



CPC 2023

台灣中油股份有限公司
CPC Corporation, Taiwan



Environment



Society



Governance

Quality and Steady Supply

Domestic Exploration

95.8

Yield: Natural gas 95.8 million cubic meters

1,868

Condensate 1,868 kiloliters

Overseas Exploration

5.68

Crude oil 5.68 million barrels

441

natural gas 441 million cubic meters

59.2

LPG 59.2 thousand barrels

Diverse Services and Products

26.54

Total domestic sales of natural gas 26.54 billion cubic meters

16.596

Total domestic sales of oil products 16.596 million kiloliters

937

Annual production of ethylene 937 thousand tons

Fulfillment of Social Responsibility

475

Support for regional education and the underprivileged: NTD\$ 475 million

26,715

Blood donation charity campaign Participation: 26,715 people

2.436

Employee donation to underprivileged children: NTD\$ 2.436 million

CPC

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Incorporating Net Zero into ESG goals



Chairman

Lee, Shem-chin

The conflict between Russia and Ukraine in early 2022 led to a surge of natural gas and crude oil prices. The tightening of supplies led to a so-called "Fourth Energy Crisis" and has transformed the global energy trade entirely, forcing countries worldwide to shift gears in the energy transition. The global economy is clouded by surging inflation, geopolitical tensions, and an everlasting pandemic as the war in Ukraine drags on. Under such difficult circumstances, CPC strives to maintain a stable oil and gas supply within the country and follow the Taiwanese Government's price-freezing policies to stabilize commodity prices for households and industrial users. CPC has thus cumulatively absorbed nearly a NT\$300 billion deficit; such an endeavor has led to enormous, record-high financial losses.

Even so, thanks to the dedication and efforts of all CPC employees, the company has made significant progress in all business areas in 2022, and it continues to build on previous success in environmental sustainability, social inclusion and corporate governance (ESG).

Regarding energy prospecting, CPC actively seeks international collaboration. The first oil well at Guardfish in the US was put into production in June; Nos. 16, 17, and 18 geothermal exploration wells at the Yilan site were completed with active development of domestic geothermal energy, and green energy MOUs with Taiwan Cement Corp. and Baseload Power Taiwan were signed respectively, for the cooperative development of geothermal energies in Hualien and Taitung.

Regarding carbon neutrality, in 2022, CPC built the first carbon-neutral gas station in Taiwan – the Qianfeng Road station. It is also the first carbon-neutral gas station worldwide that adheres to the PAS 2060 standard and was third-party verified with the BSI, generating local carbon credits and offsetting carbon locally. CPC also imported the first shipment of crude oil with a certified carbon offset. With CPC's efforts in recent years, including voluntary emission reduction and environmental actions, the company has made great strides in four areas pursuing carbon neutrality: natural gas, ethylene, gas stations, and crude oil.

Regarding energy infrastructure, CPC continues to push forward major infrastructure plans following the government's energy transformation policies, including eight stabilizing natural gas supply projects and five refinery transition investment projects. In particular, Taichung LNG Terminal Phase III Investment Project began the construction of storage tanks and regasification facility in 2022. Once complete, the overall natural gas storage and distribution resilience will be further improved.

Regarding diversified energy services, in 2022, CPC gas stations won the *Reader's Digest* Trusted Brand Platinum Award for the 22nd consecutive year, which shows that the general public widely recognizes the company's service quality. CPC also continued its installation of smart and green gas stations, having completed an eight-plug charging facility at the Guangming Road station in Hsinchu and 226 battery charging/ swapping facilities for electric scooters, which met CPC's target of installing a thousand public charging stations in total.

Regarding environmental protection and conservation, in 2022, CPC conserved the energy equivalent of 36,000 cubic meters of oil and reduced emissions to the equivalent to 76,000 tons of carbon dioxide. CPC also completed carbon footprint verification for petrochemical products, which is also third-party certified. CPC has fulfilled its commitment to ensure that the natural environment and the Guantang LNG Terminal can prosper together. It held a presentation on November 7, showcasing the conservation result of Guantang's ecosystem, a culmination of four years' work.

In 2022, CPC announced the launch of CPC Net Zero Year One, pursuing ESG excellence with three transition strategies: optimizing refining operations, reducing carbon emissions, and developing clean energy. CPC's endeavor received wide recognition in Taiwan and overseas, winning ESG and sustainable development accolades. In particular, CPC's aim to accelerate the transition to Net Zero won the Taiwan Sustainability Action Awards (TSAA) gold award. The company also received yet another Sustainability and Resilience Pilot Award from BSI. CPC is not only standing out among state-owned enterprises but acts as a leader of companies in Taiwan.

Regarding environmental sustainability, CPC is implementing sustainable practices following the Net Zero strategy. Regarding the optimization of refining operations, CPC has adopted a progressive Crude Oil-to-Chemicals (COTC) strategy which has not only increased the conversion rate year-on-year, but has also created other value-added petrochemical materials. In 2022, CPC collaborated with the National Space Organization (NSPO) to successfully develop a product-optical payload composite cylinder and continued on the research plans for advanced materials, such as Dicyclopentadiene (DCPD) and lithium-titanium-oxide (LTO).

Regarding carbon reduction, in 2022, CPC set a mid-term target of reducing 49.5% of emissions (compared with the base year 2005) by 2030. To meet the target, CPC is focusing on improving energy efficiency, reducing emissions in production processes, conducting carbon footprint verification for CPC products, and adopting an internal carbon pricing scheme. The company is also actively involved in Carbon Capture, Utilization, and Storage (CCUS) projects, such as the CCU demonstration system in the Dalin Refinery and the CCS pilot program at Tieh-Chen Mountain.

In the pursuit of clean energy, CPC has expanded into renewables, including hydrogen, geothermal, and solar power, and it has planned the installation of the first hydrogen refueling demonstration station as its first venture into the realm of hydrogen energy. CPC plans to build a new 4MW geothermal power plant in Tuchang of Yilan and continues to install more solar power plants so that the overall installation capacity for solar energy would reach as high as 24.48MW.

To promote social inclusion, CPC employs Slow-Flying Angels (people with developmental delays) in its kindness gas stations and strives to build a friendly, inclusive workplace. In 2022, CPC won the first prize in the Global Views Magazine's CSR Awards and Asia Responsible Enterprise Awards (AREA) by Enterprise Asia. The year marked the tenth anniversary of CPC's charity campaign to encourage the general public to donate blood. CPC also continues its plan to maintain environment-friendly public toilets. In 2022, public toilets in all CPC-owned stations were rated as Excellent. On November 19, World Toilet Day, CPC invited franchise stations to contribute to the cause, cleaning public toilets and achieving Urban Sanitation, the United Nations' Sustainable Development Goal 16.

Regarding corporate governance, CPC believes that integrity and safety are the prerequisites for a company to thrive. The fire at the R3 Refinery in 2022 dealt a massive blow to CPC's corporate image. Consequently, the company reviewed all existing procedures, made adjustments, and established the first procurement integrity platform for major construction projects, and the company is determined to uphold transparency and eliminate criminal incidents. CPC strives to maintain compliance, integrity, and professionalism. In light of the 2022 fire, CPC was prompted to conduct a comprehensive review of equipment (including standards and regulations), operation, and management, to ensure that such accidents would never occur again. As a part of National Critical Infrastructure (CI), in 2022, CPC incorporated advanced technologies such as 5G internet and AIoT into environmental safety, pipelines, storage tanks, critical equipment, operation management, and training, to enhance resilience and ensure security.

As the war in Ukraine drags on and inflation continues to surge, the outlook for the coming year remains challenging. Energy demand will depend on the status of the global economy; meanwhile, energy prices are affected by geopolitics and other factors, and remain uncertain. While enhancing integrity, occupational safety, environmental protection, and cybersecurity, CPC will continue to monitor the dynamics of the energy market to ensure a stable domestic supply. Also, CPC will improve coordination and flexibility of production, marketing, distribution, and storage to provide a steady energy supply, and to ensure energy security in the country. As the world shifts towards Net Zero, CPC will uphold its three transition strategies – optimizing refining operations, reducing carbon emissions, and developing clean energy – while investing in research and development to gain momentum moving forward. CPC plans to make tangible progress in energy saving, emission reduction, renewables, and energy storage. Meanwhile, CPC also aims to explore new businesses on the road to transition, enhancing the company's resilience towards environmental changes. It is the consensus of everyone at CPC to transform such a vision into reality and move toward sustainability.



President

Fang . Jeng-Zen

Sustainable Practice that Constantly Creates Value

1946

CPC's Timeline of Innovative Development

CPC was established in Shanghai on June 1, 1946, initially under the aegis of the Council of Resources – the precursor of today's State-owned Enterprise Commission, Ministry of Economic Affairs.

1949

Following the ROC government's relocation to Taiwan in 1949, the corporate headquarters was set up in Taipei, and the company's affiliation was transferred to the Ministry of Economic Affairs. Its business scope and facilities are carried out throughout Taiwan, encompassing importing, procurement, exploration, production, refining, storage and distribution of oil and gas. In addition, CPC produces petrochemical raw materials.

2003

In 2003 CPC instituted a policy for sustainable development, in line with both the global trend and the need for environmental protection.

2007

On February 9, 2007, the board of directors approved changing the company's English name from "Chinese Petroleum Corporation" to "CPC Corporation, Taiwan."

2016

On June 17, 2016, the board of directors approved revising the company's articles of association and moved its headquarters from Taipei City to Kaohsiung City.



CPC's Sustainable Operation Policy and Practice

- Constant water and energy conservation through efficient utilization.
- Practice comprehensive clean manufacturing methods to protect the environment.
- Place importance on fulfilling CSR commitments and expanding its service area.
- Establish indicators for environmental protection while maintaining transparency.
- Actively research and develop products while expanding new areas of business.
- Comply with both Taiwan's national regulations and international protocols.

CPC Corporation Taiwan established the Sustainable Operation Promotion Committee in 2005, a core driver for sustainable operation. The CPC chairman serves as the committee chair; the president serves as the vice chair, while the vice president in charge of business management serves as the executive secretary. Other executives, external experts, and scholars serve as committee members. Together, the committee reviews the sustainability issues affecting business operations and stakeholder interest.

The committee aims to achieve sustainable operation with tangible actions, constantly creating value for stakeholders; therefore, the committee categorized issues concerning sustainable operation into four parts: environmental and ecological conservation, social, social care, policies, and R&D, and environmental accounting & information. Execution groups for each category were created, formulating action plans and monitoring progress. Members of the execution groups come from various departments within the company, which makes resource integration and strategy and action plan implementation more effective.

In 2022, CPC Sustainable Operation Promotion Committee convened three meetings and voted on several sustainability proposals. The CPC president intermittently reports to the Board of Directors on the progress and effectiveness of the sustainable operation endeavors.



2022 Milestones and Honors

Milestones:

- Completed Qianfeng Road station, the first carbon-neutral gas station in Taiwan.
- Imported the first crude oil cargo with certified carbon offset.
- Ventured into space and satellite industry, and developed the innovative optical payload composite cylinder and high-pressure fuel tank/valve and pipe coating.
- Released the Net Zero by 2050 Best Practices Report with the European Chamber of Commerce Taiwan (ECCT), heading towards Net Zero emission by 2050.

Honors:

- 2022 Asia Corporate Excellence & Sustainability Awards (ACES): Sustainability Award – Top Sustainability Advocates in Asia.
- 2022 Asia Responsible Enterprise Awards (AREA): Social Empowerment category, Green Leadership category, and Health Promotion category.
- 2022 Global Corporate Sustainability Awards (GCSA): Sustainability Reporting (English) – Silver Class.
- 2022 Taiwan Corporate Sustainability Awards (TCSA): Corporate Sustainability Report Award (Chinese): Platinum (Energy), and six awards for Best Performance of Specific Categories: Social Inclusion, People Development, Growth through Innovations, Climate Leadership, Sustainable Water Management, and Gender Equality.
- 2022 Taiwan Sustainability Action Awards (TSAA): Gold award: CPC Net Zero and Sustainable Transformation Acceleration Plan; Silver award: CPC Overseas Sustainable Track; and Bronze award: CPC gas stations, going to the toilet is easy.
- British Standards Institution (BSI): Sustainability and Resilience Pilot Award.
- Global Views Monthly's Corporate Social Responsibility & ESG Award: First prize in the Education and Promotion category: CPC Guarding Slow-Flying Angels, Spreading their Wings to Fly project.
- 19th National Brand Yushan Award: seven awards, including First Prize of the Best Product Award, Best Popular Brand Award, and five Best Product Awards.

