Taiwan Cement Corporation

2017 Corporate Sustainability Report

2017


TCC
"A stage focused on
an environmental engineering company
handling the complex relation between
civilization and nature"

Report profile

This is the 2017 Corporate Sustainability Report (this Report) of Taiwan Cement Corporation (TCC). Based on the principles of openness, transparency, and good faith, this Report faithfully discloses our efforts to communicate with our stakeholders and to engage in sustainable development in 2017. With this Report, we hope to support the business philosophy: Taking from Society and Giving Back to Society and to improve future living quality through collaboration with stakeholders.

Reporting period and disclosure boundaries

This reporting period is between January 1, 2017 and December 31, 2017. The boundary of financial performance covers both consolidated and individual performance. Data regarding energy and greenhouse gases are based mainly on the cement plant (the premixing plant with extremely low occupancy are not covered), and the business activities of TCC in Taiwan are the focus of other contents. As our environmental investments are inseparable from the Hoping Power Plant and the Hoping Industrial Harbor Administration, these two entities are included in our environmental issues of this report. In consideration of information comparability, some data are disclosed together with data in the past three years.

Publication date of the previous issue: June 2017
Publication date of the current issue: June 2018
Publication date of the next issue: June 2019

Reference guidelines

This report has been prepared in accordance with the "Core" disclosure principle in the GRI Sustainability Reporting Standards (GRI Standards) and Sustainability Reporting Guidelines & "Mining and Metals Sector Supplement" published by the Global Reporting Initiative (GRI).

Information disclosure

Information in relation to financial performance disclosed in this Report shall be subject to the published consolidated financial statements certified by the certified public accountant. All financial figures are expressed in the New Taiwan Dollar. While public companies, either listed on the Taiwan Stock Exchange or Taipei Exchange were requested to adopt the International Financial Reporting Standards (IFRSs) as of 2013, we have since disclosed financial data with respect to IFRSs. Other data disclosed in this Report have been collected and adjusted from our statistics with the commonly used data description methods and disclosed after rounding. In addition, this Report is also published on the TCC website at the same time.

Audit and verification

Internal audit: All data disclosed or data provided by individual responsible units have been verified by the CSR Report Editing Team. After submitting to the officers of each department, this Report has been reviewed and approved by the chairman.

External verification: Report compliance with the Core disclosure principle in the GRI Standards has been verified and assured by SGS Taiwan Ltd. with reference to the requirements for Core disclosure principle of the GRI Standards and the Moderate Assurance in Type 1, AccountAbility 1000 Assurance Standard. Please refer to the indices for related assurance/verification methods and results.

Contact

Should you have any comments or suggestions for this Report, please feel free to contact us at:

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Mitigation of climate change

- Awarded the TSCA Climate Leadership Award
- Awarded the TSCA Circular Economy Leadership Award
- Subscribed **500,000** kWh of green power, accumulating to **1.5** million kWh.
- Surpassed the minimum of 15% ratio of recycling materials in cement admixtures temporary set for the Gold Green Cement Mark in CNS 61 with **186** kg of replacement materials for every tonne of cement.
- Dioxin value from burning waste tires at **0.015** ng/Nm3, way lower than national standard at 1ng/Nm3.
- Captures **200** tCO_2e accumulatively with CO_2 capture technology.
- Won team awards at the 5th National Industrial Innovation Award for the application of microalgae in CO_2 fixation.
- Passed the certification of **16** items for Portland Cement by the Taiwan Accreditation Foundation (TAF)
- Passed low-carbon cement certification.

Excellence for business growth

- Awarded the Influential Enterprise of the Year in the cement industry by the China Building Materials News.
- The board of directors approves the establishment of the "Sustainable Development Committee" as an ad hoc function committee.
- Won the **Top 50** Taiwan Corporate Sustainability Awards (TCSA)
- Consolidated revenue reached NT$**98.312** billion, up by **9.77%**.

Practice makes dreams come true!

Protection for the natural environment

- Won the Outstanding Eco-Friendly Model Plan Award from the 2017 CSR Awards organized by Global Vision Magazine.
- Waste recycling up to **100%**.
- Accumulative electricity output up to **635** million kWh from waste heat generation reduced about **333,600** tCO_2e.
- GHG emissions at **7,704** tCO_2e, **2,652** tCO_2e less than the base year.
- Saved diesel by **23,265** kL/year with shaft mining, or **62,816** tCO_2e.
- Successfully reproduced the **570** silky camellia (Pyrenaria buisanensis) trees.

Dissemination of social inclusiveness.

- Passed the certification of the OHSAS 18001: 2007 Occupational Safety and Health Management System
- Passed the certification of the CNS15506: 2011 Taiwan Occupational Safety and Health Management System (TOSHMS)
- Trained **93** management assistants into section chiefs.
- **100%** reinstating rate and retention rate after parental leave of absence.
- Awarded the TCSA Social Inclusion Award
- The Cement Academy benefited up to **1,284** students.
- Bought out **15** performances at TaipeiEYE for Japanese high school students.

Chairman
An-ping Chang

Let's start from some questions!

Who are we?

Where are we from?

Why we come?

Where we go?

Human beings never stop asking these questions …

Let's try to figure out these questions.

Earth is our common home. This blue planet exists in the immense universe as beautiful as a miracle. So far, Earth is the only known plant with life. Through innumerous miracles and coincidences, Lucy, the ancestor of human beings, eventually entered the four-billion-year-old Earth about three million years ago. For survival, human beings began to watch the changes among celestial bodies and observe animals.

In the course of time, human beings advanced slowly.

On this planet, all living organisms always find themselves a suitable shelter instinctively, and human beings are no exception. Soon we understood that we must build our home with our own hands. So we began to find materials in nature and change nature by building what was on our mind with clay and sand, wood, shells, and rocks. Human beings are always in search of artificial rocks that are as robust and permanent as natural rocks and as easy to access for building homes faster and more easily. Indeed, we found it – cement. Cement enables human beings to realize their dream of housing and build brilliant civilizations.

Cement is the answer.

Yet, we all know that cement will never be the answer once and for all. When 7.5 billion peoples are subsisting on the limited resources on this planet to enjoy a modern life. The problem has become severe and complicated. At this turning point in human history, the evolution of TCC will never be a never-changing straight line. Over time we have spared no effort to explore the complicated relationship between human beings and life and human beings and the living environment in terms of land, rock geology, air, and water.

So, we cautiously took over the "cement" project. The evolution of TCC has also started a new chapter in history:

TCC — a green environmental engineering company

that handles the complicated relationships between human civilization and nature with total devotion.

The circular economy is an innovative thinking integrating with nature. Natural resources on Earth are limited and evolve in pace with the circulation of nature. As a small island, Taiwan must import 98% of energy, 99% of fertilizer raw materials, 90% of feed raw materials, and over 60% of practice. These are facts challenging the capacity of our demand for natural resources. Not only are we believers, but we are also practitioners of the circular economy. The idea of the circular economy enables Taiwan to get rid of the destiny of resources depletion.

Zero waste, zero pollution, zero emission,

are our belief and the direction for us to become a sustainable business. Our valuable past experience in waste disposal enables us to maintain cooperation with the administration units of different districts and extend our scope of disposal to more solid and hazardous waste. The circular economy is an ever-lasting economic system. While there is no waste in nature, the end of waste must be the beginning of another resource. The environmental industry is an emerging market. We should walk one step ahead of others seriously. A global vision is a prerequisite for modern enterprises to foresee the constantly changing trend and progress in the future.

From now to the future, we have an important silk road to cultivate.

A silk road is a communication channel of culture, technology, and religions. In addition to bringing us stimuli, this road enables us to capture more world trends. Enterprises must look closer, closer enough to see the trend of Earth.

Thanks to technological advancements, balancing economic development and environmental protection is no longer a myth, when human beings must find a balanced way of survival in nature. We are heading toward zero waste and zero pollution, in an attempt to balance development and sustainability.

Zero emission in carbon capture is the last mile for TCC.

In addition to a matter of belief and determination, creation and progress are a process of creation requiring long-term efforts. It is a must for enterprises to set a standard: implantable, practicable, bearable, and progressive,

as it takes time and experience to hatch and to mature. Instead of a follower of standards, we are always ahead of standards in order see the spacious horizon that cannot be seen by followers. Despite our incessant efforts to resolve the complicated relationship between human beings and the natural environment, this relationship is getting more complicated to be resolved completely. This is our never-ending issue!

Regardless of whatever activities, we always put people first.

May it be the cement industry, whatever industries, whatever terms …

Life will always be our one and only answer.

In face with life, there is no answer but questions and stories about how to resolve problems. Lastly, let's encourage one another with plus ultra, the motto of Emperor Charles V of "the empire on which the sun never sets".

Let's go further beyond, because the future is worth it.

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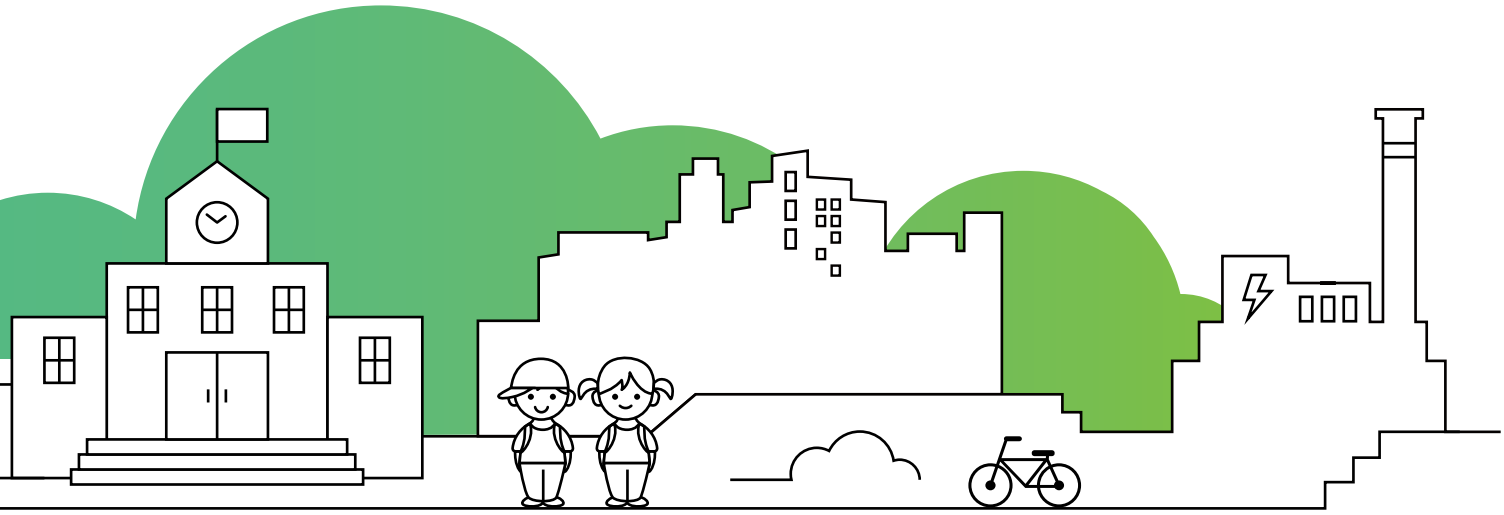


Chapter 2

Value Creation: Changes for Innovation!

Chapter 3

Symbiosis : Sustainable growth through circulation!

Chapter 4

Humanities : Culture disseminates!

Chapter 5

Communication : Mutual understanding is achieved through exchange!

Appendix

Chapter1
Operations: Protection of what is worth it!

Operating TCC is the ultimate pursuit of “expertise”.
“Expertise” also suggests dedication.
Apart from technological advancements, outstanding financial performance,
Expertise is the pursuit of the ultimate harmony between the industry and the natural environment.

——— Chairman An-ping Chang

Support for the UN Sustainable Development Goals (SDGs)

5 Achieve gender equality and empower all women and girls.

- Maintaining gender equality and human rights, avoiding gender-based workplace discrimination, and implementing sexual harassment prevention.
- Showing continuous concerns about the gender distributions in higher management.

7 Ensure access to affordable, reliable, sustainable and modern energy for all.

- Practicing the circular economy to reduce energy demands and continuously developing green energy to offer more options to Taiwan's renewable energy market.

8 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

- Maintaining steady economic growth and well-planned financial risk management and offering quality employment environments to promote economic development.

9 Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

- Investing in continuous industrial R&D and creating optimal technological capacity and product specifications.

11 Make cities and human settlements inclusive, safe, resilient and sustainable

- TCC is the product brand selected for important infrastructure construction in Taiwan to provide excellent infrastructure quality for the country.

12 Ensure sustainable consumption and production patterns.

- Publishing the TCC Sustainability Report in Chinese and English versions periodically.

16 Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

- Establishing the Code of Ethics and the Ethical Corporate Management Best Practice Principles to maintain a robust system for sustainable development.
- Practicing reliable legal compliance, showing voluntary concerns and periodically checking for regulatory changes, and developing the awareness and concept of legal compliance in employees.

17 Strengthen the means of implementation and revitalize the global partnership for sustainable development.

- Participating in related associations and organizations at home and abroad; sharing and exchanging R&D outputs, best practices, and technology applications; and assisting with industrial and national development.

Material topics

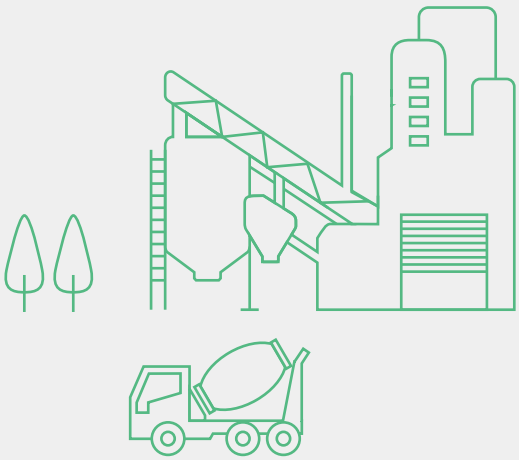
- Environmental Compliance
- Socioeconomic Compliance
- Economic Performance
- Anti-Corruption

Management approach

- Accelerate circular economy development, set mission to become"a green business handling the complicated relationships between human beings and nature"for TCC to transform into a sustainable business balancing cement production and environmental sustainability.
- Establish the"Corporate Social Responsibility Best Practice Principles"and"Corporate Governance Best Practice Principles"to balance economic, environmental and social sustainability while pursuing business sustainable development and implement operational management through a well-established governance framework.
- Establish the ad hoc function"Sustainable Development Committee"chaired by the company's chairman and topic-based teams to implement strategies in relation to organizational sustainable development at full stretch.
- Strictly abide by domestic related laws and regulations and establish the standard operating procedures (SOPs) for ethical management to achieve the zero-non-compliance goal through various operational activities implemented upon integrity and ethics, fairness, and impartiality.
- Improve the understanding and awareness of related economic, environmental, and social laws and regulations through training, education, and awareness education.
- Encourage employees to report any illegal or unethical conducts.
- Maintain profitability and assume responsibility for shareholders/investors and employees are our commitment of economic performance. Through reliable financial planning and risk avoidance, we persistently create economic value.
- Establish the "Code of Ethics" to define the need to maintain integrity and reliability for directors and managers to carry out their duties, in order to maintain organizational assets; protect the rights and interests of stakeholders; treat customers, suppliers, competitors, and employees without impartiality; and obtain no undue or improper advantage through improper means or behaviors. Report incidents against the code of ethical conduct through the report mailbox.

Evaluation mechanism

- Responsible units of respectively material topics relating to operations report the timeframe and status of individual material topics to the board of directors by means of a proposal.
- The Sustainable Development Committee holds meetings periodically to assess the performance of individual plans for practicing sustainable development.
- Internal audits are conducted annually and departmental audits are conducted monthly as mechanisms for assessment and management.
- The Audit Office performs the internal audit according to the annual plan, reviews corrective and preventive actions for detected defects with related departments, and attend the board meeting or Audit Committee meeting as a guest to present the internal audit report.
- Assess financial allocation periodically to reduce financial risks; and report and adjust the allocation at the internal executive meeting to ensure steady organizational growth.
- Adjust related standards, principles, regulations, and specifications after assessing the latest information announced by competent authorities to maintain the highest standard in our business activities.



1-1 TCC

"TCC is an environmental engineering company handling the complex relationship between human civilization and nature."

The Future Is Worth It

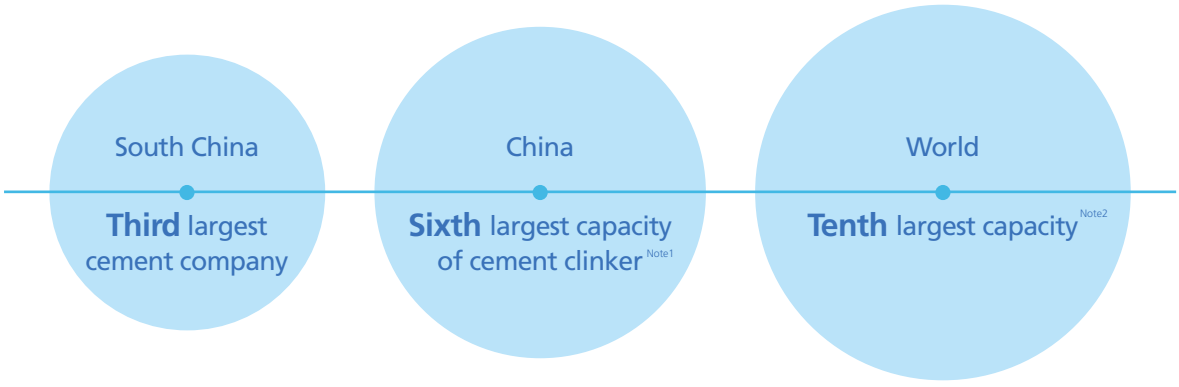
Combing the implications of the "Möbiusband strip" and the "infinity symbol in Mathematics",the new image of TCC—"circulation and sustainability"— is built"The Future Is Worth It" vision is made.

Cement is the adhesive of civilization and the power that keeps human civilization going.

In 1954, we began operations after privatizing from a state business, with the first brand representing Taiwan. In 1962, we became Taiwan's first public company listed with the stock code 1101, suggesting that business operations and social interest are our responsibilities. Over the past 60 years, we have been growing with Taiwan, expanded our territory in pace with national policies, and participated in infrastructure and major national construction projects to build Taiwan social and economic miracles.

"Environmental protection, energy, and cement" are our three core business lines, and "environment, energy, and ecology" are our three main future directions. At the investor conference held in November 2017, Chairman An-ping Chang officially expounded the upgrading blue prince of TCC from cement manufacture and marketing to an eco-solution provider that voluntarily seek eco-solutions and protect the natural environment.

TCC is one of the brands that represent Taiwan. In the past, we manufactured to demands. In the future, we will voluntarily maintain eco-friendliness and become an eco-solution provider that build a circular economy emphasizing "zero waste, zero pollution, and zero emission" through technology and thought innovation and new energy development, in order to create new values for sustainable businesses.



Note1: 2017 Ccement Statistics Note2: Intercem BNP, (2015). 2015 Global Cement Outlook.Outlook)

Three business domains

Green energy industry

Solar energy, wind power, and geothermal power generation

Circulatory economy value chain

Municipal solid waste and water resources treatment services

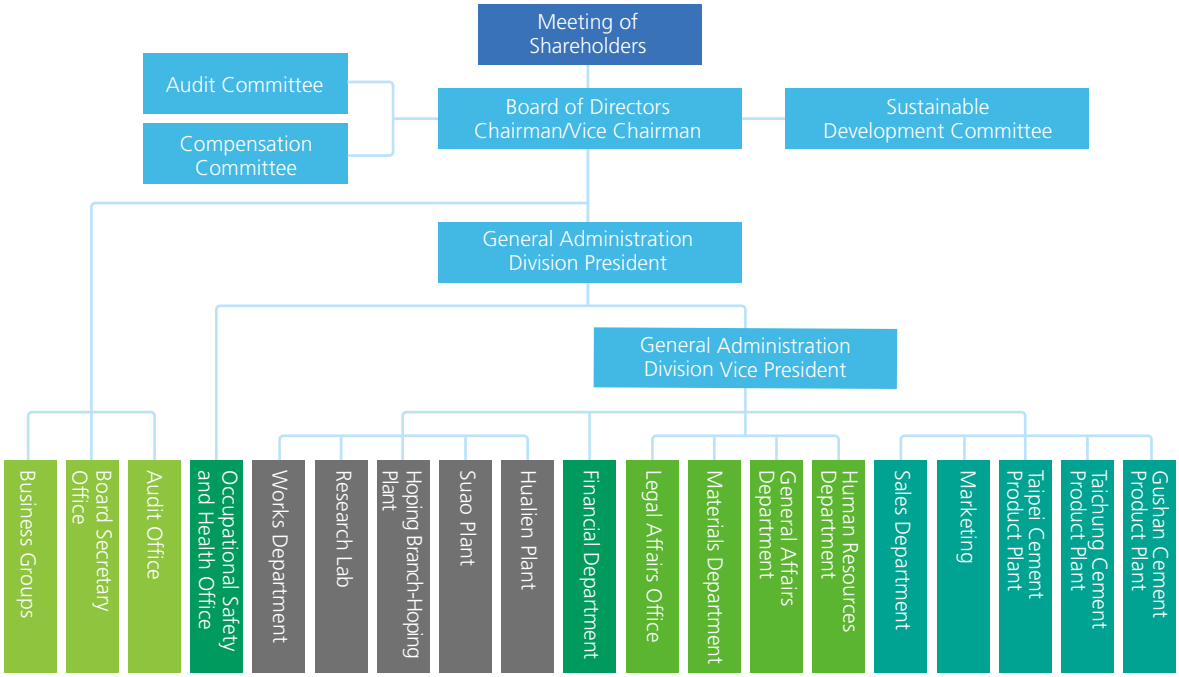
Cement internationalization

Establish plants in Europe and Asia

Organization framework

Adhering to the Confucian entrepreneurial spirit, with trust and honesty serving as our core value, we maintain integrity and transparency externally and put shareholder/investor interests first; we also ask for accuracy and efficiency internally and insist on the correct goals and appropriate and efficient methods. We have established the Audit Committee Committee and the Compensation Cimmittee Committee that report their activities and resolutions to the board of directors and assists the board in performing its supervisory duties.

In addition, based on the importance of the environmental policy in our sustainable development concept and on the expertise required by environmental issues, the board of directors approved the establishment of the "Sustainable Development Committee" in 2018 chaired by the company's chairman, hoping to reduce environmental pollution, offer benefits and protection, purify ecology, improve environmental quality, and build a happy workplace.



Note:The cement manufacturing plants in Taipei, Taichung, and Gushan are the parent plants under which there are 17 premixing branch plants and 3 cement distribution plants, and a premixed cement plant in Hualien.

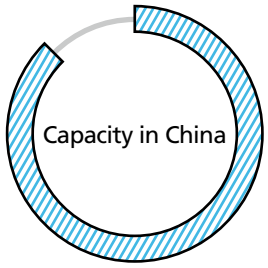
TCC Privatization

In 2017, we privatized subsidiary TCC International Holdings Limited (TCCI) by way of a scheme of arrangement and offered stock transfer for existing shareholders with TCC issuing new shares. We also delisted from Hong Kong Exchanges and Clearing Limited in November 2017 to fully reflect TCCI's contribution to TCC operations.

Global Market Deployment

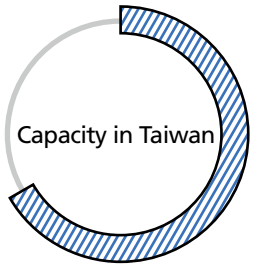
In 2017, our authorized capital amount exceeded NT$42 billion. With strong R&D power and stringent process control, we made quality excellence and image superiority the stereotype of TCC products distributed worldwide, including Taiwan, China, Japan, South Korea, Hong Kong, the USA, the Philippines, Kuwait, Saudi Arabia, Palou, Honduras, Bangladesh, India, Singapore, Malaysia, Brunei, Vietnam, Nigeria, and West African countries. As a result of our quality excellence and service perfection, the 2017 sales volume reached 57,469,000 tonnes. In support of the 2025 export reduction policy that reduces national export volume to 20% of the total output, we only sell a small part of products to Southeast Asian countries.

In response to the cement plant and milling plant establishment in mainland China, we will invest in the construction of aggregate plants or ready-mix concrete plant to extend product ranges to downstream cement products to create the added value of processing. Moreover, by implementing the independently developed decision-making support systems, including the internal control alert system and the war room system, and the e-commerce app, we accelerate the integration of sales, production and logistics resources and achieve information sharing and experience inheritance, to develop TCC into a business entity featuring integrity, efficiency, and reliability for sustainable development.

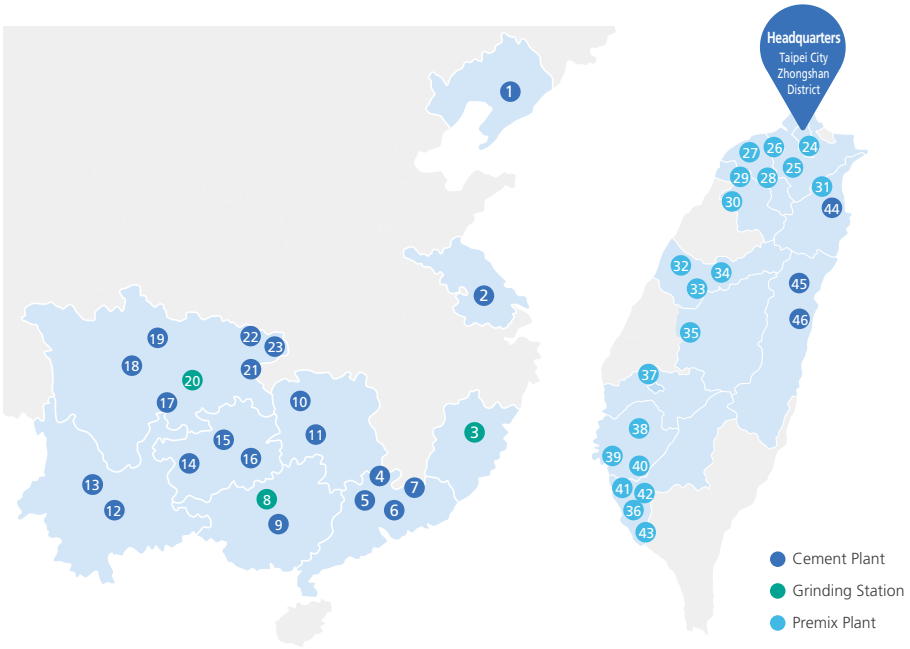


64.30 million tonnes

(Excluding the 1 million tonne capacity of Hejiang Saide Cement Corporation and Anhui Jujiaqiao Corporation.)



10.40 million tonnes



1. Liaoning
2. Jurong
3. Fuzhou
4. Shaoguan
5. Longshan
6. Yingde
7. Hailo, Yingde
8. Liuzhou
9. Guigang
10. Huihua
11. Jingzhou
12. Anning
13. Baoshan
14. Gangan
15. Anshun
16. Kaili
17. Suyong
18. Hanyuan
19. Yingjing
20. Naxi
21. Chongqing
22. Guangan
23. Huaying
24. Taipei
25. Tucheng
26. Guishan
27. Taoyuan
28. Bade
29. Zhongli
30. Hsinchu
31. Yilan
32. Taichung
33. Dadu
34. Taiping
35. Caotun
36. Gushan
37. Chiayi
38. Shanhua
39. Anping
40. Tainan
41. Luzhu
42. Renwu
43. Siaogang
44. Suao
45. Hoping
46. Hualien

Most Representative M&A Deal of the Year Award

Most Innovative M&A Deal Award

Best Cross-Strait M&A Deal Award

Note: 2017 MAPECT Taiwan M&A Awards

Membership of Associations

We actively participate in activities organized by industry and other associations to play the role of an industry leader. In addition, all function units also participated in the activities organized by the industry and other associations relating to their business, in order to promote exchange with regional communities. We have long been investigating environmental issues in industry and other associations. In 2017, we commissioned the NCKU Research and Development Foundation to conduct the research project "Circulatory Economics and Development Strategies for the Cement Industry" to develop the prototype of the circulatory economic system of Taiwan's cement industry. We also commissioned the Taiwan Cement Institute and the Taiwan Construction Research Institute to implement the "Industrial Circular Economy Implementation Project" to investigate how the cement industry can raise the consumption of domestic waste and study the feasibility of achieving the EU carbon reduction targets, in order to bring positive contributions to Taiwan's environment. In 2018, we further joined the Cement Sustainability Initiative (CSI) established by the World Business Council for Sustainable Development (WBCSD) to share our research outcomes and best practices in cement sustainable development in terms of seven aspects, in order to help promote the sustainable development of the global cement industry.

Membership of Associations in 2017

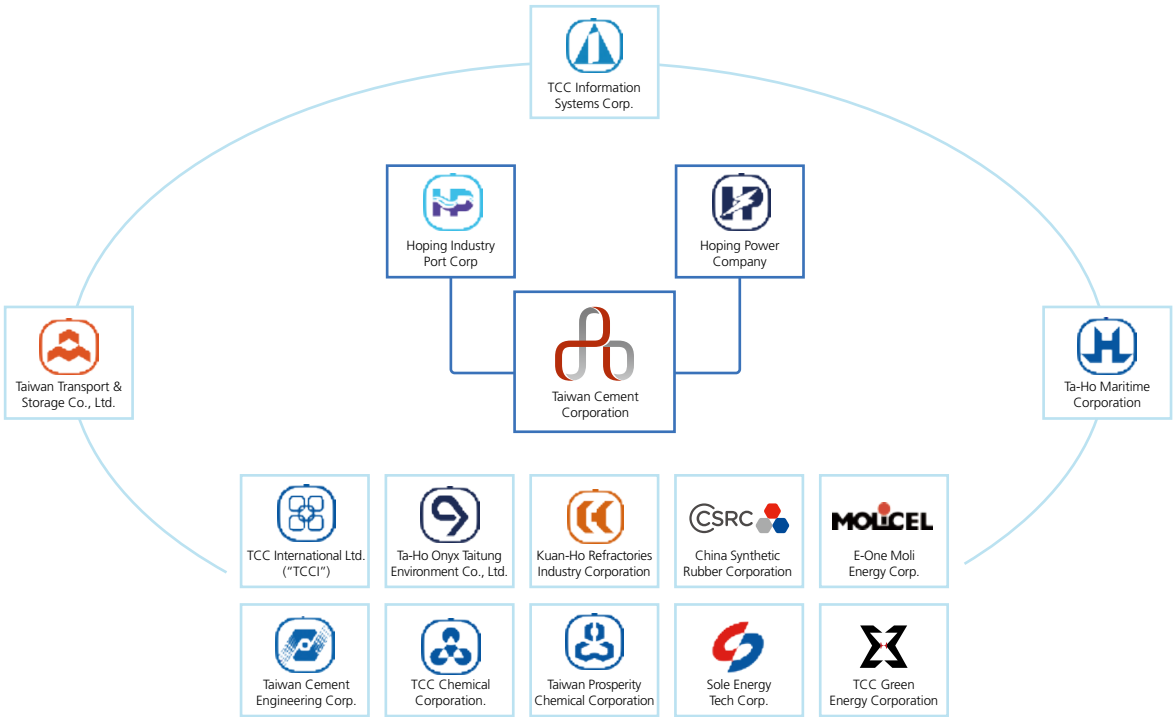
Association	Board of Directors/ Supervisors	Professional Committee	Member
Taiwan Cement Manufacturers' Association	●	●	●
Taiwan Ready-mix Concrete Association	●	●	●
Taiwan Marble Association	●		●
Chinese Institute of Mining & Metallurgical Engineers			●
Taiwan Concrete Institute	●	●	●
Chinese National Federation of Industries	●		●
Chinese National Association of Industry and Commerce	●		●
Taiwan Corporate Governance Association			●
Chinese International Economic Cooperation Association	●		●
Cross-Strait CEO Summit	●		●
Monte Jade Science and Technology Association of Taiwan	●		●
Taiwan Stock Affairs Association	●		●
The Third Wednesday Club			●
Audit Bureau of Circulations			●
Eisenhower Fellowships Association			●
Bio-App Biotechnology Industry-Academia-Research Alliance			●

Association	Board of Directors/ Supervisors	Professional Committee	Member
CNS Certification Mark Association	●		●
Chinese Arbitration Association, Taipei			●
Taiwan Accreditation Foundation			●
The Institute of Internal Auditors-Chinese			●
Taiwan Carbon Capture Storage and Utilization Association	●		●
Taiwan Institute for Sustainable Energy			●
Center for Corporate Sustainability	●		●

Note: TCC is a supervisor of the CNS Certification Mark Association and sponsors NT$20,000 advertising fee a year.

