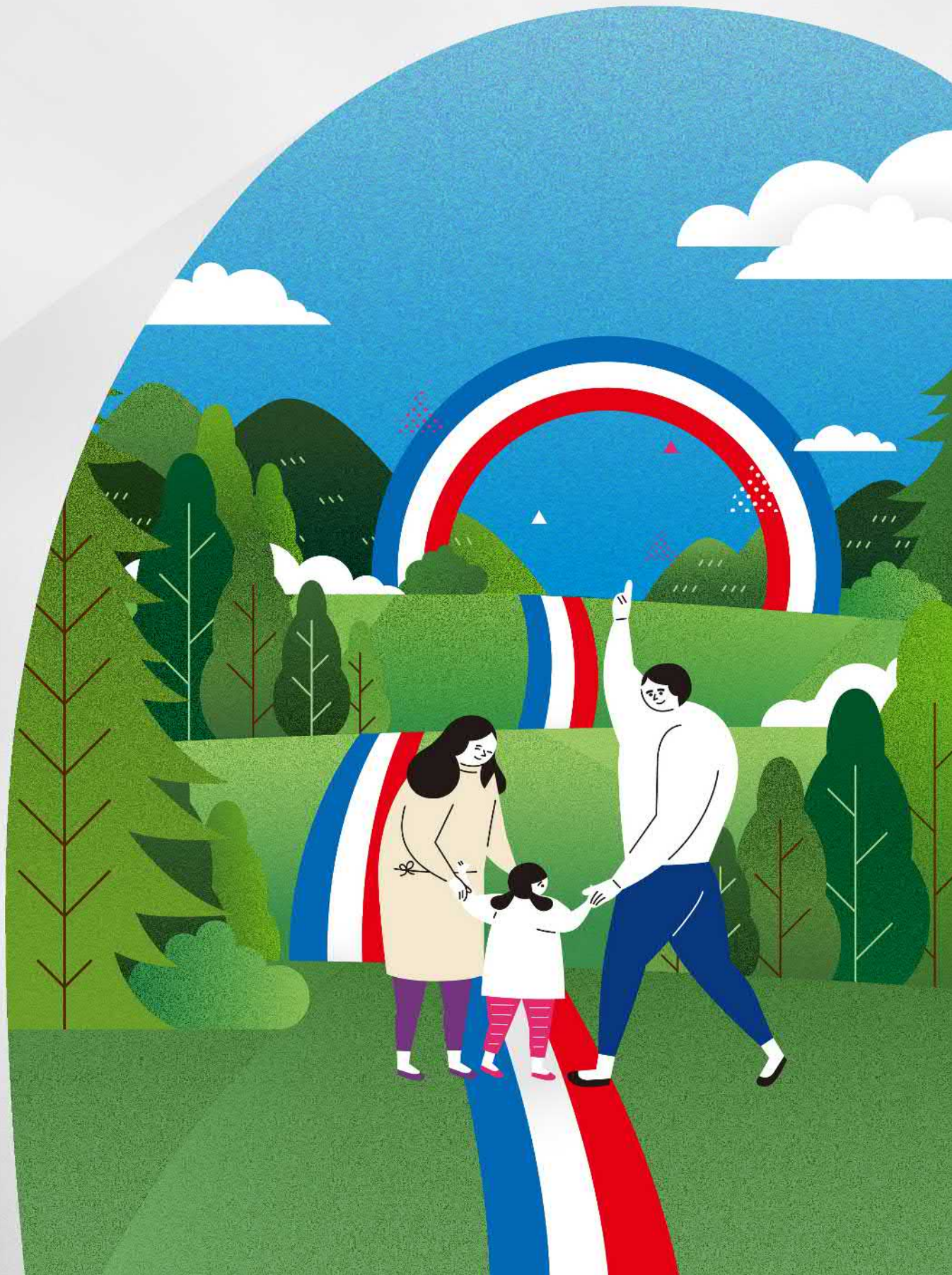




2021 Sustainability Report



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Shareholder (MOEA)

- 1 Changing World • Transformative CPC
- 2 Transparent Integrity • Sustainable CPC
- 3 Green Citizenship • Circular CPC



Business Partners

- 1 Changing World • Transformative CPC
- 2 Transparent Integrity • Sustainable CPC
- 3 Green Citizenship • Circular CPC
- 4 Preserved Heritage • Blessed CPC



Public Representatives

- 1 Changing World • Transformative CPC
- 2 Transparent Integrity • Sustainable CPC
- 3 Green Citizenship • Circular CPC
- 5 Caring Heart • Inclusive CPC



Communities

- 3 Green Citizenship • Circular CPC
- 4 Preserved Heritage • Blessed CPC
- 5 Caring Heart • Inclusive CPC



Customers

- 1 Changing World • Transformative CPC
- 2 Transparent Integrity • Sustainable CPC
- 3 Green Citizenship • Circular CPC

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Government

- 1 Changing World •
Transformative CPC
- 2 Transparent Integrity •
Sustainable CPC
- 3 Green Citizenship •
Circular CPC



Employees

- 1 Changing World •
Transformative CPC
- 3 Green Citizenship •
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- 4 Preserved Heritage •
Blessed CPC



The media

- 1 Changing World •
Transformative CPC
- 2 Transparent Integrity •
Sustainable CPC
- 3 Green Citizenship •
Circular CPC



NPOs/NGOs

- 1 Changing World •
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Message from the management

When humankind faced the threat of viruses in 2020, together we witnessed the global COVID-19 pandemic, lockdown of cities and countries, economic stagnation, decrease in energy demands, and unprecedented negative oil prices. Taiwan became a safe haven because of its prevention strategies; however, the impact of rapid climate change forces energy industry to accelerate its industry reformation and transition, which becomes CPC's challenges. In this critical time, CPC still stands with their stakeholders, aiming to reach ESG goals in all aspects.



President and
Acting Chairman

Lee, Shun-chin

Shareholder: Creating Profit to Country

Over the years, CPC has continued to expand its business areas, to provide a stable oil and gas energy source, and to contribute to the economy and policy of the nation. In 2020, the Oryx oilfield in Chad was successfully developed. The first barrel of oil demonstrated a new era of international collaboration of oil industry. Facing COVID-19 pandemic, CPC not only has continued to provide a stable supply of domestic oil, gas and petrochemical raw materials (e.g. for face mask production), but also has cooperated with the government to implement policies to stabilize market prices to alleviate societal hardships. Such act helped ensuring the steady development of domestic industries.

Customers: Customer's Perfect Choice

CPC is committed to corporate governance, striving to improve the risk management and future strategies for energy. CPC also upholds corporate integrity through responsible operations and continues to provide quality products and services, demonstrating the company vision of "Supreme Quality, Superb Service, Selfless Contribution." In 2020, CPC was recognized as "Trusted Brand Platinum" for 20 consecutive years by Reader's Digest, while winning the 1st place of "Consumer's Ideal Brand" by Management Magazine and the 17th of "National Brand Yushan Award". Regardless of market share or consumers' preference, CPC is people's first choice.

Business Partners: Coexistence Partnership & Co-glory

CPC aims to establish long-term partnership with suppliers, dealers, and franchises. Extending from CPC's own operations, products, and services with management mechanisms of training, evaluation, assessment and counseling, CPC strives to create positive influence together with 1,300 franchises on four aspects: proper governance, business identification, product and service, and operation management. The end goal is to develop a collaborative supply chain for sustainable operation.

Climate: Climate Protection Company

In accordance with national policies, CPC has formulated GHG reduction targets while continuously decreasing the emissions and energy consumption. By introducing various technological facilities and management methods, CPC is able to reduce pollution and mitigate the impacts on the environment. In 2021, when Taiwan was suffering from the worst drought in half a century, CPC sent a professional drilling team to drill groundwater wells for drought relief to help alleviate the water crisis.

Environment: Clean Power Creator

"Low-carbon, clean, and energy-efficient" has become the trend for energy industry. To expand the use of low-carbon energy, CPC promotes various major infrastructure projects to enhance the domestic natural gas transmission, storage, and supply capacity. In recent years, CPC has devoted itself to the ecological restoration of the Guantang fishing ports, and successfully created a habitat for little terns. Meanwhile, to meet global expectations of carbon neutrality by 2050, CPC has demonstrated its voluntary and proactive efforts to reduce carbon emissions. CPC introduced carbon-neutral LNG to illustrate win-win situation of environment, economy, and energy (3E).

Employees: Caring Personal Career

Employees are seen as CPC's most valuable assets. CPC continues to attract talents and creates a friendly workplace with diverse approaches. To take care of the employees' health and safety, CPC has made occupational safety a prerequisite for all operations. CPC has implemented the "Taiwan Occupational Safety and Health Management System (TOSHMS)" for years, where 34 units had been certified by TOSHMS and ISO45001 in 2020. At the same time, CPC introduces new technologies for equipment risk detection as well as provides employee and contractor safety training, strengthening the overall safety management network.

Community: Cultivating Prosperity for Community

As a state-owned enterprise and Taiwan's leader in petroleum energy industry, CPC has supported both industrial and societal development to promote economic prosperity. CPC is committed to fulfilling its corporate social responsibility, actively caring for disadvantaged groups, building its Kind Gas Stations, and protecting disadvantage group's developments. CPC continues its energy education and provides computers to student in rural area; CPC supported the development of domestic elite sports by establishing the CPC soccer team in the hope of winning glory for the country; lastly, CPC prolonged industry-academic cooperation with local universities, establishing Xiao Gang high school science class and continuously creating more successful University Corporate Social Responsibility (UCSR) examples.

Next generations: Committing a Premium Century

CPC follows the concept of sustainable development. Since its establishment that happened nearly three quarters of a century ago, CPC has contributed to the development of many industries and infrastructures. Moreover, CPC actively engages in protection of precious resources and environment to fulfill CPC's "pollution control, energy and carbon emission reduction, and sustainable environment" strategies, creating a better future for the next generation.

"2021 Sustainability Report" was published at the time of COVID-19 pandemic. Taiwan has entered the third level national alert on May 19th. However, CPC already held its first video conference about pandemic prevention in advance on May 13, and immediately launched the "The COVID-19 Epidemic Business Continuity Plan" that was established in March 2020. In one hand, ensuring operations, production departments, and countries' Critical infrastructure (CI) is vital to provide stable supply of oil and gas. On the other hand, CPC has comprehensively strengthened the environment of front-line gas stations and public toilets disinfection. CPC also promotes the use of CPC PAY to reduce the contact between cash, vouchers, and cards, with uninterrupted services. To protect the health of CPC's employees, various anti-COVID measures for office sites are implemented, such as off-site or remote home offices, flexible working hours, and work group diversion.

When facing the drastic "changes" of the world that are rapid and uncontrollable in the environment and ecology, CPC responds with corporate resilience by starting its carbon-reducing "transition" to cope with immediate and long-term risks and challenges, walking step-by-step on a path to sustainable operation.

CPC's Sustainable Vision



Our SDGs and Core Values

Strive for Research and Development and pioneer business areas



Establish environmental protection guides and disclose transparent information



Follow government regulations and comply with international agreements



Enforce clean production and environmental protection



Emphasize social responsibility and expand service scope



Use resources effectively and efficiently and demand water and energy saving



How CPC implements the SDGs

SDG	Significance to CPC	Contributions of CPC	Corresponding Chapter	Page
 SDG 1 No Poverty	CPC supports the underprivileged people at domestic and international mining sites, in hopes of utilizing CPC's global influence to eliminate poverty and underdevelopment	<ul style="list-style-type: none"> CPC supports underprivileged groups and the development in various industries by providing care activities with relief packages (e.g. rent deferment, rent reduction, and oil product subsidies), helping them cope with the COVID-19 crisis CPC formulates a specific budget for local community development and organizes charity events in developing countries' mining sites each year. CPC also provides local job opportunities, skills training, and proper education for children to help alleviate poverty 	1.1 Our CPC 5.1 Social Welfare	16 142
 SDG 2 Zero Hunger	CPC ensures the basic nutrition needs of the poor and underprivileged as well as the availability of basic nutrition to support the needs in their daily life	<ul style="list-style-type: none"> CPC donates daily necessities and nutritious foods such as dried milk to the local community in Chad 	5.1 Social Welfare	142
 SDG 3 Good Health and Well-Being	Ensuring employees' health and safety is CPC's responsibility	<ul style="list-style-type: none"> Employees are provided with complete medical examination and occupational safety protection CPC clinics have been established in Taoyuan, Miaoli, Kaohsiung and Taipei to serve employees and local communities 	4.2 Workplace Safety 4.3 Friendly Workplace	121 129
 SDG 4 Quality Education	Through edutainment for wide variety of audiences (e.g. children, teenagers, and the general public), CPC promotes energy education in daily lives and its sustainability philosophy via publicities, exhibitions, events, and environmental educations	<ul style="list-style-type: none"> CPC actively participates in MAKER PARTY, which is an energy education program that teaches elementary school student with handcrafts and learning games to enhance energy education The CPC Kaohsiung Refinery Environmental Education Park and the Taiwan Oil Field Exhibition Hall have been granted the Environmental Education Facility Certification in Taiwan The CPC Petroleum Discovery Museum adopts digital and virtual reality technologies to enhance visitors' learning intent and effectiveness To assist local residents and help children learn and grows, CPC promotes the dissemination of cultural and educational knowledge in the community, sponsors livelihood equipment, donates refurbished computers, and provides assistance to sports teams in rural areas 	5.1 Social Welfare 5.2 Environmental Education 5.3 Promotion of Sports Development	142 146 151
 SDG 5 Gender Equality	CPC sees all genders as equals. Salaries and promotions are not distinguished by gender in any way	<ul style="list-style-type: none"> Females employees accounted for 14.95% of general staff and 22.22% of senior executives Until 2020, three female vice presidents have been appointed, making CPC ahead of all state-owned enterprises in Taiwan 32% of male employees are provided with unpaid parental leave, while the reinstatement and retention rates for both genders are 100% 	4.1 Human Resources 4.3 Friendly Workplace	117 129

SDG	Significance to CPC	Contributions of CPC	Corresponding Chapter	Page
 SDG 6 Clean Water and Sanitation	CPC places great emphasis on water resource management, infrastructure improvement in developing countries, and drinking water supply. CPC implements various water conservation measures, while improving water efficiency	<ul style="list-style-type: none"> From 2018 to 2020, all three refinery plants had recycled about 98% of the water consumptions CPC donates groundwater wells at mining sites in developing countries to improve local water usage. In addition, CPC also brings in voluntary medical services to improve the health and sanitation environment locally 	3.3 Energy and Resources Management 5.1 Social Welfare	<u>92</u> <u>142</u>
 SDG 7 Affordable and Clean Energy	CPC maintains the stability of energy supply and its market price. CPC also promotes the installation of solar power systems at gas stations as well as sponsors research and development of green energy	<ul style="list-style-type: none"> CPC ensures consistent supply of oil and gas for domestic demands as well as strives to increase the supply of low-carbon energy sources (e.g. natural gas) as the support to the nation's energy transformation efforts By the end of 2020, 210 rooftop solar photovoltaic stations were installed with a total energy capacity of 10.9MW 	1.1 Our CPC 3.1 Mitigation and Adaptation of Climate Change 3.2 Green Energy Transition and Circular Economy	<u>16</u> <u>74</u> <u>81</u>
 SDG 8 Decent Work and Economic Growth	CPC offers appealing employment opportunities, provides friendly working environment, and strives to maintain strong operating performance	<ul style="list-style-type: none"> CPC has set up global operations in 4 continents and 14 countries, while improving local employment rate and economic growth at mining sites in developing countries CPC hired 849 people with disability (including interns), representing 4.93% of total employees (including contract employees and interns) In 2020, the average training hours of employees is 54. CPC obtained Talent Quality-Management System (TTQS) Silver Award certification 	1.1 Our CPC 4.1 Human Resources 4.3 Friendly Workplace	<u>16</u> <u>117</u> <u>129</u>
 SDG 9 Industry, Innovation and Infrastructure	CPC continuously promotes circular economy, energy/resource efficiency enhancement, and innovative R&D projects as the means to maintain competitiveness, sustainability, and resilience in the industry	<ul style="list-style-type: none"> Continuous enhancements on LNG transportation infrastructure, LNG storage, and pipeline capacity to improve gas supply with a robust gas supply network 65 gas stations were certified as green buildings, and 11 of which received diamond-grade certification 4 Smart & Green Demo e-Stations have been built across Taiwan, with each located in northern, central, southern, and eastern Taiwan 	3.1 Mitigation and Adaptation of Climate Change 3.2 Green Energy Transition and Circular Economy	<u>74</u> <u>81</u>
 SDG 10 Reduced Inequalities	CPC ensures that every employee is entitled to equal recruitment, treatment, and promotion opportunities	<ul style="list-style-type: none"> Offers the same entry salary as well as promotions regardless of age, gender, and race Pays attention to employees' opinions and encourages employees to provide feedback. A total of 5 collective negotiation meetings and 24 labor-relations meetings were convened in 2020 Sets up an employee appeal committee, a sexual harassment prevention committee, as well as a reward and disciplinary committee 	1.3 Materiality and Stakeholder Communication 4.1 Human Resources 4.3 Friendly Workplace	<u>26</u> <u>117</u> <u>129</u>
 SDG 11 Sustainable Cities and Communities	CPC has gas stations all over Taiwan. Being one of the most highly used public spaces, it is important that we offer safety, inclusiveness and convenience to all women, children and people with disabilities	<ul style="list-style-type: none"> CPC has gas stations established in offshore islands and rural areas, regardless of benefits or losses CPC's 454 gas station public toilets won the local evaluation with premium Grade and 101 stations with excellent grade, accounting for 90% of the total 616 self-operated gas stations 65 gas stations were certified as green buildings, and 11 of which received diamond-grade certifications 	2.3 Products and Services 3.1 Mitigation and Adaptation of Climate Change	<u>54</u> <u>74</u>

SDG	Significance to CPC	Contributions of CPC	Corresponding Chapter	Page
 SDG 12 Responsible Consumption and Production	CPC undertakes innovative R&D to provide environment-friendly and sustainable energy solutions to fulfill its duties as a responsible producer	<ul style="list-style-type: none"> All products are in compliance with CNS Information and safety data sheet (SDS) of key products and services have been disclosed on CPC's website Progress of sustainability efforts is publicly disclosed 	2.3 Products and Services	<u>54</u>
 SDG 13 Climate Action	CPC responds to the risks and opportunities of climate change, while addressing them through mitigation and adaption measures	<ul style="list-style-type: none"> CPC has set a company-wide and long-term target of reducing 30% and 56.7% of greenhouse gas emissions by 2030 and 2050, respectively, with a 2005 baseline year Complete climate change risk assessment for 24 energy supply plants All major investment projects have completed environmental impact assessments 	3.1 Mitigation and Adaptation of Climate Change	<u>74</u>
 SDG 14 Life Below Water	Part of CPC's operations take place near harbor areas. Thus, CPC invests resources into marine conservation and adopts the duty to reduce impacts to the ocean ecosystem	<ul style="list-style-type: none"> CPC continues to adopt the approach of avoiding algal reefs during the construction of the third LNG Receiving Terminal. CPC carries out undersea ecological monitoring at LNG receiving terminals to minimize the impact on the environment. Moreover, CPC collaborates with external parties to maintain the ecology of the algal reef reserve CPC provides LNG cold water drainage for local communities at Yongan Plant to enhance aquaculture efficiency CPC constantly implements ecological and environmental education, while engaging in the protection of corals (<i>Polycyathus chaishanensis</i>) in the Guantang Industrial Park, resulting an increase of 25 coral clusters in 2020 compared to 2018 	2.2 Ethical Management and Legal Compliance 3.2 Green Energy Transition and Circular Economy 3.5 Ecological Preservation and Soil Remediation	<u>48</u> <u>81</u> <u>106</u>
 SDG 15 Life on Land	CPC is dedicated to preserve biodiversity at all operating sites, and embraces its responsibility and mission to facilitate sustainability of the ecosystem	<ul style="list-style-type: none"> Pollution removal, protection and habitat restoration efforts are being carried out at various locations. For example, 19 flora sample areas surveys and 12 fauna surveys have been completed for the ecological evaluation at the Suao Oil Supply Service Center According to observations in the wild bird habitat and breeding program, the little terns' breeding success rate has increased to 92% in 2020 	3.5 Ecological Preservation and Soil Remediation	<u>106</u>
 SDG 16 Peace, Justice and Strong Institutions	CPC upholds business integrity and has management systems in place to prevent fraud and to protect consumers' best interests	<ul style="list-style-type: none"> CPC has been given a rating of AAA (twN) by Fitch Ratings for 15 consecutive years All departments have ethics units to constantly perform integrity risk assessments Board performance was given a score of 88.64 in self-assessment by directors and executives CPC undergoes MOEA's corporate governance evaluation on a yearly basis 	1.1 Our CPC 2.1 Corporate Governance 2.2 Ethical Management and Legal Compliance	<u>16</u> <u>38</u> <u>48</u>
 SDG 17 Partnerships for The Goals	CPC continues to focus on advancing operations and giving back to the Earth. Through alignment with international sustainability trends and a series of development strategies (e.g. low-carbon transformation, technology R&D, and sustainable governance), CPC develops international perspectives among global enterprises	<ul style="list-style-type: none"> CPC supports world's energy conservation and carbon emission reduction initiatives as well as responds to climate change. CPC also supports national policies through ongoing expansion and enhancement of natural gas supplies, and actively involved in the research and development of green energy solutions CPC participates in exchanges with international organizations from time to time. From 2003 to 2020, CPC has attended the Conference of the Parties (COP) to the UN Framework Convention on Climate Change 14 times to learn about the impact of climate change and ways to reduce carbon emissions 	1.1 Our CPC 2.5 Membership in External Organizations 3.1 Mitigation and Adaptation of Climate Change 3.2 Green Energy Transition and Circular Economy	<u>16</u> <u>68</u> <u>74</u> <u>81</u>

About this Report

CPC Corporation, Taiwan (hereafter abbreviated as CPC) values stakeholders' opinions as propositions to enhance its business operations. Since 2007, the sustainability report has been published voluntarily, and this report is the 13th. The reports not only disclose CPC's sustainable development goals, strategies, and accomplishments, but also actively respond to corporate social responsibility (CSR) issues that are voiced by the stakeholders.

The 2021 Sustainability Report coincides with the 75th anniversary of CPC. The report is designed with the theme of "Passing through the Dark Tunnel, Walking into a Bright Future." The design demonstrates CPC's contribution to promoting fundamental development and driving all industries forward for the past three quarters of a century. It also conveys CPC's determination to overcome difficulties and make a breakthrough. In hope of creating a rainbow of red, white, and blue for future generations and a bright path that symbolizes sustainability, CPC combines "Dynamic 75: Leap Innovation" to deliver the message of the devotion to energy transformation (the image of energy switch) and continuous innovation (the image of upward arrow).

Reporting Period and Scope

The reporting period is from January 1, 2020 to December 31, 2020 (contents include historical and 2021 data to ensure information integrity and continuity), while previous report was published in June 2020. None of the information is re-edited for this report, and there is no difference in reporting boundaries between these two years. This report provides information regarding the activities of CPC headquarters and affiliates. For the environmental aspects, the reporting boundaries mainly cover the operations of the Taoyuan Refinery, Dalin Refinery, and Linyuan Petrochemical Plant. For matters and data not disclosed in this report, kindly visit our corporate website (<https://www.cpc.com.tw/>).

Reporting Guidelines and Principles

This report is compiled according to the GRI standards of the Global Reporting Initiative (GRI) for global sustainability reports to disclose CPC domestic and international Corporate Social Responsibility (CSR) activities and new developments. In 2020, CPC further incorporated major international sustainable indices and initiatives, such as Sustainability Accounting Standards Board (SASB) index and the Task Force on Climate-related Financial Disclosures (TCFD) to disclose the CSR engagements in a more comprehensive manner.



**AA1000
Accountability
Principles**



**Sustainability
Accounting Standards
Board**



**ISO 26000
Guidance on Social
Responsibility**



**The UN
Global Compact**

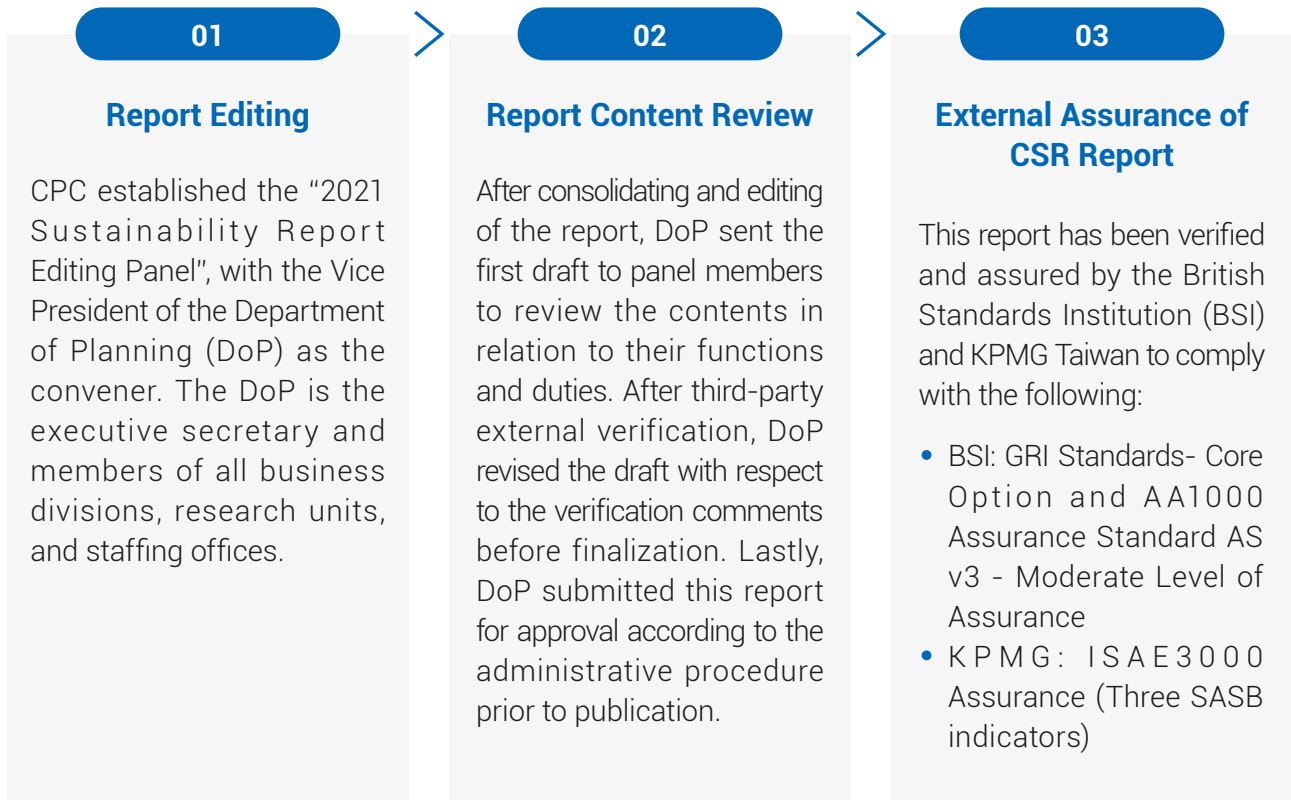


**The UN
Sustainable
Development Goals**



**Task Force on
Climate-related
Financial Disclosures**

Report Quality Control Workflow



Data Calculation

All financial data were based on CPC's CPA-certified financial statements and expressed in New Taiwan Dollars. Some statistics were quoted from open information of government agencies (e.g., EPA). ISO 14064-1, ISO14001, and ISO45001 are certified by third-party certification bodies.

Contact Information

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CPC World Wide Web



2020 Sustainable Accomplishments



-  Received "Circular Economy Leadership Award", "Investment in People Award" and the Carbon Reduction Champion Certificate at the 2020 Asia Responsible Enterprise Awards (AREA)
-  Received "Leadership Awards - Industry Champions of the Year", "Sustainability Awards - Top Workplaces in Asia" at the 2020 Asia Corporate Excellence & Sustainability Awards (ACES)
-  Received "Comprehensive Performance Award - Top 50 Corporate Sustainability Awards", "Corporate Sustainability Report - Platinum Award in the Energy Industry" and seven Excellent Case Award including "Growth through Innovation Award", "People Development Award", "Social Inclusion Award", "Gender Equality Award", "Climate Leadership Award", "Sustainable Water Management Award" and "Circular Economy Leadership Award" at the 2020 Taiwan Corporate Sustainability Awards (TCSA)
-  Awarded "Excellence in Sustainable Resilience" by the British Standards Institution (BSI)



Received a national long-term rating of "AAA (twn)" from Fitch Ratings, Inc. for 15 consecutive years



Voted as the No. 1 "Consumer's Ideal Brand" from the customer service survey conducted by the Management Magazine for 16 consecutive years



Awarded "Trusted Brand Platinum Award in the Gas Station category" for 20 consecutive years and "Trusted Brand Gold Award in the Lubricant subcategory under the Automobile and Related Products category" for two consecutive years from Readers' Digest



Received 8 main awards from the 17th National Brand Yushan Awards, including "Outstanding Enterprise National Top Award", "Best Product National Top Award", "Outstanding Enterprise", "Outstanding Corporate Leader" and "Best Product Award"



Received "Excelsior Award" at the 17th National Innovation Award



Achieved two "Gold Medal Awards" and one "Silver Medal Award" in the Invention Patent Competition hosted by the Taiwan Innotech Expo



Received the "Silver Award," the "Bronze Award," and the "Green Action Award" at the 2nd National Enterprise Environmental Protection Awards held by the Environmental Protection Administration, Executive Yuan



Received "Energy Conservation Leadership Special Award" in the Industry and Commerce Group A (Office Space) category at the Taipei City Energy Conservation Leadership Awards



Received the "Public Construction Golden Quality Award - Excellent Award" at the Public Construction Golden Quality Awards held by the Public Construction Commission



Received the "Golden Safety Award cum Excellent Occupational Safety and Health Unit - Five-Star Award" at the Golden Safety Awards held by the Ministry of Labor



Received "15th ANZCham Business Awards - Outstanding Contribution Award" from the Australia and New Zealand Chamber of Commerce in Taipei (ANZCham)



Received the "Silver Award" from the Ministry of Labor's Talent Quality-management System (TTQS)



Achieved the Gold Class in the Sponsorship category at the Sports Activist Awards held by the Sports Administration, Ministry of Education for 3 consecutive years



Became the champions of the Taiwan Football League Division 2 in 2020 and won promotion to the 2021 Taiwan Football Premier League

**Featured
Topic 1**



National Drought-Relief Team

Water resource is vital to various industries. The three main water consumption sources in Taiwan are agricultural, domestic, and industrial water use. Due to COVID-19, global demand for technological products grew substantially, leading to the significant increase of water use for Taiwan's semiconductor and circuit board manufacturing industries. At the beginning of 2021, western Taiwan suffered from the worst drought in centuries, causing severe lack of water resources in science parks located in both central and southern Taiwan.

Water conservation Begins with Daily Routine



Water Management at CPC Plants



CPC has implemented water conservation and recycling practices at all of its plants, such as the efficient use of cooling water, boiler water, water for firefighting, and water for manufacturing as well as water reuse and recycling. In particular, Linyuan Petrochemical Plant was awarded with the Outstanding Water-Saving Unit by the Water Resources Agency, Ministry of Economic Affairs for its ability to save approximately 7,400 metric tons of water per day through its wastewater recycling system. On the other hand, three of CPC's refinery plants have actively increased the recycled water ratio to fight against drought altogether. As of April 2021, each drop of water has been used and reused for 8.92 times in average.

Water Conservation at CPC Offices



CPC installed Green-Building-affiliated stormwater recycling systems at its office buildings and business divisions, including gas stations. Meanwhile, CPC actively cooperates with government's projects on building water reclamation plants, which based on evaluation, can reduce the impact of drought on all CPC's plants before the drought occurs.



Critical Times Call for Proactive Measures

In 2021, Taiwan faces its worst drought in the century. CPC undertakes the drought relief mission and serves as the national drought relief team by offering its unique expertise in petroleum exploration via sending an engineering team that had been drilling oil and gas wells in Taiwan and abroad for years. Thus, CPC becomes the emergency response team that drills for groundwater sources for Taiwan.

Stationed in Houli, Taichung City, CPC's professional drilling engineering team has been tasked to search for new water resources in central Taiwan with oil- and gas-well drilling equipment. The team's goal is to drill 1 to 3 wells with the depth of 350 meters each. The first well was drilled before the end of May, which was expected to supply 15,000 tons of water per day to Taichung City (i.e. serve as a water source for nearly 60,000 people).

According to hydrological data from the Central Geological Survey, Ministry of Economic Affairs, groundwater well locations were chosen in Liyutan Water Supply Plant. Because the drilling mission was seen as national emergency, CPC staffs had been racing against time to drill wells day and night. At first, the geological factors of gravel layers cause damage on the drilling rigs. However, team members immediately conducted relevant repairment and resumed the work because compared to the original drilling work during oil exploration, groundwater well drilling was the sudden yet glorious mission for the team. Team members even moved their base without hesitation to Taichung, while covering the passageway of the office building as the temporary command center. They worked, had their meals, and rested all at the center under extreme summer heat. The silhouettes of the drilling team members wearing yellow safety helmets and yellow uniforms resembled the yellow minions in a famous animated movie. The CPC staffs all strive to make their contributions for the country by providing abundant water sources to ameliorate the drought in Taiwan.

"Drilling work goes on day and night without stopping. In the beginning, 70 workers have worked in shifts on site. If adding logistics staffs who assist the delivery of goods and equipment, 100+ workers have assigned to this drought relief mission. We have spent 24 hours for preparatory work, which usually takes only 80 hours under normal circumstances. Therefore, this has been an extremely difficult and challenging mission."

- Chin-Li Su, leader of the drilling engineering team



 Chapter 1

Changing World · Transformative CPC



Chapter summary

In response to the changes of global economy, energy policy and the 5+2 industrial innovation plan of our government in the recent years, CPC has continued to provide production, marketing and other technical services in the purpose of national energy stability. Moreover, CPC has continuously expanded its investment in world-leading research and development, while has actively communicated with its stakeholders. Moving forward to sustainable operation, CPC created paths of sustainability for individuals, enterprises, society and the country.

Recommended audiences

- Shareholder (MOEA)
- Business Partners
- Public Representatives
- Customers
- Government
- Employees
- Media
- NPOs/NGOs

Corresponding SDGs



1.1 Our CPC

This report discloses CPC’s overall accomplishments in 2020. Based on the feedbacks collected from 9 categories of stakeholders, CPC reveals its business strategies and performances with the focus on the significant material topics. CPC follows government’s low-carbon transformation policy and adopts the business philosophy of “taken from the community, giving back to the society.” Through this report, CPC hopes to enhance communication with all stakeholders and improve the operations for better inclusiveness, equality, and sustainability of our environment and society.

1.1.1 Company Profile

As a state-owned enterprise with operations and practices throughout Taiwan, CPC imports petrochemical from upstream, while supplying petrol-products to downstream. CPC, as a vertically integrated omnibus energy supplier, plays not only the role of Taiwan’s main energy supplier but also a critical contributor to the nation’s economic growth and stability.

Company Data

Company Name	CPC Corporation, Taiwan
Date of Incorporation	June 1, 1946
Ownership	State-owned Enterprise (MOEA 100%)
Capital Value	NT\$130.1 billion
Sales (2020)	NT\$721.7 billion (audited)
Acting Chairman	Shun-chin Lee
President	Shun-chin Lee
Number of Employees (Dec 31, 2020)	16,123 Persons (including contracted employees)
Headquarters Address	No. 2, Tso-Nan Road, Nan-Tzu District, Kaohsiung City, Taiwan 811 (R.O.C)
Credit Rating	"AAA (tw)" by Fitch Ratings
Major Businesses	<ul style="list-style-type: none"> • Exploration, mining, and operation of oil, natural gas, geothermal (steam) and other related energy or minerals • Establishment and refinement manufacturing plants for oil and related hydrocarbons • Importation, storage, transportation and sales of crude oil, natural gas, steam, high temperature water, petroleum products and related services

Organization Structure

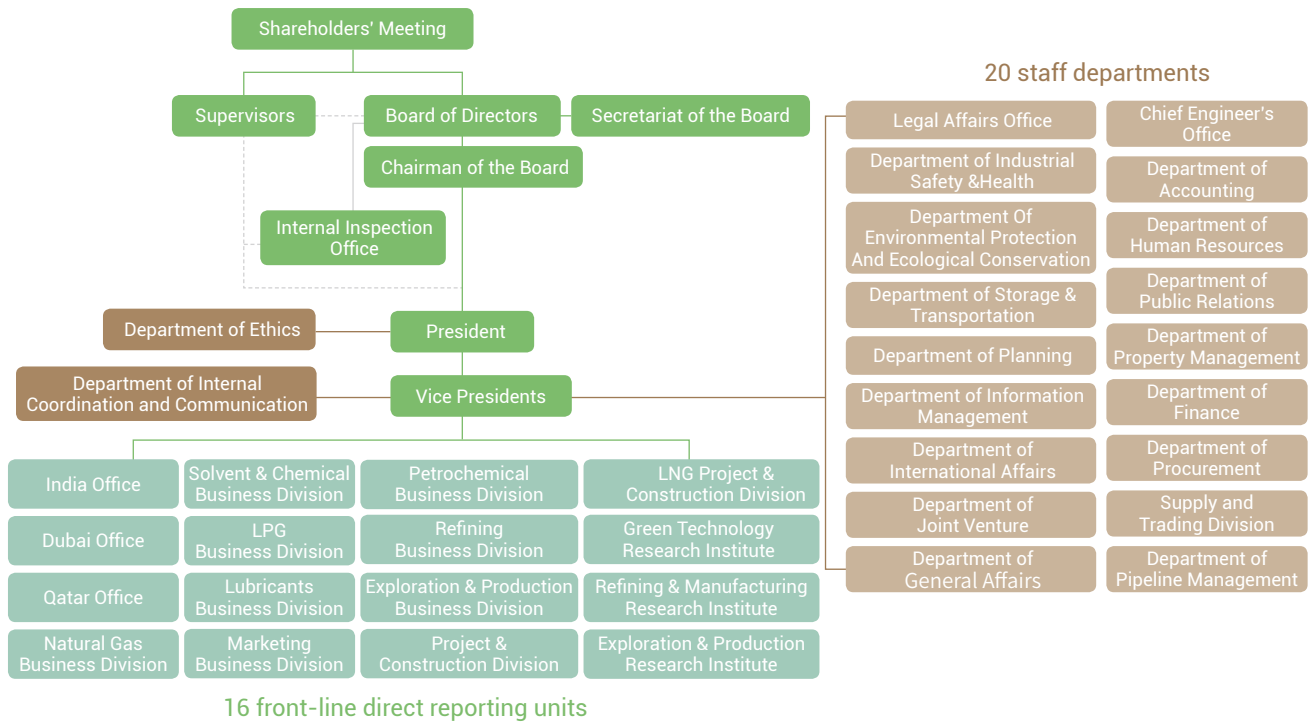
CPC has 20 staff departments and 16 front-line direct reporting units. For details regarding to the organization structure, please refer to our website: [➔](#)

20
staff
departments

16
front-line
direct reporting
units



Our CPC | Sustainable Management | Materiality and Stakeholder Communication



Operational performance

Since the day CPC was founded, it has been entrusted with the mission to stabilize oil and gas market price for the growth of the national economy. In 2020, CPC generated NT\$721.7 billion in revenues and contributed NT\$108.3 billion of taxes to the national treasury. Detailed financial information can be found in CPC's consolidated financial statements; thus, [please refer to 2020 CPC annual shareholder meeting report](#).

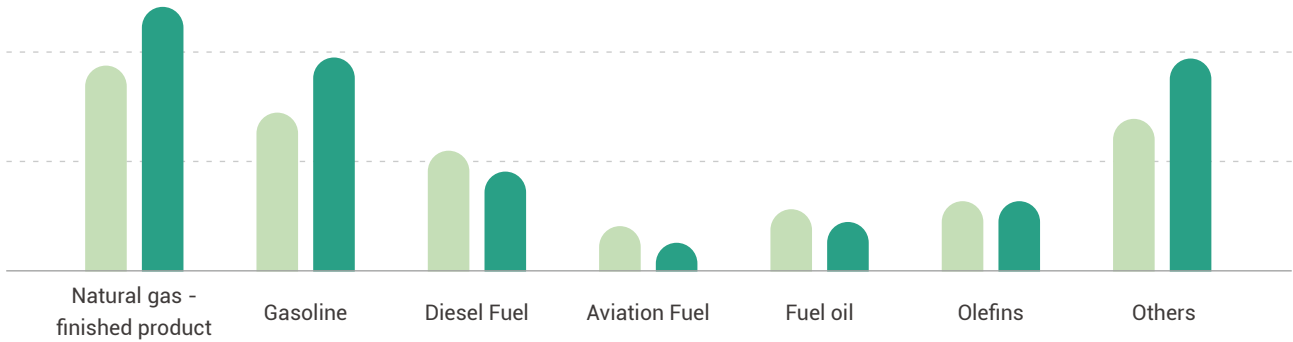
Operating Performance in 2018-2020

Unit: NT\$100 million

Items	Year			
	2018	2019	2020	
Direct Economic Value	Operating revenue (IFRS)	10,346	10,141	7,217
	Operating Costs	9,903	9,779	7,324
Economic Value-Allocated	Employee wages and benefits	226	228	216
	Payments to providers of capital	41	278	26
	Payments to government	1,320	1,501	1,083
	Community investments	3.85	4.5	6.13
Others	Earning Before Tax	438	333	-77
	Net Profit	343	324	-73
	Total Assets	7,695	8,019	7,373

Note: 2018 and 2019 figures were certified, whereas 2020 figures were audited

Revenue and proportion of main products

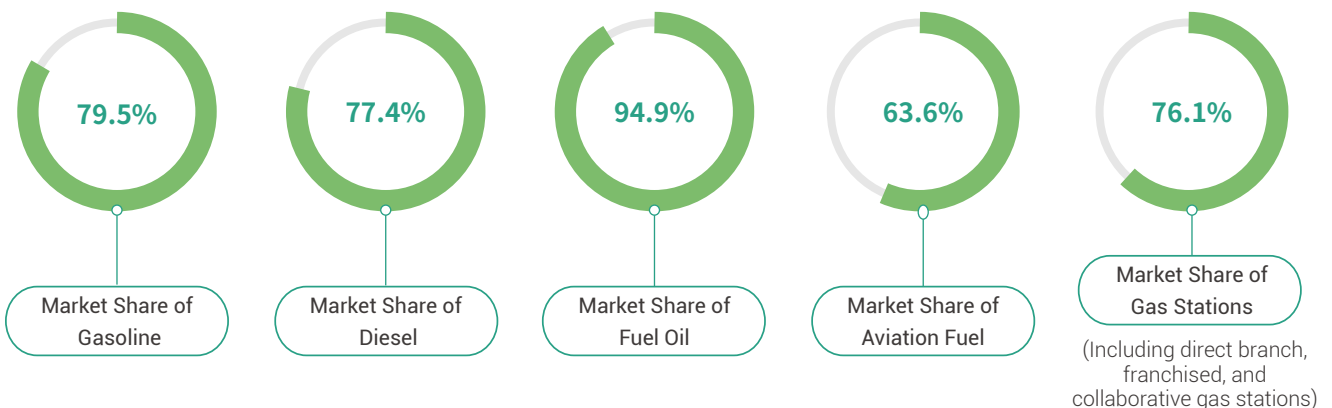
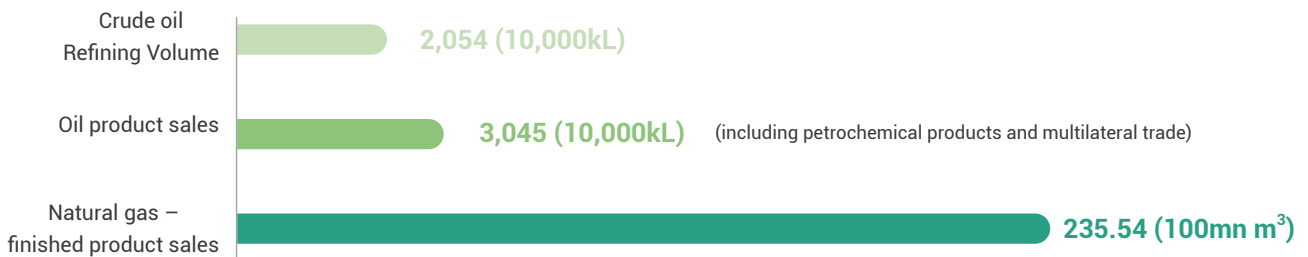


Product Category (including multilateral trade)

● Percentage of 2019 ● Percentage of 2020

25.11%	22.71%	15.25%	3.89%	5.48%	6.13%	21.43%
27.05%	23.77%	12.78%	2.65%	4.36%	6.21%	23.18%

2020 Overview of the operation



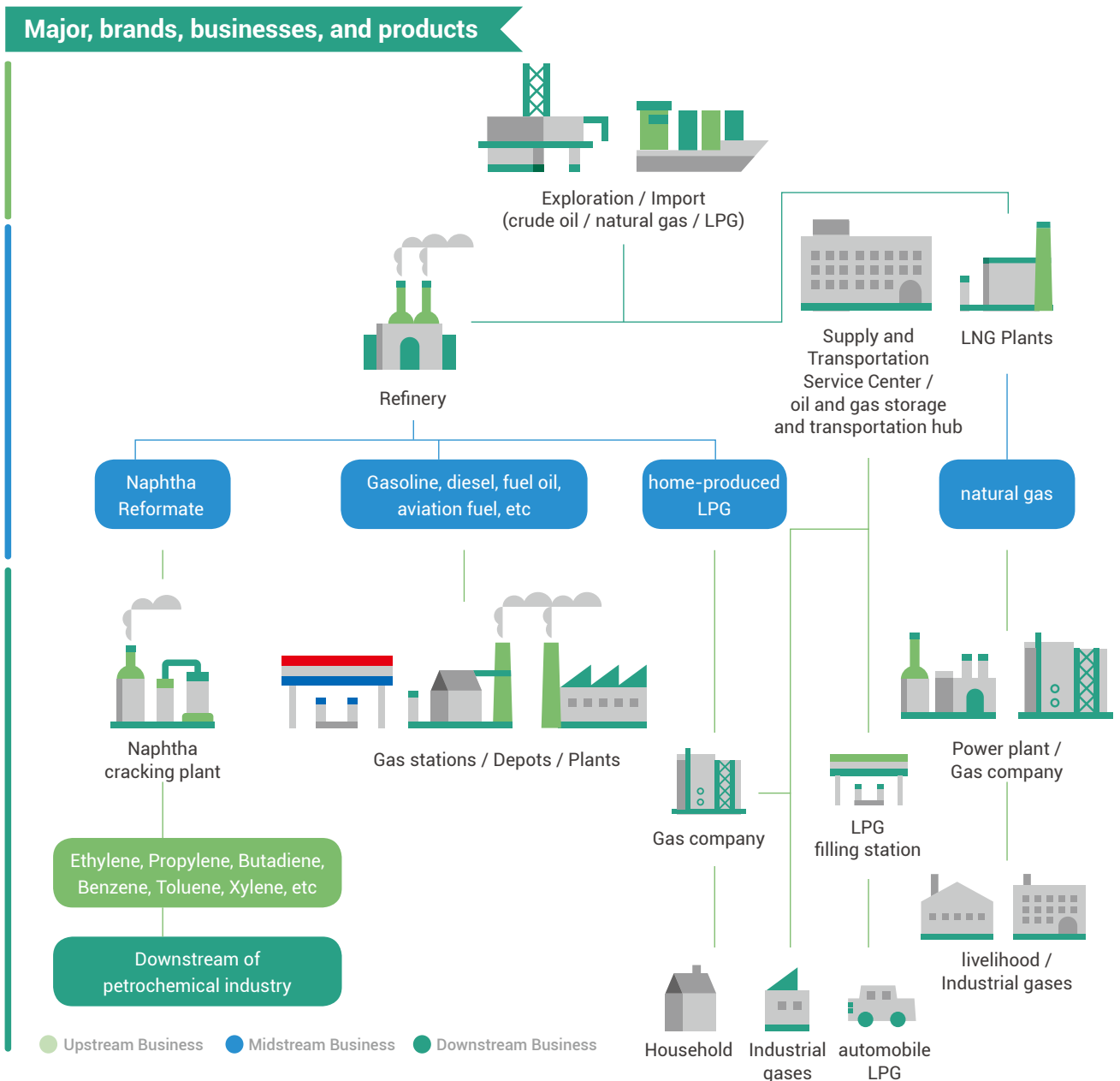
1.1.2 CPC Value Chain

The petrochemical industry has a prominent position in people's life, economic, and the job market. Its upstream and midstream industries include petrochemical raw materials, chemical fertilizers, artificial fibers, synthetic resins and plastics. Its downstream manufacturers cover the paint, cleaning products, synthetic textile, knitting, rubber products, and other industries that are closely related to people's daily life. CPC obtains crude oil from the upstream and refines naphtha, gasoline, diesel and

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other oil products such as petrochemical olefins. In the midstream, it produces plastics, chemical fibers, rubber, chemicals and other materials through polymerization, oxidation and synthesis with “petrochemical primary raw materials.” Finally, manufactured products include plastic, textile, rubber and other chemical for the downstream. Due to the booming petrochemical industry and the use of petrochemical products in daily life, the living standard of the general public has improved rapidly and significantly.

From the perspective of the value chain, different products and services all have an impact on the three ESG aspects (i.e. environment, social, and governance). Therefore, by reviewing its efforts for sustainable development, CPC not only examines its positive and negative impacts but also captures the key factors to sustainable development in value chain. Therefore, CPC maximizes the positive impact and minimizes the negative impact through establishment of sustainable value chain.



Products and Services

Main products

Product Type¹ (includes multilateral trade)

- Natural gas product
- Gasoline
- Diesel Fuel
- Aviation Fuel
- Fuel oil
- Olefins
- Others

Other diverse products and services

Products for daily life

- Biotech products
- Festive gifts
- Agricultural Products
- Vehicle fuel

Quality service

- Car Service and Tire Centers
- Carwash
- Compound stores and public toilets
- CUP & GO coffee shop
- Battery Charging points

Midstream and upstream products

- Refinery and supply of petrochemical products

Note1: CPC's main products are oil, petrochemicals and natural gas, of which the domestic supply of natural gas is an exclusive market that extends to power generation, natural gas utilities and industrial users.

Major Domestic Locations

2 refineries

(in Dalin and Taoyuan)



1 petrochemical plant

(Linyuan)

1 Supply and Transportation Service Center

1 oil and gas storage and transportation hub

13 Fuel Distribution Center

oil business offices

10

direct, franchised, and collaborative gas stations in Taiwan

1,898



2 LNG Receiving Terminal

(Taichung and Yongan)



LNG supply centers

8

1 Natural Gas Transportation Center

LNG service centers



4

Business Division

8



Research Institutes

3

Project & Construction Division

2



Human Resource Training Center

1



Global operations

2020 exports about 8.978 million kL of petrol-products to Singapore, the Philippines, Indonesia, South Korea, Australia, Malaysia, and Pakistan. CPC's global locations have been widely spread through 4 continents and 14 countries.



- ① **USA** Opicoil America, Inc., OAI
Opicoil Houston, Inc., OHI
- ② **Ecuador** Ecuador Branch, OPIC
- ③ **Niger** OPIC Niger S.A.R.L.
- ④ **Chad** OPIC Africa Corp.
- ⑤ **Dubai** Dubai Office
- ⑥ **Qatar** Qatar Office
- ⑦ **India** India Office
- ⑧ **Singapore** CPC International Trading Pte. Ltd.
- ⑨ **Indonesia** Indonesia Branch, OPIC
- ⑩ **Australia** OPIC Australia Pty. Limited

Investees

- ⑪ **Taiwan** China American Petrochemical Co.Ltd. (CAPCO)
CPC Shell Lubricants Company Ltd.
Kuokuang Power Co., Ltd. (KKPC)
Chun Pin Enterprise Co., Ltd. (CPEC)
Global Energy Maritime Co. (GEMCO)
Taiwan Stock Exchange Corporation (TWSE)
China Ship Building Co., Ltd. (CSBC)
Overseas Investment & Development Corp.
- ⑫ **Vietnam** Dai Hai Petroleum Corp. (DHP)
Maxihub Company Limited (MAXIHUB)
- ⑬ **Qatar** Qatar Fuel Additives Company Limited (QAFAC)
- ⑭ **Liberia** Faraway Maritime Shipping Co. (FMSC)
- ⑮ **Cayman Islands** NiMic Ship Holding Co., Ltd. (NSHC)
NiMic Ship Management Co., Ltd. (NSMC)
- ⑯ **Australia** Ichthys LNG Pty Ltd. (ILPL)

**Highlights: United efforts to implement energy independence
Successful Production of Oryx Concession in Chad**



In 2006,CPC signed a contract with Chad`s Petroleum Munustry to acquire the exploration rights of three blocks with a total area of nearly 30,000 km² under the name of OPIC Africa Corp.In 2010,it successfully drilled crude oil after three years of survey. In the following 10 years,it had completed seismic surveys and drilling in the exploration area in Chad, while successively discovering a large amount of crude oil with commercial value. In 2017, it was granted the development and production license for the Oryx Concession and officially entered the development and production period. The development work such as the construction of the joint external roads and the bases, the Central Processing Facility and the crude oil export pipeline was successively completed. In early 2020, the first barrel of oil was extracted from the Chad exploitation area and shipped to Taiwan in November of the same year.

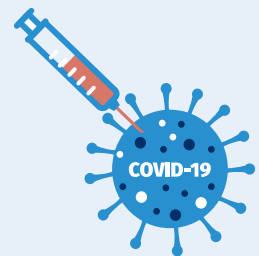
The Oryx Concession is the first time that CPC has conducted exploration overseas as an operator and entered into development and production phase. It force overcame the major hurdles and unmet challenges and obtain the first cargo of crude oil. It was not only a major milestone in the 40 years of overseas exploration by CPC but also the heritage across generations, proving that CPC has the capability to manage the whole life cycle of petroleum exploration and production project by itself as well as to realize the vision of energy independence for Taiwan.

Then general manager of OPIC Africa,Tseng Chi-chung, wrote this emotional statement in the dozen of pages-long production on-stream log he kept,"This is a historic moment. Today, CPC, serving as the oilfield's operator and handling everything on its own, from exploration to development, has successfully achieved the goals of oilfield production and crude oil export. OPIC Africa has made history for CPC and for Taiwan. I am proud of everyone."



Highlights: Assist the Society to Fight Against the COVID-19 Pandemic

In 2020, CPC is committed to implementing measures in response to the COVID-19 pandemic. In addition to internal efforts to promote caution during the outbreak, CPC also implemented a series of oil and gas price relief measures to ensure the health of the general public, and to contribute to the economy.



Pandemic Prevention Measures of CPC

CPC drew up the "The COVID-19 Epidemic Business Continuity Plan" in March 2020. During the pandemic, all operations and production units, especially the first-level national critical infrastructure (CI), were implemented in accordance with the plan to maintain normal operations and ensure stable supplies of oil and gas. In addition, the risk management team of all direct business units as well as all staffing units and offices of CPC implemented management control at different levels ([please refer to section 2.1.4 for risk management in details](#)). CPC also established the "COVID-19 Pandemic Prevention Zone" to regularly disclose information related to pandemic prevention, such as the report of pandemic prevention materials from each unit, the pandemic prevention actions of CPC, and educational materials related to understanding of the COVID-19. The following are the four main pillars of CPC's internal prevention measures:

Self-protection



- Strengthening contractor control by issuing work permits outdoor to avoid access to the control room and reinforcing pandemic prevention measures such as reporting and ship docking control.
- Planning the attendance management principles for off-site office and home office and setting up an online sign-in system for home office on the company website. In response to the severe pandemic, working from home is launched in May 2021.
- Meetings and training are conducted online to avoid group gatherings.
- The critical infrastructure plant re-designed the scheduling method, increased the spare shift manpower, and adopted non-face-to-face method for handover. The non-face-to-face shift mode reduces the chances of contact with each shift.



Materials Storage

- CPC maintained a sufficient stock of 20,000 medical masks and distributed anti-pandemic masks for colleagues to perform their duties; in addition, a sufficient stock of 300 liters of disinfectant alcohol is maintained.
- Establishing the Company's reporting area for pandemic prevention materials to facilitate mutual support in case of emergency.

Strengthening Pandemic Prevention

- Continuously carrying out various health education campaigns and tracking of abnormal and high-risk groups.
- The CPC Pandemic Prevention LINE group was established to facilitate the announcement of the latest pandemic prevention information, notification of pandemic investigation results, and contact with various units for suggestions or assistance.
- Convening pandemic prevention meetings from time to time to continuously adjust our countermeasures and pandemic prevention actions.

Health Care

- Wearing masks and taking body temperature measurements before entering workplace.
- Forwarding related pandemic prevention regulations of the government agencies, such as the pandemic prevention quarantine leave and vaccination leave are not included in the average wage calculation period, overtime work is applicable to natural disasters, relief and revitalization special regulations, etc.
- Depending on the status of the pandemic, the restaurant operation is adjusted, and colleagues are advised to take away the food.
- Strengthen the disinfection of the office area, and the elevator restricts the number of passengers and standing positions.

Highlights for external pandemic prevention

Supply raw materials for masks, "Cover" for the front line of pandemic prevention



As the leading petrochemical industry in Taiwan, CPC has been supplying domestic petrochemical raw materials steadily for years, and is the top two suppliers of "propylene", a petrochemical raw material used in the production of masks in Taiwan. In 2020, CPC supplied approximately 330,000 metric tons of propylene to Formosa Plastic Group and LCY Company. About 14,500 metric tons of propylene (PP) were used as raw material for the production of medical grade masks, ensuring a secure supply of raw material for the production of masks. In order to alleviate the dilemma that masks are difficult to get during the pandemic, 606 directly operated gas stations have applied for a "sales business pharmacy license" to sell medical-grade masks for adults and children. In 2020, a total of 3.22 million pieces of masks have been sold and have been normally.

The market share of CPC's supply of petrochemical raw materials is in 2020 **30%**

Medical grade mask raw material (polypropylene, PP)



Collaboration with the Ministry of Health and Welfare to produce a pandemic prevention video

In view of the impact of the COVID-19 pandemic on the domestic industry, in order to assist enterprises in strengthening capacity, in 2020, CPC cooperated with the Ministry of Health and Welfare to share CPC's response to the pandemic and its business continuity plans (BCP) with domestic enterprises through video stories, in the hope that all industries can stay resilient during the pandemic.





Zero Contact with CPC PAY

In order to reduce the chance of contact between physical cards and banknotes, and reduce the contact rate, CPC has continued to promote "CPC Pay" to enhance the convenience and smoothness of mobile payment with the number of registered members reaching 660,000. CPC Pay integrated member point management and mobile payment to provide multiple convenient services for smart transportation life with the average monthly transaction exceeding 300,000.