Great Vision for Opportunities, Steady at the Helm in New Territories



Board and Corporate Officers

Chairman & Standing Director |
Shun-Chin Lee

Directors

Standing Director & President |
Jeng-Zen Fang

Standing Director & Independent Director |
Ming-Chang Hsu

Independent Director | Chih-Chheng Shen
Syang-Peng Rwei

Chung-Pao Wu

Pei-Li Chen

Li-Chen Lin

Chung-Hsien Chen

Chao-Chung Kuo

Shih-Yuan Su

Peng-Fu Wang

Sheng-Ching Huang

Supervisors

Tsang-Fu Wu

Hui-Shan Wei

Feng-Yuan Chien

Corporate Officers

President Jeng-Zen Fang

Vice Presidents Chia-Shou Chiu

Jane H.J. Liao

Huang-Chang Lee

Michael Chang

Po-Tung Lo

Spokesman Ray-Chung Chang

CEO, Exploration & Production

Business Division Frank S. L. Tang

CEO, Refining Business Division Chin-Jung Hsu

CEO, Petrochemical Business

Division San-Tay Huang

CEO, Marketing Business Division Tray-Shing Chiou

CEO, Natural Gas Business Hsi-Wen Lee

CEO, Lubricants Business

Division Chung-Liang Lin

CEO, Liquefied Petroleum Gas

Business Division Feng-Cheng Chu

CEO, Solvent & Chemical

Business Division Angela Koju Lin

Director, Refining &

Manufacturing Research Institute Ming-Chang Tsai

Director, Exploration &

Development Research Institute Ta-Lin Chen

Director, Green Technology

Research Institute Guo-Hsu Lu

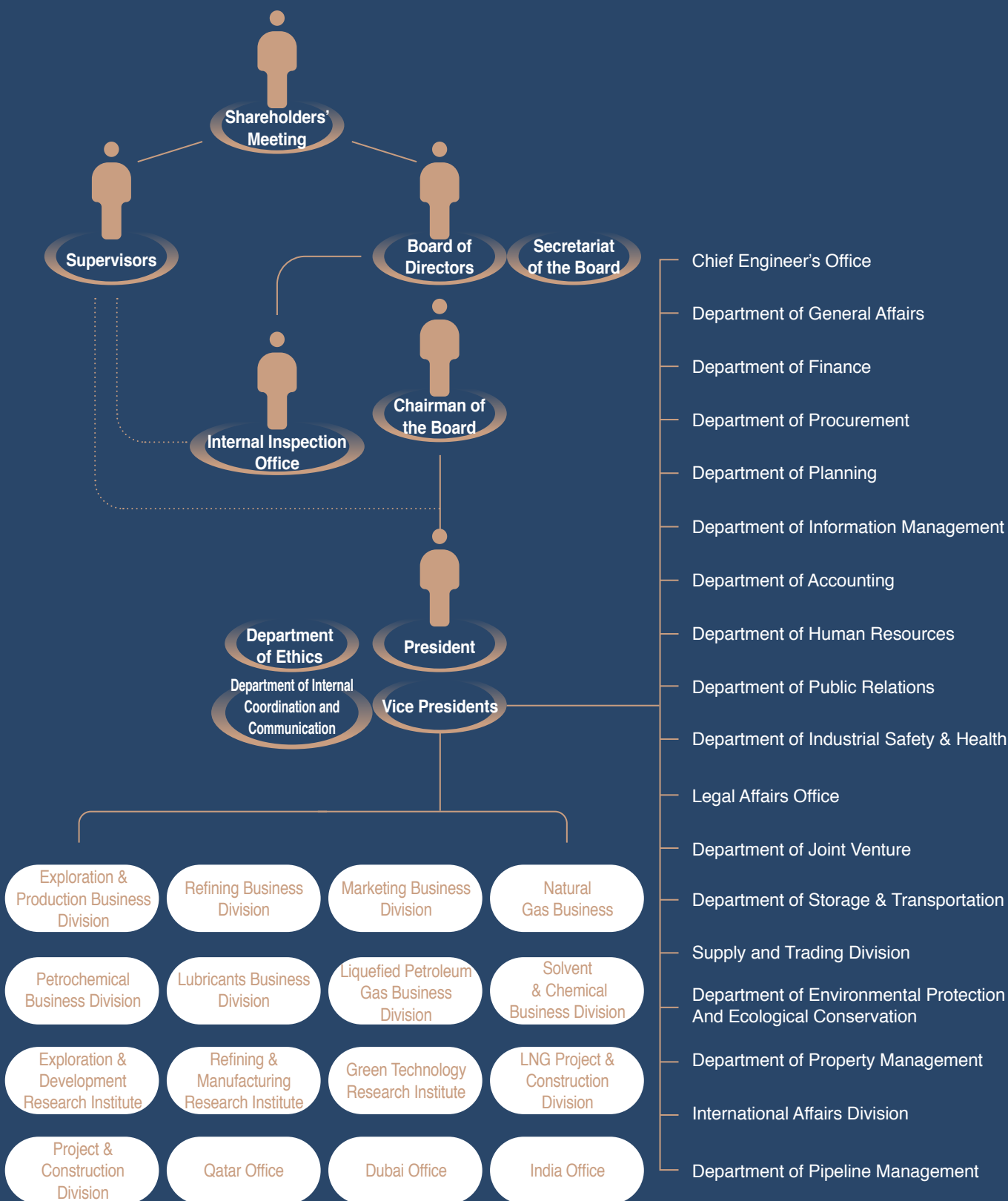
LNG Protect & Construction

Division Rong-Yuh Hwang

Director, Project & Construction

Division Ching-Tang Hung

Organizational Chart



Corporate Officers



Back row: **Ray-Chung Chang**
Spokesman

Frank S. L. Tang
CEO, Exploration & Production Business Division

Front row: **Po-Tung Lo**
Vice Presidents

Michael Chang
Vice Presidents

Jeng-Zen Fang
President

Shun-Chin Lee
Chairman



Back row: **Tray-Shing Chiou**
CEO, Marketing Business
Division

San-Tay Huang
CEO, Petrochemical
Business Division

Hsi-Wen Lee
CEO, Natural Gas
Business

Chin-Jung Hsu
CEO, Refining Business
Division

Front row: **Chia-Shou Chiu**
Vice Presidents

Jane H.J. Liao
Vice Presidents

Huang-Chang Lee
Vice Presidents

Striving for Low-carbon and Renewable Energy

Exploration and Production

Taiwan has limited indigenous energy resources; therefore, it depends on imports for most of its fossil fuel needs. As a result, CPC has cooperated with the government's "furthering energy supply security mechanism and forging international energy cooperation" policy. CPC is dedicated to improving its performance in new energy development, expanding upstream operations, and increasing overseas production, to stabilize the supply of crude oil and natural gas to the domestic market and alleviate the impact of oil price fluctuation.

To improve overall strategic planning, and based on active expansion and focus, CPC has adopted exploration and production strategies that aim to expand overseas operations and exploit domestic operations, simultaneously undertaking mergers and acquisitions and exploration and production, as well as the training of talent for breakthroughs, in the hope of gradually increasing the ratio of self-owned energy reserves within its full sourcing range, moving towards developing low-carbon energy resources.

Planning geothermal power plants per government policy

Currently, the CPC's onshore producing oil and gas wells are located in and around Mt. Tiezhen, Jinshui, Ching Tsaohu, and Guantian. In 2022, they yielded 95.8 million cubic meters of natural gas and 1,868 kiloliters of condensate.





In 2022, following the government's National Renewable Energy Policy, CPC completed a geothermal survey of Hungyie-Ruisui in Hualien County, which covered 72 square kilometers, and a geochemistry study of the area. Also, CPC signed an MOU with Baseload Power, a company developing geothermal power in the same area, to join forces in prospecting and exploration. CPC had already completed the production test of geothermal wells No. 14 and 15 in Tuchang, Yilan, whose geothermal power potential is 1.2MW (a conservative estimate). Building on such foundation, in 2022, CPC completed the drilling and prospecting for well Nos. 16, 17, and 18 in Tuchang, and began planning the CPC-owned 4MW geothermal power plant. In 2023, the company will expand the scope of exploration for two more geothermal wells in Tuchang and prepare for future power generation.

Offshore E&P and CCS

Starting on December 18, 2012, CPC worked with Husky Energy International Corporation to explore the oil and gas potential in the deep-water areas of the Tainan basin. The acquisition, processing, and interpretation of 2D and 3D seismic survey data was completed in 2021. CPC and Husky Energy also completed a joint study with risk assessment basin modeling in 2022 and expect to proceed with preliminary well design in 2023.

Regarding prospecting and exploration in domestic waters, CPC has targeted the Tainan basin, using new technologies to re-process and interpret seismic data and conduct oil and gas potential studies. Additionally, following the government's Net Zero emission policy, CPC is assessing potential sites for carbon sequestration at several basins offshore of west Taiwan. With CPC's vast underwater geological data and exploration experience, the company is formulating short-, mid-, and long-term plans for offshore carbon dioxide sequestration. In the future, there is potential for establishing a large-scale commercial offshore site that not only meets CPC's sequestration needs but also offers a new path for companies in Taiwan to reduce emissions.

**2022 Domestic natural
gas production**



9,580 million cubic
meters

**2022 Domestic
condensate production**



1,868 kiloliters

2022 CPC's overseas E&P Projects



natural gas
441
million cubic meters



crude oil
5.68
million barrels



LPG
59.2
thousand barrels

ongoing
8 countries

10 producing



International collaboration: two new oil and gas concessions

In 2022, CPC was engaged in oil and gas exploration and production joint ventures with international oil companies, participating in ten projects in eight countries. Annual production, including 5.68 million barrels of crude oil, 441 million cubic meters of natural gas and 59.2 thousand barrels of LPG, were allocated to CPC. The oil and gas were from fields in United States of America, Ecuador, Niger, Australia and Chad.

Significant milestones include: Large-scale extraction at the Niger oil fields, aiming for crude oil export soon; the Ichthys Project in Australia, which has continued with the Phase 2 development plan and maintains stable production with good profitability; the Prelude Project in Australia continued its sound LNG production, serving Taiwan's domestic market; the Oryx Field in Chad has consistently maintained a stable oil production level; the Guardfish Project in the U.S. was put into production in June; and the Service Contract of the Block 16 in Ecuador expired on December 31, and relevant facilities were returned to the local government.

Besides the development and production projects stated above, CPC continues to seek exploration and prospecting opportunities for oil and gas. In 2022, CPC completed the contract signing for two new concessions, awaiting approval of local governments.

CPC's upstream business was launched in 1959. Today, it comprises exploration and production in both onshore and offshore oil and gas fields, both in Taiwan and overseas. To date, CPC has yielded over NTD\$ 200 billion in upstream business. Looking to the future, CPC will actively enhance the value of existing assets. Merger and acquisition (M&A) activities will focus on exploration blocks with low risk and assets with potential to increase self-owned reserves. CPC also ventures into renewable energy, developing geothermal power while preparing for carbon capture and storage (CCS). The goal is to become an international oil and gas company with high value-added assets.



Fields under development or now producing

- 1 **Guardfish, U.S**
OAI (50%)
Operator: CalNRG (50%)
- 2 **Block 16, Ecuador**
(The mining contract was due on December 31, 2022)
OPIC (31%)
Operator: Repsol (35%)
SINOPEC (20%)
SINOCEM (14%)
- 3 **Block 17, Ecuador**
OPIC (30%)
Operator: PetroOriental (70%)
- 4 **Agadem, Niger**
OPIC Niger (20%)
Operator: CNPCNP (65%)
The Republic of Niger (15%)



Fields under ongoing exploration

- 5 **Oryx, Chad**
Operator: OPIC Africa (35%)
CEFC (35%)
SHT (30%)
- 6 **Ichthys, Australia**
OPIC Ichthys (2.625%)
Operator: INPEX (66.245%)
Others (31.13%)
- 6 **WA-285-P, Australia**
OPIC Australia (2.625%)
Operator: INPEX (66.245%)
Others (31.13%)
- 7 **Prelude, Australia**
OPIC Australia (5%)
Operator: SHELL (67.5%)
Others (27.5%)
- 8 **East Seram, Indonesia**
OPIC East Seram (40%)
Operator: Balam Energy (60%)
- 9 **Purity, Paraguay**
OPIC Paraguay (50%)
Operator: President Energy (47.5%)
LCH S.A. (2.5%)
- 10 **SL10B/13, Somaliland**
OPIC Somaliland (49%)
Operator: Genel Energy (51%)

Bearing the Responsibility of Maintaining a Stable Domestic Supply

Importing & Refining

As Taiwan's domestic production of crude oil yields only extremely low volumes, CPC needs to import virtually all of the crude it refines to supply its domestic market. To ensure stability, CPC works to both maximize procurement on long-term contracts and diversify its sources of crude.

Crude oil imports reached 138.69 million barrels in 2022: 45.31% from the Middle East, 43.72% from the USA, and 9.06% from Africa. In recent years, low-sulfur crude oil makes up some crude oil imports to meet the more stringent environmental laws.

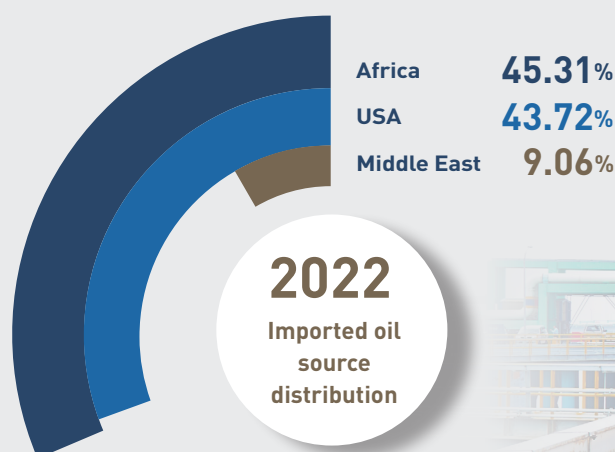
To import crude oil, CPC has installed offshore mooring pontoons to unload large oil tankers at Shalun in Taoyuan and at Dalinpu in Kaohsiung. The company has also built dedicated loading/unloading berths for tankers in the ports of Kaohsiung, Taichung and ShenAo.

Improving quality and offering better products

Currently, CPC's operating refineries in Taoyuan and Dalin can refine 600,000 barrels of crude oil per day. In particular, the Dalin Refinery has four offshore mooring pontoons and ports with which to unload imported crude oil and export oil products. It has a refining capacity is 400,000 barrels per day, while the Taoyuan Refinery's capacity is 200,000 barrels per day. In 2022, CPC's refined product output totaled 9.309 million kiloliters of gasoline, 2.217 million kiloliters of aviation fuel, 5.964 million kiloliters of diesel, 1.899 million kiloliters of fuel oil, and 367 kilotonnes of LPG.

Fulfilling the government's commitment to relocate industrial facilities, the Kaohsiung Refinery ceased production in late 2015, with its crude oil refining activities were transferred to the Dalin Refinery, which was expanded to meet domestic demand. Petrochemical materials supply was made up by the New-No.3 Naphtha Cracker in Linyuan and by imports.

Given the public's concern for the quality of life, Taiwan's standards of environmental protection are increasingly stringent. At the same time, the demand for oil-derived products is growing more diverse. The company has gradually built additional refining facilities, such as reforming units, isomerization units, gasoline/diesel desulfurization plants, and an aviation fuel processing facility, together with normal paraffin, alkylation, and residual fluid catalytic cracking (RFCC) units. CPC also plans to build VDU, SDA units, and aromatic hydrocarbon extraction units to improve production and to offer domestic consumers even better products.



Optimizing refining procedures to meet emission standards

The Environment Protection Administration, (EPA) called for reductions in the sulfur content of gasoline and diesel fuel to under 10ppmw, of the aromatic hydrocarbon content of gasoline and diesel fuel to under 35 vol%, and of the olefin content of gasoline to under 18 vol%, by 2011. By 2008, CPC had constructed a 30,000 barrels per day pyrolysis gasoline hydro-desulfurization unit at the Taoyuan Refinery, a 20,000 barrels per day pyrolysis gasoline hydrodesulfurization unit at the Dalin Refinery by 2009; and a 40,000 barrels per day diesel hydro-desulfurization unit at the Dalin Refinery by 2010. Furthermore, a pyrolysis gasoline production unit with 18,000-barrel-per-day output was moved from the Kaohsiung Refinery to the Dalin Refinery in 2011.

CPC began increasing its heavy oil conversion rate by constructing an RFCC unit with a capacity of 80,000 barrels per day at the Dalin Refinery. CPC also completed its testing and began volume production in 2013. CPC completed testing of the alkylation plant with a capacity of 14,000 barrels per day and began volume production in mid-2013; its operation has increased the value of our product and improved gasoline quality. In addition, to cope with the problem of acidic gas generated in the production process and to reduce polluting emissions, CPC has invested in the construction of a sulfur plant with a daily output of 250 tons, which started to produce qualified sulfur products at the end of June 2014.

The No.3 Residual Oil Hydro-desulfurization Unit at the Dalin Refinery was also expanded to increase its high sulfur crude refining capacity, lowering the cost of crude oil procurement and stabilizing the quality of the RFCC unit's feedstock. The revamped unit began operation in March 2017, increasing production to 40,000 barrels daily.

To cope with the consequences of the Kaohsiung Refinery closure, the Dalin Refinery expanded its capacity to include a 150,000 barrels per day atmospheric crude oil distillation unit (CDU), a 50,000 barrels per day condensate fractionating unit (CFU), a 40,000 barrels per day diesel hydro-desulfurization (DHDS); unit and a 30,000 barrels per day kerosene hydro-desulfurization (KHDS) unit. These units completed performance testing and began mass production in 2018, eliminating concerns of raw materials shortages (due to the closure of the Kaohsiung Refinery) needed for the survival and future development of Taiwan's petrochemical industry. With the completion of that expansion project, the capacity of the Dalin Refinery was boosted from 300,000 barrels per day to 400,000 barrels per day at present, raising CPC's overall daily crude oil refining capacity to 600,000 barrels per day.