Resources integration

We effectively integrate resources and conclude a contract or purchase order for every transaction to specify the rights and obligations of each party. We price products with respect to general market prices. When no reference price is available, both parties will discuss a fair price before signing a contract.

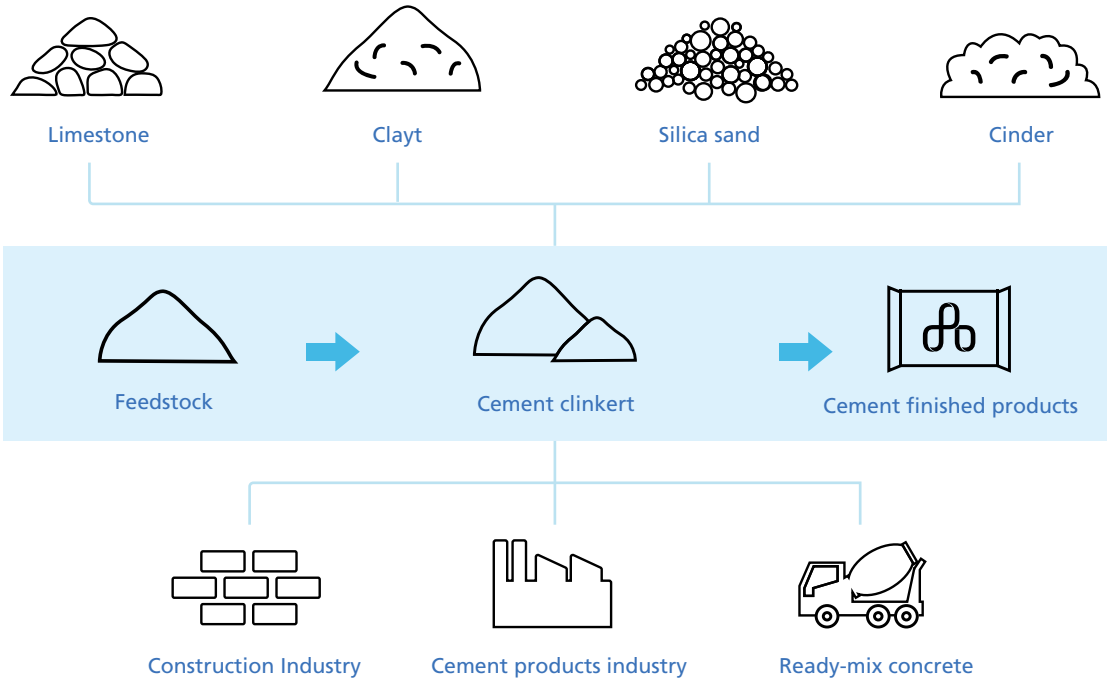


Note: Except for China Synthetic Rubber Corporation and Onyx Ta-Ho Environmental Services Company, all others are the entities disclosed in our consolidated financial statements.

1-2 Product

Industrial value chain

As one of the essential materials for construction, cement is made of grounded and kilned mineral raw materials. From acquiring the permit to mine limestone to the procurement of other raw materials, the transportation of mined limestone, the reduction of CO2 emission, and the recycling of industrial waste in the production process, we have spared no effort to improve the mining technology, optimize transportation, and develop new carbon capture technology and industrial waste recycling, we contribute to environmental sustainability from emissions reduction and industrial waste recycling.



Cement and cement clinker

- The limestone, clay, silica sand, and cinder are the major raw materials of cement. After proper grounding and mixing, feedstock is sintered at high temperature in a rotary kiln incinerator to become the cement clinker. Lastly, a suitable amount of plaster is added to mill cement clinkers into cement. We sell "branded cement" with models including the CNS Portland Cement Type I, low-alkaline cement Type I, Type II, Type IV, and Type V. We also supply other cement products on the customer's demand.
- For the export market, apart from supplying TypesI/II and II/Vcements to the USA, we export cement and cement clinkers to Europe, South America, Africa, and Southeast Asia that meet local standards and demands. The seven types of cement produced in mainland China include the P.I52.5R, the P.II52.5R, the P.II42.5R, the P.O42.5R, the P.O42.5, the P.C32.5R, the and P.S.A32.5 to meet the demands of customers and projects of different levels.

Ready-mix concrete

- Ready-mix concrete is a composite material making up of cementation materials (cement, and slag), aggregates, chemical admixtures, and water at a proper proportion (proportioning) before mixing in a stationary mixing machine, then settling for hardening. For its high hardness, rigidity and durability, comprehensive material sources, simple production process, low cost, high plasticity, and suitability for use in different types of natural environments, cement is the most used material in civil projects across the world. Our product ranges cover different types of conventional concrete,self-compacting concrete (SCC) and high flowing concrete (HFC). We also manufacture and supply high-performance cement at the customer's request.

With a sound brand image and excellent quality, TTC products are designated by various major infrastructure projects across Taiwan. This suggests that our quality demand has been recognized by the business and become the best choice in the market.

Major projects using TTC cement in 2017

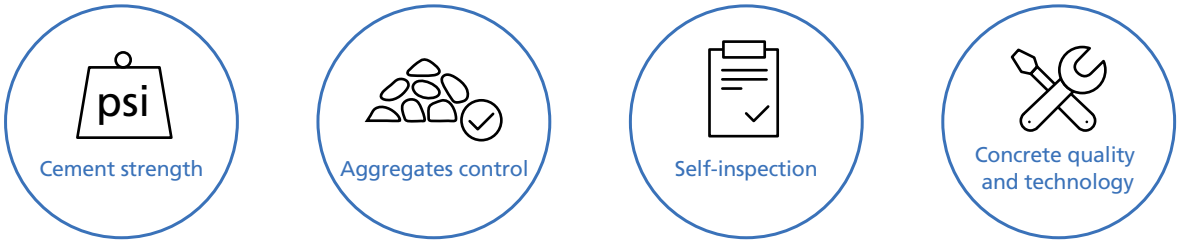
Linkou Power Plant

Daan Trunk Line Overpass Project in Fangli,
West Coast Expressway (Provincial Highway No. 61)

Front treatment facility of the tap water supply project at the lower course of the Hushan Reservoir.

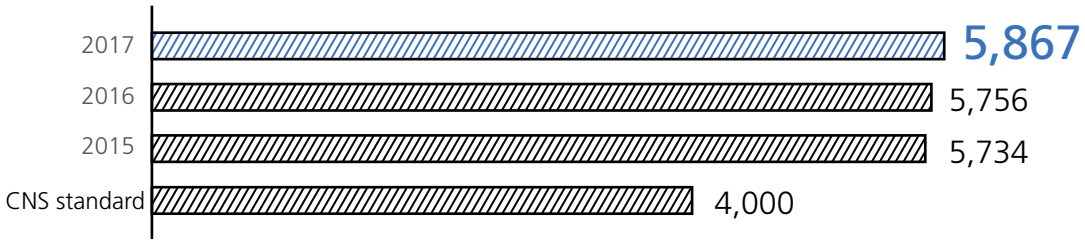
Four basic principles of product quality

Through total quality improvement, we make continual improvement of product quality to ensure superiority to the national standards of major countries in the world. Starting from the following aspects: cement strength, aggregates control, self-inspection, and concrete quality and technology, we assure that all TCC products have passed related quality and safety assessments to protect the end-user safety.

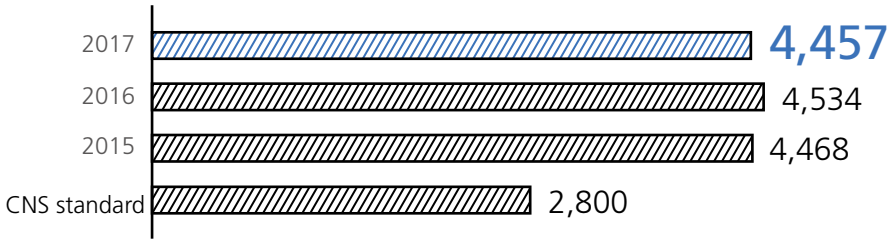


Cement strength

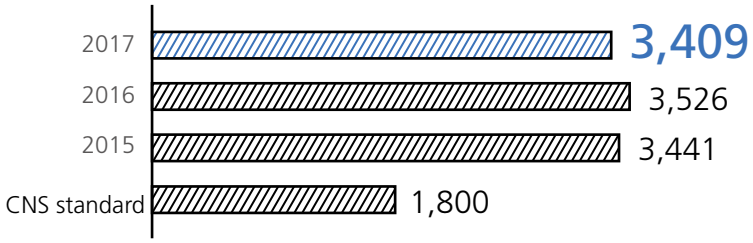
28-day strength



7-day strength



3-day strength



Note: All values are the average of the monthly inspection results in 2017 measured by the TAF-accredited (No. 0539) laboratory of TCC.

Aggregates control

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

1 Unannounced aggregate selection and material source assessment.

2 Suppliers receive TCC professional training and obtain related certificates.

3 Become a qualified supplier to supply 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 control product quality and safety for end-users.

SOP

Tier I Control

Perform material incoming inspection by branch plants based on the SOP.

Tier II Control

Periodic sampling inspection by the parent plant.

Tier III Control

Irregular on-site inspections and audits by impartial and independent third-party laboratories.

Concrete quality and technology

To enhance building quality, maintain safety of living, and reduce carbon footprint (CFT) of the construction process and application, besides formulating concrete with high-quality TCC cement, we maintain a perfect gradation design with cement without cutting corners. In response to the market demands, we have successfully developed concrete products including SCC, HFC, and high-performance concrete for specific construction needs, such as the Taipei 101 (formerly Taipei World Financial Center) and Taiwan High Speed Rail stations. In addition to the excellent performance, these concrete products have effectively reduced the energy consumption and enhance the safety of construction.

Types of Concrete	Main Features
 Conventional Concrete	✓ Suitable for common structures: Our perfect gradation design maintains a balance among fillers (aggregates), water, and cementitious materials (cement, fly ash, and slag). ✓ Optimal specifications: Slump of 15-18cm and compressive strength of 2000-5000 psi.
 Self-Compacting Concrete (SCC)	✓ Product CFP reduction: Replace cement with a large quantity of industrial byproducts — slags and fly ash, and use quality chemical admixtures. ✓ Our SSC is characterized its high flowability and high formwork filling ability. As it casts itself by gravity without the need of compacting, this can reduce energy consumption and noise from construction equipment on-site to improve the quality and safety of living. ✓ With sufficient consistency, SCC is able to resist segregation during construction. The uniformity of SCC is better than that of conventional concrete to bring an impressive improvement of overall quality and durability of reinforced concrete structures.
 High Flowing Concrete (HFC)	✓ Energy and noise reduction for construction: Apart from water-free workability, and being low in slump loss and bleeding, HFC is characterized by its high flowability, high water-tightness, and high resistance to segregation. Therefore, it is a perfect solution for problems, such as the need to add water when pumping, honeycombed concrete, bleeding, crust, shrinkage and cracking, that are commonly found in conventional concrete. With such, it can reduce energy consumption and noise from construction equipment on-site.
 Ultrahigh Strength Concrete	✓ Special standard: 90-day design compressive strength above 10,000 psi. ✓ Best technology: Concrete casting inside of steel columns (CFT method) for the Taipei 101 to bring an impressive improvement of Taiwan's concrete manufacturing technology.
 Non-Shrinkage Concrete	✓ Special standard: Characterized by its bleeding free, shrinkage free, and high strength performance, the 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 standard: Customizable at the customer's request to meet the project-specific construction needs

8 Plants

2017 China National Cement Quality Inspection Rating

Excellent Award for all plants in mainland China at the 2017 China National Cement Quality Inspection Rating
The Guigang Plant won the Guangxi Leading Brand and the China Best Quality awards.

186 KG

Replacement raw materials for each tonne of cement

According to the Environmental Protection Administration, the temporary ratio of recycling materials in cement admixtures for the Gold Cement Green Label under CNS61 must be higher than 15%. From 2017, we began using 186kg of replacement raw materials for each tonne of cement. It is estimated that in 2025 the raw materials replacement rate will be increased by 10% of 2017.

3 Years

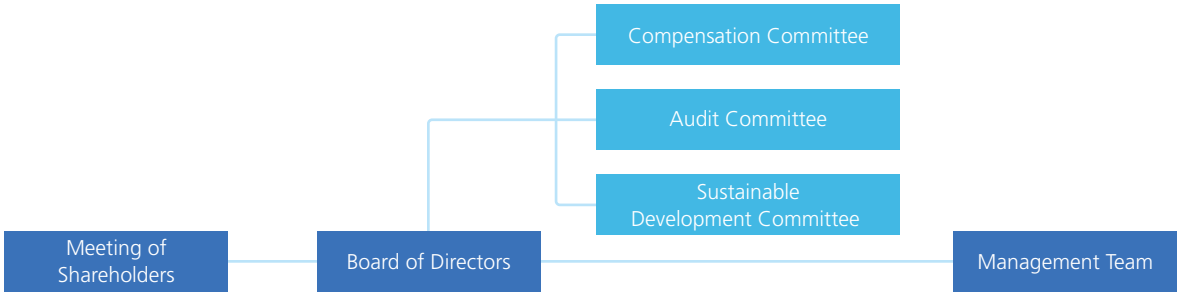
Important quality attributes of cement

Important quality attributes of cement in the last three years: The compressive strength of all ages is ahead of competitors and superior to the national standard.

1-3 Governance

We care about the rights and interests of shareholders/investors; optimize the board of directors to demonstrate its command, supervision, and management functions; enhance information transparency; strengthen internal audit functions; and faithfully present financial data to ensure the rights and interests of stakeholders.

In order to build a mechanism to process and disclose material information; prevent intended leakage of information; and ensure the consistency and accuracy of information disclosed to the public, we have established the "Internal Material Information Processing Standard Operating Procedure" to define and regulate the accuracy, integrity, timeliness, reliability, and fair disclosure of information.



Board of Directors

The board of directors (BOD) is composed of 19 directors, including four independent directors and one female director. Directors are elected by the annual general meeting of supervisors (AGM) according to the Company Act and the TCC Articles of Incorporation, and the term of each director is three years. In 2017, one independent director was re-elected. By the end of 2017, five of the 19 directors were aged under 50, and 14 of them were aged over 50.

BOD is operated and carries out its duties in accordance with related laws and regulations, the TCC Articles of Incorporation, the BOD Rules of Procedure. With expertise in respective fields and rich industry experience, directors exercise their supervision and management duties in good faith; assume responsibility for optimizing the organizational operational system and protect the

rights and interests of investors; carry out their duties with self-discipline and cautions; and faithfully implement organizational operations and development and important organizational decisions. BOD also invites certified public accountants to attend board meetings as a guest to present organizational financial reports and make direct exchange and communication with directors.

BOD holds at least one board meeting each quarter. In 2017, BOD held ten board meetings in which directors discuss organizational issues. For issues having a conflict of interest with them or the institutional investors they represent, BOD will explain the conflict and related directors will sidestep from voting. BOD also discloses important resolutions on the Market Observation Post System (MOPS) to ensure information transparency and disclosure.

Members of the 2017 BOD

Title	Institutional Investor	Representative	Gender	Major Education and Experience	Required Attendances	Actual Attendances	Attendances by Proxy	Actual Attendance Rate
Director	Fu Pin Investment Co., Ltd.	An-ping Chang	Male	MBA, New York University, USA Chairman, Chia Hsin Cement Corporation	10	10	0	100%
Director	Fu Pin Investment Co., Ltd.[1]	Kung-yi Koo	Male	MBA, Wharton School, University of Pennsylvania, USA Vice Chairman, Investment Banking Division, Morgan Stanley	9	9	0	100%
Director	China Synthetic Rubber Corporation	Kenneth C.M. Lo	Male	Master of Business, University of Alabama, USA Chairman, O-Bank	10	6	4	60%
Director	He Feng Investment Co., Ltd.	Por-yuan Wang	Male	Ph.D., Carnegie Mellon University, USA Chairman, Sercomm Corporation	10	8	2	80%
Director	Heng Qiang Investment Co., Ltd.	Tzun-yen Yu	Male	EMBA, Harvard Business School, USA BS, Electrical Engineering, National Taiwan University Chairman, CTCI Corporation	10	9	1	90%
Director	CTCB Investments Co., Ltd.	Qiu-qin Lin	Female	LLM, Harvard Law School, USA Managing Partner, Tsar & Tsai Law Firm	10	9	1	90%
Director	Xin Hope Investment Co., Ltd.	Chi-Wen Chang	Male	Master's in Accountancy and Management California State University, Fresno, USA Director & Chairman, Xin Hope Investment Co., Ltd.	10	5	5	50%

Title	Institutional Investor	Representative	Gender	Major Education and Experience	Required Attendances	Actual Attendances	Attendances by Proxy	Actual Attendance Rate
Director	Qing Yuan Investment Co., Ltd.	Jian-dong Chen	Male	MA, Department of Banking and Finance, Tamkang University Director, Hsin Kao Gas Co., Ltd.	10	6	4	60%
Director	Shinkong Synthetic Fibers Corporation	Eric T. Wu	Male	J.D., Harvard Law School Chairman, Shinkong Synthetic Fibers Corporation	10	8	2	80%
Director	Goldsun Co., Ltd.	Ming-sheng Lin	Male	JD, College of Law, University of California Hastings, USA Chairman, Goldsun Co., Ltd.	10	9	1	90%
Director	Sishan Investment Co., Ltd.	Nan-chou Lin	Male	MBA, La Trobe University, Australia Chairman, Sishan Investment Co., Ltd.	10	7	3	70%
Director	Chia Hsin Cement Corporation	Jason Kang-lung Chang	Male	MS, Management Studies, Massachusetts Institute of Technology Chairman, Chia Hsin Cement Corporation	10	7	3	70%
Director	Fu Pin Investment Co., Ltd.	Chi-chia Hsieh	Male	PhD, Electrical Engineering, University of California Santa Clara, USA Chairman, Microelectronics Technology Inc.	10	10	0	100%
Director	Heng Qiang Investment Co., Ltd.	Chi-te Chen	Male	MBA, University of California Santa Clara, USA Chairman, Chien Kuo Construction Co., Ltd.	10	9	1	90%
Director	C. F. Koo Foundation	David Carr Michael David Carr Michael	Male	BA, Department of Economics, Harvard University, USA MBA, Stanford University, USA Senior Consultant, Boston Consulting Group (BCG), USA	10	3	7	30%
Independent Director	-	Arthur Yu-cheng Chiao	Male	MS, Electronic Engineering, University of Washington, USA BS, Communication Engineering Department, National Chiao Tung University Chairman, Winbond Electronics Corporation	10	9	1	90%

Title	Institutional Investor	Representative	Gender	Major Education and Experience	Required Attendances	Actual Attendances	Attendances by Proxy	Actual Attendance Rate
ndependent Director	-	Victor Wang	Male	EMBA, National Taiwan University BA, Department of Accountancy, Soochow University was CEO & Vice Chairman, Audit Service Division, Deloitte Taiwan	10	10	0	100%
ndependent Director	-	Jen-ming Yeh	Male	BA, Department of Accounting and Statistics, National Cheng Kung University CPA, J. M. Yeh CPA Firm	10	10	0	100%
ndependent Director	-	Emile Chih-jen Sheng[2]	Male	Ph.D., Political Science, Northwestern University, USA President, L'Hotel de Chine Group Chairman, FDC International Hotels Corporation	5	5	0	100%
ndependent Director	-	Edward Yung-do Way2	Male	MBA, University of Georgia, USA BA, Department of Accounting, Soochow University was CEO, Deloitte Taiwan	3	3	0	100%

Note 1: At the provisional board meeting on January 23, 2017, Heng Qiang Investment re-assigned Mr. Kung-yi Koo to represent it.

Note 2: Independent Director Edward Yung-do Way resigned on April 1, 2017. Mr. Emile Chih-jen Sheng was elected as the new independent director in the re-election on June 28, 2017.

For directors to receive extended education, we have established related mechanisms and channels to raise the efficiency of extended education for directors. With extended education, we aim to help directors access related information and maintain their core value and professional strengths and capacities. The Secretary Office provides information of extended education courses relating to governance organized by competent authorities and private organizations for the reference and choices of directors.

Extended Education for Directors in 2017 (unit:hours)

Title	Name	Course	Length
Director	Kung-yi Koo	Enterprise Mergers and Acquisitions Through the Eyes of Directors and Supervisors	3
		Enterprise Strategies and Key Performance Indicators	3
		Supervising Enterprises to Optimize Risk Management and Crisis Management for Government Enhancement for Directors and Supervisors	3
Director	Kenneth C.M. Lo	Notices for 2017 AGM and Board Meetings	3
		Impact of US Tax Trends on Taiwanese Enterprises and Countermeasures	3

Title	Name	Course	Length
Director	Por-yuan Wang	Report on Information Security Trends	3
		Introduction to Anti-Money Laundering and Counter Terrorist Financing	3
Director	Tzun-yen Yu	Big Data Analysis and Organizational Corruption Detection and Prevention	3
		Key Missions of Boards of Directors in Risk Management for Use of Innovative Technologies	3
Director	Qiu-qin Lin	Interpretation of Key Financial Information	3
Director	Jian-dong Chen	Insider Trading and Enterprise Responsibility Seminar 2017	3
		Legal Compliance for Stock Trading by Insiders of Public Limited Companies Seminar	3
Director	Eric T. Wu	Close Companies and Limited Partnership Organizations: Practice and Application	3
		Tax Issues for Enterprise Mergers and Acquisitions: Practice and Interpretation	3
Director	Chi-chia Hsieh	Enterprise Mergers and Acquisitions: Practice and Case Study	3
		New Thoughts in Intellectual Property Management	3
Director	Chi-te Chen	Investigating Enterprise Information Disclosure and Preventing Insider Trading	3
		Exercising Fiduciary Duty for Directors (including court decision analysis and best practices)	3
Independent Director	Arthur Yu-cheng Chiao	The Era of IoT and Industry 4.0. Challenging World Economic Development	3
		Global Economic Trend and Development: Outlook 2017	1.5
		Leadership Reform Sharing: Power that Triggering Taipower Transformation	3
		Audit Committee and Compensation Committee: Operation and Practice	3
		Effects of Anti-Money Laundering on Business Operations	3
Independent Director	Victor Wang	Legal Compliance for Stock Trading by Insiders of Public Limited Companies Seminar	3
		Audit Committee and Compensation Committee: Operation and Practice	3
		Effects of Anti-Money Laundering on Business Operations	3
Independent Director	Jen-ming Yeh	Professional Role of Accountant in a Board of Directors and A General Meeting of Shareholders	3
		Analysis of New-Typed Audit Reports for Non-Listed Companies	3

Title	Name	Course	Length
Independent Director	Emile Chih-jen Sheng	How Do Directors Cope with an Enterprise	1

Audit Committee and Compensation Committee

To help BOD assess and supervise the pay standard of directors and managers of the Company, we established the "Audit Committee" in 2015 for the first time to take over the duty of supervisors to establish and revise the internal control system; the procedure for handling significant financial behaviors; and review marketable securities, financial statements, and conflicts of interest with directors. The "Compensation Committee" is established to establish and review the policy for assessing the performance and remuneration of directors, independent directors, and managers. At the 2017 AGM, one independent director was re-elected as the committee member, making up to four.

Members of the Audit Committee and Compensation Committee 2017

Title	Name	Major Education and Experience	Required Attendances	Actual Attendances	Attendances by Proxies	Actual Attendance Rate
Member	Arthur Yu-cheng Chiao*	MS, Electronic Engineering, University of Washington, USA BS, Communication Engineering Department, National Chiao TungUniversity Chairman, Winbond Electronics Corporation	6	5	1	83%
Member	Victor Wang**	EMBA, National Taiwan University BA, Department of Accountancy, Soochow University was CEO & Vice Chairman, Audit Service Division, Deloitte Taiwan	6	6	0	100%
Member	Jen-ming Yeh	BA, Department of Accounting and Statistics, National Cheng Kung University was Consultant, Deloitte Taiwan CPA, J. M. Yeh CPA Firm	6	6	0	100%
Member	Emile Chih-jen Sheng	Ph.D., Political Science, Northwestern University, USA President, L'Hotel de Chine Group Chairman, FDC International Hotels Corporation	3	3	0	100%

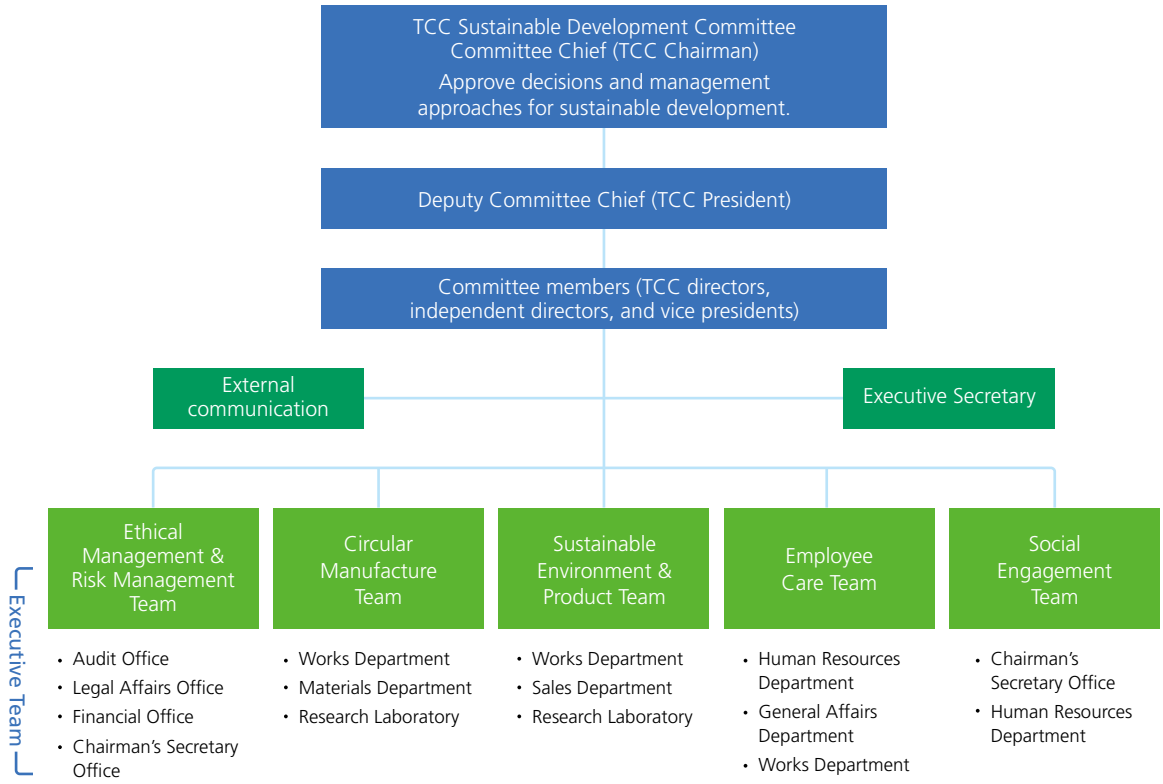
Title	Name	Major Education and Experience	Required Attendances	Actual Attendances	Attendances by Proxies	Actual Attendance Rate
Member	Edward Yung-do Way[2]	MBA, University of Georgia, USA BA, Department of Accounting, Soochow University was CEO, Deloitte Taiwan	1	1	0	100%

Note 1*:Convener of Compensation Committee ** Convener of Audit Committee

Note 2:Independent Director Edward Yung-do Way resigned on April 1, 2017. Mr. Emile Chih-jen Sheng was elected as the new independent director in the re-election on June 28, 2017.

Sustainable Development Committee

We value business sustainable development. Therefore, we have established the "Environmental Business Promotion Committee". In 2018 we further established the ad hoc functional committee "Sustainable Development Committee" chaired by the chairman of the Company to plan and implement the strategy and plan to implement sustainable development; disclose sustainability effectiveness; and produce the sustainability report through five working groups: "Ethical Governance and Risk Management", "Circular Manufacturing", "Sustainable Environment and Products", "Employee Care", and "Social Engagement".



1-4 Commitment

Integrity and ethics

At TCC, we value discipline and integrity. Therefore, we reinforce ethical management by means of establishing policies and regulations, signing contracts with suppliers, and setting up channels for grievances and reporting, in order to maintain organizational assets and protect the rights and interests of stakeholders.

Establishing policies and regulations

- We have established the "code of ethical conducts" and "rules for ethical management practices" to specify that directors and managements are obliged to uphold integrity and ethics when carrying out their duties, and observe the Political Donations Act, Anti-Corruption Act, and other laws and regulations governing business practices and activities.

Signing contracts with suppliers

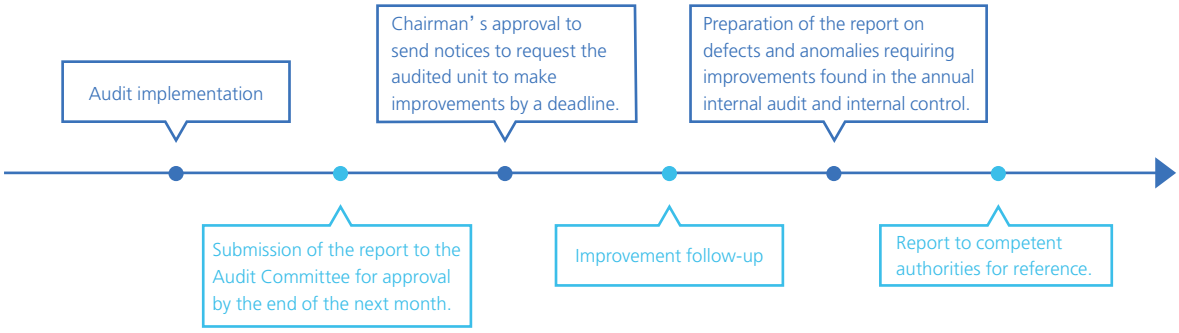
- For material procurement contracts with an amount above NT$300,000, we will request suppliers to sign a standard procurement contract to ban undue or improper advantage.

Setting up channels for grievances and reporting

- We encourage employees to report to the management any alleged or confirmed unethical conduct.
- Any suppliers, contractors, or employees may report violation of work discipline and integrity to the complaint box (MP.Buster@taiwance-ment.com).

Internal audit

The audit office carries out audits according to the annual audit program. The process includes: pre-audit meeting, audit implementation, writing internal audit recommendation, holding closure meetings, and submit the audit report. Based on past experience and future trends, the audit office draws up and implements audit projects to help audited business units to discover opportunities for improvement, in order to make the organizational structure more robust.



Legal compliance

We abide by the law in our business and production activities. In product sales, we observe related regulations to market and label products and request for the best quality at a high standard. Environmentally, we observe the Air Pollution Control Act and related environmental regulations to protect the environment with due care and due diligence. We also strengthen the law abidance awareness of employees by organizing training camps, training/education activities, and talks and seminars. In addition, by establishing and implementing the internal audit mechanism, we prevent business operational risks to enhance business operational effectiveness.

No sanction involving significant fines was reported in 2017. All environmental non-compliance incidents have been improved. To reinforce the prevention of potential treats to industrial safety and renew environmental equipment, we implemented the Industrial Safety and Environmental Improvement Project in 2018. Plants in Taiwan proposed a total of 332 items required for improvement. Industrial safety and environmental meetings are held monthly to follow up the improvement progress, in order to prevent them from occurrence and non-conformities from recurrence.

