the material topic and its Boundary	1.2 Identifying sustainability topics	43-44	
103-2	The management approach and its components	1.2 Identifying sustainability topics CH6 Governance and Risk	43-44 98	
103-3	Evaluation of the management approach	CH6 Governance and Risk	98	
419-1	Non-compliance with laws and regulations in the social and economic area	6.2.2 Legal Compliance	107	

Mining and Metals Sector Supplement

Aspect	Indicator	Commentary	Corresponding Sections or Note (including omissions)	Page
Biodiverse	MM1	Amount of land (owned or leased, and managed for production activities or extractive use) disturbed or rehabilitated.	CH3 Ecology and Regeneration There is no ecological conservation or restoration area located in the TCC mining areas.	59-62
Biodiverse	MM2	The number and percentage of total sites identified as requiring biodiversity management plans according to stated criteria, and the number (percentage) of those sites with plans in place.	CH3 Ecology and Regeneration TCC mining sites are located in areas not intended for biodiversity management. However, TCC voluntarily monitors biodiversity around the Hoping Industrial Park over time, and no significant impact has been detected.	59-62
Effuents and Waste	MM3	Total amounts of overburden, rock, tailings, and sludges and their associated risks.	CH3 Ecology and Regeneration	
Labor/ Management Relations	MM4	Number of strikes and lock-outs exceeding one week's duration, by country.	No related incident was reported in 2018.	
Local Communities	MM6	Number and description of signifcant disputes relating to land use, customary rights of local communities and Indigenous Peoples.	No related incident was reported in 2018.	
Artisanal and Small-scale Mining	MM8	Number (and percentage) of company operating sites where artisanal and smallscale mining (ASM) takes place on, or adjacent to, the site; the associated risks and the actions taken to manage and mitigate	No related incident was reported in 2018.	

Accountant's Independent Assurance Report

Deloitte.

勤業眾信

INDEPENDENT AUDITORS LIMITED ASSURANCE REPORT

The Board of Directors and Stockholders
Taiwan Cement Co., Ltd.

We have performed a limited assurance engagement on the selected subject matter information (see Appendix A) in the Corporate Social Responsibility Report (the Report") of Taiwan Cement Co., Ltd. ("the Company") for the year ended December 31, 2018

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 Corporate Social Responsibility Reports by TWSE Listed Companies and GRI Standards and Sector Guidance published by the Global Reporting Initiatives (GRI) and other applicable rules covering up to its sector features, and for such internal control as management determines is necessary to enable the preparation of the Report that are free from material misstatement

Auditor's Responsibilities for the Limited Assurance Engagement Performed on the Report

We conducted our work on the selected subject matter information (see Appendix A) in the Report in accordance with the International Standard on Assurance Engagements 3000 (revised) (ISAE 3000 revised) to issue a limited assurance report on the preparation, 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 on 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

Independence and Quality Controls

We have complied with the independence and other ethical requirements of the Norm of Professional Ethics for Certified Public Accountants 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 Auditing Standard No. 46 "Quality Control for Public Accounting Firms" issued by the Accounting Research and Development Foundation of the Republic of China and, accordingly, maintains a comprehensive system of quality controls including documented policies and 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 information in the Report is not stated fairly, in all material respects, in accordance with the above-mentioned reporting criteria.

Deloitte & Touche

Deloitte & Touche
Taipei, Taiwan
Republic of China

June 21, 2019

Notice to Readers

For the convenience of readers, the independent auditor's limited assurance report has been translated into English from the original Chinese version prepared and used in the Republic of China. Where there is any conflict between the English version and the original Chinese version or any difference in the interpretation of the two versions, the Chinese language independent auditor's limited assurance report shall prevail.

APPENDIX A

SUMMARY OF SELECTED SUBJECT MATTER INFORMATION

#	GRI Number	Descriptions of Indicators	Corresponding Section	Applicable Criteria
1	GRI 205-3 2016	Confirmed incidents of corruption and actions taken	GRI Index table	Confirmed by the number of corruptive incidents of the organization, staff, and business partners in 2018
2	GRI 302-1 2016	Energy consumption within the organization	2.1.4 Energy management	The energy consumption of coal, diesel, and outsourced electricity.
3	GRI 303-1 2016	Water withdrawal by source	2.1.3 Management of water resources and the water cycle	The amount of water withdrawal of tap water, groundwater, and industrial water supply
4	GRI 305-7 2016	Nitrogen oxides (NOx), sulfur oxides (SO_x), and other significant air emissions	2.1.2 Pollution control and management	The statistical results of air emissions including nitrogen oxides (NOx), sulfur oxides (SO_x), and particulate matter
5	GRI 306-2 2016	Waste by type and disposal method	2.1.2 Pollution control and management	The total weight of non-hazardous wastes disposed in 2018
6	GRI 403-2 2016	Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	4.2.1 Workplace safety	Type of injury, injury rate (IIR), occupational disease rate (ODR), lost day rate (LDR), absence rate (AR), and work-related fatalities, categorized by region and gender

Independent Assurance Opinion Statement

SGS

ASSURANCE STATEMENT

SGS TAIWAN LTD.'S REPORT ON SUSTAINABILITY ACTIVITIES IN THE TAIWAN CEMENT CORPORATION'S CORPORATE SOCIAL RESPONSIBILITY REPORT FOR 2018

NATURE AND SCOPE OF THE ASSURANCE/VERIFICATION

SGS Taiwan Ltd. (hereinafter referred to as SGS) was commissioned by TAIWAN CEMENT CORPORATION (hereinafter referred to as TAIWAN CEMENT) to conduct an independent assurance of the Corporate Social Responsibility Report for 2018 (hereinafter referred to as CSR Report). The scope of the assurance, based on the SGS Sustainability Report Assurance methodology, included the sampled text, and data in accompanying tables, contained in this report.