To improve the refining configuration of the Dalin Refinery, meet the IMO 2020 standard's requirements for marine fuel oil, cater to the increasingly strict environmental regulations for air pollutant emissions in Taiwan, and strengthen its competitiveness in the asphalt market, CPC plans to construct a vacuum distillation unit (VDU) and a solvent deasphalting (SDA) unit at Dalin Refinery, along with Polymer-Modified Asphalt and asphalt cutback production facilities, asphalt storage facilities, an asphalt blending system, and a revamping of the No.9 diesel hydrodesulfurization unit and associated equipment. CPC aims to increase its competitiveness domestically and overseas through these efforts.

Reduction of benzene in gasoline to improve product quality

With the awareness of the need for environmental protection and concerns over air pollution, the EPA has enforced stricter standards for automobile gasoline. Since July 1, 2020, benzene levels in petroleum have gradually been reduced from 1.0 vol% to 0.9 vol%. The EPA plans to reduce benzene to less than 0.8 vol% in the future. In response to energy transition and the regulatory limits for the benzene content of gasoline, CPC first invested in the project to create a 0.3 wt. % ultralow sulfur fuel oil and asphalt cutback production center. In 2020, CPC proposed an investment plan for gasoline production for high-quality products with reduced benzene content. The company will build a unit to extract aromatics content from pyrolysis gasoline with a capacity of 32,000 barrels per day (including an aromatization unit) and its accessory equipment, including storage tanks and utility systems, to make its gasoline products comply with regulatory requirements and to increase the competitiveness of CPC and its products in both domestic and overseas markets.

Investing in CCS and planning demonstration sites

Since COP26, achieving net zero emissions by 2050 has become a global commitment, and the Taiwanese government also published "Taiwan's Pathway to Net-Zero Emissions in 2050" in 2021. Following this framework, CPC formulated the three strategies – optimizing refining operations, reducing carbon emissions, and developing clean energy. It has taken the initiative to research carbon capture (CC) and survey potential sites for carbon sequestration (CS) since 2021. The company plans to build a demonstration plant for carbon capture at the Dalin Refinery to further its contribution to sustainability.



CPC in Petrochemicals

CPC's major petrochemical production facilities are its Linyuan Petrochemical Plant, run by the Petrochemical Business Division, and the Taoyuan and Dalin refineries, operating under its Refining Business Division. The RFCC units in the two refineries at Dalin and Taoyuan produce propylene products, while the naphtha crackers and butadiene extraction units at the Linyuan Petrochemical Plant produce ethylene, propylene, and butadiene products. Aromatics extraction units produce benzene, toluene, and mixed xylene. Currently, CPC's annual production capacities for basic petrochemical raw materials are 1.07 million metric tons of ethylene, 1.194 million tons of propylene, 158 thousand metric tons (KTA) of butadiene, 274 KTA of benzene, 321 KTA of toluene and 507 KTA of mixed xylene.

As a pioneer of the upstream petrochemical business in Taiwan, CPC has continued to invest in various upstream petrochemical businesses to drive the development of the domestic petrochemical industry, which has contributed to the economic miracle of Taiwan. In recent years, it has been dedicated to equipment upgrades and capacity expansion to reduce the petrochemical raw materials supply shortage. In 2005, CPC implemented the "New No. 3 Naphtha Cracker" project at the Linyuan Petrochemical Plant, with an investment of over NT\$40 billion. This new No. 3 Naphtha Cracker started to produce ethylene that meets specific standards in 2013 with an ethylene capacity of 720 KTA, propylene capacity of 370 KTA, and butadiene capacity of 100 KTA. It supplies petrochemical raw materials to both downstream businesses in Linyuan Industrial Park and Renda Industrial Park, whose supply was initially provided by the No.5 Naphtha Cracker, creating economic benefits worth around NT\$100 billion annually. CPC plans to evaluate the expansion of petrochemical production capacity based on market demand to fully supply basic raw materials for not only daily commodities but also high-tech industries.

Refining-petrochemicals integration with low-carbon transformation

In response to the growth of the global electric vehicles market and in support of the government's energy transition policy, CPC has conducted the integration of its refining and petrochemical businesses, reduced its production of gasoline and diesel, and has produced more chemicals. In addition, CPC has reduced the severity of pollution from its plants, decreased the energy consumption of its operations. It has strengthened safety at its facilities through the supply of raw materials among different business units, and its plan to create a synergy of its resources and public facilities through high-degree integration. In addition, CPC is evaluating the implementation of carbon capture, utilization, and storage technology (CCUS) to establish a low-carbon operation.

Strategy for optimizing refining operation and converting fuel into new materials

CPC actively complies with the government's Circular Economy Policy by transforming petrochemical by-products used as fuel or previously regarded industrial waste into value-added products. For example, CPC uses the heavy oil from naphtha crackers to produce soft-carbon material for lithium battery manufacturing, and purifies Dicyclopentadiene (DCPD) from pyrolysis gasoline to be used in wind turbine blades. Meanwhile, CPC will continue to assess carbon capture and utilization (CCU) technologies and develop value-added products.

Facing the energy transition challenge, CPC remains steadfast in sustainable operation, striving for success for Taiwan's energy, economy and environment.



Marketing CPC Petroleum Products

CPC’s marketing of refined petroleum products in its domestic market primarily focuses on the transportation sector—specifically gasoline, diesel, fuel oil, and aviation fuel. In 2022, its sales of those products in Taiwan totaled 16.59 million kiloliters in volume and generated approximately NT\$ 421.8 billion in revenue. Automotive gasoline accounted for the largest share at around 50.1%, followed by diesel at about 26.8%, fuel oil at about 14.3%, and aviation fuel at approximately 8.8%.

Taiwan’s internal market for refined petroleum products is divided chiefly between CPC and the Formosa Plastics Group, and competition has grown increasingly intense. CPC has worked hard at leveraging the advantage of its marketing network and protecting its market share by consolidating its gas station network. Of the 2,519 stations operating in Taiwan at the end of 2022, CPC and other parties directly ran 623, and 1,302 were privately owned by CPC franchisees, adding up to 1,925. Their sales as a part of the total market volume break down as 79.6% gasoline, 77.2% diesel, 96.4% fuel oil, and 60.3% aviation fuel, with the overall market share being 77.5%.

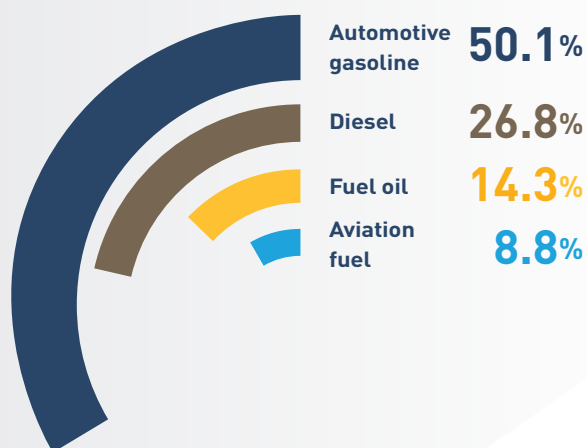
Storage and transportation network meets the requirements of all areas

In terms of storage and transportation, CPC not only runs its own gas stations, but also operates aviation fueling stations at all of Taiwan’s airports: Songshan, Taoyuan, Kaohsiung, Taichung, Hualien, Taitung, Kinmen, and Penghu. Around the coast, it has marine bunkering stations for international vessels at Keelung, Suao, Taichung, Kaohsiung, and Hualien ports.

As of the end of 2022, CPC operated 13 product distribution centers located country-wide at Keelung, Shimen, Taichung, Taichung Harbor, Wangtian, Minxiong, Tainan, Fengde, Qiaotou, Suao, Hualien, Huxi, Kinmen and Matsu. They supplied products to gas stations in their surrounding areas with a total of 18,732,000 kiloliters of products over the year. CPC has three chemical analysis centers/petroleum laboratories in Keelung, Taichung, and Kaohsiung, plus six testing laboratories, which test products for quality control, and altogether these handled 31,288 samples in 2022. The transportation department transported 11,825,000 kiloliters of oil in 2022; the total distance covered was 40,642,000 kilometers.



2022 Proportion of each oil product/
sales revenue





Optimizing services with diverse and mobile payment

In terms of gas station operation, CPC is unquestionably the market leader by virtue of offering the consumers superior-quality services across the board that differentiate CPC from its competitors. The company has leveraged its service advantage by implementing total customer experience management which has created and maintained a culture of hygiene of lavatories, vigorously promoted VIP membership cards, introduced new business lines and services in line with contemporary trends, and reinforced customer relationship management. CPC has taken the lead in offering card-based self-service refueling as a means of lowering operating costs and working around the difficulty of recruiting filling station attendants. At the same time, as promoting a multi-service business model featuring a diversity of offerings, the company has boosted non-operating income by strengthening cross-industry alliances.

Because of the popularity of mobile payments, CPC introduced and promoted contactless payment (Near-field Communications, NFC) in June 2018. To optimize the mobile payment program, CPC's own payment tool, CPC Pay, was released on November 12, 2019. It can be considered a pioneer of an app exclusively designed for making mobile payments at gas stations. CPC Pay combines diverse functions, such as payment, member services, special offers, and vehicle-related services. Users can access a variety of information efficiently using CPC Pay.

To provide customers with a variety of ways to pay, since July 15, 2020, CPC gas station customers can use six third-party payment services for e-payment transactions at the full-service areas: LINE Pay, iPASS MONEY, Pi Mobile Wallet, JKOPay, O'Pay, and GAMA PAY. CPC Pay has allowed users to add VISA/MasterCard/JCB credit cards since December 29, 2020, to make payments. It has been optimizing the features of CPC Pay. With CPC Pay promotional campaigns, customers are more willing to use CPC Pay and have a more robust brand identification with CPC Taiwan.

Following the government's mobile payment policy, the company allowed Taiwan Pay (debit card/debit account only) since March 31, 2021. CPC also installed wireless barcode readers in gas stations so that customers could make payments without stepping out of their cars, making it more convenient.



Gas and charging stations offering comprehensive services

The multi-service business model for gas stations comprises the provision of car-washing, quick maintenance, CUP&GO coffee, on-site convenience stores, and the sale of superior-quality products. In response to the green energy policy, we are actively developing charging and swapping stations for electric vehicles. We have met the goal of building one thousand stations by the end of 2022. As of 2022, there are 273 stations offering car washing services, 66 stations offering quick maintenance services, and 123 stations selling CUP&GO coffee. In 2022, the gross profit of the diversification business exceeded NT\$1.36 billion. In particular, CPC intake valve cleaners for cars and diesel vehicles sold 2.44 million bottles, while the sales of eco-friendly laundry detergent and dishwashing detergent reached 1.21 million bottles. Holiday gift boxes set a sales record of 186,000 boxes, and more than 1.22 million cups of CUP&GO coffee were sold. This fully demonstrates the channel value of gas stations, and diversified services have been recognized by customers.

Regarding customer service, in 2000, CPC set up the 0800-036-188 customer hotline to coordinate the handling and response of customer issues after integrating various professional services provided by different internal units. The 1912 CPC service hotline came into use in 2011; an English-language service was added in 2020, a Taiwanese-language service in 2021, and a Hakka service in 2022, expanding the company's communication with the public.



Green gas stations Environmental inclusion and mutual benefit

The global trend toward environmental protection has led to the popularity of sustainable, green buildings. Various terms “ecological buildings” in Japan, “eco-buildings” or “sustainable buildings” in Europe, and “green buildings” in the USA and Taiwan, they all aim to protect ecological systems, encourage a mutually beneficial relationship between buildings and the environment, conserve energy and reduce both pollution and overall environmental impact. These sustainable design and green concepts align with CPC’s dedication to achieving sustainability in its operations. CPC launched a program to green its gas stations in 2013. As of December 2021, 70 gas stations had received “green building” certification.

In 2021, to support the United Nations’ World Toilet Day, CPC launched the “CPC gas stations, going to the Toilet is easy” campaign, which invited employees, employee family members, and franchise partners to help clean up the public toilets at gas stations. In 2021 and 2022, all public toilets at CPC-owned gas stations were rated Excellent.

Location Of CPC Gas Stations With ‘Green Building’ Certification



Diamond Level

- Badu Gas Station (Keelung City)
- Guishan Station (Taoyuan City)
- Xinzhuangzi Station (Hsinchu County)
- Kenting Station (Pingtung County)
- Fengang Station (Pingtung County)
- Matai’ an Station (Hualien County)
- Houbi Station (Tainan City)
- Guangzhou Station (Tainan City)
- Ziqiang Road Station (Miaoli County)
- Danhai New Town Station (New Taipei City)
- Puyan Station (Changhua County)

Gold Level

- Guiren High Speed Rail Station (Tainan City)
- Heping Station (Taichung City)
- Wugu Industrial Park Station (New Taipei City)
- Dongshan Road Station (Taichung City)
- Yunhe South Road Station (Kaohsiung City)
- Qianfeng Station (Tainan City)
- Yongan Station (Kaohsiung City)
- Anping Fort Station (Tainan City)
- Tsaotun XinFeng Station (Nantou County)

Silver Level

- Bailing 4th Road Station (Taipei City)
- Badu Gas Station (Keelung City)
- Tai Po Station (New Taipei City)
- Shinyuan Station (Pingtung County)
- Shengchang Road Station (Tainan City)
- Changzhi Station (Pingtung County)

Bronze Level

- Dazhi Station (Taipei City)
- Qiaotou Station (Kaohsiung City)
- Zhongzheng 3rd Road Station (Kaohsiung City)
- Minhua Station (Hsinchu City)

Certified Level

- Muzha Station (Taipei City)
- Luzhou Station (New Taipei City)
- Tingzhou Road Station (Taipei City)
- Xizhi Station (New Taipei City)
- Binjiang Dazhi Station (Taipei City)
- Xinsheng North Road Station (Taipei City)
- Changhua Zhongshan Road Station (Changhua County)
- Taishan Station (New Taipei City)
- Sanzhi Station (New Taipei City)
- New Hukou Station (Hsinchu County)
- Beipu Station (Hsinchu County)
- Nanchuang Station (Miaoli County)
- Emei Station (Hsinchu County)
- Dadu Station (Taichung City)
- Fenyuan Station (Changhua County)

- Jhonghe Station (New Taipei City)
- Huanhe South Road Station (Taipei City)
- Jhonglun Station (Taipei City)
- Guanyinsanhe Station (Taoyuan City)
- Dasi Station (Taoyuan City)
- Jianlong Station (Taoyuan City)
- Guangfu Station (Hualien County)
- Linnei Station (Yunlin County)
- Jhuangwei Station (Yilan County)
- Yunlin Dongshih Station (Yunlin County)
- Bali Station (New Taipei City)
- Qian zhen Station (Kaohsiung City)
- Da feng Station (New Taipei City)
- Gongguan Station (Miaoli County)
- Fuyang Street Station (Taipei City)
- Wangli Station (New Taipei City)
- Sawulun Station (Keelung City)
- Xinwu Station (Taoyuan City)
- Kwanshang Station (Taitung County)
- NanJing Station (Jiayi County)
- Jianshi Station (Hsinchu County)
- Baoshan Station (Hsinchu County)
- Puxin Station (Taoyuan City)
- Xihu Station (Miaoli County)
- Tungluo Station (Miaoli County)



Natural Gas Supply

CPC promotes natural gas as the fuel of the future, in keeping with Taiwan's policy aim of energy diversification. It is based on its inherent advantages in terms of high thermal efficiency, low pollution profile, and convenience that allows for safe handling. A new era of clean energy for Taiwan was ushered in with the completion of the country's first LNG receiving terminal in Kaohsiung's Yongan District in 1990, and a second-phase expansion project was completed in December 1996, boosting the capacity to 4.5 million tons annually; A third-phase expansion project to satisfy demand from independent power producers (IPP) as well as consumer and industrial end-users in northern Taiwan commenced in July 1996. In addition to terminal-area expansion, this involved laying a 36-inch diameter, 238 km long undersea pipeline from the Yongan plant to Tongxiao. Its completion in December 2002 expanded CPC's annual LNG handling capacity to 7.44 million tons.