Uninterrupted gas station and public toilet services

During the pandemic, all gas stations directly operated by CPC have adopted the highest level of prevention measures (e.g. strengthened the frequency of cleaning and disinfection) and are committed to providing public safety at gas stations. When the pandemic heated up in 2021, CPC increased the frequency of disinfecting and wiping toilet door handles and faucets from every 0.5 hour to 1 hour, providing safe and clean toilets for the people to use; in addition, measures such as clean the fuel guns, self-service fueling equipment and other related equipment before going to work every day and when each shift is handed over. Each gas station staff shall conduct forehead (ear) temperature measurement before work every day, and wear masks at all time during work. Meanwhile, the "SMS real-link system" QR code is posted in pump islands, public toilets, business rooms and store entrances to help customers scan and complete the identification login. All services are ensured to be uninterrupted.



Regular disinfection with alcohol



Wear masks



Enhanced cleaning at areas and toilets



Fill in forms in compliance with identification and tracking for the pandemic

Oil and Gas Relief Program

- **LPG price adjustment**

Considering the impact of the COVID-19 on the domestic industry and the public economy, in order to reduce the burden of the general public and joint prevent pandemic, the underpricing part was temporarily absorbed by CPC. Therefore, the accumulative impact was up to NT\$3.5 billion in 2020.

- **Reduction in natural gas fee**

In order to comply with the government's policy, CPC established the "Interim Guidelines to Assist Natural Gas Industrial Users in Stable Operation in Response to the COVID-19", according to which the reduction in natural gas fee and the increase in project investment amount had an accumulative impact of NT\$ 23.59 million in 2020.

- **Taxi fuel subsidy program**

In line with the Ministry of Transportation and Communications' "Operating Guidelines on Fuel Subsidies for Taxis Affected by the COVID-19", CPC assisted in the implementation of a taxi fuel subsidy program to provide relief measures from April to September. The monthly subsidy of NT\$2,000 for refueling of registered taxis had been paid for a total of 6 months, with the total subsidy costs of approximately NT\$700 million. In addition, CPC also prepared the special application form and taxi discount card. Starting from October, a cash deposit of NT\$500 may enjoy a 5% bonus.

- **Rental Relief Measures**

In order to alleviate the burden of tenants affected by the pandemic, CPC provided general private tenants with measures in cooperation with the government's policy. In terms of the "rent reduction", the rent for 2020 was reduced by 20% (the reduced rent not less than the cost of holding the land value tax and housing tax to be borne by CPC); in terms of "rent deferral", the rent for 2020 was deferred until the end of the year. The deferral period would be free of default fees and interest. In 2020, CPC provided a total of NT\$42.99 million in rent reductions for 147 cases of tenants and 5 rent deferrals.



Assist in triple voucher packaging business

In line with the Executive Yuan's initiative to promote the Triple Vouchers, CPC immediately initiated the project planning and related matters. From June 24 to July 27, 2020, 55 to 63 staff members were deployed on a daily basis to Hsinchu Prison to support the distribution of the Triple Vouchers, and to plan for accommodation, transportation, working hours, and manpower deployment during the period. In order to complete the task within a short period of time, the packing operation was not interrupted during holidays. As a result, people could use the Triple Vouchers as scheduled for the purpose of revitalizing Taiwan's economy.

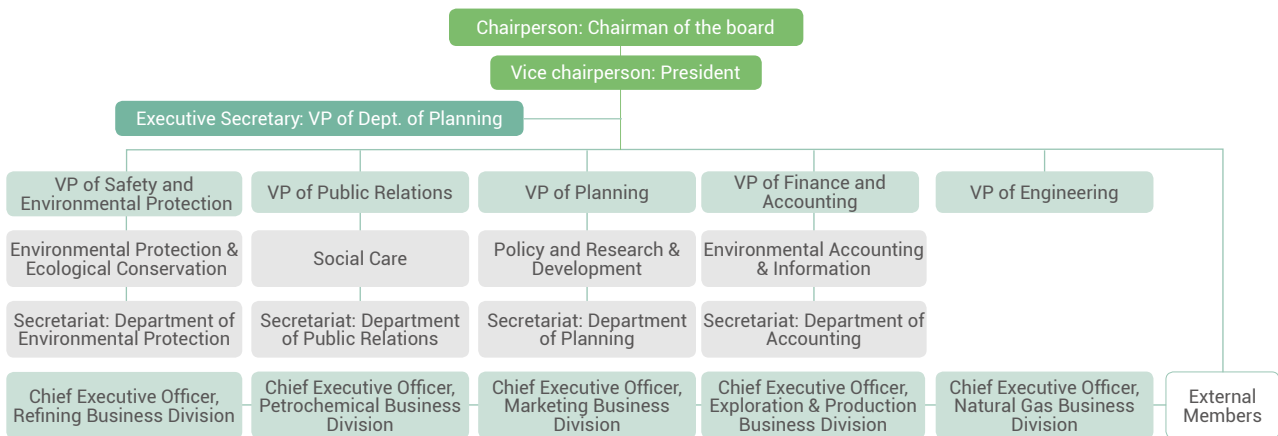


1.2 Sustainable Value Management

1.2.1 Framework of Sustainable Governance

CPC's "Sustainable Operations Promotion Committee" was assembled in 2005. The committee oversees sustainability in four major aspects: "Environmental Protection And Ecological Conservation," "Social Care," "Policy and R&D" and "Environmental Accounting and Information"; it pays constant attention to sustainability trends local and abroad, contributes expertise on both strategic and operational levels, and promotes sustainability of the organization as well as the society.

The Sustainable Operations Promotion Committee is chaired by the Chairperson, with the President as the Vice Committee Chair, the Department of Planning (DoP) VP as the Secretary, and other VPs and the CEOs of the five business divisions as Committee Members. The committee has been sourcing experts from outside the organization to serve as committee members since 2008. The Sustainable Operations Promotion Committee convened 3 meetings in 2020. The Chairman and President supervise the committee's sustainability efforts on behalf of the board to discuss various proposals and made unscheduled reports to the board of directors.








1.2.2 Sustainable Development Strategy and Goals

It has been 70 years since the establishment of CPC. In addition to its responsibility to stabilize oil and gas prices as a state-owned business, CPC also strives to adequately supply domestic oil and gas products, assist the development of petrochemical midstream and downstream industries. In addition, CPC is committed to improving environmental quality, fulfilling corporate social responsibility, and harmonizing social relations. In response to the global trend and in line with the international trend of environmental protection, CPC has formulated the following sustainability management policy since the end of 2003.

Sustainability Management Policy

	Policy Guidelines	Explanation	Corresponding to chapter
	Follow government regulations and comply with international agreement	Compliance with government regulations is the fundamental requirement for respective unit of CPC with its aim of further actively participating in the promotion of domestic and international environmental protection conventions to expand business vision and respond to the trend of corporate globalization as early as possible.	CH2

	Enforce clean production and environmental protection	> CPC makes good use of the environmental management system for pollution prevention, continuous improvement, waste reduction and source improvement. CPC also handles waste properly, conducts product life-cycle analysis, and realizes comprehensive clean production to protect the ecological environment.	CH3
	Use resources effectively and efficiently and demand water and energy saving	> Energy efficiency, water conservation, and energy saving are implemented to create company benefits with minimum costs to reduce various pollutants, wastes, and greenhouse gas emissions.	CH3
	Emphasize social responsibility and expand service scope	> To fulfill the responsibility of a good corporate citizen in the concept of environmental protection, promoting the enhancement in social humanity; to expand the scope of CPC's services, so that business partners are willing to apply CPC's services for joint benefits, thereby enhancing corporate competitiveness.	CH4 CH5
	Establish environmental protection guides and disclose transparent information	> Establish environmental efficiency indicators, continue to produce and publish performance regularly, and strive to improve the transparency of operating information to promote sustainable operations.	CH2 CH3
	Strive for Research and Development and pioneer business areas	> Facing various new energy application technologies, CPC's vision as an energy company in Taiwan will apply innovation and R&D as an opportunity for the Company to operate in new areas.	CH3

1.3 Materiality and Stakeholder Communication

As a state-owned enterprise, CPC exercises significant influence as an industry leader. Its products, services and operations are constantly under public scrutiny; therefore, it is of utmost priority to meet expectations and address the interests of all the stakeholders. In order to have a better understanding of stakeholders on the direction of CPC's sustainable management, we use a systematic identification process of materiality to analyze the issues that are of greater concern to stakeholders or have a greater impact on CPC's sustainable management in the sustainability report. The identification procedures of stakeholders and major issues that are important to CPC are as follows:

1 Identification of Stakeholders

9
Stakeholder Groups



Through reference to the stakeholder groups identified by domestic and foreign energy industry, and referring to the attributes of stakeholders as specified in AA1000SES 2015 (Stakeholder Engagement Standards): dependency, responsibility, tension, influence, and diverse perspectives, CPC identified nine stakeholder groups: shareholder (MOEA), the government, public representatives, employees, customers, partners, communities, non-profit organizations (NPOs) and non-governmental organizations (NGOs), and the media.



2 Collection of Major Issues of Sustainability

23
Issues

After identifying the stakeholders of CPC, issues concerning global, national and industry trends are taken into consideration to create a "Stakeholder Concern Questionnaire" and "Stakeholder Impact Questionnaire" with 23 questions covering environmental, social, economic and corporate governance aspects.

3 Analysis and discussion on the order of significance of sustainability issues

678
questionnaires

40
internal
management

A total of 678 questionnaires were collected through a survey in which nine categories of stakeholders were asked to fill out external stakeholder concern questionnaires. A total of 40 internal management participated in a stakeholder impact questionnaire survey to identify the impact of sustainability issues in the context of economic, environmental and social impacts. After thorough analysis and prioritization, CPC has analyzed our 2020 sustainability issues as follows. The further an issue is positioned in the top-right corner of the matrix, the higher its impact is on CPC and the higher concern it is to stakeholders.



4 Confirmation of material topics on sustainability

15
material
topics

According to the results of the analysis, the top 15 issues were chosen for CPC's 2021 report as material topics to be communicated with stakeholders in this report. For each of the topics identified, CPC has disclosed its performance highlights, management approach and actions for the year to address stakeholders' concern.

5 Communication with Stakeholders

CPC operates 8 main business divisions and hundreds of sales offices, providing multiple communication methods and channels for different stakeholder categories, listening to outside voices immediately, and responding reasonably to various queries or suggestions.

Confirmation of material topics on sustainability

According to the results of the analysis, significant issues and their impact for the year are tabulated below which can be found in the corresponding sections for further information.

Dimension	Prioritization	Material Topic	Within the organization	Outside Organization	Corresponding to chapter or subchapter	Corresponding GRI disclosure
Comprehensive	1	Emergency Events Prevention and Handling	CPC	NPOs/NGOs, the Media, Customers	2 2.1.4 Risk Management	103 Management Approach, 102-11, 413-2
Environment	2	Environmental Compliance	CPC	The Government	3 3.4.1 Environmental Compliance	103 Management Approach, 307-1
Governance	3	Leading edge R&D	CPC	Business Partners and Customers	3 3.2.1 Green Energy Transition	103 Management Approach, 203-1
Environment	4	Customer Rights and Product Safety	CPC	Business Partners, Customers, the Media, and Public Representatives	2 2.3.2 Products and Customers	103 Management Approach
Governance	5	Ethical Management and Legal Compliance	CPC	Shareholder, the Government, Public Representatives, the Media, Business Partners and Customers	2 2.2.1 Ethical Management and Legal Compliance	103 Management Approach, 102-16, 419-1
Society	6	Workplace Safety and Health	CPC	The Government, Employees, Business Partners	4 4.2 Workplace Safety	103 Management Approach, 403-1~10 (2018)
Governance	7	Information security and customer privacy	CPC	Business Partners, Customers, NPOs/NGOs	2 2.3.3 Information Security and Customer Privacy	103 Management Approach, 418-1
Environment	8	Air pollution prevention and control	CPC	The Government, Public Representatives, NPOs/NGOs, the Media	3 3.4.2 Emissions and Air Pollutants Management	103 Management Approach, 305-7
Governance	9	Corporate Governance	CPC	Shareholder, the Government, Public Representatives, Employees, Customers, Business Partners	2 2.1 Corporate Governance	103 Management Approach, 102-11, 102-16, 102-18, 102-21, 102-22, 102-30, 102-33, 413-2

Our CPC | Sustainable Management | **Materiality and Stakeholder Communication**

Society	10	Talent Recruitment and Retention	CPC	Public Representatives, Communities	4	4.1 Human Resources	103 Management Approach, 102-8, 401-1, 405-1, 405-2
Environment	11	Greenhouse Gas Management	CPC	Shareholder, the Government, Public Representatives, NPOs/NGOs, the Media	3	3.1 Mitigation and Adaptation of Climate Change	103 Management Approach, 305-7
Environment	12	Climate Change Response	CPC	Shareholder, the Government, Communities, NPOs/NGOs	3	3.1 Mitigation and Adaptation of Climate Change	103 Management Approach, 201-1, 201-2, 305-1, 305-2, 305-4, 305-5
Environment	13	Ecological and Environmental Protection	CPC	The Government, Public Representatives, Communities, NPOs/NGOs, the Media	3	3.5.1 Environmental Protection	103 Management Approach, 304-1, 304-2, 304-3, 304-4
Environment	14	Waste Management	CPC	Shareholder, the Government, Communities, NPOs/NGOs, the Media	3	3.4.4 Waste Management	103 Management Approach, 306-2
Environment	15	Energy Resource Management	CPC	Shareholder, the Government, Communities, NPOs/NGOs, the Media	3	3.3 Energy and Resources Management	103 Management Approach, 302-1, 302-3, 303-2, 303-3

The 15 identified material topics of the year cover most of the topics in last year’s Sustainability Report. Five additional topics have been added, "Environmental Compliance", "Information Security and Customer Privacy", "Air Pollution Prevention and Control", "Talent Recruitment and Retention", and "Energy Resource Management," Environmental and social issues are increasingly important.

Changes in Material Topics


Topic ranking	2019	2020
	Name of topic	Name of topic
1	Emergency Prevention and Handling	Emergency Prevention and Handling
2	Effluents and Waste Management	Environmental Compliance
3	Greenhouse Gas Management	Leading edge R&D
4	Innovation and R&D	Customer Rights and Product Safety
5	Customer Rights and Product Safety	Ethical Management and Legal Compliance
6	Ethical Management and Legal Compliance	Workplace Health and Safety
7	Climate Change Response	Information security and customer privacy



8	Workplace Safety and Health	Air pollution prevention and control
9	Social Inclusiveness	Corporate Governance
10	Ecological and Environmental Protection	Talent Recruitment and Retention
11	Indirect Economic Impacts	Greenhouse Gas Management
12	Corporate Governance	Climate Change Response
13	-	Ecological and Environmental Protection
14	-	Waste Management
15	-	Energy Resource Management



In line with the changes in society, CPC's material topics for the year are different from previous year by collecting and analyzing the opinions of wider range of stakeholders, CPC 's 2020 material topics focuses on the environment and society. Regarding the three environmental topics, "Environmental Compliance", "Air Pollution Prevention and Control" and "Energy Resource Management," CPC expects to fulfill its commitment to the environment and ecological conservation by adopting advanced manufacturing technology and raising environmental awareness. In terms of two social topics, "Talent Recruitment and Retention" and "Information Security and Customer Privacy", CPC is committed to creating a workplace-friendly environment and has taken emergency measures to resolve major information security incidents and strengthened its control mechanism in the future. CPC hopes to listen to diverse opinions and improve itself as a benchmark in the energy and petrochemical industry.



Stakeholders Communication

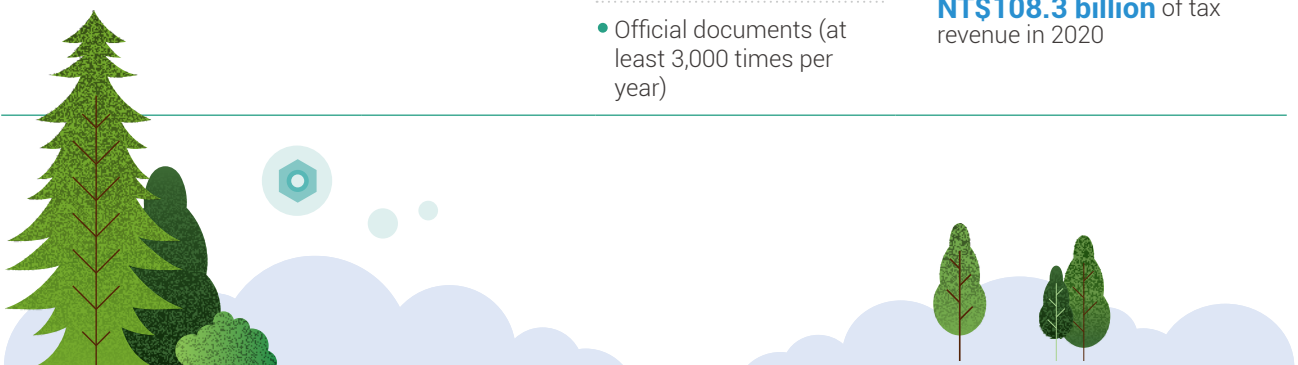
CPC operates 8 main business divisions and hundreds of sales offices. Below is a list of diverse communication methods and channels that CPC has adopted to engage different stakeholders:



Stakeholders	Significance to CPC	2020 Material Topic	2020 Communication Channel and Frequency	2020 Communication Performance and Outcomes
 <p>Shareholder (MOEA)</p>	CPC is a state-owned enterprise (SOE) which is owned by the Ministry of Economic Affairs (MOEA). Our commitment and mission are integrity and sustainable operation	Economic performance and outcomes	<ul style="list-style-type: none"> • CSR questionnaire (once per year) 	<div style="background-color: #007060; color: white; padding: 2px;">Performance</div> <ul style="list-style-type: none"> • 1 questionnaire • Board of directors' meetings: 13 • Procurement Review Team, Business Plan Review Team, Exploration Review Team and Project Meetings: 31 • Frequent visits and exchanges • Written communication <div style="background-color: #007060; color: white; padding: 2px;">Results</div> <ul style="list-style-type: none"> • Directors and supervisors participated in the "Oil Industry Innovation Strategy Forum and Music Festival", "2020 R&D Results Presentation of Three Research Institutes", Senior Executives' Meeting and Senior Executives' Keynote Speech
		Corporate Governance	<ul style="list-style-type: none"> • Shareholder meetings and extraordinary shareholder meetings (currently convened on behalf by the board of directors) (at least once per month) 	
		Emergency Prevention and Handling	<ul style="list-style-type: none"> • Public policy meetings (at least 24 times per year) • Official correspondences (at least 3,000 times per year) 	

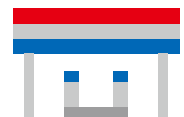
Stakeholders	Significance to CPC	2020 Material Topic	2020 Communication Channel and Frequency	2020 Communication Performance and Outcomes
 <p>Business Partners</p>	<p>CPC and business partners (including contractors, suppliers and distributors) create value and stabilize the energy supply in Taiwan to build a sustainable value chain</p>	Information security and customer privacy	<ul style="list-style-type: none"> • CSR questionnaire (once per year) • Contractors meeting (at least 10,000 times per year) • Educational training/ drills/exercises (at least 500 times per year) • Suppliers meeting (at least 17 times per year) 	<p>Performance</p> <ul style="list-style-type: none"> • 70 questionnaires • 364 disaster prevention/ rescue drills were held during the year, including 4 escalated emergency response drills • 5-day education training on dynamic oil and gas resources software operation
		Leading Edge R&D	<ul style="list-style-type: none"> • Distributor evaluation (from time to time) 	<p>Results</p> <ul style="list-style-type: none"> • Additional training on equipment dismantling and aerial work trucks for contractors, and more than 800 people had been trained and qualified • Research and analysis of engineering issues in the mining areas in Africa and feedback to field units to revise development plans
 <p>Public Representatives</p>	<p>CPC engages public representatives in active communication in order to learn the opinions of residents, so that projects and works can be carried out in conformity with the public's needs and expectations</p>	Indirect economic impacts	<ul style="list-style-type: none"> • CSR questionnaire (once per year) • Project report (36 cases) • On-site inspection (16 sessions) • Coordination meeting (158 sessions) 	<p>Performance</p> <ul style="list-style-type: none"> • 15 questionnaires • Responses to Legislative Yuan questions consisted of 76 written questions, oral questions, and related documents • Responding to legislators' concerns including a total of 538 cases consisted of correspondence, coordination, petitions and personnel cases
		Ethical Management and Legal Compliance	<ul style="list-style-type: none"> • Personal visit (at least 150 visits per year) 	<p>Results</p> <ul style="list-style-type: none"> • CPC communicates with public representatives through various meetings and invites them to project meetings to update them on the progress of various projects. This practice ensures smooth and unobstructed interaction with the stakeholder
		Waste management	<ul style="list-style-type: none"> • Official correspondences (at least 200 cases per year) 	<ul style="list-style-type: none"> • After full communication with the public representatives, CPC immediately compiled and provided public representatives with various information on issues of concern. Given the smooth communication, CPC's 2020 budget review was successfully passed
		Social Inclusiveness	<ul style="list-style-type: none"> • Communication meetings of various form (at least 500 times per year) 	<ul style="list-style-type: none"> • In the 2nd Session of the 10th congressional evaluation, CPC was recognized by the congressional evaluation survey as the winner for both group and individual category in the state-owned sector

Stakeholders	Significance to CPC	2020 Material Topic	2020 Communication Channel and Frequency	2020 Communication Performance and Outcomes
 Communities	In addition to gas stations, CPC has refineries and petrochemical plants. Therefore, to maintain good relations with local communities and their living conditions are our commitments	Air pollution	<ul style="list-style-type: none"> • CSR questionnaire (once per year) 	<div style="background-color: #008080; color: white; padding: 2px;">Performance</div> <ul style="list-style-type: none"> • 70 questionnaires • CPC fully supports the activities of indigenous peoples. In 2020, a total of 42 subsidies (donations) were made • CPC also subsidized events such as local educational/cultural activity, scholarship, emergency aid, low-income household support, elder welfare, welfare for people with disability, local festivity, local sports/entertainment, residents gathering, etc. In 2020, the Company subsidized 5,604 events for a total of NT\$447million <div style="background-color: #008080; color: white; padding: 2px;">Results</div> <ul style="list-style-type: none"> • CPC maintains good communication with local communities, participates in public welfare construction and assists neighbors in promoting various cultural education, health promotion, caring for the elderly and promoting energy-saving and carbon reduction activities to fulfill our corporate social responsibility • Neighborhood activities include donating to the neighborhood community development association's Dragon Boat and Mid-Autumn Festivals, providing emergency relief to the neighborhood and poor children, and coordinating rent reductions for land tenants
		Information Transparency	<ul style="list-style-type: none"> • Neighborhood engagement event (Aperiodic) 	
		Waste management	<ul style="list-style-type: none"> • Community meeting (Aperiodic) 	
		Emergency Prevention and Handling	<ul style="list-style-type: none"> • Charity events (more than 200 times per year) 	
 NPOs/NGOs	CPC engages NPOs/NGOs in ongoing communication to identify areas of potential improvement and ways to achieve social inclusion	Emergency Prevention and Handling	<ul style="list-style-type: none"> • CSR questionnaire (once per year) 	<div style="background-color: #008080; color: white; padding: 2px;">Performance</div> <ul style="list-style-type: none"> • 11 questionnaires • Global information website and Facebook provide the latest information of CPC <div style="background-color: #008080; color: white; padding: 2px;">Results</div> <ul style="list-style-type: none"> • Due to CPC's cooperation with the Wild Bird Society of Taoyuan and the Taoyuan City Government, the breeding success rate of little terns in Taoyuan increased significantly from 17-30% to 68% in 2019, and over 90% in 2020
		Leading Edge R&D	<ul style="list-style-type: none"> • CPC global information website and CPC Facebook (real-time communication) 	
		Information security and customer privacy	<ul style="list-style-type: none"> • Commissioned Wild Bird Society of Taoyuan to conduct the little tern ecological survey (convening meetings from time to time) 	
		Ecological and Environmental Protection	<ul style="list-style-type: none"> • Commissioned the algal reef ecological survey team of National Taiwan Ocean University (at least 9 times) 	
		Social Inclusiveness		

Stakeholders	Significance to CPC	2020 Material Topic	2020 Communication Channel and Frequency	2020 Communication Performance and Outcomes
 <p>Customers</p>	<p>Based on the management philosophy "Quality, Service, and Contribution to Society," we engage with customers and pave our way for sustainable management and generating profit</p>	Information Transparency	<ul style="list-style-type: none"> • CSR questionnaire (once per year) • Customer satisfaction survey (at least 1 time per year) • Grievances/service mailbox (from time to time) 	<p>Performance</p> <ul style="list-style-type: none"> • 74 questionnaires • Total average customer satisfaction score of 95.3 in 2020 • CEM customer experience management score of 94.0 in 2020
		Customer Rights and Product Safety	<ul style="list-style-type: none"> • Education training (from time to time) 	<p>Results</p> <ul style="list-style-type: none"> • CPC has been Awarded "Consumer's Ideal Brand" for 16 consecutive years, with a 78% "consumer share" in the hearts of consumers. • In 2020, a total of 224,405 customer service cases were received and 96% of the cases were completed immediately • Awarded "Trusted Brand Platinum Award in the Gas Station category" for 20 consecutive years
		Information security and customer privacy	<ul style="list-style-type: none"> • Customer service hotline (from time to time) • Visits/exchanges (from time to time) • Website information (from time to time) 	
 <p>Government</p>	<p>As a state-owned enterprise, CPC continues to support government policies and contribute to sustainable development in Taiwan</p>	Environmental Compliance	<ul style="list-style-type: none"> • CSR questionnaire (once per year) • Training courses of authorities (at least 12 classes per year) 	<p>Performance</p> <ul style="list-style-type: none"> • 47 questionnaires • For the labor inspection audits, 360 audits have been conducted, and CPC is actively tracking cases until complete improvement is made • At least 100 cases per year
		Air pollution	<ul style="list-style-type: none"> • Charity event (from time to time) 	<p>Results</p> <ul style="list-style-type: none"> • Proactively respond to national policies such as energy transformation, energy supply stabilization, and COVID-19 outbreak relief • The Company contributed NT\$108.3 billion of tax revenue in 2020
		Emergency Prevention and Handling	<ul style="list-style-type: none"> • Labor inspection audits (at least 300 times per year) • Email/telephone (from time to time) • Official documents (at least 3,000 times per year) 	



Stakeholders	Significance to CPC	2020 Material Topic	2020 Communication Channel and Frequency	2020 Communication Performance and Outcomes
 <p>Employees</p>	<p>CPC views employees as the most valuable assets and is constantly looking for ways to create a friendly workplace and introduce competitive human resource policies. Employees are offered comprehensive trainings and assurance of work-life balance</p>	Workplace Safety and Health	<ul style="list-style-type: none"> • CSR questionnaire (once per year) 	<p>Performance</p> <ul style="list-style-type: none"> • 375 questionnaires • Convened 1 Employee Grievance Handling Committee meeting to consider 1 case • Convened 24 Labor-management collective bargaining meetings • Convened 5 group agreement negotiation meetings • Published 12 CPC Monthly • Conducted 7 labor education seminars <p>Results</p> <ul style="list-style-type: none"> • In July 2019, CPC and the Taiwan Petroleum Worker's Union re-started the collective bargaining agreement negotiations. The two parties held 11 collective bargaining meetings; in 2020, reached an agreement in January 2021 with a total of 9 chapters and 55 articles in the draft consensus, which is expected to be concluded in 2021
		Employee Benefits	<ul style="list-style-type: none"> • Grievances (employee grievances according to their needs) • Internal meetings: workers' director of the Board of Directors (once per month) • Internal meetings: Labor-management meetings (once per month) 	
		Leading Edge R&D	<ul style="list-style-type: none"> • External meetings: group agreement negotiation meeting (once per month) 	
			<ul style="list-style-type: none"> • CPC Monthly (monthly publication) 	
			<ul style="list-style-type: none"> • Labor education seminar (once per month) 	
 <p>Media</p>	<p>CPC regards the media as an important partner for external communication, and strives to maintain relationship through information sharing, seminar etc. so that CPC's mission, philosophy and performance can be properly conveyed to the public</p>	Air pollution	<ul style="list-style-type: none"> • CSR questionnaire (once per year) 	<p>Performance</p> <ul style="list-style-type: none"> • 15 questionnaires • Through 8 press conferences, 163 press releases, and 3 on-site visits, media awareness of CPC's business was enhanced <p>Results</p> <ul style="list-style-type: none"> • Invited the media to attend the press conference of launching ceremony and the yearly award records held by CPC, which received positive coverage and demonstrated the achievements of CPC's long-term commitment to corporate social responsibility, thereby enhancing the positive image of CPC
		Emergency Prevention and Handling	<ul style="list-style-type: none"> • Instant press release 	
		Waste management	<ul style="list-style-type: none"> • Press conference (Aperiodic) 	
		Response to Climate Change		
		Workplace Safety and Health	<ul style="list-style-type: none"> • Visiting events (at least more than 500 times per year) 	



Internal and external stakeholder communication channels and methods

• Communication with Internal Stakeholders

CPC addresses employees' grievances in honest, open, immediate and direct manner with the Employee Grievance Policy. Employees may raise grievances when there are objections to rewards, punishments or employee misconduct. The following is a brief description of the grievance channels and operations. For more details on performance and highlights, [please refer to section 4.3.4 Labor Relation Communication and Bargain Agreement.](#)

Communication Channels	Operation Mechanism
Employee Grievance Committee	CPC has established the Employee Grievance Committee with seven to nine seats held by the representatives of related departments and offices, and the Chairman and representatives of the labor union.
Labor-management meetings	In accordance with the implementation rules for Labor-management meetings, at least one labor-management meeting is held every three months. The records of all Labor-management meetings are disclosed on the internal website. No labor disputes or losses occurred in 2020.
collective bargaining agreement	CPC and the Taiwan Petroleum Worker's Union have not yet entered into a collective bargaining agreement. However, both parties re-started group agreement negotiations in 2019, and the draft consensus was completed in 2021.

• Communication with External Stakeholders

Extensive and creative communication channel via Internet

CPC maintains communication with the external parties, and actively gathers and responds to queries or suggestions through corporate website, department website, service mailbox, official Facebook, CPC APP, various meetings, events, media, unions, and the 24-hour customer service hotline "1912".



Innovative communication with Internet videos

CPC Golden Flame Award

Encourage employees to take "front line videos" of themselves at the workplace from a CPC employee's perspective



CPC Corporation, Media

Set up image promotion, business introduction, CSR media and other online videos



Customer Visit

As part of its service to customers, CPC marketing staff pays regular visits to direct sales customers every month. Marketing office compiled and analyzed customer visit reports and developed feasible countermeasures and assist customers in solving their problems in order to have a better understanding of customers' actions and enhance customer satisfaction based on customers' needs. CPC paid customers a total of 3,315 visits and helped customers resolve 661 issues concerning product use in 2020.

Customer complaints and suggestions

In 2020, we received a total of 230,267 cases, including 224,405 customer enquiries, 3,786 customer suggestions, 1,040 customer comments, 158 customer complaints, and 878 other cases (including affirmation and recognition). The Customer Service Center and Customer Service Office resolved 96% of these cases, and 4% (8,991 cases) were referred to related responsible units. It took about 3-6 workdays for the responsible unit to resolve a referred case. A case is deemed overdue when it remains unsolved after six working days. In 2020, there were 47 overdue cases, with an overdue rate of 0.02%. All 158 consumer disputes (customer complaints) were resolved in time.

CPC conducts a satisfaction survey on the quality of service delivered through the customer service center in order to learn how satisfied customers are with the responses and the ways their queries are handled. The 2020 survey showed a high satisfaction rate of 99.3%, which indicates that customers felt satisfied and reassured with CPC's methods and attention.

Communication with local communities and partners

CPC engages with the public in active communication and has Neighborhood Engagement Guidelines and Neighborhood Engagement Review Committee in place to govern engagements of operational sites' local city/county governments, schools, organizations and communities. Through active communication, visits, monthly or ad-hoc review meetings to discuss local neighborhoods, CPC has worked with local groups and communities to create a sustainable culture of business and community.

Highlights of 2020

01
Regular meetings

12 review meetings and 7 ad-hoc meetings were convened in 2020

12
review meetings

7
ad-hoc meetings

02
Quarterly visits

4 on-site visits were arranged in 2020 to assist local units with their neighborhood engagement efforts

4
on-site visits

03
Annual tasks

In 2020, CPC host a 2-day neighborhood engagement task meeting at Tainan to help employees develop skills that are relevant to their tasks. Plans and uses of the neighborhood engagement budget are discussed at the end of each meeting. A total of 42 neighborhood engagement activities were executed in 2020

42
neighborhood engagement activities

 Chapter 2

Transparent Integrity · Sustainable CPC



Chapter summary

CPC has implemented a sound corporate governance structure and regulations to prevent corruption and consolidate its operating foundation. CPC expects to continuously improve its internal and external operating efficiency and operating performance through diversified operations and innovation transformation, combining the latest technological innovation and R&D, managing knowledge of various important businesses, and focusing on information security protection to become a competitive and sustainable international energy company.

Recommended audiences

- Shareholder (MOEA)
- Business Partners
- Public Representatives
- Customers
- Government
- The media
- NPOs/NGOs

Corresponding SDGs



Chapter Highlights



Corporate Governance, Ethical Management, and Legal Compliance

Short-term	Medium/long-term
<ul style="list-style-type: none"> Conduct high ethical standard and avoid corruption No major violation against social, environmental or economic laws and regulations 	Ensure the appropriateness and effectiveness of the internal control system, and establish a clean and honest enterprise

2.1 Corporate Governance

In order to fully implement sound corporate governance, CPC has established the “Corporate Governance Best Practice Principles”, CPC Code of Ethical Conduct and “Rules of Procedure for Meetings of Board of Directors”, and complied with the “Act on Recusal of Public Servants Due to Conflicts of Interest” and “Integrity and Ethics Principles for Employees of the Ministry of Economic Affairs” to uphold integrity in all corporate activities, strictly prohibit any form of corruption, bribery and exploitation of position for the benefit of others or oneself, in order to continuously enhance board and supervisor functions. We also set up a corporate governance area and a business announcement area on the CPC Global Information Website to regularly disclose financial and non-financial information such as the annual report of the shareholders’ meeting and the sustainability report to protect the rights of shareholders and stakeholders through the enhancement of information transparency.

2.1.1 Functions of the board of directors

Composition of the Board

We are a 100%-owned SOE of MOEA. The highest governance unit is the board of directors, which exercises authority on behalf of the shareholder. There are 13 directors and 3 supervisors in the board, all are assigned by MOEA, including 2 independent directors. The chairman and the president are executive directors. For details on directors’ and supervisors’ academic/career background, salary composition and education background, [please refer to the 2020 annual report of the shareholders’ meeting.](#)

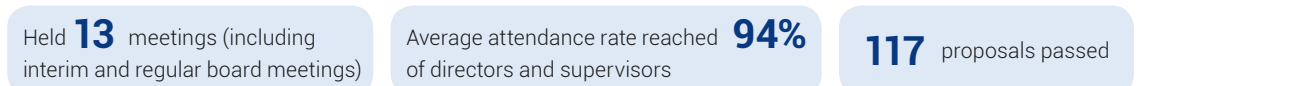
Information of CPC board in 2020

Composition of directors (including independent directors) and supervisors

	29 and under		Aged 30~50 (inclusive)		Aged 51 and above	
persons	0	0	2	2	11	1
Proportion (%)	0%	0%	12.5%	12.5%	68.7%	6.3%

Average age ¹	58.9
Average tenure for serving as directors and supervisors ¹	29.06 months

Note 1: The above data is based on the current (33rd) board of directors



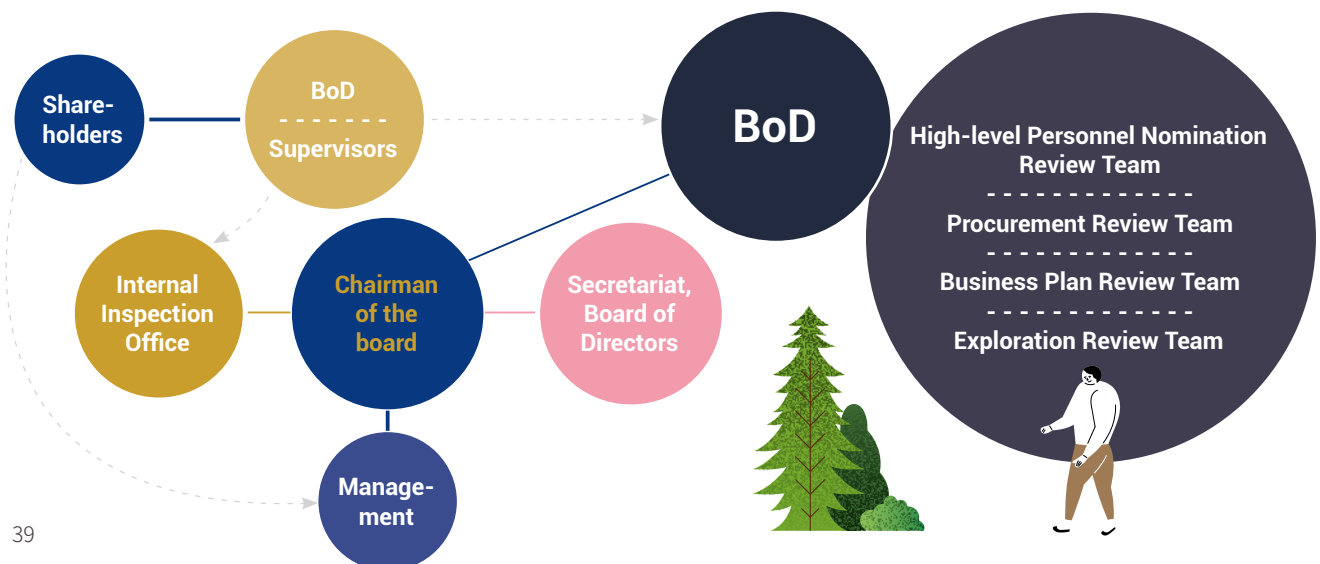
Operations of the Board

CPC holds board meetings on a monthly basis to review the major business strategies of each department, review the operating reports and implementation progress, and evaluate the business performance of the management team to maintain the Company's sustainable growth and meet the market demand. In addition, according to the "CPC's List of Matters Required for Board Reporting", corporate operating plans, development and introduction of new products are required to be reported to the board of directors for evaluation and control, and the minutes of monthly board meetings are made available on the CPC global information website.

The board of directors of CPC has established various review teams for strategic planning, exploration business, recurrent procurement and the selection and appointment of high-level personnel of CPC. The board of directors has set up review teams on "Business Plan", "Exploration", "Procurement" and "High-level Personnel Nomination" to fully discuss the resolutions before the board meetings and submit the review results to the board as the reference of making decisions to save the time of the board meetings and enhance the efficiency of the proceedings. A total of 30 resolutions were discussed in 2020.

In order to assist the board of directors in fulfilling its supervisory duties, CPC regularly arranges on-site visits by directors and supervisors to various units and investee companies to enhance their understanding of the Company's business and fulfill their supervisory responsibilities. In addition, to assist the board of directors in exercising its duties and complying with laws and regulations, a new position of corporate governance officer was created in 2021 to provide the board of directors with the necessary support.

In order to promote sustainable governance and commence in-depth corporate governance and CSR culture, CPC convened a total of three "Sustainable Operations Promotion Committee" meetings in 2020. The Chairman and President supervised the Committee on behalf of the board of directors and invited directors to participate in the meetings from time to time to urge and promote sustainable operations. The President reported to the board of directors from time to time on relevant issues. For more information on the Sustainable Operations Promotion Committee, [please refer to 1.2.1 Framework of Sustainable Governance](#). In addition, each department reports and reviews the impact of various economic, environmental and social governance issues on the Company and how to respond to such issues through regular reports to the board of directors.



Diversification of directors' education program - On-site educational courses for directors and supervisors

In consideration of the characteristics of the CPC industry and the rapidly changing internal and external business environment, we have arranged certification courses for directors and supervisors. The courses were presided by the Chairman and President. Senior executives of the Company were invited to join the courses to discuss with external professional lecturers, directors and supervisors on economic, environmental and social corporate governance issues related to operations, and to establish a mutual interactive channel for internalization in daily operations and decision-making activities. In 2020, in response to international events, four on-site educational courses were held on the topics of "COVID-19 and Information Security Risk Management" and "Corporate Governance and Corporate Social Responsibility", with a total of 143 participants consisting of directors and seniors.



Performance of the board of directors

CPC has implemented a set of "Directives for Performance Assessment of the Board of Directors" based on "Corporate Governance Best-Practice Principles for TWSE/TPEX Listed Companies" that introduces a self-assessment approach for evaluating board performance. Furthermore, individual directors are required to conduct self-assessments in line with "Notes on Appointment of Directors, Supervisors and Key Staff in State-owned Enterprises, Private Businesses and Non-profit Organizations by Ministry of Economic Affairs and Subordinates" and "Notes on Implementation of Independent Director System by Ministry of Economic Affairs and Subordinates" and set performance targets accordingly to enhance board efficiency. In addition, CPC has established the "Performance Evaluation Form for the Review Team", which is used by the board members to evaluate the implementation of meetings held by the High-level Personnel Nomination, Business plan, Procurement and Exploration review teams.

The results of the 2020 board of directors' performance evaluation, which are available on the Corporate Governance section of [CPC's global information website](#), were generally good.

Performance Evaluation of the Board in 2020

Indicator Level of participation, decision quality, board composition, directors' ongoing education, internal control, etc.

Evaluation Description Individual directors make suggestions for improvement in various aspects of the directors' operations and submit the evaluation results to the board of directors in the form of a report at the end of each year; among which, the results of individual directors' performance evaluation are submitted to the Ministry of Economic Affairs for re-evaluation after the completion of the preliminary self-evaluation.

Evaluation Results The total average score of performance evaluation is **88.64**

Performance Evaluation of the Functional Review Group in 2020

Indicator Level of participation, decision quality, composition of review teams, scope of proposals, etc.

Evaluation Description In October each year, the directors and supervisors conduct an evaluation of the implementation of meetings held by the High-level Personnel Nomination, Business plan, Procurement and Exploration review teams for the past year, the results of which are available on the Corporate Governance section of CPC's global information website.

Evaluation Results The total average score of performance evaluation is **87.26**

2.1.2 Corporate Governance Evaluation

In order to continuously improve the corporate governance system, in addition to performance evaluation of the board of directors conducted by CPC, the State-owned Enterprise Commission, Ministry of Economic Affairs also conducts corporate governance evaluation through document review and on-site visit every year. The Chairman, independent directors, workers' director, supervisors, audit supervisors and finance and accounting supervisors were interviewed individually while corporate governance and board practices were investigated in great depth. According to the results of the last year's evaluation, the specific highlights of CPC in 2020 are as follows:

The 2020 outcome of strengthening corporate governance

- ▶ **It is recommended that internal directors may attend the board meetings of the "High-level Personnel Nomination Review Team," but shall not serve as attending members or conveners. The content of the proposal of the "High-level Personnel Nomination Review Team" and the review opinions of the attending members shall be presented to the board of directors for discussion to enhance the board's decision-making power.**
- ▶ In accordance with the provisions of the Company Act and the Administrative Law of State-Owned Enterprise, CPC elects a certain percentage of labor directors who share the same duty to attend the relevant board meetings with executive directors and other internal directors. In 2020, CPC completed the amendment to the "Operational Guidelines for High-level Personnel Nomination Review Team of the Board of Directors of CPC" to specify that if more than half of the directors are present or provide written opinions (including delegated opinions), the opinions shall be considered; if less than half of the directors are present, the opinions shall be submitted to the board of directors for discussion to reduce the concern that the meetings of the high-level personnel review team are only for the opinions of a few people.
- ▶ **It is recommended that all directors participating in functional committees shall be able to evaluate the performance of functional committees.**
- ▶ In 2020, all directors and supervisors of CPC were invited to participate in the performance evaluation functional committees.
- ▶ **It is recommended to regularly review whether the Company's audits cover all units in the Company's organizational system.**
- ▶ CPC prepares an annual audit plan based on risk assessment results every year. The audit plan for 2020 was approved by the board of directors, and the 2020 on-site audits had covered all units in the organizational system.
- ▶ **In accordance with Article 20 of the Taiwan Stock Exchange Corporation Operation Directions for Compliance with the Establishment of Board of Directors by TWSE Listed Companies and the Board's Exercise of Powers, it is recommended that CPC should actively review the current status of the division of corporate governance projects under the supervision of the supervisor of each unit, and consider the benefits to the Company in promoting corporate governance in the long run.**
- ▶ CPC has designated the Secretariat, Board of Directors as the Board of Directors' meeting unit and has set up a director in charge of corporate governance affairs. In 2021, CPC notified all units (offices) that the Secretariat, Board of Directors had added the corporate governance matters listed in Article 21 of the "Taiwan Stock Exchange Corporation Operation Directions for Compliance with the Establishment of Board of Directors by TWSE Listed Companies and the Board's Exercise of Powers", which meets the requirements for setting up a corporate governance supervisor in the August 2020 "Corporate Governance 3.0-Sustainable Development Blueprint". In addition, the Director of the Secretariat, Board of Directors who served as the corporate governance officer attended courses for a total of 18 hours in 2020.

The 2020 corporate governance evaluation score is 91.9 points, and the CPC's advantages are as follows:

Establishment of Internal Governance Capacity



Directors and supervisors with diverse academic backgrounds and well-developed educational programs

Directors and supervisors have rich and diversified academic backgrounds, and all of them meet the requirements of the relevant study hours. The diversity of courses and topics enables directors and supervisors to choose topics that are relevant to their needs or interests, enhancing the effectiveness of their learning and allowing them to apply their learning to corporate governance.

Corporate Governance | Ethical Management and Legal Compliance | Products & Services | Supply Chain Management | Membership in External Organizations

Improvement in Function Planning of Talent development

CPC has a complete talent cultivation function plan and has planned corresponding reserve supervisor courses for positions at different levels. CPC also passed on professional knowledge and experience through apprenticeship, online courses, CPC University, digital school, knowledge management system, etc., showing CPC's focus on talent cultivation.

External Communication and Performance



Commendable information transparency performance

By upgrading the RSS news feed format, CPC integrates the global information website and the oil price system with the historical oil price data, and visualizes the graphical presentation to enable the general public to view such information effectively.

Recognition from various parties for sustainable operation outcomes

In 2020, the Company won good grades in external evaluations, such as the "Leadership Award - Industry Champion of the Year" and the "Sustainability Award - Best Workplace in Asia" of the "2020 Asia Corporate Excellence & Sustainability Awards", as well as the "Circular Economy Business Leadership Award" and the "Talent Investment Award" of the "2020 CSR Awards"; domestically, it won the 9 awards in the "2020 TCSA Taiwan Corporate Sustainability Award" and 8 awards in the "National Brand Yushan Award", setting a winning record for a state-owned enterprise for two consecutive years.

In order to continue improving the corporate governance system, CPC also proposes a follow-up plan to strengthen governance in response to the review opinions of corporate governance evaluation in 2020 and continue to optimize the system to achieve the vision of sustainable CPC.

2021 Improvement Plan for Corporate Governance

Strive to achieve the goal regarding not having more than one-third of the Company's board seats filled by female directors

The Company has written to its shareholder (MOE) to take into account the policy objective of having no less than 1/3 of either gender when approving the appointment of directors and supervisors.

Appropriately increase the manpower for the Internal Inspection Office, and plan the manpower arrangement and training for the Internal Inspection Office as early as possible

In 2020, the retired staff of the Internal Inspection Office had been added to the annual audition process and will continue to conduct professional core training according to the business needs, so as to plan the manpower arrangement and training of the Internal Inspection Office as early as possible to take over the inspection work smoothly.

There is an M-shape fault as the Company streamlined its personnel in the past. We will continue to implement talent training to achieve the goal of talent integration

The Company has established the "Short, Medium and Long Term Manpower Training Plan of CPC" to strengthen the training mechanism for recruits, conduct core capability training, develop advanced senior talent, cultivate employees with relevant professional core competencies each year in response to the demand for talent for future development, and to continuously set up employee training budgets and formulate employee training plans.

Adopt a dispute resolution mechanism suitable for each case of lawsuits to enable employees can concentrate on their own business and improve business performance

In 2021, the Company wrote to each unit to request that, in the event of litigation cases, it should, on the premise of the relevant regulations, such as the notice regarding the legal practices of CPC, the directions of the appointment of attorneys and the detailed list of hierarchical responsibilities, make reference to the recommendations of the court, the engineering meetings or the conciliation committee, and discuss with the legal or appointed attorney to adopt a dispute resolution mechanism suitable for each case, in the hope of effectively resolving the relevant disputes.

Establish a corruption prevention mechanism, review the functions of the corruption prevention platform on a rolling basis to make further corrections and reviews

The Company has established an annual employee integrity law promotion plan, which has been conducted in a diversified advocacy approach. If there is a potential risk of violation within the unit, and if there is a risk of irregularity or lawlessness, the Ethics department of each unit shall submit relevant cases to the head of the unit to propose timely adjustment of duties or relevant early warning actions. In addition, for cases in the unit that have been prosecuted or adjudicated, we will activate the re-corruption prevention mechanism promptly, study and propose relevant reform proposals, and assist business departments in formulating re-corruption prevention measures to continuously enhance improvements.

Supervise the rights of contractors to recruit workers, strengthen the control density and reduce labor disputes

Starting from 2021, the frequency of random visits to laborers was changed from "semi-annually" to "quarterly" to detect problems at an early stage and care about the working conditions of laborers during the visits to ensure their rights and interests at work; and new regulations on the management of contractors were added to strengthen the supervision and management of labor contractors.

2.1.3 Board and Stakeholder Bargaining

In accordance with the "Corporate Governance Best Practice Principles" and "Rules of Procedure for Meetings of Board of Directors", it is stipulated that directors who have an interest in the matters of the meeting with themselves or the legal entity they represent should explain the important contents of their interest at the current board meeting and should not join the discussion and vote if it is detrimental to the interests of the Company. They should recuse themselves from the discussion and vote and should not exercise their voting rights on behalf of other directors.

In addition, if board resolutions involve a related party transaction and are related to a board member, a note must be included in the proposal to remind the board of directors to avoid conflict of interest. There were a total of 7 cases of recusal of directors' interests for the 2020 board of directors, which can be found in the [2020 annual report of the shareholders' meeting](#).

Material bargaining events approved by the board of directors in 2020

01 Pass the resolution to support 10 new projects in the Linyuan District proposed by the Kaohsiung City Government with the remaining funds after the actual implementation of the "3rd LNG Receiving Terminal Renewals Project Subsidy (Donation) for Road Projects in the Linyuan District" under the total budget unchanged.

02 Approve the loan to the Kaohsiung City Government for 5 years and 3 years, respectively, for Case A, "Part of the land within the oil house section and the oil plant section in Nanzih District, Kaohsiung City" and Case B, "Part of the land within the oil plant section in Nanzih District, Kaohsiung City" managed by the Refining Business Division.

2.1.4 Risk Management

Short-term

Based on the risk management policy, each unit carries out its duties and functions with respect to its objectives and plans; implements routine operations; manages, prevents, and monitors risks and makes continual improvement; and establishes an effective emergency response and reporting system

Medium/long-term

- Arrange appropriate training and education on risk management or organizational learning for employees of all levels for them to understand their responsibilities, develop the ability to carry out risk management tasks, enforce the risk management mechanism, and reduce the operational risk of the Company
- Equip employees with risk awareness and risk management ability; blend risk management into routine operations and decision operations; and improve corporate crisis handling capacity to achieve our medium-and long-term plans and sustainable management goals and protect the rights and interests of stakeholders

Risk Management Mechanism

Apart from establishing the "Principles for Risk Management and Crisis Handling Practices," a risk management system, and an internal audit system, we activate the Crisis Response Team at crisis outbreaks to maintain the effective operation of internal control to ensure steady business operations. We established four risk management policies as the guiding principles of organizational risk management:

01

Reduce business risks for corporate sustainability

02

Adopt total risk management and enforce operating procedures

03

Improve risk management capacity and shape a risk management culture

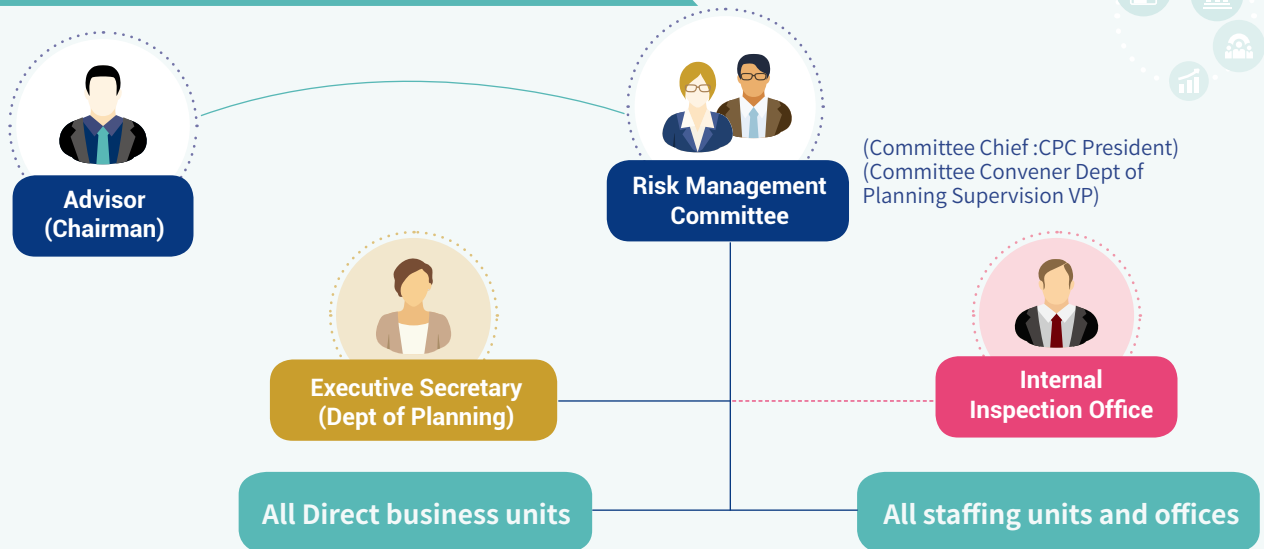
04

Enhance the communication with employees and stakeholders and enforce the risk management policy

Risk Management Committee

In order to implement the risk management system, CPC established the “Risk Management Committee” and respective unit's risk team in March 1998 to continuously implement CPC's risk management operation mechanism and set up the Enterprise Risk Management System (ERM) to systematically record, track and control the improvement of CPC's various risks.

Risk Management Committee Organization Chart



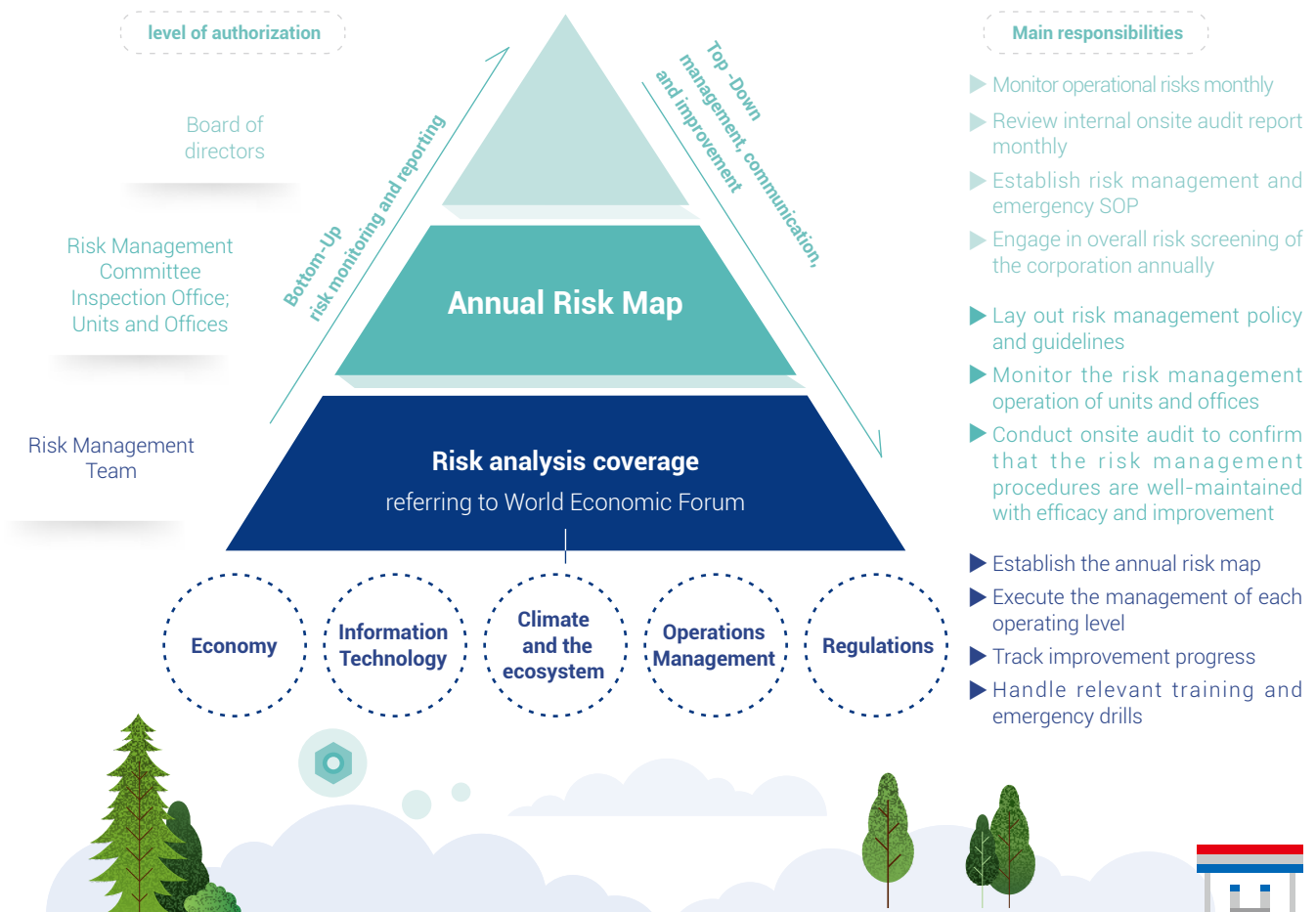
Operations of Risk Management

Bottom-up risk management

- Each unit establishes a risk management operation mechanism according to its business attributes, examines various factors of risk changes, lists annual risk items and images, proposes risk solutions, reviews and monitors the status of improvement periodically, and reports to the Risk Management Committee to follow up the effectiveness of handling.