The information in the TAIWAN CEMENT's CSR Report of 2018 and its presentation are the responsibility of the management of TAIWAN CEMENT. SGS has not been involved in the preparation of any of the material included in TAIWAN CEMENT's CSR Report of 2018.

Our responsibility is to express an opinion on the report content within the scope of verification with the intention to inform all TAIWAN CEMENT's stakeholders.

The SGS protocols are based upon internationally recognized guidance, including the Principles contained within the Global Reporting Initiative Sustainability Reporting Standards (GRI Standards) 101: Foundation 2016 for accuracy and reliability and the guidance on levels of assurance contained within the AA1000 series of standards and guidance for Assurance Providers.

This report has been assured using our protocols for:

- AA1000 Assurance Standard (2008) Type 1 evaluation of the report content and supporting management systems against the AA1000 Accountability Principles (2008) at a moderate level of scrutiny; and
- evaluation of the report against the Global Reporting Initiative Sustainability Reporting Standards (2016)

The assurance comprised a combination of pre-assurance research, interviews with relevant employees, superintendents, CSR committee members and the senior management in Taiwan; documentation and record review and validation with external bodies and/or stakeholders where relevant. Financial data drawn directly from independently audited financial accounts has not been checked back to source as part of this assurance process.

STATEMENT OF INDEPENDENCE AND COMPETENCE

The SGS Group of companies is the world leader in inspection, testing and verification, operating in more than 140 countries and providing services including management systems and service certification; quality, environmental, social and ethical auditing and training; environmental, social and sustainability report assurance. SGS affirm our independence from TAIWAN CEMENT, being free from bias and conflicts of interest with the organisation, its subsidiaries and stakeholders.

The assurance team was assembled based on their knowledge, experience and qualifications for this assignment, and comprised auditors registered with ISO 26000, ISO 20121, ISO 50001, SA8000, EICC, QMS, EMS, SMS, GPMS, CFP, WFP, GHG Verification and GHG Validation Lead Auditors and experience on the SRA Assurance service provisions.

VERIFICATION/ ASSURANCE OPINION

On the basis of the methodology described and the verification work performed, we are satisfied that the information and data contained within TAIWAN CEMENT's CSR Report of 2018 verified is accurate, reliable and provides a fair and balanced representation of TAIWAN CEMENT sustainability activities in 01/01/2018 to 12/31/2018.

The assurance team is of the opinion that the Report can be used by the Reporting Organisation's Stakeholders. We believe that the organisation has chosen an appropriate level of assurance for this stage in their reporting. In our opinion, the contents of the report meet the requirements of GRI Standards in accordance with Core Option and AA1000 Assurance Standard (2008) Type 1, Moderate level assurance.

AA1000 ACCOUNTABILITY PRINCIPLES (2008) CONCLUSIONS, FINDINGS AND RECOMMENDATIONS

Inclusivity

TAIWAN CEMENT has demonstrated a good commitment to stakeholder inclusivity and stakeholder engagement. A variety of engagement efforts such as survey and communication to employees, customers, investors, suppliers, CSR experts, and other stakeholders are implemented to underpin the organization's understanding of stakeholder concerns. For future reporting, TAIWAN CEMENT may proactively consider having more direct two-ways involvement of stakeholders during future engagement.

Materiality

TAIWAN CEMENT has established effective processes for determining issues that are material to the business. Formal review has identified stakeholders and those issues that are material to each group and the report addresses these at an appropriate level to reflect their importance and priority to these stakeholders.

Responsiveness

The report includes coverage given to stakeholder engagement and channels for stakeholder feedback.

GLOBAL REPORTING INITIATIVE REPORTING STANDARDS (2016) CONCLUSIONS, FINDINGS AND RECOMMENDATIONS

The report, TAIWAN CEMENT's CSR Report of 2018, is adequately in line with the GRI Standards in accordance with Core Option. The material topics and their boundaries within and outside of the organization are properly defined in accordance with GRI's Reporting Principles for Defining Report Content. Disclosures of identified material topics and boundaries, and stakeholder engagement, GRI 102-40 to GRI 102-47, are correctly located in content index and report. For future reporting, it is recommended to have more descriptions of TAIWAN CEMENT's involvement with the impacts for each material topic (103-1), and how efforts were given to mitigate the impacts. More disclosures on each management approach purpose statement and component (103-2). In addition, more disclosures on the information of other entities within the organization are recommended in future reports. It is recommended to integrate SDGs into TAIWAN CEMENT's business strategies and identify potential opportunities related to SDGs, such as bringing innovative commodity services, which may have positive influence in enhancing the creating shared value of TAIWAN CEMENT.

Signed:
For and on behalf of SGS Taiwan Ltd.

AA1000
Licensed Assurance Provider
000-8

David Huang
Senior Director
Taipei, Taiwan
15 May, 2019
WWW.SGS.COM

TW/PP5008 Issue 1905

TCC

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