Constructing a business network that increases operation capacity

With the primary purpose of supplying natural gas to the Taiwan Power Company (Taipower), industrial firms and household users in central and northern Taiwan, CPC built a LNG receiving terminal sited close to Taichung's Port West Pier 13 and the hinterland, with capacity of three million tons; three LNG storage tanks each of 160,000 kiloliter capacity; gasification and gas supply facilities; and a 135-kilometer, 36-inch sea long-distance gas transportation pipeline from Taichung Harbor through the Tongxiao distribution center to the Datan metering plant. This plan was launched on July 13, 2009. The recently-completed Taichung LNG Terminal Phase II Investment Project calls for the construction of three additional 160,000 kiloliter above-ground storage tanks, plus another gasification facility at the terminal itself; a 26-inch, 21.8 km terrestrial gas pipeline between the terminal and the Wuxi Separation Station; and a further switching station linked to the existing 26-inch pipeline at the Wuxi site. The project will boost the annual LNG handling capacity of the Taichung terminal to over six million tons and ensure a stable, dependable supply of natural gas during the winter's often inclement monsoon period, as well as and partly because of greater storage capacity in terms of the number of days' supply of LNG on hand.

Currently, Taiwan government policies to phase out nuclear power plants and to reduce greenhouse gas emissions mandate 50% of Taiwan's total electricity to come from natural gas by 2025. To help reach this target, CPC will lease Wharves 11 and 12 and their associated facilities from the Port of Taichung to create the Taichung LNG Terminal's second dedicated LNG-unloading wharf. Execution of its Phase III expansion module will add two 180,000 kiloliter above-ground storage tanks and their associated gasification plant. These projects are expected to improve the unloading energy and gas supply stability upon completion.

Natural gas transmission and distribution system comprised of



2,226 kilometers of terrestrial trunk pipeline

Total domestic sales of natural gas in 2022



26.54 billion cubic meters



In order to comply with the “Capacity of Self-provided Storage Tanks for Natural Gas Production or Import Enterprises” revised on August 27, 2019, and the requirements to increase the number of storage tank capacity days and business inventory days year-on-year, CPC will continue with the Taichung Receiving Terminal New Pier & Terminal Expansion exterior Taichung Harbor Investment Project (which will add four above-ground full-capacity 180,000 kiloliter LNG storage tanks, gasification facilities, and two LNG-unloading wharves and other related facilities). After completion of the land reclamation of the North Reclamation Area (III) and the South Reclamation Area (IV)-2, the Nanti Rd.-crossing pipelines will connect to the existing plant area to support each other. It is expected that after the completion at the end of 2028, the overall equipment utilization rate can be reduced and the gas supply stability and safety can be improved. In addition, it is planned to build LNG receiving terminal in the second area of Dalin Petrochemical Oil Storage and Transportation Center (second phase of Intercontinental), including one LNG unloading dock, four 180,000 kilolitre above-ground storage LNG tanks, related regasification facilities and the gas transmission pipeline. It is expected to be completed by the end of 2031. Yong-An LNG receiving terminal can be back by Intercontinental LNG receiving terminal. So the equipment utilization rate of Yong-An LNG receiving terminal can be reduced, and improve the stability of gas supply.

CPC has constructed an extensive natural gas transmission and distribution system on Taiwan's western side. It comprises approximately 2,226 kilometers of terrestrial trunk pipeline, extending from Pingtung in the south to Keelung in the north; and which includes eight supply centers, one transfer center and 50 distribution stations along its length. Current plans are centered on the goal of constructing interlocking ring-shaped networks to produce a figure-of-eight configuration. This will involve laying down a 238-kilometer undersea pipeline from the Yongan LNG Terminal to Tongxiao and a 500-kilometer terrestrial pipeline onwards from Yongan to Taoyuan. In addition, after the 36-inch undersea gas pipeline from the Taichung LNG plant to Datan power station has come on stream, it will be linked with terrestrial pipelines in central and northern Taiwan to form another circular formation, thus completing the planned island-wide, integrated figure-of-eight natural gas transmission network.



Building the Guantang LNG Terminal, ensuring a comprehensive gas supply system

In compliance with government policies to phase out nuclear power plants and to create an environmentally-friendly, low-carbon environment, CPC plans to set up three gas-fired generating units at Datan Power Station. To generate abundant energy for Datan Power Station, the commodity sectors in the north and other customers of the power station, CPC plans to set up a third LNG terminal in Kuantang Industrial Centre, comprising reception facilities which can hold up to three million metric tons of import quantum, two LNG storage tanks each of 160,000 kiloliter capacity; gasification and gas supply facilities to connect with the existing gas supply system.

CPC's Third LNG Receiving Terminal project got under way in 2016 and is currently scheduled to come on stream in June 2025. In the future, with the three terminals-one each in northern, central and southern Taiwan-supplying natural gas to users in their respective areas, there should be some reduction in the cost and risk of transmitting gas over long distances. The figure-of-eight combined undersea and terrestrial gas pipeline network will enhance both the safety and stability of gas supply through its transfer and backup functions. The completion of this third LNG receiving terminal project will enable CPC to construct and operate a national level natural gas supply system that is fully functional, stable and safe.

Towards net zero, introducing carbon-neutral LNG

As a first approach toward energy transition and net zero, CPC imported carbon neutral LNG cargo since 2020. To ensure the credibility of the net zero products, high quality nature-based carbon credits have been used to offset the overall greenhouse gas (GHG) emissions of the relevant LNG cargo, including exploration, transmission, liquefaction, shipping, regasification, distribution and end-use. From 2021, CPC's carbon neutral natural gas has been certified as carbon neutral product in accordance with PAS2060. Carbon neutral natural gas can be an alternate net-zero solution for our downstream customers in Taiwan.





Global strategy for a stable gas supply

CPC has devoted considerable efforts diversifying its sources of LNG imports to ensure a stable supply of natural gas for Taiwan. The source of LNG imports is all over the world, including the Middle East, the Asia-Pacific region, Australia, North America, Central and South America, Africa and Europe.

In 2021, CPC imported most of its LNG from Australia, Qatar, the United States, Papua New Guinea and Indonesia.

2022 Distribution of sources of LNG imports

● The United States

Distance: 10,520 nautical miles
Shipping Time: 27.4 days (via Panama Canal)

● Qatar

Distance: 5,285
nautical miles
Shipping Time: 13 days

● Australia

Distance: 2,275
nautical miles
Shipping Time: 5.9-7 days

● Papua New Guinea

Distance: 2,835
nautical miles
Shipping Time: 7.4 days

● Indonesia

Distance: 1,470
nautical miles
Shipping Time: 3.8 days

● Malaysia

Distance: 1,345
nautical miles
Shipping Time: 3.5 days



Other Products

Liquefied petroleum gas — Supporting government policy in absorbing the impact of surging prices

CPC's long-standing monopoly in the LPG market was ended when the government opened it up to competition in 1999. Formosa Petrochemical Corp. began competing with CPC as a producer and importer. In response to market competition, CPC has maintained its leading market share in the household gas market by using its quality advantages, north-south transport links, storage systems, comprehensive marketing, retail network, a full grasp of international market price fluctuations, and reductions in procurement costs. In selling industrial gas, the company aims to raise the quality of its customer service and promote its products' value to both retain existing customers and win new ones.

As a state-owned enterprise, CPC Taiwan undertook its mission to stabilize prices. In 2022, CPC kept LPG prices unchanged to mitigate the impact of surging prices on industries and households in Taiwan. CPC also complied with the government's safety reserve policy to increase storage tank turnover rate and revenue. Meanwhile, the company endeavors to reinforce occupational safety and environmental protection protocols, fulfilling its mission to stabilize domestic LPG supply and deliver operational performance.

CPC LUBRICANTS — The BEST strategy that focuses on transition and development

CPC's Lubricants Business Division (LBD) was founded on March 16, 1999. CPC is now the leader in Taiwan's lubricants market with two brands: CPCLUBE ("a brand with mission") and Mirage ("professional automotive lubricants"), and it sells its products to both domestic and overseas consumers.

CPC currently has more than 30 distributors, more than 600 CPC-owned gas stations, and distribution partnerships with major wholesalers in Taiwan. It offers the most comprehensive, convenient, and diversified distribution and services. Meanwhile, CPC is also actively exploring the Asia-Pacific and African markets, with operating offices and direct clients in China, Vietnam, Philippines, Indonesia, Myanmar, India, Thailand, Australia, Congo, and Suriname. To break through the ASEAN tariff barrier to non-members, CPC has worked with a domestic warehousing company to set up Maxihub Corporation in Vietnam's Tong-Nai Province as a joint venture, which officially began commercial operation in 2022, operating a petrochemical storage terminal and lubricant blending plant. The joint venture enjoys preferential tariffs for ASEAN members and the advantage of local production.

Facing the global trend of going green, CPC Lubricants Business Division adopted a "BEST" strategy focusing on Bio, ECO, Synthetics, and Total solutions in its transition. The division developed bio-lubricants made by non-petrochemicals and lubricant products specifically for wind turbines. It uses completely synthetic base oils, and improves the functionality and durability of lubricant products with innovative technologies. CPC also manufactures packaging and bottles using recycled plastic to reduce waste and pollution, while using new technology to maximize production efficiency.





As electric vehicles become more popular, the automotive lubricant market is shrinking. Thus, marine engine oil has become a new focus for the Lubricants Business Division. CPC now has more than 70 products that have received critical international certification, recognized by companies including MAN ES, WinGD, Wartsila, YANMAR, J-ENG, MTU, Bosch Rexroth, and Parker Denison. The Lubricants Business Division won the Best Product Award from the National Brand Yushan Award for four consecutive years (2019 to 2022). CPC lubricants won the Reader's Digest Trusted Brand Gold Award in the Lubricant subcategory, and in 2022 won the highest accolade of the Platinum Award. These honors show that CPC lubricant products are widely recognized worldwide.

SOLVENTS & CHEMICALS — Responding to growing demands and expanding the export business

CPC Solvent & Chemical Business Division was established in April 1999. It mainly produces petroleum solvents, additives for refinery processes, and various products in small packages at the Chiayi plant. The Division outsources the production of specialty coatings to a producer in Kaohsiung. In terms of sales, its four major product lines include asphalt, solvents, chemicals, additives, and coating for storage tanks and pipeline equipment.

The asphalt products the Division produces are high-quality, have a good reputation, and are mainly used for domestic pavement projects. In 2022, it took about 55% domestic market share. In response to climate change, the Division has continued to produce Polymer-Modified Asphalt that can adapt to high temperatures and wet weather, and it has invested in new asphalt storage tanks in recent years to enhance its asphalt production and storage system further and improve domestic road quality.

Solvents produced by the Division include Aliphatic Hydrocarbon solvents, aromatics solvents, dearomatized aliphatic hydrocarbon solvents, toluene, mixed xylene, and various products in small packages. Thanks to its sound development capabilities and technologies, complete transport and storage system, and the quality of its premium products, the Division had about 58% market share in 2022. It is the market leader in the domestic petroleum solvents industry.

Chemicals produced by the Division include normal paraffin, octene dimate, methanol, and others. In particular, its normal paraffin has not only been sold to domestic detergent producers as a raw material, but it has also been exported to China, India, the U.S., and some European countries during the COVID-19 pandemic, successfully expanding its business territory by satisfying the needs of different international customers with adjustments to the product ingredients.

To meet processing needs and occupational safety and environmental regulations, CPC has developed its own additives and specialty coatings to meet the maintenance and operational needs of its refineries to reduce operational risk for manufacturing equipment. In 2019, 2020, and 2022 CPC's intake-system cleaners, fluorinated paint, and the De-aromatized Aliphatic Hydrocarbon Solvent D80 won the National Brand Yushan Award for Best Product.

CPC has actively integrated the sales channels of its specialty chemicals and solvent products, refined its services to improve its product quality and image, and has committed itself to the development of new green products and new business in the pursuit of sustainable development, in line with the international community's continuing push for carbon-reduction.



Safety and Health As a Priority While Pursuing Environmental Sustainability



Industrial Safety & Health

Petroleum products and natural gas are highly flammable substances. In handling them, CPC places heavy emphasis on industrial safety and health, as well as on fire prevention, to maintain continuity in operations and to prevent harm to employees, local communities, and the property of local people. Apart from compliance with Taiwan's relevant laws and regulations, CPC has also drafted – and strictly enforces – its own safety and loss prevention protocols by reference to those of advanced countries in Europe, the United States, and Japan. Such protocols have been suitably adapted to reflect local conditions and operational characteristics.

Enhancing occupational safety management with risk control as a priority

Industrial safety is the key to the continued sustainable future of CPC. To achieve the 100% industrial safety goal, with no accidents at all, CPC has constantly and actively strengthened its safety culture by implementing a policy based on safety disciplines, “All staff safety awareness, risk management, and health care.” CPC's industrial safety performance has been recognized by broader society; it also often receives the annual Excellence in Organizational and Personnel Promotion of Occupational Safety and Health award from Taiwan's Ministry of Labor.