Top-down risk management

- CPC holds daily morning reports and weekly business meetings, annual target announcement meetings, mid-year target review meetings, and regular risk management committee meetings to continuously review and control the implementation progress of various operational plans, new product introductions, and related risk issues.
- The Risk Management Committee holds regular meetings every year to review the effectiveness of risk management in each unit, and has established the "Overall Risk Measurement Principles", according to which risk items and risk levels are proposed and divided into 7 major impact, including financial losses, personnel casualties, loss from business disruption, company reputation, public opinions, violation of laws and regulations, and human resources, components to measure the degree of impact. The "Risk Map (Risk Matrix)" is used as an assessment tool to review factors of risk changes on a rolling basis according to current events, and to prevent, handle and integrate related resources immediately in order to avoid the negative effects of risk events on the organization and minimize the impact of risk damage. In addition, the Internal.
- Inspection Office conducts annual on-site audits to examine the appropriateness and effectiveness of the risk management system of CPC.







Operational Results of Risk Management in 2020

The CPC Risk Management Committee has the chairman representing the board of directors serving as a steering member and supervising the conduct of the meeting. All board members participate in the company's annual overall risk project opinion survey and ranking and participate in high-level risk management seminars from time to time.

The Risk Management Committee of CPC conducts an overall review of the possible risks faced by the enterprise, develops various response plans, reviews the response methods, and monitors the results. In 2020 we identified 12 risk items. After taking measures to make improvements, and keep monitoring the risk items, 11 of which remained the same or decreased; one of which increased.

After the hacking incident occurred in May 2020, in response to drastic changes in the company's business environment, major emergencies, or major deficiencies, the overall risk items have been added to the operating principles. According to the resolutions of the high-level meeting or the recommendations of the project review report, after the approval of the chairman of the risk management committee, the company's overall risk project is added for timely management and control. Then send it to the next risk management committee meeting for ratification. After adding the operating principles for the newly added overall risk items, timely and rolling review of the handling of major risks or crisis events will improve the efficiency of risk management and crisis handling and reduce operational risks.

Identification of risks and opportunities	Risk Category	Effectiveness management
Construction or operation risk due to failure to implement the OHS SOP (including contractors)	 Operations management	<ol style="list-style-type: none"> 1.Strengthen personnel (including contractors) to implement standard operating procedures (SOP) promotion, education and training, implementation and verification. 2.Continue to develop and revise SOP in accordance with the practice and conduct related education and training. 3.Reduce the number of accidents that do not implement SOP in 2020 compared to 2019.
Risk of talent and core technology succession gap and outsourcing overall risk	 Operations management	<ol style="list-style-type: none"> 1. Accelerate new employee recruitment, strict assessment and selection, and handle core business and technical skills training. 2. Cultivate employees' diversified expertise through a rotation system and arrange employees to attend training at external organizations as and when appropriate. 3. Leverage emerging technologies to enhance business execution or training effectiveness and compensate for some of the manpower requirements to reduce the complexity of business succession. 4.Commence cross-unit cooperation to promote emerging projects and develop new products; carry out cross-departmental cooperation within the unit to promote emerging business and support integration. 5. Retain a certain proportion of planning and operational workforce of core business; outsource non-core business activities.
Stable supply and safety of oil and gas	 Operations management	<ol style="list-style-type: none"> 1. Actively expand and diversify oil sources, and set long-term contracts every year to ensure the supply quantity. 2.Hold regular production and marketing planning and tracking review meetings as well as oil transmission and storage coordination meetings. 3. Conduct contingency planning drills and training for different risk scenarios. 4. Promote the third LNG Receiving Terminal Project; increase the number of available tanks to relieve strain on natural gas reserve. 5.Establish supporting gas pipeline management and key customer planning for dual source gas supply. 6. Flexibly adjust import, export, some plant operations and crude oil refining volumes to effectively respond to unanticipated events such as the "COVID-19" pandemic in 2020 and the sudden drop in international oil prices in March.
Leakage of long-distance oil and gas pipelines	 Operations management	<ol style="list-style-type: none"> 1.Continuously and regularly implement pipeline inspection, daily pipeline monitoring system to monitor abnormalities. 2. Equip pipelines with monitoring systems to send alarms if there are abnormalities. 10 leakage monitoring systems have been completed.Arrangements have been made for the construction of industrial pipelines that have not yet been installed with such systems. 3. A "Pipeline Management Information System" has been set up to compile all inspection data and evaluation reports of pipelines. 4.In 2020, we held two "Pipeline Emergency Response and Practical Simulation Courses" and one "Commander Training Courses for Emergency Response," and continued to strengthen emergency response drills under the guidance of ITRI in order to correctly and effectively reduce pipeline risk hazards.
Risks of unplanned boiler halt	 Operations management	<ol style="list-style-type: none"> 1. Perform system overhaul and enhance maintenance quality to raise equipment reliability. 2. Establish the commissioned refinery mechanism for crude oil and semi-finished oil products and arrange oil tankers to transport oil products for emergency supply. 3.Plant meeting to track the progress of the implementation of key work in each plant to coordinate relevant material repairs. 4. Control the process modification procedures by computers. 5. Apply rigorous control over natural gas tank capacity so that inspections are completed according to timeline; conduct regular tracking on the inspection of storage tanks.

Identification of risks and opportunities	Risk Category	Effectiveness management
Oil price fluctuation risk	 <p>Economy</p>	<ol style="list-style-type: none"> 1. Continuously capture the international oil prices and related product price changes, and commence timely review and adjustment in response to reduce operating costs. 2. Optimization of inventory management, a flexible adjustment in production and sales. 3. Convene monthly oil price hedging strategy meetings to develop hedging strategies and review them on a monthly basis. 4. Conduct economic benefit analysis to facilitate decision making and negotiation and make every effort to reduce production costs in order to reduce seller's risk of oil price fluctuations. 5. In addition to the price formula for each product, we regularly evaluate and adjust prices, and propose marketing plans according to market changes.
Offshore gas supply risk due to seabed collapse	 <p>Climate and the ecosystem</p>	<ol style="list-style-type: none"> 1. Operate in accordance with SOPs and enhance drills in accordance with relevant emergency response plans. 2. Commence equipment inspection and continuous periodic testing and facilitate the planning and execution of new pipeline projects. 3. Continue to carry out routine maintenance management and inspection work on a regular and irregular basis, and implement appropriate protection measures to improve, reduce the risk of offshore pipelines to ensure the safety of offshore transportation of oil and gas. 4. Complete contingency drills or training according to the annual drill plan.
Impacts of green energy transformation	 <p>Regulations</p>	<ol style="list-style-type: none"> 1. Continuously observe the number of electric motorcycle license plates and examine the impact of the changes in market trends on sales revenue to develop timely countermeasures. 2. Provide gas station sites to build electric motorcycle recharging stations by tenders in accordance with the government policy and charge the vendors to compensate for the short sales. 3. Adjust refining model, improve structure and introduce new technologies, such as proper selection of suitable crude oil types and plant operation model in accordance with oil supply demand, as well as adjust the production ratio of gasoline, diesel and petrochemicals. 4. R&D of new technologies and products, such as the conversion of oil into high-value special chemicals or materials.
Impacts of ecological issues on major investment projects	 <p>Climate and the ecosystem</p>	<ol style="list-style-type: none"> 1. Examine the commitment and the progress of environmental assessment monitoring project when reporting the quarterly environmental assessment commitment to ensure compliance with law requirements of environmental assessment. Report on the implementation of the environmental assessment commitments at the EPA's "Environmental Impact Assessment of the Guantang Industrial Park and Guantang Industrial Park Port" project supervision meetings on a quarterly basis and cooperate with the Guantang Industrial Park (Port) Ecological Conservation Committee to discuss relevant matters. 2. Actively communicate and coordinate with the Ocean Conservation Administration and Taoyuan City Government on the conservation of algal reefs in Taoyuan and establish communication channels between algal reefs conservation of Council of Agriculture and the third LNG receiving terminal to create a communication channel with the environmental protection group. Moreover, create a suitable breeding environment for little terns outside the industrial area (G1, Baiyu, and Zhuwei) to enable the little terns to migrate to a suitable environment.
Industrial (environmental) safety incidents caused by natural disasters	 <p>Climate and the ecosystem</p>	<ol style="list-style-type: none"> 1. Timely review of specifications during the planning stage to enhance structural safety. 2. Enhance the maintenance and preparation management of emergency response equipment. Each unit reviews the emergency response equipment on a monthly basis and registers it in the system to ensure that the equipment can function properly in case of an emergency.

<p>Industrial (environmental) safety incidents caused by natural disasters</p>	 Climate and the ecosystem	<ol style="list-style-type: none"> 3. Each unit reports a disaster emergency response plan every year and executes drills according to the plan to familiarize employees with emergency response measures in case of disasters. 4. In 2020, each unit had conducted 7 emergency response drills for unpredictable emergencies, and 35 engineering quality supervisions for the Company. We also tracked the deficiencies until improvement is completed.
<p>Impacts of the COVID-19 pandemic on the operations</p>	 Climate and the ecosystem	<ol style="list-style-type: none"> 1. Cooperate with the Central Epidemic Command Center and related policies to implement personal hygiene protection; postpone some activities, arrange online activities or suspend the activities; some meetings are also conducted in writing or online. Pandemic prevention measures are announced on the intranet and extranet. 2. Set up a pandemic prevention response team and actively prepare pandemic prevention materials and understand the Company's pandemic prevention capacity. 3. Each unit completes off-site office layout and home office network setup. 4. Pay close attention to the extent of the impact of the pandemic and changes in the supply and demand of international crude oil, and adjust the balance of oil supply and demand in the domestic market in a timely manner.
<p>Risk of information security attack</p>	 Information Technology	<ol style="list-style-type: none"> 1. Promote the implementation of the Company's information security regulations and cooperate with e-mail social engineering drills to continuously improve information security awareness. 2. Report on the organization planning project and survey on the manpower requirement and the number of additional staff to strengthen the IT/OT manpower and capacity for information security. 3. Build an offline disk backup system and regularly retest the availability of backup media. 4. Use firewall and virtual network settings to strengthen the management of network structure and domain.

Note: CPC also follows the framework of "TCFD Climate Change Related Financial Disclosure Recommendations (TCFD)" to identify potential risks and opportunities of climate change. Please refer to 3.1.2 Adaptation of Climate Change.

2.2 Ethical Management and Legal Compliance

2.2.1 Ethical Management and Legal Compliance

CPC attaches great importance to the relationship with its stakeholders and has established the "CPC Code of Ethical Conduct" with respect to the "Guidelines for the Adoption of Codes of Ethical Conduct for TWSE/TPEX Listed Companies", as well as established the "Act on Recusal of Public Servants Due to Conflicts of Interest", and "Integrity and Ethics Principles for Employees of the Ministry of Economic Affairs" and other regulations to constrain business conduct of employees (including board members, management, and general employees). CPC also upholds the principle of integrity in the execution of all business activities, and strictly prohibits any corruption, bribery and any form of fraudulent behavior such as using one's position to benefit others or oneself to ensure a sustainable and honest corporate culture.

Complying with government regulations is a fundamental requirement. CPC continues to pay attention to policies that have potential impact on the Company and to comply with international conventions. At the same time, there are rules and procedures in place to ensure that employees conduct their business accordingly. In 2020, there were no violations of laws and regulations in the social and economic fields, and no anti-competitive, antitrust and monopolistic practices or related legal actions.

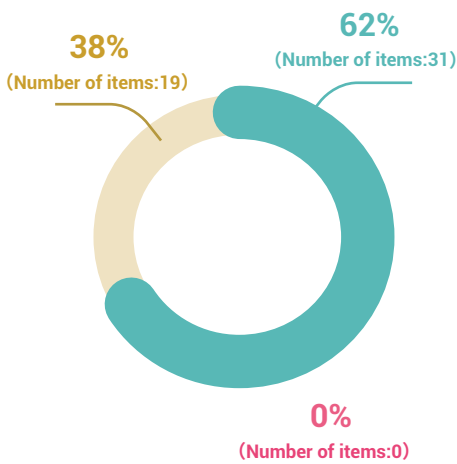
Corporate Governance and Ethical Management Principles

Corporate Governance Structure	Performance and Results
Reasonableness of state ownership	<p>The special responsibilities and obligations of the Company to achieve social and public policy objectives are authorized and promoted in accordance with the law or the instructions of the competent authorities, and are disclosed in the annual report of the shareholders' meeting and on the Company's global information website.</p>
Government as the owner	<ol style="list-style-type: none"> 1.The Company is 100% owned by the government and the board of directors is appointed by the Ministry of Economic Affairs to participate in the shareholders' meetings (the powers and functions of the shareholders' meetings are exercised by the board of directors) and exercise voting rights. 2.The Company provides monthly reports on its operations and performance review to the State Council of the Ministry of Economic Affairs, and annually submits performance and related review reports to the Executive Yuan in accordance with the relevant regulations.
The role of state-owned enterprises in the market and fair competition	<ol style="list-style-type: none"> 1.CPC is committed to providing convenience for all people to use oil (including setting up unprofitable gas stations in the remote areas and mountains). 2.The oil products sold are in competition with Formosa Plastics Corporation. The wholesale prices of oil products are set weekly according to the floating oil price adjustment mechanism approved by the government, while private gas station operators can set their own retail prices to maintain healthy competition in the market. 3.CPC is responsible for policy and plays an important role in stabilizing domestic oil prices.
Fair treatment of shareholders and other investors	<ol style="list-style-type: none"> 1.CPC has established and disclosed relevant self-regulatory regulations to prohibit insiders from using inside information for profit. 2.CPC has regulations regarding the acquisition or disposal of assets, the lending of funds or the endorsement of guarantees.
Stakeholder relationships and responsible business	<ol style="list-style-type: none"> 1.The Company actively promotes its CSR policy and regularly compiles "Sustainability Report". The relevant information and promotion results are disclosed in the CSR section of the global information website. 2.The fairness of employment, welfare and retirement system, working environment and safety of employees are implemented in accordance with the law and are properly disclosed. There are proper regulations and mechanisms for employee's violation of laws and business misconduct, as well as for employee's complaints. 3.The Company conducts monthly review and improvement of environmental protection penalties and formulates specific policies to reduce the negative effects of environmental pollution.
Information transparency and disclosure	<ol style="list-style-type: none"> 1.The Company discloses its financial reports within the prescribed period, and the annual report of the shareholders' meeting also discloses the duties, experience, part-time positions, operation profile and remuneration of directors, supervisors and senior managers, as well as the amount and nature of the fees of the CPAs. 2.The Company regularly discloses corporate governance regulations and important information, such as information on meetings of directors and supervisors, in the Corporate Governance section on the global information website.
Responsibilities of the board of directors of state-owned enterprises	<ol style="list-style-type: none"> 1.There are a total of 13 members of the board of directors of CPC, including 2 female directors, with diverse expertise in chemical, mechanical engineering, law, and business management. There are also three supervisors, including one female supervisor with expertise in accounting and finance. 2.The directors and supervisors participated in further education courses conducted by the Taiwan Corporate Governance Association, Center for Corporate Sustainability and Chinese National Association of Industry and Commerce, Taiwan in 2020. 3. The average attendance rate of all directors and supervisors is 94%.
Accounting system	<ol style="list-style-type: none"> 1.CPC evaluates the independence and appropriateness of the CPA appointed by CPC every year and submits the appointment of the CPA to the board of directors for approval. 2.The CPA regularly communicate with the supervisors on the financial statement audit planning and audit opinions, and attend the meetings of the board of directors and supervisors to answer questions from the independent directors and supervisors regarding the results of the audit reports.

2.2.2 Anticorruption

In anticorruption work, CPC begins with corruption prevention. By establishing business reform and anticorruption measures and the “Principles of Co-Supervision of CPC’s Ethics Officials” and the “Platform for Reporting Procurement Anomalies to Ethics Department,” CPC hopes to prevent procurement corruption and ensure open, impartial, and transparent competitions. All units which have a government ethics department are included in the corruption risk assessment. In 2020, each unit implemented corruption risk assessment and reported 50 probable “corruption risk events” as follows. CPC has taken actions, such as administrative responsibility investigations, recovery of funds, or legal actions for criminal offences.

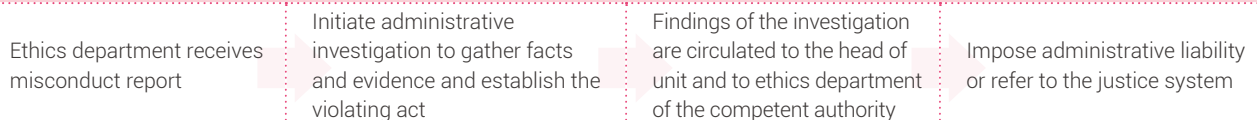
Corruption risk events



Corruption risk levels	Type	Remedies
Low corruption risk (62%)	Falsification of travel expenses, improper use of corporate vehicle and violation of the “Ethics Guidelines for Civil Servants” by personnel	CPC has pursued the administrative responsibilities of the relevant personnel and has made proposals for reform to rectify the deficiencies. For those involved in criminal liability, in addition to continuing to collect information and send letters for investigation, CPC also fully cooperated with the investigation of the prosecution and integrity units.
Medium corruption risk (38%)	Abnormalities in gas station billing operations, illegal bid-rigging by vendors, violation of procurement contracts by vendors	CPC has pursued the administrative responsibilities of the relevant personnel and has made proposals for reform to rectify the deficiencies. For those involved in criminal liability, in addition to continuing to collect information and send letters for investigation, CPC also fully cooperated with the investigation of the prosecution and integrity units.
High corruption risk (0%)	-	-

CPC has several channels in place to receive misconduct reports. In 2020, CPC received a total of 12 investigation results of previous cases, including 1 prosecution, 7 suspended prosecutions, and 4 verdicts. No significant act of corruption had occurred. Furthermore, violations are compiled into case studies and conveyed to employees on a regular basis.

Procedures for reporting misconduct behaviors



Internal corruption reporting channels

Whistleblower Box of CPC's Ethics Unit: P.O. Box 128-36, Taipei Xinyi Post Office, Tel: (02)8725-8478, Fax: (02)8789-9007

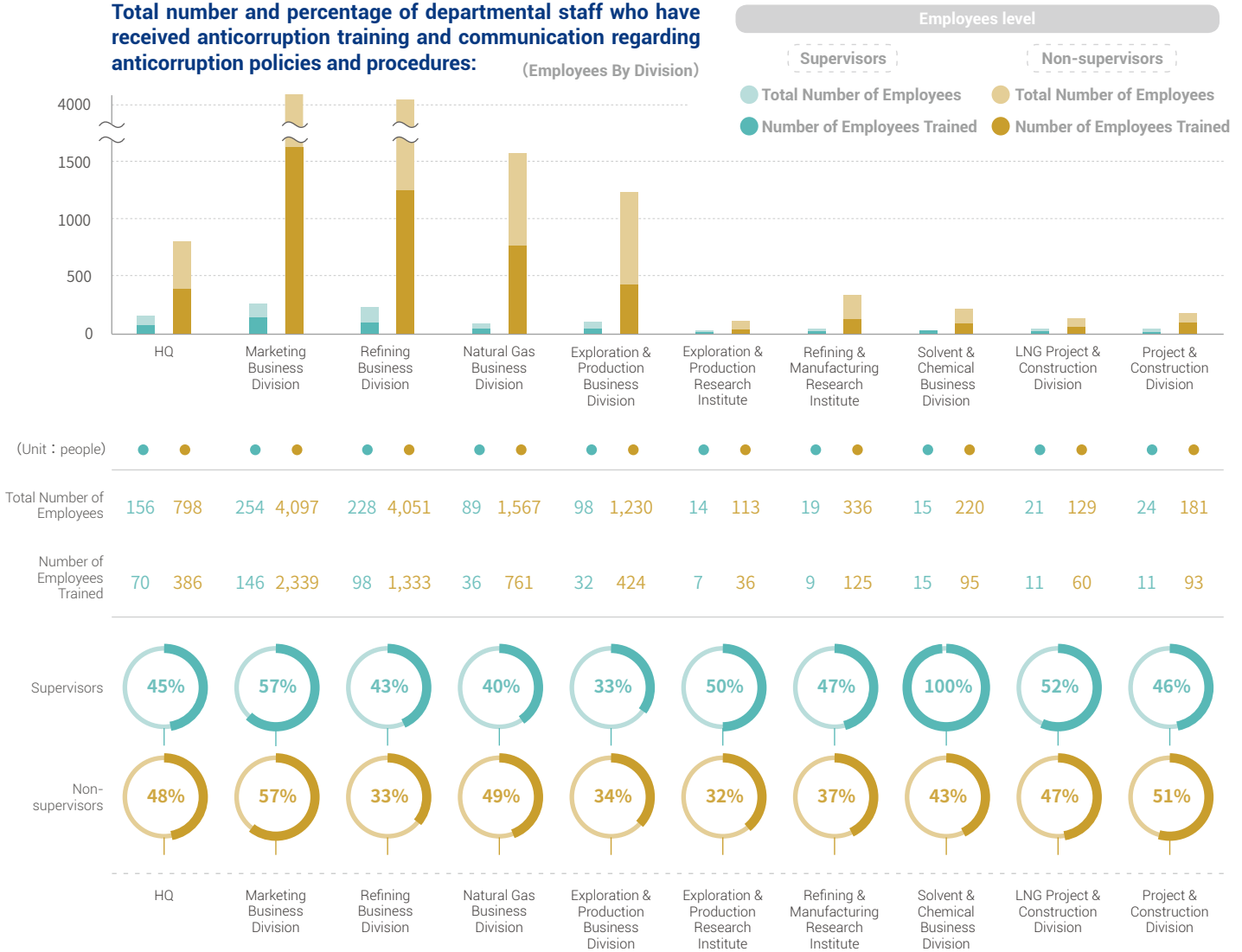
External reporting channels

- Procurement and Audit Team, Ministry of Economic Affairs: No. 15, Fuzhou St., Taipei City, Tel: (02) 23971592, Fax: (02) 2397-1593, e-mail: ps.unit@moea.gov.tw
- Address of the Central Procurement and Audit Team, Public Construction Commission, Executive Yuan: 9F, No. 3, Songren Rd., Taipei City, Tel: (02)87897548, Fax: (02)8789-7554
- Dedicated phone lines of Agency Against Corruption, Ministry of Justice: 0800-286-586; dedicated mailbox for reports: " P.O.BOX 153, Academia Historica 10099"; dedicated fax line: (02) 2381-1234; dedicated email address: gechief-p@mail.moj.gov.tw; address of the report center: No.166, Bo'ai Rd., Zhongzheng Dist., Taipei City.
- [List of dedicated phone lines and mailbox information of the Ministry of Justice Investigation Bureau and its division](#)

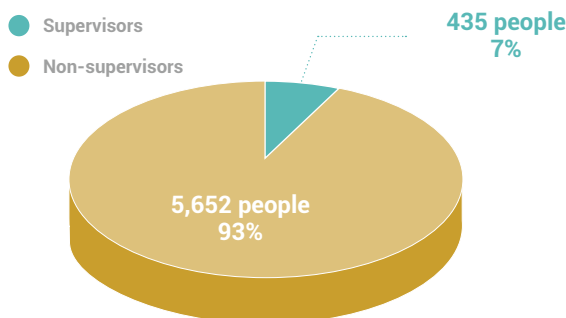


In 2020, CPC held a total of 68 thematic anticorruption educational programs with 6,087 participants, including two seminars on “Corporate Integrity and Anticorruption” held by each of the two business units of CPC’s Marketing Business Division and Solvent & Chemical Business Division, with a total 160 participants of employees and representatives of invited companies. Through case studies and mutual opinion exchange and communication, CPC aims to build a quality procurement environment, improve the quality and efficiency of procurement, and demonstrate its integrity and anticorruption image. In addition, a total of 6 disclosures were made through media to expand promotional marketing.

Total number and percentage of departmental staff who have received anticorruption training and communication regarding anticorruption policies and procedures: (Employees By Division)



With a total of 6,087 participating employees



Major anticorruption actions and performance in 2020

- CPC Code of Ethical Conduct passed by board of directors
- Public disclosure The Company upholds integrity principle and adheres to the highest ethical standards. One case of lobbying was recorded on file in 2020
- A dedicated organization, Ethics Department, has been established to oversee integrity and anti-corruption
- Co-supervision of ethics
- Integrity incident and personnel risks are analyzed and assessed on a yearly basis
- Integrity risk assessment report
- Dedicated phone lines, fax line, EMAIL and supervisor’s mailbox are made available to receive misconduct reports, whether named or anonymous

2.2.3 Internal Audit System

In order to strengthen the internal control and audit system, CPC has established an internal inspection office in the board of directors, which consists of a chief auditor, 15 auditors and an assistant auditor. CPC respects the professionalism and independence of the internal inspection office and internal auditors, and fully authorizes them to conduct regular project audits, and sets the following regulations for the audit system:

(I) In terms of policies



1. In response to the internal and external business environment, changes in laws and regulations, organizational adjustments, and business changes, each unit is required to perform self-assessment and to compile and communicate the deficiencies of field audits to each unit for reference.
2. The internal control documents are prepared by the management and approved by the board of directors, and the appropriateness and completeness of the internal control documents are reviewed regularly to improve the internal control system. There are a total of 9 major cycles and 539 internal control documents.

(II) In terms of implementation



1. Regular annual internal control-related risk assessment and audit work plan for on-site audit operations: CPC conducts annual internal control on-site audits of the units and offices within the Company. In 2020, CPC performed on-site inspections for a total of 23 units and a total of 20 units of headquarter offices.
2. The management conducts self-assessment of internal control at least once a year.
3. Internal control audit every year: CPC continues to implement a project audit plan each year for business items that are assessed to be high-risk or have repetitive deficiencies. In 2020, we performed a total of 7 project audits to check deficiencies and non-conformities and continues to track such issues until improvement is completed.

Internal audit

- The Internal Inspection Office reports directly to the board of directors, and devises internal audit plans for the following year based "Regulations Governing Establishment of Internal Control Systems by Public Companies" as well as CPC's operational goals and risk assessment outcome to draft the internal inspection (audit) work plan for the next year.
- Convene 3 supervisors' meetings every year to regularly check and review the deficiencies of the internal control system and measure the effectiveness and efficiency of the operation.
- Actively establish new auditing operation system to optimize the operation process and provide the management with suggestions for improvement of field checking deficiencies, continuing to follow up until complete improvement.
- Increase the plus and minus points of the total audit performance assessment, strengthen the connection between audit results and performance, and enhance the effectiveness of the audit.

External supervision

- CPA certification and FSC examinations every year.
- Accept supervision of the State-owned Enterprise Commission, MOEA, and the National Audit Office, Control Yuan.



2.2.4 Response and Explanation of Major Operational Events in 2020

Hacking attack in May 2020



Impact

The incident affected mainly the Windows operating environment and systems under the server of CPC Active Directory (AD) Service of CPC, which exerted an impact on the daily operation of the administration business. The rest of the production and operation sides were not affected, and the operation of oil, gas, refining and chemical industrial control systems remained normal. Credit card and cash transactions at gas stations (accounted for 85.9%) were not affected. Membership card, fleet card and Chieh Li Card transactions (accounted for 10.8%) were changed to authorized offline operations to maintain normal business transactions. A total of 96.7% of transactions were not affected, and the membership card, fleet card, and Chieh Li Card systems were restored to service on the evening.



Response

In order to prevent new attack techniques by hackers and maintain normal business operations, CPC will build an information security mechanism covering information technology (IT), operational technology (OT), environmental boundary defense and intranet detection to strengthen the depth of network protection by enhancing the difficulty of intrusion, the sensitivity of monitoring, and the speed of response processing and recovery after reviewing its information security practices.



Subsequent enhancement measures

After such incident, CPC has continued to strengthen measures such as advising employees not to browse websites or videos that are irrelevant to daily operations, not to open emails from unknown sources, and to turn off computers and power supplies after work. CPC also revised the emergency response plan and operational handling procedures for information security incidents, enhanced information security alertness and risk sensitivity through publicity and occasional audits, and ensured the effectiveness of the relevant information security and protection activities as a whole.

Elaboration of financial loss for 2020



Impact

The outbreak of the COVID-19 pandemic in 2020 has restricted global economic activities. The collapse of the production reduction agreement between the Organization of Petroleum Exporting Countries and its partners (OPEC+) in early March has led to an oversupply of crude oil, resulting in a collapse of crude oil prices. In addition, the global economy has suffered a significant impact due to unresolved trade dispute between the U.S. and China. CPC's operations were also under enormous pressure. In the face of the uncertainty of market demand for oil products and oil prices, CPC has been actively cooperating with the central government in the prevention of pandemic and adjusting production and sales schedules on a rolling basis to ensure a stable supply of oil, gas and petrochemical raw materials to the domestic market, while cooperating with the government in the implementation of policies to stabilize prices and take care of industries and people's livelihood to ensure the stable development of related industries and enterprises in the country. In 2020, CPC's revenue amounted to approximately NT\$721.7 billion and pre-tax loss was NT\$7.7 billion, a decrease of NT\$21.8 billion from the statutory pre-tax surplus of NT\$14.1 billion. This was mainly due to the impact of international oil prices on overseas oil and gas assets that resulted in a recognition of a loss of approximately NT\$12.0 billion on oil and gas interests, as well as the failure to adjust product prices in line with the market mechanism in order to comply with the government's price stabilization policy and the government's relief measures of approximately NT\$10.0 billion. The total amount of taxes (including sales tax) paid in 2020 was NT\$108.3 billion, which was still a significant contribution to the national revenue.



Response and subsequent enhancement measures

In the face of the challenges and uncertainties of the future business environment, CPC will keep abreast of the changes in the international energy market, the development of the domestic market and the impact of industrial transformation, and dynamically adjust its operating model to continue to strengthen the development of its core businesses in exploration, refining, petrochemicals, oil marketing and natural gas, stabilize the supply of domestic oil and gas and petrochemical raw materials, enhance its international competitiveness and expand its overseas markets, and expand the scope of its reinvestment business to ensure the achievement of financial performance targets.

Issues on referendum for algal reef



Impact

In order to achieve the 2025 "non-nuclear home" target and to meet the country's commitment to reduce carbon emissions by replacing coal-fired power generation with natural gas, natural gas power generation is bound to increase drastically in the future. Therefore, in order to meet the increasing demand of the domestic natural gas market and to balance the demand of the North, Central and South part of Taiwan, a 3rd LNG receiving terminal must be built in order to meet the demand of natural gas growth.

The construction of the 3rd LNG receiving terminal is for the purpose of supplying the new gas-fired units of TPC's Datan Power Plant and the demand for natural gas for the conversion of the northern plants to meet the government's 2025 energy transformation policy of 50% gas-fired power generation. In October 2014, CPC completed the evaluation of the 3rd LNG receiving terminal site proposal, and only the Guantang Industrial Area (Port) can meet the 2022 supply schedule for the new gas-fired units of the Datan Power Plant, which is the proposal that best meets the demand. In 2015, the Executive Yuan approved the development plan of the 3rd LNG receiving terminal and selected the site in the Guantang Industrial Park (Port).

CPC communicated with environmental assessment members and environmental groups many times during the environmental assessment considerations and proposed the "Avoidance Solution" for algal reef-friendly ecology. The development of the industrial area was reduced from the original 232 hectares to 23 hectares, and only the land already filled by Dongding company 18 years ago was used for the construction of tanks and other facilities required for the LNG receiving terminal, and the Guantang intertidal algal reef area (G1 and G2) was preserved in its current state without affecting the algal reef ecology.

As for some environmentalists' opinions and claims about algal reefs, CPC fully understands and respects them. Since the construction in 2019, CPC has continuously invested human and material resources to maintain the ecology of algal reefs, and various monitoring results show that the ecology of the Guantang coast has a positive trend of change, demonstrating that the ecology of the area has not been damaged due to the construction.



Response

In order to demonstrate its sincerity and determination to protect algal reefs, CPC is working with local residents in Taoyuan to promote the maintenance and conservation of the algal reef ecosystem. At present, in accordance with the environmental assessment commitments, the Baiyu Coast Environmental Education Park has been established. CPC will continue to follow the environmental assessment commitments and implement correct conservation concepts and practices based on the recommendations of scholars, experts and conservation groups. In addition, CPC will also continue to adopt coastal conservation, clean up trash on a regular basis, and hold large scale beach cleaning activities every year to maintain and monitor the ecology of the algal reef ecosystem, taking into account both environmental protection and ecological sustainability. In the future, we will continue to strengthen communication with the environmental groups and the public to clarify relevant issues and facts in order to seek a win-win situation.

Details of CPC's conservation of algal reefs can be found in [3.5.1 Environmental protection](#) and [special coverage of carbon neutrality](#).

2.3 Products and Services

Short-term

Continue to introduce CEM program to all gas stations

Medium/long-term

- Avoid violation of regulations regarding products, services, customer privacy, and personal information
- Enhance the customer satisfaction and practice the "Supreme Quality, Superb Service, Selfless Contribution" business philosophy



CPC implements management activities to maintain customer rights and interests and ensure product safety based on the concepts "full participation, quality improvement, and customer satisfaction," in order to provide products and services of the best quality. In addition to continuous understanding of customer needs, we constantly improve and reduce the defect rate and prevent the occurrence of problems to improve product quality and safety, protect customer rights and interests and enhance customer satisfaction.



2.3.1 Transparency of Price Information of Major Products

CPC has been implementing a price stabilization system for oil, Liquefied Petroleum Gas, and natural gas in line with the government's price stabilization policies since 2007. For gasoline and diesel, those are based on the principles of the floating oil price mechanism issued by the government, and the price adjustment plan for gasoline and diesel fuel is proposed weekly and announced after approval in accordance with administrative procedures. Relevant oil price adjustment information (including price adjustment rate comparison table and adjustment amount calculation table and prices in neighboring regions, etc.) is sent to the relevant competent authorities for inspection and supervision, and is disclosed on the CPC global information website and press releases. Domestic gasoline and diesel prices are adjusted weekly in accordance with international oil prices and exchange rate averages, and the size of the adjustment depends entirely on the calculation of the oil price formula. After calculating, the system works by adjusting retail price of 92 Unleaded and Super Diesel using prescribed formula before converting them to pre-tax wholesale prices. These prices are then compared to current week's lowest pre-tax price observed in competing countries in Asia (namely Japan, South Korea, Hong Kong and Singapore), which serves as the upper limit for price adjustments. Furthermore, to lessen the financial burden and impact that price changes have on the general public, the MOEA announced a new set of oil price stabilization measures in 2018 that set three price thresholds for 95 Unleaded at NT\$30, NT\$32.5 and NT\$35 per liter. If retail price rises above the threshold, the government will absorb 25%, 50% and 75% of the excess, respectively. The same absorption rate applies to 92 Unleaded, 98 Unleaded and diesel equal to 95 Unleaded. The monthly domestic LPG price adjustment information (including the wholesale price, international CP average price, exchange rate and Asian neighboring prices) is disclosed in the press release issued by CPC and on the global information website; information about CPC's LPG price adjustment mechanism is also announced on CPC's global information website for public inquiries. In addition, in accordance with the natural gas price adjustment mechanism approved by the Ministry of Economic Affairs in 2008, CPC's natural gas price fluctuation caps at 3% in a single month and 6% over 3 consecutive months. Adjustments above this cap must be reported to and approved by the Ministry of Economic Affairs before taking effect. The information on gas price adjustment explanation and pricing basis is updated monthly in the announcement on the [CPC global information website](#). CPC had no legal actions caused by oil and gas price inflation or manipulation related events in 2020, therefore, its related monetary loss was NT\$0.

2.3.2 Products and Customers

Supreme Quality, Superb Service, Selfless Contribution



CPC values how product safety affects customers. Ensuring compliance with CNS standards and all applicable laws and regulations, CPC implements quality management with respect to the ISO 9001 international standard and disclose the information and safety data sheet (SDS) of all products and services on the corporate website for the reference of stakeholders. In addition, we state the precautions in the package of individual products as warnings for consumers.

Refinery and research institute, refineries, oil supply centers and gas stations regularly conduct oil product sampling and monitoring, review products and services, as well as revise related procedures and operations as necessary. In addition, the inspection units commissioned by the Bureau of Energy implement the "Petroleum Product Quality Inspection and Management" program on a regular basis to ensure compliance with the national standard by spot checks. There was no report of non-compliance with consumer health and safety involving our product or service in 2020.

Customer satisfaction survey

Aiming to serve society, CPC has taken it as its concept to understand the needs and opinions of customers, provide them with complete services, and consider customer complaint handling rate, customer satisfaction survey and performance appraisal as an internal evaluation mechanism. Moreover, CPC has established the "Operation Procedure of Satisfaction Survey". The survey is conducted annually and continuous improvement is made based on the analysis results to achieve the goal of continuous improvement of service quality. The results of the survey are as follows:

01

Customer satisfaction of main services and products



Year		2018	2019	2020
Natural Gas Supply Service		96.9	96.9	95.3
Product Sales Service	Solvent Business	91.8	92.2	92.8
	Lubricant Business	95.2	95.2	94.4
	LPG	90.8	90.7	92.5

02

Gas station customer satisfaction survey



Every year, State-owned Enterprise Commission, Ministry of Economic Affairs outsources the customer satisfaction survey by interview or by phone of each business unit with customer-specific questionnaires to find the causes of dissatisfaction. The decrease in satisfaction in 2020 compared to 2019 is due to the modification of the scoring method by the State-owned Enterprise Commission. CPC will continue to improve its refined services and enhance and modify the hardware and equipment of gas stations to maintain high quality service standards.

Year	2018	2019	2020
Score of gas station customer satisfaction	97.3	98.8	95.3

03

Customer Experience Management (CEM)



CPC focuses on consumer experience and opinions and makes continual improvement to the quality of gas station services. Through the continuous introduction of the "CEM" and customer satisfaction surveys, we understand the areas of service improvement at gas stations. We conduct outbound telephone surveys from our customer service centers for at least 125 gas stations each time, targeting VIP members who visit gas stations for refueling within 24 hours to carry out telephone survey concerning four aspects including the overall service, the service attitude, the filling behaviors, and the filling environment, in order to understand the customer's feedback of our gas station services, and make progressive improvement to optimize service quality.

Year	2018	2019	2020
Score of CEM	93.4	93.4	94.0

Diversified Management

Committed to leading and innovating gas station services, apart from actively transforming gas stations into “CPC Smart & Green e-Station,” CPC began business diversification to car maintenance and carwash, product sales, cross-industry alliances, and business platform, while bringing more products under the proprietary brand, such as CPC Racing Motor Oil, Intake Valve cleaner, See Clean Laundry Detergent, Cup & Go etc. These efforts have been made to increase the service value of gas stations, provide customers with one-stop value-added services, and friendlier, more convenient, elaborate gas station.



CPC-Life Wash

- CPC not only offers express, convenient and professional vehicle cleaning and carwash service (including fully manual or machine-based manual services), but also provides oil removal film, vehicle coating and other value-added services.
- In 2020, carwash service was being provided across 273 gas stations.



CPC-Life Express

- As a car doctor (all technicians on site have been certified for the national Class B Vehicle Maintenance Technician), CPC provides fast vehicle maintenance, tire change service and health diagnosis for consumers' cars to maintain the quality of vehicle use and protect the safety of drivers on the road.
- Express vehicle maintenance and tire service centers are available at 68 gas stations throughout Taiwan.



CPC-Life Shop

- In addition to meeting the needs of consumers for refueling, CPC also provides services for travel supplies or consumption.
- CPC has established 126 compound stores and convenience stores to sell general merchandise, festival gift sets, agricultural products, own-brand products and Cup & Go. In particular, in 2018, we launched our first coffee brand - Cup & Go at Fulin Gas station in Taipei. In 2020, the concept was implemented in additional stations throughout Taiwan. As of December, we had already set up 28 stations and will continue to expand our stores to serve more consumers in the future.

Highlights: public toilet service at gas stations

A gas station is often the best place to gather and rest in the minds of passersby; the quality public toilets at CPC gas stations are the first choice for people on the go. As a state-owned enterprise and a leading brand in the oil market, CPC serves more than one million people every day. In addition to providing a stable supply of domestic oil products, CPC hopes to touch the deepest feelings of customers with welcoming services by providing clean, bright, safe, and comfortable toilet space and excellent public toilet quality, so as to promote the habit of using public toilets with love and care, and also to work together to enhance the culture of public toilets in Taiwan. In 2020, 454 public toilets out of 616 gas stations directly operated by CPC were rated as “excellent”.

The Hengshan gas station is located on the romantic Provincial Highway 3 (between Hsinchu and Miaoli of Taiwan), where heavy motorcycles and bicycles often pass through for supplies. Decorated with Tung tree flowers, large green plants, giraffes and black bears, and concrete animal dolls, the public toilet is full of Hakka cultures. In 2020, the EPA held the “Green Living for All Public Toilets Competition”. Among 16,012 public toilets in gas stations, parks, tourist areas, scenic spots, hospitals, libraries, etc. throughout Taiwan, it was ranked top 50 as the most distinctive public toilets in 2020, which was a true honor.

The Nanliao gas station is located near the Nanliao fishing port in Hsinchu, and the photo of the Nanliao landmark is designed on the wall of the public toilet. The floor is embedded with transparent glass, and the installation art full of marine style star sand, shells and starfish is included, supplemented with chandelier lighting design, giving people the illusion of being on the beach. The atmosphere is delicate and pleasant that it often leaves visitors in awe. The cactus planted in the corner of the public toilet not only adds greenery to the public toilet, but also fills the gas station with vitality.

Highlights:

In 2020, 454 of CPC's gas stations had public toilet quality rated Exceptional while another 101 stations were rated Excellent, totaled 90% of CPC's 616 gas stations.

2.3.3 Information Security and Customer Privacy

Short-term

- Inventoried the internal management procedures for the collection, processing and utilization of personal data at least once a year
- Cybersecurity awareness training will be held at least twice a year
- Complete the current year's auditing operation and produce the personal data protection audit report by the end of December each year

Medium/long-term

Continue to implement the protection and management of personal data

For the maintenance of customers' personal information, CPC has established procedures for information security and personal information management in its customer service centers, regularly reviews the existing operation mechanism and strengthens information system security maintenance measures, and strengthens staff education and training on "privacy protection" and "information security" to ensure the preservation and protection of customers' information. In the event of a personal data file being destroyed by vandalism, inadvertent operation, or illegal intrusion such as hacker attack, resulting in a personal data leak, emergency response measures shall be taken and promptly reported to the personal data protection promotion and implementation team of CPC; if the personal data leak is an information security incident, it shall be handled in accordance with the relevant regulations of information security of CPC.

In response to the implementation of the Personal Information Protection Act, CPC convenes a personal information meeting at least once a year, with the Vice President of legal affairs as the chairman. Colleagues from each unit handling personal information protection business attend the meeting to fully communicate and discuss personal information protection-related issues and exchange opinions. In order to strengthen the protection and management of personal information, CPC has built various software and hardware, provided the necessary funds, and established a personal information filing management system to conduct an annual personal information inventory by filing personal information related forms online to facilitate the control of personal information kept by CPC.

In order to prevent employees from being inadvertently caught by the law due to lack of understanding of the law and to enhance their awareness of personal information act, CPC holds two personal information law education training sessions each year to enhance the promotion of personal information act related regulations and practical insights, and holds two personal information seminars in 2020 to train and strengthen employees on personal information law practices and personal information system operation procedures and methods. There was no report of customer privacy invasion or leakage or theft of personal information in 2020. [Please visit our corporate website](#) for more details about our information protection policy.

Type	Number of items
Complaints of violation of customer privacy (including competent authorities)	0
Leakage or theft of information	0

2.3.4 Technology Innovation

5G and /AIoT Applications

In response to the national development policy and in consideration of the needs of the 5G+AIoT new innovation industry in the Kaohsiung Software Park in the vicinity of CPC's Chengkung plant, CPC has cooperated with the Export Processing Zone Administration, Ministry of Economic Affairs to lease land for the expansion of the Kaohsiung Software Park, and to bring in outstanding investment teams to build a comprehensive economic and trading business park to create job opportunities and drive the urban transformation of Kaohsiung. In addition, CPC plans the development path and symbiosis model of the future smart town, using different energy technologies including production, storage and utilization together with big data intelligent services to build solar photovoltaic systems and electric motorcycle charging stations at gas stations throughout Taiwan, which are closely related to people's lives, to promote them to all gas stations in an attempt to achieve the transformation goal, aiming to become the core of smart community energy and realize the vision of sustainable management.

AR/VR digital training

AR/VR can be incorporated into oil well platform and equipment training, which saves the time and cost of having to relocate trainees. The simulation also avoids risk of hazard in the event of error. Operator Training System (OTS) for the new No. 3 Naphtha Cracker has been designed using massive volume of data gathered from previous years. It trains employees by putting them in a simulation that is virtually indistinguishable from the actual environment.

AI applicationication

AI application assessment sheet	Abnormality detection on key equipment	By combining machine learning and data analysis with equipment inspection/maintenance, CPC is able to develop equipment failure prediction models and undertake precautionary measures to prevent production losses and work safety incidents
	Contractor management application	License plate recognition and vehicle tracking
	Electronic fence and access control	Set up the critical infrastructures to facilitate prevention and tracking
	Alarm system	With more rational and more effective design of the alarm system, CPC will be able to classify alarms by severity, gather historical data, analyze work site condition and manage alarm through automation
	Production analysis for cracking products	By simulating the cracking process, CPC is able to estimate how the changes in coil outlet temperature and different components of feedstocks affect production yield. This stimulation allows the production profit of crackers to be configured to achieve the optimization
	Tank truck straying and collision alert	An advanced driver safety system can be installed to gather real-time data on whether the driver is exhibiting abnormal behavior on the road. The system will also record abnormal situation and position in real-time to ensure tank truck safety

Please refer to [4.2.4 Countermeasures](#) for more smart systems that are applied for work and safety management.

Promotion of electronic payment

In response to the growing maturity and popularity of mobile payment and the government's goal of reaching 90% mobile payment penetration by 2025, CPC gas stations introduced NFC mobile payment and CPC Pay in June 2018 and November 2019, respectively, and then introduced third-party/electronic payment services at self-operated stations in 2020, opening up the use of mobile payment services such as LINE Pay, LINE Pay Money, Pi Wallet, JKOPAY, O'Pay and Gama Pay. As of December 2020, the total number of transactions in a single month had approached 850,000. In addition, in order to meet the needs of self-service customers using mobile payment, NFC mobile payment and CPC Pay services have been gradually introduced through function upgrade and equipment replacement. As of December 2020, the self-service fueling system of a total of 153 stations fully supported NFC and CPC Pay. In addition, the improvement of mobile payment transaction process at gas stations and the optimization of CPC Pay function and service are also the key tasks of CPC to enhance the satisfaction of customers using mobile payment. Considering that mobile payment popularization policy is a national priority, CPC has continued to diversify its mobile payment tools and expand the number of mobile payment service users in recent years. As of December 2020, NFC mobile payment and CPC Pay have been actively promoted and more than 1,600 stations have supported these two mobile payment services. In addition, third-party/electronic payment services will be introduced to the franchised stations.

Highlights: CPC Pay



Average monthly transactions using CPC Pay reached 300k



Around 661k members downloaded the app

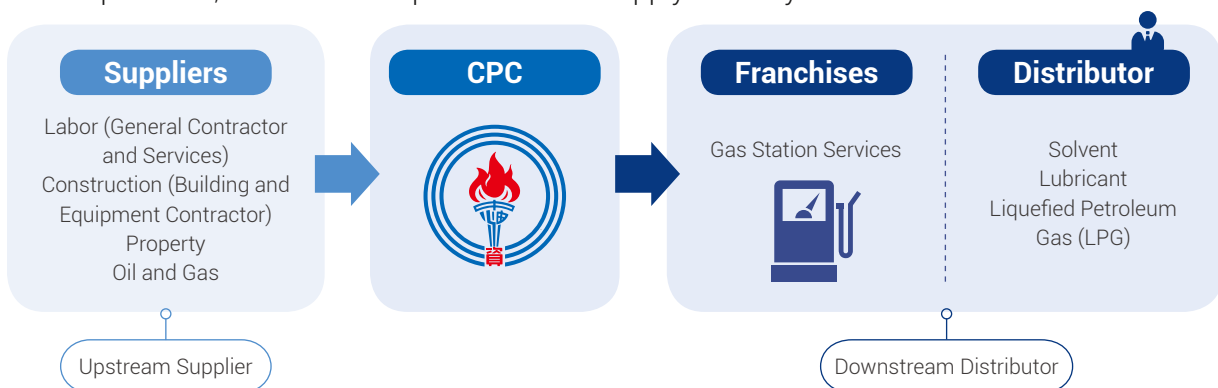
After more than two years of mobile payment promotion at gas stations, the number of transactions has continued to grow. In addition, according to statistics, CPC Pay took the lead in the proportion of mobile payment service transactions at gas stations in 2020, accounting for approximately 60%. It is reasonable to assume that CPC Pay is the preferred mobile payment tool for most customers among the mobile payment services supported by gas stations. The investment of CPC in CPC Pay shall not be underestimated. From the launch of the CPC Pay to the end of 2020, the number of downloading registered members had reached 661,000 through our continuous efforts. According to the statistics, among the average monthly mobile payment transactions of 490,000 at the direct branches in 2020, approximately 300,000 were made using the CPC Pay. In order to expand CPC Pay's service locations and provide the public with better functions, CPC not only completed counseling 1,082 franchised stations to provide CPC Pay services, but also officially launched the credit card binding functions of all banks by the end of 2020. "CPC Pay" is a payment tool developed by CPC. It is positioned as a payment wallet exclusively for gas stations, which is a historical innovation and breakthrough for CPC. CPC Pay upholds the service of "the quickest way for refueling". In 2020, CPC won the "Best Product Award First Prize" in the 17th National Brand Yushan Award on behalf of CPC, which demonstrated that CPC Pay won the recognition and favor of the professional judging team and the public with the careful investment and vigorous promotion of CPC.

2.4 Supply Chain Management

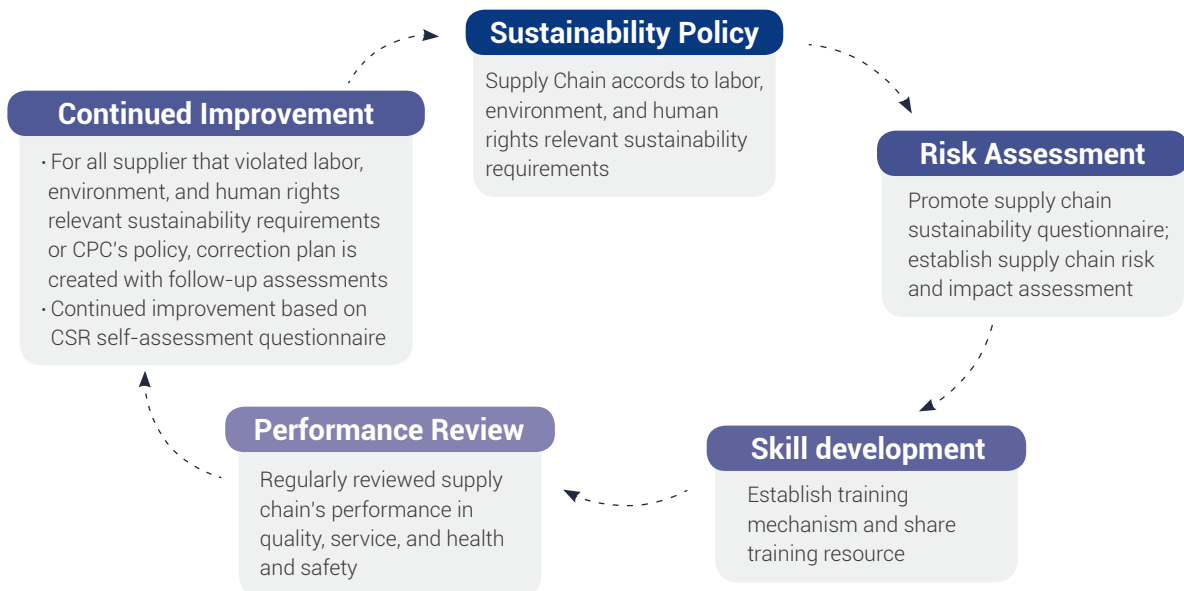
2.4.1 Supply Chain Management and Assessment

CPC Supply Chain

CPC values corporate sustainability development. In addition to self-committed to CSR responsibility, CPC also consider the supply chain as an important sustainability development partner. CPC exerted a positive influence and grow together with our supply chain by extending from the products, services and operations. The supply chain system of CPC is as follows:



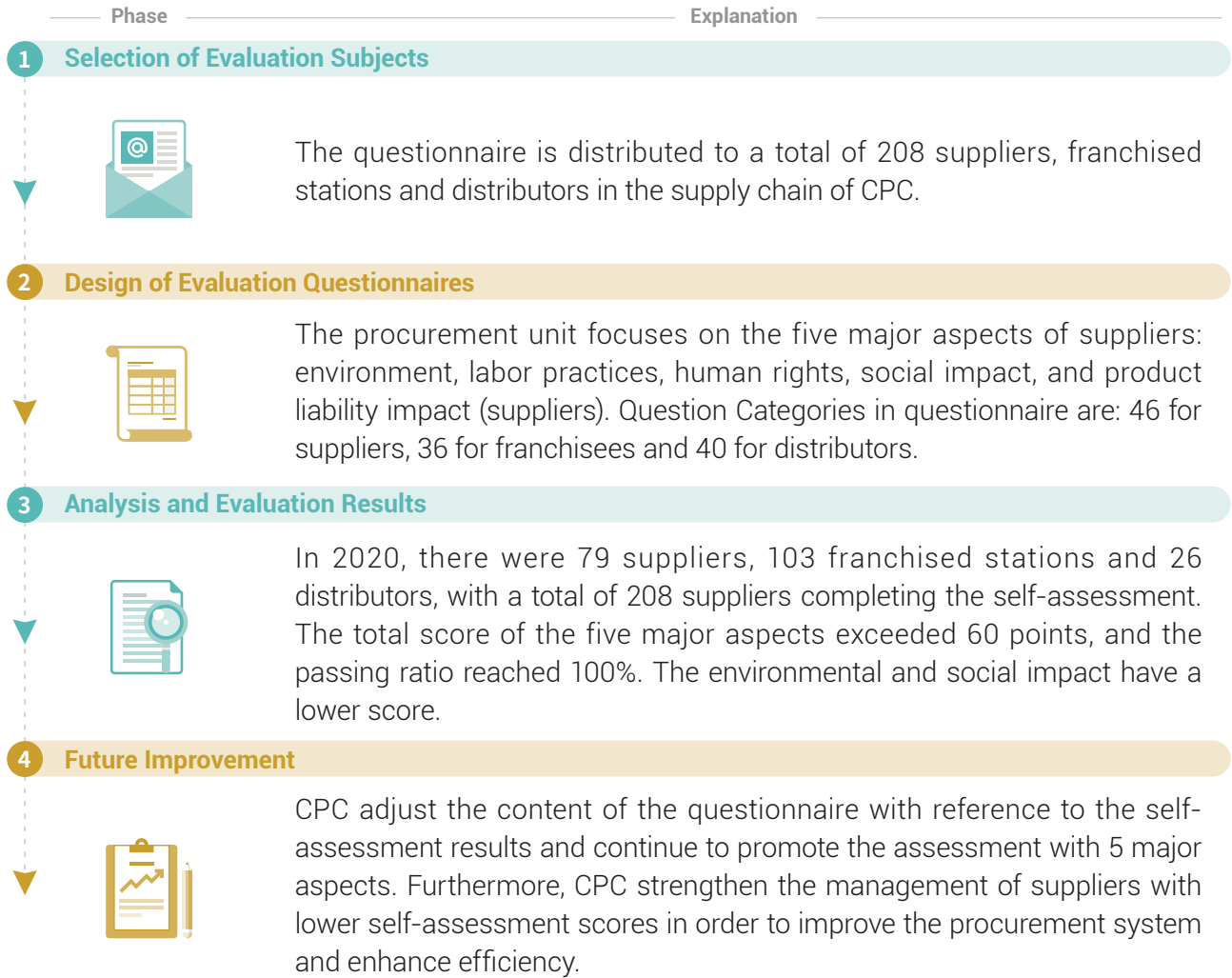
Sustainable Supply Chain Management



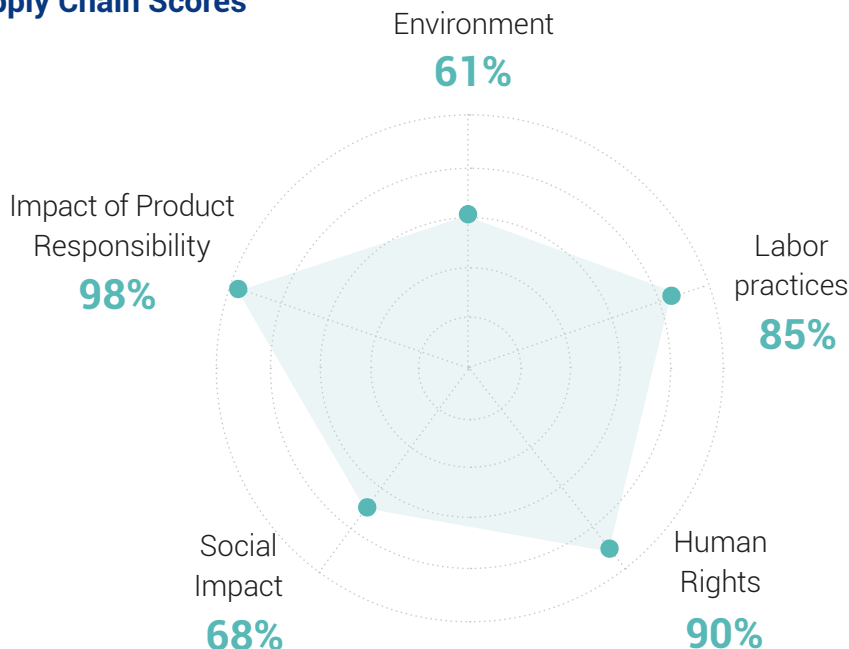
Supply Chain Sustainability and Risk Evaluation

In 2020, CPC promoted the supply chain sustainability risk assessment and conducted a CSR assessment system by completing CSR self-assessment questionnaires, including the five major aspects of environment, labor, human rights, social impact and product responsibility. A total of 208 supply chain partners had completed CSR self-assessment questionnaires to identify the current status of suppliers' sustainability promotion, capture the risk points, and be able to respond to such risks in advance.

Procedures of Supply Chain Sustainability Risk Identification



Supply Chain Scores



Assessment Aspects	Score of Each Aspect
Environment	61%
Labor practices	85%
Human Rights	90%
Social Impact	68%
Impact of Product Responsibility	98%

2.4.2 Supplier Management

As a state-owned enterprise, CPC's procurement activities are regulated by the Government Procurement Act. CPC is bound to exercise supply chain management in a fairness, justice and open manner. The Company treats all suppliers as key business partners and checks the tenderers of blacklist history using government database before tendering. Suppliers are also required to submit tax return as proof of integrity. Furthermore, it is essential for suppliers to comply with labor, environmental and human rights criteria. Any violations discovered must be responded with an improvement plan and followed up accordingly.