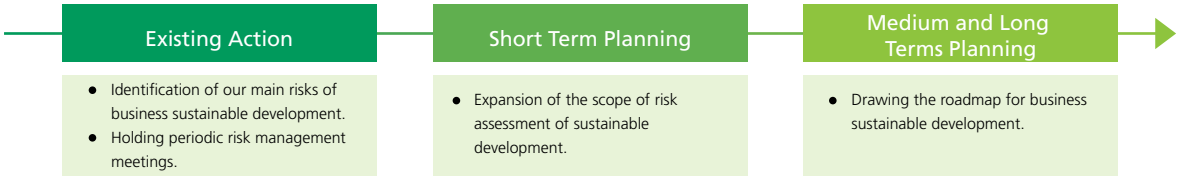
Monetary Sanctions in 2017 (unit: NTD)

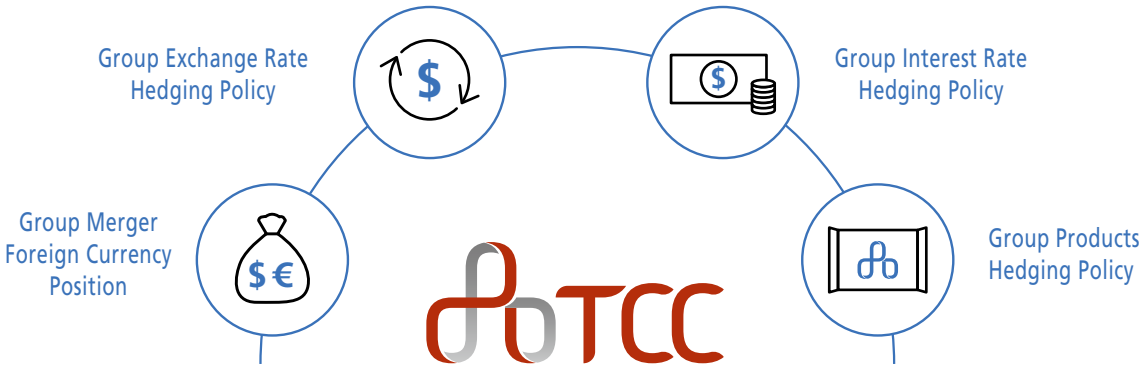
Plant	Non-conformity	Value of Fine	Corrective Action
Suao Plant	Failure to establish a full-time occupational health and safety (OHS) supervisor by law.	60,000	A full-time OHS supervisor has been assigned and obtained the certificate.
	Damage caused by corrosion of the handrail along the aisle next to the clay unloading pit, and insufficient coverage of the tail wheel cover of the silica sand conveyor in the feedstock warehouse.	60,000	Defects have been audited and improvement was made. Corrections of potential threats to industrial safety have been made.
	Occurrences of electrical burns caused by an instantaneous electric arc when pulling off the safety operation lever off the isolation switch during main switchboard HV switch segregation.	90,000	Posting warning signs on the HV segregation switchboard near the isolation switch and implementing training on "Cautions for HV Isolation Switch Operation".
	Overtime Excess	20,000	Reinforcing awareness education, voluntary care for employees to understand their work status, and sending alert to supervisors to prevent excessive overtime.
Hoping Plant	In a joint audit on significant industrial safety incidents in the cement industry, the Occupational Safety and Health Administration (OSHA) found that no railing was installed on the roof slab opening, corrosive stairs, and absence of a confined space hazards prevention plan in the warehouse.	60,000	Railing has been installed at the roof slab opening, corrosive stairs have been repaired, and onsite industrial safety equipment check and repair were implemented according to the ESH Tour Inspection Manual.
	Failure to post the "no entry" sign at the entrance of the confined workplace. Failure to implement end supervision and management of contractors that did not secure pressured cylinders.	180,000	Reinforcement of on-site tour inspection according to the ESH Tour Inspection Manual. Issue of warning tickets or fine tickets. Installation of locks on the top cover of tanks in the sewage treatment plant and posting warning signs at confined spaces.
Hualien Plant	No protective cover at the end of the shaft of the cement bag conveyor, no railing on the platform opening, excessive space for partial air exchange devices in areas enclosed by packaging machines.	60,000	Improvement of the anti-fall devices on cranes, installation of railing on platform opening when not in use; improvement of partial air exchange devices in the enclosure to prevent excessive exposure.
	Restoration of railing immediately after construction at the opening on the corrosive stairs of the original coal conveyor belt of which contactors were not informed in training/education and hazard prevention notice issued before construction within their work.	180,000	Railling was re-installed in place immediately after construction, and the hazard prevention notice has been posted in place as necessary based on the nature of individual tasks.

Plant	Non-conformity	Value of Fine	Corrective Action
Taipei Plant	Failure to install the electricity leakage breaker (ELB) on the circuit of electrical equipment installed in moist areas in the Taipei Premixing Plant to prevent electrical shock as detected by the Taipei City Labor Standards Inspection Office.	30,000	Completion of ELB installation to prevent employees from electrical shock.
Chiayi Branch Plant	Improper cleaning of the tires of trucks accessing the plant caused road contamination in Chiayi Branch Plant as found by Southern Brach BEI.	1,200	Reinforcement of awareness education and request for tire cleanup of trucks accessing the plant.

Note:From 2017, the base day of fine disclosures were subject to the actual date of fine occurrence, and fines that were disclosed in 2016 will not be disclosed this year.

1-5 Risk management





Risk management is key to business operations. By identifying internal and external management risks, measuring and analyzing the short, medium, and long terms impacts brought to TCC in different aspects, improve the effective of decision making, and enhance enterprise value. To continuously optimize the risk management mechanism, we have planned to draw up the risk roadmap of the Company covering existing financial, operational, and product aspects and emphasize the risk management of disaster and work safety, we further established corresponding implementation plan and strategy.

Risk management organization

We totally understand the challenges that risks brought to business operations and thus set up a risk management organization. This organization holds a meeting every month to investigate the focus of risk management, risk assessment, and countermeasures. The organization also reports to BOD the risk environment and management strategies relating to business operations.

Identification and countermeasures of four major risks

Operation Risks

- The scope of operational risks covers responses to legal and other changes, market supply and demand, product and material prices, production and manufacture, and research and development.
- We have established a production alert system to help timely discover and resolve plant side manufacturing problems by means of prevention, real-time monitoring, and anomaly alert.
- We have also implemented the MyGUI Mini mobile information platform to display operational information including sales, procurement, and production on a mobile device to timely capture anomalies and take immediate actions.

OHS Management Risks

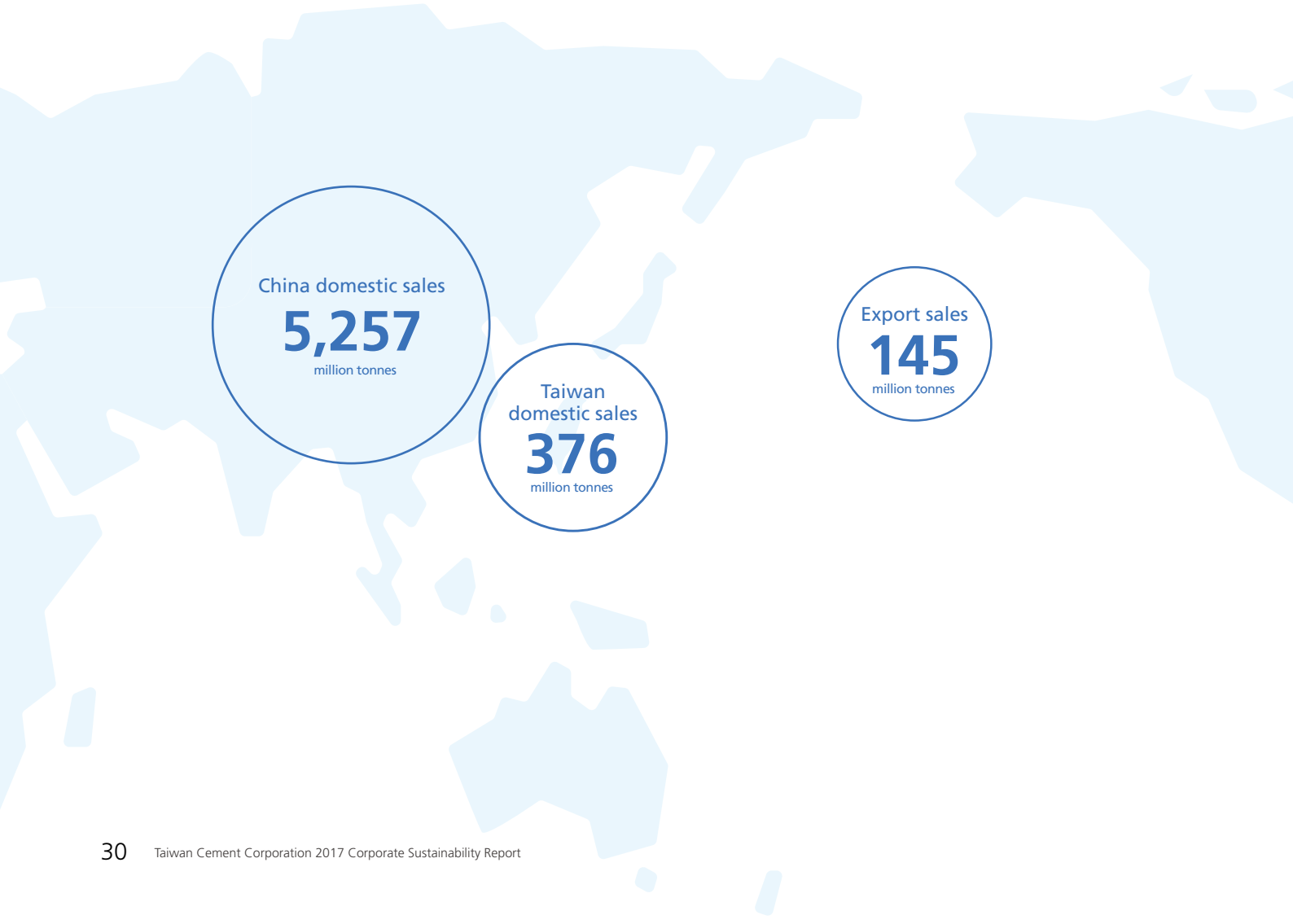
- The scope of OHS management risks covers work environment safety and employee awareness of occupational hazards prevention.
- Apart from identifying and assessing risks regularly, self-management is implemented to eliminate potential OHS hazards.
- Industrial safety regulations are implemented and incident handling procedures are publicized in-house.
- Related courses are organized every year to enhance the daily safety awareness of employees.
- The reporting system is activated immediately after an OHS incident to report to related units and the general administration.

Financial Risks

- The scope of financial risks covers financing, investment, liquidity management, dividend allocation, and hedging for exchange rate and interest rate.
- By implementing new long-term fund-raising plans, maintaining the stability of financial ratio under surveillance, and controlling the volatility of finance-related risks, we met the surveillance requirements set for financial ratio in last two years.

Disaster Risks

- The scope of disaster risks covers natural disasters including fires, typhoons, and earthquakes.
- We proactively participated in various exercises and training activities organized by government agencies.
- We also perform disaster prevention and rescue exercises regularly within the organization to improve the disaster prevention competencies and response ability of employees.



1-6 Financial performance

By implementing the "outcome oriented" and "optimality, simplicity, and accuracy" concepts, we practice innovative management featuring "embracing changes and learning with enthusiasm" to reduce costs, raise productivity, enhance efficiency, and constantly expand markets. In 2017, consolidated revenue reached NT$98.312 billion, up by 9.77% compared to 2016, as a result of the 9.99% growth of the cement sector and the significant 34.80% growth of the chemical engineering sector. In addition, by ensuring stable supply through production scheduling, we maintained the annual cement price at a medium-high level, including the cement clinker price that was running high.

TCC Consolidated Financial Performance 2017 (unit: NTD thousand, except for EPS at NTD).

Type	Item	Amount
Economic Value-Generatd	Operating Income	98,311,776
	Net Profit (Loss)	13,962,885
	Non-operating Income and Expenses	-138,226
Economic Value-Allocated	Operating Cost	79,398,862
	EPS	2.03
	DPS	2.5
	Cash Dividend	1.5
	Income Tax (TW)	1,186,631
	Income Tax (CN)	27,583
	Income Tax (Others)	2,287,645
	Employee Salary and Benefits	5,108,634
	Social Expenditure	250,940
	Retained Earnings	49,019,510
Economic Value-Residual	Net Profit of the Period	10,322,800

The 2017 RD investment amounted to NT$51.09 million, up by 11.71% compared to 2016; and the 2017 tax credit of investment was NT$5.468 million. Apart from continuing the "Calcium-Looping Technology for CO_2 Capture RD Project" with the Industrial Technology Research Institute (ITRI), we implemented the "Outdoor CO_2 Fixation by Microalgae System and High Unit Price Microalgae Culture Research project" in collaboration with ITRI in 2017 to reuse CO_2. Moreover, we commissioned to ITRI the research project "Extraction Process and Application Development for Astaxanthin from Haematococcus pluvialis" in 2017 to search for the microalgae products from CO_2 reuse, in order to find opportunities for development in the back-end industries. Note: Data of the tax credit of investments and RD expenses were extracted from the TCC individual financial statement, with the Haematococcus pluvialis and high-performance bio CO_2 fixation research projects.

1-7 Supply chain management (SCM)

Commitment for suppliers

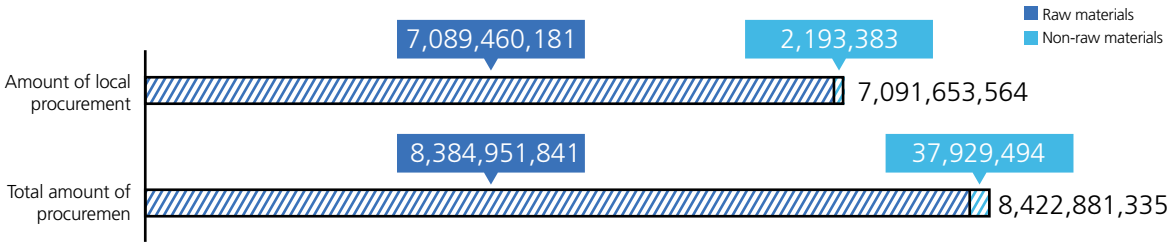
At TCC, inclusiveness and growth with suppliers have long been our SCM focus to achieve sustainable supply chain management. After an integrated assessment of factors including legal trends, macro environment changes, and technology maturity in industries, we emphasize local procurement and sustainable procurement, and the sustainability evaluation practice of both current and new suppliers in our procurement strategy. Furthermore, when communicating related issues with suppliers, we hope to spread our sustainable development spirit.

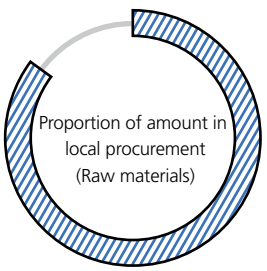
Current Actions	Short Term Goals	Medium and Long Terms Goal
• Local procurement • Sustainable procurement standards • Supplier sustainability evaluation • Sustainable supplier cultivation • Supplier Integrity Undertaking • Supplier grievance mechanisms	• Green procurement policy and practice • Furthering supplier sustainability evaluation • Furthering sustainable supplier cultivation	• Risk assessment of supplier sustainability

Local procurement

Based on the principle of local development and local supply, we proactively cultivate local suppliers to achieve procurement at the right time in the right place to lower management and operational costs, reduce carbon emissions as a result of long distance transportation, create local job opportunities and economic prosperity, and realize local procurement. In addition, to ensure the timely delivery, quality, and price of raw materials, apart from establishing a sustainable raw material management system, we further gather raw material information to maintain overall procurement management.

Local Procurement 2017 (unit: NTD)





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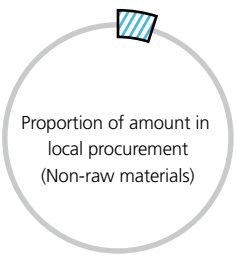
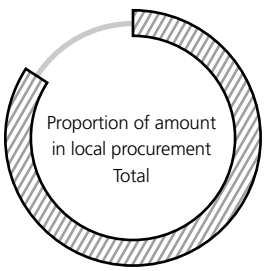


5.78%



84.20%

Note 1:To achieve local procurement, we procured from Taiwanese suppliers for plants in Taiwan.
Note 2:Non-raw materials include spare parts, construction projects, and on-site labor service.

Supplier evaluation

At TCC, supplier evaluations are essential. Therefore, we have established the "Plant Supplier Evaluation Regulations" to evaluate current suppliers every year. The evaluation is performed by a functional task force formed with members from the quality control, manufacturing and financial departments. We may also outsource supplier evaluation to an external organization. An evaluation covers quality, service, organization, and financial performance. We will issue the "Supplier Improvement Notice" to unqualified suppliers to request them to complete the improvement by a deadline. We will delist any suppliers failing to complete improvement by the deadline. Growing with suppliers is our primary goal in prosperity with the supplier chain. Therefore, we notify and supervise unqualified suppliers to make improvements. So far, only a small number of suppliers received our improvement notice.

100%

Supplier Evaluation Completion in 2017

Number of suppliers	931
Number of suppliers required stringent management	63
Actual number of suppliers evaluated	63
Actual evaluation proportion (%)	100%

Note 1:Suppliers required stringent management are suppliers that will affect the quality and delivery time of our products or suppliers with an amount or a proportion of procurement reaching a specific level. These suppliers must be evaluated.

Note 2:The total number of suppliers are qualified suppliers that had transactions with us in 2017.

Sustainable supplier cultivation

Before cultivating new suppliers, the Materials Department will conduct supplier surveys as necessary in collaboration with the RD Office, the plant, and the Financial Department. In addition to a documentary review, the team performs on-site inspection to understand the production lines and mineral sources of new suppliers. Then, the team will produce a report and upload it to related management systems of the supplier chain. In 2017, 75 out of the total of 87 new suppliers became our qualified suppliers after evaluation, with an acceptance rate of 86.21%.

Supplier grievance mechanism: Suppliers may report any offences against the discipline and integrity of work to the complaint box at MP.Buster@taiwancement.com.

Chapter2
Value Creation: Changes for Innovation!

Creation and progress are constant changes and upgrading of specifications.
In addition to a belief and willfulness, they represent a long-time process of industrious creating.
We cannot change wind directions, but we can adjust our sail,
Nothing is eternal, and the goal of everything is found from changing.

—— Chairman An-ping Chang

Support for the UN Sustainable Development Goals (SDGs)

3 **Ensure healthy lives and promote well-being for all at all ages**

- Care for employee health and benefits, continuous health examinations and continuous follow-up, and extension to employee family.
- Maintenance of work environment safety and guarantee for the rights and interests of employees, suppliers, and contractors.

4 **Ensure inclusive and quality education for all and promote lifelong learning**

- On-the-job training/education for all employees regardless of gender and training effectiveness follow-up to find opportunities for future improvement.

5 **Achieve gender equality and empower all women and girls**

- Employment by expertise and academic backgrounds regardless of gender.

8 **Promote inclusive and sustainable economic growth, employment and decent work for all**

- Provision of a safe work environment, favorable salary and benefits, recruitment channel diversity, and employment of domestic and worldwide outstanding talents.

15 **Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss**

- Investments in the R&D of carbon capture and continuous mitigation of the impacts from global warming.
- Reduction of resources depletion through the circular economy design and planning of the Hoping Power Plant and the Hoping Cement Plant.

Material topics

Management approach

- Abide by labor related laws and regulations, establish personnel related regulations according to statutory and regulatory requirements, timely adjust related regulations and SOPs with respect to legal changes, and provide employees with a work environment assuring physical and mental health.
- Treat employees as partners for sustainable growth; continuously integrate internal resources; provide complete career development and training diversity; establish robust training resources, enhance employee cohesion, improve the sense of achievement, and enhance organizational commitment of employees within the organization; and attract quality talents to join TCC from outside of the organization.
- Set up the employee suggestion box, grievance box, or email for employees to feed back their opinions or report incidents.
- Continuously improve work environment safety according to labor safety related regulations; set up an OHS management office at headquarters to promote and implement OHS related affairs; manage and promote in-house ESH work by the plant QA section; supervise the effectiveness of implementation of each plant by the administration division at Taipei Headquarters; and combine the effectiveness of in-house risk management of occupational risks with the score of individual performance and operational management.

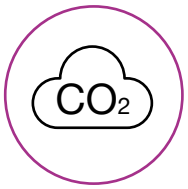
Evaluation mechanism

- Review training/education length regularly, establish post-training satisfaction indicators, and effectively improve training effectiveness for the reference of course planning feedback.
- Hold OHS management committee meeting regularly to report management results; implement disciplinary actions for significant occupational accidents, investigate the cause(s) of accidents, and follow up the improvement effectiveness.
- Directly combine the effectiveness of in-house risk management of occupational risks with the score of individual performance and operational management.

2-1 Innovation

R&D and innovation are our essentials. We make continuous innovation in terms of three aspects: product R&D and innovation; CO2 capture and storage (CCS) and reuse; and microalgae culture for carbon fixation.

Product R&D and innovation



CCS and reuse

Microalgae culture for carbon fixation

Product R&D and innovation

R&D and innovation are our essentials. Therefore, we have established the unique professional cement and concrete research laboratory to focus on the development and promotion of three main aspects: cement, concrete, and resource recycling by integrating existing development technologies, channels, and external resources, and the internal talent cultivation program. Apart from the mass production of types II/V and IV cement for use in different environments, the lab continuously conduct research on cement, concrete, and energy conservation and emissions reduction. In the future, we will proactively support international organizations to share the mature technologies and application development with the world.

16 items

Passed the certification of 16 items for Portland Cement by the Taiwan Accreditation Foundation (TAF).

lab certification of chlorine ion content

Passed the lab certification of chlorine ion content in hardened concrete

low-carbon cement

Passed the low-carbon cement certification of China

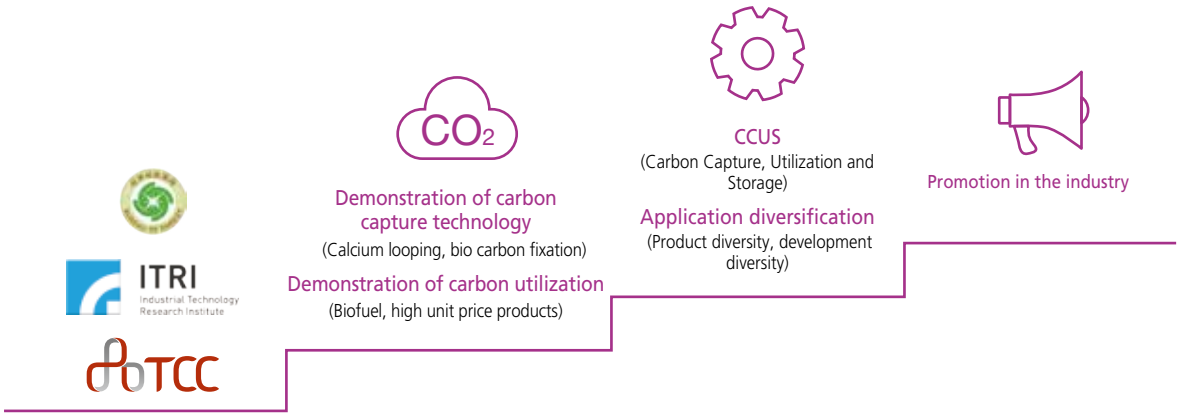
Successfully developed cement and concrete technologies or products

- ✓ Mass production of type II high-performance cement and types II/V high-strength cement.
- ✓ Mass production of type IV cement with quality complying with the CNS requirements and special construction requirements.
- ✓ Development of the mass production capacity of 10000psi high-performance concrete.
- ✓ Development of the mass production capacity of self-compacting concrete with high water-tightness and permeability resistance.
- ✓ Development of the mass production capacity of high water-tightness and permeability resistance concrete.
- ✓ Development of technologies for the texting and recycling of calcium fluoride sludge
- ✓ Development of technologies for testing trace elements in cement.
- ✓ Development of treatment technology for reducing cement pre-sintering in the rotary kiln.
- ✓ R&D of technologies for energy conservation and emissions reduction using thermoelectric materials on rotary kilns for waste heat power generation.

In the future, we will continue to research and develop an environmental and economical virtuous cycle to achieve sustainable development in terms of six aspects: “high productivity, high customer satisfaction, high innovation, high cooperation, high education, and high internationalization” as the backbone for “enhancing competitiveness, maximizing resource recycling, reducing unit energy consumption, reducing waste, and supporting other enterprises to dispose of waste with cement kilns” according to the socioenvironmental trends.

CCS and reuse

To achieve the CO_2 emission standard for inhibiting global average temperature rise below 2°C as specified in the Paris Agreement, the global status of CCS: The 2017 CCS status report shows that CCS contributed to 14% of emissions reduction, just second to energy efficiency enhancement and renewable energy. Realizing the importance of CCS technology, we promoted the Calcium-Looping Technology for CO_2 Capture Pilot System Collaborative Research Project and the CCS Technology Verification and Maximization Research Project. Limestone is used as the absorbent for its low cost, high absorbency, and ease of access. In addition, an inactive absorbent can be reused as a raw material of cement making or for producing precipitated calcium carbonate (PCC) with higher added value. Therefore, our process contains no waste, and technology verification is under progress.



Under the CCS R&D Alliance framework of the Ministry of Economic Affairs (MOEA), we plan and form an industry alliance with the cement, power plant, petrochemical, steelworks, engineering and engineering consulting, mechanical engineering, and chemical engineering industries to lead related domestic industries to create emerging industries, with coal-fired power plant, steelworks, cement, and petrochemical industries as the target markets; participate in related activities worldwide; and develop demo projects, in order to capture world trends and business opportunities. In the future, we will develop the China and Southeast Asia markets through the industrial linkage with local related industries through overseas Taiwan merchants.

Accumulative operating time up to **2,600** hours

Accumulative CO_2 capture up to **200** tonnes

Applied for **22** patents with **10** items

Continuous operating time during testing period up to **106** hours

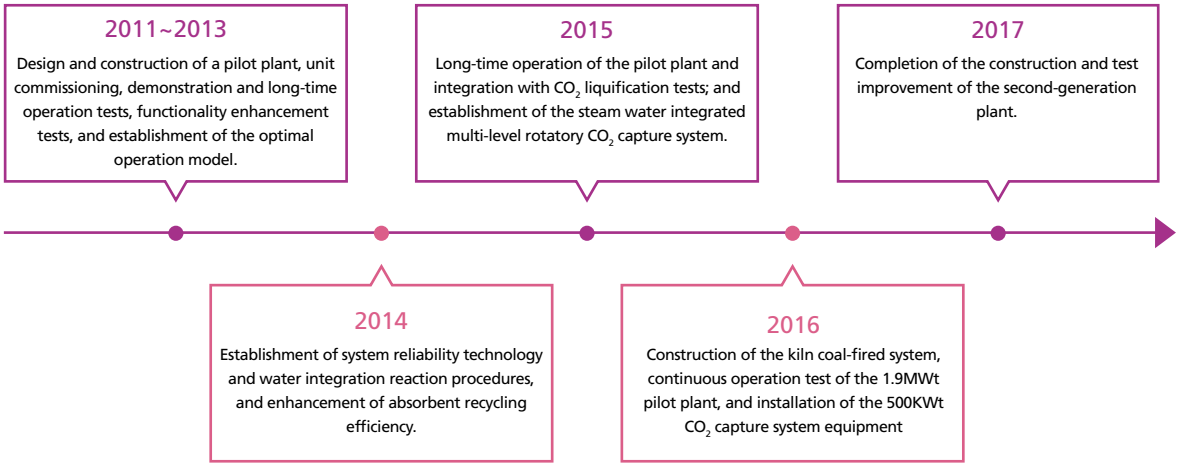
Captured CO_2 from the Hoping Cement Plant up to **230** tonnes

Note: Calculation made according to the GHF inventory data in 2017.

Note: 2017 mid-term report of the ITRI Calcium-Looping Technology for CO2 Capture Verification and Maximization Research Project.

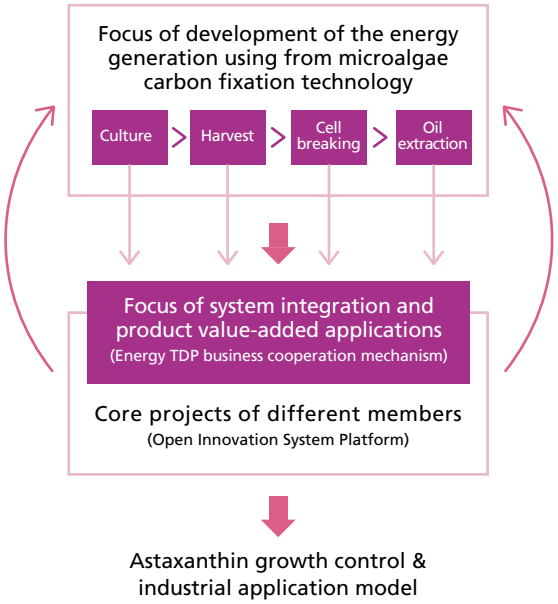
We have made the first CO_2 capture test plant in the Hoping Plant as the demo plant for promoting CO_2 capture. In 2017, we invested NT$8.14 million to build a second-generation CO_2 capture plant to continue CO_2 capture tests. So far, we have successfully developed the methods and processes for producing PCC with inactive absorbents, optimized the technology of the multi-level rotatory capture system by integrating steam water, and implemented the detailed design of the 30MWt calcium looping CO_2 capture demo system. In 2018, we will continue to develop the new-generation multi-level rotatory CO_2 capture technology combing with steam water using calcium looping technology to build a 500KWt testing system for continuous long-time operation to enhance CaO conversion rate and reduce Ca/C ratio. Our medium- and long-term goals are to develop and establish the calcium looping CO_2 capture system and technology with a commercial scale. After combining the technology with cement production and power generation, we aim to become a competitive provider to CO_2 capture technology.

Progress of CO_2 capture R&D



Microalgae carbon fixation and culture

To develop and innovate biomass energy and value-added applications, we launched the Outdoor CO_2 Fixation by Microalgae System and High Unit Price Microalgae Culture Collaborative Research Project with ITRI. The main research topics include: development of applications of the energy generated from microalgae CO_2 fixation technology; development of key microalgae upstream (culture), midstream (harvest), and downstream (oil extraction) technologies; and process integration and value-added applications for derivative products. With this collaborative project, we aim to accelerate commercialization and industrialization of microalgae CO_2 capture. With three innovation values: technology innovation, value-added application innovation, and energy and daily life application innovation, we hope to realize the protype of CO_2 capture using microalgae system, in order to construct an innovative circulatory economy as the foundation for sustainable development.



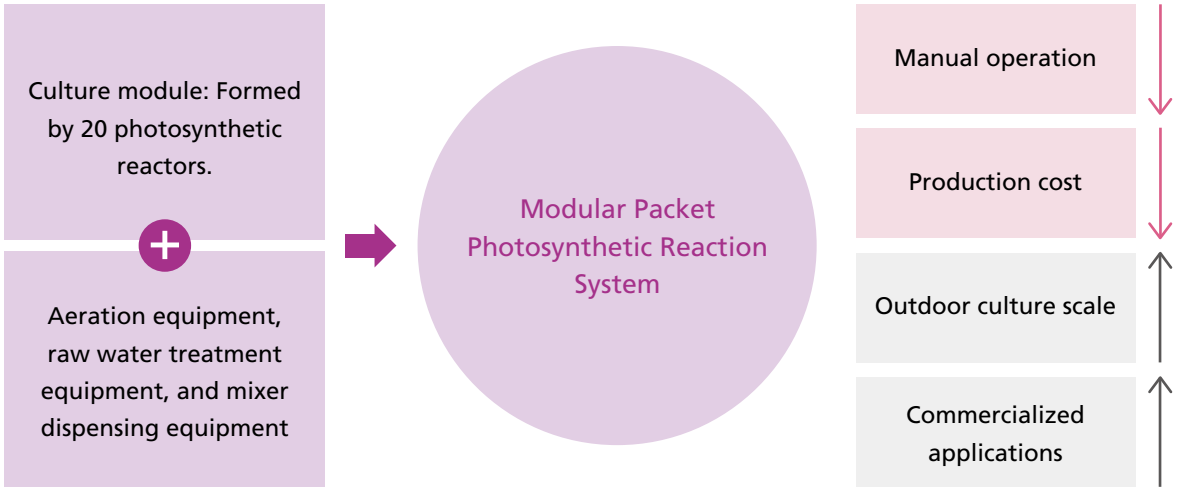

Technology innovation


Value-added application innovation


Energy and daily life application innovation

Technology innovation

To promote the Modular Packet Photosynthetic Reaction System and Quasi Plant Workshop Culture System Pilot Plant project, we built the pilot plant at the Hoping Plant in 2013 and began to promote system optimization and astaxanthin product development every year. Combining with the low cost and high transmittance characteristics of plastic coated packets and the modular design of automatic connected feeding and harvesting devices, we enable all packet reactors in the culture module to complete the feeding and harvesting procedures based on the set feeding quantity or harvesting quantity to reduce operation labor and shorten operation time to significantly lower construction cost to only one tenth of the conventional acrylic reactor.