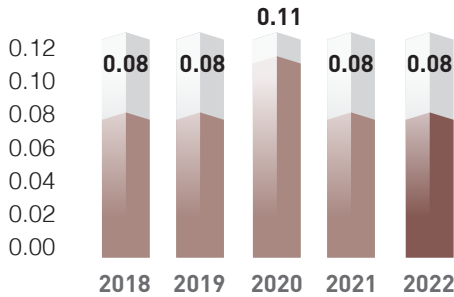
The company has continued to raise awareness of issues to both its employees and external vendors in the interest of creating a safe and comfortable working environment through a collective effort. In line with its emphasis on a culture of industrial safety, CPC is putting particular effort to focus on the following points:

- Implementation of the Taiwan Occupational Safety and Health Management System (TOSHMS) and continuous improvement concerning its operational environment. CPC received ISO45001 reversion verification, aligning with international norms. To reinforce industrial safety practice mandates, CPC has established inspection and auditing teams to go onto construction sites for unscheduled on-site inspection and auditing, and to set out the “Management procedures for safety and health of contractors” and the “Guidance on safe work permit.” CPC has also established a contractor evaluation system to urge the implementation of self-management and reduce occupational accidents among their employees on CPC sites.
- In conjunction with the implementation of occupational safety laws, CPC conducts periodic reviews of industrial safety and health rules and continuously reviews and revises standard operating procedures.
- CPC is strengthening industrial health management protocols, scheduling regular employee health checkups, analyzing and tracking those health checkup results, promoting a healthy lifestyle, and emphasizing the importance of employees' mental health.
- CPC is implementing risk management and process safety management (PSM) and establishing equipment safety management processes – a periodic, regular, thorough inspection of oil tanks and pipelines and the installation of monitors and leak detection systems along their extended sections.
- CPC is strengthening fire prevention and response capabilities, organizing local joint emergency response teams, and ensuring that personnel, facilities, and emergency response and rescue equipment are all available and applicable to all units to minimize losses due to fire and other disasters.
- CPC is implementing on-site safety inspections with graded results, continuously improving systems, equipment, and implementation by observing their preparedness and raising awareness of the importance of industrial safety disciplines.
- CPC is empowering industrial safety inspections team with senior managers using “management by walking around,” professional industrial safety inspections, pre-operational industrial safety inspections of new and renovated workplaces, and tracking all deficiencies discovered through the information system until remedial improvements have been completed.
- Planning and executing health and safety training and awareness programs, developing and providing online study courses, establishing an industrial safety test-question database, and compiling and publishing industrial accident case study-based teaching materials.
- Based on classifying the identified emergencies, CPC is developing a plan for various emergency response drills, and emergency simulations to strengthen contingency and disaster prevention capacity are regularly conducted. In 2022, CPC conducted 345 disaster prevention drills, including six no-warning emergency response drills and four large-scale emergency response drills.

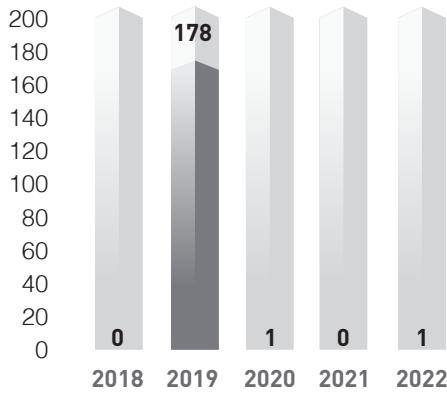
CPC's occupational accident statistics for the past five years



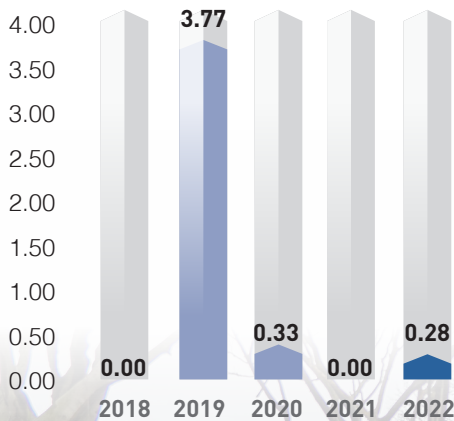
Frequency of Disabling Injury



Severity of Disabling Injury



Occupational Injury Frequency-Severity Index



Continually improving and utilizing technology

In 2022, CPC investigated and analyzed all workplace incidents and accidents to find the root causes, drew up action plans, improvement plans, and scheduled follow-ups. The action plans and improvement plans are as follows:

Action plans

- Implementing PSM in CPC: Five critical facilities in Linyuan, Dalin, Taoyan, Yongan, and Taichung were individually establishing PSM as a first step. The next step is to implement comprehensive implementation to all manufacturing units in CPC.
- E-management: CPC has introduced digital platforms, which allow construction workers to provide work permits and allow inspectors to confirm tasks by computer, mobile phone, or tablet, to work efficiently and safely.
- Enhancement of training for contractors: we have enhanced safety and technical training for contractors on high-risk operations, including three-in-one scaffolding safety training; equipment dismantling training; and aerial work platform safety training. Only qualified contractors who have completed the training can start work for CPC.

Improvement plans

- Procurement control: CPC has strengthened its review of job description documents for contractor procurement. By utilizing the expanded procurement mechanism and extending contracts with contractors with better records, CPC aims to encourage contractors to conduct self-management.
- Utilization of AI technology: CPC has utilized technology tools to improve its contractor management performance. For example, integrating work permit and contractor access control, and installing a CCTV system that monitors operation and site safety, and automatically identifies safety violations.





Pollution Prevention and Environmental Protection

To fulfill its corporate responsibility, CPC has long been dedicated to various environmental protection efforts, including improving wastewater disposal, air pollution, waste treatment, and limiting the contamination of soil and groundwater. CPC implements environmental protection policies, actively prevents pollution, and strengthens the control of the sources of pollution. The company utilizes low-pollution production processes and the latest pollution control facilities. CPC also uses the best available control technology (BACT) and equipment to reduce pollution caused by the production, transportation, and storage processes of its new projects.

Ecological protection with tangible results

In recent years, CPC has further deepened its commitment to ecologically restorative measures that include improving the quality of its petroleum products, reducing energy consumption and waste, and adapting to climate change. Since 1995, all of the company's business units have introduced the ISO 14001 standard of the environmental management system. As of the end of 2022, 24 business units had received official certification. In response to the global trend, in 2004, CPC deployed an environmental accounting system to improve its environmental protection performance.

In all its development projects, CPC has followed through on commitments written into the respective environmental impact assessments (EIA). It has introduced appropriate environmental protection measures in response to the potential risks posed by specific development undertakings. It also maintains a comprehensive monitoring system to protect environmental quality and biological diversity around its facilities. As a result, CPC's air pollution emissions are better than the quality level stipulated in the current national environmental protection regulations, improving the company's performance in environmental protection.

Regarding ecology preservation, CPC has set up the Guantang Industrial Park (Port) Ecological Preservation Committee on November 7, 2018, for consultation and review of its environmental protection efforts and achievements, aiming to achieve the goals of marine environmental conservation and sustainable community development. Six stations have been set up throughout Taiwan to monitor algal reef ecology. In 2022, the Taoyuan algal reefs' coast survey results showed that there were 39 algal species in total: 17 macroalgae and 22 crustose coralline algae. Regarding the number of algal species in each area, Guanxin Algae Reef ranks top with 34 species. In comparison, there are 33 species in Datan Algae Reef and Baiyu Algae Reef, respectively. When it comes to macroalgae specifically, Guanxin and Datan have 15 species, while Baiyu has 14. On crustose coralline algae, Guanxin and Baiyu both have 19 species, while Datan has 18.

In addition to regularly surveying algal reef ecology, CPC has completed habitat restoration for little terns since 2019. CPC has worked with the Wild Bird Society of Taoyuan and the Taoyuan City Government, and the reproductive success rate has increased significantly from 17%-30% to 68% recently. In 2022, the reproduction success rate for little terns in Taoyuan increased to 72%, which shows that CPC has spared no effort in ecological conservation. The company's partnership with environmental organizations has yielded tangible, fruitful results.

Significant reduction of greenhouse gases and carrying out climate risk assessments

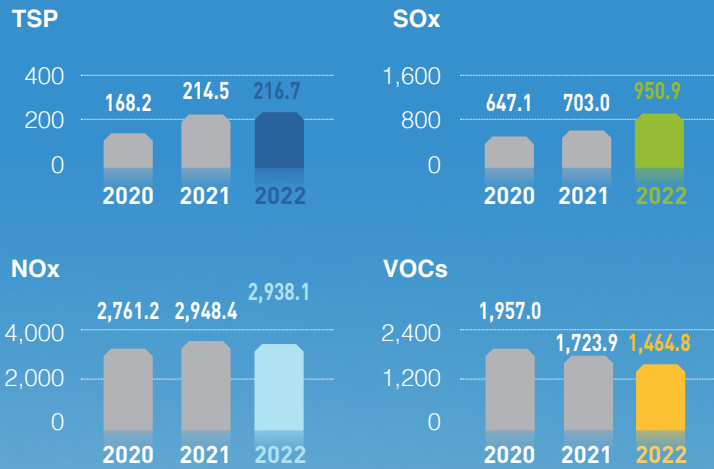
Taiwan's Greenhouse Gas Reduction and Management Act was formally promulgated on July 1, 2015. CPC has set goals to reduce greenhouse gases in compliance with national policies, and it continues to monitor its emissions by calculating its greenhouse gas inventory. To achieve the national goal of long-term greenhouse emissions reduction, CPC introduced the ISO 14064-1 system in 2004 to calculate its greenhouse gas inventory, actively implemented its energy-saving carbon emission reduction plan, and set targets and timelines for carbon emission reduction for its existing plants. CPC has also imposed reduction measures according to the reduction plan using clean fuel, clean production, equipment efficiency improvement, energy saving, and waste reduction. In recent years, CPC has used the latest technology to improve the energy efficiency of the plants effectively. As a result, the company's reduction in greenhouse emissions from 2005 to 2021, verified by a third party, was about 33.6.



In addition, CPC has implemented electricity conservation in its offices in compliance with the guidelines on the management plan for power usage effectiveness for government agencies and schools laid down by the Executive Yuan. CPC achieved its annual power consumption goal in 2022, and its offices under monitoring have all switched from fluorescents to LED lighting by September 2020. To adapt to the risks of climate change, CPC has participated in the Climate Change Adaptation Strategy and Guidance Program for the Energy Sector by the Bureau of Energy between 2018 and 2021. It completed a risk assessment on strong winds and floods at 25 sites. In 2022, CPC optimized the risk assessment results of seven sites using the latest GIS data.

Pollutant emission trend of CPC refineries in the past three years

Unit: metric ton



Note 1: In 2022, SOx emissions of the refineries increased compared to 2021. This is due to the Dalin Refinery increased operation days and fuel use for the heavy oil cracking plant and particular procedures.

Note 2: the emission levels of 2020 and 2021 are the approved emission levels, while the emission level of 2022 is the reported emissions.



Reducing air pollution and promoting environmental education

CPC's air pollutants come mainly from its oil refineries and petrochemical plants. The pollutants include total suspended particulate matter, sulfur oxides (SO_x), nitrogen oxides (NO_x), volatile organic compounds (VOCs), and others. Catering to production needs, the Dalin Refinery increased operation days and fuel use for heavy oil cracking plant and particular procedures because of production needs, leading to an increase in SO_x emissions. Other emissions, such as TSP, NO_x, and VOCs, all maintained last year's level or saw a gradual decrease, showing that the improvement measures CPC implemented effectively reduced air pollution.

Since the enactment of the Environmental Education Act in 2011, CPC has actively promoted environment-related education and similar activities, and the concepts of environmental protection and of cherishing Taiwan's natural resources. It has called on the public to come together on local ecological issues, showing concern for the development of local communities and taking specific actions, such as park and forest adoption, garbage clean-ups, and marine pollution remediation, to pass on a clean environment for future generations. In further educational developments in recent years, CPC's Taiwan Oil Field Exhibition Hall at Chuhuangkeng in Miaoli County was officially certified as an environmental education facility on August 22, 2017. It is the only educational facility for oil extraction. Another company-developed environmental education site is the CPC Kaohsiung Refinery Environmental Education Park, certified as the only petrochemical industry environmental educational facility on January 22, 2018.

CPC is dedicated to protecting the homeland and the environment. Therefore, it strives to raise its environmental performance by deploying the latest pollution-control technology, actively introducing highly efficient processes, investing in the circular economy, waste recycling, and increasing value – all in the pursuit of developing sustainability in its operations and the sharing of good health and prosperity with citizens.

2022 Environmental Footprint						Material investment		
Effluent						Material investment		
monthly average								
Item	Taoyuan Refinery	Standards Effluent	Dalin Refinery	Linyuan Petrochemical Complex	Standards Ocean Effluent			
COD (ppm)	18.62	100	30.6	48.35	280	Water Usage	31,403	Thousand kiloliters
Oil (ppm)	3.33	10	<1.0	<1.0	20	Crude oil	22,185	Thousand kiloliters
SS (ppm)	10.43	30	7.3	8.6	100	Fuel Oil	138	Thousand kiloliters
Phenol (ppm)	0.0038	1.0	<0.01	<0.01	1.0	Fuel Gas	1,563,950	Thousand cubic meters
						Natural Gas	1,236,978	Thousand cubic meters
						Gasoline additives (MTBE)	502	Thousand kiloliters
						Purchased Electricity	2,099,207	Thousand kWh
Material emissions						Refinery/petrochemical output		
Gas emissions	CO ₂	7,590,595*			Tons	Diesel	5,964	Thousand kiloliters
	NO _x	2,923			Tons	Fuel oil	1,899	Thousand kiloliters
	SO _x	955			Tons	Vehicle fuel	9,309	Thousand kiloliters
	TSP	278			Tons	Jet fuel	2,217	Thousand kiloliters
	VOC	3,223			Tons	Liquefied petroleum gas	367	Kilotons
	COD	358			Tons	Ethylene	937	Kilotons
Waste Water		13,996			Thousand cubic meters	Propene	899	Kilotons
Waste		132,926			Tons	Butadiene	119	Kilotons

*Note: the amount of CO₂ emission is 2021 figure.



Continued compliance with regulatory requirements for pollution remediation

Following the promulgation of the Soil and Groundwater Pollution Remediation Act by the President in 2000, Taiwan's Environmental Protection Agency (EPA) has introduced related Enforcement Rules, subsidiary legislation, and related control standards for the Soil and Groundwater Pollution Remediation Act. Many CPC plant locations have been listed as sites that require pollution response, control, or remediation. CPC has proposed appropriate and respective pollution response, control, and remediation plans, and the company has implemented related soil and groundwater pollution surveys and pollution remediation measures as per associated regulations. In 2022, CPC had four sites listed for response measures, 29 for pollution control, and eight for remediation. Meanwhile, remediation had been completed at 45 locations by the end of 2022.

Kaohsiung Refinery was officially decommissioned at the end of November 2015, and pollution remediation of the area caught considerable attention. CPC presented a pollution control plan to the Environmental Protection Bureau of the Kaohsiung City Government for review, which the bureau approved on December 16, 2016. The overall pollution improvement period is 17 years. To speed up the revitalization of the land where the Kaohsiung Refinery was formerly sited, CPC signed an administrative contract entrusting Kaohsiung City Government to remediate and delist the polluted sites. CPC signed an administrative contract with the Public Works Bureau of the Kaohsiung City Government on May 13, 2021. Areas with soil and groundwater pollution in Zone 3 for remediation were delisted on March 28 and May 31, 2022, respectively. As of the end of 2022, the completion rate of pollution control and remediation for soil and groundwater pollution at the Kaohsiung Refinery has reached 57.14%.

Research and Innovation for Business Transformation

Research and Development

Research and Development (R&D) is a core value for CPC's technological innovation and corporate sustainability. There are three major institutes responsible for R&D in their respective areas: the Exploration & Development Research Institute (EDRI) in Miaoli; the Refining & Manufacturing Research Institute (RMRI) in Chiayi; and the Green Technology Research Institute (GTRI) in Kaohsiung.

The EDRI primarily evaluates oil and gas reserves by analyzing domestic and foreign geological/stratigraphic data, technological developments in exploration, drilling and extraction methodology, environmental monitoring, geothermal resource development, and carbon sequestration. The RMRI plays a leading role in the R&D of high-value-added petrochemicals, promoting the circular economy, controlling pollution, improving refinery structure or configuration, and resolving on-site production problems. The GTRI is dedicated to R&D on biofuels, renewable energy, and green materials, and is responsible for pilot production on advanced projects. CPC's expenditure on R&D in 2022 amounted to about NT\$4.094 billion. The R&D achievements are described below.