Policy and objectives of supplier management

- ▶ **Achieve co-existence and co-prosperity long-term partnership with suppliers**
- ▶ **Complied quality and competitive prices**
- ▶ **Supplier management is being carried out according to the Government Procurement Act**

Participation criteria for new suppliers

- ▶ **Compliance with government Procurement Act and other related regulations: Suppliers must comply with fair trade principles, environmental protection laws, Labor Act, and occupational safety and health regulations**
- ▶ **Suppliers must hire people with disabilities and indigenous peoples according to the People with Disabilities Rights Protection Act, the Indigenous Peoples Employment Rights Protection Act, and the Government Procurement Act**

Supplier Risk and Impact Assessment Mechanism

Risk Prevention

- Discuss material supply mechanisms with suppliers periodically and establish long-term strategic partnership with suppliers
- Determine safety the stock based on the department-specific material preparation and lead-time to ensure unobstructed supply chain operations



Post-Disaster Damage Control

- Immediately gather information regarding the employee safety, plant equipment, feedstock supply, and finished product damage of suppliers after a disaster and submit the results to all staffing units to understand and take actions
- Hold emergency rationing meetings based on the status of damage, adjust supplier rations, and assess the possibility of backup supply of new suppliers as necessary



Ethical Management Promotion of Suppliers

In 2020, CPC held two "Corporate Ethics and Anticorruption Seminars" and invited representatives from suppliers to attend the seminars to establish the concept of ethical management and anticorruption through discussions. The achievements in two seminars 2020 are as follows:

Northern district: Seminar on procurement anticorruption risk for vendors and employees

- The engineering council and the procurement audit team, Ministry of Economic Affairs were invited to conduct a special report on the case study of the Government Procurement Act. 22 representatives of vendors were invited to participate in the seminar with a total of 120 participants.
- In order to build a quality procurement environment, protect the rights and interests of vendors, and improve the quality and efficiency of procurement, we conducted a mutual communication on the possible anticorruption risk violations in procurement operations.

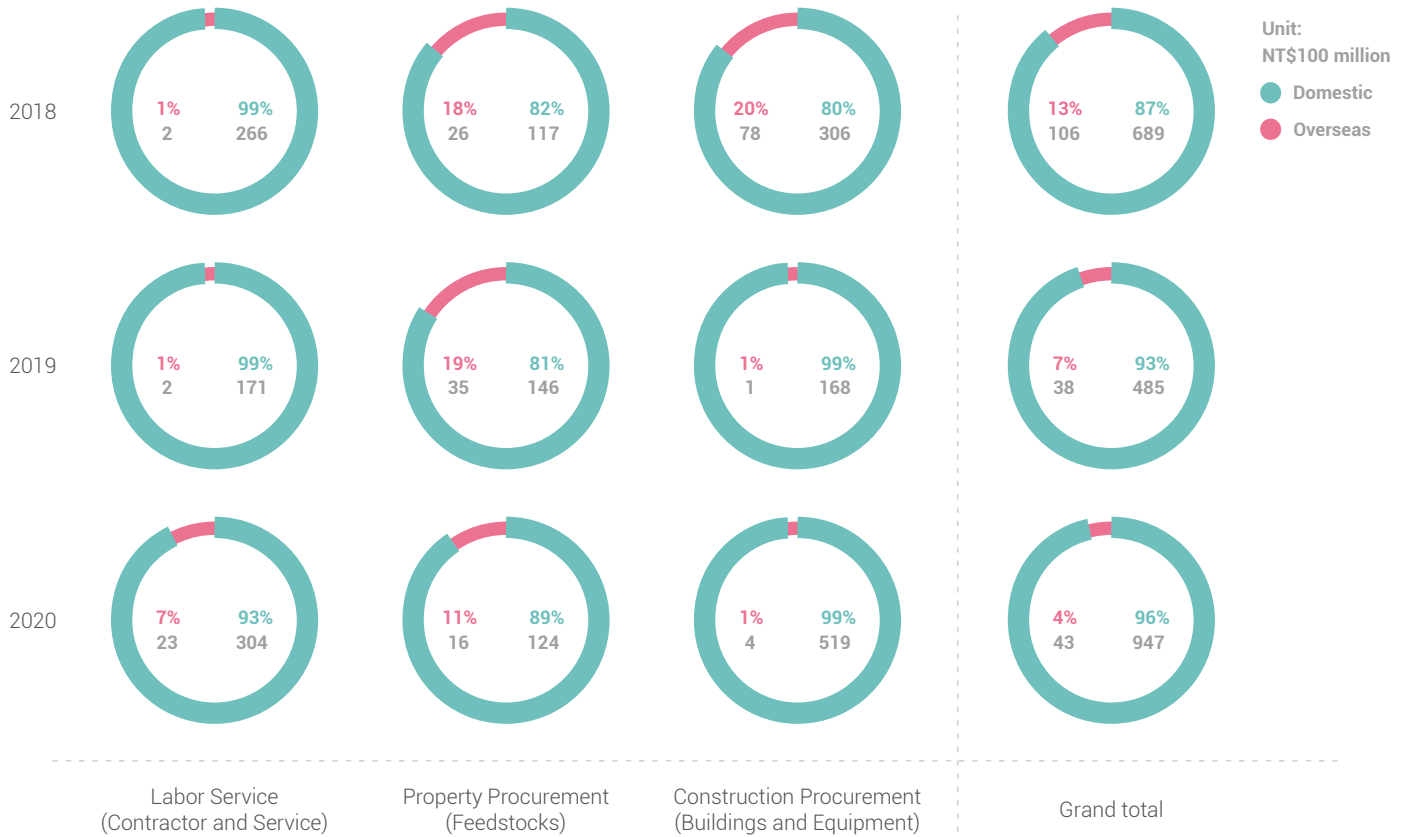
Southern district: Environmental corporate ethical management and anticorruption governance

- We invited Environmental Protection Bureau, Yunlin District Prosecutors Office to jointly arrange the event, which invited 24 representatives from vendors to participate in the event with a total of approximately 300 participants to exchange opinions and sign a letter of intent for cooperation.
- Through cross-sectoral cooperation between industry, government, and academia, we promoted ethical procurement and environmental protection, echoing the issues and initiatives of the event; the government and the people worked together to create an anticorruption, ethical society and a sustainable low-carbon living environment.

CPC Procurements

Procurement Amount (excluding crude oil and natural gas)

CPC procures labor service, property and construction service in accordance with the Government Procurement Act. Procurement amount and weight (by locality) in the last three years are shown below:

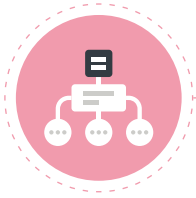


Crude Oil Procurement

Over 90% of energy used in Taiwan is imported. Therefore, it is our responsibility to ensure energy security. CPC's prime mission is to maintain stable energy supply. A crude oil procurement policy has been established based on the Government Procurement Act and internal policies.

Crude oil procurement source by country and by region: The Middle East region accounted for the highest percentage (50%) of CPC's crude oil import in 2020, while Africa and America made up the rest.





Management Method

Ensure that suppliers comply with the following through the development of management requirements:

- Fulfill the contract as scheduled and not affect the production and marketing plan of CPC
- Ensure stable supply to avoid impact on Taiwan's energy security and damage to CPC's business reputation
- No violation of human rights or international and local regulations



Evaluation System

CPC requires suppliers to meet certain standards, disclose their performance background and requirements implementation to ensure that they can meet their contractual obligations as scheduled in order to proof that they are qualified crude oil suppliers

New suppliers

Written documentation shall be provided for review to ensure compliance with requirements and standards

Existing suppliers

Regular review system at least once a year, and review the cooperation with each supplier



Quality Management of Crude Oil

When a supplier proposes a new oil source, CPC shall commence procedures as follows:

- Evaluate and test the quality of its crude oil in accordance with internal procedures
- Retain crude oil samples for testing as a basis for future verification and tracking

Natural Gas Procurement

CPC imported liquefied natural gas (LNG) from 14 countries in 2020 (20 exporting countries in the world), including the sources from Middle East, Southeast Asia, Australia, Africa, Russia and the United States. It is CPC's strategy to diversify sources of LNG supply. CPC also has more than 40 Master Agreements that enable to purchase LNG within a short-term period to meet unexpected gas demand.

Highlights: Taiwan Becomes World's 5th Largest Importer for LNG Procurement

As CPC is the only supplier of imported natural gas in Taiwan and has a major mission of energy security, it has adopted four major measures: "diversification of oil supply sources", "diversification of gas supply sources", "responding to North American shale gas development", and "safe storage of oil and gas". In addition to the first 20-year LNG import contract signed with Pertamina of Indonesia since 1987, long-term contracts ranging from 15 to 25 years were signed with RasGas of Qatar, Petronas of Malaysia, Papua New Guinea, Ichthys of Australia, and Cheniere of the United States. These contracts are also supplemented by short to medium-term procurement contracts. We import LNG from other gas source countries, such as Russia, Oman, Nigeria and Trinidad, to prepare for contingencies to diversify our gas sources and significantly increase the stability of our supply of clean energy. The Natural Gas Business Division carefully evaluates the supply, price and transportation costs of the global LNG market. After the first LNG receiving terminal in Taiwan operated in 1990, the import volume has been growing year by year, with 8.82 million tons imported in 2009. In order to accelerate the energy transition and expand the use of clean energy, it reached 17.75 million tons by 2020,

making Taiwan the 5th largest importer in the world.



8.82 million tons imported in 2009 reached 17.75 million tons by 2020

Contractor management

CPC upholds the business philosophy of "Work Safety First" and considers the management of contractors as its own responsibility. Over the years, CPC has been committed to promoting a number of licensing counseling and training systems in the hope of exerting a positive influence, build professional capabilities and systems, protecting the health and safety of every worker, and fulfilling corporate social responsibility. CPC's specific actions are as follows.

	Management Mechanisms	Operation Strategies and Performance
Basic	Regulations of Human Rights	<ul style="list-style-type: none"> Contractors shall comply with occupational safety and health regulations and conduct regular health inspections of its employees. Contractors shall purchase valid labor insurance and health insurance for the employees. Contractors shall not employ foreign (mainland) workers who are stowaways, illegal immigrants, or who have not been approved by the Ministry of Labor. Contractors shall dismiss or transfer workers in accordance with the law.
	Professional Development	<p>CPC continues to strengthen the license counseling and training system of contractors. The training situation in 2020 is as follows:</p> <ol style="list-style-type: none"> (1) Training of 3-in-1 construction frame for contractors: 26 shifts, 490 participants and 483 passes. (2) Equipment disassembly training of contractors: 48 shifts, 506 participants, 506 passers. (3) Aerial work truck training for contractors: Starting from December 2020 with 4 shifts, 110 participants and 110 passes.
Advanced	Occupational Safety and Health Protection	<ul style="list-style-type: none"> Specify safety and health management regulations to control the access and safety of contractors' personnel, machinery, equipment, vehicles, etc. Use high-tech operations, such as facial recognition, vein verification, and license plate recognition, to strengthen the management and protection of the contractors' workforce. Declare the qualified contractor site manager and occupational safety personnel before starting work. Convene a safety meeting before construction to inform the hazards. Grant daily work permits and implement pre-work education before the daily construction. Convene regular meetings of the joint operation agreement organization to coordinate site management.
	Assessment and Evaluation	<ul style="list-style-type: none"> Establishment of contractors' non-compliance control system: Compile statistics of contractor's non-compliance, further analyze the data, and evaluate contractors' overall safety and health management capability. Non-compliance record registration: After the completion of construction, colleagues shall fill out the evaluation form of the contractor in the system. The letter of improvement will be issued to contractor with the average score less than 6 (full score of 10). Regularly follow up, assessment and improvements are required.

2.4.3 Franchise Management

CPC has a strict management and counseling mechanism for franchised stations from construction to operation. CPC's specific actions are as follows.

Management Mechanisms	Operation Strategies and Performance
Development of Basic Skills	<p>Soft and Hard Skills:</p> <p>In accordance with gas station regulations, gas station land use regulations, building and fire regulations, etc., we provide assistance in preparing gas stations and obtaining business licenses. In order to assist in the operation and management of franchised stations, we set up a "fuel tank supply connection system". We authorize the use of an "automated information management system", assist in the establishment of credit card machines, and launch our own brand of CPC PAY mobile payment services. We plan and promote various multi-faceted products or service businesses into the CPC gas station chain management system to generate extra fuel revenues and strengthen brand services at franchised stations and fulfill the diversified service needs of consumers.</p>

Development of Basic Skills	<p>Authorization of Trademark</p> <p>The content, standard, quantity and location of the CIS of the franchised stations and the self-operated stations of CPC are all approved and authorized by the CPC before they are set up. After that, we conduct monthly assessment at the franchised stations to ensure the cleanliness and integrity of the CIS and establishment of brand recognition by consumers.</p>
Enhancement of Professional Knowledge	<p>We provide active counseling on various fueling SOPs, subsidies for environmental testing and education training at franchised stations, and environmental and industrial safety items in the contracts and perform assessments to urge franchised owners to implement them and take care of employee safety and health.</p> <p>Annual education training for franchisees:</p> <p>(1) Management training: 30-40 classes per year with about 4-5 hours per class and trainees of about 1,300 per year.</p> <p>(2) Mobile payment briefing: about 15 sessions with about 3-4 hours per session and about 300 participants per year.</p> <p>Domestic observation activities: about 28 sessions per year with 3 days per session and about 1,400 participants per year.</p>
Quality Management Evaluation	<p>Oil quality:</p> <p>(1) Oil products are tested and qualified at all stages before shipment.</p> <p>(2) We have regulations on oil quality sampling and testing at franchised stations: franchised center counselor (staff) take oil samples from franchised stations every month to ensure the quality of oil sold at franchised stations and to protect the rights of consumers.</p> <p>Service quality</p> <p>(1) Objective: Pursue "business philosophy", "corporate identity", "product service" and "operation management" as the four consistent business objectives of the franchise chain.</p> <p>(2) Actions:</p> <ul style="list-style-type: none"> · Provide comprehensive counseling and point-of-sale 3S system integration for franchise stations. · Authorization of the CIS. · Stipulate the service evaluation method in the contract. · Organize recognition activities for outstanding stations.
Promote the Culture of Sustainability and Co-Prosperity	<ul style="list-style-type: none"> • In response to the rising awareness of environmental protection, we provide partial subsidies for inspection fees and oil tank cleaning costs to assist franchised stations in their environmental protection inspection operations. • In response to the impact of social and environmental changes, changes in consumption patterns, environmental protection and energy conservation, and the trend of multiple mobile payment, CPC actively promotes green energy smart gas stations and electric motorcycle charging stations, and launches its own CPC PAY mobile payment services to provide consumers with multiple service needs and assist franchised stations in improving operational efficiency. • Support franchised stations to fulfill their corporate social responsibility, conduct public toilet improvement projects, assist in the presentation and evaluation of public toilet services, and provide hardware incentives to build a quality brand image. • Encourage joint arrangement of culture festivals, distribute spring couplets and red envelopes, and participate in social welfare activities such as tree planting and blood donation organized by CPC. • Provide franchised stations with highway network maps, and provide water and gas refilling services to facilitate driving.

Highlights: Service Quality Improvement's Incentives

CPC regularly organizes service quality improvement's incentives for branches and franchised gas stations. CPC selects gas stations with outstanding performance through the evaluation mechanism at each stage. In 2020, out of 1,278 gas stations, a total of 10 specialty stations and 60 special stations were selected. The incentives brought together all staff members to attach importance to the management philosophy of "Utmost Quality", "Best Service" and "Selfless Contribution". Through the neat and uniformed appearance and good attitude of the gas station staff and the perfect hardware and facilities, customers can feel the sincerity and dedication of CPC gas stations.



"Supreme Quality, Superb Service, Selfless Contribution"

2.4.4 Distributor Management

CPC considers distributors as important partners. Through regular communication and strengthened management mechanism, we hope to work together for brand management and sales enhancement to create a win-win situation. CPC's specific actions are as follows.

Management Mechanisms	Operation Strategies and Performance
Contract Management	According to the market and changes in supply and demand, we review and revise the content of the distributor contract to regulate the rights and obligations of both parties in sales channels and brand management. After the actual negotiation with each distributor, the contract is executed according to the agreement of both parties.
Enhancement of Professional Knowledge	<ul style="list-style-type: none"> • Visit the market from time to time and keep abreast of the market and competitors' conditions to flexibly adjust our operation strategies. • Implement product promotion and after-sales technical services. • Arrange annual education and training courses for distributors to enhance their professional functions, oil management experience and technical service quality.
Incentive and Evaluation System	<ul style="list-style-type: none"> • Lubricant distributor incentive system: adopt obligation and incentive at the same time, offer a rebate incentive discount for achieving the performance target. • Lubricant distributor evaluation system: evaluate high performing distributors and coach lagging distributors. • Conduct annual customer satisfaction surveys to collect and review satisfaction and feedback related to sales, logistics and technical services of distributors.
Continuous Feedback Improvement	<ul style="list-style-type: none"> • Organize distributor meetings to promote sales strategies and marketing concepts, collect business information and customer feedback, and maintain mutual trust and friendship between the two parties. • Adjust our strategic planning for the next year based on the results of the satisfaction survey. • Commence in-depth interviews with distributors, feedback and review of the effectiveness of the current mechanism to adjust and revise sales targets, individual counseling, and consensus building among distributors to help achieve targets.

Highlights: Distributor Meetings

CPC maintains good communication with its distributors and held several distributor meetings in 2020 to conduct business reports, exchange information and opinions with them, and discuss strategic planning for the next year.



2.5 Membership in External Organizations

2.5.1 Participation in External Initiatives

Participate in Overseas Awards

- 1 Won the top awards of "Leadership Award - Industry Champion of the Year" and the "Sustainability Award - Best Workplace in Asia" at the "2020 Asia Corporate Excellence & Sustainability Awards (ACES)".
- 2 Won the "Business Leadership Award for Circular Economy" and "Human Capital Investment Award" at the "2020 Asia Responsible Enterprise Awards (AREA)"; and was awarded the carbon reduction champion certificate.

Participate in Overseas Forums

- 1 **2020 European Association of Geoscientists and Engineers (EAGE):**
EAGE is one of the largest geoscience forums in Europe. Due to the pandemic, the conference was held as an online virtual conference with the main topics of exploration technology, production monitoring, "AI," "information management," and 60 categories. The seminar has diverse contents. CPC participates in seismic data acquisition, seismic data processing, seismic data interpretation, sedimentary environments and petroleum systems, borehole geological research, carbon dioxide storage, geothermal and gravity and other topics to understand the current status of global exploration hotspots and new technologies, such as optimization and historical tuning of oil and gas field production simulation, fluid property analysis, enhanced oil recovery, application of artificial intelligence in the petroleum industry and energy transformation, etc., to refine future exploration and mining research directions and inject new concepts into mining area assessment.
- 2 **2020 ATD Association for Talent Development International Conference:**
Due to the pandemic, the conference was held as an online virtual conference with the main topic of "Building Capabilities and Connection", covering "career development", "effectiveness evaluation", "global vision", "instructional design", "leadership", "learning science", "learning technology", "management", "training management", "talent development strategy and management", "training implementation and guidance", etc. The colleagues of the Human Resources Division of CPC learned together with international experts and peers in the field of human resources online from June 1 to June 5, 2020.
- 3 **2020 Human Resource Development Asia Pacific Annual Exhibition and Sharing Session:**
In addition to sending a dozen of colleagues to the forum, the CPC's Human Resources Division also participated in the exhibition and shared its experience of winning the "National Talent Development Award" with the theme of "Practicality and Innovation". During the forum, CPC met more than 700 experts and peers in the field of human resources in Taiwan for exchange and sharing, which was significantly recognized by our colleagues.

Signed Cooperation Agreement

- 1 The CPC Kaohsiung Refinery Environmental Education Park entered into an environmental education alliance and cooperation agreement with the Reclaimed Water Demonstration Park of NEPA 2020.
- 2 CPC entered into a memorandum of cooperation on environmental education with the ASE Green Technology Education Center.




Membership in External Organizations

2.5.2 Participation in External Organizations

In order to align with domestic and international industry trends and to maintain the competitiveness and visibility of CPC, we participate in domestic and international industry organizations and public associations for exchange and cooperation. It expands multilateral relationships and exchange business experience and market information. The main external organizations and identities are listed as follows.

Type	Name of External Organization	Form of Participation	Important Discussions and Decisions or Performance in 2020
 <p>Industrial Exchange and Development</p>	International Group of Liquefied Natural Gas Importers	Member, executive committee member	CPC continues to participate in the organization to promote the exchange of information and experience with LNG importers in order to improve the safety, reliability and efficiency of LNG imports.
	Chinese International Economic Cooperation Association	Class A membership; member representatives: 5	CPC continues to participate in the CIECA member meetings to capture the international economic situation and investment opportunities and to promote CPC's overseas business.
	Chinese Association for Energy Economics	Member; member representatives: 2	CPC serves as the secretariat of the association, organizing management and supervisory meetings, annual conferences and academic seminars to keep abreast of national policy developments, promote energy industry exchanges and expand multilateral relations.
	Chinese Petroleum Institute	Member Director/ Managing Supervisor	In order to capture the development opportunity of energy transformation, CPC invited the institute to select the "CPC Outstanding Paper Award" and publish the paper report in the quarterly journal of the institute to expand the influence.
	Petrochemical Industry Association of Taiwan	Member; member representatives: 6	CPC participates in the association to coordinate the domestic petrochemical industry to promote common interests and to plan the improvement and promotion of the industry to promote economic development.
	Taiwan Biotechnology Industry Alliance	Member; member representatives: 3	Continue to join the alliance to strengthen the cooperation between domestic biotechnology manufacturers and academic research units. Furthermore, to integrate resources from industry, academic, and research units to help promote CPC's biotechnology product sales.
 <p>Technological Innovation</p>	Chinese Association of Museums	Member	Through the use of organization resources (e.g., global information website and periodicals), CPC strengthens the promotion of its own museum information and solicits professional consultation services from museums, thereby promoting inter-museum cooperation and mutual assistance for joint development.
	National Association of Corrosion Engineers	Member; member representatives: 13	CPC continues to join the association as a corporate member in order to gain access to corrosion-related technical resources and benefits such as license renewal for members, and to continue to train corrosion-related professionals.
	Chinese Society of Structural Engineers	Member; member representatives: 1	CPC continues to participate in the engineering-related seminars organized by the institute, and regularly provides a quarterly newsletter for CPC colleagues to enhance their professional functions.
	The Corrosion Engineering Association of the Republic of China	Member; member representatives: 1	CPC continues to cooperate with the association to hold academic lectures on corrosion engineering, and from time to time commissions the association to conduct corrosion engineering research and problem solving.

Membership in External Organizations

Type	Name of External Organization	Form of Participation	Important Discussions and Decisions or Performance in 2020
 <p>Corporate Governance</p>	Institute of Internal Auditors, ROC (Taiwan)	Member; member representatives: 5	The auditors of CPC continue to attend audit-related courses offered by the institute to improve the theoretical and practical knowledge of internal auditing and to promote the sound development of CPC's internal audit system.
	Taiwan Institute for Climate Change and Sustainable Energy	Member; member representatives: 3	Participate in corporate sustainability awards and provide information exchange on corporate sustainability reports. Furthermore, CPC actively participates in professional training and certification for corporate sustainability managers.
 <p>Sustainable Management and Environmental Protection</p>	Taiwan Institute for Sustainable Energy	Member; directorship	Support the promotion of sustainable business practices and the implementation of the United Nations Sustainable Development Goals (SDGs).
	ROC Business Council for Sustainable Development	Premium member; member representatives: 12	Assisted in the review of the translation of GRI 306: Waste (2020) into Chinese.
	Taiwan Association of Soil and Groundwater Environmental Protection	Member; member representatives: 3	CPC continues to participate in the association's seminars related to soil and water remediation and conducts technical exchanges with the association from time to time.
 <p>Industrial Safety Management</p>	Industrial Safety and Health Association of the ROC	Member	CPC continues to participate in the occupational safety and health training activities promoted by the association with the aim of enhancing the knowledge and skills of employees and training various occupational safety and health professionals.
	Taiwan Safety Council	Member; member representatives: 3	CPC participated in the "15th Taiwan Safety Culture Academic Forum" held by the council, focusing on COVID-19 pandemic protection, process safety management, and equipment integrity to conduct in-depth discussions, research, and improvement measures.



 Chapter 3

Green Citizenship · Circular CPC



Chapter summary

CPC has long devoted its attention to environmental protection. In addition to ensuring energy-saving and carbon reduction and reducing environmental impact, CPC also applied the TCFD framework, ISO14001 environmental management system and other relevant international standards to address the risks of climate change and seek opportunities for the transformation to the circular economy as early as possible. Meanwhile, habitat preservation for little terns is being carried out near the Guantang area where the third LNG Receiving Terminal is located. This effort signifies CPC's intent to simultaneously cater to economic.

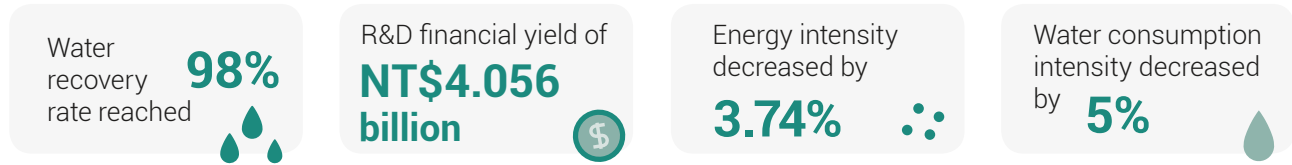
Recommended audiences

- Shareholder (MOEA)
- Business Partners
- Public representatives
- Communities
- Customers
- Government
- Employees
- The media
- NPOs/NGOs

Corresponding SDGs



CPC Highlights



As a high carbon emission energy industry, CPC's main guiding principles for promoting environmental protection are as follows:

- 1 Pollution prevention:** As pollution prevention is more important than remediation, CPC strengthens its source control, adopts low-pollution processes and the latest pollution prevention facilities, implements environmental assessment commitments, and establishes environmental monitoring systems to maintain and improve the environment.
- 2 Energy-saving and waste reduction:** Energy savings and resource reuse are implemented to reduce the generation of waste.
- 3 Environmental sustainability:** To establish a development model that fulfill current needs without harming the needs of future generations while protecting the environment.

In order to fulfill its commitment of environment and ecological conservation, CPC's Environmental Protection Division changed its name to "Environmental Protection and Ecological Conservation Division" in 2018. The division established the Ecological Conservation Executive Committee, while setting up special environmental protection teams in each department to establish an integrated environmental management system. In line with the policy direction and the trend of convergence with sustainable development, CPC have added the key points of environmental organization management, required each unit to set up designated staff, set up a website for environmental documents, and provided an internal and external complaint mechanism. In addition, CPC required all supervisors to finish professional training in environmental protection and implemented regular review meetings to examine the implementation progress with the purpose to achieve CPC's environmental management policies related objectives.

Topics and Frequency of the Environmental Work Review Meeting in 2020

Items of Work Review Meeting	Frequency
Environmental protection meeting	
Equipment components and volatile organic compounds (VOC) improvement meeting	Once per quarter
Guantang Industrial Park Ecological Conservation Committee	
Waste taskforce meeting	At least once per year
Soil and groundwater pollution remediation and improvement meeting	
Energy-saving effectiveness tracking meeting	Two times per year
Energy-saving and carbon reduction working group meeting	
Working group meeting on soil and groundwater pollution remediation	Three times per year

Environmental protection expenses	2018	2019	2020
Company operating cost ¹	300,896	265,905	247,818
Upstream and downstream relevant costs of suppliers and customers ²	3,171	2,424	2,305
Management activity cost ³	29,496	25,282	26,052
R&D cost ⁴	10,868	10,180	12,731
Social activity cost ⁵	15,915	21,390	15,826
Loss and compensation cost ⁶	2,010	283	109,000
Fees and taxes ⁷	439,047	416,750	427,172
Total	801,403	742,214	742,804

Unit: NTD ten thousand

Mitigation and Adaptation of Climate Change | Green Energy Transition and Circular Economy | Energy and Resources Management | Pollution Prevention | Ecological Preservation and Soil Remediation | Featured Topic

Note 1: Expenditure on pollution prevention, global environmental protection, and resource recycling.

Note 2: Expenditure on green procurement, resource recovery and recycling, products and services from implementing environmental protection, and additional expenditures on packaging containers from reducing environmental impacts.

Note 3: Expenditure on environmental education and training, verification and certification, environmental monitoring and measurement, handling environmental impacts, insurance for environmental protection, air pollution, soil pollution, water pollution and other fees.

Note 4: Expenditure on environmental protection product research and development and expenditure on research to reduce environmental impacts on the products in the market, and expenditure on environmental impact assessment.

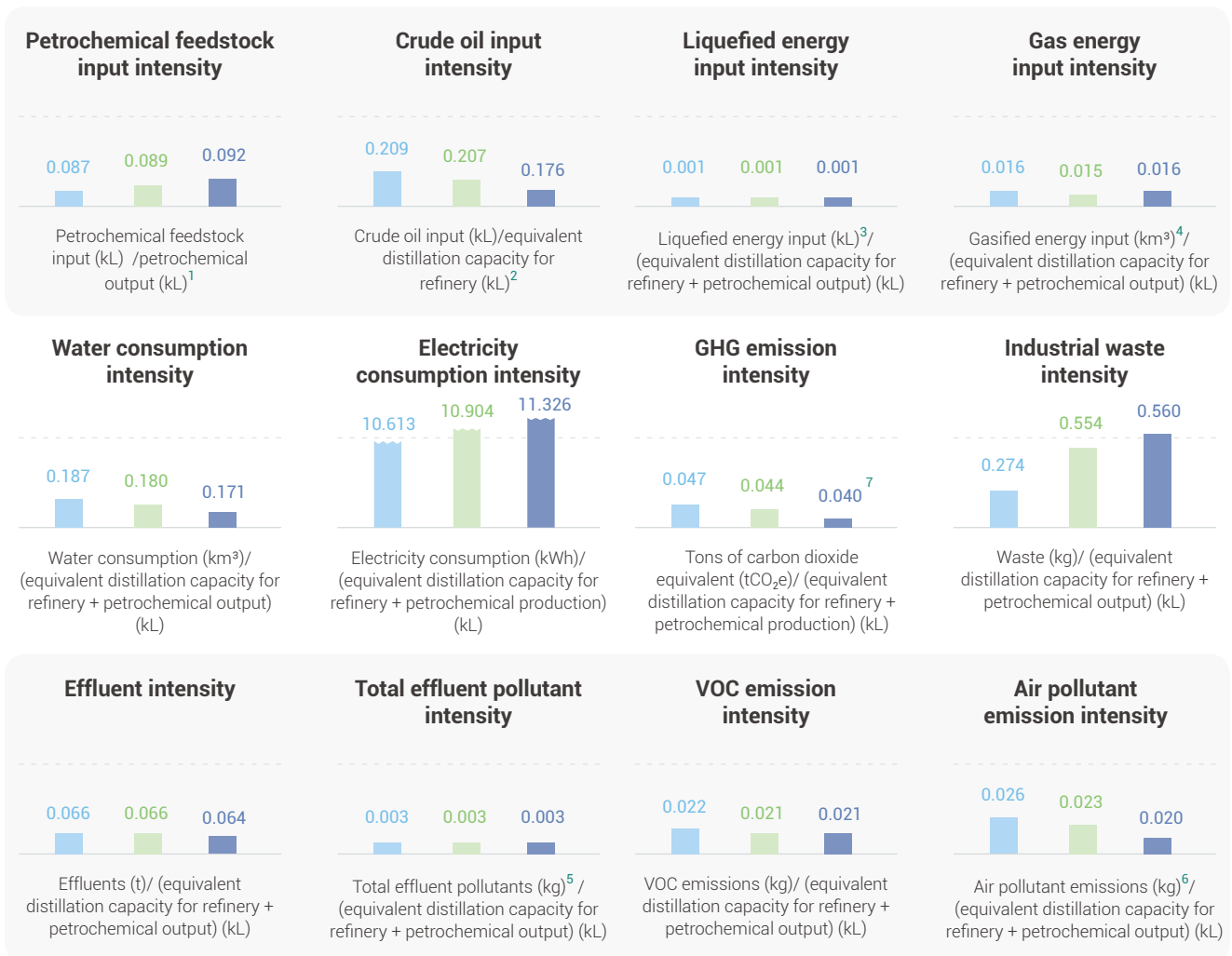
Note 5: Expenditure on nature conservation, afforestation, landscaping and other environmental improvements, expenditures on sponsoring community activities for environmental protection, environmental groups, announcements, environmental protection publicity, and other information.

Note 6: Expenditure on environmental issues, compensation, penalties and lawsuits, and maintenance of urban landscape and living environment quality.

Note 7: Fees regarding air pollution, soil pollution, water pollution and other fees imposed by the government.

Environmental performance indicators

● 2018 ● 2019 ● 2020



Note 1: Petrochemical feedstock input=(naphtha+ reformate+ xylene mixture) input, the petrochemical output is the output of ethylene, propane, butadiene and benzene converted into equivalent distillation capacity (EDC).

Note 2: EDC (Equivalent Distillation Capacity): Standardized amount for different refinery processes.

Note 3: Liquefied energy input= (gasoline+ diesel+ fuel oil) input.

Note 4: Gasified energy input= (NG+ fuel gas) input.

Note 5: Total effluent pollutants=total amount of (COD+SS+Oil) in effluents.

Note 6: Air pollutant emissions=total amount of (SOx + NOx + TSP).

Note 7: The initial estimated value is 0.040. Third party verification is to be completed by the end of July 2021.

3.1 Mitigation and Adaptation of Climate Change

Short-term	Medium/long-term
<ul style="list-style-type: none"> · Achieve the annual GHG reduction goal and education training will be held at least twice a year · Complete climate risk facility inventory of 24 energy supply plants · Encourage employees to obtain environmental related certificates and participate in professional training 	<ul style="list-style-type: none"> · Complete the adaptation strategy and reinforce facilities for medium-high climate risks · CPC has set its phased and long-term goals of to 30% and 56.7% emission reduction target compare with the 2005 by 2030 and 2050 respectively, which conforms with the carbon reduction goal that Taiwan has committed and outlined in the Greenhouse Gas Reduction and Management Act · Cooperate with the government policy schedule to achieve the goal of net zero carbon emissions

Climate change has become a global concern and is an inevitable issue for CPC. It will directly or indirectly affect energy supply and costs, cause changes in energy demand and resulting in investment losses. It will have a direct impact on energy supply facilities, such as oil and natural gas refining, distribution, storage, receiving and transmission infrastructure. In response to the national carbon reduction policy and the global trend of climate risk, CPC has set carbon reduction targets for 2030 and 2050 and continues to assess the risks and opportunities of climate change. In recent years, the TCFD climate risk management framework has been commonly adopted by large enterprises as a framework for climate risk assessment. CPC has integrated the TCFD concept with existing risk processes, conducted an inventory of climate risks and opportunities, and developed an adaptation strategy.

3.1.1 Mitigation of Climate Change

In response to the international trend of the mitigation of climate change, carbon reduction goal and enhance the competitiveness of the green economy, CPC has followed the national policy to set GHG reduction targets and continuously tracked emissions through GHG inventory. In line with the national long-term GHG reduction targets, CPC introduced the ISO 14064-1 GHG inventory system in 2004 to conduct annual GHG emissions inventory, which the refinery emissions are verified by third-party certified by the EPA. Based on which GHG reduction targets, GHG management plans are promoted to reduce GHG emissions.

In line with the national carbon reduction target of the Greenhouse Gas Reduction and Management Act (GHGRA) announced by the EPA, 50% reduction of GHG emission compared with 2005 needs to be done by 2050. CPC sets 11.58 million tons (CO₂e) emission of 2005 as the base year emissions and conducts an annual GHG inventory in Scope I and Scope II based on the management table of GHG coefficients announced by the Environmental Protection Administration. Self-site (plant) coefficient will be used first, and the GWP value will be adopted according to the regulations of the Environmental Protection Administration. CPC's GHG inventory operations are conducted by the operation control method, and the results are expressed in terms of CO₂e. In 2020, GHG emissions were reduced by 1 million tons of CO₂e compared to 2019. Since 2016, the GHG emission intensity has shown a decreasing trend for three consecutive years. GHG emissions intensity in 2020 was increased by 23% compared to that in 2019 due to the 29% decrease of revenue resulted from COVID-19.³

Year	Scope I	Scope II	Total Emissions (ten thousand tons)	Scope I Percentage of emission control
2018	723.3	114.0	837.3	97.4%
2019	693.5	121.4	814.9	97.2%
2020 ³	586.4	128.4	714.8	97.1%



Note 1: CPC does not use biofuel.

Note 2: The upstream and downstream supply chains of CPC are extensive, and it is difficult to a certain extent to carry out the inspection on the supply chains. However, as CPC is currently conducting an ongoing supply chain inventory. The quantification and verification of Scope III are temporarily not included in the emissions calculation.

Note 3: The 2020 greenhouse gas emissions are preliminary estimates, and the total emissions must be confirmed after the refinery completes third-party verification in July 2021; At that time, the verification information will be revealed in the QR code link; greenhouse gas emission intensity = annual greenhouse gas emissions / annual revenue (kg/NT\$).

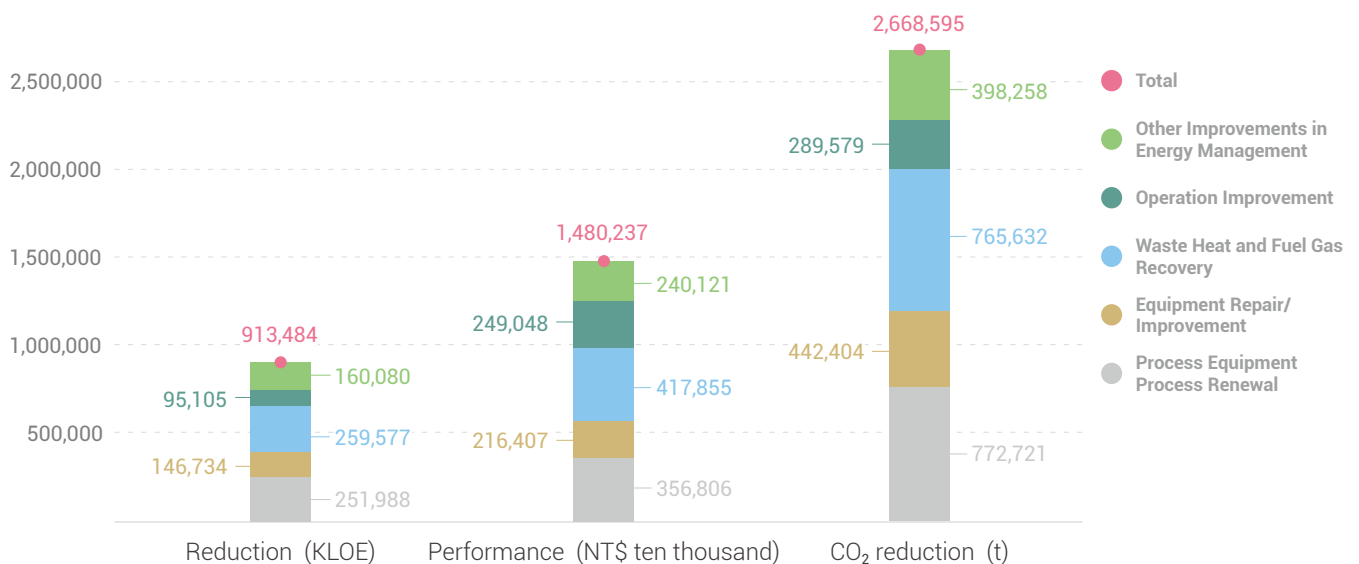
Note 4: In 2020, CPC implemented 58 energy-saving and carbon-reduction measures. Greenhouse gas emission intensity (= annual greenhouse gas emissions / EDC refining volume) is calculated as 0.040 at the initial estimate, which is better than the value 0.044 in 2019.

Mitigation and Adaptation of Climate Change | Green Energy Transition and Circular Economy | Energy and Resources Management | Pollution Prevention | Ecological Preservation and Soil Remediation | Featured Topic

In line with the first phase of GHG emission control actions, CPC has been implementing a number of process improvement and energy management projects since 2005 to continuously reduce GHG emissions. The cumulative energy savings from 2005 to 2020 was 913,000 KLOE, equivalent to a carbon reduction of 2.669 million tons. Energy consumption had improved significantly across all major production units during this period.

In 2020, internal and external experts were invited to the natural gas processing plants of the Exploration and Production Department and the Yongan LNG Receiving Terminal of the Natural Gas Business Division for energy-saving and carbon-reduction counseling. It is to help review the operation and energy utilization efficiency of the major equipment and provide suggestions for improvements. The result is later on concluded in the energy-saving and carbon-reduction effectiveness tracking meetings.

Major Energy Conservation Measures and Performance 2005-2020



With respect to the "Regulations for Setting Energy Conservation Targets and Implementation Plants of Energy Users" promulgated by the Bureau of Energy, CPC continued to promote energy-saving programs, energy-saving lighting and energy-saving equipment, etc. CPC has saved over 1% of electricity on average every year. Meanwhile, "Refinery Performance Enhancement Program" and "Petrochemical Plant Performance Enhancement Program" have been devised to support GHG Emission Control Action Plans (phase I) of CPC's energy and manufacturing departments. Based on the 2014 energy consumption emissions of its refineries and petrochemical plants, the CPC GHG emissions reduction target from 2018 to 2020 is 2.3% (105,500 and 51,000 tons, respectively) were achieved in 2020. CPC will continue its efforts in energy saving and carbon reduction to reduce emissions by 30% and 56.7% in 2030 and 2050 as the milestones and long-term goal. CPC will also track the implementation through the bi-annual energy saving and carbon reduction meetings.

CPC Energy Sector Phase I Action Plan

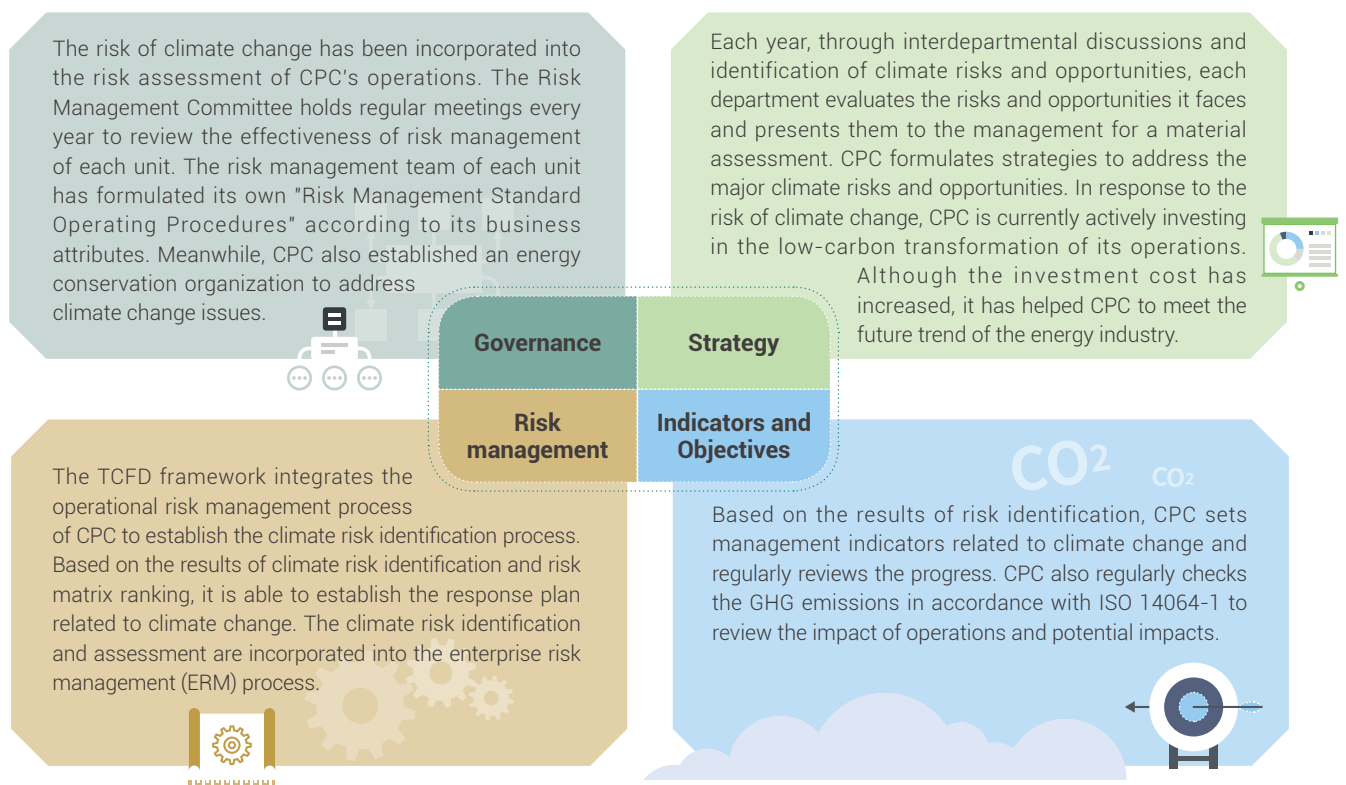
Program	Period	Expected Benefits	2020 outcome
Increase Low-Carbon Energy (Natural Gas) Supply Program	2018-2020	Natural gas loading/unloading capacity amounted to 16.5 million tons in 2020	The operating volume of natural gas in 2020 is 17.75 million metric tons. Natural gas loading/unloading capacity achieved the goal of 16.5 million tons per year in 2020.

Mitigation and Adaptation of Climate Change | Green Energy Transition and Circular Economy | Energy and Resources Management | Pollution Prevention | Ecological Preservation and Soil Remediation | Featured Topic

Program	Period	Expected Benefits	2020 outcome
Macroalgae Aquaculture (Red Algae) Technology Development Program	2018	20-ton red algae pilot is built in Yongan LNG Plant to develop the outdoor LNG cold	The macroalgae aquaculture (red algae) technology development program was completed in 2018 with the achievements as follows: The patent was acquired, and the average output of a 20-ton pond up to 1kg/m2/week. In 2020, it won the "Excelsior Award" at the 17th National Innovation Award.
Refinery Performance Enhancement Program	2018-2020	seawater drainage macroalgae aquaculture technology	Continuous improvement in the refineries' energy efficiency, achieving a steady annual carbon reduction performance of 113,200 tons from 2018 to 2020.
Promote fuel replacement with natural gas	2018-2020	Guidance for 10 fuel-consuming manufacturers to replace fuel with natural gas each year	In 2020, CPC completed guidance for 27 plants to use natural gas. A total of 97 plants received counseling from 2018 to 2020.
Petrochemical Plant Performance Enhancement	2018-2020	Implement energy conservation and improvement measures every year. Starting from 2014, the estimated energy efficiency rate is 2.3% (approx. carbon reduction of 51,000 tons) of an entire plant	A total of 2.5% energy efficiency improvement (approx. carbon reduction of 55,500 tons) was achieved from 2018 to 2020.

3.1.2 Adaptation of Climate Change

CPC pays constant attention to the latest global trends and development as a response to climate change and related impacts. Meanwhile, TCFD (Task Force on Climate-related Financial Disclosures), published by the Financial Stability Board (FSB) in June 2017, is progressively being incorporated into the management system for information disclosure. CPC's original risk management policy has been integrated with the climate risk and opportunity framework proposed by TCFD. An inventory of climate risks and opportunities has been conducted for policy, regulation, market, physical risks, and R&D of low-carbon product to formulate an adaptation strategy.



CPC's Implementation Strategy of Climate Change Adaptation

Establishment of an Energy Conservation Organization



Key Measures

- In 2005, CPC established the energy conservation service team, in charge by the Vice President, to coordinate the promotion of energy conservation at CPC, and to provide downstream customers with consultation and services on energy conservation technology. The main focus is on introducing and R&D of new energy-saving technology, establishing the unit energy consumption indicators for major plants, formulation of improvement objectives, and enhancement in the effectiveness tracking and management. Meanwhile, CPC also established a technical consulting team to provide each plant and department with necessary technical consultations and services.
- CPC established the Energy Conservation and Carbon Reduction Team in 2019. The team holds working team meetings at the plant regularly and is responsible for the research and review of energy conservation and carbon reduction practices, introduction and implementation of energy conservation technologies, the guidance of energy conservation and carbon reduction of plants and divisions, and compilation and experience sharing of energy conservation cases.

Strengthen the Promotion of Energy Saving and Carbon Reduction and Personnel Training



Key Measures

- Raise the energy conservation awareness among employees, energy management workshop, improve refinery energy conservation efficiency and energy productivity of each unit.
- Implement automotive and motorcycle inspections, fuel saving and turning off lighting education, as well as promote activities such as planting trees and giving away saplings.

Participate in the government's energy conservation, carbon reduction, climate change adaptation plans, and promote the assessment and improvement of climate risks in refining, gas and oil supply systems



Key Measures

- Continuous annual GHG emissions inventory to reduce impacts.
- Cooperate with the National Green Energy and Low Carbon Action Plan of the Executive Yuan to expand the LNG receiving terminals in Taichung and activate the investment and construction of the third LNG receiving terminals.
- Cooperate with the adaptation strategy and counseling program for the energy sector of the Bureau of Energy in response to climate change and conduct climate risk assessments for production, transmission, storage, and industrial safety facilities at refineries, LNG receiving terminals, gas supply centers, and oil supply centers, etc. In 2020, seven plants and departments, including Taoyuan Refinery, Yongan LNG Plant, Tunghsiao Transmission, Hsinchu Gas Supply, Taichung Gas Supply Center, Su'ao Oil Supply Center, and Wangtien Oil Supply Center, completed climate risk assessment reports, and will subsequently develop improvement plans for high-risk facilities based on the assessment results.

Improve Refinery Process and Enhance Energy Efficiency



Key Measures

- Make structural enhancements and equipment renewals to the refinery process. Adopt the best available technology (BAT) to enhance energy efficiency and reduce environmental impact.
- Actively enhance the energy efficiency of refineries and petrochemical plants; set energy conservation and carbon reduction targets to control unit energy and resource consumption.
- Introduction of energy-saving technologies such as heat recovery through heat pipe, heat exchanger network simulation and new furnace air preheater; installation of crude oil pre-boiling system, motor conversion to inverter motor, non-stage adjustment system for reciprocating compressor, heating furnace chamber coating with high radiation coating; enhancement in the recycling of fuel gas, low and medium pressure steam and water resources.

Regional Energy and Resource Integration



Key Measures

- Promote waste heat recovery in collaboration with other companies in the industrial park, such as purchasing steam produced with furnace waste heat of China Steel Co. to reduce utilization of energy.
- In 2020, the Dalin Refinery utilized a total of 367,000 tons of steelmaking waste steam generated by China Steel Co.. It reduced the use of natural gas by 30,000,000 m³, which is equivalent to a reduction of 60,000 tons of direct CO₂ emissions.
- Use of natural gas and cold energy, which supplied Far Eastern Industrial Gases and Blue Ocean Industrial Gases with 348,000 tons and 570,000 tons of cold energy, respectively in 2020.

Exchange with International Organizations



Key Measures

- Conferences of the Parties (COP): CPC participated in 14 COPs between 2003 and 2020, which enabled it to observe methods for climate change impact and reducing carbon emission, and devise carbon reduction plans accordingly. (The organizer canceled the conferences due to the pandemic in 2020).
- The first Norway Economic Cooperation Conference: In October 2010, CPC sent participants to attend the conference and share their efforts on climate change and green business development.

Promote and Implement Green Energy-Related Technologies



Key Measures

- Expand the scope of industry-research cooperation to develop technologies in relation to renewable energy and green energy, such as solar energy, biomass energy, energy storage materials, and biomaterials to keep abreast with the trend of high-value petrochemical products and facilitate the investment in the green industry.
- Construct solar photovoltaic systems, promote Smart & Green e-Stations, and obtain green building certification and renewable energy site certification for gas stations.

Increase Natural Gas Transmission and Storage Capacity



Key Measures

- Expand natural gas storage and transportation facilities in Yongan and the Port of Taichung. In 2020, the supply capacity of natural gas amounted to 16.5 million tons. It is expected to increase to more than 23.5 million tons in 2025.

Promote the Expansion of the Application of Biofuel



Key Measures

- Continue to supply and promote E3 alcohol gasoline at 14 gas stations in Taipei and Kaohsiung Cities. Engage in the R&D of microalgae cultivation, renewable diesel, and bio-ATF technologies and standard verification.

Mitigation and Adaptation of Climate Change | Green Energy Transition and Circular Economy | Energy and Resources Management | Pollution Prevention | Ecological Preservation and Soil Remediation | Featured Topic

Climate Change Risks of CPC

Aspect	Items	Impacts on CPC	Countermeasures	
Physical risks	Instant	Flood	Climate change leads to an increase in the occurrence and intensity of heavy rainfall, which may cause damage to some operational facilities.	Evaluate the vulnerability of the facilities and assess the strategies such as raising equipment and setting up suction pumps in response.
		Strong wind	Climate change leads to an increase in the intensity of typhoons, which may cause damage to some operational facilities.	Evaluate the vulnerability of the facilities and assess the strategies such as strengthen infrastructure and provide mitigation equipment in response.
		Droughts	Production disruption due to output reduction or facility shutdown as a result of water rationing.	<ul style="list-style-type: none"> Reclaimed water through wastewater recycle system to improve water efficiency. Purchase of reclaimed Water.
	Long-term	Flood	Climate change has increased the frequency and intensity of heavy rainfall, which may cause damage to some operational facilities.	CPC will take an inventory of the vulnerability of the facilities and develop an adaptation strategy through the guidance of ITRI.
		Strong wind	Climate change has led to an increase in the intensity of typhoons, which may cause damage to some operational facilities.	CPC will take an inventory of the vulnerability of the facilities and develop an adaptation strategy through the guidance of ITRI.
		Market	The Shift of boiler fuel from oil to natural gas or fuel gas; fuel oil consumption decreased.	Enhance fuel oil export.
Transition risks	Policies and laws	Amendments to the Greenhouse Gas Reduction and Management Act proposed to include a Carbon pricing options for Taiwan	The new carbon pricing will have an impact on operating costs.	Improve energy efficiency, implement energy saving and carbon reduction, and express industry views at public hearings in a timely manner.
		Market	The Shift of boiler fuel from oil to natural gas or fuel gas; fuel oil consumption decreased.	Enhance fuel oil export.

Opportunities in Climate Change of CPC

Aspect	Items	Effects on CPC	Implementation Performance
Energy and Resources Integration	Promote regional energy-resources integration such as the use of nitrogen, steam, fuel gas, hydrogen, caustic soda, and fuel oil	Enhance energy and resource efficiency and reduce site pollution to effectively reduce environmental impact and improve environmental quality.	<ul style="list-style-type: none"> Purchase steam, nitrogen from China Steel Co. and caustic soda from others to reduce energy consumption. Sell fuel gas, hydrogen, and fuel oil, and enhance energy and resource utilization efficiency.
	High-value petrochemical products	Make optimal use of oil by-products and turn low-value fuel into high-value materials.	Turn viable contents of pyrolysis gasoline into materials for livelihood necessities.
Product, market, and service	Additional electric vehicle (motorcycle) recharging stations at gas stations	Smart & Green e-Stations to provide diversified services and create new green business opportunities.	A total of 558 recharging stations and 4 Smart & Green e-Stations were completed in accordance with the "Smart Electric Motorcycle Energy Recharging Station Plan".
Low carbon transition of energy and resources	Expansion of natural gas supply	Expand the use of natural gas to replace oil market demand and create a clean energy supply chain for CPC.	Construction (expansion) of LNG receiving terminals to enhance natural gas import, storage and supply capacity.

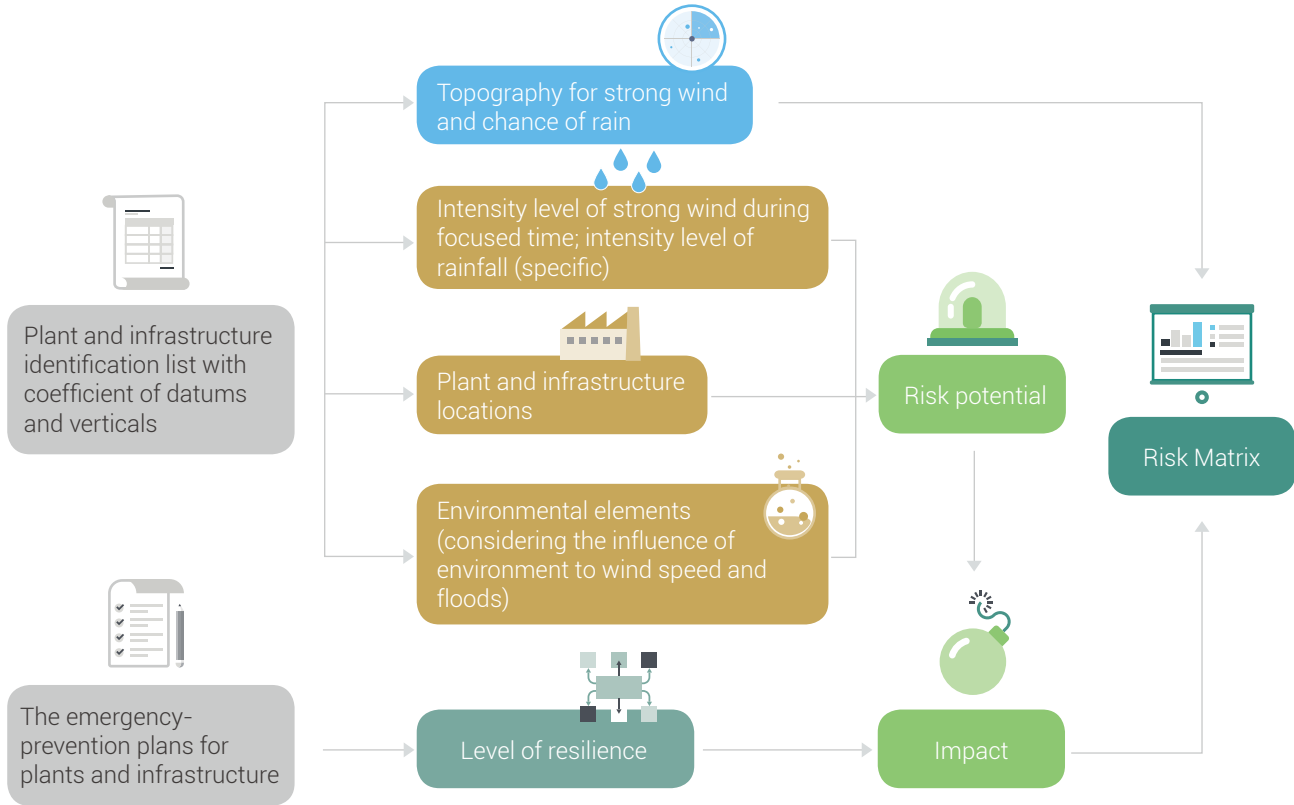
Financial Impacts of Climate Change on CPC

Aspect	Items	Financial impact on CPC
Increase in Revenue / Sales	Electric vehicle (motorcycle) charging stations at gas stations	Transformation to Smart & Green e-Stations provide diversified services and create new green business opportunities. The revenue of charge and exchange stations amounted to NT\$15.74 million in 2020.
	Expansion of Natural Gas Supply	Expansion of the use of natural gas to replace demand in the oil market. The gas sales increased by 182 million m ³ and the fuel oil sales decreased by 439,500 kL in 2020 compared to 2019. ¹
Increase in Costs	Adjustment of Refining Model and Structural Improvement in Response to Policies and Regulations	<ul style="list-style-type: none"> · CPC intends to promote the gasoline benzene reduction and quality improvement investment plan at the Dalin Refinery, with a total investment of NT\$7,578 million (for the period from July 2022 to December 2026). · CPC intends to promote an increase in the production of 0.3 wt% ultra-low sulfur fuel oil at the Dalin Refinery and an investment regarding a modified asphalt production center, with a total investment of NT\$7,019 million (for the period from July 2021 to December 2025).
	Replacement of Gas-Fired from oil at Refinery	<p>The costs of gas-fired burner at the refineries in recent five years:</p> <ul style="list-style-type: none"> · The Dalin Refinery upgraded its gas burners and accessories, with an investment cost of NT\$12.33 million. · The cost of Taoyuan Refinery's gas-fired burner upgrade conversion project amounted to a total of NT\$11.13 million. · Total investment of Taoyuan Refinery No.1 boiler replacement investment plan amounted to NT\$1,697 million (plan period: July 2018 to December 2021).
	Promote the Construction of Natural Gas Infrastructure	<ul style="list-style-type: none"> · Promote the second phase of the Taichung LNG plant investment plan (for the period from July 2012 to December 2022), with a total investment of NT\$19.354 billion. · Promote the investment plan for the third LNG receiving terminal (for the period from July 2016 to December 2025), with a total investment of NT\$66.012 billion. · Promote the investment plan for the new land pipeline of natural gas from Taichung LNG plant to Tunghsiao station (for the period from July 2016 to December 2022), with a total investment of NT\$5.487 billion. · Promote the investment plan for the construction of additional storage tanks at the Yongan LNG Plant (for the period from January 2019 to December 2026), with a total investment of NT\$24.647 billion. · Promote the third phase investment plan for the Taichung LNG Plant (for the period from January 2020 to December 2026), with a total investment of NT\$17.536 billion.