Value-added application innovation

Astaxanthin can clear free radicals. Therefore, it has high application value in health foods, cosmetics, and drugs. By researching biocarbon fixation cultures in exhaust stacks, we aim to promote microalgae carbon fixation and enhance its efficiency by developing bioactive substances. In the research, we applied the second-generation package culturing system to run tests related to and demonstrate carbon fixation culture, in order to effectively reduce the cost of Haematococcus pluvialis powder, enhance product competitiveness, and accelerate the commercialization and mass production of astaxanthin. In 2018, we will continue to research active compounds that can promote microalgae growth and investigate their application to microalgae growth, in order to further optimize the production process and effectiveness of biocarbon fixation and products and thereby broaden the scope of biocarbon fixation research.

National Industrial Innovation Award

Team awards at the 5th National Industrial Innovation Award

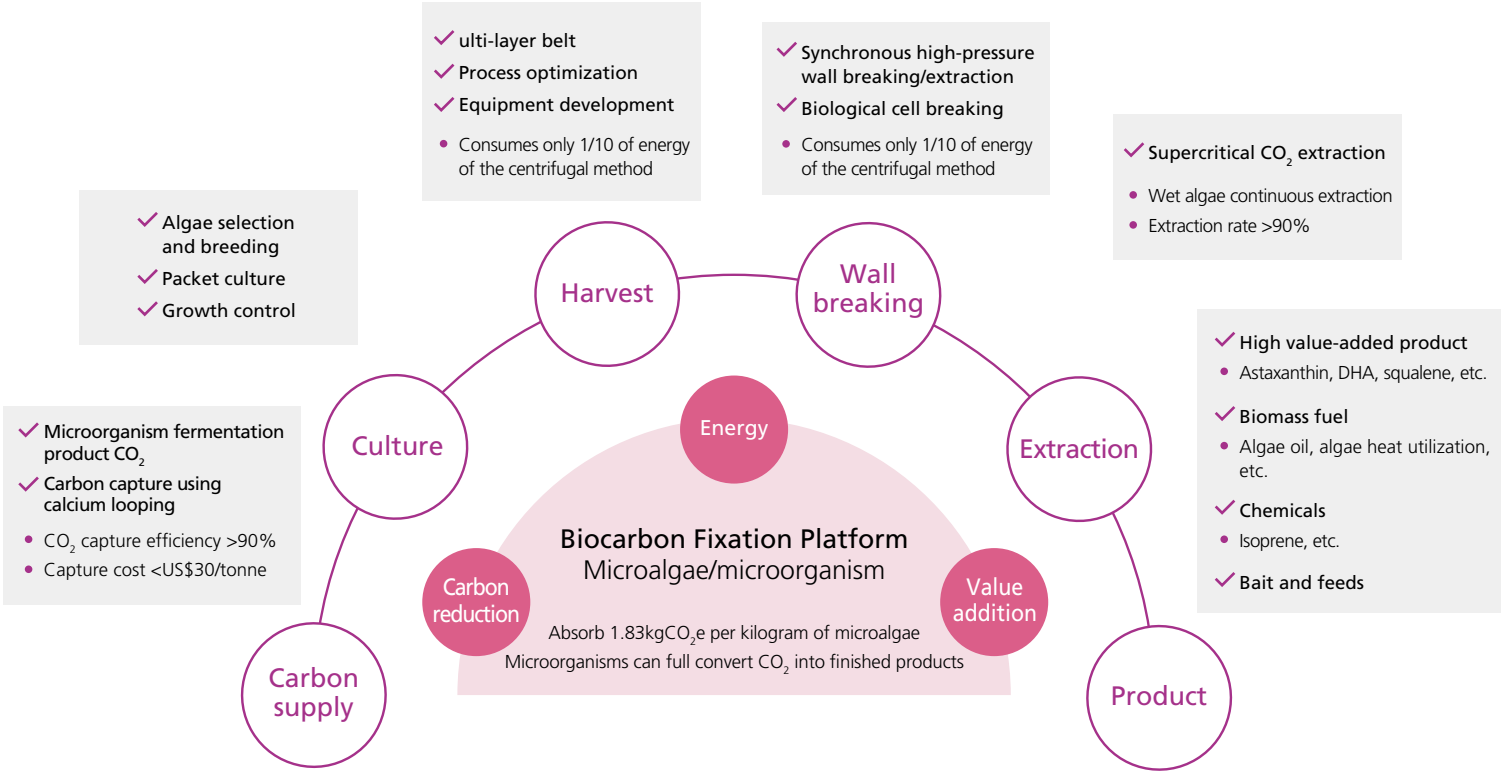
1,765 million

Invested NT$17.65 million to broaden the scope of biocarbon fixation in 2017

Energy and daily life application innovation

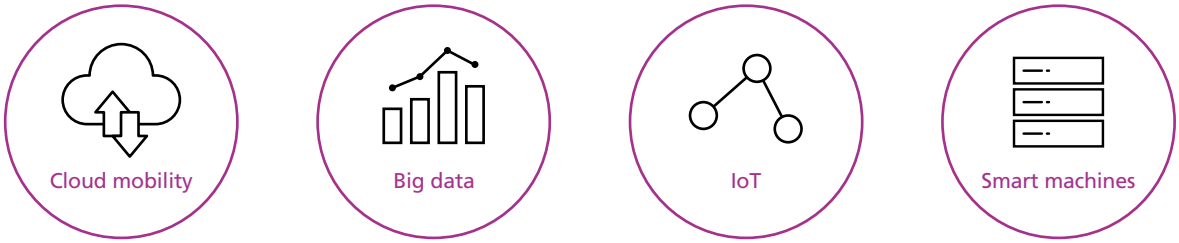
With the circular economy design and planning of Hoping Power Plant and Hoping Cement Plant, we transport coal ash and plasters to the cement plant as raw materials of cement making. Combining with the development of calcium looping capture technology, microalgae low-carbon energy technology, and astaxanthin products, we further construct the CCUS-based carbon circular economy model. In the future, CCUS will be applied to industries, such as petrochemical, power generation, and iron making industries, with high carbon emissions to achieve the CCUS synergy.

Low-Carbon Circular Platform



2-2 Smart

In response to the coming Industry 4.0 era, we optimize the internal management system to integrate with the economic optimization plan, environmental optimization plan, social optimization plan, and risk management optimization plan in terms of four main features: cloud mobility, big data, the Internet of Things (IoT), and smart machines. With such, we change management by objectives (MBO) into behavior management for employees and administrators to make accurate judgments and take precise actions at the time first to optimize outputs and enhance efficiency.



Cloud mobility

We set up the TCC War Room System as a shared platform of internal information to capture the production and marketing information of each plant in real time, in order to foresee risks. In addition, the carbon emission data of each plant are monitored over the system to maintain constant control and emissions reduction.

Big data

We set up Bearing Alert System to monitor the temperature status of the front, middle and rear pullers of each rotatory kiln after force is applied. By sending uneven force alerts seven (7) days in advance, the system allows workers to take early intervention to protect equipment. The system has also been set up in all TCC plants in China. In addition, we developed the kiln temperature big data analysis model to detect areas with abnormally high temperature in real time and alert the control room crew to stay alert to temperature anomalies, in order to reduce shell reddening incidents.

Patents approved

Patents approved by the Intellectual Property Office, MOEA, Taiwan

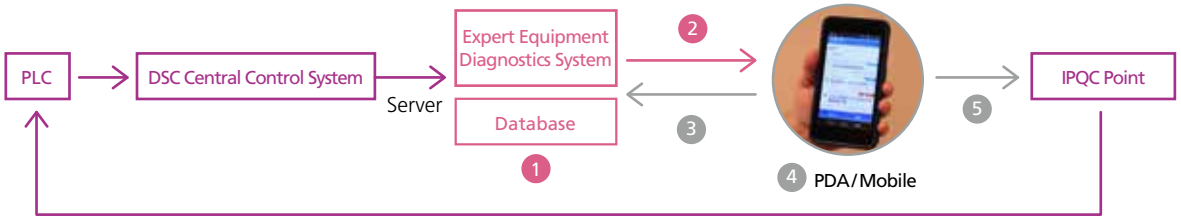
IoT

In 2018, we will establish six major environmental indicators: CO_2, SO_x, NO_x, dust, and unit product power consumption, and unit product coal consumption. With modern monitoring technology and network technology, we perform continuous automatic monitoring and build a complete database to enhance management efficiency and provide a reference for management plans and management. In addition, these six environmental indicators will be included in system monitoring of each plant to strengthen source control of pollution.

Smart machines

In the future, we will implement the smart equipment diagnosis mechanism to analyze if current data fall in the reasonable range, predict potential anomalies, and alert IPQC staff to handle anomalies automatically with the smart database (expert database system, EDS).

Process of the smart equipment diagnosis mechanism



1. 1.Analysis by the smart database (Expert Database System, EDS)
   2.Automatic judgment if data fall in the acceptance range to prevent potential anomalies
   3.Estimate machine lifespan and required maintenance intervals

2. Remind IPQC staff to handle anomalies and:
   1.Provide information for handling similar anomalies
   2.Check the need for component renewal
   3.Check the need for maintenance

3. Data upload/download via Wi-Fi /4G

4. PDAs/mobiles for taking photos and recording data in an IPQC task

5. Automatic TAG detection to confirm arrival at the IPQC point

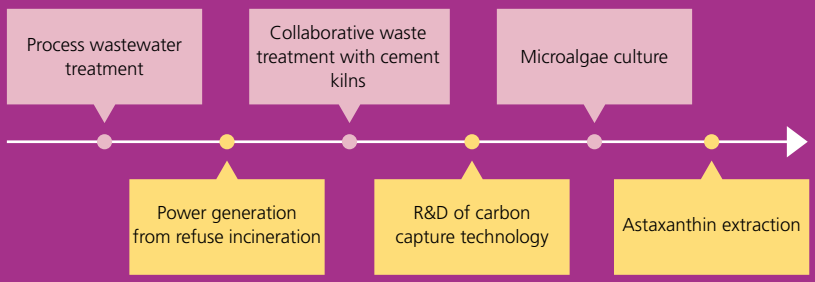
2-3 Service

To provide customers with satisfactory products and services has always been our ultimate goal since TCC was founded. With the unique cocktail service model, we maximize value for customers. In addition, we build a marketing and service platform and integrate group resources to provide complete pre-sales, in-sales, and after-sales services; disseminate the "integrated environmental protection" environmental sustainability concept; enhance professional technology and service speed; enforce customer relationship management (CRM); accumulate talents and experience; and strengthen core expertise to create higher customer satisfaction.

Integrated Environmental Protection: Dissemination of environmental sustainability

Through dealer conferences, sales visits, the TCC e-commerce app, and the WeChat official account, we provide customers with quality services and disseminate the circular economy system for "integrated environmental protection" to raise the customer's awareness of environmental sustainability.

Integrated environmental protection



Cocktail customer service

To help customers achieve good application results and produce the best value with TCC products, we have established a dedicated laboratory to provide cocktail custom services and the customer complaint settlement plan in collaboration with respective production and sales units. With five feature services: front-end service, technical support, on-site service, regular visits, and follow-ups, we enable customers to truly feel our stable quality that is superior to that of competitors.

Front-end service	Technical support	On-site service	Regular visit	Follow-up
Offered by sales staff and quality control staff	Lab back-end technical support	Cement applications, ready-mix concrete proportion adjustment, and on-site construction problem solving	Care for product use and record service contents	Bridging the gap between lab tests and field applications through lab quality check and comparison

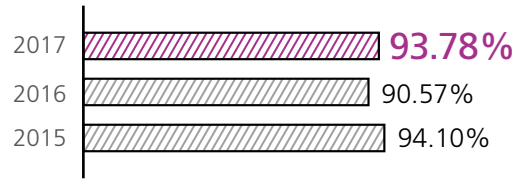
Customer satisfaction

We conduct a customer satisfaction survey every year for the reference of improvement and supervision. The questionnaire is distributed to all customers, excluding related parties, having transaction with TCC in the year to understand the current market trends and customer needs and timely adjust various transaction terms and conditions, in order to maintain reciprocity for customers and TCC and to increase overall organizational profit. In 2017 the questionnaire was conducted on 80 domestic customers with 74 valid responses. For the three items with lower satisfaction, we have improved the delivery method and

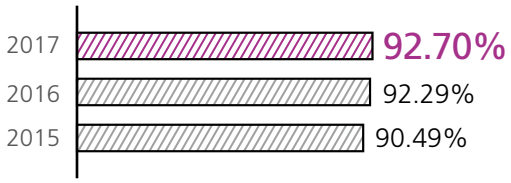
designed the delivery timetable of each plant and station after assessing the collection needs and cost of customers. For customers with projects requiring large quality delivery, each plant and station will extend the delivery time or ship products on holidays. In addition, we have also repaired the faulty equipment affecting delivery efficiency of the station at the Port of Taichung and enhanced the tour inspection and repair of to enhance equipment availability. The significant improvement improved delivery plant convenience by 7.21% in 2017. Furthermore, we offer customer service to ensure if our cement products meet their expectations. In 2017, we received 62 customer complaints, mostly involving joint spot check. All customer complaints in 2017 were closed after proper handling.

Results of Customer Significance Survey in Last 3 Years

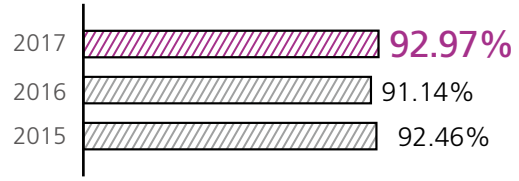
Market Presence



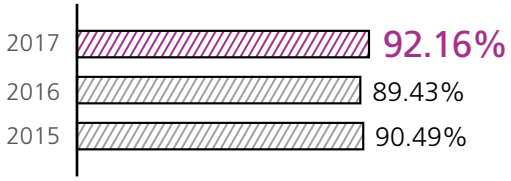
Delivery Plant Convenience



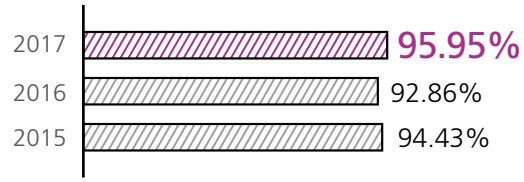
Cement Brand



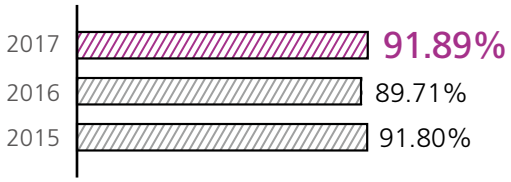
Service Sincerity



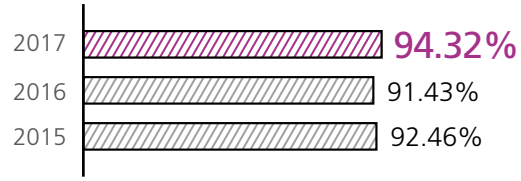
Cement Quality Stability



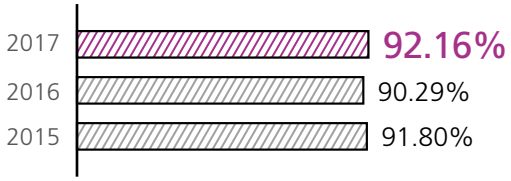
Customer Complaint Response Time



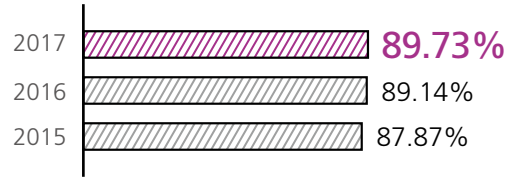
Cement Price



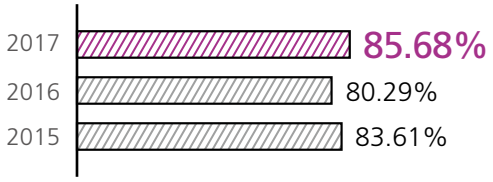
After-sales Service Perfection



Payment Terms

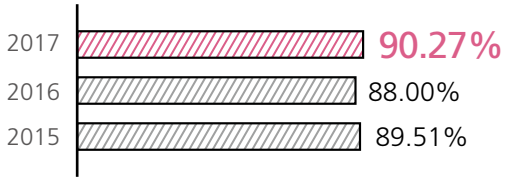


Total

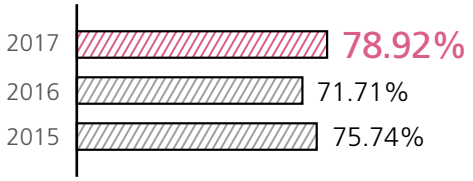


Results of Customer Satisfaction Survey in Last 3 Years

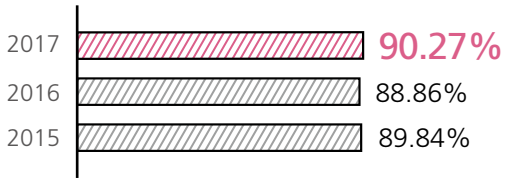
Market Presence



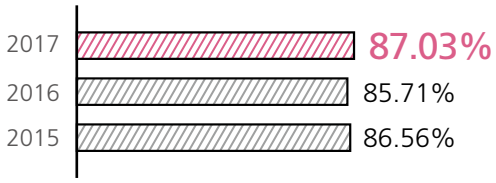
Delivery Plant Convenience



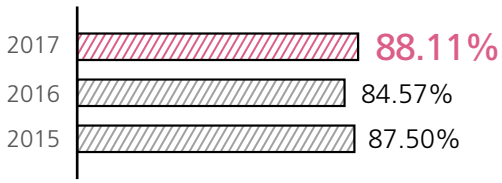
Cement Brand



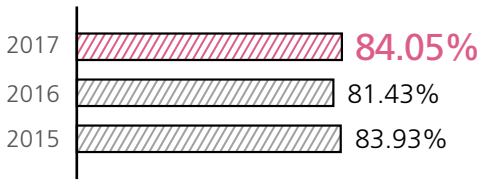
Service Sincerity



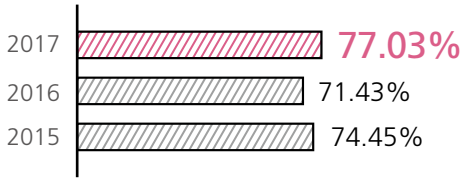
Cement Quality Stability



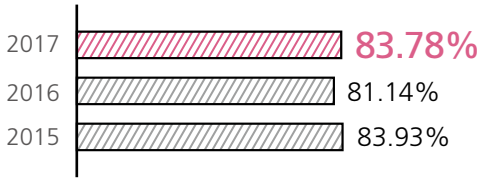
Customer Complaint Response Time



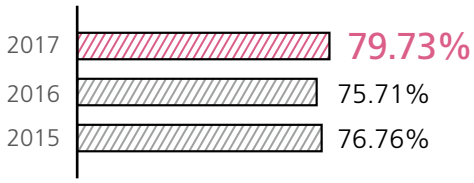
Cement Price



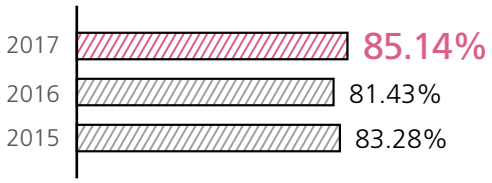
After-sales Service Perfection



Payment Terms



Total



2-4 Cultivation

	Existing Action	Short Term Goals	Medium and Long Terms Goal
Work Safety	• Connect work-related injuries/environmental fines and performance rewards • Raise the safety awareness of employees through periodic training/education	• Implement and regularly follow up industrial safety and environmental protection projects • Establish the Cement Industry OHS Management Promotion Working Team in collaboration with the labor union to promote the occupational safety management platform, integrate experience of the industry, and improve the industrial safety environment in collaboration with the occupational safety unit.	• Zero industrial accident. • Zero environmental fine.

Given that employees are the foundation for maintaining sustainable excellence, we proactively recruit outstanding talents and engage in no discrimination based on gender, religion, race, or political dissimilation. In addition, we abide by related laws and regulations and do not request female employees in pregnancy or within one (1) year after delivery or work-study students to engage in dangerous or hazardous jobs. Furthermore, we build a happy workplace in terms of five aspects: youth cultivation, workforce composition, talent development, employee care, and workplace safety and contractor occupational safety management.

Workforce composition

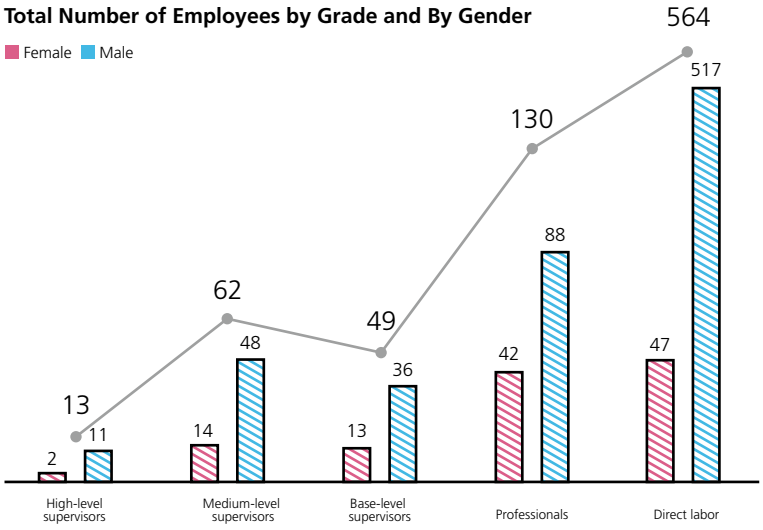
As the most important organizational asset, employees are the key that drives TCC to keep going. In response to legal amendments and duty expansion, there were 818 active employees by December 31, 2017, 42 employees more compared to 2016, including 700 male employees and 118 female employees, 22 female employees more compared to 2016. These figures show our ongoing efforts to maintain gender equality. In terms of age distributions, 85 employees were in the 30 and under age group, 489 in the 31-50 age group, and 244 in the 51 and over age group.

Note 1:All TCC employees are direct labor. The total number of employees disclosed does not include one fixed-term employee and 35 dispatched (agency) workers.

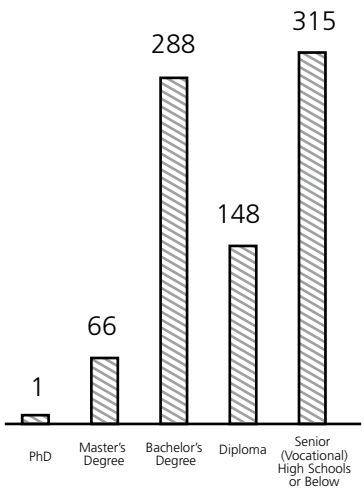
Note 2:At TCC headquarters, there were 126 employees, including 75 males and 51 females. At TCC plants, there were 692 employees, including 625 males and 67 females.

Note 3:Seven expatriates returned to Taiwan from China in 2017

Total Number of Employees by Grade and By Gender



Total Number of Employees by Education

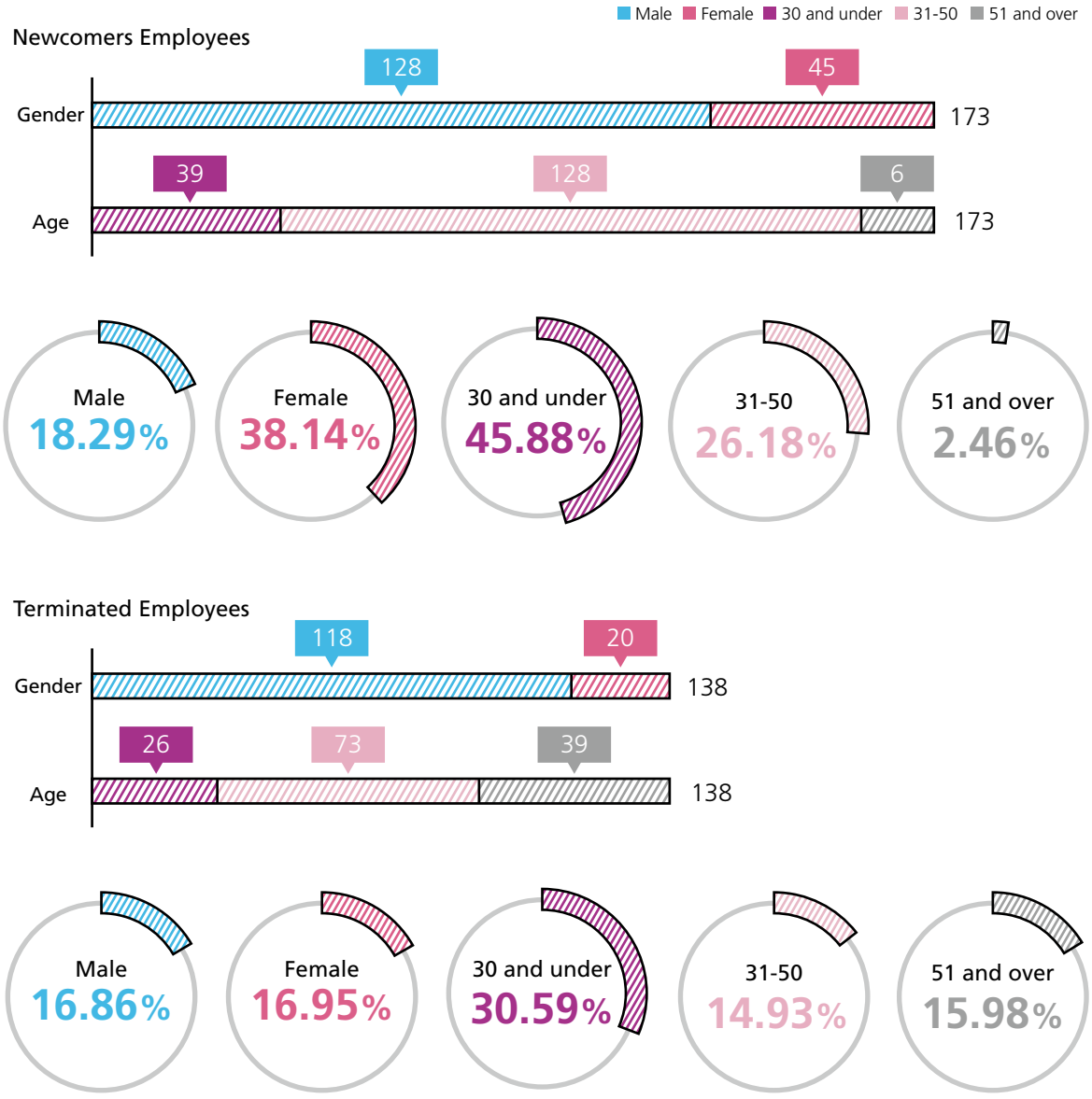


Note:High-level supervisors are assistant vice presidents and higher; medium-level supervisors are managers and associate managers; and base-level supervisors are assistant managers and chiefs; and professionals are engineers, management professionals, and management assistants.

Turnover

There were 173 newcomers in 2017, commanding at 21.15% of all employees, including 45 females, and six are over 51 years old. In terms of termination, there were 138 terminated employees in 2017, accounting for 16.87% of all employees.

Number of Newcomers and Terminated Employees by Gender and by Age



Talent development

Excellent human resources are the bedrock for sustainable development of enterprises. To improve the competency and quality of employees to maintain long-lasting competitive strengths, apart from providing training relating to business administration and plant management, we actively offer related technical training courses to develop required professionals. In 2017, the training and education expense increased significantly to a total of NT$27 million. Furthermore, facing future trends and the challenges on organizational sustainable development, we offered management courses that combine theory and practice for upper management in 2017 to create mutual support among enterprise, organization, and management.

Training/Education in 2017 (unit: hour)

		Training Length (unit: hour)		Total Length	Average Length
		Female	Male		
Duty	High-Level Supervisors	85	199	284	21.85
	Medium-Level Supervisors	985	2,298	3,283	52.95
	Base-Level Supervisors	460	1,073	1,533	31.29
	Professionals	8,982	20,958	29,940	230.31
	Direct Labor	1,083	2,529	3,612	6.40
Total Length		11,595	27,057	38,652	-
Average Length		98.26	38.65	47.25	-

Performance evaluation

At TCC, we offer competitive salary in the market and favorable performance rewards. Based on the fair and encouraging performance reward regulations, we combine overall business performance of the company with individual performance to reward employees with outstanding performance. The performance evaluation rate in 2017 was 100%. (Note: Newcomers during the 3-month probation were not evaluated.)

Youth cultivation

TCC spares no effort to cultivate youth talents. In 2017, we activated the Management Assistant Program (MAP) that combines theory, business, and management. Through intensive and systematic training and horizontal learning that linking different functions and departments, we train youth to resolve problems from the administrator's point of view. By offering youth job opportunities, tailoring course contents, a graduation ceremony emphasizing honor and legacy, we train management assistants to jump out of the box and develop mature and forward-looking views, in order to enforce sustainable development and experience inheritance.

93

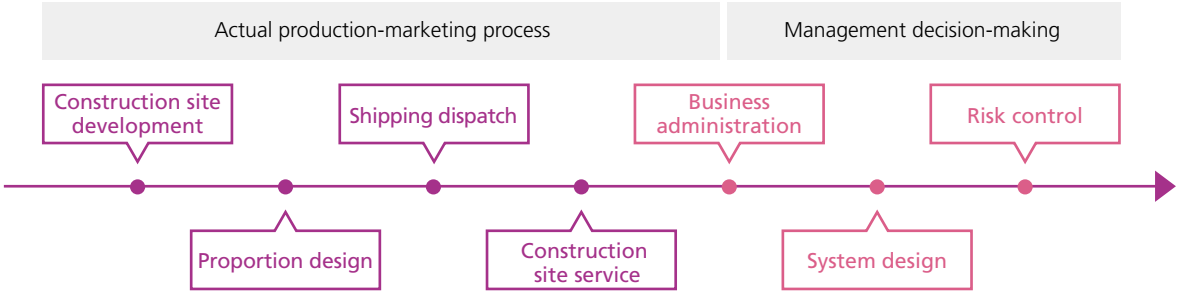
management staff were trained

Tailored course contents

To meet the needs of organizational functions, we arrange training activities for trainees of different specialties and plan cross-function in-depth learning, including the complete production process from raw material input to product output of cement plants in Taiwan and in China, business decision making and risk control strategies at the administration division. Through serially structured teaching: situational approach, department drills, study group sharing, on-site technology teaching, and exclusive instructors, apart from professional training, we respect the CSR commitment of trainees. Every train has the opportunity to go to the Cement Academy, become a volunteer who teaches children in remote areas, and understand the importance of ecological conservation at the botanic conservation center. Management assistants passing the evaluation are now working at different TCC cement plants in Taiwan or in China, the administration division, and the laboratory. In the future, they may enter the upper management.