Exploration & Development Research Institute

- Selected offshore gas fields in northwestern Australia, which had been discovered but had not been developed or was not under development, and completed natural gas asset ratings and asset/block field ratings for 75 sites. Subsequently, it identified the top 10 assets/mining fields to consider for future block acquisition.
- Applied the latest drilling data from the Benoy, Mbaikoro, and Mouroumar Blocks in Chad and used pre-stacking inversion to improve the accuracy of thin-layer reservoir predictions. By adding parameters such as lithology, porosity, and water saturation, CPC was able to update 3D models and reservoir predictions.
- Integrated its paleontological data, sequence stratigraphic interpretation of well logs, and structural seismic interpretation to complete a tectonostratigraphic model of the Tainan basin.
- The production of natural gas wells in Taiwan often faces disruption due to liquid accumulation. Therefore, CPC has attempted to increase production by adopting foam-lift and has completed lab trials of this method with positive results. CPC is drafting a plan for on-site trials and expects to start on-site trails in 2023.
- Collaborated with the Central Geological Survey, MOEA, to conduct a geothermal exploration in the Matsao area of the Tatun Mountains. The exploration well is targeted to be 1,350 meters in depth and is expected to reach the target depth in June 2023. It will be used to collect core samples, drill cuttings, and water samples for further analysis.
- Completed downhole mineral analysis for three wells at Xiaoyoukeng, Qingtiangang, and Zhugaoling in the Tatun Mountains and constructed a well-tie cross section.
- The report "Research and Economic Analysis of Acid-Resistant Casing Alloys for Datun Volcanic Geothermal Development" was completed. The results will be used to further develop geothermal power at Mt. Datun.
- Investigation of potential sites for carbon sequestration off the west coast of Taiwan: CPC completed its first offshore investigation in November. The company expects to complete the first phase of the overall survey in June 2023 and then to narrow down the potential targets for further research in the next phase.
- Geologic sequestration of carbon dioxide: CPC regularly measures the concentration of CO₂ and methane, and their carbon isotopes, in the atmosphere and soil at potential sequestration sites to establish base-line data. After analysis, CPC found that the results are similar to global CO₂ levels in the atmosphere. In the future, CPC will establish continuous monitoring stations, automatically sending measurement data.
- Simulation of carbon sequestration: CPC simulated the injecting of gases at potential sites, setting the start year of 2025 and running the simulation for a hundred years. The simulation showed that there would be no gas leakage and that sequestration will be safe. Such results can serve as a reference for future development.
- Developing green and sustainable remediation technologies using microorganisms and plants for remediating in-situ oil-contaminated soil. The model will be applied to remediation engineering in the field
- Using ground-penetrating radar (GPR) to investigate underground pipelines. The technology is used by departments across the company. It is pivotal for the Marketing Business Division to find pipeline breaches where oil theft has taken place.
- Completed site remediation of the Hsinchu distribution center and gas stations in Shengang, Changhua. Assisted in drafting pollution control plans for the Songshan Airport gas stations.
- Constructed a mobile lab which can analyze soil, gas, and groundwater samples on-site, reducing the time-cost for sample delivery. The use of a mobile lab improves the efficiency of site investigation.

Refining & Manufacturing Research Institute

- Developed new production processes, including the preliminary assessment of a new light diesel engine motor oil formulation to meet the European Automobile Manufacturers Association (ACEA) C3 5W/30 standards; the development and application of CPC amorphous soft carbon anode vehicular battery research; obtained graphene using electrochemical-mechanical hybrid exfoliation of artificial graphite; development of environmentally-friendly precision machinery cutting oil; the development of styrene recycling technology; the establishment of alicyclic polycarboxylate hydrogenation technology; the planning of a trial production process for refined bitumen; and the development and application of magnetic filters and packing technology.



- Completed the evaluation of commercial gasoline and diesel quality and performance; testing of heavy-duty diesel engine; gasoline and diesel fuel additive performance tests for cleaning; and the promotion of the integration of natural gas heating value and the standardization of stove specifications to help protect the environment.
- Completed groundwater soil remediation and detecting services in refinery-related polluted sites; the monitoring of airborne volatile organic compound (VOC); VOC recovery of gasoline filling exhaust; health risk assessment; and for environmental impact assessments, the planning for special waste-liquid pretreatment and waste-water recycling. to meet environmental regulations and requirements.
- The continuous monitoring of the effect of stray electric currents from the Taipei MRT system on pipelines, and assisting in diagnosing refinery boiler pipe problems to ensure pipeline safety.
- Successful conversion of CPC-own heavy oil through a self-developed proprietary refining process to exploit a long-life amorphous soft carbon material with great potential to be used in lithium-ion battery anodes.
- Installation and implementation of Smart Green gas stations: CPC installed a 50kWh Lithium (LFPO) battery module in the Smart and Green demo e-station in Chietong, Taoyuan. This is not only for the verification of CPC-own soft carbon materials but also has potential application in emergency rescue in distress areas; conducted ongoing solar power generation and the verification of the Smart EMS (Energy Management System) in "Chiayi Xinyi Smart & Green Demo e-Station."
- Optimized the gasoline/diesel and petrochemical raw material production processes and offered advisory services to resolve on-site problems and enhance operational efficiency to achieve energy-saving goals.
- Transfer of the newly-formulated CPC Marilube, Guoguang brand low-alkali marine motor oil, environmentally-friendly metalworking fluid, and long-life equipment oil technologies.
- Development of products including fully synthetic 10W/30 specialty oil SP for CMC, CPC Superpower C3/SN, fully synthetic 5W/30 motor oil for SUVs, CPC Racing C3/SN, fully synthetic 5W/30 motor oil, and CPC cutting oil SSC10.
- Improved the dielectric properties of traditional substrate resin materials to meet high frequency and speeds of 5G communication requirements, and successfully entered ton-scale pilot production. Copper-clad laminate (CCL) manufacturers have certified the resulting novel resin material for subsequent downstream promotion.
- Development of bio-based and bio-degradable plastics in compliance with the national plastic restriction policy: bio-based plastics use biomaterials as feedstocks, while bio-degradable plastics could undergo further microbial decomposition to carbon dioxide and water. For bio-degradable plastics, we focused on polylactic acid (PLA) in the short term and the more-environmentally friendly polyhydroxyalkanoates (PHAs) in the longer term, to reduce the pollution caused by synthetic plastics. Regarding feedstock selection, CPC actively seeks non-food types such as lignocellulose, methanol, and natural gas, to balance economic development and environmental protection.

- Developing new biomaterials, including whitening and antimicrobial ingredients in cosmetics and medical products, to break into the retail market with cosmetics made from CPC-own materials.
- Establishing a CO₂ Capture facility: Installed equipment for carbon capture trials and began performance tests.
- Developing eco-friendly solvents: CPC selected suitable oils at the refinery for hydrogenation and purification to produce non-toxic solvents.

Green Technology Research Institute

- Established a solar power operation center to manage the operation of more than 230 rooftop solar plants and to continue installing solar panels. CPC expects to reach an installation capacity of 25.055 MW by the end of 2023.
- Completed the stable process of manufacturing a 40138-type 1200F supercapacitor and the development of 48V modules, and ventured into developing anode materials for modified sodium-ion batteries.
- Established a field verification of high and low-temperature fuel cells for distributed power generation, and facilitated the installation of mobile hydrogen stations and a demonstration project for hydrogen-fueled vehicles.
- Developed low-cost and durable lithium titanate and its application as an anode material for lithium-ion batteries.
- Developed high voltage cobalt-free LNMO and its application as a cathode material for lithium-ion batteries.
- Used indoor seawater-recycling coral farming equipment to research the optimal conditions for coral cultivation and applied the results to the cold seawater drainage of LNG terminals for coral restoration.



- Completed the performance verification of recycling Residual hydrodesulfurization (RDS) catalysts to produce vanadium electrolytes and the material's application in vanadium redox flow batteries (VRFB). The technology will lower the company's cost of processing catalyst waste and foster a circular economy.
- Developed a synthesis technique of bio-polyols and launched low-carbon vegetable oil-based coatings.
- Developed a super-hydrophobic coating and acid corrosion-resistant insulation coating, used as alkaline and acidic geothermal pipeline materials. The materials are corrosion and scaling resistant.
- Developed the technology for Dicyclopentadiene (DCPD) pilot runs and established a trial plant.
- Established carbon footprint verification and assisted the Lubricants Business Division to formulate Rules to categorize the environmental footprint of lubricants. The company also completed carbon footprint verification and third-party certification for CPC Water Resistant E .P. Grease No. 1.
- Applied the purification process of fatty acid esters to develop value-added cutting oil/base oils.
- Completed developing the manufacturing process of 5-hydroxymethylfurfural (5-HMF), an essential precursor to bio-based polyester polyethylene furanoate (PEF).

Information Management

As the world faces rapid informatization, digitization, and mobilization, CPC's information infrastructure is based on enterprise resource planning, customer relationship management, big data analysis, knowledge management, and ICT platforms. CPC continues to integrate the company's information systems, providing real-time information for management and decision-making, and to expand the industry value chain by integrating physical and virtual channels. However, as the informatization, digitization, and mobilization levels grow, the company is exposed to higher cybersecurity threats and risks. Therefore, as CPC expands cloud services and 5G AIoT applications, it must strengthen its cybersecurity and cyber-resilience to move towards smart manufacturing and digital transformation goals.

Introducing smart technologies and upgrading cybersecurity

IT applications:

- Following the government's policy of promoting open data, it adopted ODF-CNS15251 as the standard document format, and implemented a smart government action plan.
- Used new technology to improve operations and services and introduced a DevOps model to accelerate application development and deployment.
- Strengthened POS systems at gas stations, integrated e-commerce systems for petroleum products, and introduced intelligent systems to gas stations and oil tankers. Such efforts allowed the company to deepen customer relationships and offer premium services.
- Expanded the 3D pipeline GIS data system, integrating maintenance information into the database to improve pipeline management and safety.
- Adopted new technologies in areas such as occupational safety intelligent inspections, digital fence and surveillance systems, and improved energy efficiency of naphtha cracking plants. Such efforts improved the safety of the environment, product quality, and production efficiency.
- Responding to trends in the Internet of Things, cloud services, and mobile applications, CPC built an in-house optical fiber infrastructure and company-wide IPv6 environment, integrating audio and multimedia communication services.
- Continuously updates equipment and optimizes off-site backup mechanisms to ensure business continuity.
- Adopted cloud computing and established a virtual server operating environment to build a hybrid cloud service structure that combines private and public clouds.



Cybersecurity:

- Established a security operation center (SOC), intrusion detection and defense system, anti-virus security mechanism, Advanced Persistent Threat (APT) defense for emails and websites, email filtering, website application firewalls, and Endpoint detection and response (EDR) tools to strengthen cybersecurity of the overall information environment.
- Conducts regular security inspections, firewall policy reviews, cybersecurity health checks, scanning and patching vulnerabilities in personal computers and servers, and organizing red team exercises, to evaluate the comprehensiveness of cybersecurity and information and communication systems.
- Following the PDCA (Plan-Do-Check-Act) principle, CPC regularly conducts business continuity and cybersecurity exercises, ISO 27001:2013 (information security management systems) third-party certification, internal cybersecurity audits, and on-site cybersecurity audits for contractors.
- Introduced two-factor authentication and behavioral analysis for identity protection to enhance the security of personal identities and user accounts. The company also established a cybersecurity risk management system that examines the risk exposure of CPC, contractors, and suppliers on the Internet.
- Enhanced the security and protection of the industrial control system to ensure that Critical Information Infrastructure (CII) is operating correctly.

Human Resources

People-centered values, leading the company forward

As of the end of 2022, CPC had 16,682 employees. To fully develop their potential, CPC provides long-term training and career guidance, while at the same time making both incentives and benefits more attractive. CPC has also actively discovered managerial talent to facilitate corporate development with talented people of outstanding ability.

Integration of talent selection and training, investing in what the business needs

Regarding human resource utilization, CPC has recently engaged in organizational and process reengineering and formulating and carrying out a policy whereby selected employees are rotated through different jobs, units, and departments to use their human capital effectively. It has also actively recruited a cohort of young professionals to inject new blood and provide a smooth transfer of technical and operational knowledge, as well as commercial and competitive skills, to increase the competitiveness of its employees and prepare for a wave of retirements.

In addition to using professional qualifications and personal traits as the basis for selecting entrants to its supervisors, CPC provides management and leadership development training to help its employees achieve their full potential and contribute to accomplishing corporate growth objectives. At the same time, the company is strengthening its on-the-job training programs at all levels and has integrated existing training systems into establishing the CPC Corporate University (CPCCU). This system offers beginner, intermediate, and advanced level courses in exploration, refining, marketing, and engineering - the four key areas comprising CPC's core competencies. CPC has systematically enhanced specific professional expertise for employees through experiences passed on by senior employees, which has helped them develop a broader range of skills to optimize workforce utilization. The company also encourages its employees to take national qualification examinations in skills and allows them to obtain professionally-required certification in industrial safety, environmental protection, and other relevant disciplines. The company is also strengthening its secondary-skill training programs in its corporate transformation process. Beyond this, employees are selectively sent abroad for higher education, research assignments, and internships, and to participate in conferences and seminars on various topics.



Passing on experience and cultivating professional talents

Since CPC recently hired new employees, on-the-job training is now combined with formal skills development courses. Senior employees are also designated as mentors to help new colleagues adapt to their workplace and responsibilities. These new employees are rotated, with job training provided, allowing them to gain experience in various positions and develop their talent at every level. Seniority requirements for promotion have been shortened for outstanding managers, lowering the age distribution in the upper management echelons and thus helping to motivate those with ambition. Concerning employee training, each department reviews its professional-skill shortfalls at the beginning of the year and formulates a corresponding training plan in which outstanding personnel are recruited as instructors and tasked with passing on their



operational knowledge and experience. Some departments also make on-site training arrangements for their junior employees, which last up to a year, depending on departmental needs. Following the e-learning trend, various knowledge elements and physical courses have also been digitized and uploaded to CPC's knowledge base and e-learning center. This helps CPC preserve, share, and pass on core knowledge, techniques, and experiences, and facilitates the company's value-adding applications. With the application of digital technology, multiple learning programs based on virtual-physical technology integration are developed step-by-step to help employees learn related knowledge and expertise anytime, anywhere.

The CPC Training Center (CPCTC) in Chiayi serves as an incubator for internal talent and a hub for passing on experience. It is also tasked with building a talent pool of energy and petrochemical expertise. In compliance with the government's energy policy and the Energy Consumption, Energy Saving, Carbon Reduction, and Digital Transformation strategies, CPC has recruited not only professional talent with engineering, investment, trading, and management backgrounds for these business activities, but also expanded domestic and overseas government-industry-university-institute collaboration, and actively formulated various courses in pre-employment training and on-the-job training for talent in multiple fields, to maximize its contribution to the cultivation of energy and petrochemical talents for our country.