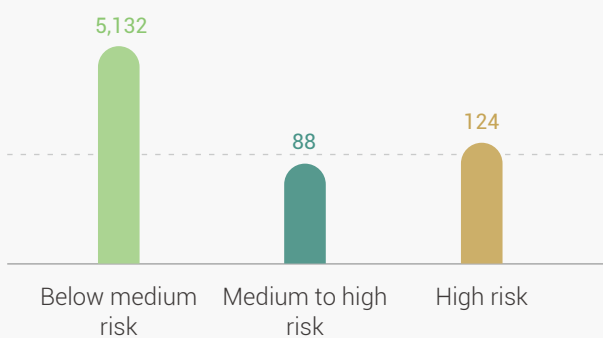
Note1: In 2020, due to the impact of the COVID-19 pandemic, the price of crude oil collapsed. In order to avoid the error of calculating revenue, financial impacts are calculated based on sales volume.

Since 2018, CPC signed up to the "Climate Change Adaptation Strategy and Guidance Program for Energy Sector" by the Bureau of Energy to conduct risk and resilience assessment for strong winds, rainfall, flooding and other risk factors according to refinery plant's locations and elevations. CPC also simulated the impact of a disaster and finally integrated the occurrence probability and impact assessment results to risk matrix and identify the climate change risk of CPC. CPC have completed climate risk inventories for 24 energy supply regions (covering refineries, LNG receiving stations, oil supply centers, and gas supply centers) within the period from 2018 to 2020 with a total of 5,344 operating facilities inventoried. Among these, 212 were identified as medium-high to high risk facilities. CPC will continue to improve and enhance the facilities each year and will propose adaptation strategies to strengthen the high-risk facilities.

Risk Assessment Procedures of the Climate Change



Risk Assessment Results of the Climate Change



Risk grade		
Below medium risk	Medium-high risk	High risk
5,132	88	124

(Facility Quantity)

3.2 Green Energy Transition and Circular Economy

Short-term	Medium/long-term
Increase the added value of petrochemical	<ul style="list-style-type: none"> • Achieve the sustainable supply of green energy in response to climate change • Achieve smart and green transition

3.2.1 Green Energy Transition



To accommodate recent changes in the global economy, support the government's energy policies and the 5+2 industries project, CPC's research department has progressively expanded its research efforts into the themes including: smart green energy, high value-adding materials, circular economy and smart and safety environmental. CPC estimates having generated a financial yield of NT\$4.056 billion in 2020 from the new products and technologies developed. Through green energy transformation, CPC is bringing sustainable practices into its operation.

	2018	2019	2020
Investment budget (NT\$100mn)¹	17.76	18.96	21.30
Proportion of R&D expenses in net income¹	0.17%	0.19%	0.30%
Financial benefits (in multiples of NT\$100 mn)	34.27	38.58	40.56
Acquired patents	21	16	18
Published papers	253	199	208
Leading edge results	49	48	62

Note1: The R&D investment budget in the Sustainability Report after 2021 is revised to be based on actual R&D expenses (including capital expenditure)
 Erratum: Page 62 of the 2020 Sustainability Report, the proportion of R&D expenses to net income calculated based on budget of 2018 was incorrect, and was revised to 0.23%.

CPC promotes green transformation and invests in green innovation in technology, products and services. Align with the global trend of environmental protection, carbon reduction and circular economy, CPC is committed to R&D in renewable energy, energy saving, carbon reduction, high-value materials and process waste reduction. Furthermore, in an attempt to pilot mass production of R&D results, CPC achieved the ultimate goal of "commercialization of new products and engineering of new technologies". Innovation progress is tracked through monthly, quarterly and annual reports. It is reviewed and improved through relevant meetings.

Leading Edge R&D Directions and Results

Aspect	Items	R&D Outcomes
 Evaluation of Oil & Gas Potential of Domestic and Overseas Area	Evaluation of Domestic Mining Area	Completed the production test and analyzed the water characteristic in Jentse area of Yilan; completed the geothermal fluid analysis in Matsao area of the Mount Datun and tested the casing material and wellhead equipment for future reference in the selection of geothermal exploration areas and corrosion resistant tubing.
	Evaluation and Research of Overseas Mining Sites	Completed a rolling update on geological model, in-situ volume, reservoir morphology and 3D geological model of the Oryx oilfield in Chad; completed an analysis of geological structure and petroleum system in a basin in the Zagros fold belt in the Middle East.
 Development and Application of Renewable Energy	Geothermal Energy Analysis	Analyzed the production capacity and the water quality of the Renze area, Yilan; analyzed the geothermal fluid of the Matsao area in Datunshan and conducted a test about casing material and wellhead equipment for future reference when selecting a exploration area and a corrosion resistant tubing.
	Solar Power Technology Development	Actively assisted in promoting the construction of solar photovoltaic systems, and currently have more than 210 sites with a total installed capacity of 10.9 MW. CPC are also planning and constructing large-scale solar photovoltaic systems, with an estimated total installed capacity of 13.38 MW by the end of 2021 and will incorporate the sites into our self-developed "Cloud-based and Maintenance Management System".

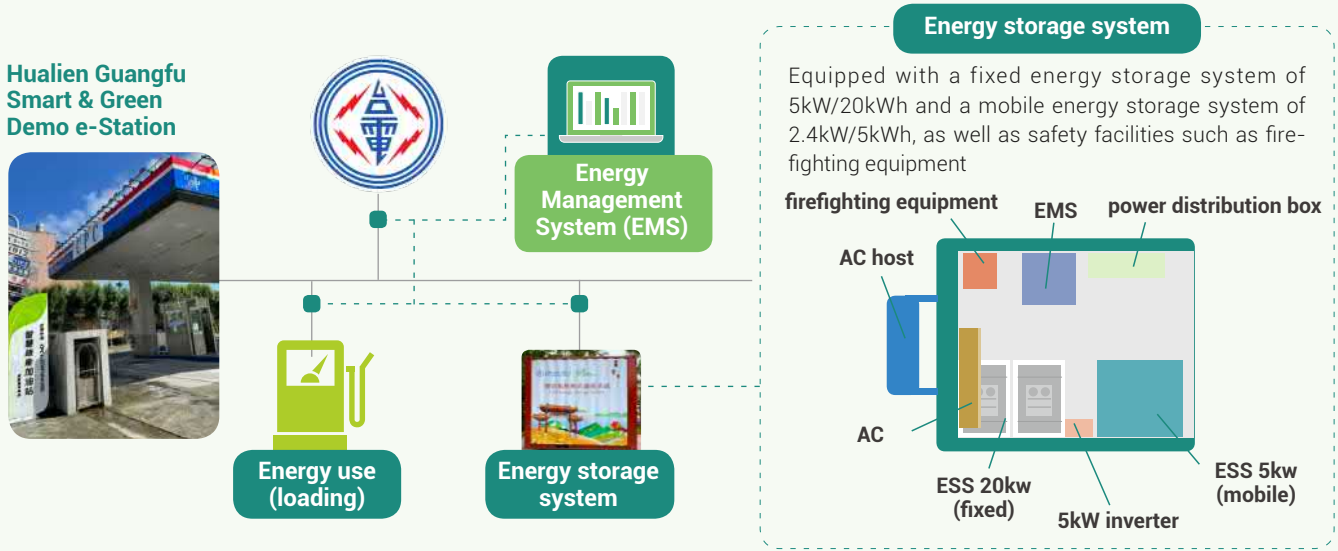
Aspect	Items	R&D Outcomes
 <p>New Products, New Technology Development</p>	Biomass Refining Technology	Developed transesterification technology to produce diversified fatty acid esters, which can be broadly applied to products such as biodiesel, bio-lubricant, and specialty chemicals.
	Hydrogen Fuel Cell	Developed its proprietary gas reformer and cooperated with domestic industry and R&D units to verify high and low temperature fuel cell distributed generation using pipeline natural gas and refinery by-product hydrogen as feedstock.
	Biomass	Continued to optimize the production process of multi-pore carbon material (biomass carbon material), and successfully produced a sample of the super capacitor (1200F) with similar performance to commercially available products. It can be used for short-range fast charging of various vehicles and renewable energy storage applications in the future.
	Smart & Green Demo e-Station	Qianfeng Road Green Energy Pilot Station in Tainan has met its green energy equipment operational efficiency. At present, self-generated electricity is about 23.6% of the total electricity consumption of the station, achieving the goal of reducing the electricity supply from the utility. The Chiayi Xinyi demonstration station is designed to be self-sufficient, and since its operation in 2019, the percentage of self-production capacity increased from an average of 72.2% in 2019 to an of 87.9% in 2020 through enhanced energy management EMS technology. In addition, CPC completed the planning and construction of the Taoyuan Jiadong demonstration station and the Hualien Guangfu Green Energy Station in 2020.
	Lithium-Titanium Oxide (LTO) Material	Continued to improve the cost, process and quality of LTO materials and build a demonstration plant with an annual capacity of 1,000 tons to provide battery manufacturers and subsequent product applications in the future.
	Soft Carbon Pilot Production and Processing Integration	Utilized the existing equipment, CPC completed improvement in equipment availability, production line parameters adjustment and product quality control, and built an automated continuous grinding and calcining process, with an annual production capacity of 18 tons of soft carbon.
	Cold Seawater Drainage Applications - Algae Cultivation and Product Development	The cold seawater drainage from the Yongan LNG terminal is reused to construct a farming pilot site with an annual capacity of 2 tons of algae. It is utilized for carbon reduction and circular economy, and is applied to product development such as red algae noodles, egg rolls, and popsicles to add product value.
	Saturated Low Frequency Eddy Current Detection Technology Development and Verification	An eddy current test is able to penetrate the FRP coating layer, saving the operation of knocking out the bottom FRP and repainting the bottom plate, which is conducive to enhancing the storage tank inspection technology, shortening the tank inspection period and adjustments.
	Relevant Energy Storage Materials Derived from Soft Carbon	Developed long-life soft carbon material and spherical activated carbon, among which the long-life soft carbon material can be used as the anode material in automotive lithium-ion battery, which is characterized by safety and long cycle life under normal use. This development was granted the 15th National Innovation Award.
	AI Gasoline Performance Modeling	Established relationship between real-world fuel consumption and engine performance and provided AI to precisely estimate the parameters and probability distribution in the relationship to identify the most cost-efficient formula from real-world fuel consumption performance.
 <p>Development and Application of Environmental Cleanup and Pollution Remediation Technologies</p>	Developed a fast detection technology for soil oil concentration and established a new tool for environmental protection	Developed a fast detection technology for total petroleum hydrocarbons in soil. Successful development and application of GC/FID with thermal desorption pre-treatment system. Established a fast screening technology and tool that can be used in field. It enables us to accurately detect the concentration of each product within 5 minutes. The result can be used for site investigation, emergency response and excavation treatment, other on-site immediate judgment and decision making.
	Bioplastic Materials Process Research and Development	In line with the national plastic restriction policy, CPC introduced and developed HMF biomass refining process technology, which can be used to develop and validate the application of biomass plastics, biodegradable plastics, etc. in the future.

Highlights: Smart & Green e-Stations

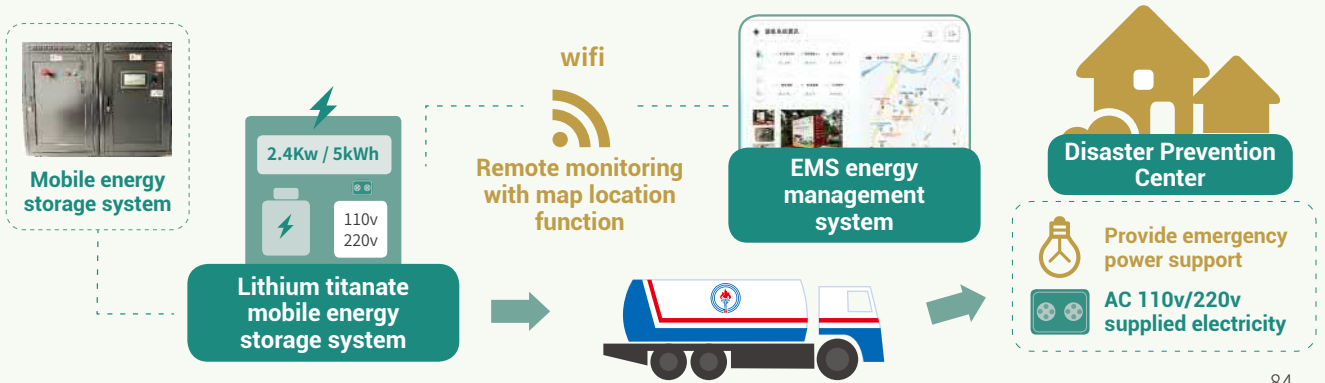
In response to the government's policies of green energy transformation and energy saving and carbon reduction, CPC has upgraded and transformed traditional gas stations into Smart & Green e-Stations. These stations provide diversified services such as "energy production", "energy storage", "energy utilization" and "intelligence". In addition to Tainan Qianfeng and Chiayi Xinyi Smart Green Energy Gas Station, CPC expanded its green energy footprint in 2020 by upgrading the Taoyuan Jiadong Station and Hualien Guangfu Station to Smart & Green e-Stations and developing mobile energy storage systems with intelligent power regulation functions. It fully demonstrating CPC's R&D capabilities in the hope that public can enjoy the convenience brought by the integration of green energy technology in gas stations.

The Hualien Guangfu Smart & Green Demo e-Station provides a complete service of energy production, energy storage, energy management system and electric motorcycle energy utilization. With respect to the design planning, the mobile LTO energy storage system developed by CPC was introduced to meet the local demand. The energy storage system has fast charging and discharging characteristics with the setting of a GPS positioning system. In order to provide local urban and aboriginal areas with emergency power needs for disaster prevention, it can be mechanically transported when demand is received. In the event of a power outage, the storage system can also be automatically converted into an island operation mode to supply the gas station's electricity needs to provide continuous and comprehensive services and fulfill the corporate social responsibility of community protection. At the same time, an electric motorcycle power exchange station is set up at the Guangfu Station, and the energy management system is used in conjunction with the energy storage system to regulate the power consumption of the gas station and the power exchange station, thereby achieving the effect of intelligent energy saving.

Special feature 1: Islanding operation and electricity adjustment

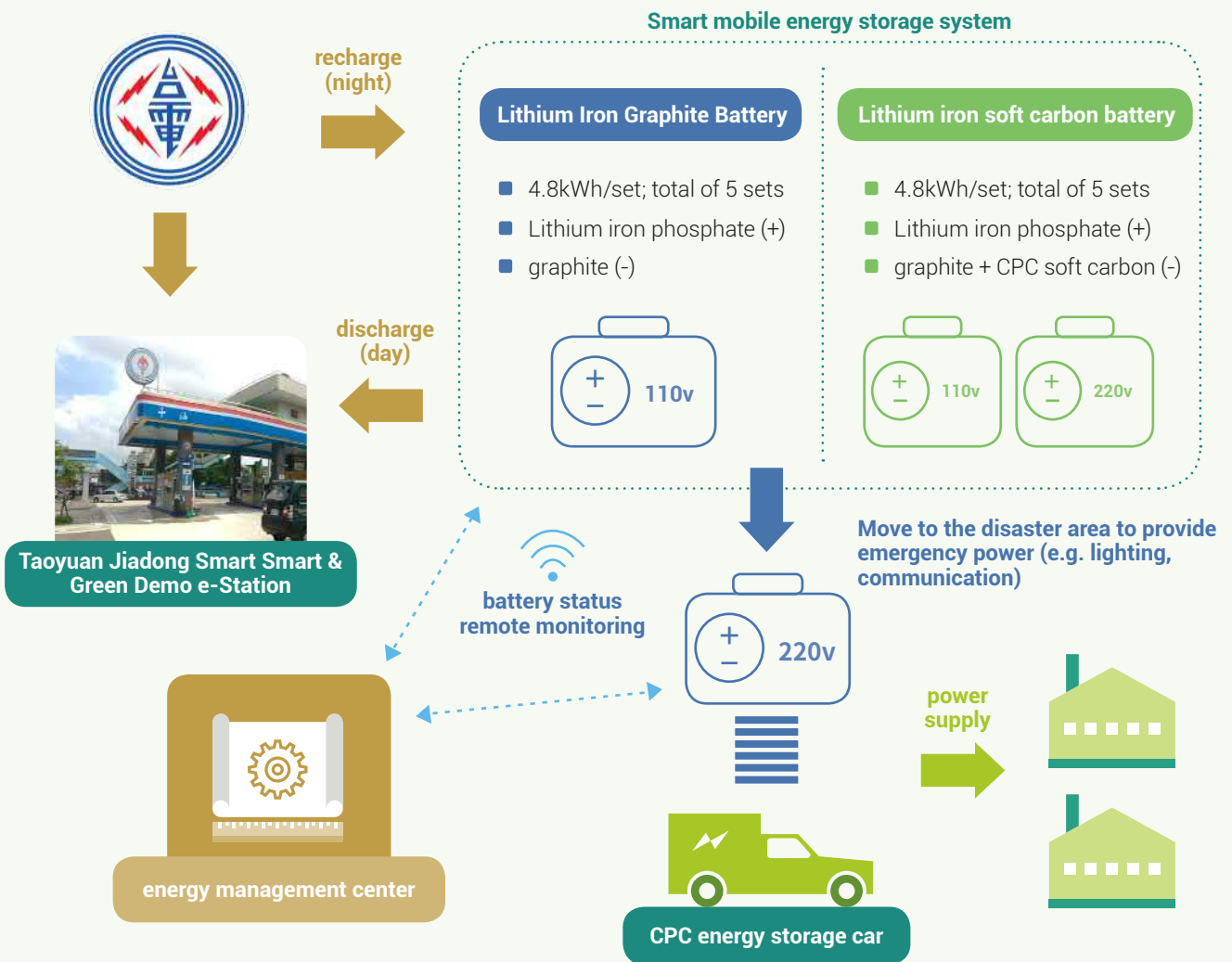


Special feature 2: Provide emergency power support for disaster prevention



The installation of the Taoyuan Jiadong Smart & Green Demo e-Station was completed by the end of 2020. The station was equipped with a smart motorized energy storage system that uses a 10-foot storage container with 10 sets of small mobile lithium-iron energy storage batteries. 5 of which are made of graphite as the anode material and the other 5 are mixed with lithium-iron soft carbon, which had been developed by CPC for 10 years. It has characteristics of fast charging, long life and safety, and is paired with intelligent monitoring and regulation of the energy management system to enhance the efficiency and safety of the energy storage system. In addition, since some areas in Taoyuan City are prone to collapse due to heavy rainfall resulting in isolated islands without electricity. A small mobile lithium-iron storage battery can be delivered to the disaster area to provide basic electricity for local residents. The station's special motorized energy storage system provides off-site motorized backup, isolated island transportation and disaster area support functions.

Schematic diagram of the design of the smart mobile energy storage system built at the Taoyuan Jiadong Smart & Green Demo e-Station



Through the promotion of Smart & Green e-Stations, CPC expects to plan the development and symbiosis model of future smart towns, so that green energy gas stations can become the energy core of industrial green power and smart communities, realizing the vision of sustainable operation.

Actual view of the energy storage system and mobile battery module at the Taoyuan Jiadong Smart & Green e-Stations

- Through successful commercialization, the research and development of soft carbon demonstrate the strength of CPC, which provides high-quality lithium batteries with safety certification
- CPC's Green Energy transition combined with Taoyuan Smart City, showing the advanced deployment of the era of electricity

The energy storage system is designed with Taoyuan city flowers as the exterior design



Mobile battery



Highlights: High-value Materials

In response to the demand for high frequency, high speed or high-power efficiency in 5G generation, CPC is committed to develop dicyclopentadiene derivatives for application and use the by-products of ethylene production to develop materials with high value and technicality. Currently, CPC has successfully developed two types of high-frequency substrate resin materials, and the substrates made in cooperation with ITRI can be applied to the future high-frequency circuit board material field without changing the current manufacturing process. Since the resin materials commonly used in substrates have to be imported from abroad and exclusively supplied, the risk of supply chain disconnection can easily arise. The risk can be avoided if the materials developed by CPC are introduced. This type of research and development is attractive for the sustainable development of the panel industry in Taiwan.

Another future star product developed by CPC is light diffusing particles, which are mainly used in the display and lighting field. With its high durability, high uniformity and high transmittance characteristics, the patent has cooperated with BASF Taiwan to develop the eye-protection and energy-saving lighting fixture "Chen Kuang Tsai". It has the three characteristics of suppressing blue light by more than 50%, high color rendering and low energy consumption. This eye-protection product not only makes the color presentation more realistic and more energy-saving, but also effectively protects the eyes.



CPC has successfully developed two types of high-frequency substrate resin materials






Highlights

CPC has been conducting R&D in environmental protection, energy saving, circular economy, promoting the commercialization of patents, and presenting the results of research and development in the form of user-friendly products in the hope of integrating with people's lives.

Highlights: Established Advanced Catalysis Center to Lead the Upgrading and Transformation of Domestic Industries and Create a Circular Economy

With the global energy-saving and carbon-reduction policies, the production of gasoline and diesel fuel will be reduced in the future. CPC is actively developing in the direction of refining structure upgrade, chemical value addition, and carbon capture and reuse. The "Advanced Catalysis Center" will be established in 2021 and will join hands with Academia Sinica to hold a "Memorandum of Understanding Signing Ceremony for an Advanced Catalyst Research and Development Exchange Platform". CPC invite important domestic and foreign companies to establish clusters in Taiwan in an attempt to reinforce the overall development of the circular industry and achieve the goal of catalyst nationalization. In addition, the Advanced Catalysis Center is positioned as a demonstration base for new generation of smart production, introducing digitalization and AI technology, and build a smart plant environment to realize the goal of "Industry 4.0" in petrochemical industry. The establishment of the Advanced Catalysis Center is a key step in the transformation of CPC. In the future, CPC will play a leading role in the domestic industry to create a circular economy and drive technological innovation and industrial upgrading.

Three major R&D principles Energy transformation towards non-nuclear home

 Carbon reduction economy	 Energy saving and environmental protection	 Green products
Target	Target	Target
Development of carbon dioxide hydrogenation to produce methanol catalyst; for example, a methanol plant with an annual production capacity of 2 million tons is expected to reduce carbon dioxide emissions by 3 million tons per year.	Development of high efficiency NOx removal catalyst for power/steel/petrochemical plants; improvement in removal efficiency by 10% and reduction in annual NOx emissions by about 40,000 tons.	Utilization of hydrogenation technology to develop high value green oil products with the integration of our own chemicals and other petrochemical raw materials into the development of electronic grade raw materials required by the semiconductor industry.

Establishment of the Advanced Catalysis Center & Catalyst performance testing equipment

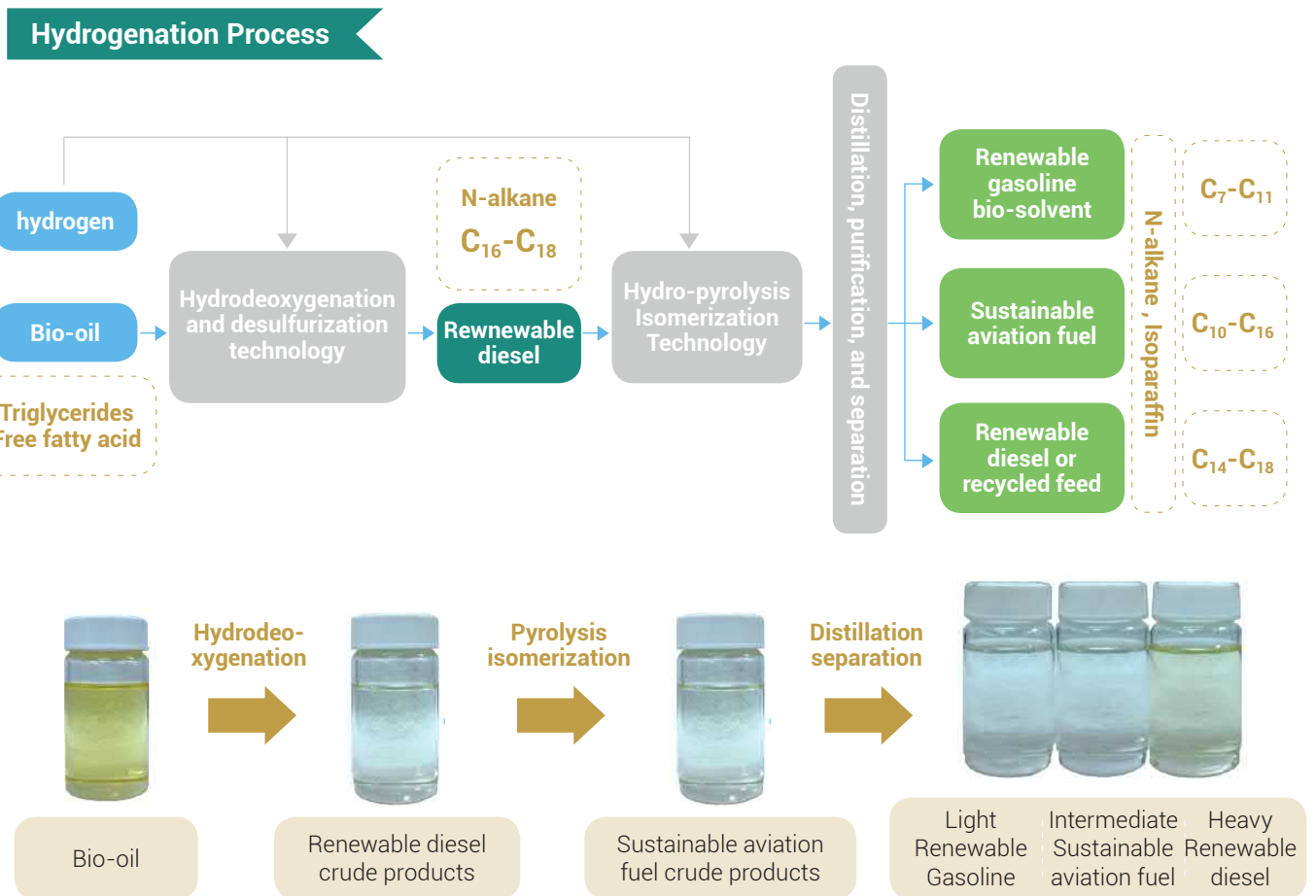


3.2.2 Circular Economy

CPC considers waste as resources, which is why the company re-examines existing waste and tries to find new values through Reduce, Reuse, Recycle and Renew strategies. By pursuing a zero-waste goal and ensuring reasonable and effective use of resources, CPC hopes to address the dilemma between economic development and environmental impact.

R&D of Renewable Fuels

In the past, CPC has invested in the development of bio-oil hydrogenation process to convert bio-oil into renewable diesel and sustainable aviation fuel (as shown in the figure below). At the same time, the oil quality analysis and specification of renewable fuels were conducted. Under the specific blending ratio, they could meet the requirements of domestic diesel fuel and JET-A1 aviation fuel specification. The results of research and testing showed that adding 5% of renewable diesel fuel could effectively improve the overall performance and reduce fuel consumption. In addition, it can effectively reduce air pollution emissions and benefits the environment. Through testing, biomass aviation fuel has the effect of reducing SOx, NOx, CO and CO₂. After blending with fossil fuels, it can improve oil quality, which has the characteristics of sustainable fuel and can enhance the value of aviation fuel.



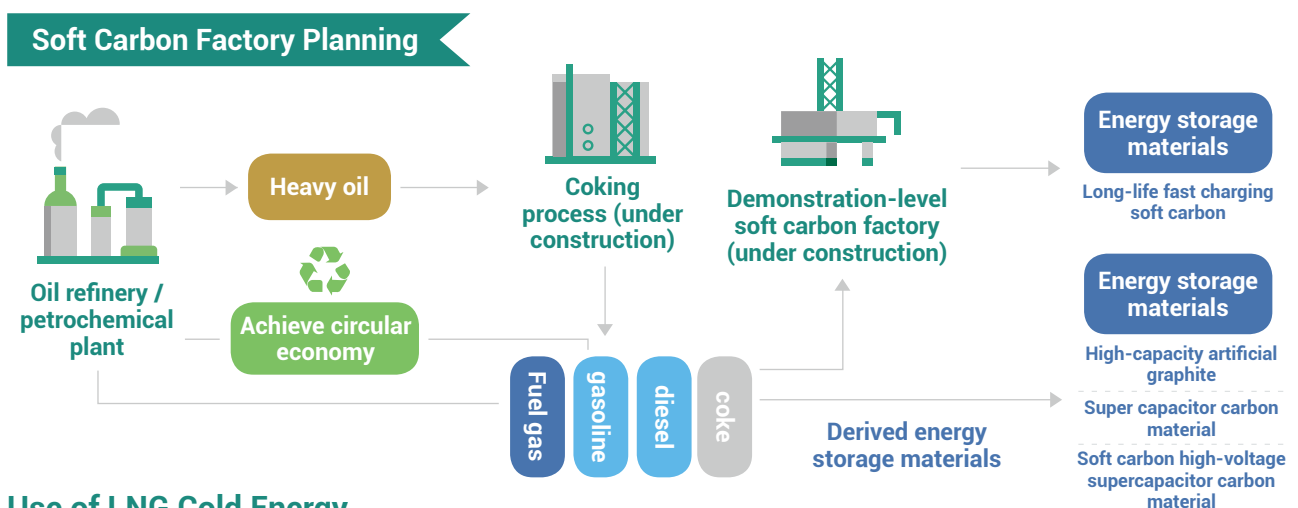
High-value Heavy Oil products

In order to meet the goals of circular economy and high value petrochemicals, CPC has continued its research on petroleum refining. CPC has successfully developed the high-value energy storage soft carbon materials by using heavy oil that used to be used as fuel. Such energy storage soft carbon materials are suitable for use as "anode material for lithium battery" for electric motorcycles and was introduced to China Motor Corporation fast-charging motorcycle batteries for commercial applications in July 2020.

In order to actively plan for the commercial production of energy storage materials, CPC's proposal got approval from the Ministry of Economic Affairs for the construction of a demonstration soft carbon process plant after a feasibility study in 2020.

The high-value use of heavy oils has recently developed a high-specific-surface-area carbon material. This high value carbon material is an important energy storage component for supercapacitors. The quality of high-specific-surface-area carbon materials influences the performance of supercapacitor products. The electrical properties of the carbon material formula developed are better than those of commercially available specifications. The research team has also established a high-specific-surface-area carbon material preparation process and will further optimize the preparation conditions to find the most suitable supercapacitor of carbon materials.

CPC continues to carry out in-depth research and development of high value utilization of heavy oil and expand the core technology to carbon materials and composite materials and other related fields. Research and development on carbon materials such as fast-charging silicon carbon anode materials, advanced supercapacitors carbon materials, environmentally friendly spherical carbon materials of synthetic mesophase asphalt and other fields will be continued to develop high-value utilization of heavy oil.



Use of LNG Cold Energy

Taiwan lacks natural resources and relies on imported natural gas supply. The international transportation of natural gas across the sea is first compressed into LNG at -162 degrees Celsius to facilitate storage and reduce transportation costs. After being transported to Taiwan by special ships, the LNG is exchanged with seawater for temperature exchange and then provided to the public.

The large amount of cold energy released in the process of LNG gasification is a rare energy source that can be utilized. Therefore, CPC has secured this precious resource and utilized it properly in its related business:

Cold energy power generation

CPC uses propane to recover cold energy from the LNG gasification process, which can be pressurized and gasified to drive the expander and power generator to generate electricity up to 1,800 kW per hour. Cold energy meets part of Yongan Plant's power requirements.

Cold energy chiller system

Apart from power generation, CPC can generate chilling water for equipment cooling and air-conditioning for the entire plant by exchanging heat between ultra-low temperature LNG and high-temperature liquid flowing back from the chiller. Doing so saves significant electricity cost.

Liquefaction of gas

The cold energy reduces air temperature and turning it into liquid form. It subsequently run through the rectifying tower to be separated into liquid nitrogen (LN₂), liquid oxygen (LO₂) and liquid argon (LAR). This process is more power efficient than the conventional liquefaction method. Taichung and Yongan plants supply cold energy to Blue Ocean Industrial Gases and Far Eastern Industrial Gases, respectively, for cooling air use.



Chang Chih-Hsing, director of the Yongan plant of Far Eastern Industrial Gases explained that, "CPC hope to create a win-win business entity. General gas companies use electricity to cool the air. Far Eastern Industrial Gases is actually using the LNG that needs to be gasified by CPC to reduce the consumption of electricity."

Lin Shu-Chang, director of the Taichung Plant of Blue Ocean Gas explained that, "At the scale of Blue Ocean Gas, if LNG isn't used, 800 metric tons more water must be consumed every day to complete the production of of liquefied air. CPC's LNG can not only save electricity in the cooling process, but also can reduce the large amount of water used by gas companies, which can be said to have multiple environmental benefits. "



Cold drainage for Algae Farming and Aquaculture

The natural gas gasification process requires the use of large amounts of seawater for heat exchange. In order to avoid the plankton in the seawater from attaching to the equipment and affecting the heat exchange efficiency, the seawater has to go through three filtration and cleaning processes. Electrolyzing the seawater to produce sodium hypochlorite to remove the bacteria and algae in the seawater. During the process, as the cold water is only used for cooling, there is no process pollution problem. The water quality is stable and can be effectively reused.

The cold water with pure water quality and relatively stable temperature can be used for algae cultivation as a raw material for health food. Since 2005, CPC has undertaken to provide "cold drainage " for reuse in neighboring fish farms at no cost. The Fisheries Agency provided the project budget for the expansion of underground water diversion box culverts as the main project under the name of "Continuous Common Water Supply Project for Yonghua and Xingang Aquaculture Fishery Production Areas". The culverts can reduce the escape of cold energy during the transportation and expand the common water supply area in Yongan District, which is a model of circular economy with the cooperation of the industry (CPC), the government (Fisheries Agency) and the people (associations and fishermen). For example, the "Yongan Grouper Festival", which has been held for several years in the neighboring communities of Yongan Plant, has become a famous and grand event in the local area.

The introduction of cold drainage from Yongan LNG Plant has become a unique source of water for aquaculture, creating the well-known Yongan Gentian grouper

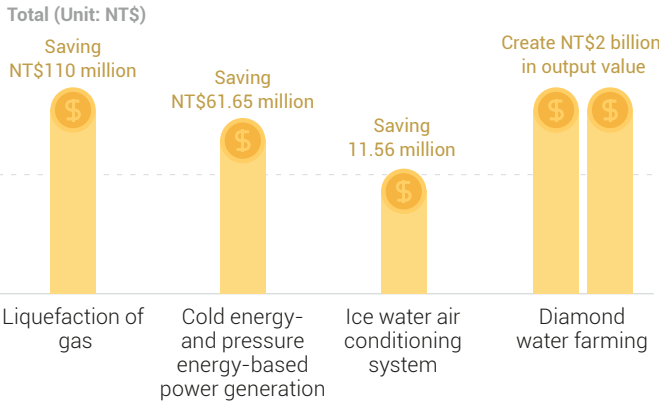


Development around the community of Yongan Grouper

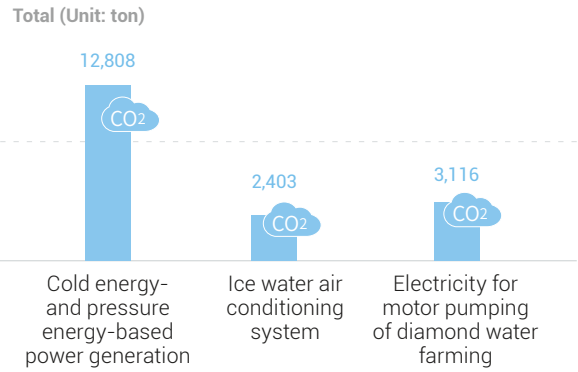


Mitigation and Adaptation of Climate Change | **Green Energy Transition and Circular Economy** | Energy and Resources Management | Pollution Prevention | Ecological Preservation and Soil Remediation | Featured Topic

Economic benefits: cost savings or value creation



Environmental benefits: a reduction in CO₂ emissions



Social benefits

Reduce the risk of ground subsidence by avoiding groundwater extraction by farmers

Development of a rural area with one characteristic, brighten up the town and rural areas

Assist in government and academic research promotion

Improve the chaotic scene of dense coastal pipelines, beautify the seascape and enhance the quality of tourism

Energy and Resource Integration

As the leader of Taiwan's petrochemical energy industries, CPC has regarded the promotion of efficient use of energy resources as its responsibility. CPC has also actively formed energy resource integration links with enterprises in industrial areas, so that raw materials such as steam, hydrogen and other industrial gases can be obtained from other enterprises without the need to purchase or invest in energy resources for production. Thus, it reduces the overall cost and environmental burden of the entire industrial area. At the same time, CPC also further improves and refines the efficiency of energy use in the manufacturing process.

Internal energy and resource sharing



Fuel gas utilization: The emissions from the Dalin Refinery are used as fuel gas for the Linyuan Petrochemical Plant to improve energy efficiency rate.

Process equipment refinement: Renewed pure water treatment equipment, established MBR/RO wastewater purification recovery treatment equipment and condensate recovery and purification plant equipment, etc. The wastewater from Linyuan Petrochemical Plant is recycled to reuse through the wastewater treatment plant.

External energy and resource sharing

Nitrogen integration: Nitrogen is used in the plant for equipment pressurization, sealing, blowing out and other procedures. Other companies provide assistance to achieve the de-commissioning principle, and CPC does not need to purchase or invest in energy resources for production.

Caustic soda integration: Caustic soda is mainly used in refinery processes and acid-alkali neutralization. In the past, it was transported by tanker truck, but it has been partially converted to pipeline transportation, which can reduce the fuel, transportation cost and transportation management risks of tanker truck transportation.

Steam integration: The medium-pressure steam required for the process is integrated with the energy resources of the industrial area, and the steam generated from waste heat is used for mutual benefit and to reduce CO₂ emissions.

Hydrogen integration: The hydrogen by-products of the process can be used by other companies to improve the efficiency of the process.

Power integration: Instead of wasting energy, selling electricity back to TPC through demand bidding when electricity is in shortage.

3.3 Energy and Resources Management

Short-term	Medium/long-term
<ul style="list-style-type: none"> · Implement a number of water conservation measures, formulate contingency plans during water restrictions, and take precautionary measures in advance. Continue to promote the installation of rainwater recycling systems · Manage energy and resources at the source and continue to improve energy and resource use to reduce the amount of energy and resources used per unit of product 	<ul style="list-style-type: none"> · Maintain the contract for purchasing reclaimed water · Introduce the latest technology in the process to improve the water recovery rate

3.3.1 Energy Consumption and Management

CPC consumes electricity, natural gas, steam, fuel gas, petroleum gas, and fuel oils. The total 2020 energy consumption was 102 million GJ, with the highest heating value from fuel gas. In addition, the 2020 renewal energy output of our PV systems totaled 9.215 million kWh and were sold to TPC. The 2020 output production was about 180.245 million kL, with energy intensity at 0.566 GJ/kL, about 3.74% lower than that of 2019 at 0.588 GJ/kL. After energy conservation and carbon reduction programs are implemented, the unit product energy consumption was stabilized.

In addition, as the largest oil and gas energy supplier in Taiwan, under the vision of global transformation to green energy, CPC's prospect of energy industry is closely related to the issue of carbon reduction. In response to the carbon reduction policy of the government of Taiwan, CPC is making efforts for environmental sustainability and corporate sustainability by importing carbon-neutral LNG for voluntary carbon reduction. [See the carbon neutral special issue for details.](#)

* Total energy intensity = total energy consumption/volume of products produced

Use of energy source (heating value) by the three plants in 2018 ~ 2020

Unit: 10 million GJ (GJ=10⁹J)

Year	2018	2019	2020	
Direct energy consumption	LNG	1.63	1.62	2.13
	Fuel gas	5.56	5.40	5.14
	Low BTU fuel gas	0.51	0.63	0.45
	LPG	0.20	0.15	0.03
	Low sulfur fuel oil 0.5 %	0.62	0.62	0.55
	Carbon residue	2.02	1.69	1.23
	Total heating value	10.50	10.10	9.54
Indirect energy	Purchased Electricity	0.56	0.60	0.60
	Purchased steam	0.20	0.10	0.11
	Total heating value purchased	0.75	0.70	0.71
Total energy consumption	11.25	10.80	10.20	

Note 1: Energy Consumption = Fuel Usage * Unit Heating Value.

Note 2: The unit heating value is: (1) natural gas of 8,900 Kkcal/KS, (2) fuel gas of 9,000 Kkcal/KS, (3) low BTU fuel gas of 6,000 Kkcal/KS, (4) LPG of 6,635 Kkcal/KL (5) NC bottom oil of 9,700 Kkcal/KL, (6) low sulfur fuel oil (0.5%) of 9,200 Kkcal/KL, (7) Carbon residue of 9,580 Kkcal/TON, (8) purchased electricity of 860 Kkcal/MWH and (9) purchased steam of 724Kkcal/TON.

Mitigation and Adaptation of Climate Change | Green Energy Transition and Circular Economy | **Energy and Resources Management** | Pollution Prevention | Ecological Preservation and Soil Remediation | Featured Topic

In response to the Renewable Energy Development Act "Regulations for the Management of Setting up Renewable Energy Power Generation Equipment of Power Users Above a Certain Contract Capacity", there are a total of 6 business units to be regulated. The following table shows the obligation of setting up renewable energy power generation equipment by each business unit. The total capacity of renewable energy should be installed by CPC is 25.25MW, As of the end of 2020, 10.9 MW of rooftop solar power generation systems (excluding 709 kW for lease) had been installed; another 1.625 MW of energy storage systems had been installed or under planning.

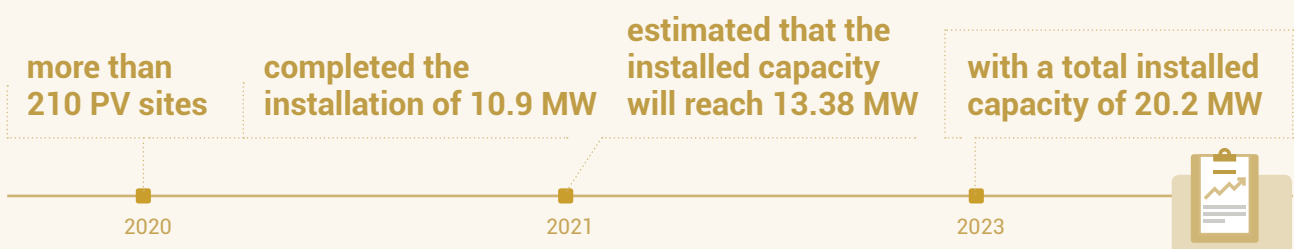
The capacity of renewable energy equipment required to be set up at each business unit

Capacity Threshold	Business Unit	Electricity Users	Contracted Capacity (MW)	Equipment capacity required be set up (10% of the contracted power capacity) (MW)
Above 5MW	Refining Business Division	Dalin Refinery	140	14
	Refining Business Division	Taoyuan Refinery	52	5.20
	Petrochemical Business Division	Linyuan Petrochemical Plant	20	2
	Natural Gas Business Division	Yongan LNG Plant	18	1.80
	Natural Gas Business Division	Taichung LNG Plant	14.50	1.45
	Refining Business Division	Kaohsiung Refinery	8	0.80
Total capacity should be set up				25.25

Highlights: Solar Power Technology Development

In 2020, CPC invested NT\$82,728,000 in R&D of solar power technology. By the end of 2020, CPC had completed the installation of 10.9 MW and had more than 210 PV sites throughout Taiwan and the outlying islands. The installation includes gas station rooftops, oil supply centers, refinery and petrochemical plants, and office building rooftops. It is estimated that the installed capacity will reach 13.38 MW by the end of 2021. In addition, in order to comply with the "High Energy User Clause" of the Renewable Energy Development Act, CPC is actively evaluating potential sites for the installation of PV systems, with a total installed capacity of 20.2 MW by 2023. In 2020, CPC generated 9.215 million kWh of renewable energy from solar power stations, mainly for sale to TPC. CPC has obtained 18 renewable energy site certifications and 885 renewable energy certificates.

In order to manage the solar power sites, CPC has built the "Cloud-based Solar Power Monitoring and Maintenance Management System" to monitor the power generation situation in real time, collect abnormal power generation events, improve the inspection and repair efficiency through the monitoring system, and establish a standard operation process for maintenance while training relevant maintenance personnel to reduce maintenance costs and maintain high power generation efficiency in the long run.



Renewable Energy Development Act Task Force

In order to actively respond to the major users of electricity of the Renewable Energy Development Act, which came into effect on January 1, 2021, CPC immediately held a meeting of the project team on January 14, 2021 to carry out cross-functional discussion on the Company's plan to achieve the legal green power construction. Meanwhile, CPC signed a memorandum of understanding "Jentse-Tuchang Geothermal Area Exploration and Power Generation Development and Operation in Yilan County" with TPC to explore geothermal resources, emphasizing CPC's focus on renewable energy and its attitude to promote the high-value development of the industry. The renewable energy plans covered include:

- 1 Solar power system construction planning and strategy
- 2 Hydrogen energy and biofuel promotion plan and strategy
- 3 Fuel cell storage equipment R&D strategy
- 4 Geothermal energy development and strategy
- 5 Renewable energy certificate application



3.3.2 Water Use and Management

Global warming has led to severe extreme weather, which may not only affect food production, but also cause water crisis. In order to avoid water shortages or water outages that may affect industrial operations and cause business losses, CPC has established a comprehensive water resource management mechanism that focuses on both "water acquisition" and "wastewater recycling". Water use plans have been evaluated for water supply impacts, and water withdrawals have not caused significant impacts on water sources. At the same time, it also ensures that CPC's water resource management mechanism meets the requirements of regulations and responds to emergencies immediately. There Were three violations of the Water Pollution Control Act in 2020, all of which Were corrected at once.

Violation unit	Reason for penalty	Fines and Penalties	Solution or Improvement
LNG Project & Construction Division	The newly constructed project did not operate in accordance with the runoff wastewater pollution reduction plan and violated Article 18 of the Water (Prevention and Control of Pollution) Act	NT\$18,000 and 2 hours of environmental lecture	<ul style="list-style-type: none"> · Records Were left during the maintenance and cleaning of the sedimentation ponds from December 2019 · Supervised the contractor to comply with the requirements of the Environmental Protection Bureau of Taoyuan City Government
Taoyuan Refinery	The breakage of long-distance underground oil pipeline (gasoline) resulted in leakage of gasoline into the rainwater side ditch that polluted water bodies, in violation of the Paragraph 1, Subparagraph 2 of Article 30 of the Water Pollution Control Act	NT\$270,000 and 2 hours of environmental lecture	<ul style="list-style-type: none"> · Established an emergency response team to immediately relieve pressure, isolate and check for leakage, and completed pipe replacement and repair · Set up SVE (Soil Vapor Extraction) system for oil and water extraction and implemented environmental monitoring operations · Set up additional test points at oil leakage area to regularly monitor the effectiveness of cathodic corrosion protection of pipelines
Taoyuan Refinery	The oil pipe ruptured and leaked diesel fuel into the nearby ground water, in violation of the Paragraph 1, Subparagraph 5 of Article 30 of the Water Pollution Control Act	NT\$30,000 and 2 hours of environmental lecture	<ul style="list-style-type: none"> · Sent pumping oil and mud truck to the scene to clean up the oil and water in the gutter, and used wood chips to clean up the oil on the ground of Zhongxing Road, and spread oil ropes at the downstream of the oil leakage area to avoid polluting the sewer · Repaired the pipeline and set up a leakage detection table for the pipeline sectional pressure check

In addition, in accordance with the requirements of the Environmental Protection Administration's Water Use Plan Audit Management Regulations, CPC plans and records the use of water resources, while the R&D team continues to invest in relevant research to optimize the recycling mechanism of process water with high-efficiency equipment. CPC will cooperate with the government's water reclamation plant strategy in the future to implement a diversified water utilization strategy and optimize water resource management, which the water obtained is fresh water from the Taiwan Water Corporation. In addition, according to the World Resources Institute (WRI) water stress zone index, CPC has zero water withdrawal from the water stress zone. Moreover, CPC has set up a wastewater treatment and recycling system and promoted the installation of rainwater recycling systems on the roofs of green buildings at gas stations.

Data on water acquisition and recycling in each plant area

Plant	Unit (m ³)	Year				
		2018	2019	2020		
Dalin Refinery	Total amount	639,930,353	603,958,428	639,449,986		
	Runoff (tap water, river water, irrigation system water)	Water Withdrawal	11,984,186	8,973,939	8,881,879	
		Ratio	1.87%	1.49%	1.39%	
	Groundwater (CPCII water)	Water Withdrawal	1,405,957	2,778,785	2,960,778	
		Ratio	0.22%	0.46%	0.46%	
	Reclaimed Water	Rain	90,350	35,501	116,974	
		Process Wastewater (Reclaimed volume of effluent reclamation equipment)	985,963	1,182,166	796,130	
		Other total volume	625,463,897	590,988,037	626,694,225	
		Cooling water circulation	622,733,368		624,798,821	
		Others	Condensate reclamation	2,327,129	Note	1,625,892
			Acidic water reclamation	403,400		269,512
			Total water reclamation	626,540,210	592,205,704	627,607,329
	Ratio	97.91%	98.05%	98.15%		

Note: The information was lost due to the information security attack on CPC in 2020.

Plant	Unit (m ³)	Year				
		2018	2019	2020		
Taoyuan Refinery	Total amount	288,252,481	295,944,185	270,053,831		
	Runoff (tap water, river water, irrigation system water)	Water Withdrawal	5,897,648	6,028,370	4,689,782	
		Ratio	2.05%	2.04%	1.74%	
	Groundwater (CPCII water)	Water Withdrawal	718,221	734,240	896,867	
		Ratio	0.25%	0.25%	0.33%	
	Reclaimed Water	Rain	0	0	0	
		Process Wastewater (Reclaimed volume of effluent reclamation equipment)	0	0	0	
		Other total volume	281,636,612	289,181,575	264,467,182	
		Cooling water circulation	278,529,310	285,495,700	261,675,800	
		Others	Condensate reclamation	2,215,021	2,663,220	1,852,678
			Acidic water reclamation	266,418	381,768	292,208
			Wastewater reuse volume	625,863	640,887	646,496
	Total water reclamation	281,636,612	289,181,575	264,467,182		
	Ratio	97.70%	97.71%	97.93%		

Plant	Unit (m ³)	Year				
		2018	2019	2020		
Linyuan Petrochemical Plant	Total amount	759,758,661	734,679,013	718,655,183		
	Runoff (tap water, river water, irrigation system water)	Water Withdrawal	12,718,516	14,282,055	13,332,655	
		Ratio	1.67%	1.94%	1.86%	
	Groundwater (CPCII water)	Water Withdrawal	0	0	0	
		Ratio	0.00%	0.00%	0.00%	
	Reclaimed Water	Rain	0	0	0	
		Process Wastewater (Reclaimed volume of effluent reclamation equipment)	Other total volume	774,188	924,151	790,389
			Cooling water circulation	746,265,957	719,472,807	704,532,139
		Others	Condensate reclamation	742,864,741	716,281,669	701,408,766
			Acidic water reclamation	3,401,216	3,191,138	3,123,373
			Acidic water reclamation	0	0	0
		Total water reclamation	747,040,145	720,396,958	705,322,528	
		Ratio	98.33%	98.06%	98.14%	

Meanwhile, in response to the risk of water scarcity and water consumption charges and to cherish the environmental resources, CPC strives to recycle and reuse the wastewater in its plants, increase the water recycling rate in its processes, and reduce the intensity of water dependence. Through the following measures, CPC achieved the goal of water conservation and maximized the benefits of water recycling. CPC reduced water consumption by 5% in 2020 compared to 2019 and meet a water recycling rate of 98% or higher in all three plants. CPC's water conservation practices include process water conservation, wastewater recycling, and subscription for reclaimed water:

Water saving measures for each plant of CPC



Reduce cooling water loss

Strengthen the renewal of water trays and honeycomb water deflectors at each plant to lower cooling water lost in evaporation from 0.1% to 0.003% to reduce cooling water refill.



Improve boiler water quality

Produce water with pure/ultrapure water equipment at each plant to increase water intake and reduce effluent in cycle. Treat raw water with electro dialysis reversal (EDR) equipment to reduce water conductivity and total hardness. As a result, it increases the water intake of ion-exchange resin and thereby reduce boiler water consumption by improving intake water quality.



Improve water for firefighting

Stagnant water for firefighting is prone to deteriorate. Flushing water surface with backwash water for firefighting to inhibit algae growth can maintain water quality for a longer time.



Save process water

Install condensate monitoring and diversion equipment to keep track on condensate quality at all times to prevent condensate from contamination and non-reusability; solenoid valves are used to recycle water and replenish water towers; desecrating tanks are used to recycle low-pressure steam, which enables recovery of heat and condensed water.



Reclaim and reuse effluents

Process wastewater after treatment is transported to the park wastewater treatment plant. Some effluents are reclaimed and reused in sludge dehydrators or incinerator wet scrubbers; after sedimentation and sediment removal, some effluents from sewage can be used in washing gutters and oil tanks.



Purchase of reclaimed Water

Each plant actively cooperates with the government's plan to build reclaimed water plants to subscribe for reclaimed water: At present, the third refinery has achieved an average water recovery rate of 98%. In order to continue to optimize the water resource management mechanism, CPC continues to subscribe reclaimed water. The Dalin Refinery is expected to purchase 10,000 tons of reclaimed water per day from the Kaohsiung City Linhai Reclaimed Water Treatment Plant starting in 2022; the Taoyuan Refinery signed a contract with the Taoyuan City Government in October 2020 to purchase 10,000 tons of reclaimed water per day upon completion of the reclaimed water treatment plant at the North District Water Reclamation Center of Taoyuan City Government. (The Linhai Reclaimed Water Treatment Plant in Kaohsiung is scheduled to be completed by the end of 2021, and water supply will begin in 2022. The reclaimed water treatment plant at the North Water Reclamation Center in Taoyuan is under planning).

Water conservation progress

Effectiveness of water recycling over the last three years at three plants				
Year		Dalin Refinery	Taoyuan Refinery	Linyuan Petrochemical Plant
2018	Raw Water Replenished (in 10 thousand tons)	1,339.0	661.6	1271.9
	Reclaimed Water Volume ¹ (in 10 thousand tons)	62,654.0	28,154.4	74,704
	Water Reclamation Rate ² (%)	97.9%	97.7%	98.3%
2019	Raw Water Replenished (in 10 thousand tons)	1,175.3	676.3	1,428.2
	Reclaimed Water Volume ¹ (in 10 thousand tons)	59,220.6	28,914.3	72,039.7
	Water Reclamation Rate ² (%)	98.1%	97.71%	98.1%
2020	Raw Water Replenished (in 10 thousand tons)	1,184.3	558.7	1,333.3
	Reclaimed Water Volume ¹ (in 10 thousand tons)	62,760.7	26,446.7	70,532.3
	Water Reclamation Rate ² (%)	98.2%	97.9%	98.1%

Note 1: Reclaimed Water Volume: Harvested stormwater, reclaimed process wastewater, reclaimed cooling water, reclaimed condensate, reclaimed acidic water, and reclaimed backwash water.

Note 2: Water Reclamation Rate (%): Reclaimed Water Volume / (Raw Water Replenished + Reclaimed Water Volume).

Highlights: Reclaimed Water Use at Taoyuan Refinery



Corresponding to the Target 6 of the Sustainable Development Goal (SDGs)

The uneven distribution of water resources in Taiwan coupled with environmental and climatic changes in recent years has made it increasingly difficult to control the timing of the dry season. It is a phenomenon that may pose a serious threat to plant production. As water shortage crisis has become an increasingly serious issue, CPC actively evaluated the feasibility of the reclaimed water which is characterized by its stable supply of water resources to reduce the impact. The Taoyuan plant has taken the initiative to cooperate with the city government to make use of reclaimed water in the absence of the requirements of the environmental assessment-related laws and regulations, and to gradually increase the proportion of reclaimed water use according to the needs of the on-site process.