Five stages for cement sales staff training

Education for pre-mix concrete professionals



Graduation ceremony emphasizing honor and legacy

At the end of MAP, we organize a solemn promotion ceremony. Apart from recognizing trainees' career development, it welcomes talents to become part of the management. Therefore, we encourage MAs to share their glory with family, carefully select meaningful and representative gifts. In addition, the creative graduation ceremony filled with blessings organized for senior trainees by junior trainees symbolizes the inheritance of the sustainable legacy.

Employee care

At TCC, we value the rights and interests of employees. Therefore, we offer well-developed salary, human rights maintenance, comprehensive benefits, and non-obstructed communication to provide employees with the most favorable protection and the happiest workplace and work environment.

MAP Testimonial
Guo-chang Huang, trainee of the 8th MAP and current manager of the Dongguan Plant

Jumping out of my comfort zone, apart from understanding the production process, production equipment, finance, and transportation, I have learned the operational and marketing skills and how to increase organizational interests in completely different environments. During the practicum, "change", "learning", and "growth" are topics for 24 hours, and the pressure and difficulty challenge kept rising. By following the learning step of the practicum and after passing the final evaluation, now I think of profit making, sales structure optimization, product-marketing communication and related affairs every day in my office. It is different from the past that I am ready for all kinds of challenges and to complete any assignments from the company.

Well-developed salary

Human rights maintenance

Comprehensive benefits

Non-obstructed communication

Well-developed salary

We are committed to developing and optimizing a sound salary and reward mechanism to ensure a competitive salary in the market. We also review the remuneration policy and system regularly in order to recruit and retain outstanding talents. We set the year-end bonus at two (2) months of salary every year. In addition, based on the operational performance of the company and the performance of individual employees, we plan a favorable reward system to effectively encourage employees, in order to create win-win for labor and management and achieve operational performance based on the profit-sharing aim.

In 2017, we reformed the remuneration system by re-establishing the salary structure and standard and the job grade and job class as the principles for employee promotion and the standard for talent employment. In addition, we enlarged the interval of pay grade to enhance the market competitiveness of talent recruitment. To raise organizational cohesion and commitment of employees, we increased the meal allowance of employees to NT$2,400 and gave employees a raise based on their past performance, in order to retain outstanding talents.

Pension system

Starting from employee care, we have established an attractive pension system and handle employee retirement according to the Labor Standards Act (LSA) and the Labor Pension Act (LPA).

940,000

In 2017, we released a total of NT$940,000 pensions and benefits

47

In 2017, we released a total of 47 gold rings.

Pension reserve

- Every month we contribute the labor pension fund to the special account at the Bank of Taiwan. The fund is supervised by the Labor Pension Reserve Supervisory Committee co-established by labor and management.
- Every month we contribute 6% of the employee's monthly contribution wage to the Labor Pension Personal Account established by the Bureau of Labor Insurance for each employee.

Payment of employee pension

- Superior to the standard in the Labor Standards Act, applicable to employees choosing the LSA Plan and meeting the retirement requirements. Under the LSA Plan, the service length of employees before and after retirement will be accounting for and calculated affording to the TCC Pension Fund Regulations.
- Employees choosing the LPA Plan may claim for the pension from the Labor Pension Personal Account established by the Bureau of Labor Insurance.

Human rights maintenance

To maintain an equal and healthy work environment, we have established the Special Regulations for Workplace Sexual Harassment Prevention and related grievance channels to ensure gender equality in employment and respect personal dignity. Employees being sexually harassed in the workplace may report to the head of the personnel unit via the grievance hotline and email for special staff to 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 issues relating to human rights to protect employee human rights in a better way.

Comprehensive benefits

We have spared no effort to take care of employees and their family every since TCC was established by building a warm and ideal work environment, planning and implementing comprehensive benefits, take care of the daily life of employees, and benefiting employee family. In addition, through irregular publicity activities, we encourage employees to use their benefits.

Health Care

- Annual Health Examination
- Medical Allowance
- Birth Allowance

Daily Life Care

- Travel Allowance
- Savings Mutual Aid
- Employee dormitory
- Marriage and birth gifts
- Retirement and termination benefit and funeral benefits

Learning Care

- Extended education allowance
- Scholarships for children

Festivity Care

- Labor Day vouchers
- Spring Festival vouchers
- Dragon Boat Festival vouchers
- Mid-Autumn Festival vouchers
- Birthday vouchers
- Festivity gifts

Insurance Care

- Labor Insurance and National Health Insurance
- Group insurance (including termed life insurance/accident insurance/cancer insurance/employee and dependent medical insurance)

Post-mortem Care

- Lump sum pension for surviving family of employees die while in the line of duty or during employment based on their service length.

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

Health care: Healthy employees for healthy organization development

To maintain the health of employees and their family, and to reduce their financial burden from medical treatment, we offer medical allowance for outpatient clinic treatment and hospital treatment for employees to work at TCC without worries. In addition, we care about the physical and mental health of employees and arrange annual health examinations for employees with items and frequency superior to the law. Newcomers can receive the general labor physical checkup and special examination items, including noise, dust, and ionizing radiation at all TCC contract hospitals at the company's expense.

Daily Life Care

To encourage employees to engage in outdoor leisure activities and travels in order to help them relax their body and mind and release work stress and spend more time with family, we have established the travel allowance regulations to offer high-amount allowances every year to raise their organizational cohesion and commitment.

For retired employees to enjoy a stable later life, we introduce the employee saving scheme by setting up a personal savings trust account at CTCB Bank to encourage employees to make small amount savings. Furthermore, we contribute 50% of their savings amount to their account for employees to withdrawal the savings plus interest after termination or retirement.

Insurance Care

Apart from the care for employees, we treat their family as part of our family by offering them favorable group insurance plan. Employees enjoy fixed-term life insurance, accident insurance, injury medical, hospital medical, cancer medical, and occupational accident insurance with all premiums paid by the company. Furthermore, employee families also enjoy accident insurance, injury medical and hospital medical insurance at a favorable premium.

Parental leave of absence

After working at TCC for six (6) months, full-time employees are entitled to take the parental leave of absence. The reinstatement and retention rates in 2017 were both 100%.

	2015		2016		2017	
	Female	Male	Female	Male	Female	Male
Employees qualified for the parental leave of absence in the year (A)	5	45	6	52	8	58
Number of employees applying for the parental leave of absence (B)	0	1	1	0	1	3
Estimated number of employees reinstating in the year (C)	1	1	0	1	0	2
Actual number of employees reinstating (D)	1	0	0	1	0	2
Number of employees continuing work at TCC after reinstatement for 12 months (E)	0	0	1	0	0	1
Reinstatement rate after the parental leave of absence (D/C)	100%	0%	-	100%	-	100%
Retention rate 1 year after reinstatement (E/D in last year)	0.00%	0.00%	100%	-	-	100%

Note: Number of employees qualified for the parental leave of absence in the year: Full-time employees who apply for the parental leave of absence in the year after working at TCC for six (6) months or full-time employees who applied for the maternity leave or paternity leave in last two (2) years and are still at work.

Fitness center

With the increasing awareness of hypertension prevention of modern people, we have installed the fully automatic blood pressure meters at the headquarters and all plants for employees to measure blood pressure for free. In addition, to encourage employees to develop an exercise habit, we have established a fitness center and recreational facilities at the headquarters and all plants. Equipment installed in these facilities include the treadmill, upright bike, elliptical cross-trainer, table-tennis table, and pool ball for indoor use, and the basketball court for outdoor exercise. We have also arranged massage chairs for employees to release stress. With these well-planned facilities and equipment, we hope employees can maintain health realize healthy working and healthy life.

TCC Building



Hoping Plant



Employee cafeteria

At the employee cafeteria, reusable ceramic tableware is used. Nutritious meals including one part of meat, three parts of vegetable, one soup, and one dessert are arranged to meet the four basic principles: balanced diet, food hygiene and safety, delicious taste, and economic efficient. In addition, each plant provides health education information and knowledge on the notice board and update new health-related information to provide employees with correct health education and knowledge, such as the prevention of chronic renal disease; the need for reliable checks of hypertension, hyperlipidemia, and hyperglycemia, and health promotion activities such as the Healthy Life Side by Side.

Family Day

We value employee family and organize Family Day every year to promote exchange and interaction among employees and enable their family to understand more about TCC, in order to establish a closer tide among employees, employee family, and the company.

Non-obstructed communication

We value labor-management communication and hold the labor-management meeting every quarter to promote communication, interaction and exchange between labor and management. The conference includes information of business overview, recent legal amendments, and notification of related administrative and management orders for employees to understand their rights and interests and legal protection, in order to maintain sound labor-management interaction. In addition, to protect the rights and interests of employees, promote labor-management harmony, and enhance opinion communication, we have set up the employee suggestion box (mailto:) and a hotline ((02) 2531-7099 ext. 20626 or 20672) for employees to express their opinions and make improvement suggestions for the company and work.

Every quarter we hold the unique Town Hall Meeting (THM) for the two-way labor-management communication, in order to inform employees of the organization's business policy, listen to their suggestions, and enhance the organizational commitment and cohesion. We also arrange keynote speeches for employees to understand more and better about organizational development, in order to grow and grow strong with employees.

Workplace safety and contractor occupational safety management

Work environment safety for employees has always been our main concern. Therefore, we have established the Occupational Health and Safety Management Office to take charge of OHS-related affairs, hold OHS Committee meetings regularly, and follow up the effectiveness of tasks and project progress. In addition, each plant has established a QA section to plan and implement the management and promotion of plant ESH work, with the headquarters supervising the effectiveness of the tasks of each plant. Each plant reports the outcomes of OHS improvement plan, including the handling and prevention of accidents and occurrences and the construction safety management of contractors, in order to review the current status and maintain continual improvement.

Passed the certification of the
OHSAS 18001
2007 Occupational Safety and Health Management System

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

To strengthen the determination and effectiveness of environmental improvement for workplace safety, and to reinforce the prevention of potential threats to industrial safety and renew environmental equipment, we implemented the Industrial Safety and Environment Improvement Project in 2018. Plants in Taiwan reported a total of 332 items required rectification. The industrial safety and environment meeting is held every month to follow up the rectification progress to prevent the recurrence of non-conformities. Potential safety threats in the corridor, railing, slabs and platforms, were rectified; the dust precipitator was modified; and the pipeline of the waste heat boiler was replaced.

Occupational injury

To raise the safety awareness of employees in routine work and thereby prevent severe industrial accidents, we have identified and accessed the risks of related hazards and implemented self-management to eliminate potential hazards, implement in-house safety stringently, publicize the SOP for handling industrial safety incidents, and reduce the damage and loss caused by industrial safety incidents. When an industrial safety incident occurs, a plant shall immediately activate the reporting system to report the incident to related units and the administration division. In addition, we organize self-defense fire training according to the fire safety protection plan every year.

Occupational Injury in 2017

		Industrial accidents		Lost days	Lost day rate (LDR)	Injury counts	Injury rate (IR)	Total length of absenteeism	Absentee rate (AR)
		Work-related casualties	Work-related fatalities						
TCC Headquarters	Female	0	0	0	-	0	-	48.44	0.38%
	Male	0	0	0	-	0	-	10.5	0.06%
Plant	Female	0	0	0	-	0	-	16.38	0.1%
	Male	2	0	36	6.23%	2	0.35	311	0.2%

Note4:Electrical burns and traffic accidents when employees came to work and went home after work were the main causes of occupational injuries for 2017.
Note5:IR = (Total Number of Injuries/Actual Number of Hours Worked) x 200,000. Please 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.
Note6:LDR = (Total Number of Lost Days/Total Number of Hours Worked) x 200,000
Note7: AR = (Total Number of Workdays Lost to Absenteeism/Total Number of Available Workdays) x 100, absenteeism includes sick leave, menstrual leave, and occupational injury leave.

Contractors must abide by OHS related laws and regulations and the Contractor Occupational Safety, Health and Environment Management Rules and Punishment established by TCC. Before entering a TCC plant, contractors are required to fill in the Workplace Environmental Hazardous Factors Notice to ensure their understanding of our ESH regulations and the Workplace Environmental Hazardous Factors Advice. In addition, we also request contractors to sign the OHS Liability Undertaking to ensure that contractors will request their staff to abide by related OHS rules when working in a TCC plant. No occupational injury was reported from contractors in 2017.

Special Report: Practice, Circular Economy

As a believer and practitioner of the circular economy, by developing waste management and collaborative processing ability and the "cement + energy + environmental protection" 3-in-1 operation, we realized the circular economy.

Waste Management and Collaborative Processing Ability Development

"Cement + Energy + Environmental Protection" 3-in-1 Operation

Waste Management and Collaborative Processing Ability Development

Why disposing of municipal solid waste in the cement kiln?

The 20% incinerator bottom ash is difficult to remove.

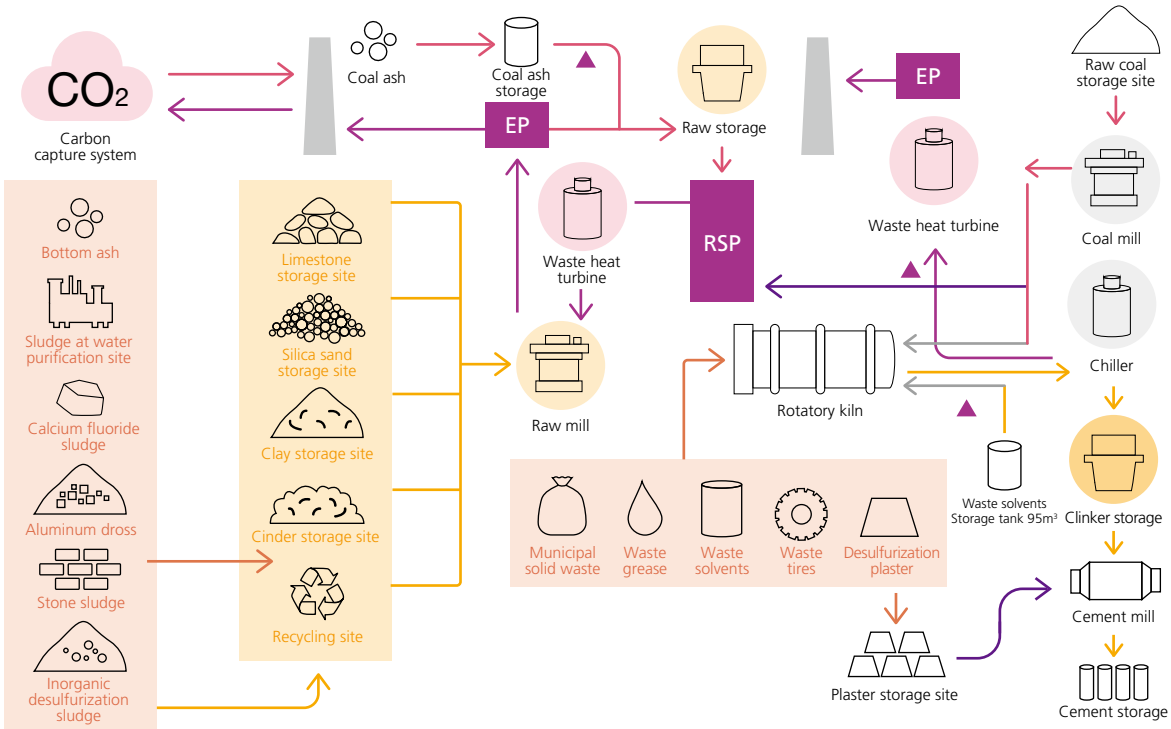
Refuse incineration produces 3-5% of fly ash containing toxic substances.

Kiln incineration can fully purify flying ash and incinerator bottom ash to achieve total resources recycling.

Characterized by high temperature, high turbulence, and high retention time, we can decompose toxic substances at 1,600°C in the kiln to prevent dioxin production.

Therefore...

We have established related specifications and procedures, including acceptance criteria, inspection standards, and mixing proportion. Waste must be tested to ensure compliance with the acceptance criteria. Cement products made with recycled materials must pass ISO 9001 quality management certification and the national Portland cement standard CNS 61. Over the years, we have processed material waste from various industries, including optronics and semiconductor, papermaking, water purification, chemical engineering, and steel making industries. This suggests that our collaborative waste processing capacity allows us to implement integrated environmental protection.



Achievements...

814,007 tonnes

Collaborative processing of non-toxic waste: 814,007 tonnes.

100%

100% reuse of non-toxic waste through the cement manufacturing process.

18.76 tonnes

Non-toxic waste processing volume per NT$1,000: 18.76 tonnes

0

Waste produced from cement production: 0

Do you know?

While cement making requires kilning, the kiln temperature is above 1,600°C. Fuel and raw materials will all be burnt or become finished products or semi-finished products.
According to the 2010 EU report on energy efficiency and CO2 emissions, the CO2 emission of per unit (kg) production of cement clinkers using waste tires as fuel is about 0.244-0.325 kgCO2e, which is cleaner than using secondary soot (approx. 0.384 kgCO2e per unit production) and
brown coal (approx.0.404 kgCO2e per unit production).
World-leading cement makers also help local environmental authorities to effectively turn waste, such as waste tires, into reusable resources to replace fuels, in order to reduce cement product CFP without affecting the environment and ecosystem. This is an international practice of collaborative waste processing.

In an EPA commissioned trial project replacing fuels with waste tire chips, with the kilning temperature at 1,600°C and 3T (time, temperature, and turbulence) conditions, conducted at the TCC Hoping Plant, a third-party laboratory found that the average dioxin emission was 0.015ng/Nm3. While the dioxin emission standard of collaborative processing of solid waste of worldwide cement makers is way lower than the standard at 0.1ng/Nm3 set by the EU, Japan, and the USA, our figure shows that TCC's expertise in waste tire processing is no second to the standard of any advanced countries.


Material income


Loading by bulldozers

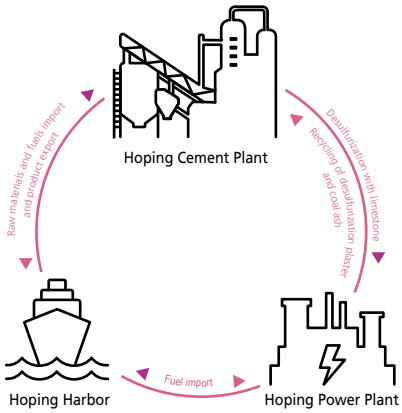

Handling


Material unloading


Material feeding

“Cement + Energy + Environmental Protection” 3-in-1 Operation: The unique feature of the cement industry

In response to the expiration of the mining permit in western Taiwan and in support of the government’s eastward movement of the cement industry policy, we have initiated the Hoping Cement Complex Investment Project. In addition to increasing the overall TCC income, the project will enrich the revenue income of Hualien to indirectly support local development. Furthermore, while raw materials required for making cement, including fuel, cinder, plaster, and slag are shipped to the Hoping Harbor, finished cement products are also shipped to the harbor cement receiving stations in western Taiwan from Hoping Harbor to save transportation expense and prevent environmental impact at the same time.



Hoping Cement Complex

8,600 tonnes

Daily capacity of each is 8,600 tonnes of cement clinker.

560 million tonnes

The annual equipment capacity is 5.60 million tonnes.

Note:Kilns 1 and 2 of Hoping Cement Complex.

With the fully sealed storage and conveyor system, low NOx process and equipment, continuous emission monitoring system (CEMS) installed on the main exhaust stacks, we stringently control exhaust quality to ensure all emissions are superior to the national standard, in order to maintain landscape and environmental protection at the same time. The most advanced suspension preheater for cement calcining plant can effectively save energy and enhance productivity, and incorporate a 31,500kWh waste heat generation set. When kilns 1 and 2 operate together, the crude generation capacity is above 21,300 KW. As the Hoping Cement Complex sits near a national park, a landscape park of 20 hectares has been built on the complex to achieve the goal of complex as a park.

Hoping Harbor

708,351 kWh

Use of LED lampsSaved about 708,351kWh of electricity a year.

16.7 hectares

Green area of 16.7 hectares

317,172 kg

Reduced CO_2 emissions by 317,172kg a year.

We have built a dedicated four wharfs, including one cement wharf, one coal unloading wharf, and two multifunctional wharfs for vessels below 80,000 tonnage to load and unload materials. The total throughput is 23 million tonnes. All facilities are built for use by all plants within the Hoping Complex to effectively reduce transportation cost and thereby enhance market competitiveness.

In addition, we have purchased cleaning vessels to clean up drifting items and refuse in the harbor waters and green the harbor area by zone to achieve the goal of "harbor greening". The harbor storage and transportation system has a sealed corridor conveyor belt design to reduce fugitive dust from materials. Automatic loading and unloading machines are equipped on the harbor to reduce transportation volume and thereby air pollution in the harbor area.

Hoping Coal-Fired Power Plant

Apart from two coal-fired steam power generation sets, each 660MW, the plant is equipped with edgy air pollution prevention equipment, including the sealed fuel coal storage and transportation system, electrostatic precipitator, flue gas desulfurization (FSD) equipment, selective catalytic reduction SCR) equipment, low NOx burner, and CEMS, to effectively control the SOx and NOx emitted from the exhaust stacks to meet the high domestic standard.

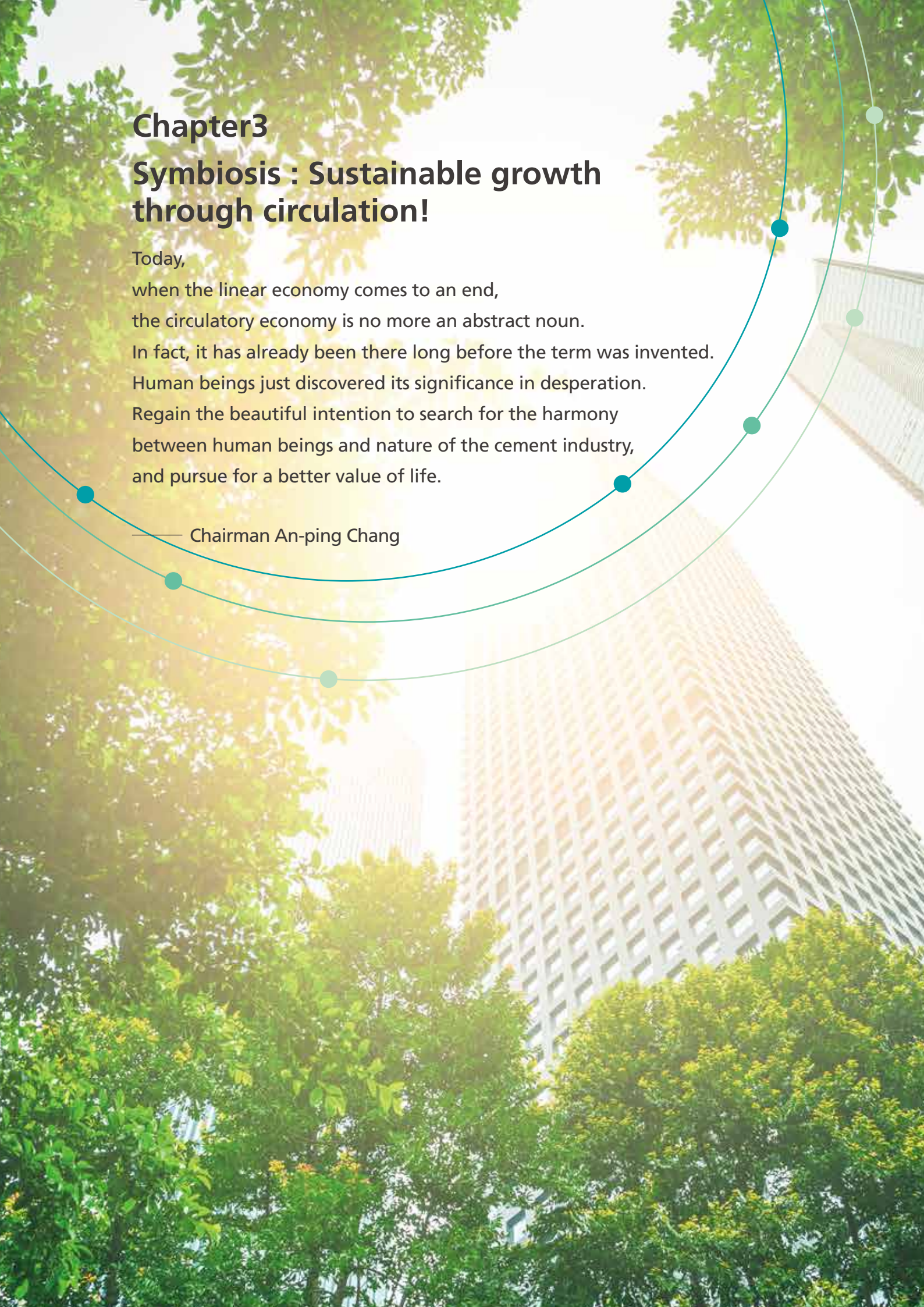
Waste produced from power generation falls into the fly ash and the bottom ash. Both of them are coal ash substances. We use all coal ash from the power plant as raw materials for the Hoping Cement Plant. Hoping Power Plant produces about 420,000 tonnes of coal ash each year. With such a policy, we not only prevent marine pollution but also make waste to resources a reality.

Flying Ash

- Concrete improvement projects (e.g. dam projects): Prevent concrete from cracking and strengthen dam structure strength.
- Hydraulic, bridge, and tunnel projects: Enhance corrosion resistance against salt from seawater or soil.
- Direct mixture with cement: Replace part of the cement to reduce cement consumption.

Bottom Ash

- Coarser particles, angular shape, and porous surface, suitable for ground filling, brick making, artificial aggregates, and construction materials.



Chapter3

Symbiosis : Sustainable growth through circulation!

Today,
when the linear economy comes to an end,
the circulatory economy is no more an abstract noun.
In fact, it has already been there long before the term was invented.
Human beings just discovered its significance in desperation.
Regain the beautiful intention to search for the harmony
between human beings and nature of the cement industry,
and pursue for a better value of life.

—— Chairman An-ping Chang

Support for the UN Sustainable Development Goals (SDGs)

2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture

- Help the world maintain the seed vault through international exchange of the restoration achievements of the Botanic Preservation Center.
- Increase the cultivation and restoration quantity every year.

3 Ensure healthy lives and promote well-being for all at all ages

- Reduce the possibility of air, water and soil pollution through proactive environmental management.

6 Ensure availability and sustainable management of water and sanitation for all

- Set targets for water resources utilization, install water reclamation and treatment facilities, and maintain sustainable water management from the withdrawal and drainage of water with the best process technology.

7 Ensure access to affordable, reliable, sustainable and modern energy for all.

- Reduce energy consumption of business and production activities through energy management and the utilization of alternative fuels and emerging technologies.

12 Ensure sustainable consumption and production patterns

- Ensure recycling of the Earth's resources by greening mines and maintaining ecology, soil and water conservation, vegetation, and living safety.

13 Take urgent action to combat climate change and its impacts

- Implement aggressive environmental management and natural resource restoration; promote technology R&D and innovation; and provide examples of best practices for exchange with and the reference of the industrial value chain at and abroad, in order to mitigate the impacts of global warming together.
- Implement GHG inventory and intensity management of GHG emissions; set targets for reduction and participate in government programs; and help achieve the national emissions reduction target with organizational influence.

14 Conserve and sustainably use the oceans, seas and marine resources for sustainable development

- Replace fuel oil with offshore wind power and effectively arrange and schedule vessels to reduce impacts on the marine environment.

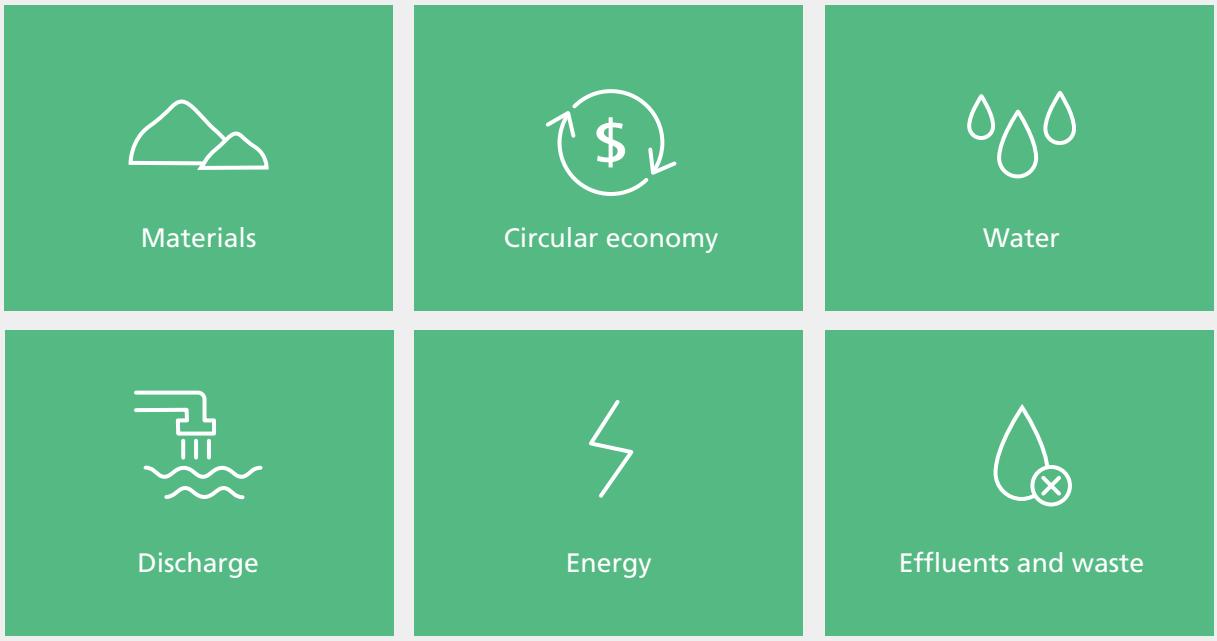
15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

- Implement the circular economy, reduce consumption of natural resources, and sustainably manage vegetation, forest and water bodies to reduce damage of natural resources.
- Maintain global biodiversity and restore native flora for future generations to see the true nature and ecology through botanic conservation.

17 Strengthen the means of implementation and revitalize the global partnership for sustainable development

- Plan and proactively support international initiatives and disclose climate management performance.
- Launch cooperation with international botanic conservation alliances and initiate collaborative research and technological exchange to maintain global ecology together.

Material topics

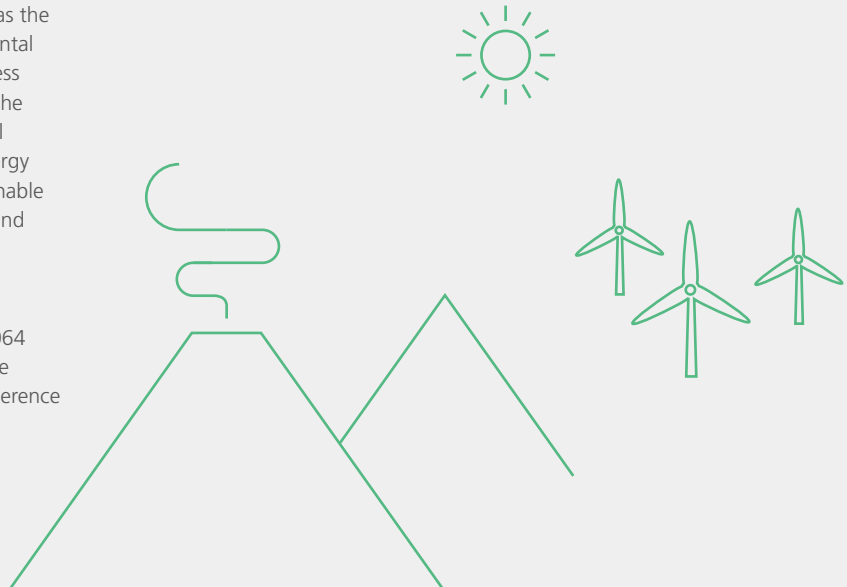


Management approach

- Combine local procurement with annual supplier audits to ensure our requirements are met and enhance the yield rate and safety standard of cement products.
- Use power generation waste from the Hoping Power Plant as alternative materials of cement making to reduce natural resources consumption without sacrificing product safety.
- Develop green energy and carbon capture and microalgae carbon fixation systems, and cultivate the economic value of astaxanthin extracted from the Haematococcus pluvialis to practice the circular economy in business and production activities.
- Fuel cement kilns with municipal solid waste and industrial waste to dispose of waste and reduce energy consumption.
- Develop a complete circular economic system with "integrated environmental protection" through green energy deployment, the strategic goal of our next stage.
- Set "environmental protection as a responsibility" as the operational strategy and implement the environmental policy through the Environmental Protection Business Steering Committee under direct management of the president. Implement the ISO 14001 environmental management system (EMS) and the ISO 50001 energy management system (EnMS) to promote the reasonable use and improvement of energy, water, effluents, and waste. Treat exhausts and wastewater emitted and discharged from production activities with proper pollution control equipment to meet the relevant environmental requirements. Implemented ISO 14064 GHG inventory and verification in 2013 to verify the actual effectiveness of our efforts and provide a reference for future improvements.