A friendly environment that ensures gender equality

Regarding employee incentives and benefits, CPC provides bonuses considering the company's overall performance, individual contribution, and KPIs, and assigns the employee welfare committee to organize welfare and entertainment activities. Also, all employees are covered by national health insurance, public servant insurance, labor insurance, group life insurance, and casualty insurance. CPC also provides consolation and compassionate payments for work-related injuries, disability, or death, guaranteeing the welfare of CPC employees.

Employees of all business units have access to clinics, employee cafeterias, libraries, and general stores in their vicinity. CPC also offers sports facilities, including swimming pools, ball courts, and gyms. Furthermore, CPC offers scholarships and college tuition fee loans for employees' children; medical subsidies for employees and dependents; wedding, funeral, and retirement subsidies for employees; and interest-free emergency loans. CPC also sponsors employee group activities from ball games, bridge, chess, mountain climbing, swimming, and painting, to film watching, ensuring the well-being and morale of the employees.

Regarding employee assistance programs, CPC offers various services to help employees resolve and prevent problems affecting their performance and motivate employees at work. CPC enhances the organization's competitiveness by implementing multiple health promotion measures, creating a caring work environment, and building a friendly, communicative business culture.

Additionally, CPC is dedicated to promoting gender equality and implementing relevant measures to build an inclusive workplace. CPC will continue to increase the number of female employees, breaking gender stereotypes in the industry and achieving gender equality. In 2022, CPC won the 20th Golden Carnation Awards for its "Women at CPC, happy enterprise and friendly workplace" project. The recognition is proof of the CPC's commitment to gender equality.

CPC's joint venture strategy is: "on the foundation of the core business, active expansion into fields of petrochemicals (upstream and downstream), new energy, high value-added petrochemicals, and international investments." The company aims to boost its bottom line by selectively introducing patented technologies to develop high-value-added products with its own materials and technologies for petrochemical products. Total investment in these 15 joint venture entities, as of the end of 2022, was NT\$21.109 billion, generating an unaudited investment income of NT\$686 million in 2022 and cash dividends of NT\$1.93 billion over the same period.

CPC's current 15 affiliates can be divided into four main categories: petroleum products, petrochemicals, natural gas, and implementation of government policy. Of the 15, eight are based in Taiwan and seven are based overseas. The principal entities are briefly described below.

CHINA AMERICAN PETROCHEMICAL CO. LTD. (CAPCO)

Established in 1976, CAPCO is a major supplier of purified terephthalic acid (PTA) to Taiwan's polyester textile industry; its plant is located in the Taichung Harbor in Taiwan's central region. CPC holds 38.57% of the company's equity, including preferred stock. CAPCO's production units have implemented improvement programs to lower production costs and boost market competitiveness.

DAI HAI PETROL CORP. (DHP)

Established in 1994, with CPC holding 35% of the equity, DHP is headquartered in Haiphong, Vietnam. The branch station is located in Ha Tay province. The company engages in businesses including storage, transportation, supply, and the marketing of liquefied petroleum gas in northern Vietnam.

QATAR FUEL ADDITIVES COMPANY LIMITED (QAFAC)

Qatar Fuel Additives Company Limited (QAFAC) was established in 1996, with CPC holding 20% of the equity. Located in Mesaieed Industrial Zone in Qatar, it produces chiefly methanol and methyl tert-butyl ether (MTBE).

CHUN PIN ENTERPRISE CO., LTD. (CPEC)

Chun Pin Enterprise Co. was established in 1998, with CPC holding 49% of the equity, to set up and operate a storage and transportation center as part of the Phase II development of Taipei Harbor. CPEC is engaged in the storage and transshipment of petroleum and petrochemical products, and is currently formulating a plan to move its storage tanks to reclaimed land in the outer harbor of the Port of Taipei.

KUOKUANG POWER CO., LTD. (KKPC)

KuoKuang Power Co. was established in 2000, with CPC holding 45% of the equity, under the government's policy of opening up power generation to private operators to alleviate the power supply shortfall in northern Taiwan. The entity involves constructing and operating a natural gas-fired power plant with an installed capacity of 480 MW in the Guishan District of Taoyuan City.

NIMIC SHIP HOLDING CO., LTD. (NSHC)

Established in 2006, with CPC holding 45% of the equity, NSHC has four ship-owning companies under its umbrella. It has built four LNG carriers to transport LNG from Qatar's Ras Laffan II. In compliance with the IMO's environmental protection regulations, NSHC has planned and implemented modifications since 2018 to burn low-sulfur fuel oil, and to install a ballast water management system for LNG carriers.

NIMIC SHIP MANAGEMENT CO., LTD. (NSMC)

Established in 2006, with CPC holding 45% of the equity, NSMC is responsible for operating and managing the four LNG carriers built by NSHC. In addition to assisting in the implementation of modifications to burn low-sulfur fuel oil and the installation of a ballast water management system for the four LNG carriers in 2018, NSMC also has an ongoing cooperative program with NTOU and NKMU aimed at developing a pool of Taiwanese seafarers.

GLOBAL ENERGY MARITIME CO. (GEMCO)

Established in 2011, with CPC holding 48% of the equity, GEMCO has built three double-hulled VLCCs with a capacity of 300,000 DWT and a double-hulled LR1 vessel with a capacity of 80,000 DWT, engaged in shipping crude oil and petroleum products. In compliance with the IMO's environmental protection regulations, GEMCO completed retrofitting the scrubber system for VLCCs.

ICHTHYS LNG PTY LTD (ILPL)

Established in 2011, with CPC holding 2.625% of the equity, ILPL pipes natural gas from Australia's offshore Ichthys field to an onshore gas liquefaction plant near Darwin to produce LNG, LPG, and condensate. The first LNG cargo was shipped in November 2018.

MAXIHUB COMPANY LIMITED (MAXIHUB)

Established in 2014, with CPC holding 40% of the equity since 2016, MAXIHUB plans to build a wharf, tank farm, and a lubricant blending factory in Dong Nai Province, Vietnam. The company was founded to manufacture and process lubricating oils, base oil, and solvent chemicals, and to provide storage and warehouse services. The lubricant blending factory started its trial operation in January 2022.



2022
Financial
Statements

The profit before tax for the Exploration & Production Business Division has decreased in 2022, as compared to 2021, due to an increase in impairment losses on assets. Furthermore, the profit margin has decreased in the Natural Gas Business Division and the Refining and Marketing Business Division due to an increased in cost and a restriction in market price factors.

The capital expenditure incurred in 2022 was NT\$42,017million, a 39.97% increase from 2021.

The breakdown of the expenditure was as follows:

Production & manufacturing 38.37%

Marketing & transportation 12.65%

Others 48.98%

The exchange rate between the NT dollar and the US dollar was 30.656:1 on December 31, 2022.

STATEMENTS OF INCOME FOR THE YEARS ENDED DECEMBER 31, 2022 AND 2021

(In Thousands of New Taiwan Dollars)

	<u>2022</u>	<u>2021</u>
Operating Revenues		
Sales	\$1,210,569,860	\$885,554,926
Other operating revenues	<u>11,286,982</u>	<u>18,217,796</u>
Total operating revenues	<u>1,221,856,842</u>	<u>903,772,722</u>
Operating Costs and Expenses		
Cost of goods sold	1,379,828,131	891,280,130
Exploration expenses	1,758,418	2,119,987
Oil and gas transmission and storage expenses	13,544,558	12,843,525
Other operating costs	<u>7,404,850</u>	<u>4,839,965</u>
Total operating costs	<u>1,402,535,957</u>	<u>911,083,607</u>
Gross Profit(Loss)	<u>(180,679,115)</u>	<u>(7,310,885)</u>
Operating Expenses	<u>23,268,191</u>	<u>22,067,454</u>
Non-Operating Income and Gains	<u>8,344,135</u>	<u>5,097,908</u>
Non-Operating Expenses and Losses	<u>20,452,578</u>	<u>22,851,284</u>
INCOME (LOSS) BEFORE INCOME TAX	<u>(216,055,749)</u>	<u>(47,131,715)</u>
Income Tax Expense (Benefit)	<u>(28,467,162)</u>	<u>(7,847,293)</u>
NET INCOME (LOSS) FOR THE YEAR	<u>\$(187,588,587)</u>	<u>\$(39,284,422)</u>

BALANCE SHEETS

DECEMBER 31, 2022 AND 2021

(In Thousands of New Taiwan Dollars)

Assets	<u>2022</u>	<u>2021</u>
Current Assets		
Cash and cash equivalents	\$ 2,012,293	\$ 2,710,867
Current financial assets at fair value through profit or loss	26	863
Accounts receivable, net	80,492,241	56,666,521
Accounts receivables from related parties, net	838,796	332,899
Other receivables	7,303,141	6,792,577
Inventories	162,308,160	127,147,077
Prepayments	41,479,530	20,582,107
Other current assets	<u>8,111,475</u>	<u>2,288,097</u>
Total Current Assets	<u>302,545,662</u>	<u>216,521,008</u>
Non-current Assets		
Non-current financial assets at fair value through other comprehensive income	14,352,745	16,409,518
Investments accounted for using equity method	11,830,005	11,837,200
Property, plant and equipment	462,939,340	446,820,912
Right-of-use assets	33,517,575	36,295,738
Investment property	26,167,394	19,218,218
Intangible assets	546,732	447,680
Deferred income tax assets	44,840,040	16,762,028
Oil and gas investments	57,583,763	59,089,839
Refundable deposits	336,183	249,390
Long-term receivables	16,775,216	16,504,018
Long-term prepayments	1,855,046	1,886,101
Other non-current assets	<u>235,667</u>	<u>243,101</u>
Total Non-current Assets	<u>670,979,706</u>	<u>625,763,743</u>
Total Assets	<u>\$ 973,525,368</u>	<u>\$ 842,284,751</u>

BALANCE SHEETS
DECEMBER 31, 2022 AND 2021

(In Thousands of New Taiwan Dollars)

Liabilities and Equity	<u>2022</u>	<u>2021</u>
Current Liabilities		
Short-term borrowings	\$ 208,544,108	\$ 26,974,075
Short-term notes and bills payable	269,287,743	157,562,442
Financial liabilities at fair value through profit or loss-current	4,781	3,806
Contract liabilities	12,123,812	12,641,764
Accounts payable	89,021,557	73,922,271
Payable to constructors	4,229,555	6,558,364
Other payables	20,430,613	20,849,412
Lease liabilities-current	300,415	1,991,939
Long-term borrowings, current portion	13,000,000	23,400,000
Other current liabilities	<u>12,172,711</u>	<u>10,718,244</u>
Lease liabilities-current	<u>629,115,295</u>	<u>334,622,317</u>
Non-current Liabilities		
Bonds payable	102,000,000	75,000,000
Long-term borrowings	10,400,000	-
Non-current provisions	28,354,605	42,324,544
Deferred tax liabilities	84,467,134	84,782,837
Lease liabilities-non-current	34,120,483	32,079,605
Post-employment benefits payable	4,260,948	4,096,145
Guarantee deposits received	1,565,668	1,598,895
Other non-current liabilities	<u>5,743,277</u>	<u>5,659,224</u>
Total Non-current Liabilities	<u>270,912,115</u>	<u>245,541,250</u>
Total Liabilities	<u>900,027,410</u>	<u>580,163,567</u>
Equity		
Share capital		
Common shares	130,100,000	130,100,000
Retained earnings		
Legal reserve	3,390,331	3,390,331
Special earnings reserve	-	127,195,339
Accumulated profit (deficit)	<u>(66,330,017)</u>	<u>(5,805,386)</u>
Total retained earnings	<u>(62,939,686)</u>	<u>124,780,284</u>
Other equity	<u>6,337,644</u>	<u>7,240,900</u>
Total Equity	<u>73,497,958</u>	<u>262,121,184</u>
Total Liabilities and Equity	<u>\$ 973,525,368</u>	<u>\$ 842,284,751</u>

CPC CORPORATION, TAIWAN
STATEMENTS OF CASH FLOWS
FOR THE YEARS ENDED DECEMBER 31, 2022 AND 2021

(In Thousands of New Taiwan Dollars)

	<u>2022</u>	<u>2021</u>
Cash flows from operating activities:		
Net income before tax	\$ (216,055,749)	\$ (47,131,715)
Adjustments:		
Non-cash adjustment items:		
Depreciation expense	18,476,329	17,705,512
Amortization expense	3,266,058	2,571,328
Expected credit loss	101,994	154,798
Net loss (gain) on financial assets or liabilities at fair value through profit or loss	(838,332)	66,258
Interest expense	4,411,504	1,990,054
Interest revenue	(553,536)	(317,023)
Dividend income	(1,317,705)	(675,342)
Share of loss (profit) of associates accounted for using equity method	645,222	(82,161)
Gain on disposal of property, plant and equipment	(678,059)	(56,521)
Loss (Reversal) of write-down of inventories	34,101	15,526,673
Impairment loss (reversal) recognized on non-financial assets	2,748,130	(8,369,000)
Gain on unrealized foreign exchange	(1,335,469)	(3,207,283)
(Gain) Loss on oil and gas investments	(29,392)	630,900
Others	(930,354)	(721,416)
Total non-cash adjustment items	<u>24,000,491</u>	<u>25,216,777</u>
Changes in operating assets and liabilities:		
Accounts receivable	(24,645,310)	(18,355,601)
Other accounts receivable	(510,564)	(969,860)
Inventories	(35,195,184)	(62,497,213)
Prepaid expenses	(17,977,297)	(2,016,160)
Other current assets	(5,815,749)	(902,180)
Contract Liabilities	(517,952)	2,293,981
Accounts payable	15,099,286	38,591,314
Provision-non-current	(14,136,895)	13,685,844
Other current liabilities	2,145,092	2,091,661
Post-employment benefits payable	(6,974)	284,143
Total adjustments	<u>(57,561,056)</u>	<u>(2,577,294)</u>
Cash outflow generated from operations	(273,616,805)	(49,709,009)
Interest received	553,536	62,039
Interest paid	(3,968,854)	(2,024,221)
Income taxes paid	(7,629)	(358)
Net cash flows provided by operating activities	<u>(277,039,752)</u>	<u>(51,671,549)</u>

	<u>2022</u>	<u>2021</u>
Cash flows from investing activities:		
Acquisition of property, plant and equipment	(39,747,366)	(23,977,883)
Proceeds from disposal of property, plant and equipment	858,200	235,700
Acquisition of intangible assets	(308,039)	(276,360)
Increase in oil and gas interests	(3,751,114)	(2,958,167)
Increase in refundable deposits	(146,593)	(92,252)
Decrease in refundable deposits	59,800	136,360
Decrease in long-term receivables	1,335,682	411,110
Increase in other non-current assets	(435,645)	(467,368)
Dividends received from associates and others	1,928,840	<u>1,172,788</u>
Net cash flows used in investing activities	<u>(40,206,235)</u>	<u>(25,816,072)</u>
Cash flows from financing activities:		
Increase in short-term borrowings	358,932,270	64,633,803
Decrease in short-term borrowings	(183,714,075)	(40,545,559)
Increase in short-term bills payable	670,125,619	348,662,411
Decrease in short-term bills payable	(558,400,318)	(295,939,007)
Payments to bonds payable	(23,400,000)	(18,600,000)
Proceeds from long-term borrowings	10,400,000	-
Increase in bonds payable	40,000,000	23,250,000
Proceeds from guarantee deposits received	2,904,497	2,402,424
Refund of guarantee deposits received	(2,937,724)	(2,186,683)
Payment of lease liabilities	(3,701,050)	(4,508,525)
Decrease in other non-current liabilities	(13,644)	(21,718)
Net cash flows used in financing activities	<u>310,195,575</u>	<u>77,147,146</u>
Net decrease in cash and cash equivalents	(7,050,412)	(340,475)
Cash and cash equivalents at beginning of period	<u>2,330,117</u>	<u>2,670,592</u>
Cash and cash equivalents at end of period	<u>\$ (4,720,295)</u>	<u>\$ 2,330,117</u>
Components of cash and cash equivalents		
Cash and cash equivalents reported in the statement of Financial position	2,012,293	2,710,867
Bank overdrafts	(6,732,588)	(380,750)
Cash and cash equivalents at end of period	<u>\$ (4,720,295)</u>	<u>\$ 2,330,117</u>

CPC CORPORATION, TAIWAN

NOTES TO FINANCIAL STATEMENTS

FOR THE YEARS ENDED DECEMBER 31, 2022 AND 2021

(In Thousands of New Taiwan Dollars, Unless Stated Otherwise)

(1) Company history

CPC Corporation, Taiwan (the “Company” or CPC) was established on June 1, 1946 and engages mainly in oil and gas exploration, refining, procurement, transport, storage and marketing.