The Taoyuan plant considers the risk of drought affecting refining production scheduling and the need for diversified water supply sources and plans to introduce reclaimed water to partially replace existing industrial water to ensure that the Taoyuan plant's water supply is balanced in the short, medium, and long-term during dry periods.

The expected benefits are described as follows.

1 It can reduce the risk of water shortage caused by a complete water shutdown due to factors such as the lower water level of the Shimen Reservoir or the annual repair of the Taoyuan canal. The water storage tank at the Taoyuan Refinery is not sufficient to meet the needs of the industrial water shortage during the dry season, which can be made up by reclaimed water, preventing some plants from having to shut down their furnaces or lower their refining capacity due to water shortage.

2 Solve the drought water shortage problem and unnecessarily delay the activation of the "Drought Water Shortage Emergency Response Plan", so that the Taoyuan Refinery reduces the possibility of restricted water supply, allowing for flexible planning of plant operations.



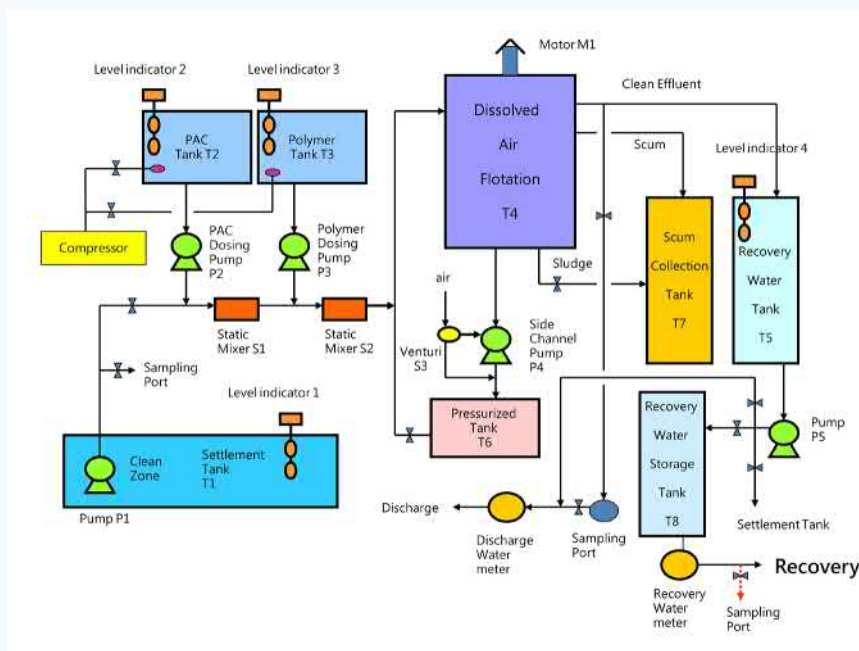
Picture source: Information Services Department of Taoyuan City Hall



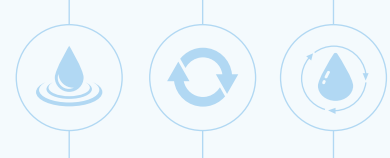
Highlights: Car Wash Wastewater Recycling at Gas Stations and Drought Relief Measures

The car wash sites at CPC gas stations with a daily water consumption of more than 20 cubic meters are equipped with self-developed car wash wastewater recycling systems. The main pollutants in car wash wastewater are mud and sand, suspended solids (SS), organic matter and interface activator (MBAS), etc. After the recycling process, the wastewater can be recycled and used as the first high-pressure rinse water for car washing, floor washing and flower watering, saving more than 1/2 of the water cost. At the same time, the car wash wastewater passes wastewater treatment procedures (sedimentation, dosing and floating removal, etc.). After the wastewater treatment process (sedimentation, dosing floatation, etc.), the water quality has met the effluent standard and can be recycled for floor washing, flower watering, etc.

Schematic diagram of car wash wastewater treatment process



Carwash wastewater treatment and recycling device



Comparison of appearance before and after wastewater treatment

Before treatment, the car wash wastewater was slightly turbid. After treatment, the water quality is transparent and clear, and the water quality meets the effluent standard that can be recycled.



During the domestic drought in 2021, CPC's gas stations have adjusted the car washing business. In accordance with the Ministry of Economic Affairs' water signal and the water restriction measures of each county and city government. In addition, each gas station has taken the initiative to install water-saving devices at the faucets in public toilets and business rooms to adjust the amount of water discharged from the faucets according to the local water conditions. Green plantings at gas stations are also watered with reclaimed water to conserve water.

3.4 Pollution Prevention

Short-term

- Enhance upstream wastewater source management to ensure the effluents standard and improve effluent recirculation rate
- Required hazardous waste treatment permit for self-incineration of hazardous waste for refining and petrochemical industries
- Achieve air pollution prevention targets for refineries and petrochemical plants and control the leakage of VOCs from equipment

Medium/long-term

- Encourage employees to obtain licenses and certificates in relation to environmental protection and participate in the related training and education activities
- Upgrade wastewater treatment equipment, promote recycling and reuse of wastewater, establish an off-site soil treatment facility with the goal of turning soil into resource, and adopt a circular economy concept

3.4.1 Environmental Compliance

The increasingly stringent environmental protection laws and regulations in Taiwan, CPC not only keeps informs of the latest regulations, but also adopts the best available pollution prevention technology at refineries and establishes a self-inspection mechanism to promptly address issues. In addition, CPC regularly invites experts to conduct environmental inspections and sets up an environmental inspection team. Inspection data is stored in CPC environmental data system for further tracking and assurance of improvements. Wastewater and waste management SOPs are established and regularly reviewed or updated to ensure all departments are in compliance with the SOPs. In response to the risks associated with environmental laws and regulations, the measures of management practices are as follows:

1. Actively participate in the discussion of establishment of relevant laws and regulations to protect the rights and interests of CPC and adjust operation strategy.
2. Convene regular environmental protection meetings such as equipment component and VOCs improvement meetings, soil and groundwater contamination improvement meetings...etc. to track the operation and improvement progress of air, water and environmental assessment of operations.
3. Perform monthly environmental audits and track the improvement process until the completion.
4. Develop various standard operating procedures for environmental protection and conduct environmental protection training to share past experiences.

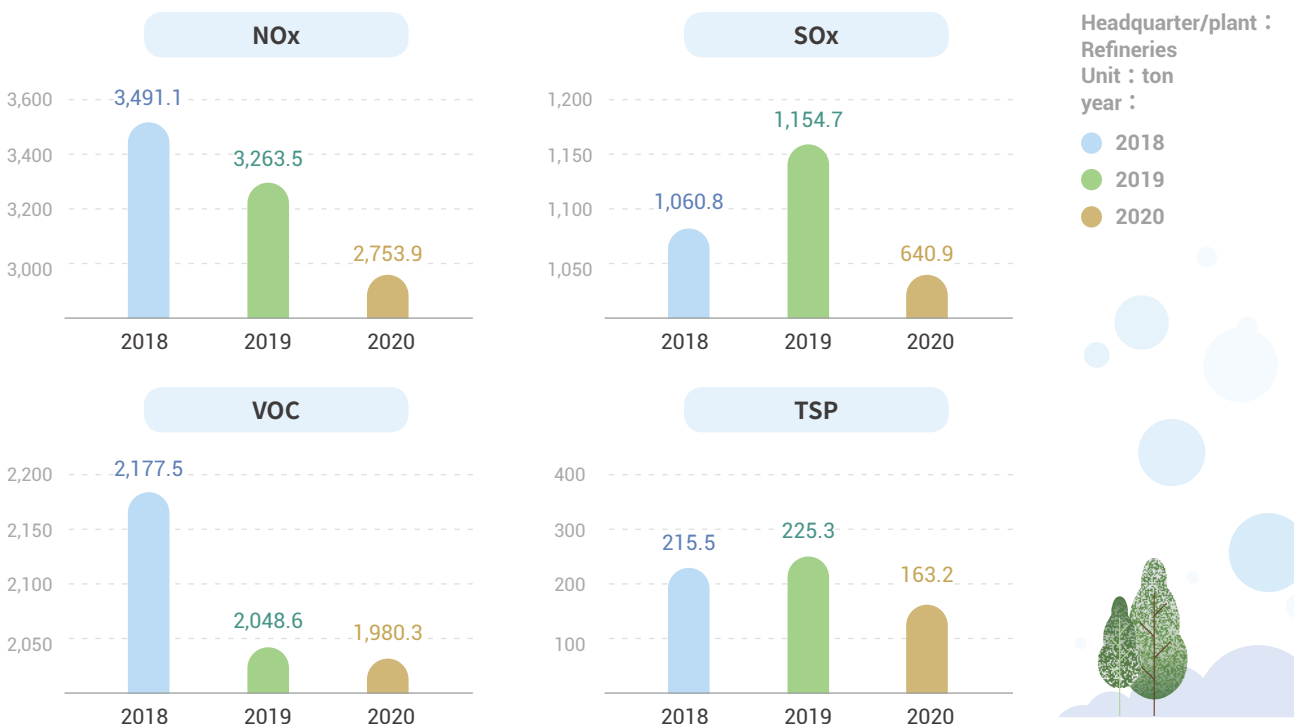
In 2020, there were 3 major non-compliance cases resulting in fines caused by CPC's operational deficiencies with a total of NT\$1.7 million and corresponding requested environmental trainings. In addition, CPC has taken immediate measures and improvement plans in response to the violations.

Violation unit	Reason for penalty	Fines and Penalties	Solution or improvement
Linyuan Petrochemical Plant	Emission of Particulate Matter Pollutants, PM (black smoke), in violation of Article 32, Paragraph 1 of the Air Pollution Control Act	NT\$600,000 and 2 hours of requested environmental trainings	Immediately shut down the on-site emissions source and performed a fault tree (FTA) analysis. CPC has completed improvements to address root cause.
Linyuan Petrochemical Plant	Emission of Particulate Matter Pollutants, PM (black smoke), in violation of Article 32, Paragraph 1 of the Air Pollution Control Act	NT\$300,000 and 2 hours of requested environmental trainings	Immediately shut down the on-site emissions source and performed a fault tree (FTA) analysis. CPC has completed improvements to address root cause.
Taoyuan Refinery	Monitoring value exceeds statutory standard requirements, in violation of Article 20, Paragraph 1 of the Air Pollution Control Act	NT\$800,000 and a total of 12 hours of requested environmental trainings	Leakage equipment components were immediately removed, checked, repaired and further refinement of the equipment for leak prevention was completed.

3.4.2 Emissions and Air Pollutants Management

CPC carries out air pollution prevention and improvement in accordance with the "Air Pollution Prevention Action Plan". Nitrogen oxides (NOx), sulfur oxides (SOx), volatile organic compounds (VOCs), and total suspended particulates (TSP) are the major air pollutants emitted from our production facilities. Emission sources are stacks, flares, storage tanks, and loading operation...etc. Compared to 2019, 2020 NOx emission was 15.62% lowered, SOx emission was 44.5% lowered, VOCs emission was 3.33% lowered, and TSP emission was 27.56% lowered, indicating that improvement measures were effective at reducing various emissions.

Emission volume in the past 3 years



Notes1: The information is the total annual emissions from the three petrochemical refineries of CPC (Taoyuan Refinery, Dalin Refinery and Linyuan Petrochemical Plant, unit: tons).

Notes2: There was no information regarding PM₁₀ and H₂S to be reported.

Notes3: CPC has a total of three refineries in densely populated areas (the township where the operating base is located has a population of more than 50,000): Taoyuan refinery is located in Guishan District, Taoyuan City, with nearby population of approximately 164,400 people; Dalin Refinery is located in Siaogang District, Kaohsiung City, with nearby population of approximately 157,400 people; Linyuan Petrochemical Plant is located in Linyuan District, Kaohsiung City, with nearby population of approximately 69,500 people.

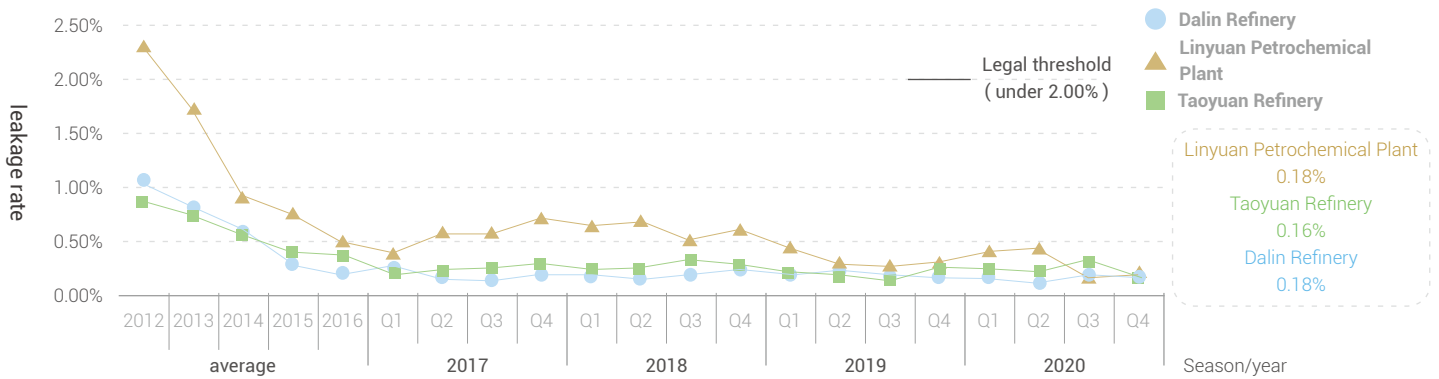
Equipment VOCs fugitive emission is the most difficult to control. CPC will put more efforts on testing and inspecting equipment for VOC emissions. Each unit will be required to regularly examine the implementation of on-site independent testing and improvements. Furthermore, units will convene monthly equipment/component improvement meetings to facilitate inter-department communication, so improvement measures can be taken accordingly to reduce environmental violations in the future. CPC initiate air pollution improvement projects in response to the government policy. Since 1989, CPC have invested over NT\$50 billion in reducing pollution and emissions. The Executive Yuan proposed an "Air Pollution Prevention Action Plan" at the end of 2017. To support the above policy, CPC has made plans for 32 air pollution improvement measures to be carried out between 2017 and 2025. 19 out of the 32 improvement measures have been completed, and 13 are still in progress. Below is a summary description of prevention measures:

	Improvement Measures	Explanation
Improvement Plan for Petrochemical Refineries Plants	Incorporation of Advanced Procedures and Equipment (BACT) into Production	<ul style="list-style-type: none"> Introducing advanced manufacture central integration and control systems, CPC is able to improve the stability of its operations Use of optimal control technologies with lowest-leakage equipment currently available
	Use of Clean Fuel	<ul style="list-style-type: none"> Transition into gas fuel for existing and new boiler to significantly reduce emission of pollutants
	Process Improvement	<ul style="list-style-type: none"> Adjust operation and program of existing equipment for optimal performance Improve combustion technology with higher combustion efficiency
	Installation of Air Pollution Control Equipment	<ul style="list-style-type: none"> TSP: Install static electricity- or bag dust collector SOx: Install fume gas desulfurization (FGD) equipment NOx: Adopt selective catalytic reduction (SCR) or low NOx burner (LNB) VOCs: Progressively transition into low-leakage components and adopt oil and gas recovery equipment
	Waste Gas Recovery	<ul style="list-style-type: none"> Install Flare Gas Recovery System (FGRS) at refineries and petrochemical plants, so that exhaust generated can be recovered and reused in the production process
Diesel vehicle Improvement Plan	Diesel Vehicle	<ul style="list-style-type: none"> In accordance with the Executive Yuan's "Air Pollution Prevention Action Plan", all diesel vehicles under Phase III had been improved from 2017 to 2019 and met the emission standards of Phase IV and above, with a total of 330 vehicles improved
	Contractors' Diesel Vehicles	<ul style="list-style-type: none"> Establish a performance emission standards requirement for diesel vehicles for contractors to comply with



VOCs Emission Management and Improvement

After continuous emission management efforts over the years, three petrochemical refineries of CPC have made significant improvement in reducing VOC leakage from equipment to approximately 0.3%, (far better than the regulatory standard of 2%). However, CPC still strives for improvement and requires each department to reduce the quarterly leak detection rate to 0.2% from 2021 onwards.



Highlights: Advance Deployment Ultra Low Solvent Coatings

Industrial development has led to global climate change. CPC's pollutant emissions are mainly from petrochemical refineries, including particulate matters, sulfur oxides, nitrogen oxides, and VOCs. In accordance with the "National Volatile Organic Compound Emission Standards for Architectural and Industrial Maintenance Coatings" issued by the Environmental Protection Administration, Executive Yuan, CPC has stipulated VOC emission limit for high corrosion protection coatings used in petrochemical plants of 450 (g/L) (approximately 45%). CPC also has conducted a R&D program for new generation environmental protection coating systems. At present, CPC have completed the development of ultra-low solvent type environmental protection coatings that meet the highest corrosion rate (environmental type: CX offshore grade) and contain less than 20% VOC, and are expected to achieve the following results:

01

Reduce environmental pollution, reduce the use of VOCs/and non-toxic chemical coating system and reduce the chance of generating particulate matter (PM_{2.5}) and haze.

02

Improve energy efficiency and develop high reflectivity materials.


03

Improve economic efficiency and increase the solid content of coatings. It has been gradually promoted in various oil supply centers.


3.4.3 Effluents Management

CPC equipped with wastewater treatment facilities or wastewater treatment sites are required to comply with the "Operational Guidelines for Discharge Control of Upstream Wastewater of Wastewater Plants" and formulate the regulations for the operation, maintenance, and cleaning of the oil and water separation ponds at the plants under their jurisdiction. The Environmental Protection Department of the Refining and Petrochemical Division should set the wastewater quality standards and inspection requirements. The wastewater management policy of CPC is as follows.


Effluents management approaches

01 


Implement water pollution preventive measures, and apply for approval of bypass and dilution to environmental protection authorities

02 


Implement contingency measures and report to competent authorities for water body contamination due to negligence

03 


Enhance upstream wastewater source management to ensure the effluents standard and improve effluent recirculation rate

04 

Enhance monitoring, inspection, and emergency response drill of storage tanks and transportation equipment

05 

Encourage employees to obtain related certificates and participate in professional training

06 

Upgrade wastewater treatment equipment and wastewater recycle system

CPC has established comprehensive wastewater pollution prevention measures, with the primary focus on controlling the source of wastewater, enhance effluent recycling with high-performance equipment, and ensure effluents are compliant with environmental protection laws to prevent process wastewater from causing environmental impacts. Petroleum organic compounds are the major pollutants contained in our effluents. The continuous and regular effluent monitoring targets include suspended solid (SS) chemical oxygen demand (COD), oil, and phenol. In 2020, the effluent monitoring values of all production facilities met the effluent standards. Remedial actions Were taken to clear damaged piping of residual oil, remove contaminated soil, promoting residents to use water supplied by CPC for irrigation instead, and CPC will subsidize the installation of freshwater equipment for access to drinking water. Overall, residents' use of water was unaffected. Meanwhile, additional pressure monitoring system, inspection points and anticorrosion test points Were introduced, and pipelines Were actively replaced to prevent recurrence. Wastewater pollution prevention by facility:

Dalin Refinery

Wastewater from Dalin Refinery (special wastewater, wastewater containing oil, mineral salts wastewater, and sewage) is transported to treatment at the secondary wastewater treatment site through the oil-water separator before being released through the ocean at the Kaohsiung Linhai Industrial Park.

Tests Subjects	Effluent Standard (EPB) or Control Standard (Science Park)	2018	2019	2020
SS(mg/l)	100	12	4.3	8.95
COD(mg/l)	280	45.4	39.8	36.2
Oil(mg/l)	20	<1	1.1	ND
Phenol(mg/l)	1.0	0.005	<0.05	<0.05
Discharge (ton)	-	3,415,819	2,064,735	2,128,142

Taoyuan Refinery

Wastewater from Taoyuan Refinery (special wastewater, wastewater containing oil, mineral salts wastewater, and sewage) is transported to the wastewater treatment site before releasing to the Nankang River, provided that the volume must not exceed the river's assimilative capacity. In addition, as the quality of treated wastewater complies with the national effluent standards and is better than the quality of the river. There is only mild impact on the river.

Mitigation and Adaptation of Climate Change | Green Energy Transition and Circular Economy | Energy and Resources Management | **Pollution Prevention** | Ecological Preservation and Soil Remediation | Featured Topic

Tests Subjects	Effluent Standard (EPB) or Control Standard (Science Park)	2018	2019	2020
SS(mg/l)	30	11.20	10.27	10.40
COD(mg/l)	100	19.88	21.40	29.20
Oil(mg/l)	10	8.40	4.37	0.70
Phenol(mg/l)	1.0	0.005	0.005	0.004
Discharge (ton)	-	3,041,824	2,969,641	2,761,370

Linyuan Petrochemical Plant

After primary treatment, wastewater from Linyuan Petrochemical Plant (special wastewater, wastewater containing oil, mineral salts wastewater, and sewage) is transported to secondary (biological) treatment. After meeting the control standards, secondary treated wastewater will be released through the ocean from central wastewater treatment plant at the Kaohsiung Linhai Industrial Park. After primary treatment, some wastewater is transported to secondary treatment and tertiary treatment and sent back to the manufacture plant for reuse after it meets required standards.

Tests Subjects	Effluent Standard (EPB) or Control Standard (Science Park)	2018	2019	2020
SS(mg/l)	100	5.3	9.25	9.65
COD(mg/l)	280	60.45	38.5	61.85
Oil(mg/l)	20	1.55	<0.1	<1.0
Phenol(mg/l)	1.0	<0.01	<0.01	<0.01
Discharge (ton)	-	3,007,259	3,296,109	3,249,599

Mining formation with water production

Most domestic oil and gas mining are natural gas wells. When mining natural gas, condensate oil (naphtha; C⁵-C²⁰) and formation water are also produced. After three phases (oil, water and gas) of separation, the formation associated with water production will be affected by the difference in salt content (Cl⁻, about 3,800-11,000 ppm) in different mining areas. Although salt is not included in the effluent control standard, it may cause soil salinization. Therefore, there are two treatment methods for water production:

01



After concentration, the associated water is used to restore the well and is re-injected into the oil and gas reservoir. This will help extract additional oil

02



After being treated by the wastewater treatment plant and discharged into the river after passing the quality inspection, the total output of stratum-associated water in 2020 will be 22,085.9 kL

Region	Tiezhashan Mine, Jinshui Area, and Qingcaohu Area of Jinqing Mine	Chuhuangkeng Mine
Treatment	Re-injection into the ground formation through disposal wells	Discharge after wastewater treatment
Description	Before oil reinjection into the ground formation, the oil slick is recovered by oil-water separation then re-injection into the underground reservoir. The specifications of disposal wells mainly refer to the relevant regulations of the second class of injection wells of the United States federal regulations.	Oil is first separated and recovered by an oil-water separator (API) and discharged until it meets the release standard using an air pressurization floater and biological treatment system.
Volume treated in 2020 (%)	6,196.5 kL 28.06 (%)	15,889.4 kL 71.94 (%)

3.4.4 Waste Management

In order to strengthen the management of waste reduction, reporting, storage, and cleaning (removal, treatment, and reuse), CPC formulated the "Principles of Business Waste Management". The "Operational Principles of Business Waste Tracking" was formulated to track CPC's management of the waste cleaning (removal, treatment, and reuse). The relevant management principles are reviewed and amended regularly in accordance with the laws and regulations and access current status to implement waste management.

Apart from general waste, CPC's main wastes are catalysts, sludge, and oil sludge. CPC dispose of different types of waste according to their nature. Household wastes were disposed at local incineration plants through qualified contractors. CPC recycle precious metals contained in waste metal catalysts and bury sludge after in-house incineration. Overall, CPC dispose of solid by categories, such as recycling, solidification, burial, incineration, physical and chemical treatment, thermal treatment, oil and gas recovery, etc. Drilling mud is a common waste of the oil and gas industry. Its components often include various types of oils and chemical treatment agents. Improper disposal will thus affect water bodies and ecology.

Since waste has a market value and that the government agencies announce that it should be recycled and reused, CPC makes every effort to promote the recovery and reuse of waste. Zeolite catalyst (mainly consists of aluminum oxide (Al₂O₃) and silicon dioxide (SiO₂)) is the main form of waste reused at refineries and petrochemical plants in 2020 and 100% of which was reused. Based on the reuse purposes outlined in Ministry of Economic Affairs Regulations Governing Reuse of Industrial Waste, CPC transports zeolite catalyst waste to the appropriate institutions.

Volume and Method of Waste Disposal of Refineries and Petrochemical Plants in 2020



Type	Method	Volume Disposed (tons)	Disposal Percentage(%)	Amount of Waste (tons)	Type Percentage(%)
Hazardous waste	Solidification	135.86	0.12%	2,193.46	2.04%
	Physical treatment	61.11	0.05%		
	Incineration	1,996.20	1.86%		
	Cleaning treatment	0.28	0.00%		
	Thermal Treatment	0.005	0.00%		
Non-Hazardous Waste	Chemical treatment	1,878.38	1.75%	105,376.49	97.96%
	Physical treatment	4,943.01	4.60%		
	Recycling	72,803.97	67.68%		
	Landfill	3,911.03	3.64%		
	Incineration	20,013.32	18.60%		
	Solidification	237.69	0.22%		
	Heat Treatment (other than Incineration)	1,589.09	1.48%		
Total		107,569.95	100.00%	107,569.95	100.00%

Note: As the hazardous waste generated by CPC is not included in the listed recyclable items in accordance with the Environmental Protection Administration's announcement "Items of Waste and Renewable Resources Required to be Recycled or Reused" and the Ministry of Economic Affairs' "Regulations for the Reuse of Business Waste", it cannot be treated by recycling and reuse. The percentage of hazardous waste recycling to total hazardous waste is 0%.

3.4.5 Treatment of Toxic Substances

CPC operates in categories I and III toxic chemical substances as well as the chemical substances of hazardous concern as proclaimed by EPA. As all of them reach the benchmark of large operation volume, CPC submit the related contingency plans to the competent authorities for review. Every contingency plan shall include the emergency response task force, the command system, the reporting mechanism and the emergency disaster prevention equipment. Two unannounced tests and full-scale drill shall be implemented for every contingency plan each year. Drills in collaboration with the emergency response of local environmental protection units shall be implemented to ensure preparedness for toxic disaster prevention.

Moreover, all relevant departments of CPC participate in the regional prevention organization in accordance with Paragraph 1, Article 38 of the "Toxic and Concerned Chemical Substances Control Act". In addition, CPC complete the stage 1 registration of a total of 159 existing chemicals according to the "Regulations of New and Existing Chemical Substances Registration." Furthermore, CPC voluntarily complete the Chemical Commodity Importation Pre-Confirmation in coordination with the "Import Management in Chemical Substance Registration" promoted by EPA.



3.5 Ecological Preservation and Soil Remediation

3.5.1 Environmental Protection

Short-term	Medium/long-term
Constant environmental and ecological monitoring	<ul style="list-style-type: none"> Establish an environmental educational park: Maintain intertidal habitats, promote ecological conservation and education with local governments, and establish Bayu Coast environmental education park Promote ecological conservation with the community to achieve the goal of sustainable ecological preservation

Adhering to sustainable co-existence, CPC spare no effort to maintain and implement ecological conservation and environmental protection education. CPC hopes to maintain the sustainable development of society, nature, and business altogether. In order to fulfill the commitment of the environmental assessment of Guantang Industrial Park (Port) development project, the "Guantang Industrial Park (Port) Ecological Conservation Committee" was established in 2018 to actively carry out ecological conservation measures in the Guantang area. The committee fulfills the corporate responsibility to maintain coastal cleanliness and regularly conduct coastal cleanup in the Datan area. Through community participation, CPC actively engage communities, experts, scholars and government agencies to establish ecological conservation partnerships in order to realize ecological and environmental conservation. At the same time, through the education of the next generation, the concept of environment and ecological conservation is passed on to the next generation. Both CPC Kaohsiung Refinery Environmental Education Park and Taiwan Oil Field Exhibition Hall provide a learning channel for future generations.

Target Groups and Relevant Objectives and Actions of Ecological Conservation

Target Groups	Short-term, Medium-term and Long-term goals	The impact of operations on biodiversity	Actions
 <p>Coral (polycyathus chaishanensis)</p>	<ul style="list-style-type: none"> Short-term: Distribution survey. Medium-term: Artificial reproduction and rehabilitation. Long-term: On-site and off-site rehabilitation and effectiveness evaluation. 	<ul style="list-style-type: none"> Impact: Sea temperature and drifting sand affect the species. Impact area: G1, G2 area of Datan. Period of impact: Long. 	<ul style="list-style-type: none"> Financial support: Invest in approximately NT\$50 million per year for ecological conservation work related to the 3rd LNG receiving terminal. Manpower: Ecological survey by a professional team. Technology: Coaching by experts and scholars. Assessment mechanism: Quarterly survey of surviving strains of Coral (polycyathus chaishanensis) in Datan area. Operational model: Regularly report the monitoring results to the EPA. Specific results: A total of 75 clusters surveyed in the 2018 environmental impact report and more than 100 clusters in 2020.
 <p>Whether the species is listed in the IUCN and national conservation lists Grade I of the Conservation Wildlife</p>			

Target Groups



Little tern

Short-term, Medium-term and Long-term goals

- Short-term: Habitat establishment.
- Mid-term: Breeding observation.
- Long-term: Habitat improvement is assessed by habitat and breeding conditions, making Taoyuan the best habitat for little terns in Taiwan.

The impact of operations on biodiversity

- Impact: Man-made, natural enemies (wild dogs, rats, etc.).
- Impact area: Various habitat of little terns in the Taoyuan.
- Period of impact: April to July every year.


Actions

- Little terns are summer migratory birds that fly from Australia to Taiwan in April to July every year to roost and breed. Every year, CPC invites the Taoyuan City Wild Bird Association to assist in habitat planning and breeding monitoring. CPC reviews the effectiveness and improvement plan at the end of the year as the direction of improvement for the next year.
- Specific results: Average breeding success rate of little terns was 66% in 2019, which increased to 92% in 2020.

Whether the species is listed in the IUCN and national conservation lists

Grade II of the Conservation Wildlife

Target Groups



Scalloped hammerhead

Picture source: Fisheries Agency

Short-term, Medium-term and Long-term goals

- Short-term: Habitat Survey.
- Mid-term: Migratory route survey.
- Long-term: Habitat conservation assessment.

The impact of operations on biodiversity

- Impact: Fishing.
- Impact area: Taiwan's Water Region.
- Period of impact: Spring and autumn.


Actions

- Scalloped hammerhead is migratory fish that appears in Taiwan waters in spring and autumn every year. It is one of the economic fish species in Taiwan and is also listed as an endangered species by the IUCN. CPC invites domestic shark experts and scholars to conduct a survey of the species' resources in Guantang and use satellite markers to understand the species' migratory route before assessing the necessity and feasibility of establishing a conservation area.

Whether the species is listed in the IUCN and national conservation lists

IUCN endangered species

Target Groups



Crustose coralline algae

Short-term, Medium-term and Long-term goals

- Short-term: Annual survey of crustose algae coverage, species and environmental factor monitoring of algae reefs.
- Mid-term: Analysis of the occurrence of crustose algae species according to the characteristics of each reef area, and analysis of their cultivation environmental factors.
- Long-term: Artificial breeding to be carried out according to the environmental factor conditions obtained from the survey. In the future, in situ or ex situ rehabilitation will be possible.

The impact of operations on biodiversity

- The construction of industrial area and port may affect the direction and speed of the tide and waves, causing changes in the characteristics of coastal drifting sand and affecting the place where crustose algae are attached to grow.
- The open design between the industrial port and the area maintains the flow of seawater and does not affect the exchange of nutrient salts in the intertidal zone of the algae reef.

Actions

- The results of the species diversity survey of macroalgae (including crustose coralline algae) showed that there were 35 species of algae in 2019, 14 of which were macroalgae and 21 of which were crustose coralline algae. There were a total of 40 species of algae in 2020, 15 of which were macroalgae and 25 of which were crustose coralline algae.
- Specific results: Only a single-digit species were surveyed in the 2018 environmental impact report, and more than 20 species in 2020.

Whether the species is listed in the IUCN and national conservation lists

None

Highlights: Ecological Survey and Methodology of Su'ao Oil Supply Service Center

In order to provide services across Eastern Taiwan, CPC has set up three direct sales service centers in Yilan, Hualien and Taitung to be responsible for oil sales, oil service, and business promotion in the Eastern Taiwan. The Su'ao Oil Supply Service Center was also established to be responsible for oil transportation and storage in Yilan. The Su'ao Oil Supply Service Center is located in Su'ao Township and covers an area of approximately 101 hectares. In order to understand whether the plant has impacted surrounding environment and ecology, CPC conducted a basic survey on the ecology of the Su'ao Oil Supply Center. A total of 12 animal surveys were conducted in the project area, and the survey results as below:





12 species of wild mammals in 6 orders and 10 families



37 species of birds in 8 orders and 19 families



4 species of reptiles in 1 order and 4 families



3 species of amphibians in 1 order and 3 families



13 species of insects in 2 orders and 4 families

In addition, a plant inventory survey was conducted for the surrounding area. A total 19 vegetation samples have been completed, and a total of 155 species in 64 families were investigated. There were 20 species of ferns in 11 families, 103 species of dicotyledons in 47 families and 32 species of monocotyledons in 6 families. It contains 9 endemic or subspecies, and variegated plants of Taiwan and 18 naturalized species. The results of the survey showed that the oil supply center is characterized by a wide variety of plant and rich biodiversity. It shows that the surroundings are in good environment and ecology condition, which enable sustainable development of the environment.



5 herbaceous samples of roadside



2 tall grass shrub samples of streams and beaches



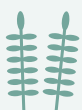
8 woody samples of forest



3 early forest samples of collapse remediation



1 shrub sample of sunny slope were set up



20 species of ferns in 11 families



103 species of dicotyledons in 47 families



32 species of monocotyledons in 6 families



9 endemic or subspecies, and variegated plants of Taiwan



18 naturalized species

The ecology of the Su'ao Oil Supply Center is one of CPC's significant conservation site. However, the oil storage tank of the center is located next to a hillside, which often collapses due to typhoons or heavy rains. Therefore, the concept of ecological conservation was especially taken into consideration in the design of slope protection and flood control projects. Appropriate ecological methods were also introduced to achieve the effects of flood control, water storage and ecological conservation. In order to prevent animals from falling into the large drainage ditch, CPC added animal escape facilities in the drainage and installed a fence at the exit of as the diversion channel on the slope. It is to prevent animals such as *Cuora flavomarginata* from falling, which demonstrated efforts and determination of CPC on animal protection. The current biodiversity of the area includes *Spilornis cheela*, *Cuora flavomarginata*, and *Macaca cyclopis*. Moreover, after the adoption of hydrological and ecological methods for slope protection, the area has been attacked by several typhoons without causing floods or landslides.

Highlights: Avoidance of Algal Reefs of 3rd LNG receiving terminal

In response to the demands of environmental groups on conservation of algal reef ecology and Coral (*polycyathus chaishanensis*), a Grade I conservation animal. CPC decided to adopt an "avoidance amendment plan" after careful evaluation. CPC has completely avoided the exposed reef and Coral (*polycyathus chaishanensis*) and regularly monitored its ecological system every year. The 2018 environmental impact report recorded a total of 75 clusters, while there were more than 100 clusters in 2020. The project only occupied the existing landfill, construction pier, hinterland of the backline and land above the high tide line. The development of the industrial area was reduced from 232 hectares to 23 hectares. The industrial area (harbor) was also configured in an open manner. The industrial area and harbor were connected by a pier to maintain the exchanging of seawater and minimizing the ecology impact of the original algal reefs.



There are currently two LNG receiving terminals in Taiwan, which were located at the Yongan Port in southern Kaohsiung and the Taichung Port in central Taiwan. At present, the natural gas used in the northern region is transported by pipelines. CPC builds the 3rd LNG receiving terminal in Guantang industrial area, which is located on the northwest coast of Datan Power Plant. CPC will comply with the relevant regulations and fulfill its responsibility for environmental protection and ecological conservation for the area. Currently, CPC are working with experts, scholars, local residents and local communities to jointly promote the conservation of algal reefs as follows:

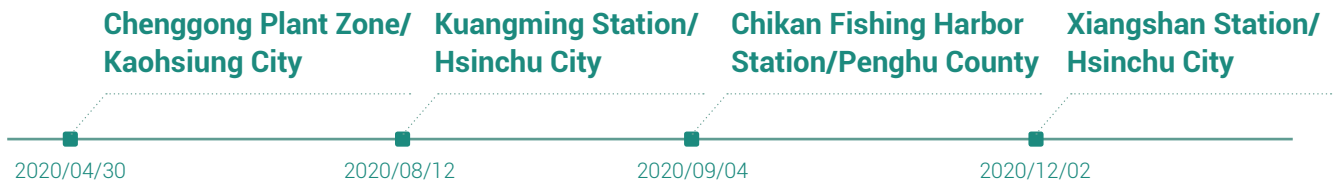
- 1 Implement and advocate proper conservation concepts and practices to maintain the ecology of the algal reefs with reference to the recommendations of scholars, experts and conservation groups.
- 2 Take care of shoreline, regularly trash clean up, and conduct large-scale beach cleaning activities annually to protect the environment of the algal reefs.



3.5.2 Remediation of Soil and Groundwater Contamination Site

CPC surveys soil and groundwater pollution and makes improvements according to the law. A total of 4 sites were deregulated in 2020. By the end of 2020, CPC had 40 sites deregulated while 39 sites were still under regulation.

Sites deregulated in 2020: 4



Response measures for the contaminated sites

Listed and regulated	Not yet list nor regulated
<p>Relevant units are required to propose contingency, control and remediation plans within the prescribed time limit. Also, the units are to follow the pollution improvement plans reviewed and approved by environmental protection authorities, scholars, and experts to carry out subsequent soil, groundwater, and pollution improvement work.</p>	<ul style="list-style-type: none"> Strengthen the inspection and monitoring of oil depots, gas station leak detection pipe, and groundwater wells. The subordinate units are required to implement the "Reference Code for the Prevention and Improvement of Soil and Groundwater Pollution" by CPC. When abnormal soil and groundwater pollution monitoring data are found in the jurisdiction, they should formulate pollution improvement measures and actively carry out pollution improvement work.

Countermeasures to Address the Difficulties Countered in the Soil Remediation Process

Technology	As it is not easy to determine the contamination area of the site, a pilot test is conducted at the early stage of remediation. According to the site characteristics, CPC constructed the detailed design of the subsequent remediation method in consider the impact radius of soil steam extraction method, the number of wells and horsepower evaluation, groundwater level, oil level, and longitudinal depth. Scope of planning, location and area of screening, etc. are continuously adjusted according to the change of site conditions.
Laws and regulations	<p>If the site number of the preservation site is not verified by the Environmental Protection Bureau (i.e., the site number is not deregulated), it will be subject to the Soil and Groundwater Pollution Remediation Act:</p> <ul style="list-style-type: none"> Article 17 of the Soil and Groundwater Pollution Remediation Act - Any subsequent construction, expansion, modification, repair or demolition of building will have to be approved by Environmental Protection Administration before proceeding. Article 19 of the Soil and Groundwater Pollution Remediation Act - Any work that involves removal, back-fill, temporary storage or transportation of soil or groundwater extraction will have to be approved by Environmental Protection Administration before proceeding.
Budget and duration	Due to the high degree of uncertainty, the estimation of remediation project cost and progress are complicated. It is necessary to reserve time for various administrative operations. It is difficult to execute with a single applicable standard. Vendors often raise the budget on safety factor to avoid performance disputes, resulting in higher project costs.
Policies	As CPC is faced with many policy issues, such as document preservation of Kaohsiung Refinery, bidding of the 5th naphtha cracking plant assets, brownfield development, green power promotion, etc., the duration of pollution remediation cannot be decided unilaterally, resulting in a high degree of uncertainty in the implementation direction. Pollution improvement operations need to be evaluated and revised as it goes, which takes more time for deliberation. It not only delayed the remediation time, but also made the competent authorities quite critical and required more time for communication.

Description of remediation method

Washing



Include two procedures: hydraulic sorting and wastewater treatment. In hydraulic sorting, soil bump breaking, sedimentation, up flow sorting, and hydro-cyclone procedures are implemented to facilitate particulate separation. It has higher processing capacity and better processing results.



In-situ chemical oxidation



Chemical oxidation can be achieved either in situ or ex situ. Given the rapid chemical reaction, in-situ chemical oxidation is more efficient and more competitive in processing time. In chemical oxidation, oxidants are added to damage pollutants or convert them into non-toxic or lowly toxic substances by means of oxidation reduction.



Bioremediation



As microorganisms decompose hydrocarbon compounds to get energy and the carbon source for metabolism and growth, bioremediation makes use of this process to convert some pollutants into CO₂ and H₂O.

Innovative practice - phytoremediation

CPC is currently conducting an experiment to plant vetiver grass on exposed soil at two of its regulated sites. This plant has high tolerance for toxic metals such as aluminum, manganese, lead and mercury and the ability to absorb them. By exploiting this special property, CPC hopes to remove heavy metals from soil and effectively reduce oil concentration in oil-polluted soil. This method is still in the experimental stage, and is expected to take 3 to 5 years to validate results.



Ex-situ processing



When other methods are ineffective to treat highly contaminated soil or highly concentrated contaminated soil (sludge), CPC outsource treatment to qualified contractors.



Highlights: Green Remediation at Beipu of the Hualien Oil Supply Center

The Beipu area of the Hualien Oil Supply Center was listed as a control site by the Hualien Environmental Protection Bureau in November 2009. After 6 years of remediation, it was released from the list in July 2016. Remediation of contaminated soil and groundwater is highly complex without any shortcut to the goal. A green remediation concept (vegetation rehabilitation) was introduced in the later period of remediation. CPC planted vetiver grass, Madagascar Almond and other plants on the site to achieve underground pollutant degradation through different plants and microbial properties. The phytoremediation technology and green remediation methods are environmentally friendly, economical and effective. CPC cooperated with various organizations to visit, exchange, promote, and provided environmental education. In addition, the Refining & Manufacturing Research Institute of CPC extracted high-value essential oil of vetiver from the roots of vetiver grass grown for many years in the Beipu area through microwave steam method. It developed a variety of vetiver essential massage oils based on mixed of variety of plant essential oils, which have the function of calming the mood, relieving tension, relaxing body and mind, and reducing stress.

The site of Beipu was assessed by the EPA as the first "Green Remediation Demonstration Site" in Taiwan that met the requirements for green remediation. It was presented at the International Green Remediation Forum. The adoption of the phytoremediation and the implementation of the green remediation method was valued by the environmental protection authorities at all levels. The EPA and the Hualien Environmental Protection Bureau invited environmental protection authorities from all counties and cities to visit Beipu during the remediation period to conduct phytoremediation and green remediation visits and guidance activities.



2016
Soil and Water Protector of Environmental Protection Bureau, Changhua County



2018
Visited by Environmental Science Society of Yunnan, China and Environmental Protection Bureau, Lianjiang County



2019 and 2021
Soil and Water Protector of Environmental Protection Bureau, Hualien County

Vetiver grass at the Beipu site



Activity of Soil and Water Protector





Carbon Neutrality

Taiwan's First Step Toward Carbon Neutrality by CPC

Conference of Parties 25 (COP 25) hosted by United Nations Climate Change Conference in 2015 passed the Paris Agreement, which was signed by 171 countries to curb the trend of global warming together. The common goal is to limit the temperature increase of global warming within 1.5°C or 2°C by the end of the century. Thereby, countries stand together to mitigate the impact of climate change. Nations around the world have enacted regulations to set net zero targets, while corporations have also set short and long term carbon reduction targets to mitigate climate-related impacts. Initiatives and guidelines related to carbon emissions reduction, such as the Science Based Targets initiative (SBTi), the Task Force on Climate-related Financial Disclosures (TCFD), and CDP have emerged. Year 2020 is the 30th anniversary of liquefied natural gas (LNG) importation in Taiwan. CPC has taken an important step to collaborate with Royal Dutch Shell Plc. (Shell) in response to climate change by importing carbon-neutral LNG. This initiative demonstrated CPC's active engagements in carbon reduction. Such importation not only shows CPC's focus on carbon emission issues, but also demonstrates CPC's connections with leading international energy companies as well as collaborations with stakeholders in the value chain. CPC constantly promotes sustainable business, while co-creating a low-carbon and eco-friendly home with stakeholders.



Royal Dutch Shell Plc. was established in 1890. It is now the second largest energy and petrochemical company in the world, which ranked 5th among the 2019 Fortune Global 500 list.

Toward Globalization and Co-Prosperity throughout Supply Chain

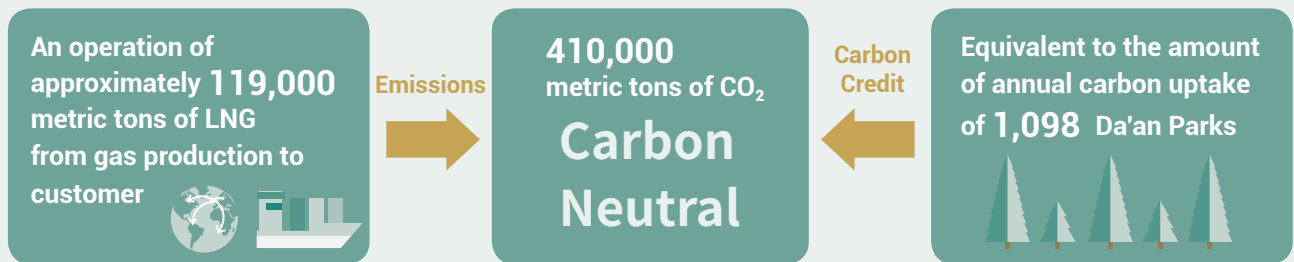
In March 2020, CPC imported the first shipment of carbon-neutral LNG from Royal Dutch Shell, setting sail from Sakhalin Island, Russia. The shipment reached Taiwan one week later, and unloaded at Yongan LNG Receiving Terminal in Kaohsiung City. Thus, it became the first carbon-neutral LNG shipment unloaded in Taiwan. CPC imported the second shipment from Nigeria in November, 2020. Carbon-neutral LNG earned its name from the purchased carbon credits of afforestation projects, which offset the total carbon dioxide equivalent (CO₂e) produced by the imported LNG from gas production to customer. Specifically, the carbon credits were earned from international forest conservation projects in Indonesia, Peru, and Ghana. These projects were supported by the United Nations' Reducing Emissions from Deforestation and Forest Degradation Program (REDD+). Carbon credits are given based on reduction quotas through long-term afforestation and forest restoration processes in exchange for international funds to support the sustainable development of conservation projects. Each carbon credit is certified by a third-party independent institution and offset under the supervision of such institution.

Life Cycle Assessment of Carbon-Neutral LNG



The life cycle of LNG can be divided into five main stages, namely gas production, liquefaction, shipping and distribution, regasification, and selling to customer. Carbon emissions are produced at each stage. In 2020, CPC imported two shipments of carbon-neutral LNG. Each ton of imported LNG produces approximately 3.4 to 3.7 tons of carbon emissions throughout its life cycle. However, about 410,000 tons of carbon emissions (equivalent to the amount of annual carbon uptake of 1,098 Da'an Parks) are offset by the carbon credits.

First-ever purchase of two carbon-neutral LNG cargoes in 2020



CPC's carbon-neutral LNG mechanism

Carbon-neutral LNG uses carbon credits to offset carbon emissions. Hence, there is no net increase in greenhouse gas emissions in the atmosphere. One carbon credit represents the offset of 1 metric ton of carbon dioxide equivalent (CO₂e). Carbon credits are obtained through ecological restoration, afforestation, and any other related projects under various international forest conservation projects. Aforementioned projects should have been certified by Verified Carbon Standard (VCS) to offset greenhouse gas emissions.



Verified Carbon Standard

Verified Carbon Standard (VCS) is the most common voluntary carbon reduction standard in the world. It had provided nearly 1,700 certified VCS projects and offset over 630 million tons of carbon and greenhouse gas emissions.



International Forest Conservation Projects

<p>The Cordillera Azul National Park Project, Peru</p>	<ul style="list-style-type: none"> • Obtain carbon credits equal to approximately 2.5 million metric tons of CO₂e each year • Restore 1.6 million hectares of endangered forests and 28 plant species with high conservation value • Support 24 sustainable development companies 	
<p>The Ghana Forest Restoration Project</p>	<ul style="list-style-type: none"> • Aim to obtain carbon credits equal to 800,000 metric tons of CO₂e by 2025 • Restore 20,000 hectares of forest and plant over 15 local tree species • Create over 1,000 job opportunities 	
<p>The Katingan Peatland Restoration and Conservation Project, Indonesia</p>	<ul style="list-style-type: none"> • Obtain carbon credits equal to 7.5 million tons of CO₂e each year • Conserve approximately 150,000 hectares of peat swamp forest and nearly 40 endangered or vulnerable species • Collaborate with 34 local villages 	

 Chapter 4

Preserved Heritage · Blessed CPC



Chapter summary

Excellent human resources are not only the foundation of a company's sustainable operation but also the key to gaining a competitive edge for a company. CPC regards employees as its greatest asset and is committed to protecting the rights of all employees. In addition, CPC continues to improve its talent recruitment, development, utilization, and retention system as well as optimize the work environment and conditions for employees while remaining committed to creating a safe and friendly work environment where employees can grow together, to enhance CPC's competitiveness.

Recommended audiences

- Communities
- Employees
- Business Partners

Corresponding SDGs



Chapter Highlights



Percentage of female senior executives

22.22%

Average years of service before retirement



39.95 years

Health promotion events and seminars



244 sessions



Percentage of male employees on extended unpaid parental leave

32%



Average training hours per employee

54 hours

CPC's frequency-severity indicator has been lower than that of the industry



24 consecutive years



Reinstatement rates for male and female employees

100%

Short-term

- No report on violation of human rights, non-compliance with non-discrimination, or impact on business activities as a result of human rights
- No gender and racial discrimination case

Medium/long-term

- Hire more indigenous people for non-technical roles at various units than the requirement stipulated in the Indigenous People's Employment Rights Protection Act in the future
- Equal remuneration for employees based on the principle of equal pay for equal work

Award Highlights in 2020

Gaining international recognition in talent development as one of the "Top Workplaces in Asia"



CPC provides employees with a safe and high-quality work environment and a human resource development system. Having long been committed to nurturing talents in professional fields, CPC has constructed a sound manpower training framework and built a comprehensive corporate university knowledge system that offers vertical advancement (entry-level, mid-level, and advanced level) and horizontal advancement (across different fields of expertise) while enhancing convenience and immediacy in learning through cross-utilization of digital learning and physical classrooms. CPC's efforts in talent development have become a benchmark at the international level.

In 2020, CPC won the top awards, including "Leadership Awards - Industry Champions of the Year" and the "Sustainability Awards - Top Workplaces in Asia" at the 2020 Asia Corporate Excellence & Sustainability Awards (ACES), as well as the "Investment in People Award" at the 2020 Asia Responsible Enterprise Awards (AREA).



Exceeding domestic expectations through continuous progress

CPC has long devoted itself to the area of human resource management and continuously promoted employee training. In 2020, CPC stood out among thousands of companies as **it received the silver award from the Ministry of Labor's Talent Quality-management System (TTQS).**

With the continuous commitment to nurturing talents in the petrochemical industry, CPC has established the Human Resource Training Center to keep pace with the development of the industry. In addition, CPC also attaches great importance to developments in gender equality. **In 2020, CPC won the "People Development Award" and the "Gender Equality Award" at the 2020 Taiwan Corporate Sustainability Awards (TCSA) for its cases including "Passing the Torch - Nurturing Diversified Talents in the Petrochemical and Energy Industries" and "Diversity and Equality at CPC - Women Empowerment in the Heart of Africa."**

4.1 Human Resources

CPC has established well-defined employment policies and has never hired child labor. In addition, to provide vulnerable groups with more job opportunities, CPC gives extra credits to people with disabilities and indigenous people during the hiring process. Based on the principle of equal pay for equal work, CPC ensures equal remuneration for employees regardless of race, belief, religion, political party, place of origin, place of birth, gender, sexual orientation, marriage, appearance, physical and mental disabilities, or past union membership. Furthermore, CPC also ensures the freedom of association of employees and encourages them to join clubs. As CPC also conducts business with suppliers and contractors abiding by the above principles, no report regarding gender discrimination or racism has been received over the years. In 2020 during hiring process, there was no report on violation of human rights, non-compliance with non-discrimination, or impact on business operations as a result of human rights.

4.1.1. Structure of Human Resources

CPC had a total of 16,123 employees (comprising direct workers, research staff, support personnel, management staff, and contract personnel) and a total of 17,231 employees (including interns) in 2020. Since CPC is a petrochemical company, most employees are recruited from the natural science and engineering disciplines and work as on-site personnel. Therefore, the male-to-female ratio is higher, i.e. 85.05% are male employees and 14.95% are female employees. In workforce arrangement, however, CPC ensures equal treatment and non-discrimination over gender. In 2020, females accounted for 22.22% of the total senior executives at CPC. As for education distribution, most employees graduated from senior high schools, colleges, and universities, accounting for 78.9% of total employees, while 19.08% hold a Master's degree. With an obligation to hire a total of 514 people with disabilities (including interns), CPC has exceeded the quota by 335 people as 849 people with disabilities have been hired by CPC. In addition, indigenous people have been employed for non-technical roles at CPC. However, some units have not been able to meet the employment quota due to the regional distribution of indigenous people. Nonetheless, the Hualien Oil Supply Service Center under the Eastern Taiwan Branch, Marketing Business Division exceeded the employment quota for indigenous people as it employed more indigenous people than the requirement stipulated in the Indigenous People's Employment Rights Protection Act.

CPC employees by employment contract in 2020



Gender and age distribution of full-time employees at CPC in 2020

Unit: persons

1 Contract employees



Total
66

Below 30 years old
30 to 50 years old
Over 50 years old



0 | 0
10 | 22
19 | 15

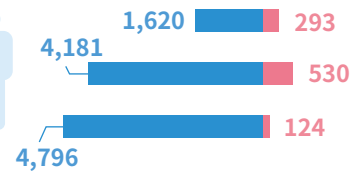


2 Direct workers



Total
11,544

Below 30 years old
30 to 50 years old
Over 50 years old



3 Research staff



Total
459

Below 30 years old
30 to 50 years old
Over 50 years old



50 | 19
180 | 31
156 | 23



4 Support staff



Total
1,928

Below 30 years old
30 to 50 years old
Over 50 years old



229 | 117
634 | 190
712 | 46



5 Management staff



Total
2,126

Below 30 years old
30 to 50 years old
Over 50 years old

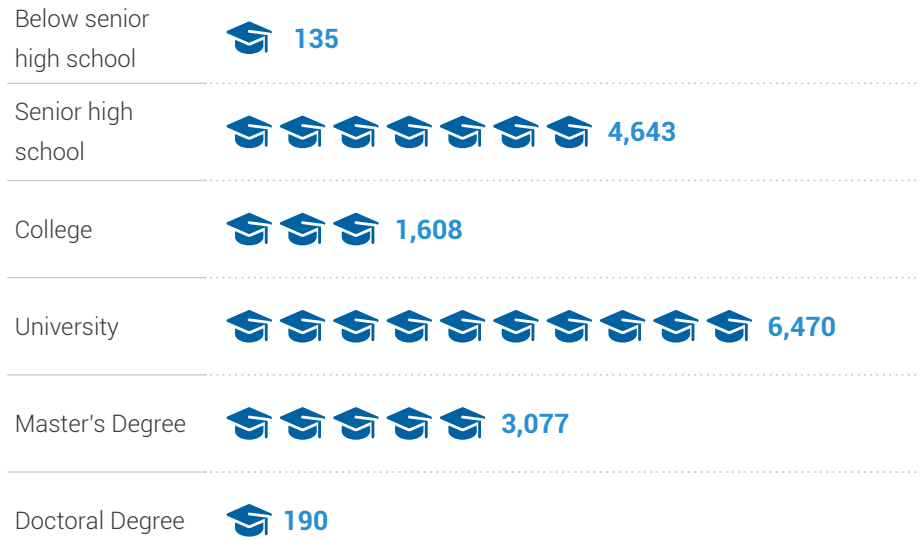


135 | 216
501 | 549
489 | 236



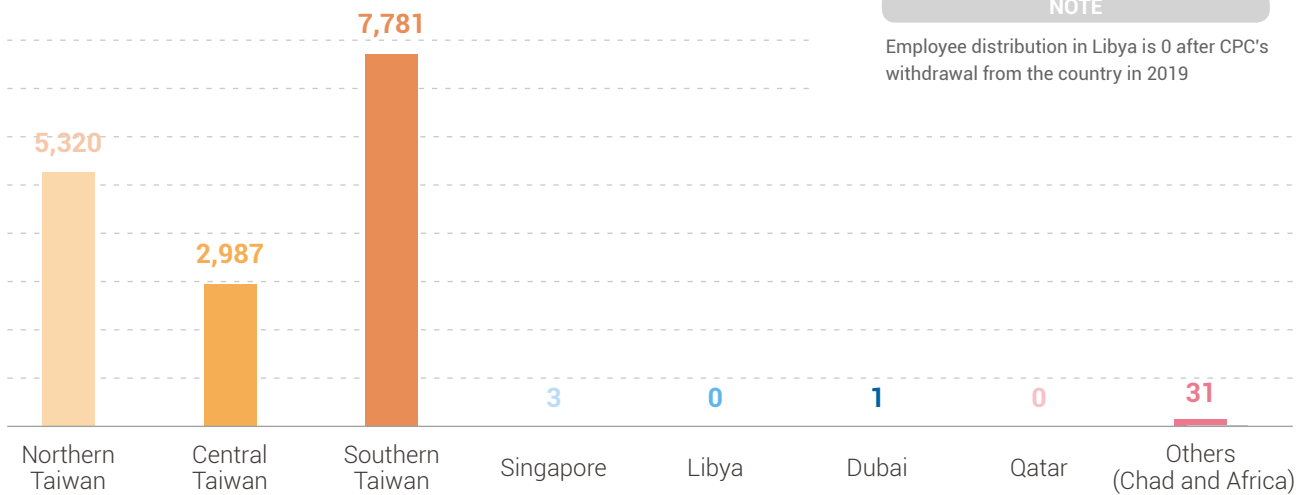
Academic background of CPC employees in 2020

Unit: persons



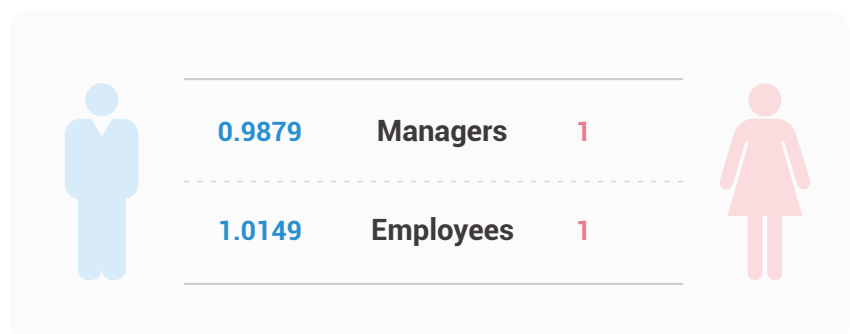
Distribution of CPC employees by region - 2020

Unit: persons



NOTE
Employee distribution in Libya is 0 after CPC's withdrawal from the country in 2019

Ratio of basic salary and remuneration of female employees to male employees at CPC in 2020



Employment of people with disabilities and indigenous people at CPC in 2020



Note: When calculating employees with disability, total employees refer to the total number of employees in the organization who are covered by insurance. When calculating people of indigenous background, total employees refers to the actual number of employees in the organization. CPC has met the legal standards for the number of people with disabilities and indigenous people employed by the organization.