Evaluation mechanism

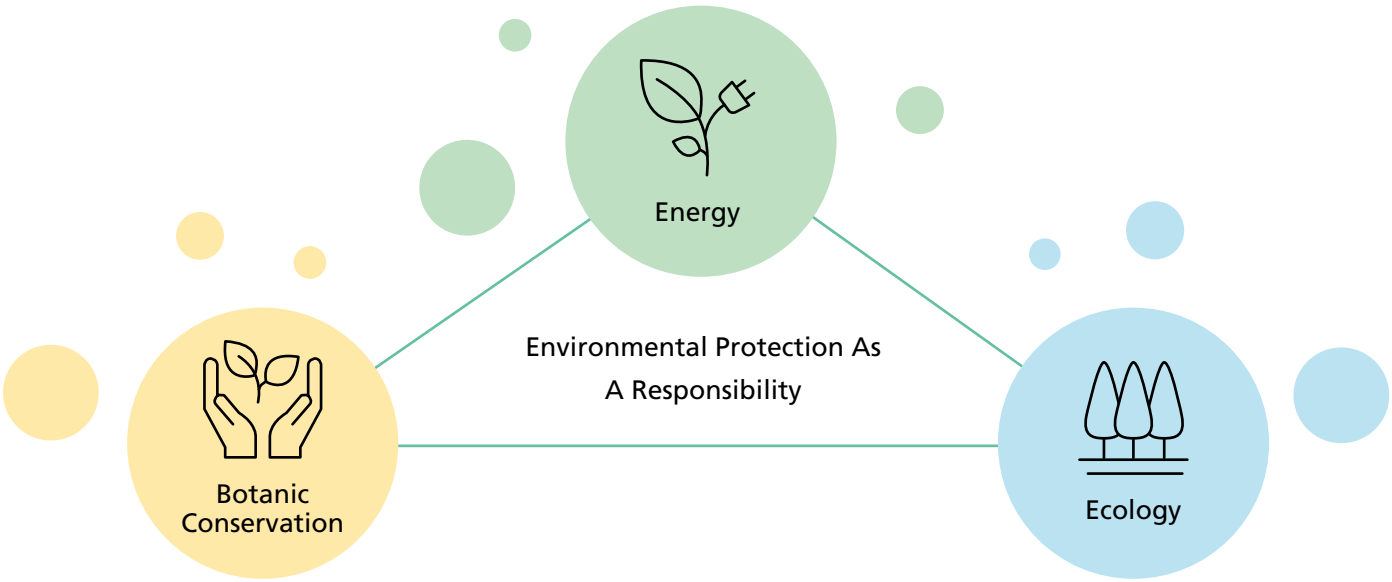
- Audit suppliers every year to practice our commitment to the environment and customers.
- Measure the performance in reducing natural resource consumption in the circulatory economic system by monitoring the replacement ratio.
- Regularly report the development status and research outputs of carbon capture related technologies to top management and assess the effectiveness of continuous resource investment.
- Evaluate the effectiveness of implementation and operation of related management policies through annual internal evaluation and external audit. Continuously evaluate the scope of implementation and applicability through out the year to ensure operational strategies are continuingly effective.



As a leader of the cement industry, we establish our ESH policy in terns of energy, ecology, and botanic conservation, with the circular economy as the core strategic goal in line with operational management, energy conservation, and environmental protection. In 2017, our investments and expenses relating to environmental protection totaled about NT$52.03 million. We also invested about NT$100 million in the Suao Plant Environmental Greening and Beautification Project to maintain the beautiful appearance and improve employee work safety within the plant. Through various measures, we practice our business philosophy: Environmental protection as a responsibility.

ESH policy

- Carry on plantation, greening, and mining site soil and water conservation to maintain the natural landscape of the mining area.
- Maintain environmental legal compliance; continue pollution prevention, control, and improvement; and enhance environmental performance.
- Practice waste reduction and resource recycling.
- Befriend with neighbors and reinforce communication with local residents.
- Abide by safety and health regulations and other requirements to prevent bodily injuries to and unhealthy lifestyles of employees.
- Identify hazards, assess risks, and implement self-management to eliminate potential hazards and prevent occupational accidents.
- Build and maintain a safe and healthy work environment to enhance safety and health performance.



3-1 Energy

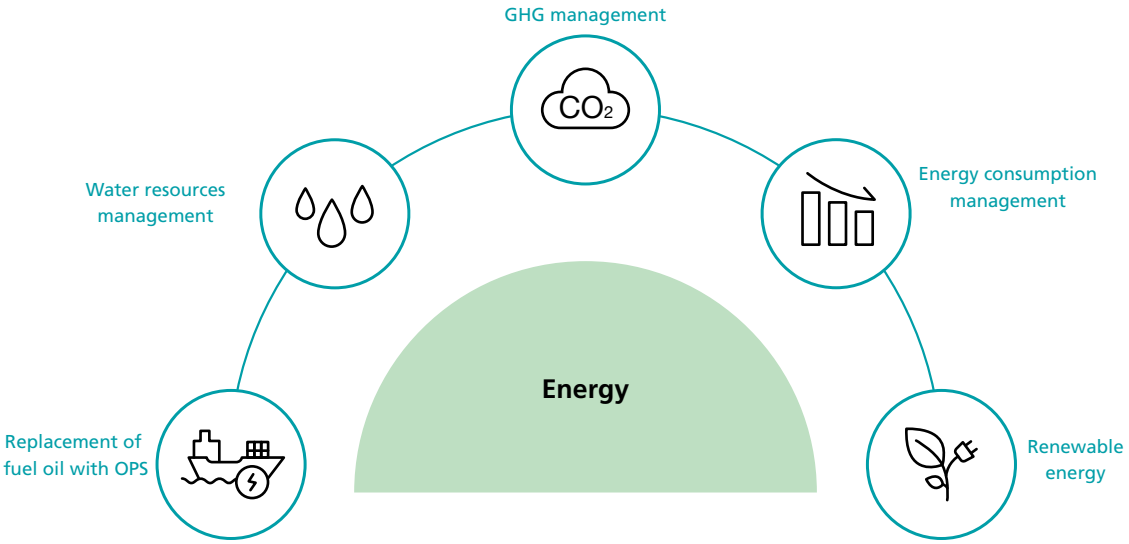
Energy consumption management is a focus in cement production. From developing green products to implementing the green management system, we have fused green management with our routine operations. After passing ISO 14000 EMS certification and ISO 14061 GHG emissions inventory and verification, the Suao Plant, Hoping Plant, and Hualien Plant were the first in the cement industry to pass ISO 50001 EnMS certification in 2014.

1.5 million kWh

Support for the MOEA Voluntary Green Power Price System Trial Project
Subscribe 500,000 kWh of green power every year since 2015, totaling 1.5 million kWh.

	Existing Action	Short Term Goals	Medium and Long Terms Goal
Energy	• Proactively support the government's green power policy and subscribe 500,000 kWh of green power every year. • Complete various energy conservation, emission reduction, and environmental protection projects.	• Continue to sign the green power contract with Taipower. • Continue to plan and implement annual energy conservation, emission reduction, and environmental protection projects. • Maintain the efficiency of waste heat generation and review purchased electricity consumption.	• Reduce energy consumption by over 5% of the 2016-2020 accumulative consumption in 2021.
Climate Change Management	• The competent unit of climate change management is a functional committee chaired by TCC chairman. • Proactively participate in government GHG reduction programs and help achieve the national reduction target. • GHG inventory and verification • Scope 3 inventory and verification • Set absolute targets for volume and intensity reduction.	• Address the CDP Climate Change project to disclose climate change management information to the world. • Assess the feasibility of the internal carbon pricing implementation plan. • Assess the feasibility of setting science based targets (SBTs). • Continue to achieve various reduction targets.	• Reduce carbon emission intensity by 2% of the 2016-2020 accumulative average in 2021.
Water Resources	• Reduce water consumption by 1.5% of 2016.	• Continue to set annual reduction target at 1% for water consumption. • Plan and implement the water footprint calculation program. • Change the water supply to reclaimed water for the road sprinkler system of cement plants.	• Reduce water consumption by over 5% of the 2016-2020 accumulative consumption in 2021.

To improve the management and enhance the efficiency of energy conservation and emissions reduction, we have established an energy management mechanism, set energy conservation targets, standardized energy consumption control, developed new technology and new equipment to improve the production process, regularly reviewed implementation outcomes, developed the Production-Based Businesses Energy Audit Online Reporting System to enquire the energy consumption and power generation capacity of each plant in real time for the reference of internal management review and external verification. In addition, we have established the product energy consumption (coal consumption/electricity consumption) index, planned energy conservation plans, developed alternative raw materials or fuels, reduce CO2 production from burning, and held monthly review meeting to continuously improve energy consumption performance. Furthermore, we plan raw material demands through the production-sales meeting to reduce the frequency of material transportation by suppliers to reduce GHG emissions from transportation. We will continue to conserve energy and reduce emissions in terms of five aspects: GHG management, energy consumption management, renewable energy, replacement of fuel with onshore power supply (OPS), and water resources management.



GHG management

Apart from providing a reference for reduction, GHG inventory enables us to set and prioritize targets. Therefore, we began GHG inventory in 2007 and acquired the statement of assurance for conformity with ISO 14064-1 in GHG inventory through external verification in 2013. Compared the 2017 GHG emissions with that of 2013, the base year, in the same scope(s), we saved 4,386,360tCO_2, 2,465,627tCO_2 less than 6,851,987tCO_2 of the base year 2013, suggesting that our efforts to reduce GHG emissions are effective. In addition, we plan the annual energy conservation plan based primarily on equipment improvement. In 2017, we implemented five energy conservation plans, reducing GHG by 425 tCO_2 after conversion.

GHG Emissions in Last 3 Year (unit: tCO_2e)

	2015	2016	2017
Scope 1	4,614,890	4,396,724	4,144,669
Scope 2	281,362	253,768	241,691
Scope 3	-	-	8,873
Total	4,896,252	4,650,491	4,394,874

Note 1: GHG emissions are inventoried in terms of operational control. The calculation equation is GHG emissions = activity data (AD) x emission factor (EF) = global warming potential (GWP), where EF and GWP are subject to the EPA GHG Emission Factor Management Table (v. 6.0.1).

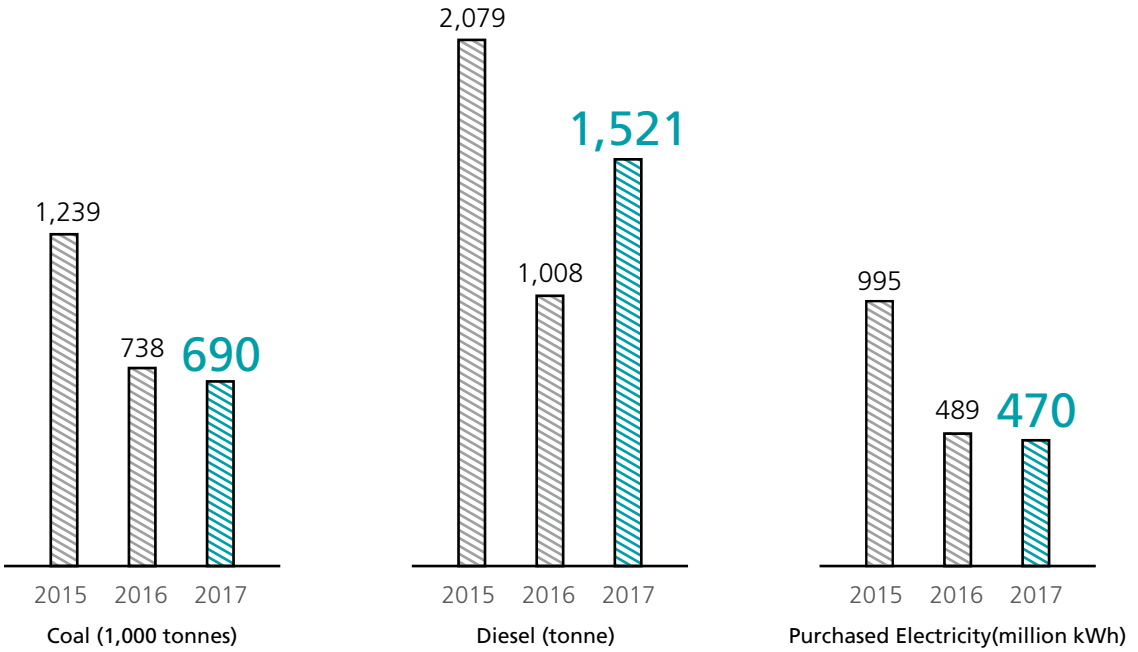
Note 2: As the Bureau of Energy has not announced the electricity emission factor for 2017, we calculated the 2017 GHG emissions from purchased electricity (Scope 2) with the 2016 emission factor at 0.529 kg CO2e/kWh.

Note 3: While the statement of assurance for GHG emissions had not been issued when we published the 2015 and 2016 CSR reports, data were disclosed based on the estimated data. In response to the international trend, we advanced the external inventory in 2017 and thus corrected the GHG emission data of 2015 and 2016 according to the data in the statement of assurance.

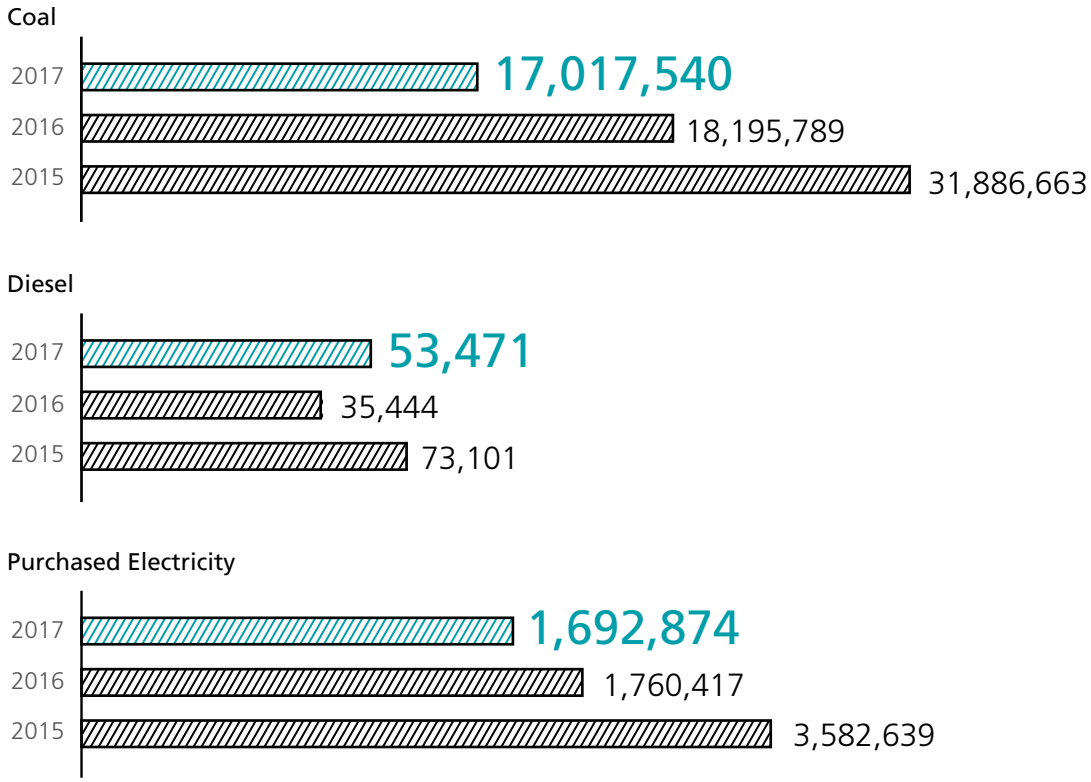
Energy consumption management

Instead of renewable energy, we basically use coal, diesel, and purchased electricity in production activities. The total consumption in 2017 was 18,763,885 GJ, with a unit revenue energy consumption at 0.43 GJ every NT$1,000, similar to that of 2016.

Major Energy Consumption in Last 3 Years



Major Energy Consumption in Last 3 Years (unit: GJ)



Note: The calorific value of respective energy types is converted based on the EF table v6.0.1 post on the Bureau of Energy website: coal 5,890 (kcal/kg); diesel 8,400 (kcal/kg); and electricity 3,600 (GJ/million kWh)

Energy conservation measures

Energy conservation and emissions reduction are important to us. Therefore, we implement various energy conservation measures at headquarters and all plants. At headquarters, energy conservation is implemented in terms of three aspects: waste sorting and recycling, reduction of paper consumption, and publicity. In 2017, we implemented stationery recycling and saved 4% of stationery compared to 2016 to contribute to environmental protection.

Diamond Grade Green Building Mark : TCC Headquarters

- The rooftop photovoltaic system generates electricity over 10,000 kWh a year.
- The stormwater harvest system reclaims water for outdoor landscape maintenance and cleaning.
- Replacement of water-efficient equipment in offices.
- Improvement of the lighting function.
- Enhancement of air-conditioner efficiency.

Waste Sorting and Recycling.

- Distinguish recyclable waste from non-recyclable waste.
- Set up the "waste recycling area" to prevent indiscriminate dumping and thereby maintain overall orderly appearance.

Reduction of Paper Consumption

- Send data by email.
- Set up the "used paper recycling area" next to photocopiers to recover used paper.

Publicity

- Recover stationery for reuse.
- Reduce the use of disposable cups in meetings.
- Encourage employees to prepare reusable cups and chopsticks.
- Recover used envelopes for reuse.

In addition, every plant has promoted various energy conservation plans over time to demonstrate TCC's determination in energy conservation.

2017 Energy Conservation Performance

Plant	Energy Conservation Plan	Total Energy Saved (unit: kWh)
Suao Plant	Renewal of the vacuum pump of the waste heat generator turbine.	167,533
Hoping Plant	Replacement of 9 old air compressors.	447,542
	Addition of the variable-frequency drive to cooler fans.	179,833
	Replacement of 450 fluorescent tubes with LED tubes.	2,190
Hualien Plant	Replacement of 2 old air compressors.	6,692

Renewable energy

We equip each cement plant with the waste heat generation system to recover the heat energy emitted from the cement kiln to generate electricity. We also use the latest flash distillation technology from Japan to enhance heat recovery efficiency and thereby maximize the efficiency of the waste heat generation system. In 2017, the output of the waste heat generation system was 74.926 million kWh, equivalent to the annual electricity consumption of about 20,000 households (subject to the 2017 average household electricity consumption announced by Taipower). The output of the waste heat generation system varies with respect to the number of days of plant operations according to the production plan. As the Suao Plant reduced production and the breakage rate of the AQC turbine pipeline of the waste heat generation system of the Hoping Plant increased in 2017, we will replace the turbine pipeline in 2018 to enhance generation efficiency.

2017 Waste Heat Generation

7,492.60 kWh

5-Year Accumulative Output

6.35 million kWh

Accumulative Emissions Reduction

333.600 tCO_2e

Note: Calculation is subject to the electricity emission factors in past years announced by the Bureau of Energy.

In support of the government's green energy development strategy, we signed a cooperation agreement with the Green Energy and Environment Research Laboratories of the Industrial Technology Research Institute in 2017 to build a 15 MW photovoltaic power plant at the TTC chemical engineering plant in the Changhua Coastal Industrial Park. Grid connection will begin in 2018. Next, we will build three sets of 2.3 MV wind turbines on the site and strive for building a ground photovoltaic power plant in Lunwei District of the Changhua Coastal Industrial Park.

Replacement of fuel oil with OPS

In response to the air pollution reduction policy, we have implemented the emission reduction of mobile pollution sources in the Hoping Harbor area by adopting the vessel speed reduction (VSR) program using the automatic identification system (AIS) to check vessel speed. In addition to advising vessels to reduce speed to below 12 knots when entering or department the harbor, we recommend the use of OPS in place of electricity generated with the vessel fuel after berthing. Furthermore, we have equipped seven power supply pillars at the wharf for use by three tugs to effectively reduce the pollution caused by the use of premium diesel during berthing and the pollution caused by the equipment and vehicles loading/unloading and transporting goods on the wharf and the vessel.

Reduce fuel oil by

3,312.6 Kl

Reduce NOx emissions by

30,886 kg

Reduce SOx emissions by

9,562 kg

Reduce CO_2 emissions by

1,516,956 kg

Note: Estimated pollution reduced in a year

Water resources management

We understand the importance of water conservation. Therefore, we set the annual water saving target to 1%. Plants reduce water consumption in the production process. Premix plants reclaim water from the production process for washing cars and for use in other part of the process. After collection from gutters, runoff is transported to the buffering pond of the sewage treatment plant for sprinkling road surface, washing truck tires before leaving the plant, and irrigating roadside trees. Industrial water and groundwater are used in the cooling tower of the waste heat generation system and living units. Effluents are used for cooling plant equipment. In 2017, the total water consumption was about 3.8228m3, and the unit water consumption was 88.09m3 per million dollars, 1.5% less than that of 2016. In 2018, we will use reclaimed water for the sprinkler system at the Suao Plant and reclaim sewage for recuse at the Hoping Plant to continuously reduce water consumption.

Water Consumption in Last 3 Years (unit: m^3)

	2015	2016	2017
Tap water	654,217	395,554	411,376
Ground water	1,692,894	1,650,335	1,837,214
Industrial water	844,323	1,037,154	978,629
Process reclaimed water	756,986	797,749	595,325
Reclaimed stormwater	21,938	-	-
Total	3,970,358	3,880,792	3,822,544

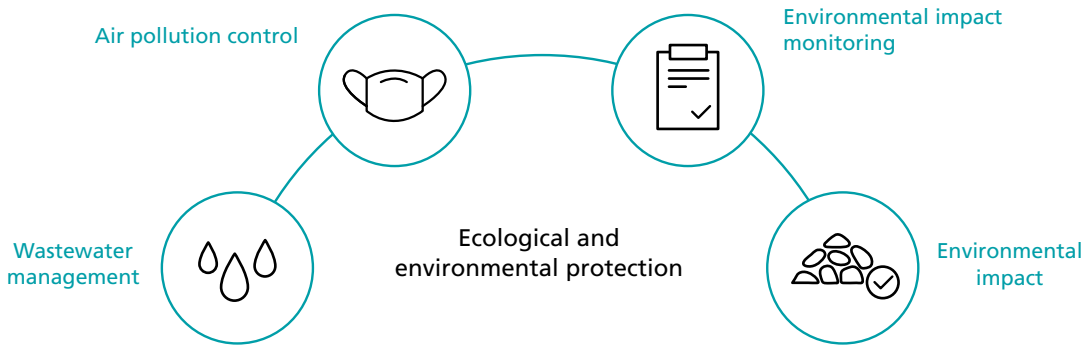
Note 1: Industrial water is used only at the Hoping Cement Plant.

Note 2: Due to a typography of the process reclaimed water consumption as river/lake water consumption in 2015, the process reclaimed water consumption for 2015 was corrected to 756,986m^3.

3-2 Ecology

	Existing Action	Short Term Goals	Medium and Long Terms Goal
Waste Management	• Professional equipment and competencies for the disposal of industrial waste and municipal solid waste. • Assistance for some enterprises with industrial waste disposal • Zero waste output	• Provision of terminal waste disposal solutions for enterprises.	• Maximization of resource utilization and constant practice of the circular economy. Use of 10% more alternative raw materials for making each tonne of cement in 2025 than in 2017,
Pollution prevention	• Set procurement standards higher than the regulatory requirements and use only low-pollution fuel coal. • Maintain and renew pollution prevention equipment regularly to maintain the best performance.	• Comply with all regulatory requirements for discharge and reduce punishment rate.	• Continue pollution prevention and improve air quality.

Ecological and environmental protection has long been our concern. Therefore, we maintain the natural environment in terms of four aspects: air pollution control, environmental impact monitoring, raw material management, and wastewater management.



Air pollution control

Plant exhausts are divided by nature into total suspended particulate (TSP), nitrogen oxides (NO_X), and sulfur oxides (SO_X). When exhausts are discharged from the stack, CEMS will continuously transmit related data to the environmental protection bureau in real time and disclose them on the website. Through third-party environmental monitoring, the Hoping Plant displays pollutant data on the LED signage outside the service center in real time for local residents to understand the real-time situation. The Suao Plant performs environmental impact assessment on Shimin Elementary School nearby every half year, with items including TSP, heavy metals, runoff, groundwater, and dioxin. In 2017, the total exhaust discharged was 7,704 tonnes, 2,652 tonnes less than the base year 2013.

Types of exhausts

Total Suspended Particulate (TSP)

- Procure quality equipment to reduce dust pollution.
- Check the intensity of different types of air pollutants half-yearly.
- The actual dust emission is far lower than the air pollutant emission standard for stationary pollution sources.

Nitrogen Oxides (NOx)

- Inhibit emissions with selective non-catalytic reduction (SNCR)equipment
- Equip the Hoping Plant with the latestlow NOx-RSPs system and burner to effectively inhibit emissions from the process.
- Complete the rotatory kiln control room to display the 24-hour average value with the continuous emissions monitoring system(CEMS)

sulfur oxides (SOx)

- Actual emissions are only 2-3% of the regulatory emission standard, and no SOx is detected occasionally.
- Install new and renew all types of dust precipitators, build eco-friendly facilities, and turn the Hoping Plant into a demo cement plant.

Air Pollutant Emissions in Last 3 Years (unit: tonne)

	2015	2016	2017
NO_X	7,896	7,331	7,035
SO_X	117	111	82
TSP	655	433	587
Total	8,668	7,876	7,704
Unit emission (kg/NT$1000)	0.177	0.187	0.178

Environmental impact monitoring

We have voluntarily commissioned the National Taiwan Ocean University to implement the Integrated Environmental Survey Expansion Project and offered the outcomes for the reference of long-term research and monitoring of nearby ecology in the future by the industry, the government, and the academia. In 2015, we started the 3-year monitoring procedure and analysis project, with the scope covering the Nanao River estuary in the north and the Liwu River estuary in the south. The project analyzed the bottom material survey and littoral drift simulation of the sea area, the range of influence on water temperature of the Hoping Power Plant, and the background of heavy metals in the bottom sludge of the Hoping Harbor; and constructed a regional environmental database system. This project will be continued in 2018 to estimate the ecological/fisheries economic productivity, investigate and analyze the yield changes of set net fisheries relating to the range of influence on water temperature of the Hoping Power Plant, investigate and analyze the influence of the Hoping Harbor on the sand source shift in the south reclamation area (replenished area), and continuously explore the status of nearby marine ecology, in order to optimize the regional environmental database.

Small volume of warm water discharged from the power plant causes limited temperature difference to the background temperature of seawater.

Water temperature at 1,000m away from the outlet is unaffected by the warm water drained from the power plant.

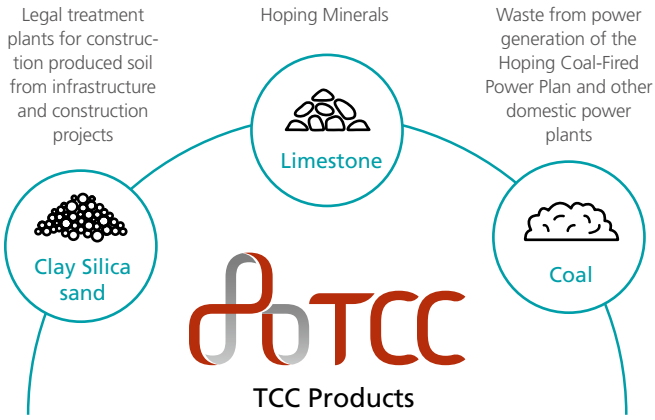
Sand of larger grain size in the seabed near the south replenished area is difficult to be transported to the northern sea area for sedimentation and deposition.

Embankment structures create better habitats for better biodiversity.

Raw material management

The limestone, clay, silica sand, cinder, high silica sand, and coal ash are the major raw materials of cement. As natural resources are limited, we proactively minimize the extraction and procurement of natural resources and study the use of recyclable raw materials, in order to minimize resource depletion in production activities.

The 2017 total consumption of raw materials was 7.8218 tonnes, 484,300 tonnes less than 2016. All clay, silica sand, and coal ash were recycled materials, demonstrating our achievements in the use of recycled and alternative materials.



Raw Material Consumption in Last 3 Years (unit: 1,000 tonnes)

	2015	2016	2017
Limestone	7,485.66	6,841.11	6,324.42
Clay	568.78	759	787.74
Silica sand	154.41	69.47	62.32
Cinder	147.82	173.17	178.48

	2015	2016	2017
High silica sand	56.46	120.56	102.39
Coal ash	322.65	342.80	366.46
Total	8,735.78	8,306.11	7,821.81

Wastewater management

Wastewater, sewage, and water from production are transported to the in-house wastewater treatment plant for treatment to the discharge standard before being discharged to the sewage treatment plant of the industrial park for further treatment. The local environmental protection authority sends inspectors to take samples from the effluent outlet to see if the effluent quality requirements are met. The total 2017 wastewater discharge was 550,266m^3.

Wastewater Discharge in Last 2 Years (unit: m^3)

	2016	2017	Discharge destination	Treatment method
Suao Plant	507,274	498,643	Sewer system	After process water and stormwater runoff are transported to the sedimentary pond for treatment, they are discharged from the effluent outlet. A small amount will be transported to the fugitive dust sprinkler system to reduce TSP effusion in the plant.
Hoping Plant	27,599	47,218	Hoping Industrial Park Wastewater Treatment Plant	After treatment to the discharge standard with related equipment, sewage and wastewater are transported to the sewage treatment plant in the Hoping Industrial Park and discharged to the Pacific Ocean in the end.
Hualien Plant	3,998	4,405	Sewer system	After process water and stormwater runoff are transported to the sedimentary pond for treatment, they are discharged from the effluent outlet. A small amount will be transported to the fugitive dust sprinkler system to reduce TSP effusion in the plant.
Premix Plant	-	-	Zero discharge	Water for cleaning truck tires, mixing machines, and mixer trucks, and the stormwater collected from the gutters in the plant are transported to the buffering pond and sedimentation pond before being reused in the mixing machines and for washing mixer trucks and barrels.

Note: Due to the value indication error, the 2016 wastewater discharge of the Suao Plant is corrected to 507,274m^3.

3-3 Botanic Conservation

The world's largest botanic conservation center of tropical plants is in Taiwan. We are honored to have you to protect plants with us.