New employees are the fundamental way for companies to maintain energy and creativity. CPC hires new talents every year. In 2020, CPC hired 1,214 new employees that accounted for 7.53% of total employees (i.e. employment rate), whereas a total of 1,051 employees either resigned or retired during the year, representing an exit rate of 6.52%. Moreover, with CPC's reputation of providing a friendly workplace, CPC employees are highly loyal and identify strongly with the values of the organization, and most employees are committed to serving long-term until retirement. CPC employees averaged 39.95 years of service upon retirement in 2020.

CPC new employees/resignations in 2020

Unit: persons

1 New employees



Total **1,214**

Employment rate **7.53%**

	521	3.23%	Below 30 years old	173	1.07%	
	425	2.64%	30 to 50 years old	80	0.50%	
	14	0.09%	Over 50 years old	1	0.01%	

2 Resignations



Total **1,051**

Exit rate **6.52%**

	57	0.35%	Below 30 years old	9	0.06%	
	89	0.55%	30 to 50 years old	16	0.10%	
	785	4.87%	Over 50 years old	95	0.59%	

4.2 Workplace Safety

Short-term	Medium/long-term
<ul style="list-style-type: none"> · Continue the enforcement of systematic management practices on contractor safety and health performance assessment, and enhance professional skill training for contractors · Enforce work safety and health training and continue implementation of safety and health certification, credit and on-job training system · Continue the execution of work safety protections and emergency response drill 	<ul style="list-style-type: none"> · Sustain the pursuit of 100% safety and zero accident · Apply the process of safety management standards to other production units in order to achieve a systematic management approach for the company · Leverage artificial intelligence (AI) technology tools to enhance the efficiency of industrial safety management and reduce the probability of accidents

CPC places industrial safety as priority. To achieve “100% industrial safety and zero accident” through employees’ and contractors’ safety, risk management, and health care, CPC is constantly committed to creating a safe, healthy, and comfortable work environment for employees. In addition, CPC is also dedicated to reducing occupational accident rates as its frequency-severity indicator has been lower than that of the industry for over 24 consecutive years.



4.2.1 Occupational Safety and Health Management

CPC has established the “Occupational Health and Safety Committee” to implement work safety, accident prevention, workplace improvement, and employee health maintenance. The committee has 26 seats, including the president as the committee chair and 25 representatives from different units as members. 9 seats (35%) are allocated to workers’ representatives, which is more favorable than that required by the law. The Occupational Health and Safety Committee convenes 4 meetings each year. In 2020, worker representatives raised 18 proposals, constituting 90% of all discussions. All issues discussed were highly relevant to the workplace and employees’ interest. From additional manpower, equipment installation and improvement, uniform material, employee training, skill certification to adjustment of performance evaluation standards, all requests were taken seriously by committee members, and relevant departments were assigned to address the issues raised.

In order to establish a high-quality safety culture, CPC adopted the Taiwan Occupational Safety and Health Management System (TOSHMS) in 2008 to capture the hazard factors in various jobs through systematic management. To ensure risk assessment consists across all units, CPC has established the “Hazard Identification and Risk Assessment SOP” to identify risks in each type of business. “Duty and Job Inventory” has also been established for further risk identification based on the inventory results to complete the “Hazard Identification and Risk Assessment Sheet.” For high-risk jobs, CPC immediately reviews the integrity of existing protective measures and makes improvements as soon as possible in terms of system, equipment, and implementation to reduce risk in the work environment. As of 2020, all 34 units in CPC have been granted the TOSHMS and ISO45001 certifications.

CPC formulates countermeasures based on the risks it has identified. CPC also draws up various emergency response drill plans and implements emergency response drills regularly to improve the ability to accident response and disaster prevention. In 2020, CPC held a total of 364 emergency response drills across plants, including 4 coordinated drills, as well as 7 headquarters-to-unit emergency response drills without warning.

Number and percentage of workers

	Employees	Contractors
Number of people	16,123	6,873
Percentage	70%	30%
Coverage	100%	100%

4.2.2 Occupational Safety and Risk Identification

CPC acknowledges the hazards involved in certain work activities such as oil tank cleaning and oil exploration, etc. For this reason, CPC complies strictly with the Occupational Safety and Health Act and related laws and has assembled separate audit teams for refinery, oil exploration, marketing, and construction activities, whose responsibilities are to perform safety and health audits on-site monthly. Each unit is also responsible for performing daily inspections and enforcing risk-based audits within their work sites. In 2020, CPC conducted 43 routine and non-routine industrial safety inspections as well as 12 construction inspections. However, CPC was handed 10 health & safety fine totaling NT\$630,000 by the competent authorities for violations such as failing to implement contractor management and failing to improve on-site safety facilities in 2020. In response to these violations, CPC immediately drew up improvement measures, such as strengthening vertical communication and horizontal contact with contractors, requiring contractors to provide pre-duty training to their construction workers, strengthening on-site inspections and immediately correcting unsafe conduct and environment, etc., and kept track on such violations until improvements have been fully made. In addition, CPC constantly implements various plans to improve workplace safety, contractor management, and occupational safety and health, as well as educates all units to implement such improvements.

43

industrial safety inspections

12

construction inspections

4.2.3 Occupational Injury

To protect the safety of employees, CPC has set up the Accident Case Study Working Team to gather information on all industrial safety accidents of the company at home and abroad to find out their causes and accident types. The team has also published the Industrial Safety Case Studies as a lesson learnt training resources to uplift the professional experience and accident analysis capabilities of employees, and thus enhance overall industrial safety performance.

CPC has established the “Principles for the Investigation and Management of Industrial Safety Accidents” to define the reporting process, investigation, report writing, statistics production, and follow-up of accidents. CPC has also designed the intranet online “Hazards and Emergency Report Form” aimed to timely capture the accidents progress that occurred in all units. To learn about the overall situation and reasons behind occupational accidents among employees, CPC regularly conducts surveys on all employees and contractors (non-employees). The main types of occupational accidents include fall, scald, slip, jamming, collapse, flash burn, and cut, while serious injuries are defined in accordance with local laws and regulations. CPC calculates and reports the number of serious occupational accidents each month. According to statistics for 2020, CPC recorded zero work-related fatality among all of its employees and 3 work-related fatalities among non-employees who were placed under the control of the organization, whereas 4 employees and 5 non-employees suffered from serious injuries. A total of 185 near-miss incidents were recorded in 2020, with 66 of them relating to chemical spills. CPC reported zero death and injury caused by occupational diseases in 2020.

Occupational Injury surveys in 2020



Plant	Gender	Occupational injury		Absenteeism rate (AR)		Disabling injury frequency rate (FR)		Disabling injury severity rate (SR)	
		Injury count	Death count	Total absent days	Total workdays	Total disabling injuries	Total work hours	Total days lost to injury	Total work hours
Whole company	Female	0	0	28,766.63	251	0	4,596,164	0	4,596,164
	Male	4	0			4	30,028,803	42	30,028,803
Total		4	0	0.71%		4	34,624,967	42	34,624,967
Description of work injury		Fall, scald, and slip							
Fatality		None							

Description	<p>(1) Calculations, including full-time and temporary employees</p> <p>Absentee rate (A.R.) = (Absent days (include personal leave, sick leave, and work injury leave)) / (Total workdays x employee count)</p> <p>Disabling injury frequency rate (F.R.) = (Total disabling injuries× 10⁶) / (Total work hours)</p> <p>Disabling injury severity rate (S.R.) = (Total days lost to injury× 10⁶) / (Total work hours)</p> <p>Average days charged for disabling injuries (ADCDI) = (Disabling injury severity rate (S.R.)) / (Disabling injury frequency rate (F.R.))</p> <p>(2) AR is based on absence due to inability to work, not limited to work-related injuries or diseases. It also excludes the approved holidays or leave, such as folk festivals, training, maternity/paternity leave, and compassion leave. Absenteeism includes personal leave, sick leave, and compensation leave for injuries at work.</p> <p>(3) The number of days lost from the inability to work of employees due to work-related injuries or diseases.</p> <p>(4) Work-related diseases shall be determined based on the diagnosis of occupational specialists of a hospital.</p> <p>(5) Disabling injuries do not include minor injuries, i.e. injuries healed on the same day and employees can return to work in the next day.</p> <p>(6) Total lost days include the sum of the lost days of four types of disabling injuries: death, permanent total disabilities, permanent partial disabilities, and temporary total disabilities.</p> <p>(7) Both deaths and permanent total disabilities are calculated at 6,000 days.</p>
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At the same time, CPC continues its pursuit of safe and stable operations at factories by incorporating process of safety management into engineering design as well as assessing and analyzing potential hazards in manufacturing processes using a structured and systematic approach. Furthermore, CPC takes corresponding preventive measures, establishes a sound process management framework and related operating procedures, reduces unplanned boiler halts, and enhances equipment reliability, with a view to creating an intrinsically safe workplace.

Process safety performance indicator	Description	Value	Unit
The ratio of major to minor process safety events (PSE) caused by loss of primary containment (LOPC)	Tier 1 PSE	0	Rate
	Tier 2 PSE	0.011	
The ratio of challenges to safety systems	Tier 3	0.381	
Management systems for identifying and mitigating catastrophic risks and back-end risks	Tier 4	To promote the process safety management system, CPC introduces international process safety management elements, which identify weak links using a progressive and systematic approach in line with internal and external compliance audits, and gradually establishes a process safety management framework with systematic, logical, targeted, and quantifiable management performance. With the newly introduced element, CPC is able to improve the safety of process operations and lower the risk of accidents.	n/a

• **The indicators are explained as follows:**

- Tier 1 incidents - Major casualties such as deaths and community-wide evacuation caused by containment failure, damages worth over US\$100,000 caused by explosion, etc.
- Tier 2 incidents - Minor injuries caused by containment failure, damages worth over US\$2,500 and minor injuries caused by explosion, etc.
- Tier 3 - No damage and loss caused despite containment failure
- Tier 4 - Explanation on risk identification and related management systems

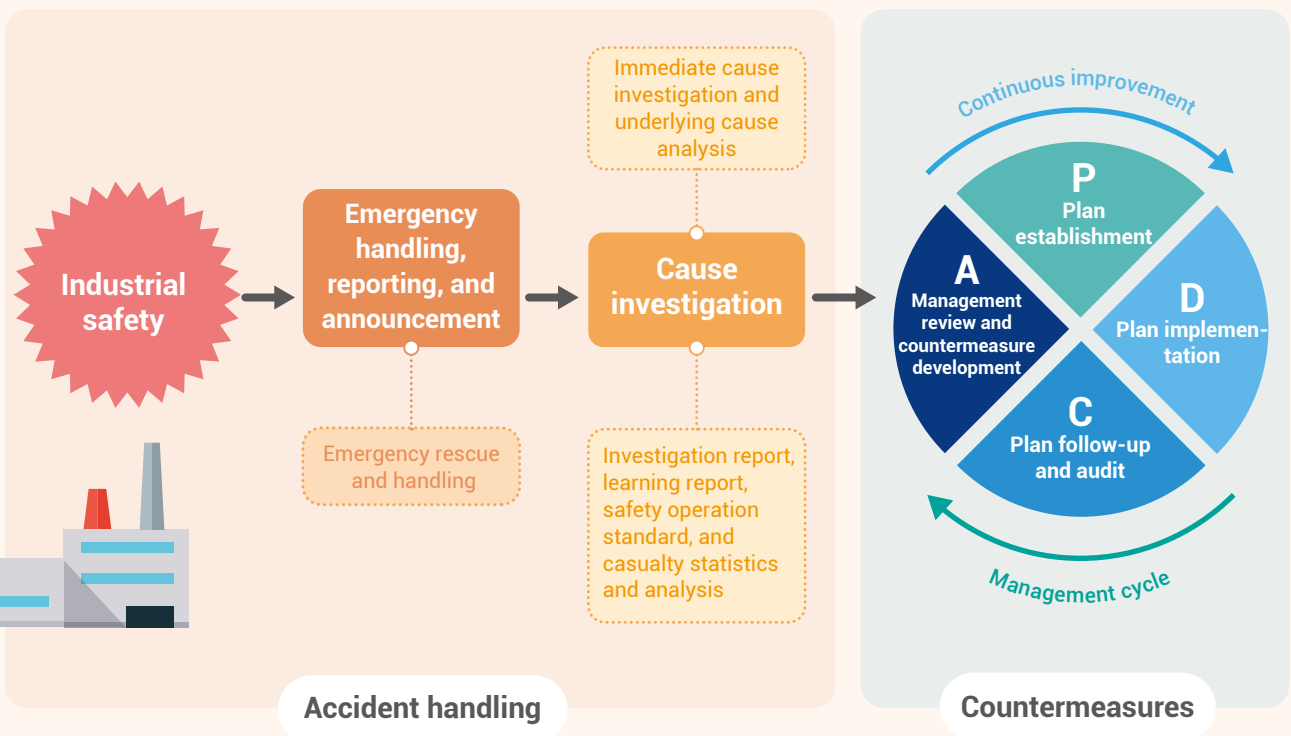
• **The formula for the indicators is listed as follows, where the indicators cover all CPC employees.**

- Tier 1 PSE rate = (Total number of Tier 1 PSE/Total work hours) × 200,000 = (0/34,624,967) × 200,000 = 0
- Tier 2 PSE rate = (Total number of Tier 2 PSE/Total work hours) × 200,000 = (2/34,624,967) × 200,000 = 0.011
- Tier 3 PSE rate = (Total number of Tier 3 PSE/Total work hours) × 200,000 = (66/34,624,967) × 200,000 = 0.381

4.2.4 Countermeasures

To prevent occupational accidents, CPC continues to improve various industrial safety measures, such as developing an automated electronic industrial safety inspection system, identifying contractor violations by incorporating AI, and enhancing access control by setting up contractor facial recognition and vehicle number plate identification systems. CPC's occupational safety and health expenditures totaled NT\$2.409 billion in 2020.

Industrial safety accident investigation and management workflow



01

Occupational Safety and Health Observation Seminar



CPC held the 2020 Industrial Safety Week in combination with the Occupational Safety and Health Observation Seminar based on the theme of "Smart Industrial Safety and Sustainable Workplace," in hopes of sharing the current applications of smart systems in industrial safety management through exchanges with experts and scholars and enhancing CPC's overall knowledge and technologies in occupational safety and health, thereby achieving sustainable development at CPC. Personnel from various sectors of society, including industry, the government, academia, and the research community, were invited to attend this seminar-cum Industrial Safety Week, which saw a total of 250 participants. Covering five major themes, including process safety management, occupational safety and health, safety technologies, accident investigation, and equipment integrity, this seminar not only featured an exhibition of industrial safety and health equipment and a presentation of related academic papers and posters, but also provided a technical exchange platform that enabled all sectors of society to observe and learn from each other and enhance various accident prevention and response capabilities, with a view to implementing an industrial safety and health culture.

02

Internet of Things (IoT) Application Seminar



- In 2020, CPC signed the memorandum of cooperation on the "Introduction of Cross-domain Curriculum Guidance in Internal Training at Business Units" with Chang Jung Christian University, with the aim of jointly promoting the cross-domain curriculum and teaching materials on occupational safety and health and Internet of Things (IoT) that are prepared and authorized by the Institute of Labor, Occupational Safety and Health, Ministry of Labor. CPC also hosted three sessions of the "Internet of Things (IoT) Application Seminar" to enhance the understanding of AI technology and IoT trends among CPC employees.
- In the future, CPC will incorporate the use of AI technology tools, to enhance the efficiency of industrial safety management. For instance, the automatic identification of safety violations through CCTV and using virtual reality (VR) techniques in training refinery operation, etc.

03

Identification of contractor violations in specific operations

With a view to strengthening contractor management, the palm vein or facial recognition function has been incorporated into the access control management system at CPC's refineries and petrochemical plants to verify the pre-construction qualifications of contractor personnel and tighten access control. In the future, CPC will develop a contractor integrated safety management platform which combines with work permits and safety inspections systems, in order to realize greater synergy in management.



04

Digital IoT Management System for Tank Trucks

Oil transportation is an important part of CPC's operation in ensuring a stable oil supply. Considering the original management approach, which involves the use of plastic seals to seal filling/unloading holes on tank trucks, plastic seals must be affixed manually and seal numbers must be copied manually to enhance active and effective monitoring and management in oil transportation via tank trucks as well as ensure oil quality and quantity. Due to various factors associated with this approach, such as increased labor costs, generation of plastic waste, and inability to achieve full-process monitoring and management of oil transportation via tank trucks, CPC integrates its own developed and newly patented digital IoT management system for tank trucks, in which CPC incorporates various concepts, such as 5G, big data, AI, and IoT, into existing service technologies, with original transportation operations-related systems to perform full-process monitoring of tank trucks and real-time reporting via GPS and 4G signal transmission on tank trucks, thereby optimizing oil filling, transportation, and unloading operations. In addition, this system is also integrated with the tire pressure and temperature monitoring system (TPTMS) to enable the smart operation of oil transportation vehicles to prevent industrial safety accidents. This system was honored with the Best Product Award during the 17th National Brand Yushan Awards in 2020.



Smart Tank truck equipment illustration

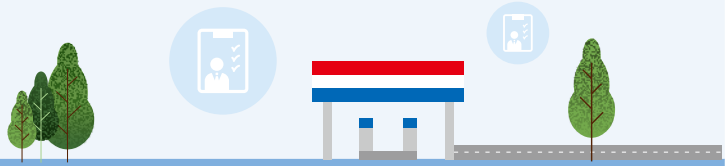
- 01 GPS antenna
- 02 Control board (with 4G antenna)
- 03 Dashcam
- 04 Tire temperature / pressure detection
- 05 Gas recovery pipe: connection detection
- 06 Induction display box
- 07 Link up detection
- 08 Front cabinet manhole cover switch detection
- 09 Rear cabinet manhole cover switch detection

05

Safety auto-inspection on equipment integrated system



CPC has developed its very own safety auto-inspection on equipment integrated system, which was first piloted at Chiayi Plant Area and the CPC Building. Equipment inspections are performed by scanning QR codes, filling out online forms, and taking photographs using hand-held devices, thus enabling enhanced convenience and implementation during inspections. CPC will continue to promote the use of the system to each unit in CPC.



4.2.5 Contractor Management Policy

At CPC, contractors are regarded as important partners in its businesses. To ensure the safety of contractor personnel at work, each service location implements various management mechanisms according to the Occupational Safety and Health Act and related laws and regulations, with a view to enhancing construction safety among contractors:



Regulations Governing Contractor Safety and Health Management

CPC has established regulations related to site entry and operation safety control for contractor personnel, machinery, equipment, and vehicles. Contractors' construction site supervisor and occupational safety personnel must submit qualified certificates and retraining certificates for approval before construction commences. In addition, contractors must fully attend construction safety meetings and notify their operators of hazard-related information. Contractors are required to conduct pre-duty safety sessions every day before construction and regularly hold joint safety operation agreements and organizational meetings to coordinate site safety management.



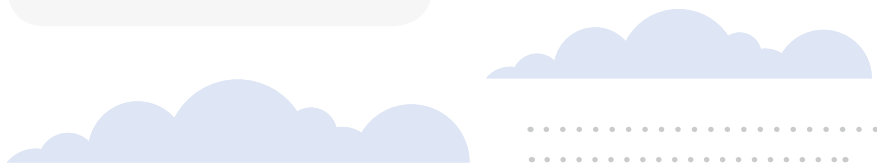
Contractor skills development

Before commencing work or placing equipment on site at CPC working area, contractors are required to attend the safety notification and briefing held by CPC and only pass the relevant test above 80 points allowing enter the site to work. In addition, CPC has also established various contractor skills training systems, such as three-in-one scaffolding training, equipment assembly and disassembly training, and hydraulic aerial cage training, to enhance contractors' professional construction skills.

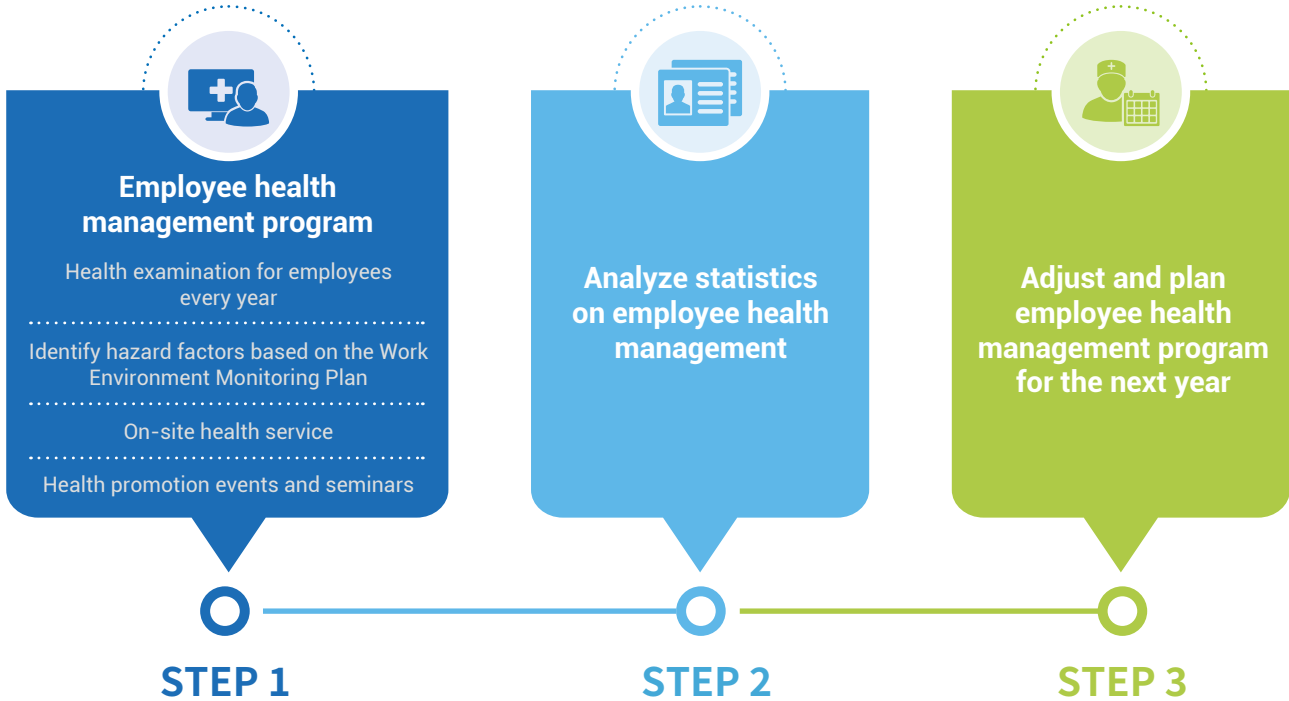


Contractors safety requirement and control system

Point deduction imposed on contractors due to violations must be recorded online. CPC personnel is required to fill out the contractor evaluation form in the system after construction is completed. For contractors whose average score is less than 6 points (out of 10 points), the Industrial Safety Office regularly issues notices on a quarterly basis, requiring each unit to strengthen management, inspection, and supervision of these contractors.



4.2.6 Employee Health Care



CPC arranges health examinations for employees every year to provide workers with a safe and healthy work environment. In 2020, 15,011 employees took the general health examination, and 2,555 employees underwent the special health examination that targets employees engaging in work with noise, dust, organic solvents, specialty chemicals, ionizing radiation, and abnormal pressures. In addition, CPC requires contractors to have their employees undergo regular health examinations in compliance with occupational safety and health regulations.

To prevent employees from exposing to various work-related hazard factors, CPC has established the Work Environment Monitoring Plan and implemented work environment monitoring for the reference of improvement, in order to prevent hazards. In 2020, CPC performed work environment monitoring on 32 chemical hazard factors (organic solvents, specialty chemicals, dust, and CO₂) and two physical hazard factors (noise exposure and wet-bulb globe temperature (WBGT) index). The monitoring results were within the permissible exposure limits. At the same time, CPC also implements various physical and mental health protection measures, such as prevention of occupational diseases, tiered management of health examination, and labor matching, as well as hires full-time or contract doctors to carry out on-site health service. CPC conducted 646 on-site health service sessions in 2020.

To further enhance the statistical analysis capacity of health management, CPC analyzes employee examination results every year and lists the top six anomalies.

In 2020, these anomalies were body weight, chest X-ray, urine protein, total cholesterol, waist circumference, and low-density cholesterol. Health talks and health promotion activities were also arranged based on these anomalies to guide employees' health management efforts.



Occupational safety and health training for employees

To improve the safety and health competencies of employees and effectively realize training effectiveness, CPC has established the "Rules for Occupational Safety, Health, and Environmental Protection Training for Workers," which stipulates that occupational safety and health certificates, credit-based training, and on-the-job training are required for different position. A training needs survey will also be conducted at the end of each year. In 2020, CPC conducted 175 occupational safety and health training sessions (including certification training, credit-based training, and on-the-job training).



Health seminar and health promotion events

CPC arranges seminars of various themes that provide employees with the proper knowledge needed to maintain and manage health at work. Activities such as smoking cessation classes, reducing body fat classes, fitness classes, aerobic programs, and hiking have been arranged to help employees develop healthy habits. A total of 244 health promotion seminars and events were organized in 2020.

Regular environmental monitoring



Health promotion events



Health seminar events

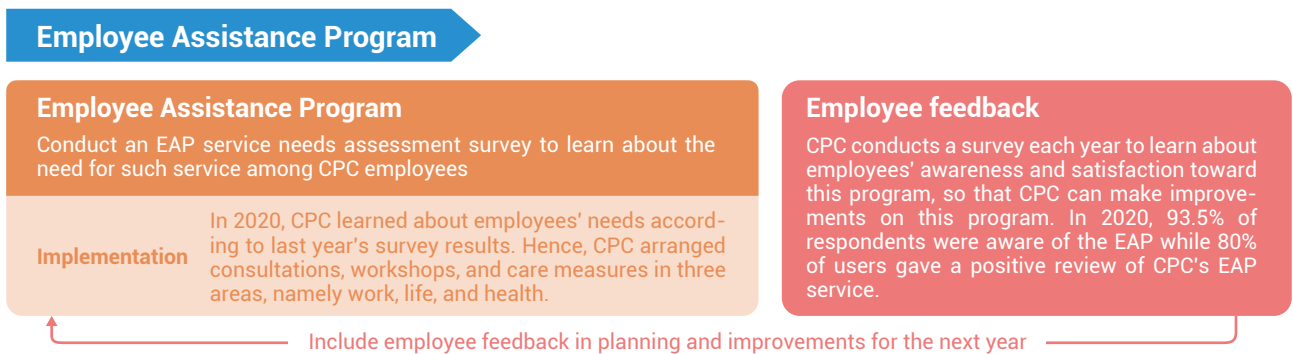


4.3 Friendly Workplace

CPC abides by international labor conventions and Taiwan's Labor Union Act to ensure the freedom of association and participation in trade unions of employees. Employees are also entitled to collective bargaining according to the related laws and regulations. Mechanisms for communicating with the labor union include board participation of labor directors, the periodic Labor-management meetings held by each business unit, irregular collective bargaining meetings, and business expansion meetings with the labor union chairperson as a guest. In addition, CPC organizes labor relations seminars every year to promote labor relations communication. Through official and unofficial activities with a host, the vice president and union representatives can communicate and exchange opinions. In addition, the company representatives often visit the labor union to learn about union members' opinions. Both parties also form the "Employee Welfare Committee" and the "Labor Pension Review Supervisory Committee." CPC is currently negotiating with Taiwan Petroleum Workers' Union for the establishment of the collective bargaining agreement. The employer and employees have been engaging with each other to draft a collective bargaining agreement since 2019 and have convened 11 negotiation meetings to date. The organization's goal is to maintain harmonious labor relations and explore solutions that work in favor of the organization's development.

4.3.1 Employee Welfare Policy

CPC creates a friendly workplace environment, and pays various bonuses based on the overall performance of each business unit, individual contribution and performance of employees, and allocates benefits in accordance with the "Employee Benefits Regulations." CPC sets up an employee welfare committee with the Taiwan Petroleum Trade Union to handle various welfare services and recreational activities. In order to promote the employee welfare business, various regional welfare branches were established under the committee. In addition to participating in national health insurance, public insurance, and labor insurance, all employees are provided with additional group insurance and overseas travel safety insurance for business trips, injury insurance, and work-related injury, disability, and death allowances to protect employees' work and life safety.



To create a harmonious and healthy work environment as well as improve employees' job satisfaction and quality of life, CPC continues to plan and improve the EAP. Areas involved in the implementation of the program in 2020 are listed as follows:

 <p>Work</p> <p>In 2020, CPC organized 51 sessions in relation to adaptation to the work environment, work-life balance, unlawful infringement in the workplace or retirement plan, which were participated by 3,811 people.</p>	 <p>Life</p> <p>In 2020, CPC organized 27 sessions in relation to legal consultation services, including disputes over the purchase and sale of real property or cars/scooters, real property purchase or lease contract, interpretation of the Criminal Code, and litigation proceedings, which were participated by 1,450 people.</p>	 <p>Health</p> <p>In 2020, CPC organized 89 sessions in relation to psychological consultation services and health care services, which were participated by 5,632 people.</p>
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A diverse range of welfare facilities

Each business unit has set up various welfare facilities, such as clinics, canteens, libraries or commissaries, as well as sports facilities, such as various kinds of ball courts and gymnasiums. Moreover, CPC assists in organizing club activities, such as ballgames, chess, mountaineering, swimming, calligraphy or movie appreciation, with a view to rejuvenating employees' body and mind and boosting their morale.

CPC Childcare Facilities and Measures



- Production units: The Company currently operates two proprietary childcare facilities, namely CPC Corporation Employee Welfare Committee (federation) Private Childcare Facility for Kaohsiung Refineries and CPC Employee Welfare Committee Miaoli Branch Private Childcare Facility for Miaoli County. The rest of the units contract highly rated local childcare institutions with the help of local Employee Welfare Committee branches and offer service to employees at preferential rate. As of end of 2020, a total of 148 children from various units were placed under childcare.
- CPC Main Building: CPC has been contracting Taipei Child Welfare Center, a top-performing childcare institution (which is located 550 meters away and within a 7-minute walking distance from the CPC Building), for childcare service since 2009, in order to provide employees with childcare service.

CPC Clinic



- CPC has family clinics established at the Taipei CPC Building, the Exploration and Production Business Division Miaoli Branch, and the Refining Business Division to provide employees with reliable medical service. Services provided at these clinics include general healthcare for adults and children; some even offer health examination and vaccination, etc. It has been a major support to physical and mental health of employees.
- These clinics not only serve CPC employees and retirees, but also provide every worker in CPC offices and plants, as well as outpatient service to the general public. They have been well recognized within the neighborhood for their outstanding service quality, transparent pricing, and contribution to community health.

Employee Subsidies

In addition, CPC also provides various benefits, such as children's scholarship, children's college education loan, medical subsidies for employees and their dependents, wedding, funeral, and retirement subsidies, and interest-free loan for emergencies. With a view to taking care of new young employees exacting general equality in employment and encouraging birth, CPC has amended the employee loan policy by including marriage and childbirth loan measures.

Pension and Compensation

Matters regarding retirement among dispatched employees and contract-based employees are subject to the "Regulations Governing the Pension, Compensation, and Severance Pay of Employees of State-Owned Enterprises Administered by the Ministry of Economic Affairs" and related civil service laws and regulations. The employment of full-time employees and contract-based employees is subject to the "Labor Standards Act" and the "Labor Pension Act." In addition, CPC has established the "Employee (for dispatched and contract-based employees) Pension Fund Management Committee" and the "Labor Pension Fund Supervisory Committee." The Employee (for dispatched and contract-based employees) Pension Fund Management Committee is responsible for the planning, custody, use of the pension fund, and the disbursement of pension, compensation, and severance pay. The Labor Pension Fund Supervisory Committee is responsible for the audit of amount of pension fund contributions and disbursements and the supervision of matters in relation to the pension fund. Every year, CPC assists the ROC Retired Petrochemical Workers' Association in organizing events, such as "Happy New Year with Peace and Health," "Happy and Healthy Later Life," and "Mid-Autumn Festival Reunion," for retired employees and their dependents.

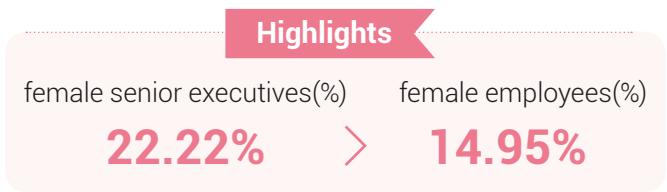


4.3.2 Performance Evaluation and Promotion

The “Managers and Workers Performance Evaluation Guidelines” have been established to ensure that CPC employees’ performance is properly reflected during evaluation in a manner that inspires greater performance in the future. Vice presidents and tier-1 units set performance criteria and targets in accordance with the Guidelines on Performance Evaluation for the Responsibility Center System approved by the board of directors. For below supervisors of tier-2 units within the scope of work, performance criteria and targets have been set within the scope of targets for tier-1 units. For operators and non-managerial staff, performance criteria and targets have also been set to carry out evaluation according to their level of target achievement and work performance. Furthermore, CPC conducts annual reviews and allocates bonus according to the “Notes on Worker Performance Review and Bonus Allocation.” Employees will be given a performance bonus of 0 to 1 month’s salary based on performance grade. Employees who receive a “D” grade will be dismissed or disqualified. Performance evaluation is carried out on CPC employees irrespective of gender or category. Except for new employees (and interns), the percentage of employees undergoing performance evaluation each year is 100%.

4.3.3 Gender Equality

Despite a strong sense of masculinity and a relatively low percentage of female employees in areas ranging from exploration, refining, the manufacture of petrochemical products and solvents, and gas station services in the traditional petrochemical manufacturing and service industry, there has never been any unequal treatment based on gender as equal opportunities for recruitment, promotion, and further education are provided at CPC. In gender equality for employment, CPC spearheaded to hire female petrol attendants back in 1973 in Taiwan. As the first mover in the industry, CPC was ahead of the government’s gender equality in employment policy. Apart from raising customer satisfaction with gas stations and oil supply, CPC has started the trend of female employment in other industries. Aside from setting an example for society, CPC significantly enhances women employment. From exploration, refining, the manufacture of petrochemical products and solvents, and gas station services, the number of female workers has increased continuously in recent years. In addition to having two female directors and one female supervisor on its board, CPC made history in Taiwan’s heavy petrochemical industry by hiring the first female vice president as a state-owned enterprise in 2016, followed by the second female vice president in 2018 and the third female vice president in 2020. In November 2020, CPC led state-owned enterprises in gender equality, with 2 out of 5 vice presidents, 22.22% of senior executives, and 14.95% of employees being female.



To provide female employees with a friendly work environment, apart from setting up quality certified lactation rooms, CPC also supports employees to take parental leave and process applications according to the Act for Gender Equality in Employment. CPC had a total of 84 employees on extended unpaid parental leave in 2020, of which 27 (32%) were male and 57 (68%) were female. Both reinstatement and retention rate for employees on extended unpaid parental leave were 100% for males and females.



Statistics on extended unpaid parental leave in 2020

	Reinstatement rate			Retention rate		
	Number of employees due to be reinstated (persons)	Number of employees actually reinstated (persons)	Reinstatement rate (%)	Number of employees actually reinstated (persons)	Total number of employees retained 12 months after returning to work following a period of parental leave (persons)	Retention rate (%)
Female	25	25	100%	22	22	100%
Male	13	13	100%	15	15	100%

Moreover, CPC arranges gender mainstreaming training classes, in which publicity films on the Convention on the Elimination of all Forms of Discrimination Against Women (CEDAW) are broadcast for employees to understand common workplace discrimination, and thus enhance their awareness of human rights. On the arrival of new employees, CPC introduces them to the new work environment and arranges classes on sexual harassment prevention and grievance mechanisms for them. CPC also conducts courses related to gender equality issues and sexual harassment prevention for supervisors, as well as requires each unit to strengthen awareness-raising efforts and prevention work among existing employees. In 2020, CPC received 11 cases of sexual harassment complaints, all of which have been reviewed, and tracked continuously. No discrimination case was reported at CPC in 2020.

	2018			2019			2020		
	Male (persons)	Female (persons)	Overall average training hours (hours)	Male (persons)	Female (persons)	Overall average training hours (hours)	Male (persons)	Female (persons)	Overall average training hours (hours)
Human rights training hours (focusing on policies and procedures related to human rights issues, sexual harassment prevention, gender equality, and human rights conventions)	1,617	434		3,407	1,048		4,146	2,059	
Total number of employees undergoing human rights training	529	143	3.05	683	180	5.16	1,039	342	4.49
Total number of employees	13,599	2,164		13,645	2,263		13,712	2,411	
Percentage of employees undergoing human rights training	4%	7%		5%	8%		8%	14%	

4.3.4 Labor Relation Communication and Bargain Agreement

Labor-management meetings

CPC attaches great importance to harmonious labor relations. The minutes of Labor-management meetings convened in 2020 have been disclosed on CPC's Intranet. Proposals discussed at Labor-management meetings in 2020 are categorized as follows:



Coordination of labor relations and promotion of labor relations cooperation

- CPC convened a total of 24 labor relations meetings, and the CPC President held 2 business seminars with Taiwan Petroleum Workers' Union.
- To create a more favorable environment and bridge of communication, CPC held 3 workshops in relation to regulations and rules of procedure for Labor-management meetings to promote labor relations harmony.



Labor conditions

- In response to the COVID-19 pandemic, CPC allows employees to use up marriage leave and funeral leave within 1 year after the pandemic ends. Non-job-related compensatory leave in 2020 has also been extended to 2021 and will be deducted in the order of expiry date.
- To take care of employees' health, CPC amended the "Guidelines on the Implementation of Self-paid Full Health Examinations for All Staff," stipulating that employees shall be given 2 days of official leave at most for self-paid health examination by their head of department based on actual needs.



- To keep the work environment clean and hygienic, CPC set out terms in procurement contracts that require contractors to clear and remove garbage and food waste in the CPC Building every day before leaving work, as well as educated employees about precautions regarding food storage.
- In order for employees to feel at ease in the workplace and juggle between work and taking care of their children, CPC laid out plans to set up childcare facilities or establish appropriate childcare measures in accordance with the Act of Gender Equality in Employment, so as to create a friendly workplace with a childcare environment.



- CPC reexamined the method for tracking the timeliness of official documents.
- In response to the COVID-19 pandemic, CPC set out specific epidemic prevention guidelines and response measures for different workplaces. Furthermore, CPC set up the "Epidemic Prevention" webpage on its Intranet and updated the actual situation of epidemic prevention at all units, with a view to providing CPC employees with an open information platform.
- Following major losses caused to CPC and employees by an information security incident that took place in 2020, CPC built a dual firewall and one-way transmission mechanism to strengthen defense at the borders of the information and industrial control environment, so that CPC's critical infrastructure is safe from hackers. Furthermore, CPC will fill the gap in information security personnel as soon as possible every year via general recruitment.

Collective bargaining Agreements



CPC and Taiwan Petroleum Workers' Union convened 5 collective bargaining meetings in 2020 and successfully reached an agreement in January 2021, with the consensus draft comprising a total of 9 chapters and 55 articles.

Employee communication and grievance channels

Addressing employees' grievances in integrity, openness, immediate and positive responses, CPC has established the Employee Grievance Policy to protect employees' rights. Employees may raise grievances when there are objections to a reward or punishment decision, or when employee rights and interests are damaged due to inappropriate systems, regulations and administrative measures, and employee misconduct. In 2020, one meeting was convened by the Employee Grievance Handling Committee to review one case which was properly resolved.

Gender equality grievance system

CPC has established a set of sexual harassment prevention and discipline guidelines in accordance with the "Act of Gender Equality in Employment," the "Sexual Harassment Prevention Act," the "Regulations for Establishing Measures of Prevention, Correction, Complaint and Punishment of Sexual Harassment at Workplace" and the "Ministry of Economic Affairs Notes on Sexual Harassment Prevention, Complaint, Investigation and Discipline," as well as set up the Sexual Harassment Complaint Review Committee to handle sexual harassment complaint cases. In addition, CPC has set up a sexual harassment prevention webpage and a sexual harassment complaint hotline (02) 8725-8422, where dedicated personnel are in charged with receiving and handling related complaints.

Labor disputes

CPC complies with labor laws and regulations. However, as a state-owned enterprise under the MOEA, CPC adopts a single salary system, so night shift pay is not included in the calculation of pension and salary. This scenario has led to repeated fines from labor inspection authorities at various cities and counties. Yet, such a dispute is a result of regulatory competition between the Labor Standards Act and the Administrative Law of State-Owned Enterprise, not an illegal act committed by CPC. Except for disputes related to night shift pay and overtime pay, CPC has not reported any other major labor disputes and forced or compulsory labor-related incidents. To effectively resolve the dispute over whether night shift pay should be included in the calculation of salary, CPC continues to issue written requests to the Executive Yuan for the inclusion of calculating night shift pay. At present, CPC continues to handle such a dispute on a case-by-case basis.

4.4 Talent Development

CPC has implemented the spirit of talent development that aims to cultivate human resources, strengthen professional skills, and cooperate with the promotion system. Meanwhile, CPC has established a robust training framework to support its growth. CPC has conducted surveys and studies of each core professional competencies. Apart from serving professional duties as reference for internal promotion, job rotation, and recruitment interview, CPC has selected personnel with qualified work attitude and concepts. Furthermore, management associate training and on-the-job management training are arranged for managers and staff of all grades to strengthen management competencies. In addition, CPC encourages employees to take national skill qualification tests, as well as assists employees in obtaining licenses and certifications in relation to industrial safety and environmental protection. CPC has also established directions for further education to encourage employees to engage in lifelong learning, second specialty training, further education after working hours, foreign language education, and job transfer training. CPC's training expenses in 2020 amounted to about NT\$132 million, where CPC conducted 3,530 training classes that were participated by 92,514 participants.

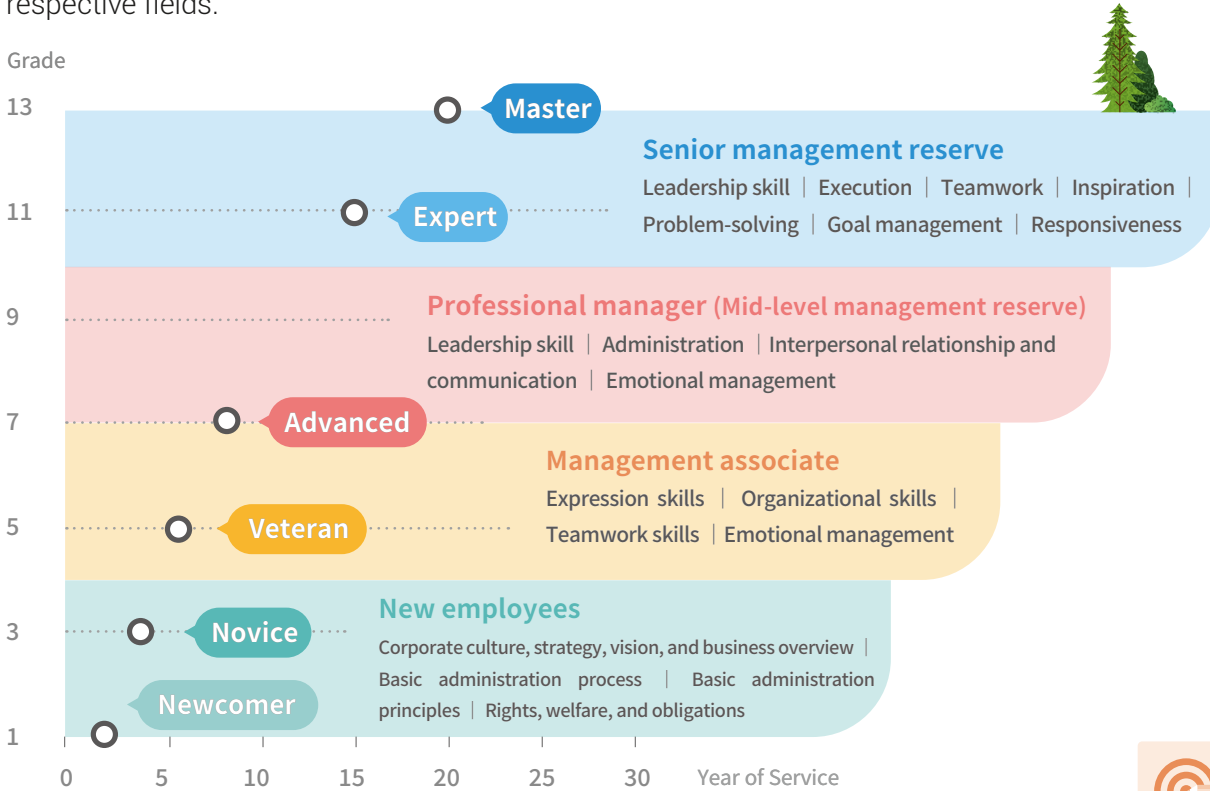
Training indicator	Unit	2018	2019	2020
Total employee training expenses	NT\$ millions	128	130	132
Total employee training hours	hours	962,135	941,312	822,369
Total employee training expenses/ Total revenue	%	0.01%	0.01%	0.01%
Total employee training expenses/ Total number of employees	NT\$/person	6,933	8,209	8,151

In addition, CPC sets job targets and training focus based on its vision, development direction, and annual training policy and with reference to the development of major business, as well as the professional competencies required by employees and their future development trends, in order to draw up training plans for "supervisor training," "professional training," "second specialty training," and "other training." Training hours per employee averaged 54 in 2020, which was less than 61 hours last year, due to a reduction of physical training courses caused by the COVID-19 pandemic.

		Supervisors		Professionals	
		Senior management	Managements	Front-line management	On-site leaders and manager and assistant manager of gas stations
Management skills training	Management associates	Organizational management practical training	Leadership ability and strategic planning training	Management concepts and routine management practical training	Job instruction, job improvement, and job relations
	On-the-job	Operational management development strategies and effective leadership management	Management ability development and training	Management ability development and training	To be conducted by unit supervisors or the human resources department as needed

Management role talent development framework

CPC provides employees with targeted training and assistance in relation to the knowledge and skills required for competence development among employees of all levels, in order to ensure that employees receive the most suitable training at each stage and gradually accumulate experience in different types of jobs, thereby expanding their professional skills and becoming experts in their respective fields.



CPC training classes in 2020

Training type	Training classes (classes)	Percentage (%)	Enrollments					
			Male	Percentage (%)	Female	Percentage (%)	Total	Percentage (%)
Supervisor training	42	1%	1,024	1%	285	2%	1,309	1%
Professional training	2,349	67%	47,448	62%	9,622	58%	57,070	62%
Second specialty training	91	3%	2,459	3%	786	5%	3,245	4%
Self-motivation training	2	0%	271	0%	95	1%	366	0%
Internal instructor training	0	0%	0	0%	0	0%	0	0%
Other training	748	21%	20,974	28%	4,823	29%	25,797	28%
Orientation training	286	8%	3,813	5%	856	5%	4,669	5%
Skills qualification training	12	0%	56	0%	2	0%	58	0%
Total	3,530	100%	76,045	100%	16,469	100%	92,514	100%

Statistics on employee education and training in 2020 (by grade)



	Count (persons)	Training hours (hours)	Average training hours per person (hours/person)
Managers	3,138	105,731	34
Non-supervisors	12,137	716,638	59
Total	15,275	822,369	54

Statistics on employee education and training - 2020 (by gender)



	Count (persons)	Training hours (hours)	Average training hours per person (hours/person)
Female	2,299	140,790	61
Male	12,976	681,579	53
Total	15,275	822,369	54

Human Resource Training Center

CPC has established the Human Resource Training Center that organizes seminars and training classes to support CPC's business development and national growth. The department trains employees on a wide range of expertise from refining, excavation, engineering, marketing, environment safety, as well as offers enterprise knowledge system with vertical advancement (entry-level, mid-level and advanced level) and horizontal advancement (courses) paths to help employees develop the skills needed for their career. Since the new building was commissioned in 2014, the number of classes has increased significantly from 334 classes to 458 classes during 2014 to 2020, whereas class enrollments have also grown from 13,450 people to 24,276 people during 2014 to 2020. CPC reached a new milestone in August 2019 when it held its 10,000th class.

01

CPC e Academy



For employees to enhance their professional skills and expand their job competencies, CPC has developed multi-channel e-learning resources in combination with information technology and learning applications. Moreover, CPC has set up the "CPC e Academy" which is a virtual library with the purpose of sharing innovation, deepening knowledge, and offering e-services on its Internet. The E Library has been included in the establishment of CPC's corporate university initiative and platform service. Meanwhile, CPC also promotes a hybrid learning solution comprising action-based learning, value-added application questionnaires and test modules, and physical courses (e.g., senior management training), which greatly improves the quality and quantity of digital learning among CPC employees. In 2020, CPC set up the Technology-based Learning Team to promote the application of technology-based learning.



Project results

1. In 2020, 55 live broadcasts with a total of 200 course hours were held. The number of live broadcast users reached 3,000.
2. CPC carries out digital transformation through the application of technologies to combine manpower training with industrial safety training. In 2020, CPC completed hundreds of documentary short films related to the overhaul of the Third Naphtha Cracker and initiated the application of virtual reality (VR) in on-site industrial safety training.
3. CPC participated in the "2020 Association for Talent Development Asia Pacific Annual Conference". CPC's participation in this conference received coverage from many media outlets, thereby enhancing CPC's brand image in human resources.



02

CPC Heart Seminar



Since the inauguration of CPC Heart Seminar in 2018, experts and scholars have been invited to give lectures on various topics, such as business management, environmental protection, humanities, and health preservation. With this lecture, CPC offered a chance for its employees to recharge while inviting external units and the general public to participate in this event, thereby enhancing CPC's image and fulfilling corporate social responsibility.

Project results

Wen-Jing Wang gave a physical lecture on "The Power of Storytelling" on August 12, 2020, which was attended by a total of 285 participants, including 63 CPC employees and 222 people from external units and the general public who either registered online or on-site. Participants were given a QR code to fill out an online satisfaction survey questionnaire after the lecture, serving as an evaluation for future planning.

03

2020 New Employee Orientation Workshop

In response to the COVID-19 pandemic, CPC adopted the E-learning + Classroom(E+C) method in place of 3 originally planned physical training courses of the "2020 New Arrivals Workshop". New employees at each unit were divided into groups and attended remote classes nearby synchronously using CPC Live. Replacement classes were also provided to replacement staff for learning purposes. In addition, real-time online tests were conducted via QR code. Interested employees were provided with related facilities to undergo online learning on their own.

Project results

A total of 557 new employees completed all the orientation training courses. This workshop offered a diverse range of training methods to speed up the understanding of CPC's operations among new employees and guide them to become competent in performing their duties.



Highlight Projects

1 Industry-academia collaboration

In line with the government's industry-academia collaboration policy and New Southbound Policy, CPC assists students in gaining practical experience and engaging in practical learning through workplace experience that combines both theory and practice. In addition, CPC provides a learning platform for students to develop employability skills before they step into the workplace in the future while enhancing the interface for searching for and promoting human resources in the future, thereby injecting new blood into CPC's development. There are mainly two types of industry-academia collaboration models as proposed by CPC:

Senior high (vocational) schools

CPC signed an agreement with Kaohsiung Municipal Linyuan Senior High School to pilot the first phase of the "Chemical Engineering Science Program" for three years from 2014 to 2016 and conduct the second and third phases of this program in 2017 and from 2018 to 2020, respectively. The main aim of this program is to nurture bottom operators in the petrochemical industry in line with the government's industry-academia collaboration policy.



Project results

The maximum number of students enrolled in each class are based on the approved number from the Education Bureau in the current academic year. Apart from the general courses, students were arranged to participate in the summer internship course during summer vacation and obtained the certificate. They could participate in the new hires of the CPC Petrochemical Division of Staff screening after finishing the course.



Universities and colleges

To implement the New Southbound Policy and strengthen the collaboration policy among government, industry and academia and CPC's social responsibility, CPC signed a "Memorandum of Industry-Academia Collaboration" with National Chiayi University, National Dong Hwa University, National University of Kaohsiung, National Chung Cheng University, National University of Tainan, National Taiwan University, Feng Chia University, Cheng Hsiu University, and Kun Shan University, with a view to realizing the integration of theory and practice through practical learning and field visit experience. In an effort to implement the New Southbound Policy, CPC also provides international students with training places or classes to improve the pre-employment skills and competencies of international students from Southeast Asian countries.

Project results

CPC has conducted a total of 21 programs and trained 792 students from 2017 to 2020. In order for international students overseas Chinese students or second-generation students to learn about the establishment and operation of the organization, CPC conducted 4 special programs, as well as 6 programs for students from countries under the New Southbound Policy, which were attended by 243 students, including international students from Indonesia, Thailand, the Philippines, Malaysia, and Mongolia, and second-generation students.



2 Taiwan's only gas station air quality testing course

With the intention of improving air quality in Taiwan, CPC has signed a memorandum of understanding with the Environmental Professionals Training Institute under the EPA to jointly conduct a course in accordance with the "Gas Station Gasoline Vapor Recovery Facility Management Regulations." The purpose of this course is to assist CPC employees and related businesses in familiarizing themselves with professional inspection and testing of gasoline vapor recovery facilities at gas stations while helping trainees obtain training qualification certificates issued by the central competent authority or commissioned institutions, thereby contributing to environmental protection. Owing to corporate social responsibility, CPC established Taiwan's only "gasoline vapor recovery facility inspector" training institution whose objective is to educate gas station operators about installing gasoline vapor recovery equipment on refueling nozzles, thereby improving ambient air quality.

Project results

In 2020, CPC conducted a total of 1 class with a total of 21 employees including CPC employees and gas station operators. The total number has reached 336 since the beginning to the end of 2020. Apart from training personnel in the petrochemical industry on the importance of gasoline vapor recovery and measurement techniques and educating gas station operators about proactively installing gasoline vapor recovery facilities on refueling nozzles, this course has enabled all refueling nozzles to be equipped with gasoline vapor recovery equipment at present, thereby contributing significantly to improving air quality near gas stations.



3 Senior and first-line manager skills map

With a view to effectively leading the team to complete organizational tasks, suitable courses are designed for management associate training workshops according to CPC's senior management competency model to improve students' competencies, including "leadership," "execution," "teamwork," "inspiration," "problem-solving," "goal management," and "responsiveness."

Project results

In the past five years, CPC has trained 269 middle managers, with 110 employees promoted to senior managers of Grade 13 and above, so as to respond to CPC's corporate management needs.



4 Senior executive further education program

To nurture senior executives, enhance their qualities, and improve their work efficiency, CPC has set up the "Overseas Master of Business Administration Program for Senior Executives," which involves sending senior executives to pursue a Master's degree in Business Administration (MBA) at one of the top 50 universities in the Financial Times Global MBA Ranking. Selected managers are given the opportunity to select the university of their choice, and are required to meet the age and foreign language proficiency requirements in accordance with the "Matters Concerning the Review of Dispatch of Personnel Overseas by State-owned Enterprises under the Ministry of Economic Affairs" and the "Directions for Research and Further Education Grants for Nurturing Managerial Talents."

Project results



Despite the low percentage of females in the industry, there has never been unequal treatment based on gender at CPC as equal opportunities for further education are provided to everyone at CPC. In the past 10 years, a total of 15 senior executives have been selected and sent to pursue further studies at renowned business schools, such as Harvard University, Stanford University, the Wharton School of the University of Pennsylvania, Columbia University, University of Oxford, and University of Cambridge, with 5 of them being female senior executives, which accounted for 33% (The proportion of senior female executives is 22.22%). CPC assists senior executives in building international network and broaden their horizons through the senior executive further education program, as well as improving their competitiveness by learning from the management experience of students from other countries and case discussions in different decision-making contexts, as well as providing recommendations in relation to the management methods adopted at CPC.

The Harvard Hall of Fame



In recent years, CPC has sent many senior executives to attend the eight-week Advanced Management Program (AMP) at Harvard University in the US. This program covers a variety of areas, including managerial accounting, business management, marketing management, strategic management, global political and economic environment and situation analysis, negotiation and consultation, and organizational leadership. It also invites successful entrepreneurs to share the gist of corporate governance in the classroom in order to inspire individual's working methods and logic for problem-solving. Hence, this program is one of the top management programs in the world.

Hui-Chen Liao, Vice President



The most memorable part of this program was the musical performance from a symphony orchestra. The orchestra conducted an inspiring symphony by directing the integration of different musical instruments and the combination of high and low tones, as well as making good use of each musical instrument with perfect tacit understanding, thereby demonstrating the essence of management practices. This program concluded with a photograph of a Harvard alumni with extreme success who ended up in jail, **with the intention of encouraging students to have both the ability to build a successful career and the wisdom to tackle failure, pursue common success in career, health, and family, as well as uphold moral and ethics in business management.**

Ke-Ru Lin, CEO / Solvent & Chemical Business Division



As the first senior executive at CPC to attend this program, I traveled to Harvard University with the mission of establishing a benchmark as well as my own expectations. Despite having accumulated the ability to interpret financial statements and analyze cases which I acquired through long-term assessment of overseas investments, I was assigned to share trends in Taiwan's petrochemical industry, which was still a high-pressure challenge to me. The Harvard Business School's ability to stay relevant and ahead lies in its efforts in rapidly adjusting and offering progressive courses. How to maintain the flexibility of adjustment and develop the ability to respond and make decisions in an intensely competitive business environment was the biggest gain I have made from this program.



Ling-Wan Hou, Director / Department of International Affairs



Having studied in the US, I yearned to return to the US after graduation. As a student in this program, I saw students from different cultures expressed different views and mindsets, reached consensuses from arguments and conflicts, created sparks through brainstorming, and learned to respect each other's cultural differences. After returning to Taiwan, I constantly remind myself, using a memorable quote as my motto, to keep growing and giving feedback at work, so as to create a sustainability culture that dares to transcend oneself and change.



MEMBERS OF AMP,

As senior executives and powerful members of your nations' political-economic communities, it is incumbent upon you to try to make your nation a better, more productive place to live and work.

“ IF PEOPLE LIKE YOU DON'T CONTRIBUTE, YOU RUN THE RISK OF GOING...”

 Chapter 5

Caring Heart · Inclusive CPC



Chapter summary

CPC has service locations deployed throughout the nation, making it an ideal neighbor and partner to local residents. CPC builds this advantage by maintaining productive interaction with local communities and organizations, as well as contributes back to the neighborhood. In addition, CPC holds various charity activities and promotes environmental education and sports sponsorship to fulfill its social care spirits.





Recommended audiences

- Public representatives
- Communities
- NPOs/NGOs

Corresponding SDGs



Chapter Highlights

Donated NT\$447 million to local charities 	The total blood donations for charity reached a high record to 4.5075 million c.c. 	Donated 475 refurbished computers 	Sponsorship to sports talents 12 individuals 08 schools 
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Short-term	Medium/long-term
<ul style="list-style-type: none"> · Assist local governments in sponsoring infrastructure projects that the public appreciates · Constantly promote neighboring work and assist in local development to sustain neighborly work 	<ul style="list-style-type: none"> · Maintain friendly understanding with communities around complexes and mines, sustain care for the vulnerable, and prosper with local residents · Combine green operations, cultural and creative industries, and community co-prosperity to build a brand-new image of green energy

5.1 Social Welfare

After decades of commitment in Taiwan, CPC has become an essential part of people's life. CPC advocates a philosophy that aims to "taken from the community, giving back to the society" by maintaining active interaction with local organizations and residents. Apart from implementing environmental and ecological protection and pollution prevention around the plants or mines, CPC proactively communicates and maintains two-way exchange with local communities to create a more harmonious community. CPC has been contributing to charity for decades; through these efforts, the Company hopes to combine more support from the public to start a cycle of decency that creates sustainable values.

Three Major Policies

CPC attaches great importance to not only the economy and the environment, but also social care. CPC's contributions include "care for the underprivileged and communities," "green charity activities," and "environmental education and promotion," with the ultimate goal of creating a harmonious society.

Policy	Action Plan
Care for the underprivileged in the community and spread love and warmth to every corner of society	<p>Successful donation activities</p> <p>CPC actively advocates blood donation and continues to address the shortage in blood supply by supporting local blood centers' call for "blood donation as a life-saving act." Outstanding blood donation units are commended during CPC's anniversary celebration each year. Due to the COVID-19 pandemic in 2020, the number of blood donors declined sharply, causing a critical shortage of blood supply across Taiwan. In active response to blood demand from society, CPC encouraged its employees to donate blood and help alleviate this crisis during the pandemic and called on 14 units throughout the country to respond to this initiative.</p> <div style="background-color: #e85c3d; color: white; padding: 5px; border-radius: 5px; margin-top: 10px;"> Achievement: 12,041 person-times (18,030 bags) in 2020, including the hosts, employees and their dependents, and community residents, participated enthusiastically in the blood donation, which amounted to a high record of 4.5075 million c.c. of blood </div>

Policy	Action Plan
<p>Care for the underprivileged in the community and spread love and warmth to every corner of society</p>	<p>Sales collaboration for agricultural and fishery products</p> <p>Starting from 2019, CPC engages in sales collaboration with farmers by purchasing agricultural and fishery products, which are then donated to underprivileged organizations in hope to helping farmers save on transportation and distribution costs and reduce losses in consideration of the shelf life of agricultural products. Four purchases of agricultural product were made in 2020, including 325 kilograms of peanuts in March, 1,500 kilograms of lychees in June, 13,350 kilograms of bananas in October, and 6,000 kilograms of mountain bananas in December. Amid serious losses caused by sluggish sales of fishery products due to the COVID-19 pandemic, CPC offered to help fishermen's associations by purchasing 10,680 Yongan groupers and donated them to underprivileged families and social welfare groups in neighboring areas.</p> <p>Achievement: 21 tons of agricultural products in total and 10,680 Yongan groupers were sold in 2020</p>
	<p>Donation for the underprivileged in society</p> <p>CPC actively maintains good interaction with local communities and residents. In 2020, CPC also subsidized a total of 5,604 events, including educational and cultural activities, scholarships, emergency relief, low-income household support, welfare for the elderly and people with disabilities, local festivals, local sports and entertainment, and residents' gatherings, in total of NT\$447 million. CPC is also committed to assisting in local development and caring for underprivileged groups, with a view to fulfilling corporate social responsibility. In 2020, subsidies to the underprivileged or related activities (i.e. emergency relief, low-income household support, welfare for the elderly and people with disabilities) accounted for 21.6% of the total amount of subsidies provided. Despite not having plants and mines in indigenous communities, CPC strongly supports events among indigenous groups. In 2020, CPC provided subsidies/donations to 42 events, amounting to NT\$2.455 million. Moreover, CPC has hired more indigenous people than the hiring quota to provide them with employment opportunities.</p> <p>Overall: Local charity donations amounted to approximately NT\$447 million in 2020</p>
	<p>2020 Mother's Day Charity Event</p> <p>In response to the impact of the COVID-19 pandemic on local industries and underprivileged groups, CPC organized the 2020 Mother's Day Charity Event in May 2020 in partnership with the Syin-Lu Social Welfare Foundation and local florists for the first time as part of its corporate social responsibility to help underprivileged groups and the flower industry tide over the pandemic through concrete actions and show care for female employees who are mothers.</p>
	<p>Encourage employees to provide financial assistance to disadvantaged children</p> <p>With a long-standing reputation of fulfilling its corporate social responsibility, CPC has been working with World Vision Taiwan since 2010 to rally employees into donating NT\$1,000 per month to disadvantaged children in the country. So far, CPC's initiative has benefited 203 children, enabling them to go to school, study at ease, and have a healthy and happy childhood.</p> <p>Achievement: A total of NT\$2.436 million was donated in 2020</p>
	<p>Donation of refurbished computers</p> <p>With CPC's long-standing support for the Ministry of Education's "Digital Application Promotion Project in Remote Areas," CPC has donated refurbished computers to schools in remote areas and underprivileged groups from time to time, in hopes of extending love and passing on happiness, fulfilling corporate social responsibility, and realizing the concept of resource recycling and reuse.</p> <p>Apart from donating to underprivileged groups, CPC proactively contacted Fu Jen Catholic University, the operation center of the Ministry of Education's "Digital Application Promotion Project in Remote Areas," to assist in donation matchmaking due to the COVID-19 pandemic in 2020, so as to provide refurbished computers to schools in remote areas for the purpose of remote learning. CPC will constantly implement the " Digital Application Promotion Project in Remote Areas " to assist rural children to achieve " Continual Learning" during the pandemic.</p>

Policy	Action Plan										
<p>Care for the underprivileged in the community and spread love and warmth to every corner of society</p>	<p>Achievement: A total of 475 refurbished computers were donated in 2020</p> <p>The recipients in 2020 include:</p> <table border="1"> <thead> <tr> <th>Donor</th> <th>Number of Refurbished Computers</th> </tr> </thead> <tbody> <tr> <td>Rural School</td> <td>314</td> </tr> <tr> <td>Social Welfare Group</td> <td>86</td> </tr> <tr> <td>County (City) Government and Offices</td> <td>75</td> </tr> <tr> <td>Total</td> <td>475</td> </tr> </tbody> </table> 	Donor	Number of Refurbished Computers	Rural School	314	Social Welfare Group	86	County (City) Government and Offices	75	Total	475
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<p>Committed to promoting greening and implement sustainable land development with concrete actions</p>	<p>The green living project of the CPC Water Refill Operation</p> <p>In response to the "National Green Living Policy" promoted by the Environmental Protection Administration, Executive Yuan, CPC became the first state-owned enterprise in Taiwan to support the water refill operation by launching the green living solution of the CPC Water Refill Operation, where the general public can search for water refill locations among 50 locations provided by CPC throughout Taiwan, including gas stations and office buildings. By downloading the "Water Refill Map" app on their smartphones at the end of November 2020, they can refill drinking water with their own containers, thereby engaging in plastic reduction with concrete actions. CPC worked with social enterprises on the Water Refill Operation, with the purpose of encouraging the general public to reduce carbon emissions by implementing plastic reduction in the simplest way through the cooperation of the general public and enterprises. This operation also supports the development of in-depth and sustainable travel performed by Taiwan's local revitalization teams through CPC's water refill locations, to bring more meaningful development to communities in combination with various elements, including travel, culture and history, and carbon reduction.</p> <p>Overall: A total of 860 water refill check-ins, 1,143,225 impressions, 2,199,967 advertisement impressions on PC, and 2,200,279 mobile phone advertisements were recorded in 2020</p> <p>Beach cleanup event</p> <p>CPC has organized a beach cleanup event titled "Guantang Cleanup in Salute to the Sea" near the third LNG Receiving Terminal for three consecutive years. In 2020, a total of 300 people, including employees and their dependents as well as neighborhood residents, participated in this event, where they not only picked up garbage in the area, but more importantly conveyed the idea of "reducing" garbage. Apart from hoping for a clean environment, CPC also looks forward to spreading the idea of loving the ocean and protecting Taiwan while becoming a good neighbor to local residents in hopes of creating a habitat suitable for the restoration of little terns.</p> <p>Overall: More than 300 people, including employees and their dependents as well as neighborhood residents, participated in this event in 2020</p>										
<p>Promote energy education to light up dreams with knowledge</p>	<p>CPC regards energy education as its responsibility. By making good use of its core expertise and strengths, CPC has continuously organized the Green Dragon Creativity Summer Camp¹. Over 8 years, nearly 1,200 college youths have taken on the role of a mentor and guided more than 22,000 elementary students in learning and building their imagination about green energy. In addition, CPC has also continuously participated in the Maker Party (Note), so as to contribute to energy education in Taiwan. Children in remote areas have been proactively invited to participate, so that they can improve their energy literacy by enjoying hands-on experience with various fun and exciting games in the CPC Energy Lab and spending a fun-filled and informative maker day.</p> <p>Note1: The events were suspended in 2020 due to the COVID-19 pandemic.</p> <p>CPC has built 6 exhibition museums with different themes across Taiwan, namely the CPC Petroleum Discovery Museum in Taipei City; Taiwan Oil Field Exhibition Hall in Gongguan Township, Miaoli County; the Exploration and Mining Technology Exhibition Hall in Miaoli City, Miaoli County; the Refining & Manufacturing Research Exhibition Hall in Chiayi City; the Gas for Life Museum in Yong'an District, Kaohsiung City; and the Refinery Exhibition Hall in Nanzi District, Kaohsiung City. The exhibition contents range from petroleum exploration, refining, LNG, research and development to energy diversification, as well as cover the history of the petroleum industry and the chronology of technological development, thereby anchoring the cultural path of the petroleum industry in Taiwan. Moreover, the Oil Field Exhibition Hall and the Kaohsiung Refinery Environmental Education Park have been granted certification for environmental education sites as they raise public awareness and values of environmental protection through the design and experience of energy and environment courses.</p>										

Highlights: Taiwan secures a foothold in Chad with great love



Neighborhood engagement with sincerity and good faith brings help and support

The Chad exploration blocks is the first project for CPC to be the operator. Over the years, CPC has deployed a wide variety of professionals and different generations of oilmen to carry out operations in this location, thereby creating a new milestone in overseas exploration and production for CPC since its founding 40 years ago. CPC is committed to fulfilling the spirit of CSR to care for the disadvantaged and improving the local water resources and medical environment while promoting the business in Chad. In 2020, CPC helped to drill ten water wells for the most water-deprived villages and donated daily necessities, such as milk powder and nutritious foods and liquid soap, assisting in building eight schools for villages near its oil field to support local children's education. Different from the traditional classrooms built with thatch, the classrooms are made of low-rise buildings made of cement bricks, and the school buildings can be called the most luxurious school there or in the area. CPC under the name of OPIC Africa assisted the "Chad Education Assistance Program" of Taiwan Great Hearts Social Welfare Association in donating whiteboards, desks and chairs in schools in each province, showing the social awareness of the community of CPC's plants and residents. In the future, CPC will continue to maintain friendly relations with the communities and to strengthen the promotion of underprivileged care; coexist and prosper with residents; and let the world feel the love and power of Taiwan by charity events.

"Zero workplace accidents and employee health have always been one of CPC's top priorities. In addition to hold work conferences in the countryside from time to time. CPC often visited tribal leaders adjacent to villages of Oryx Concession to assist the local communication as well as listen to the needs of local residents, which in turn serves as a future reference for making improvements on construction projects . Over that last decades, CPC hires a large number of Chad workers from exploration, drilling, to development and production .Before the projects have offered employment opportunities in the petroleum industry, local people rely on subsistence farming and livestock raising. That provide a cornucopia of employment opportunities.

Highlights: Sea fungus egg roll - when green energy meets charity



CPC, in collaboration with "One Factory," a sheltered factory under the Syin-Lu Social Welfare Foundation, launched a charity egg roll product, which is made of sea fungus carefully developed by CPC. These products are baked by 30 workers at the sheltered factory of the foundation, who are committed to making the most fragrant and delicious egg rolls using the most natural and pure ingredients.

Bred using cold drainage from CPC's Yongan LNG Receiving Terminal, which is famously known as the diamond water, sea fungus not only can absorb large quantities of carbon dioxide, but also can low in calories and rich in dietary fiber and protein as while containing various types of minerals. It is also Taiwan native algae being promoted by R&D units such as the Fisheries Research Institute. CPC was honored with the "Excelsior Award Advancement Award" during the 17th National Innovation Awards for its effort in breeding large local seaweed raw materials using clean diamond water. With a view to promoting sea fungus, CPC took a step further by developing sea fungus ice cream, sea fungus noodles, dried sea fungus, and sea fungus jelly. As various industries and sheltered workplaces were affected by the COVID-19 pandemic, CPC in collaboration with the Syin-Lu Social Welfare Foundation, launched the sea fungus egg roll, whose fragrance comprises a touch of flavor from the sea. This product is probably the sincerest gift.

5.2 Environmental Education

5.2.1 Educational Sites of Energy Utilization



CPC Petroleum Discovery Museum

At the CPC Petroleum Discovery Museum, visitors can experience the presence of petroleum deep in the stratum for millions of years as well as the lifetime of petroleum, including oil exploration, refining, transportation, and applications, through immersive technology. In addition, visitors can learn about the past and present of petroleum and sustainable new energy sources while personally experiencing thousands of possible applications of petroleum in various scenarios, such as gas stations, families, streets, supermarkets, and laboratories. Visitors can also witness the gradual transformation of the black gold from germination to an oil energy giant. Filled with knowledge, the immersive five-sensory experience of the development of new energy sources is suitable for not only education visits from schools, but also parent-child tours.

The CPC Petroleum Discovery Museum plays the role of corporate showcase for CPC. The museum welcomed over 20,000 visitors in 2020, thereby serving as a discovery area for parent-child learning. Moreover, the museum joined as a member of the Chinese Association of Museums in 2020, which enables it to obtain professional consultation services from museums, thereby promoting mutual assistance among museums.



Main events in 2020

- Due to the COVID-19 pandemic, the museum launched a series of online tour activities through the "Petroleum Discovery Museum on Facebook," including the "CPC Petroleum Discovery Museum Oli Coloring Contest," "Oli Tells A Story" event, and the short film titled "Travel with Oli: A Stroll in Chuhuangkeng, Miaoli." The script, shooting, and production were completed by employees at CPC and tour guides at the museum. The short film not only led to an increase in interactions and reaches on the museum's Facebook page, but also drawn positive attention and brought positive benefits.
- Little Painter Conference: This event comprised a series of items, such as "Customized Exhibitor Certificate," "Fishing with Diamond Water," "Love the Earth," "Yes or No - Petroleum Encyclopedia," "Embracing Sea Fungus," and "DIY Oli's Crown." A total of 139 children signed up for this event, with over 400 people present on the day. This event drew positive reviews for the Facebook page of CPC and the museum, thus enhancing the visibility of the museum and the image of CPC.

- Ollie Store - The Sea Fungus Week: With the idea of circular economy, a marketing series of sea fungus products produced by CPC. This event activities are "Understanding Sea Fungus - An Egg Roll Treat from Ollie," "Sea Fungus Product Tasting," and "Sea Fungus Product Promotion." Thereafter, CPC also organized the "Sea Fungus Noodles Taste Great No Matter How You Cook Them" event, which received a warm response from the general public. Some ideas in this event, such as giving out free samples of sea fungus noodles and organizing a sea fungus noodles photo-sharing contest also drew positive reviews from all walks of life. Thus, it enhanced CPC's image in energy education. Furthermore, the Ollie Store launched 12 cultural and creative merchandises, including six themed merchandises based on CPC's six exhibition museums, such as massage stick, toiletry bag, pen clip, diatomaceous earth-made coaster, children's socks, and tumbler. They were well-received by the general public.

CPC Kaohsiung Refinery Environmental Education Park

The CPC Kaohsiung Refinery Environmental Education Park uses the old site of the Kaohsiung Refinery, the Business Area, and Mount Banping as an environmental education site. The core concept of the curricula in the park mainly revolves around oil refining and oil energy management. However, it combined with the history, humanities, and culture of the fuel workshop of Japan's 6th Navy and the natural ecosystem of Mount Banping. Curriculum modules targeting adults have been developed, including three curricula, namely "Petroleum, Economy, and the Environment," "Between Height and Thickness," and "Never-Ending." The curriculum design allows students to experience the beauty of the natural ecosystem in the park while learning the history of economic development and environmental protection in Taiwan. In addition, students can learn about the meaning of environmental justice, sustainability and be aware of changes in the Earth's environment. Through the course, students are also provided with the knowledges of the limitations of fossil energy, limestones, and minerals, so that they can adopt a simple life, practice green consumption and energy conservation, and cherish and maintain the Earth's resources. The park was granted certification for environmental education sites in 2018.

Main events in 2020

There are currently three types of informative materials for adults in the environmental education curriculum conducted by the CPC Kaohsiung Refinery Environmental Education Park. Due to the COVID-19 pandemic, only 890 people participated in environmental education in 2020. During the off-peak season resulted from the pandemic, environmental education teachers in collaboration with neighboring schools planned to develop informative materials for elementary schools, junior high schools, and high schools. Curriculum is in conjunction with the Ministry of Education's "108 Curriculum Guideline." All types of informative materials are currently being submitted for review and approval.

1. Informative materials for elementary schools: Two programs were introduced, namely "Love the Earth from Treasuring Oil Resource" and "The Fragrance of Soil in Childhood."

Love the Earth from Treasuring Oil Resource



The Fragrance of Soil



2. Informative materials for junior high schools: Courses on oil refining and the ecosystem were developed in conjunction with the 2019 Curriculum Guideline. Two programs were introduced, namely "Starting and Ending with Oil" and "The Rebirth of Oil."

Starting and Ending with Oil



The Rebirth of Oil



3. Informative materials for high schools: Two programs were introduced, namely "The Refueling Cheerleaders" and "The Secret Garden of Oil Refinery."

The Refueling Cheerleaders



The Secret Garden of Oil Refinery



Taiwan Oil Field Exhibition Hall

Located in the Chuhuangkeng area of Kaigong, Gongguan Township, Miaoli County, this place is where the first sighting of oil took place in Taiwan. It is also the oldest oil field remaining in production in the world. In order to record the history of the oil field from exploration to production, the exhibition contained the history and evolution of oil exploration in Taiwan through precious documents and historical materials and relics. CPC established the Oil Field Exhibition Hall in 1981, which was rebuilt and renamed "Taiwan Oil Field Exhibition Hall" in 1990.

Having been granted certification for environmental education facilities in 2017, the exhibition hall is divided into seven exhibition areas based on various themes, including "Taiwan Oil Field and Chuhuangkeng," "Oil and Gas Generation and Exploration," "Oil and Gas Drilling, Production and Processing," "Oil and Gas Pipelines," "Offshore and Overseas Exploration," "Sustainable Development," and "Chuhuangkeng Local Scenery," VR tour brings visitors back to Chuhuangkeng in the 1960s. Introducing how oil is drilled and gathered through interactive multimedia, while showing CPC's history in oil exploration. In addition to being an edutainment and recreational place for the public, the exhibition hall also houses remnants of the Chuhuangkeng area.

Main events in 2020



In 2020, the exhibition hall received 73,801 visits (it was closed between March and May 2020 due to the pandemic) and organized 16 sessions (with 872 participants) of environmental education course with local features. At the same time, the exhibition hall promoted strategic alliances and inter-museum cooperation on environmental education in collaboration with the Taiwan Hakka Culture Development Center and organized environmental education summer camps in cooperation with the Environmental Protection Bureau of Miaoli County.



Petroleum Drilling and Processing



Taiwan Oil Field and Chuhuangkeng

5.2.2 Document Preservation

In line with government policies and in response to urban development and rising population density, the Kaohsiung Refinery officially moved out in 2015. The refinery covered an area of 253 hectares, which far exceeded the definition of a single building. The shutdown caused various issues, such as document preservation, land pollution and remediation, urban development, industry transformation,

national development policy, local residents, and regulatory cooperation. In order to determine the potential cultural asset value of the building, the Ministry of Culture and the Bureau of Cultural Affairs of the Kaohsiung City Government jointly assessed and reviewed the potential of the building. As of 2020, one area within the refinery area was designated as a municipal heritage, while 40 areas in the refinery area were registered as historical buildings. The Kaohsiung Refinery involved the largest cultural heritage review in terms of scale and the widest designated preservation area in Kaohsiung City. As more buildings and facilities are being preserved, the transformation and revitalization of the refinery will become more challenging in the future. Of the 41 heritage and historical buildings designated by the Cultural Heritage Review Committee, up to 36 have been proposed by CPC for preservation out of its own volition. Therefore, as state-owned enterprise in Taiwan that has set up a cultural heritage preservation and revitalization department, CPC has shown its dedication and vision for cultural heritage preservation with the aim of giving cultural heritage a new life.





Municipal heritage - The General Office



Previous Warehouse No. 6



Ground combustion tower for the No. 2 Naphtha Cracker



Remnants of railway for tank trucks

5.3 Promotion of Sports Development

To promote sports development, cultivate elite athletes, and fulfill corporate social responsibility in Taiwan, CPC set up the "Elite Athlete Sponsorship Consultation Committee" and established the "CPC Directives for Sponsoring and Cultivating Elite Athletes" in 2002.

In 2017, CPC amended the "CPC Directives for Sponsoring and Cultivating Elite Athletes" to expand the scope of sponsorship to the athletics team of public and private schools in all levels and renamed the program "CPC Directives for Sponsoring Top-Tier Sports Development." In consideration of the deprivation of sports talent development and the lack of stable support of athletics in remote areas, CPC amended the Directives to include sponsorship for athletics teams of schools in remote areas to demonstrate their sports talent through proper sports education and find self-assurance and the sense of achievement. It provides them an opportunity to change their life, so that they can have more control of their own path.



CPC awarded a total of 12 individuals and 8 schools in 2020

Unit: NT\$



Badminton
\$700,000



Figure skating
\$100,000

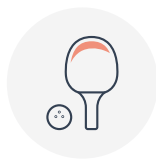


Table tennis
\$1,000,000



Triathlon
\$560,000



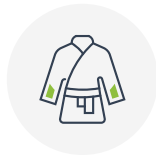
Tennis
\$200,000



Basketball
\$900,000



Archery
\$250,000



Judo
\$300,000



Handball
\$100,000



Gymnastics
\$2,000,000



Total \$ 6,110,000

CPC acknowledges the importance of talent development in a sustainable society, which is why the Company supports whole-heartedly to the government's sports policies, sponsors local communities, schools and organizations in sport events and competition. CPC prides itself for being the "strongest support for Taiwanese athletes." In addition to sponsoring top performers, the Company also extends support to sports talents and events in remote areas. In 2020, CPC received Sports Activist Awards in the Sponsorship Category - Gold Class from the Sports Administration, Ministry of Education for the third time. With this affirmation, CPC will continue supporting Taiwanese athletes with their competition throughout the world.

Highlights: CPC F.C. became the champions of the Taiwan Football League Division 2

Founded in 1970, CPC F.C. was on par with CAT F.C., the Marines, and the Steel Lions in terms of capabilities and strength during that era. In 1991, CPC F.C. reached the pinnacle of its history when it became the champions of the National Men's Football League Second Division. Due to several factors, such as the main players' engagement in different fields, work shifts, and difficulty in conducting group training, it was difficult for the football club to become a strong team. However, there was no intention to disband the football club. Yet, the football club stopped participating in competitions starting 1999. 30 years later, CPC F.C. underwent an overhaul and was officially formed in 2020. CPC allocated a budget totaling NT\$130 million to the football club for four years with the purpose of continuously supporting Taiwan's football industry. With its overall plan in fulfilling corporate social responsibility that includes nurturing elite athletes and supporting sports events, CPC will be able to provide further support to outstanding players and teams in the future. In 2020, CPC F.C. also lived up to expectations by becoming the champions of the inaugural Taiwan Football League Division 2 organized by the Chinese Taipei Football Association. CPC F.C. had an overall performance of 13 wins and 1 draw and winning promotion to the 2021 Taiwan Football Premier League. CPC hopes that CPC F.C. can continue to shine in the Taiwan Football Premier League with a series of great performance. Also, it will bring a breath of fresh air to Taiwan's football industry while helping to nurture outstanding football players for the country and making the country proud at the international level.



5.4 Industry and Academia Collaboration

With a long history of collaborating with the academia, CPC has established an industry-academia collaboration program (refer to 4.4.3 Industry-Academia Collaboration Highlight Projects). It rewarded and hired outstanding students, as well as set up a thesis scholarship program in collaboration with the Chinese Petroleum Institute and the Chinese Association for Energy Economics. It aims to strengthen their application of theories and practical abilities, so they can meet the development trends in the industry and employment needs among youths. In recent years, CPC has worked with universities through competitions and business participation, so that students can learn about the workplace and the employment environment in advance. It strengthens their competencies and make better career choices. Furthermore, CPC has further combined university social responsibility (USR) and corporate social responsibility (CSR) to form the concept of university corporate social responsibility (UCSR) based on the thought of giving back to society while contributing to the industry.

Cup & Go from 0 to ∞

Having adopted a business diversification strategy, CPC gas stations continue to expand their business scope and improve product and service quality. In consideration of different geographic conditions, local circumstances, and contingency management. CPC gas stations work with local universities to spread the same fragrance of Cup & Go coffee with different styles at all CPC gas stations across Taiwan using creative ideas and marketing approaches from different universities.



From 0 to 1

From 0 to 1 - CPC's original intention

Coffee is generally sold at gas stations abroad. When coffee is served, gas stations become a space for consumers to interact and communicate with each other. With that, CPC hopes to inject care and warmth into lifeless gas stations through coffee. The first Cup & Go Coffee Shop was born in Fulin Gas Station. Positioning itself as "fast, safe and reliable" with the tagline "Stay fully energetic with your car fully filled," the coffee brand aims to boost drivers' spirit and keep travelers recharged so that everyone can reach their destination safely and happily.

From 1 to 10

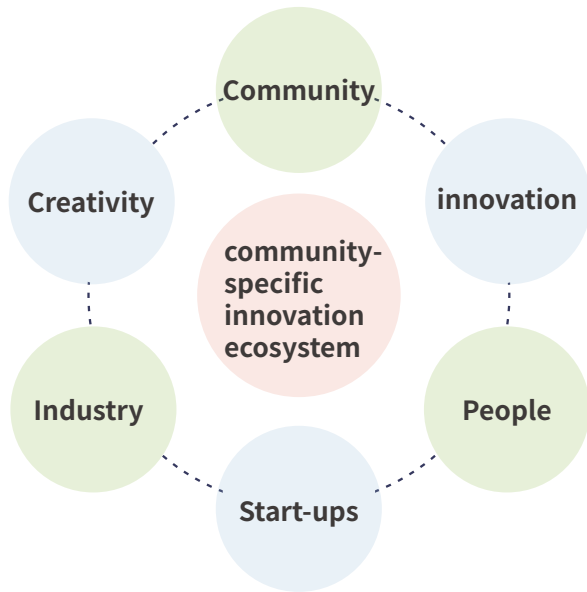
From 1 to 10 - Distinct ideas from different fields

CPC signed a letter of intent with universities to organize business competitions via industry-academia collaboration when extending the coffee brand to 10 gas stations. It aims to search for the best marketing masters on campus. Students were provided with real-world scenarios and inspired to come up with boundless creative ideas about brand association and put them into practice, so that customers will immediately think of having "A sip of Cup & Go coffee which boosts drivers' spirit" when they visit CPC gas stations across Taiwan.

From 10 to ∞

From 10 to ∞ - Local creations

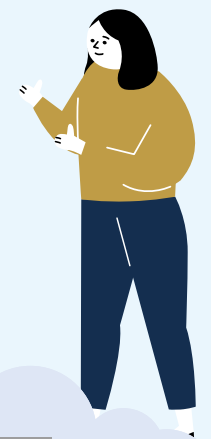
With CPC gas stations located in every township in Taiwan, CPC has not only inspired more ideas through its collaboration with local universities in the coffee business, but also actively showcased humanities and culture, landscapes, history of the industry, and craft heritage at gas stations throughout the country. It has penetrated into communities and integrate into the daily life of local residents. Apart from assisting in strengthening the development of featured industries in each county, city, and township, CPC has also driven regional economy and industries by building rest stations and unique quiet corners at gas stations from north to south.



Highlights: Fighting the pandemic together during International Nurses Day on May 12

CPC's Linkou Gong 3rd Gas Station provided teaching staff and students at the National Taiwan Sport University with opportunities to learn about industry-academia business management and marketing planning while selling Cup & Go coffee together. In addition, the gas station established cross-disciplinary collaboration with the National Museum of History to print the patterns of the museum's collections, including the "Textile with Embroidery Bird - Peony" and the "Melon-shaped Cloisonné Jar - Fruit Party," on coffee cups. Drawing rave reviews since its launch, this initiative has also led to a significant increase in coffee sales. Thus, enabled customers to refill themselves with energy while refueled their cars. CPC's Linkou Gong 3rd Gas Station also set up a "Coffee on the Wall Area" to spread love through "suspended coffee," which allows the next person to buy coffee coupons and post them on the wall so that people who cannot afford to buy a cup of coffee have the opportunity to enjoy a cup of coffee and feel the warmth of both the society and coffee.

With the intention of expressing its utmost gratitude to frontline health workers for their dedication during the COVID-19 pandemic in 2021, the Linkou Gong 3rd Gas Station together with charitable organizations have successfully raised over 2,000 coffee coupons during the International Nurses Day on May 12 and sent their warmth to Chang Gung Memorial Hospital in Linkou. Health workers at the hospital can use these coupons to redeem and enjoy a cup of Cup & Go coffee at CPC's Linkou Gong 3rd Gas Station.



Highlights: The 2020 Green Life Creative Design Competition

CPC and Panasonic Taiwan jointly hosted the 6th Green Life Creative Design Competition, in hopes of raising awareness toward the concept of green life design among college and university students through the process of creative design. This competition gathered students' ideas to come up with a wide variety of styles and elements in smart, energy-saving technology products. The design has to provide convenient for the elderly to use as well as stimulate the combined effects of smart, low-carbon life and creativity. Thereby it laid the foundation for "nurturing young dreamers" and developing "innovative entrepreneurial teams" with great potential in the future. Furthermore, students were also encouraged to set up cross-disciplinary or cross-national virtual teams to strengthen integrated innovation, resource sharing, and experiential learning. On the other hand, CPC also took the opportunity to fulfill its corporate social responsibility by organizing this competition, in an effort to evoke the imagination of local green life among residents in various cities and call on urban residents to pay serious attention to the issue of energy conservation and carbon reduction.

In 2020, the competition received a total of **178 entries from 37 different departments at 38 different colleges and universities** across Taiwan, including a number of foreign students studying in Taiwan from Vietnam, Indonesia, Malaysia, and Mainland China. The content of entries in the competition, which happened to be much more intense and exciting than previous ones, covered a number of areas, such as creativity, convenience, energy conservation, and practicality.

This year's competition inspired young students to come up with more creative green product designs and applications, especially the innovative design of green energy gas station that illustrated boundless imagination for future gas stations. It also offered a different food for thought to CPC in the transformation of gas stations. CPC hopes that the idea of green and smart living can be cultivated in schools and communities through this event, thereby creating a beautiful vision for a sustainable green life in Taiwan.





Slow-flying Angels with Burdened Wings

The journey of CPC’s care for the Angels

With long-term engagement of charitable activities, CPC has witnessed numerous challenges that people with disabilities encounter when they try to fit into our society. Thus, CPC has successfully initiated the concept of "Kindness Gas Station" since 2001, providing physically- and mentally-challenged people (known as the slow-flying angels, hereafter abbreviated as angels) with employment opportunities. CPC assists the angels with professional skills development, offering guidance and training for angels to perform services at the kindness gas stations. CPC hopes to not only enable angels to support themselves via employment, but also to help angels find self-esteem and self-confidence as well as to co-create warmth and hope to our society!



Slightly-slow Services, Same Quality

In 2001, CPC launched the first "Kindness Gas Station" in collaboration with Siwei Road Gas Station in Kaohsiung. Thereafter, CPC gradually expanded the slow-flying angel business model. A "Kindness Gas Station" is defined as the gas station that employs over five people with disabilities. In 2020, a total of 577 part-time employees hired at CPC gas stations were slow-flying angels, accounting for 32.1% of the 1,798 employees that year. Currently, there are 48 "Kindness Gas Stations" throughout Taiwan.



Great Working Skills stem from Attentive Minds

Through the "mentorship" program at CPC, the slow-flying angels are carefully guided by their one-on-one mentors at gas stations to perform standard operating procedures of pumping fuel and car wash services. Mentors would patiently remind angels for each step whenever the angels miss any steps, while keep encouraging the angels to concentrate and learn attentively with such hands-on experience. As a result, the angels have undergone transformation from being shy and inarticulate to being capable of providing services independently. Such efforts and improvement deserve a medal of honor!



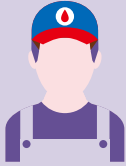
Toufen Kindness Gas Station – A Base that nurtures Angels

As the highest-sale gas station in Miaoli County, Toufen Gas Station offers various services, including fuel-pumping, convenience store, and Kindness Car Wash Service. The number of cars washed there was ranked the fourth highest among all business divisions. Moreover, this station has successfully nurtured 17 slow-flying angels to provide services. These angels are hard-working and attentive at work. They never complained about the weather even working on the days with heat or cold waves. The angels can wash 4,804 cars on average per month, and have once washed a record-breaking 565 cars in only one day!



Highlights of Miaoli Toufen Gas Station

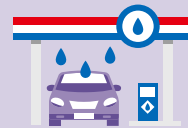
17 slow flying angels
soar into the sky



Angels washed
4,804 cars
on average per month



Angels created a record-breaking **565 cars**
in only one day



Angels with burdened wings that carried love

One brush after another, the slow-flying angels painted art that touches people's hearts with their pure innocence. CPC set up a Cup & Go Coffee Shop in collaboration with the A-Bao Education Foundation at Yuanshan Gas Station in Yilan County. Because the original coffee cup design was plain and dull, angels from the foundation took the opportunity to decorate the cups with paintings that were printed as stickers by CPC. The paper coffee cups are presented as co-branded products with designs created by the slow-flying angels! Furthermore, to enhance employability of people with disabilities, Yuanshan Gas Station trained one slow-flying angel to become a barista at the Cup & Go coffee shop, thereby proving slow-flying angels can soar high into the sky with patience and support. In addition, with any one cup of coffee sold in 2020, NT\$3 would be donated to the A-Bao Education Foundation. Both the foundation and CPC plan to expand this business model to ensure that the hard work of each slow-flying angel can warm people's hearts like a cup of coffee.



CPC has been committed to provide slow-flying angels with guidance and support. Impressed by angels' hard work, CPC hopes to expand this collaboration model to other stations and expects other companies can echo CPC's efforts in this respect so that more angels can successfully build their own careers. Moreover, CPC also aims to establish platforms for people in the community to share their warm hearts at every "Kindness Gas Station," "Kindness Car Wash Station," and "Cup & Go Coffee Shop." With the slogan, "Love at CPC provides unhindered services," CPC encourages all sectors to join this great initiative to promote social inclusion together!



48
Kindness Gas Stations
and Car Wash Stations



Nurtured
577 slow-flying angels



In-house recruitment and
collaboration with more than
30 organizations



Offered **8,076**
cups of coffee in one year

 **Appendix I**

GRI Standards Index

GRI Standards	Disclosure	Chapter and Pages	
		Chapter	Page No.
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	102-2 Activities, Brands, Products, and Services	1.1 Our CPC	<u>16</u>
	102-3 Location of Headquarters	1.1 Our CPC	<u>16</u>
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GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundary	2020 Sustainable Accomplishments	<u>11</u>
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GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundary	2020 Sustainable Accomplishments	<u>11</u>
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	103-3 Evaluation of the Management Approach	2.3.2 Products and Customers	<u>55</u>
GRI 416: Customer Health and Safety 2016	416-2 Incidents of non-compliance concerning the health and safety impacts of products and services	2.3.2 Products and Customers	<u>55</u>
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	205-3 Confirmed incidents of corruption and actions taken	2.2 Ethical Management and Legal Compliance	<u>48</u>
GRI 419: Socio-economic Compliance 2016	419-1 Non-Compliance with Laws and Regulations in the Social and Economic Area	2.2 Ethical Management and Legal Compliance	<u>48</u>

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GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundary	2020 Sustainable Accomplishments	<u>11</u>
	103-2 The Management Approach and Its Components	1.2.2 Sustainable Development Strategy and Goals	<u>25</u>
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GRI 403: Occupational Health and Safety 2018	403-1 Occupational health and safety management system	4.2 Workplace Safety	<u>121</u>
	403-2 Hazard identification, risk assessment, and incident investigation	4.2 Workplace Safety	<u>121</u>
	403-3 Occupational health services	4.2 Workplace Safety	<u>121</u>
	403-4 Worker participation, consultation, and communication on occupational health and safety	4.2 Workplace Safety	<u>121</u>
	403-5 Worker training on occupational health and safety	4.2 Workplace Safety	<u>121</u>
	403-6 Promotion of worker health	4.2 Workplace Safety	<u>121</u>
	403-7 Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	4.2 Workplace Safety	<u>121</u>
	403-8 Workers covered by an occupational health and safety management system	4.2 Workplace Safety	<u>121</u>
	403-9 Work-related injuries	4.2 Workplace Safety	<u>121</u>
	403-10 Work-related ill health	4.2 Workplace Safety	<u>121</u>

Information security and customer privacy

GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundary	2020 Sustainable Accomplishments	<u>11</u>
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	103-3 Evaluation of the Management Approach	2.3.3 Information Security and Customer Privacy	<u>58</u>

GRI 418: Customer Privacy 2016	418-1 Substantiated complaints concerning breaches of customer privacy and losses of customer data	2.3.3 Information Security and Customer Privacy	<u>58</u>
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GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundary	2020 Sustainable Accomplishments	<u>11</u>
	103-2 The Management Approach and Its Components	1.2.2 Sustainable Development Strategy and Goals	<u>25</u>
	103-3 Evaluation of the Management Approach	3.4.2 Emissions and management of air pollutants	<u>100</u>
GRI 305: Emissions 2016	305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	3.4.2 Emissions and management of air pollutants	<u>100</u>
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	103-3 Evaluation of the Management Approach	2.1.1 Functions of the board of directors	<u>38</u>
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	103-3 Evaluation of the Management Approach	4.1 Human Resources	<u>117</u>
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GRI 404: Training and Education 2016	404-2 Programs for upgrading employee skills and transition assistance programs	4.4 Talent Development	<u>134</u>
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GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundary	2020 Sustainable Accomplishments	<u>11</u>
	103-2 The Management Approach and Its Components	1.2.2 Sustainable Development Strategy and Goals	<u>25</u>
	103-3 Evaluation of the Management Approach	3.5.1 Environmental protection	<u>106</u>
GRI 304: Biodiversity 2016	304-2 Significant impacts of activities, products, and services on biodiversity	3.5.1 Environmental protection	<u>106</u>
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GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its Boundary	2020 Sustainable Accomplishments	<u>11</u>
	103-2 The Management Approach and Its Components	1.2.2 Sustainable Development Strategy and Goals	<u>25</u>
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GRI 306: Effluents and Waste 2016	306-2 Waste by type and disposal method	3.4.4 Waste management	<u>105</u>

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	302-4 Reduction of energy consumption	3.3.1 Energy consumption and management	<u>92</u>
	302-5 Reduction in energy requirements of products and services	3.3.1 Energy consumption and management	<u>92</u>

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GRI 417: Marketing and Labeling 2016	417-1 Requirements for product and service information and labeling	2.3.1 Transparency of price information for major products	<u>55</u>
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GRI 203: Indirect Economic Impacts 2016	203-1 Infrastructure investments and services supported	3.2. Green energy transition and Circular Economy	<u>81</u>
	203-2 Significant Indirect Economic Impacts	3.2. Green energy transition and Circular Economy	<u>81</u>

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GRI 401: Employment 2016	401-2 Benefits Provided to Full-Time Employees that are not Provided to Temporary or Part-Time Employees	4.3 Friendly Workplace	<u>129</u>
	401-3 Parental Leave	4.3 Friendly Workplace	<u>129</u>

GRI 404: Training and Education 2016	404-1 Average hours of training per year per employee	4.4 Talent Development	<u>134</u>
	404-3 Percentage of employees receiving regular performance and career development reviews	4.4 Talent Development	<u>134</u>
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	405-2 Ratio of the Basic Salary and Remuneration of Women to Men	4.1 Human Resources	<u>117</u>
GRI 406: Non-discrimination 2016	406-1 Incidents of discrimination and corrective actions taken	4.3 Friendly Workplace	<u>129</u>
GRI 407: Freedom of Association and Collective Bargaining 2016	407-1 Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	4.3 Friendly Workplace	<u>129</u>
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GRI 303: Water and Effluents 2018	303-1 Interactions with water as a shared resource	3.2.2 Water Use and Management	<u>94</u>
	303-2 Management of Water Discharge-related Impacts	3.2.2 Water Use and Management	<u>94</u>
	303-3 Water withdrawal	3.2.2 Water Use and Management	<u>94</u>
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GRI 203: Indirect Economic Impacts 2016	203-1 Infrastructure investments and services supported	5.1 Social Welfare	<u>142</u>
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GRI 204: Procurement Practices 2016	204-1 Proportion of spending on local suppliers	2.4.2 Supplier Management	<u>62</u>
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GRI 201: Economic Performance	201-1 Direct economic value generated and distributed	1.1.1 Company Profile	<u>16</u>
	201-2 Financial implications and other risks and opportunities due to climate change	3.1.2 Adaptation of Climate Change	<u>76</u>



Appendix II

SASB Index

SASB Code	Accounting metric	Indicator Unit	Response to each indicator			Explanation	Page No.	
GHG and other air emissions								
EM-RM-110a.1	Gross global Scope 1 emissions, percentage covered under emissions-limiting regulations	%	2018	2019	2020	The disclosed value of 2020 is quantified by CPC. The certified and assured value would be disclosed on CPC's official website.	74	
			97.4	97.2	97.1			
EM-RM-110a.2	Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets	-	Corresponding to the following chapters: 3.1.1 Mitigation of Climate Change, 3.1.2 Adaptation of Climate Change, 3.2.1 Green Energy Transition			-	74-87	
Air quality								
EM-RM-120a.1	Air emissions of the following pollutants: (1) NOx (excluding N ₂ O), (2) SOx, (3) particulate matter (PM ₁₀), (4) H ₂ S, and (5) volatile organic compounds (VOCs)	ton	Year	2018	2019	2020	PM ₁₀ and H ₂ S are not required to be reported. Assessment of future needs in statistical data is currently in evaluation process.	100
			NOx	3,491.1	3,263.5	2,753.9		
			SOx	1,060.8	1,154.7	640.9		
			VOC	2,177.5	2,048.6	1,980.3		
			PM ₁₀	-	-	-		
H ₂ S	-	-	-					
EM-RM-120a.2	Number of refineries in or near areas of dense population	Set	CPC has 3 refineries in densely populated areas (the township where the operating base is located has a population of more than 50,000)			<ul style="list-style-type: none"> · Taoyuan refinery is located in Guishan District, Taoyuan City, with a nearby population of approximately 164,400 people · Dalin Refinery is located in Siaogang District, Kaohsiung City, with a nearby population of approximately 157,400 people · Linyuan Petrochemical Plant is located in Linyuan District, Kaohsiung City, with a nearby population of approximately 69,500 people 	101	

Water resources management							
EM- RM- 140a.1	· Total fresh water withdrawn, · percentage recycled · percentage in regions with High or Extremely High Baseline Water Stress	m ³	Total water withdrawal in 2020			-	95- 96
			Dalin Plant	Taoyuan Plant	Linyuan Plant		
			639,449,986	270,053,831	718,655,183		
			Total reclaimed volume in 2020				
			Dalin Plant	Taoyuan Plant	Linyuan Plant		
			627,607,329	264,467,182	705,322,528		
Water consumption in 2020 in areas not under high water stress: 0 m ³							
EM- RM- 140a.2	Number of incidents of non-compliance associated with water quality permits, standards, and regulations	Number of cases	There were 3 violations of the Water Pollution Control Act in 2020			Related contents can be found in 3.3.2 Water Use and Management	94- 99
Hazardous waste management							
EM- RM- 150a.1	Amount of hazardous waste generated, percentage recycled	Tons and percentage	Total hazardous waste	Percentage of total waste by category	Recycling percentage	-	105
			2,193.459	2.039%	0%		
EM- RM- 150a.2	· Number of underground storage tanks (USTs), · number of UST releases requiring cleanup, and · percentage in states with UST financial assurance funds	Set	Number of underground storage tanks	Number of underground storage tanks to be emptied	Margin ratio of the underground storage tank	As the margin ratio of the underground storage tank is set by the U.S. regulations, it is not applicable to CPC	-
			3,020	0	-		
Labor, Health and Safety							
EM- RM- 320a.1	· Total recordable incident rate (TRIR), · fatality rate, and · near miss frequency rate (NMFR) for (a) full-time employees and (b) contract employees	%	Total Recordable Incident Rate (TRIR)	Disease and death rate	Near Miss Frequency Rate (NMFR)	Calculation method: (Number of accident cases / Total working hours) × 200,000	122
			0.023	0	1.069		

EM- RM- 320a.2	Discussion of management systems used to integrate a culture of safety	-	Corresponding to the following chapters: 4.2.4 Countermeasures, 4.2.5 Contractor Management Policy, 4.2.6 Employee Health Care, 4.3.1 Employee Welfare Policy	-	124- 130
Product Specifications and Clean Fuel Blends					
EM- RM- 410a.1	Percentage of Renewable Volume Obligation (RVO) met through: (1) production of renewable fuels, (2) purchase of "separated" renewable identification numbers (RIN)	-	As CPC only conducts R&D on renewable fuels and does not produce or purchase renewable fuels, there is no requirement or market survey on the percentage of renewable fuel obligation (RVO).	-	-
EM- RM- 410a.2	Total addressable market and share of market for advanced biofuels and associated infrastructure	-			-
Price Integrity and Information Transparency					
EM- RM- 520a.1	Total amount of monetary losses as a result of legal proceedings associated with price fixing or price manipulation	Sum	In 2020, there were no legal proceedings resulting from oil and gas price inflation or manipulation-related events, and the related currency loss was \$0.	For details, please refer to 2.3.1 Transparency of price information of major products	55
Environmental Regulations Management					
EM- RM- 530a.1	Discussion of corporate positions related to government regulations and/or policy proposals that address environmental and social factors affecting the industry	Number of cases	There were three incidents that resulted in major fines due to operational deficiencies in 2020.	For details, please refer to 3.4.1 Environmental Compliance	100

Major Incident Management							
EM- RM- 540a.1	Process Safety Event (PSE) rates for Loss of Primary Containment (LOPC) of greater consequence (Tier 1) and lesser consequence (Tier 2)	%	Tier 1 PSE	0	Calculation method: (Total Tier 1 PSE / Total hours worked) × 200,000	123	
			Tier 2 PSE	0.011			Calculation method: (Total Tier 2 PSE / Total hours worked) × 200,000
EM- RM- 540a.2	Challenges to Safety Systems indicator rate (Tier 3)	%	0.381		Calculation method: (Total Tier 3 PSE / Total hours worked) × 200,000	123	
EM- RM- 540a.3	Discussion of measurement of Operating Discipline and Management System Performance through Tier 4 Indicators		To promote the process of safety management system, CPC introduces international process safety related management elements, while using a progressive and systematic approach with internal and external compliance audits to identify weaknesses. Then, CPC gradually establishes a systematic, logical, target-oriented and quantifiable management performance framework for process safety management system to enhance process operation safety and to reduce the risk of accidents.			-	123
Operating Activity Indicators							
EM- RM- 000.A	Refining throughput of crude oil and other feedstocks	10,000kL	Oil products total sales (including petrochemical products and multilateral trade)	3,045	-	18	
		100mn m ³	Finished natural gas sales	235.54			
EM- RM- 000.B	Refining operating capacity	10,000kL	2,054		The data means CPC's annual production and is currently being evaluated for future data needs	18	



BSI Certification (AA1000)



INDEPENDENT ASSURANCE OPINION STATEMENT

CPC Corporation, Taiwan 2021 Sustainability Report

The British Standards Institution is independent to CPC Corporation, Taiwan (hereafter referred to as CPC in this statement) and has no financial interest in the operation of CPC other than for the assessment and verification of the sustainability statements contained in this report.

This independent assurance opinion statement has been prepared for the stakeholders of CPC only for the purposes of assuring its statements relating to its corporate social responsibility (CSR), more particularly described in the Scope below. It was not prepared for any other purpose. The British Standards Institution will not, in providing this independent assurance opinion statement, accept or assume responsibility (legal or otherwise) or accept liability for or in connection with any other purpose for which it may be used, or to any person by whom the independent assurance opinion statement may be read.

This independent assurance opinion statement is prepared on the basis of review by the British Standards Institution of information presented to it by CPC. The review does not extend beyond such information and is solely based on it. In performing such review, the British Standards Institution has assumed that all such information is complete and accurate.

Any queries that may arise by virtue of this independent assurance opinion statement or matters relating to it should be addressed to CPC only.

Scope

The scope of engagement agreed upon with CPC includes the followings:

1. The assurance scope is consistent with the description of CPC Corporation, Taiwan 2021 Sustainability Report.
2. The evaluation of the nature and extent of the CPC's adherence to AA1000 Account Ability Principles (2018) in this report as conducted in accordance with type 1 of AA1000AS v3 sustainability assurance engagement and therefore, the information/data disclosed in the report is not verified through the verification process.

This statement was prepared in English and translated into Chinese for reference only.

Opinion Statement

We conclude that the CPC Corporation, Taiwan 2021 Sustainability Report provides a fair view of the CPC CSR programmes and performances during 2020. The CSR report subject to assurance is free from material misstatement based upon testing within the limitations of the scope of the assurance, the information and data provided by the CPC and the sample taken. We believe that the 2020 economic, social and environmental performance information are fairly represented. The CSR performance information disclosed in the report demonstrate CPC's efforts recognized by its stakeholders.

Our work was carried out by a team of CSR report assurers in accordance with the AA1000AS v3. We planned and performed this part of our work to obtain the necessary information and explanations we considered to provide sufficient evidence that CPC's description of their approach to AA1000AS v3 and their self-declaration in accordance with GRI Standards: Core option were fairly stated.

Methodology

Our work was designed to gather evidence on which to base our conclusion. We undertook the following activities:

- a review of issues raised by external parties that could be relevant to CPC's policies to provide a check on the appropriateness of statements made in the report.
- discussion with managers on approach to stakeholder engagement. However, we had no direct contact with external stakeholders.
- 17 interviews with staffs involved in sustainability management, report preparation and provision of report information were carried out.
- review of key organizational developments.
- review of the findings of internal audits.
- review of supporting evidence for claims made in the reports.
- an assessment of the organization's reporting and management processes concerning this reporting against the principles of Inclusivity, Materiality, Responsiveness and Impact as described in the AA1000AP (2018).

Conclusions

A detailed review against the Inclusivity, Materiality, Responsiveness and Impact of AA1000AP (2018) and GRI Standards is set out below:

Inclusivity

This report has reflected a fact that CPC has continually sought the engagement of its stakeholders and established material sustainability topics, as the participation of stakeholders has been conducted in developing and achieving an accountable and strategic response to sustainability. There are fair reporting and disclosures for economic, social and environmental information in this report, so that appropriate planning and target-setting can be supported. In our professional opinion the report covers the CPC's inclusivity issues.

Materiality

CPC publishes material topics that will substantively influence and impact the assessments, decisions, actions and performance of CPC and its stakeholders. The sustainability information disclosed enables its stakeholders to make informed judgements about the CPC's management and performance. In our professional opinion the report covers the CPC's material issues.

Responsiveness

CPC has implemented the practice to respond to the expectations and perceptions of its stakeholders. An Ethical Policy for CPC is developed and continually provides the opportunity to further enhance CPC's responsiveness to stakeholder concerns. Topics that stakeholder concern about have been responded timely. In our professional opinion the report covers the CPC's responsiveness issues.

Impact

CPC has identified and fairly represented impacts that were measured and disclosed in probably balanced and effective way. CPC has established processes to monitor, measure, evaluate and manage impacts that lead to more effective decision-making and results-based management within the organization. In our professional opinion the report covers the CPC's impact issues.

GRI Sustainability Reporting Standards (GRI Standards)

CPC provided us with their self-declaration of in accordance with GRI Standards: Core option (For each material topic covered by a topic-specific GRI Standard, comply with all reporting requirements for at least one topic-specific disclosure). Based on our review, we confirm that social responsibility and sustainable development disclosures with reference to GRI Standards' disclosures are reported, partially reported or omitted. In our professional opinion the self-declaration covers the CPC's social responsibility and sustainability topics.

Assurance level

The moderate level assurance provided is in accordance with AA1000AS v3 in our review, as defined by the scope and methodology described in this statement.

Responsibility

The CSR report is the responsibility of the CPC's chairman as declared in his responsibility letter. Our responsibility is to provide an independent assurance opinion statement to stakeholders giving our professional opinion based on the scope and methodology described.

Competency and Independence

The assurance team was composed of Lead auditors experienced in relevant sectors, and trained in a range of sustainability, environmental and social standards including AA1000AS, ISO 14001, ISO 45001, ISO 14064 and ISO 9001. BSI is a leading global standards and assessment body founded in 1901. The assurance is carried out in line with the BSI Fair Trading Code of Practice.



For and on behalf of BSI:

Peter Pu, Managing Director BSI Taiwan

Statement No: SRA-TW-2020098
2021-05-28

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CPA Assurance (ISAE3000)



安侯建業聯合會計師事務所

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會計師有限確信報告

台灣中油股份有限公司 公鑒：

本會計師接受台灣中油股份有限公司（以下簡稱「台灣中油」）之委託，對台灣中油民國一〇九年度（2020年度）企業社會責任報告書（以下簡稱「報告書」）中所揭露之特定績效指標（以下簡稱「確信標的資訊」）執行有限確信程序並出具報告。

確信標的資訊與報導基準

台灣中油依據永續會計準則委員會（Sustainability Accounting Standards Board，「SASB」）發布之SASB永續性報導準則（SASB準則）中，屬於產業別「石油&天然氣煉製與行銷（Oil & Gas- Refining & Marketing）」規範所揭露之三項特定績效指標資訊詳列於附件一。

公司之責任

台灣中油應設定其社會責任績效和報導目標，包括辨識利害關係人及重大性議題，並依前述報導基準編製及允當表達民國一〇九年度（2020年度）報告書內所涵蓋之確信標的資訊，且負責建立及維持與報告書編製有關之必要內部控制，以確保報告書所報導之特定績效指標未存有導因於舞弊或錯誤之重大不實表達。

會計師之責任

本會計師係依據由國際審計與確信準則委員會（International Auditing and Assurance Standards Board）所發佈之國際確信業務準則第3000號—歷史性財務資訊之查核或核閱以外之確信業務（International Standard on Assurance Engagements (ISAE) 3000: Assurance Engagements other than Audits or Reviews of Historical Financial Information）規劃並執行工作，以對第二段所述之確信標的資訊是否存有重大不實表達出具有限確信報告，因有限確信案件對風險之瞭解及考量低於合理確信案件，所執行程序之性質及時間與適用於合理確信案件者不同，其範圍亦較小，因此有限確信案件取得之確信程度明顯低於合理確信案件取得者。

品質管制與獨立性

本會計師及所隸屬會計師事務所已遵循會計師職業道德規範中有關獨立性及其他道德規範之規定，該規範之基本原則為正直、公正客觀、專業能力及盡專業上應有之注意、保密及專業態度。此外，本會計師所隸屬會計師事務所遵循審計準則公報第四十六號「會計師事務所之品



質管制」，維持完備之品質管制制度，包含與遵循職業道德規範、專業準則及所適用法令相關之書面政策及程序。

所執行程序之彙總說明

本會計師係針對第二段所述之確信標的資訊執行有限確信工作，主要執行之確信程序包括：

- 取得台灣中油民國一〇九年度（2020 年度）報告書，並閱讀其內容；
- 訪談台灣中油管理階層及攸關員工，以瞭解用以蒐集及產出確信標的資訊之相關作業流程與資訊系統；
- 基於上述事項所取得之瞭解，就報告書揭露之特定資訊執行分析性程序，或於必要時抽樣核對相關文件，以獲取足夠及適切之有限確信證據。

上述確信程序係基於本會計師之專業判斷，包括辨識確信標的資訊可能存有重大錯誤或不實表達之範圍並評估其潛在風險，設計足夠且適切之確信程序暨評估確信標的資訊之表達。本會計師相信此項確信工作可對本確信報告之結論提供合理之依據。

先天限制

台灣中油民國一〇九年度（2020 年度）報告書內容涵蓋非財務資訊，對於該等資訊之揭露內容可能涉及台灣中油管理階層之重大判斷、假設與解釋，故不同利害關係人可能對於該等資訊有不同之解讀。


結論

依據所執行之程序及所獲取之證據，本會計師並未發現第二段所述確信標的資訊有未依適用之報導基準編製而須作重大修正之情事。

其他事項

台灣中油網站之維護係台灣中油管理階層之責任，對於本確信報告於台灣中油網站公告後任何確信標的資訊或適用基準之變更，本會計師將不負就該等資訊重新執行確信工作之責任。

安侯建業聯合會計師事務所

會計師：謝秋華 

事務所地址：台北市信義路五段七號六十八樓

民國一一〇年五月三十一日

附件一：確信標的資訊彙總表

編號	報告書對應章節及頁碼	確信標的資訊	SASB 準則
1	3.4. 4廢棄物管理 CH3 P.105	有害廢棄物產生量及回收比例	EM-RM-150a.1.
2	3.4.2空氣污染排放 與管理 CH3 P. 101	在人口密集地區的石化產物精煉廠數量	EM-RM-120a.2.
3	4.2 安心職場 / 4.3.1 員工福利政策 CH4 P.124-P.130	評估、監督及降低員工/約聘人員暴露於長期健康風險做法描述說明	EM-RM-320a.2.



台灣中油股份有限公司
CPC Corporation, Taiwan