There are some 21% of plants across the world are endangered species. It is estimated that a quarter of plants on the Earth will be extinct in 2050, and half of plants will disappear at the end of the 21st century." (January 16, 2017, CommonWealth Magazine)

Top of Asisa

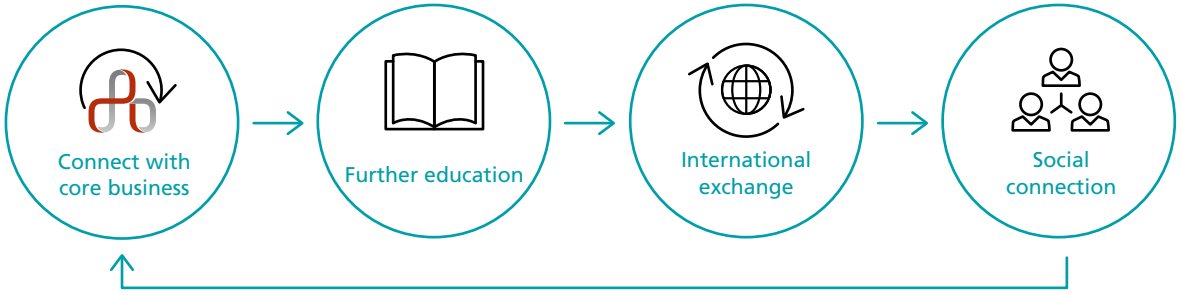
Tropical and Subtropical Plants

Top of the World

Orchidacea, Bromeliaceae, Begoniaceae, Carnivorous Plants, Pteridophyta

We have long invested in the botanic conservation of endangered species. With the Dr. Cecilia Koo Botanic Conservation Center (KBCC), we conserve tropic and subtropical plants in the world to sustainable biodiversity on the Earth. By the end of April 2018 (inventory every month), we have successfully cultivated 32,465 species of plants from different parts of the world. These plants will be the elements for rebuilding the ecosystem in the future and the materials for scholars to study plant lineage, develop new drugs, and cultivate new species for horticulture. Currently, they have been extensively used in the academic area, and many papers have been published. In addition, through computerized management, every species carries a computer tag with codes for enquiring the name, origin and plantation information of each plant in collection at any time.

As each plant requires a specific growing environment, the greenhouse design must be adjusted based on the properties of plants. After several expansions, there were 17 greenhouses at KBCC. Most of them are equipped with the shading net to regulate brightness. Th RO spray system sprays moisture regularly to control humidity and reduce temperature. Three of them adopts the water curtain greenhouse design to reduce high temperature in summer with large fans to create a shaded, cool, and humid environment. The difference between indoor temperature and outdoor temperate is up to 6°C for cultivating Orchidacea, Theaceae, Pteridophyta, Begoniaceae, Gesneriaceae, and Araceae plants requiring for a cool and moist environment. In the future, we will continue to promote botanic conservation and restoration in terms of four aspects: education and training, international exchange, social connection, and feedback, in order to recruit more people to product the Earth's environmental in real action from Taiwan and different parts of the world.



Further education

To enrich the professional knowledge and optimize the professional practice of botanic conservation, we organize a series of educational and training courses for biodiversity and botanic resource conservation, plan summer and winter science camps, and offer opportunities for internship and research to students of life science from colleges and universities, in order to demonstrate our emphasis on cultivating talents for biology and botany.

Industry-academia partnership, fostering ecology and botany talents

We offer the "Future Earth Ecology Program" in collaboration with the Bioresources Conservation Research Canter of the National Tsing Hua University, National Museum of Natural Science, National Chung Hsing University, and Scientific American. In 2017, the program accepted 24 students from 10 universities at home and abroad, including three from Singapore and the Philippines. In addition, we selected three faculty members. With focus on NGO conservation, apart from equipping students with plant identification ability, the program enables students to acquire knowledge including pot changing, trimming, insecticide use, watering, and other plant care knowledge. By enriching the program with activities including specimen watching, visits, science camps and seminars, and group drills, the program aims to develop conservation talents to save the future Earth. In 2018, we will invite students who have attended the program to join the animal behavior and ecology seminar held by the College of Life Science, National Tsing Hua University for students to access the top animal behavior and ecology research in Taiwan and to exchange between one and another.

Specimen watching

- Studied specimens and living bodies not open to public access in the specimen library.
- Watched animal specimens and geological samples collected by the National Museum of Natural Science.

Visits

- Visited the Taipei Zoo to explore how to formulate diets for animals of different eating habits and science camps and seminars discussing topics relating to release and habitat fragmentation.
- Visited the National Museum of Marine Science and Technology in Keelung to understand the importance of local communication.

Science camps and seminars

- Participated in the Ta-you Wu Science Camp – "Future Human Development: A Perspective from Life Science" held at Mt. Mabu in Beipu, Hsinchu, to investigate topics including ecology, conservation, evolution, and biomimetics.

Group drills

- Combined theory with practice and present special study report.

Internal cooperation

Numbers of scholars at home and abroad and worldwide botanical gardens visit and exchange with the botanic conservation center for its rich collection. Over the years, we have participated in Botanic Gardens Conservation International (BGCI), organized international symposia, and launched cooperation with other countries, such as the "Census and Classification of Plant Resources" in the Solomon Islands with the Solomon Islands and the "Azolla Conservation Program" with the Philippines. In 2018, we will launch the "Botanic Resources Research and Conservation Center Innovation Project" with Laos to increase the exposure of the botanic conservation center.

National Geographic Chanel Special Report: International image improvement

In addition to conserving and restoring ecology and plants, the botanic conservation center has been covered by National Geographic Channel for its continuous efforts in student cultivation. Besides deepening the public awareness of botanic conservation, the story has reminded the public of the importance of ecological issues.

Global TV household reach **4.4** million

Televised in **45** languages

Plant backups in the Solomon Islands

It was the third month I worked at the botanic conservation center that year. I was so lucky to participate in the Solomon Islands mission. Filled with expectations, I went to the Solomon Islands with senior collection manager Rui-xuan Guo of the botanic conservation center. The rugged gravel road, the heat welcome of tribal leaders, the onsite processing of plant specimens, the production of plant DNA backup copies, the response to the quarantine inspection, and the interaction with local tribes, they all were my most precious collections. Time flies. It has been one year now since I returned from the Solomon Islands. When I occasionally enter the quarantine greenhouse and see the flowers from the Solomon Islands blossoming in an exotic land, I will recall that jungle exploration, the enthusiastic greenhouse of the Taiwan Technical Mission, their warm assistance, and the mutual support of partners. I hope that the backup copies of plants we brought back to Taiwan can thrive in Taiwan, and the work of botanic conservation and the concept of habitat conservation blossom across the world. ◦

Habitat conservation is the most important task. While the present condition cannot be changed, we can only continue with offsite botanic conservation, the most efficient passive resistance. May be these plants will contribute to our world one day.

Social connection

The botanic conservation center promotes the "Thrive All Species: Operation Proliferation" to proliferate species that have been determined as extinct in the wild (EW), critically endangered (CR), endangered (EN) and vulnerable (VU) by conservationists. Besides sending the list of prioritized species to Professor Chia-wei Li of the National Tsing Hua University for implementation, the center invited other domestic organizations and scholars to take center staff to collect species in the field with a target of 50 plants each year, hoping to collect a total of 100-1000 plants in three years and grow them in their native habitats or major botanic gardens worldwide. While continuously expanding the collection of live specimens of tropical plants, the center began the botanic conservation of cloud forest species in 2017, hoping to collect 40,000 live specimens by 2027. By doing so, the center hopes to remind the public to be aware of endangered species and contribute to species conservation.

2 species

Species adoption by international conservation organizations

21 species

Species adoption by individuals and institutional investors in Taiwan

Restoring the native: Collaboration with PTCG

The International Union for Conservation of Nature (IUCN) has listed the Taiwan-endemic Pyrenaria buisanensis as a CR species in the Red List of Threatened Species, with successfully cultured mature individuals below 50 plants. Recognizing the importance of this species, the botanic conservation center has thus listed it as a focus species of the "Thrive All Species: Operation Proliferation" and grown 20 plants of the Pyrenaria buisanensis around the Pingtung County Government (PTCG)hall, in order to restore the species in its native place and extensively proliferate it in gardens and campuses in Pingtung. In the future, we will restore species in their native places in 11 counties and cities.

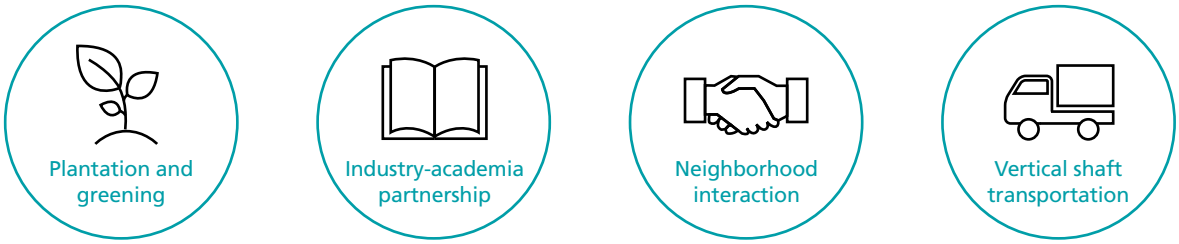
Successfully grown plants of the Pyrenaria buisanensis

570 plants

Connect with core business

In addition to maintaining plant diversity through conservation and restoration and promoting education and international cooperation, the botanic conservation center joins us to explore mines and study the optimal native species for greening. In 2015, the botanic conservation center explored numbers of TCC minds in Guizhou, Guangxi, and Guangdong to collect plant samples and introduce live plants in collaboration with the research teams of the Guanxi Institute of Botany and Fairylake Botanical Garden of Shenzhen, in order to balance environmental protection while cultivating resources in the environment. In 2018, the botanic conservation center will survey our Hualien mine to repay TCC's core business.

Special Report: Nature Cultivation, Green Mine



Although none of our mines are located in the ecological conservation or restoration area, it is our mission to maintain mine ecology and manage biodiversity. With leading-edge mining technology and restoration and botanic conservation competencies, we maintain our mines always green.

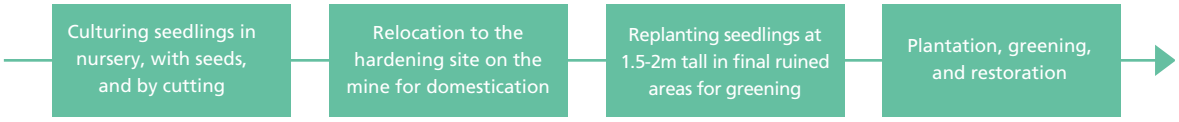
Plantation and greening

We have long been cultivating mines. During the mining process, we choose the Taiwan-unique vertical shaft technology to minimize the mining area. We also green the area with plantation at the same time. From academic research to field practice, we have effectively reduced the bald area on our mines. To strengthen the soil and water conservation function, in addition to water conservation facilities such as the berm ditch, drainage ditch, and large retention and sedimentation basins, we have built physical rock embankment of a minimum of 2m tall to prevent storm water in torrential rain from directly draining to the side slope to cause disasters. Through the planned plantation process, we create animal and plant ecosystems to keep our mines green and away from the impact of mining activities. After the success in restoring Shoushan in Kaohsiung, we will replicate the successful experience to restore our Suao Plant and Hoping Plant to continue mine greening.

Five key topics in plantation and greening research

To ensure that mine restoration can maximally restore the natural appearance of mines, through academic exchange, industry-academia research, and the effort of our botanic conservation center, we make careful planning and follow up the effectiveness of restored mines in order to restore them back to their original appearance.

Plantation and greening process



Breeding 24 species of pteridophyte; and 29 native species.

Climbing microsorium, Polypodiaceae, Pteridophyte

Breeding 54 species of dicotyledons; 53 species of arbors; 165 native species, and 32 endemic species.

Formosana begonia, Begoniaceae, Dicotyledons

monocotyledons

Yunnan bletilla, Orchidaceae, Monocotyledons

Restoration results of TCC mines on Shoushan, Kaohsiung

Before

After

Continuous restoration of Mt. Taiping Mine in Yilan

- Grew 108 seedlings, each 3m tall, completed the sprinkler system.
- Completed fundamental greening with vegetation. Current maintenance coverage rate is up to 80%.

Industry-academia partnership

We spare no effort to cultivate students. Through industry-academia partnership, we implement the ruin landscape greening and reengineering in mining area. By balancing mining and environmental protection, we maintain co-prosperity between mining area development and ecology and environmental protection and provide opportunities for students to combine theory with practice.

Student Cultivation, Dahan Institute of Technology

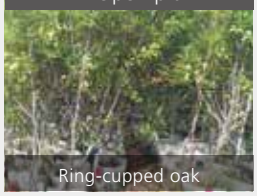
In 2017, we launched an industry-academia collaboration project with the Department of Civil Engineering and Environmental Resources Management of Dahan Institute of Technology to plan and build a "plantation and restoration demo site" in the existing plantation area. Through plantation material improvement, species and method selection, seedling preparation, and activities including demo training, we grew native trees with a higher survival rate and easy for ecological reconstruction with ecological engineering methods. Those species included the Formosan alder, Griffith's ash, Ring-cupped oak, Taiwan zelkova, and Chinese soapberry. Through this project, we preserved the overall landscape of the site, accelerated mine landscape restoration, and improved the expertise of students.

Plantation material improvement

+

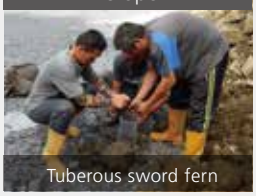
Species and method selection

Open pit



Ring-cupped oak

Slope



Tuberous sword fern

Pit planting

Plugging

Seedling preparation Immediately bulk procurement of slope plants like the tuberous sword fern for the mining area.

Collection and inspection → Growing in decomposable paper boxes with moss mixing with organic fertilizers as the base material. → Hardening and maintenance in holes on the cliff wall

Neighborhood interaction

We value the quality of life of residents living in the neighborhood. Therefore, we have built acoustic barriers and used acoustic cotton to reduce the noise from its sources (e.g. raw mill). At the Hoping Plant, we request trucks to enter the plant via the outer beltway of Hoping Village, ship materials only in the daytime, and drive slowly. In addition, we perform road surface maintenance and self-management.

Understand, Hoping Village

We emphasize interaction with local residents. Therefore, we arrange indigenous tribes to visit our mining site regularly for them to understand that the plant environmental protection is planned and implemented according to the law and as planned. In 2017, we arranged visits to three sites in the Hoping Plant for residents of Hoping Village for them to understand that we drained water from mining according to the soil and water conservation plan, the plantation and restoration work of the permanently ruined area after extraction was well implemented. By doing so, we reduce the risk of environmental safety for residents living in the neighborhood and promote neighborhood interaction.

Discovering mining method and greening performance

Assuring no further extraction on permanently ruined site by law to prevent impacts on local communities.

Understanding the native flora in the slope area near Hochung Community has been preserved.

Vertical shaft transportation

Apart from extracting the site with the most advanced Peak Platform Phase-Based Vertical Shaft Transportation, we perform plantation and greening at the same time to minimize the ruined area and impacts on the local landscape and environment. In addition to safety and high productivity, this method is characterized by a low transportation cost. Currently, we have three vertical shaft extraction systems with a combined capacity of 15 million tonnes a year. Apart from supplying raw materials for the Hoping Plant, the output can fulfill the material demand of the Suao Plant and Hualien Plant.

The vertical shaft transportation system releases no fugitive dust, consumes less fuel for minecart transportation, and is environmental and energy saving.

Joint extraction of three mining sites reduces ruined area and maximizes mine resources utilization without sacrificing environmental protection.

After feeding from the shaft opening (1,000m elevation, 12km long), limestone is crushed by the crusher and rotary crusher to reduce grain size before transporting to the silo and the plant via a fully sealed conveyor belt. As the entire process is fully sealed, there is neither noise nor dust pollution.

TCC vertical shaft method

Zero noise, zero dust, saved

23,265 KI of diesel a year or

62,816 tCO_2e

Note 1: Fuel consumption is about 39.838 L/time. Calculated at 1,600 times a day, diesel consumption is about 23,265KI.
Note 2: Carbon emissions of diesel is about 2.70kg/L

Heavy diesel trucks comply with Euro-5 emission standard.

Emit only

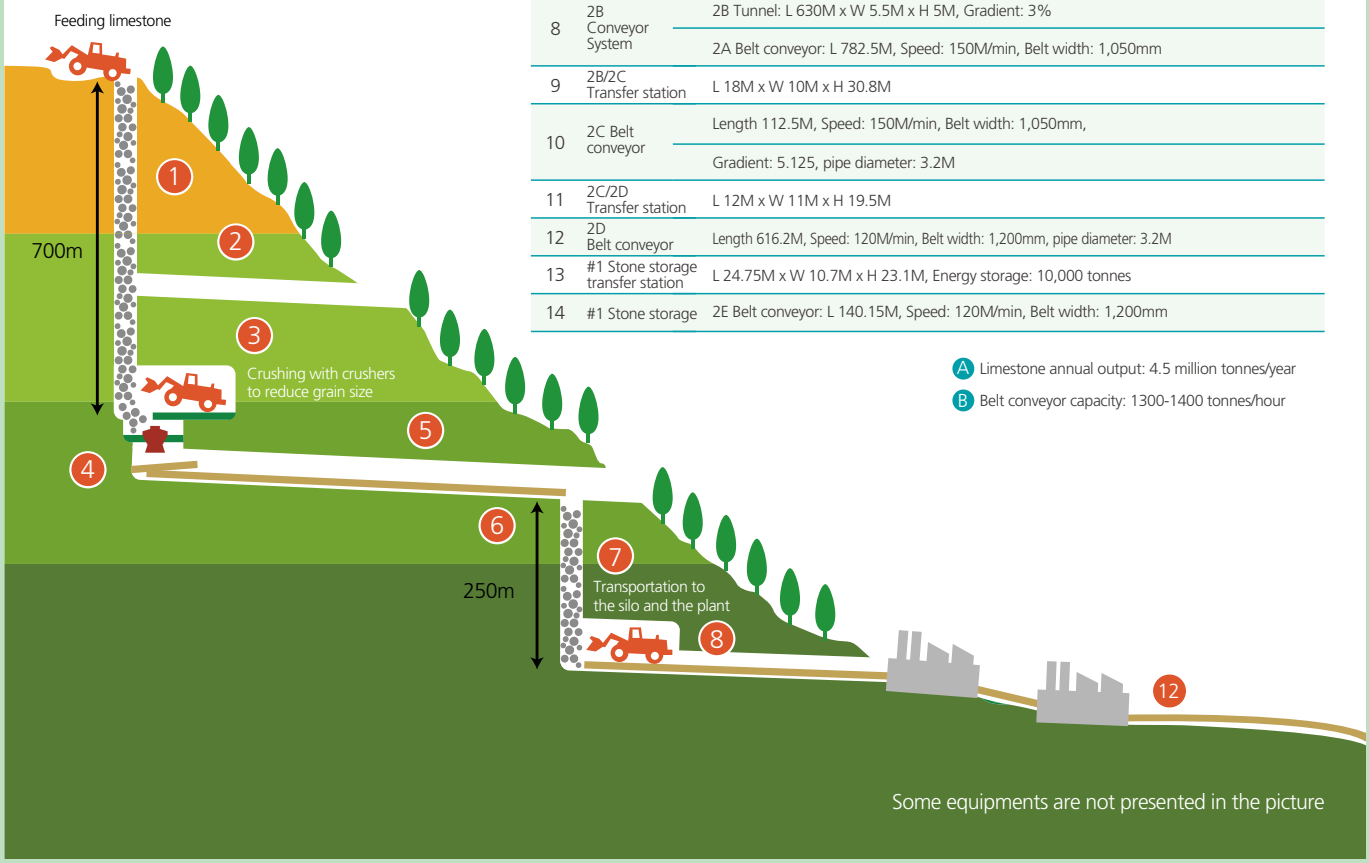
1.0 g NOx/time,or

only

1.6 kg/day.

Note: NOx emission standard is 2.0 g/kWh. Estimated at 1,600 times/day, and 30 minutes/time.

No.	Name	Description
1	2A Shaft	Diameter: 6M, Length: 656.5M (Storage capacity 30,000 tonnes)
2	2C Auxiliary tunnels	L 685M x W 3.5M x H 3.5M, Gradient: 3%
3	Crusher room	Chamber: L 20M x W 8M x H 6M
		Crusher: Model No.(TB975), Capacity: 1300-1400 tonnes/hour
4	Rotatory crusher room	Chamber: L 26.8M x W 9M x H 20.1M
		Feeding equipment: Finger-Gate, Roller-Feeder
		Rotatory crusher: 42"x65", Capacity: 1300-1400 tonnes/hour
5	2A Conveyor System	2A Tunnel: L 1005M x W 6M x H 5M, Gradient: 3%
		2A Belt conveyor: L 941.5M, Speed: 150M/min, Belt width: 1050mm
6	2B Shaft	Diameter: 6M, Length: 322.3M (Storage capacity 15,000 tonnes)
7	Feeding room	Chamber: L 18M x W 8M x H 12M
		Feeding equipment: Finger-Gate, Roller-Feeder
		Crusher: Model No.(FX60G/HB8G), Capacity: 1300-1400 tonnes/hour
8	2B Conveyor System	2B Tunnel: L 630M x W 5.5M x H 5M, Gradient: 3%
		2A Belt conveyor: L 782.5M, Speed: 150M/min, Belt width: 1,050mm
9	2B/2C Transfer station	L 18M x W 10M x H 30.8M
10	2C Belt conveyor	Length 112.5M, Speed: 150M/min, Belt width: 1,050mm,
		Gradient: 5.125, pipe diameter: 3.2M
11	2C/2D Transfer station	L 12M x W 11M x H 19.5M
12	2D Belt conveyor	Length 616.2M, Speed: 120M/min, Belt width: 1,200mm, pipe diameter: 3.2M
13	#1 Stone storage transfer station	L 24.75M x W 10.7M x H 23.1M, Energy storage: 10,000 tonnes
14	#1 Stone storage	2E Belt conveyor: L 140.15M, Speed: 120M/min, Belt width: 1,200mm



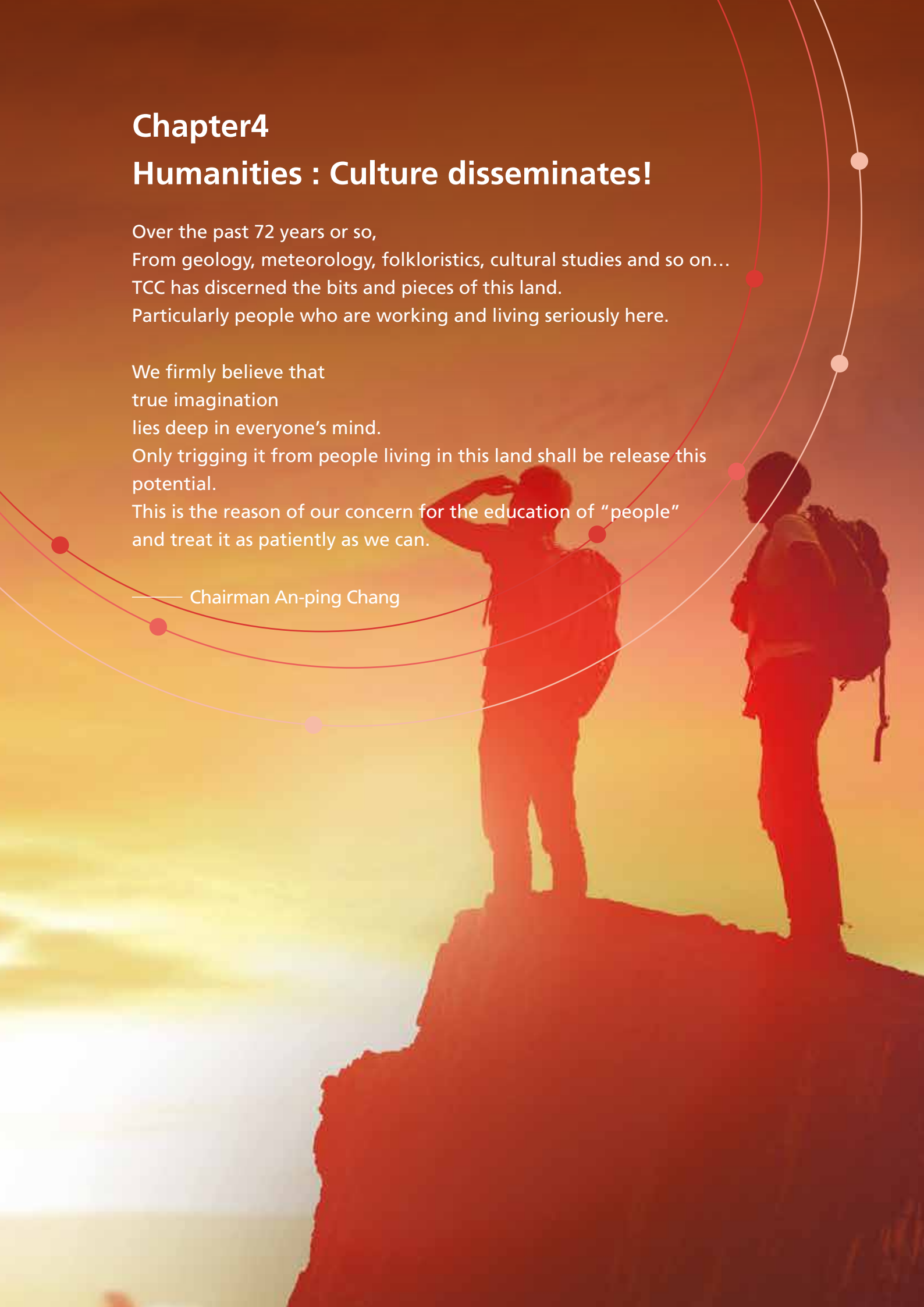
Ⓐ Limestone annual output: 4.5 million tonnes/year
Ⓑ Belt conveyor capacity: 1300-1400 tonnes/hour

Chapter4
Humanities : Culture disseminates!

Over the past 72 years or so,
From geology, meteorology, folkloristics, cultural studies and so on…
TCC has discerned the bits and pieces of this land.
Particularly people who are working and living seriously here.

We firmly believe that
true imagination
lies deep in everyone's mind.
Only trigging it from people living in this land shall be release this potential.
This is the reason of our concern for the education of "people"
and treat it as patiently as we can.

—— Chairman An-ping Chang



Support for the UN Sustainable Development Goals (SDGs)

1 End poverty in all its forms everywhere

- Invest in education for the remote by providing volunteer workers and donating money, in order to raise local education standard and competitiveness.

4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

- With "foundation cultivation, interest exploration, and specialty development" as the aim and adhering to the core belief "character", "conduct and academics", and "quality", we enable students to experience the value of education through collaboration with schools and children's family.

10 Reduce inequality within and among countries

- Invest educational resources in remote areas and progressively extend the scope of investment to bridge the urban-rural gap in children to eliminate the possibility of future inequalities.

12 Ensure sustainable consumption and production patterns

- By emphasizing character, environmental, and sustainable development in primary education, we aim to foster a consumption pattern favorable to effective resources utilization in future generations.

"Character" and "art" are the two pillars of our social engagement. Each plant has been playing the "good neighbor" role in local communities to help community construction and development; support local philanthropy, healthcare, environmental protection, and festivities; and promote folk arts inheritance. Through a myriad of methods and channels, we proactively participate in community development and activities organized by local charities to demonstrate our local attachments.

4-1 Character

With long-time concern about character, we deeply understand the citizens and their character that modern society needs. Through the "Cement Academy" and "Education for the Remote", we develop world-class future citizens in collaboration with schools and children's family and improve and support local community development, in order for students, families and enterprises to grow together and share a "quality" social value.

Cement Academy

New partner schools in 2017	Accumulative partner schools	Benefited studentsin 2017	Accumulative students benefited	Employees involved
9	20	1,284	4,277	138

With "foundation cultivation, interest exploration, and specialty development" as the aim and adhering to the core belief "character", "conduct and academics", and "quality", we prioritize elementary students from the vulnerable groups in the neighborhood of our plants in Taiwan and mainland China and offer them after school club services, including meals, teaching materials, and transportation, four days a week in combination with after-school tutoring and talent development given by professional instructors. Apart from strengthen their English and computer skills, we develop their talents in pottery, calligraphy, dance, storytelling, and painting, in order to motivate their willingness to learn, encourage them to learn from doing, and allow them to discover individual interests and traits. With such, they can enjoy a fair and potential space for well development for future education stages.

士敏學堂

Employees also spare no efforts to support the Cement Academy. Apart from giving one class by a unit head, an MA, or an ordinary employee every week, staff take students to visit the cement plant, plan achievement presentation at Christmas, and arrange summer camps to enrich the learning experience of students in extracurricular activities. Staff give 22 classes each semester. In 2018, we will encourage employees to get involved more in student learning, and arrange cross-strait exchange for students through videoconferencing, in order to encourage exchange and understanding of students from the Cement Academy in different locations in Taiwan and China through tour performance or thematic interaction. We will also arrange employees to be one-day volunteers to lead activities or tell stories in order for employees to feel what students feel and contribute to students in real action and care and share with students more. By doing so, we give students more opportunities to demonstrate what they have learned and develop self-confidence.

Education for the remote

By donating to the "School Education Savings Account" of the Ministry of Education, we save students from vulnerable groups from disruption education and help students of all levels in Taitung County, Changhua County, and Yunlin County to continue growth and learning and thereby enhance competitiveness. In 2017, we also donated

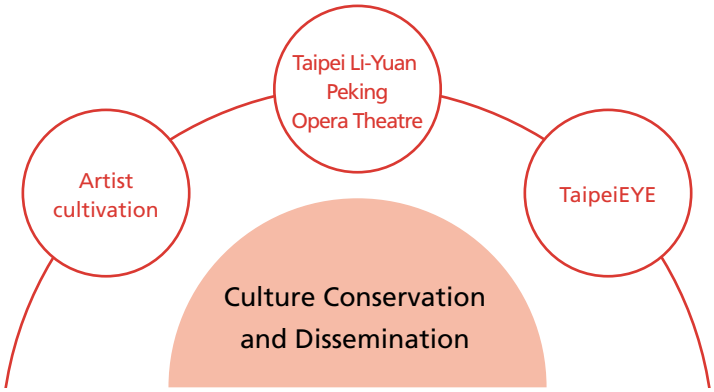
scholarships to seven primary and junior high schools in Meilun District, Hualien County, including Meilun Junior High School, the Experimental Primary School of National Dong Hwa University, Haixing Primary School, Ming Chi Primary School, Aohua Primary School, Fuxing Primary School, and Chu Chiang Primary School. We also spare no effort in sponsoring activities organized by local charities and temples and donate cement or substitution to the reconstruction of disaster affected areas or small communities.

Donations for Schools
7

Benefited Students Over
248

4-2 Arts

Insisting on promoting the operational management, medical research, arts and related activities through international (including cross-strait) exchange over time, the "Dr. C. F. Koo Foundation" focuses on culture conservation to disseminate traditional arts in terms of three vehicles: "Taipei Li-Yuan Peking Opera Theatre", "TaipeiEYE", and "artist cultivation". Such as inviting performing artist Bao-chun Li and elite Peking opera artists in Taiwan and mainland China to present neo-classics including 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 enrich the repertoire of Peking opera and fulfill the modern aesthetical views. Theatre is often invited to give performances at leading art festivals held in mainland China, such as the China Beijing Opera Art Festival, China Shanghai International Arts Festival, and Beijing Music Festival. The theatre is also active in performance tours to Europe, the USA, Japan, and mainland China to promote traditional Taiwanese culture.



Taipei Li-Yuan Peking Opera Theatre

The Taipei Li-Yuan Peking Opera Theatre formed by performing artist Bao-chun Li and like-minded professional youth at home and abroad is a conservation center of performing artists of Peking opera with a youth heart. All members graduate from professional Peking opera academies with rich stage experience. After undertaking the frontstage and backstage technical and service management of the "Metropolitan Hall" of the Taipei City Arts

Meeting Rigoletto in Peking Opera at APAP Conference NYC 2017

Engaging in the internal exchange and Peking opera inheritance in Taiwan and mainland China over time, the Taipei Li-yuan Peking Opera Theatre attended the Association of Performing Arts Professionals (APAP), International Society for the Performing Arts (ISPA), and other cultural conferences held in Hong Kong, Taipei, Shanghai, and Shenzhen and premiered the Rigoletto in Peking Opera at APAP Conference NYC 2017 for US audiences to enjoy Verdi's masterpiece presented in a different style, in order to promote international cultural exchange.

Promotion Office (formerly Taipei City Social Education Hall), the theatre demonstrates its expertise and earns a fame in the business for performance and event production, management, and consulting. In recent years, the theatre has become the technical consultant to 16 newly constructed theaters. In addition, the theater offers theater management programs in Taiwan and mainland China to cultivate new talents for theater management.

Based on the slogan "Revival", the theatre gave performances of the three neo-classics of Bao-chun Li: Confidants, Kuangyin Zhao, The Magical Lotus Lantern, and The Palace of Eternal Life: A new expression in Peking Opera and Kunqu. in 2017. The theatre also gave 14 performances in Changzhou, Shanghai, Wuhan, Shenzhen, Beijing Poly Theatre. The theatre also focuses on feminism by presenting the love and sorrow of woman poet Qing-zhao Li of the Song dynasty with She and Her Men, which blends the Peking opera singing style with the Kun opera style, to speak for women with the first divorce trial in Chinese history.

Awarded the Arts & Business Awards

Special Award, Gold Award, Silver Award

by the Ministry of Culture

Taipei City

The Best Theater Service Team

from online poll

TaipeiEYE

The TaipeiEYE attracts audiences, particularly visitors from Japan and South Korea, students, and European and US business travelers, with comprehensive folk arts, such as marionette, lion dance, acrobatics, indigenous songs and dances, and Peking opera. With wonderful programs and contents and through private-public partnership, the TaipeiEYE is developing toward the window of Asian culture. Frequency recommended and praised by the Tourism Bureau of Taiwan and the travel and tourism industries, the TaipeiEYE has become a vehicle for Taiwan to communicate with the world.

Onsite instrumental performances and acrobatics shows are fantastic, particularly the synopsis in the program leaflet and costume trial before the performances.

Cement Hall

210

performances

Japanese high schools

15

private performances

Artist cultivation

We promote Peking opera at schools of all levels to sow the seed of culture in future generations. The Peking Opera Showcase for Young Artists has recently attracted public attention. By presenting the Peking Opera Showcase for Young Artists at the "Metropolitan Hall", we give young artists to demonstrate their talent and show off their leadership. We also support young artist Chao-hsin Huang to premier The Assassin with the Taipei Li-yuan Peking Opera Theatre. The work has passed the "1st Competition of Creative Traditional Opera" and was invited by the "4th Contemporary Small Theatre & Chinese Opera Festival" to perform at the Star Theatre in Beijing. All these have demonstrated our constant engagement in artist cultivation.

"Huangmei Opera and Shaoxing Opera" Together

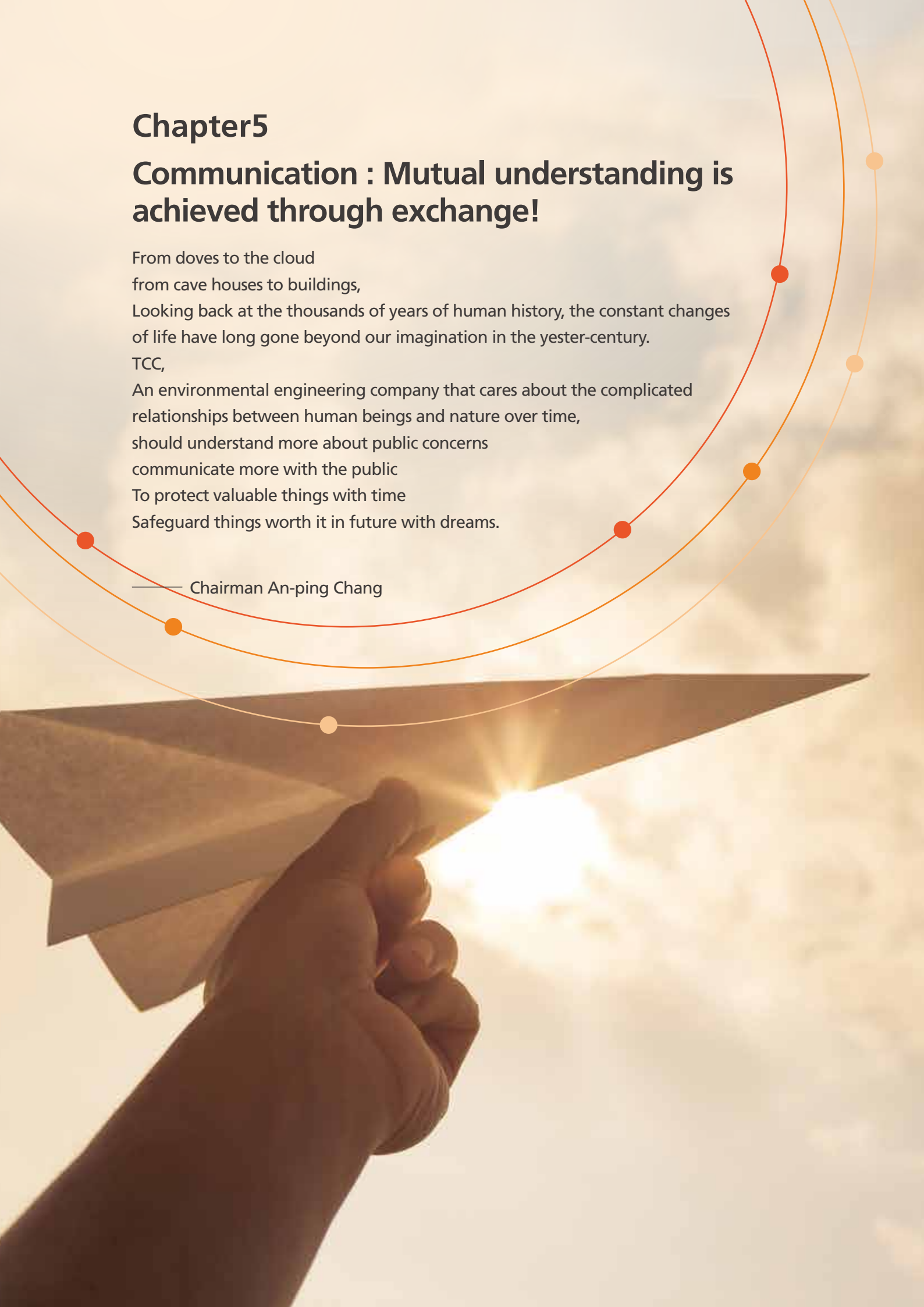
In 2017, we introduced the Zaifen Han Huangmei Opera Theatre in Anhui and Hangzhou Shaoxing Opera Theatre to Taiwan to present the desire for happiness of women from the angle of "female and female opera" by combining these two varieties of female-based opera. In fact, it was the first joint performance of "Huangmei Opera and Shaoxing Opera" in Taiwan.

Chapter5

Communication : Mutual understanding is achieved through exchange!

From doves to the cloud
from cave houses to buildings,
Looking back at the thousands of years of human history, the constant changes of life have long gone beyond our imagination in the yester-century.
TCC,
An environmental engineering company that cares about the complicated relationships between human beings and nature over time,
should understand more about public concerns
communicate more with the public
To protect valuable things with time
Safeguard things worth it in future with dreams.

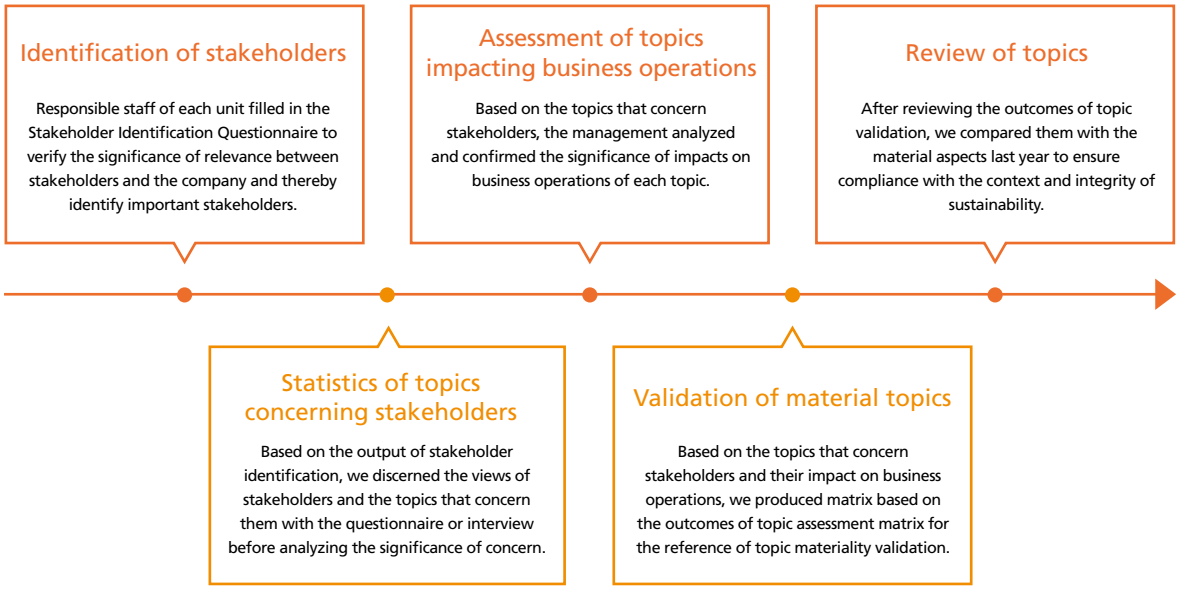
——— Chairman An-ping Chang



5-1 Engagement

At TCC, the contents of communication and engagement with stakeholders are the important reference for the assessment of material topics and implementation of related procedures. With respect to the Global Reporting Initiative (GRI) Standards and industrial attributes, we developed the questionnaire for the material topic survey, hoping to locate the material topics that concern stakeholders based on the results of stakeholder engagement and include them in the important considerations of business operations. We also address material topics with higher priorities to fulfill stakeholder expectations.

Procedures of stakeholders and material topics assessment



Stakeholder communication

To demonstrate our performance in sustainable management, we identified stakeholders based on the five principles: dependency, responsibility, influence, diverse perspectives, and tension stated in AA1000 Stakeholder Engagement Standard. In terms of the significance of relevance, these 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, we arrange comprehensive communication channels and disclose information in an open and transparent manner. In addition, we value stakeholders' expectations of the company and include the topics that concern them gathered through stakeholder communication for the reference of our operations and strategies to promote sustainable development, in order to optimize our efforts to promote sustainable development and implement corporate social responsibilities. We believe that only maintaining communication with stakeholders through smooth and effective communication channels will enable us to capture market, economic, social, and environmental trends, make continual improvement, and create value.

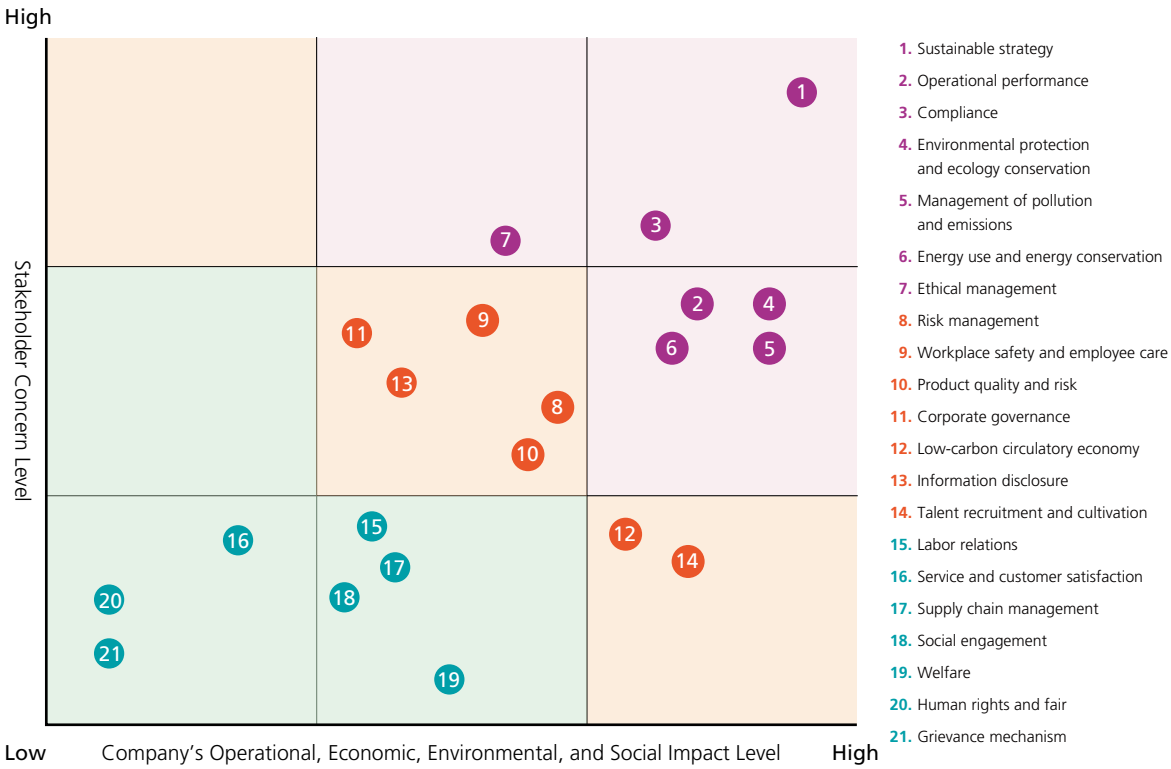
Stakeholders	Significance to TCC	Topics Concerned	Method and Frequency of Communication
Government Agencies	Concerns about TCC's compliance achievement in economic, environmental, and social aspects, and important stakeholders that affect industrial development and policy implementation.	• Transparency of information disclosure • Management of pollution and emissions • Energy use and energy conservation and emissions reduction • Low-carbon circulatory economy • Environmental protection and ecology conservation	• Regular update of information on the corporate website and the Market Observation Post System (MPOS) • Irregular interviews, seminars, and conferences • Irregular communication with documents or correspondence.
Employees	The main support of TCC's sustainable growth and the key stakeholder of TCC's sustainable development.	• Sustainable strategy • Compliance • Ethical management • Workplace safety and employee care • Risk control	• Performance evaluation and interviews with supervisors every year • Department meeting every month • Irregular training/education activities • Irregular communication by phone or email
Shredders/ investors	The main finance source of TCC and the stakeholder that concerns operational performance and sustainable development most.	• Operational performance • Sustainable strategy • Transparency of information disclosure • Ethical management • Environmental protection and ecology conservation	• Hold the annual general meeting (AGM) of shareholders every year • Regular update of information on the corporate website and the Market Observation Post System (MPOS) • Irregular replies to shareholders' questions by phone or correspondence
Customer	The stakeholder that concerns about the quality of TCC products and services, the operations, compliance and environmental protection of TCC.	• Sustainable strategy • Energy use and energy conservation and emissions reduction • Ethical management • Compliance • Management of pollution and emissions	• Perform customer satisfaction survey every year. • Irregular communication with customers by phone and external email. • The customer service team performs cocktail customer service from time to time.
Suppliers/ contractors	Business partners devoting to quality improvement products and services with TCC and the stakeholder that collaborate with environmental sustainability.	• Sustainable strategy • Ethical management • Operational performance • Product quality and product risks • Transparency of information disclosure	• Perform audit every year • Hold tender invitation meetings irregularly • Irregular communication by external email, phone, and email
Industry association	Business partners promoting industry development with us and the stakeholder with whom we maintain enquiries and exchange in the operational process.	• Sustainable strategy • Governance • Ethical management • Compliance • Workplace safety and employee care	• Irregular communication by phone or email
Local communities	The stakeholder that lives near TCC cement plants and is most affected by and concerns most about TCC's environmental protection topics.	• Product quality and product risks • Sustainable strategy • Management of pollution and emissions • Service and customer satisfaction • Social engagement	• Annual interview of local communities • Irregular communication by phone and email.
NGOs	The stakeholder that concerns about TCC environmental protection, employee care, and communication with local communities, and supervise TCC to make continual improvement	• Environmental protection and ecological conservation • Sustainable strategy • Operational performance • Talent recruitment and cultivation • Workplace safety and employee care • Social engagement	• Irregular communication by phone or email

2017 Communication Performance	Reflections and Countermeasures	Relevant Sections
• Held one investor conference. • Participation in conferences and hearings on regulatory/statutory amendments and make recommendations for competent authorities, including the "Renewable Energy Management Act, a bylaw of the Electricity Act", "Regulations for Establishment of Independent Directors and Items To Be Followed for Electricity Organizations At A Certain Scale", and the "Regulations for the Utilization, Supervisory, and Management of Electricity Development Assistance Funds" of the Bureau of Energy; the "Draft of the Environmental Impact Assessment Act and its bylaw the Required Environmental Impact Assessment Items and Scope of Determination Criteria of Development Behaviors", and the "Environmental Impact Assessment Enforcement Rules" of the Environmental ProtectionAdministration; and the "Draft of the Mining Industry Act" of the Ministry of Economic Affairs.	Keep track on the policies and laws and regulations promoted by the government, implement legal compliance and help policy implementation as a leader in the industry.	1-4 Commitment 3-1 Energy 3-2 Ecology
• Awareness publicity meetings for employees to understand more and better about related laws and regulations and company regulations • Held four labor-management meetings • Four collective bargaining agreements	Recruit suitable talents, invest in various training/education activities, and offer safe workplaces for all employees to feel happy to work at TCC.	1-3 Governance 1-4 Commitment 1-5 Risk management 2-4 Growth
• Held one AGM • Held 10 board meetings • All material topics enquired by shareholders from time to time are all replied.	Maintain steady growth in the cement industry, develop new business opportunities in the environmental aspect, and make continual performance in business operations based on the team operating mechanism featuring "optimality, simplicity, and accuracy".	1-3 Governance 1-4 Commitment 1-6 Financial performance 3-1 Energy 3-2 Ecology 3-3 Botanic conservation
• Performed one customer satisfaction survey, with satisfaction maintained at a high level.	Continuous provision of products and services with stable quality and compliance with safety standards, and implement ethical management and environmental protection to fulfill customer expectations.	1-3 Governance 1-4 Commitment 3-1 Energy 3-2 Ecology
• Audited 28 suppliers in the annual audit program. • Held 32 contractor conferences and safety conferences	Implement supplier management with a well-established management mechanism to establish a steady and long-term cooperation relationship with suppliers and for suppliers to growth with TCC.	1-2 Product 1-3 Governance 1-4 Commitment 1-6 Financial performance
• Commissioned two projects: "Circulatory Economy and Development Strategies for the Cement Industry" and "Industrial Circular Economy Implementation Project"	Continuous participation in related organizations to promote industrial growth, communicate and exchange operational performance, and help one another in operational problems.	1-3 Governance 1-4 Commitment 2-4 Growth
• Assisted local communities to completed two safety protection facilities along local roads. • Arranged visits for 40 visitors.	Optimize onsite environmental protection and maintain continuous communication and interaction with local communities for residents to understand TCC's achievements and improvements more and better.	1-2 Product 1-3 Governance 2-3 Service 3-2 Ecology
• Replies to group enquiries by phone	Make continual improvement in environmental topics, reduce damage on the natural environment, restore the natural environment, develop business opportunities for environmental protection and green energy, and assist with environmental topics handling.	1-3 Governance 1-6 Financial performance 2-4 Growth 3-2 Ecology 3-3 Botanic conservation 4-1 Character 4-2 Arts

5-2 Focus

We designed the sustainable topics questionnaire according to the international sustainability trends and the characteristics of the industry in which we are operated. Based on the outcomes of stakeholder identification, we investigated the topics that concern stakeholders with the questionnaire. After collecting 112 valid responses, five senior officers assessed the significance of impacts on sustainability, screened the topics that concern external stakeholders and their impacts on business operations, and produced the sustainable topic matrix. Then, topics with higher external concerns, and greater impacts on sustainability were prioritized for disclosure.

Based on the questionnaire results, the CSR report team confirmed seven material topics to be disclosed in the 2017 CSR Report in the meeting. These topics include sustainable strategy, operational performance, ethical management, compliance, environmental protection and ecology conservation, management of pollution and emissions, energy use, and energy conservation and emissions reduction. In addition, in consideration of the trend of sustainable development and our operational performance in recent years, we voluntarily disclosed to stakeholders part of the information of the following three topics: occupational safety and employee care, low-carbon circulatory economy, and talent recruitment and cultivation to demonstrate our efforts and achievements in sustainable management.



Cross Reference of Material Topics in GRI Standards

After referencing the identified material topics with the GRI Standards, each department confirmed the disclosure indicator, management approach, and performance to complete this report.

Topic Category	Material Topic	GRI Topic/Self-defined Topic	Significance to TCC	Impact Boundary	Relevant Sections
Governance	Sustainable strategy	General disclosure	TCC is the first listed cement company and a leading brand in the cement industry in Taiwan. Long-term development and operational perform thus play an important role to shareholders and in the investment market. Therefore, sustainable development is the topics that concern TCC, its shareholders, and its upstream and downstream suppliers.	TCC, TCC customers, and TCC supply chain.	Letter to shareholders 1-3 Governance
Economic topics	Operational performance	Economic performance	Stead growth is a TCC commitment, therefore we maintain sustainable growth with quality excellence and a sound corporate image.	TCC, TCC customers, and TCC supply chain.	1-6 Financial performance
Governance	Ethical management	Anti-corruption	Compliance with the articles of incorporation and maintenance of integrity and ethics in business operations of managers and employees are key to sustainable growth.	TCC, TCC customers, and TCC supply chain.	1-4 Commitment
Governance	Compliance	Environmental Compliance Socioeconomic Compliance	Business is operated in compliance with related laws and regulations.	TCC, TCC customers, and TCC supply chain.	1-4 Commitment
Environmental topics	Environmental protection and ecology conservation	Water Discharge	Recognizing the importance of materials used on products and in production the need to reduce depletion of natural resources, we proactively search for solutions.	TCC and its subsidiaries	3-1 Energy 3-2 Ecology
Environmental topics	Management of pollution and emissions	Effluents and waste	Waste and discharge from production are also the focus of our management and concerned by external stakeholders.	TCC and its subsidiaries	3-2 Ecology
Environmental topics	Energy use and energy conservation and emissions reduction	Energy	Through continual improvement of the cement production process and implementation of the green management system, we fuse green management with business operations.	TCC and its subsidiaries	3-1 Energy
Social topics	Workplace safety and employee care	Occupational Health and Safety (OHS)	Safety management is extremely important for cement plants to maintain employee safety Therefore, we emphasize the occupational safety of employees and contractors and implement the OHS system to enhance safety awareness and prevent occupational accidents.	TCC and its subsidiaries	2-4 Growth
Environmental topics	Low-carbon circulatory economy	Materials Circular economy	The consumption of natural resources and energy is important to us. Therefore, we proactively develop alternative fuels to reduce natural resources depletion and enhance energy efficiency.	TCC and its supply chain	3-2 Ecology
Social topics	Talent recruitment and cultivation	Training and Education	Thanks to "optimality, simplicity, and accuracy" and the combined effort of employees, TCC grows steadily. Therefore, talent recruitment, right jobs for right persons, and professional competency development are indispensable to labor-management harmony, eagerness to work, and excellent performance.	TCC and its subsidiaries	2-4 Growth

Looking out into the future from the beginning of the story

We actively develop green energy by investing in solar energy, wind power, and geothermal generation.

Grid connection of the 14MW PV system and 7MW wind power station in the Changhua Coastal Industrial Park has begun on after another.

Through transformation into the energy business, we contribute to environmental sustainability.

By enhancing our carbon capture capacity in cement production with calcium looping technology, we create new value for CO2 in capture.

This is our duty, our industry, an enchanting sustainable industry.

To us, repaying nature and people a clean sun, air, and water is worth it.

Appendix

Cross Reference with GRI Standards Reporting Indicators

No.	Disclosure Item	Corresponding Report Sections	Page
GRI 102: General Disclosures 2016			
Organization profile			
102-1	Name of the organization	Report profile	2
102-2	Activities, brands, products, and services	1-1 TCC 1-2 Product	12 16
102-3	Location of headquarters	Report profile 1-1 TCC	2 11
102-4	Location of operations	1-1 TCC	13
102-5	Ownership and legal form	1-1 TCC: Please refer to the TCC Annual Report 2017	12
102-6	Markets served	1-1 TCC 1-2 Product	13 17
102-7	Scale of the organization	1-1 TCC 1-6 Financial performance 2-4 Growth	12-13 31 45-46
102-8	Information on employees and other workers	2-4 Growth	45-46
102-9	Supply chain	1-2 Product: Please refer to the TCC Annual Report 2017	16
102-10	Significant changes to the organization and its supply chain	No significant change to the organization and supply chain was reported in 2017.	-
102-11	Precautionary Principle or approach	1-5 Risk management	29-30
102-12	External initiatives	3-3 Botanic conservation	70
102-13	Membership of associations	1-1 TCC	14-15
Strategy			
102-14	Statement from senior decision-maker	Chairman's Address	4-5
Ethics and integrity			
102-16	Values, principles, standards, and norms of behavior	1-1 TCC 1-4 Commitment	11 27
Governance			
102-18	Governance structure	1-3 Governance	20-23
Stakeholder communication			
102-40	List of stakeholder groups	5-1 Engagement	86-87

No.	Disclosure Item	Corresponding Report Sections	Page
102-41	Collective bargaining agreements	No labor union has been established at TCC, and all employees are protected under the employment contract.	-
102-42	Identifying and selecting stakeholders	5-1 Engagement	85
102-43	Approach to stakeholder engagement	5-1 Engagement	86-87
102-44	Key topics and concerns raised	5-1 Engagement	86-87
	Reporting practice		
102-45	Entities included in the consolidated financial statements	Report profile 1-1 TCC	2 11
102-46	Defining report content and topic Boundaries	5-2 Focus	88
102-47	List of material topics	5-2 Focus	88
102-48	Restatements of information	In support of the global trend, we have advanced the external inventory. Therefore, data of 2015 and 2016 have been updated as disclosed in the SOA. The 2016 wastewater discharge of the Suao Plant was updated as a result of data error in previous reports. Due to a typography of the process reclaimed water consumption as river/lake water consumption in 2015, the process reclaimed water consumption for 2015 was corrected to 756,986m3.	63 69 66
102-49	Changes in reporting	No significant change.	-
102-50	Reporting period	Report profile	2
102-51	Date of most recent report	Report profile	2
102-52	Reporting cycle	Report profile	2
102-53	Contact point for questions regarding the report	Report profile	2
102-54	Claims of reporting in accordance with the GRI Standards	Report profile	2
102-55	GRI content index	Appendix	91-94
102-56	External assurance	Report profile	2
	GRI 103: Management Approach 2016		
103-1	Explanation of the material topic and its Boundary	5-2 Focus	89
103-2	The management approach and its components (including all the following material topics)	1.Operations: Protection of what is worth it! 2.Value Creation: Changes for Innovation! 3.Symbiosis, sustainable growth through circulation!	9 35 59
103-3	Evaluation of the management approach	1.Operations: Protection of what is worth it! 2.Value Creation: Changes for Innovation! 3.Symbiosis, sustainable growth through circulation!	9 35 59

No.	Disclosure Item	Corresponding Report Sections	Page
GRI 200: Economic topics			
GRI 201: Economic Performance 2016			
201-1	Direct economic value generated and distributed	1-6 Financial performance	31
GRI 205: Anti-corruption 2016			
205-3	Confirmed incidents of corruption and actions taken	No corruption was reported in 2017.	-
GRI 300: Environment			
GRI 302: Energy 2016			
302-1	Energy consumption within the organization	3-1 Energy	63-64
302-3	Energy intensity	3-1 Energy	63-64
GRI 303: Water 2016			
303-1	Water withdrawal by source	3-2 Ecology	66
GRI 305: Emissions 2016			
305-1	Direct (Scope 1) GHG emissions	3-1 Energy	63
305-2	Energy indirect (Scope 2) GHG emissions	3-1 Energy	63
305-4	GHG emissions intensity	3-1 Energy	63
GRI 306: Effluents and Waste 2016			
306-1	Water discharge by quality and destination	3-2 Ecology	69
306-2	Waste by type and disposal method	[Special Report] Practice, Circular Economy No waste was produced due the industry characteristics.	54-57
GRI 307: Environmental Compliance 2016			
307-1	Non-compliance with environmental laws and regulations	1-4 Commitment	27
GRI 400: Social			
GRI 401: Employment 2016			
401-1	New employee hires and employee turnover	2-4 Growth	46
401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	2-4 Growth	50
401-3	Parental leave	2-4 Growth	51
GRI 403: Occupational Health and Safety 2016			

No.	Disclosure Item	Corresponding Report Sections	Page
403-2	Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	2-4 Growth	53
GRI 404: Training and Education 2016			
404-1	Average hours of training per year per employee	2-4 Growth	45
GRI 405: Diversity and Equal Opportunity 2016			
405-1	Diversity of governance bodies and employees	1-3 Governance 2-4 Growth	21-23 45
GRI 419: Socioeconomic Compliance 2016			
419-1	Non-compliance with laws and regulations in the social and economic area	1-4 Commitment	27

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.	[Special Report] Nature Cultivation, Green Mine No ecological conservation or restoration area is located in the TCC mining areas.	74-75
	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.	[Special Report] Nature Cultivation, Green Mine TCC mining sites are located in areas not intended for biodiversity management. However, TCC voluntarily monitors biodiversity around the Hoping Complex over time, and no significant impact has been detected.	74-75
Effluents and Waste	MM3	Total amounts of overburden, rock, tailings, and sludges and their associated risks.	3-2 Ecology	69
Labor/ Management Relations	MM4	Number of strikes and lock-outs exceeding one week's duration, by country.	No related incident was reported in 2017.	-
Local Communities	MM6	Number and description of significant disputes relating to land use, customary rights of local communities and Indigenous Peoples.	No related incident was reported in 2017.	-
Artisanal and Small-scale Mining	MM8	Number (and percentage) of company operating sites where artisanal and small-scale 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 2017.	-

Assurance Statement

ASSURANCE STATEMENT

SGS TAIWAN LTD.'S REPORT ON SUSTAINABILITY ACTIVITIES IN THE TAIWAN CEMENT CO., LTD.'s CORPORATE SOCIAL RESPONSIBILITY REPORT FOR 2017

NATURE AND SCOPE OF THE ASSURANCE/VERIFICATION

SGS Taiwan Ltd. (hereinafter referred to as SGS) was commissioned by Taiwan Cement Co., Ltd. (hereinafter referred to as TCC) to conduct an independent assurance of the Corporate Social Responsibility Report for 2017 (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 TCC's CSR Report of 2017 and its presentation are the responsibility of the management of TCC. SGS has not been involved in the preparation of any of the material included in TCC's CSR Report of 2017.

Our responsibility is to express an opinion on the report content within the scope of verification with the intention to inform all TCC'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); 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 TCC, 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,

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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 TCC's CSR Report of 2017 verified is accurate, reliable and provides a fair and balanced representation of TCC sustainability activities in 01/01/2017 to 12/31/2017.

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

TCC 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 and other stakeholders are implemented to underpin the organization's understanding of stakeholder concerns. For future reporting, it is encouraged to have more proactive as well as more direct involvement of stakeholders.

Materiality

TCC has established an effective process for determining issues that are material to its business. And the report addresses these issues at an appropriate level to reflect their importance and priority.

Responsiveness

The report includes coverage given to stakeholder engagement and channels for stakeholder feedback. For future reporting, it is recommended to seek feedback from stakeholders actively and describe stakeholder views of the accuracy and usefulness of previous reporting cycle.

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

The report, TCC' CSR Report of 2017, is adequately in line with 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, TCC may consider demonstrating the management approach in PDCA logic (GRI 103-2). When reporting on goals for each material topic, the expected results are suggested to be set, if applicable, with quantitative objectives. It is also proposed to explain the mechanisms for evaluating the effectiveness of the management approach specifically in the future (GRI 103-3). More descriptions about the results of the evaluation of the management approach and specific actions aimed at improving performance are encouraged.

Signed:
For and on behalf of SGS Taiwan Ltd.

David Huang, Director
Taipei, Taiwan
25 June, 2018
WWW.SGS.COM

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Licensed Assurance Provider
000-8

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The Future Is Worth It

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TCC website

2017 Corporate Sustainability Report

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CSR section