(2) Approval date and procedures of the financial statements:

The financial statements were authorized for issuance by the Board of Directors on April 19, 2023.

(3) New standards, amendments and interpretations adopted:

(a) The impact of the International Financial Reporting Standards (“IFRSs”) endorsed by the Financial Supervisory Commission, R.O.C. which have already been adopted.

The Company has initially adopted the following new amendments, which do not have a significant impact on its financial statements, from January 1, 2022:

- Amendments to IAS 16 “Property, Plant and Equipment—Proceeds before Intended Use”
- Amendments to IAS 37 “Onerous Contracts—Cost of Fulfilling a Contract”
- Annual Improvements to IFRS Standards 2018–2020
- Amendments to IFRS 3 “Reference to the Conceptual Framework”

(b) The impact of IFRS issued by the FSC but not yet effective

The Company assesses that the adoption of the following new amendments, effective for annual period beginning on January 1, 2023, would not have a significant impact on its financial statements:

- Amendments to IAS 1 “Disclosure of Accounting Policies”
- Amendments to IAS 8 “Definition of Accounting Estimates”
- Amendments to IAS 12 “Deferred Tax related to Assets and Liabilities arising from a Single Transaction”

(c) The impact of IFRS issued by IASB but not yet endorsed by the FSC

The following new and amended standards, which may be relevant to the Company, have been issued by the International Accounting Standards Board (IASB), but have yet to be endorsed by the FSC:

Standards or Interpretations	Content of amendment	Effective date per IASB
Amendments to IAS 1 “Classification of Liabilities as Current or Non-current”	Under existing IAS 1 requirements, companies classify a liability as current when they do not have an unconditional right to defer settlement for at least 12 months after the reporting date. The amendments has removed the requirement for a right to be unconditional and instead now requires that a right to defer settlement must exist at the reporting date and have substance. The amendments clarify how a company classifies a liability that can be settled in its own shares – e.g. convertible debt.	January 1, 2024
Amendments to IAS 1 “Non-current Liabilities with Covenants”	After reconsidering certain aspects of the 2020 amendments ¹ , new IAS 1 amendments clarify that only covenants with which a company must comply on or before the reporting date affect the classification of a liability as current or non-current. Covenants with which the company must comply after the reporting date (i.e. future covenants) do not affect a liability’s classification at that date. However, when non-current liabilities are subject to future covenants, companies will now need to disclose information to help users understand the risk that those liabilities could become repayable within 12 months after the reporting date.	January 1, 2024

The Company is evaluating the impact of its initial adoption of the abovementioned standards or interpretations on its consolidated financial position and financial performance. The results thereof will be disclosed when the Company completes its evaluation.

The Company does not expect the following other new and amended standards, which have yet to be endorsed by the FSC, to have a significant impact on its financial statements:

- Amendments to IFRS 10 and IAS 28 “Sale or Contribution of Assets Between an Investor and Its Associate or Joint Venture”.
- IFRS 17 “Insurance Contracts” and amendments to IFRS 17 “Insurance Contracts”
- Amendments to IFRS 17 “Initial Application of IFRS 17 and IFRS 9 – Comparative Information”
- IFRS16 “Requirements for Sale and Leaseback Transactions”

(4) Summary of significant accounting policies:

The Company is operated and managed by the Government of the Republic of China (ROC). The Company's significant accounting policies conform to the accounting laws and regulations governing state-owned enterprises, the Regulations Governing the Preparation of Financial Reports by Securities Issuers (the “Regulations”) and with the International Financial Reporting Standards (“IFRSs”), International Accounting Standards (“IASs”), as well as related guidance endorsed by the Financial Supervisory Commission of the Republic of China.

The Company's annual financial statements are required to be examined by the Executive Yuan and the Ministry of Audit of the Control Yuan. The examinations are primarily aimed at determining the extent to which the Company meets its budget as approved by the Legislative Yuan. The Company's financial statements are finalized on the basis of the results of these examinations. The Ministry of Audit's adjustments should be reflected in the financial statements audited by independent certified public accountants. The opening balance of the following year of the Company's books of accounts is based on the balance after the adjustments made by the Ministry of Audit. The examination of the Company's financial statements as of and for the year ended December 31, 2021 had already been completed, as explained in Note 12(b). The examinations of the Company's financial statements as of and for the year ended December 31, 2022 by these government agencies were not yet completed as of the auditor's report date.

(a) Statement of compliance

The financial statements have been prepared in accordance with the accounting laws and regulations governing state-owned enterprises, the Regulations and the IFRSs as endorsed and issued into effect by the FSC.

(b) Basis of preparation

(i) Basis of measurement

Except for the following significant accounts, the financial statements have been prepared on a historical cost basis:

Financial instruments measured at fair value through profit or loss are measured at fair value;

Fair value through other comprehensive income are measured at fair value;

Hedging derivative financial instruments are measured at fair value;

The defined benefit liability (asset) is recognized as the fair value of the plan assets less the present value of the defined benefit obligation.

(ii) Functional and presentation currency

The functional currency is determined based on the primary economic environment in which the entity operates. The financial statements are presented in New Taiwan dollars, which is the Company's functional currency. All financial information presented in New Taiwan dollars has been rounded to the nearest thousand.

(c) Classification of current and non-current assets and liabilities

An asset is classified as current under one of the following criteria, and all other assets are classified as noncurrent.

- (i) It is expected to be realized, or intended to be sold or consumed, in the normal operating cycle;
- (ii) It is held primarily for the purpose of trading;
- (iii) It is expected to be realized within twelve months after the reporting period; or

- (iv) The asset is cash or a cash equivalent unless the asset is restricted from being exchanged or used to settle a liability for at least twelve months after the reporting period.

A liability is classified as current under one of the following criteria, and all other liabilities are classified as noncurrent.

An entity shall classify a liability as current when:

- (i) It is expected to be settled in the normal operating cycle;
- (ii) It is held primarily for the purpose of trading;
- (iii) It is due to be settled within twelve months after the reporting period; or
- (iv) It does not have an unconditional right to defer settlement of the liability for at least twelve months after the reporting period. Terms of a liability that could, at the option of the counterparty, result in its settlement by issuing equity instruments do not affect its classification.

(d) Cash and cash equivalents

Cash and cash equivalents comprise cash, cash in bank, and short term, highly liquid investments that are readily convertible to known amounts of cash and are subject to an insignificant risk of changes in value. Time deposits which meet the above definition and are held for the purpose of meeting short term cash commitments rather than for investment or other purposes should be recognized as cash equivalents.

Bank overdrafts that are repayable on demand and form an integral part of the Company's cash management are included as a component of cash and cash equivalents for the purpose of the statement of cash flows.

(e) Financial instruments

Trade receivables and debt securities issued are initially recognized when they are originated. All other financial assets and financial liabilities are initially recognized when the Company becomes a party to the contractual provisions of the instrument. A financial asset (unless it is a trade receivable without a significant financing component) or financial liability is initially measured at fair value plus, for an item not at fair value through profit or loss (FVTPL), transaction costs that are directly attributable to its acquisition or issue. A trade receivable without a significant financing component is initially measured at the transaction price.

(i) Financial assets

All regular way purchases or sales of financial assets are recognized and derecognized on a trade date basis.

On initial recognition, a financial asset is classified as measured at: amortized cost; fair value through other comprehensive income (FVOCI) and fair value through profit or loss (FVTPL). Financial assets are not reclassified subsequent to their initial recognition unless the Group changes its business model for managing financial assets, in which case all affected financial assets are reclassified on the first day of the first reporting period following the change in the business model.

1) Financial assets at amortized cost

A financial asset is measured at amortized cost if it meets both of the following conditions and is not designated as at FVTPL:

- it is held within a business model whose objective is to hold assets to collect contractual cash flows; and
- its contractual terms give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

These assets are subsequently measured at amortized cost, which is the amount at which the financial asset is measured at initial recognition, plus/minus, the cumulative amortization using the effective interest method, adjusted for any loss allowance. Interest income, foreign exchange gains and losses, as well as impairment, are recognized in profit or loss. Any gain or loss on derecognition is recognized in profit or loss.

2) Fair value through other comprehensive income (FVOCI)

A debt investment is measured at FVOCI if it meets both of the following conditions and is not designated as at FVTPL:

- it is held within a business model whose objective is achieved by both collecting contractual cash flows and selling financial assets; and

- its contractual terms give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

On initial recognition of an equity investment that is not held for trading, the Company may irrevocably elect to present subsequent changes in the investment's fair value in other comprehensive income. This election is made on an instrument-by-instrument basis.

Debt investments at FVOCI are subsequently measured at fair value. Interest income calculated using the effective interest method, foreign exchange gains and losses and impairment are recognized in profit or loss. Other net gains and losses are recognized in other comprehensive income. On derecognition, gains and losses accumulated in other comprehensive income are reclassified to profit or loss.

Equity investments at FVOCI are subsequently measured at fair value. Dividends are recognized as income in profit or loss unless the dividend clearly represents a recovery of part of the cost of the investment. Other net gains and losses are recognized in other comprehensive income and are never reclassified to profit or loss.

Dividend income is recognized in profit or loss on the date on which the Group's right to receive payment is established.

3) Fair value through profit or loss (FVTPL)

All financial assets not classified as amortized cost or FVOCI described as above are measured at FVTPL, including derivative financial assets and accounts receivable, which is presented as accounts receivable. On initial recognition, the Company may irrevocably designate a financial asset, which meets the requirements to be measured at amortized cost or at FVOCI, as at FVTPL if doing so eliminates or significantly reduces an accounting mismatch that would otherwise arise.

These assets are subsequently measured at fair value. Net gains and losses, including any interest or dividend income, are recognized in profit or loss.

4) Business model assessment

The Company makes an assessment of the objective of the business model in which a financial asset is held at portfolio level because this best reflects the way the business is managed and information is provided to management. The information considered includes:

- the stated policies and objectives for the portfolio and the operation of those policies in practice. These include whether management's strategy focuses on earning contractual interest income, maintaining a particular interest rate profile, matching the duration of the financial assets to the duration of any related liabilities or expected cash outflows or realizing cash flows through the sale of the assets;
- how the performance of the portfolio is evaluated and reported to the Company's management;
- the risks that affect the performance of the business model (and the financial assets held within that business model) and how those risks are managed;
- how managers of the business are compensated — e.g. whether compensation is based on the fair value of the assets managed or the contractual cash flows collected; and
- the frequency, volume and timing of sales of financial assets in prior periods, the reasons for such sales and expectations about future sales activity.

Transfers of financial assets to third parties in transactions that do not qualify for derecognition are not considered sales for this purpose, and are consistent with the Company's continuing recognition of the assets.

Financial assets that are held for trading or are managed and whose performance is evaluated on a fair value basis are measured at FVTPL.

5) Assessment whether contractual cash flows are solely payments of principal and interest

For the purposes of this assessment, 'principal' is defined as the fair value of the financial assets on initial recognition. 'Interest' is defined as consideration for the time value of money and for the credit risk associated with the principal amount outstanding during a particular period of time and for other basic lending risks and costs, as well as a profit margin.

In assessing whether the contractual cash flows are solely payments of principal and interest, the Company considers the contractual terms of the instrument. This includes assessing whether the financial asset contains a contractual term that could change the timing or amount of contractual cash flows such that it would not meet this condition. In making this assessment, the Company considers:

- contingent events that would change the amount or timing of cash flow;
- terms that may adjust the contractual coupon rate, including variable rate features;
- prepayment and extension features; and
- terms that limit the Company's claim to cash flows from specified assets (e.g. non-recourse features).

6) Impairment of financial assets

The Company recognizes loss allowances for expected credit losses on financial assets measured at amortized cost (including cash and cash equivalents, amortized costs, accounts receivable, other receivable, guarantee deposit paid and other financial assets), debt investments measured at FVOCI, accounts receivable measured at FVOCI and contract assets.

The Company measures loss allowances at an amount equal to lifetime expected credit loss (ECL), except for the following which are measured as 12-month ECL:

- debt securities that are determined to have low credit risk at the reporting date; and
- other debt securities and bank balances for which credit risk (i.e. the risk of default occurring over the expected life of the financial instrument) has not increased significantly since initial recognition.

Loss allowance for trade receivables and contract assets are always measured at an amount equal to lifetime ECL.

Lifetime ECLs are the ECLs that result from all possible default events over the expected life of a financial instrument.

12-month ECLs are the portion of ECLs that result from default events that are possible within the 12 months after the reporting date (or a shorter period if the expected life of the instrument is less than 12 months).

The maximum period considered when estimating ECLs is the maximum contractual period over which the Group is exposed to credit risk.

When determining whether the credit risk of a financial asset has increased significantly since initial recognition and when estimating ECL, the Company considers reasonable and supportable information that is relevant and available without undue cost or effort. This includes both quantitative and qualitative information and analysis based on the Company's historical experience and informed credit assessment as well as forward-looking information.

The Company considers a debt security to have low credit risk when its credit risk rating is equivalent to the globally understood definition of 'investment grade which is considered to be BBB- or higher per Standard & Poor's, Baa3 or higher per Moody's or twA or higher per Taiwan Ratings'.

ECLs are a probability-weighted estimate of credit losses. Credit losses are measured as the present value of all cash shortfalls (i.e. the difference between the cash flows due to the Company in accordance with the contract and the cash flows that the Company expects to receive). ECLs are discounted at the effective interest rate of the financial asset.

At each reporting date, the Company assesses whether financial assets carried at amortized cost and debt securities at FVOCI are credit-impaired. A financial asset is 'credit-impaired' when one or more events that have a detrimental impact on the estimated future cash flows of the financial asset have occurred. Evidence that a financial asset is credit-impaired includes the following observable data:

- significant financial difficulty of the borrower or issuer;
- a breach of contract such as a default or being more than 90 days past due;
- the lender of the borrower, for economic or contractual reasons relating to the borrower's financial difficulty, having granted to the borrower a concession that the lender would not otherwise consider;
- it is probable that the borrower will enter bankruptcy or other financial reorganization; or
- the disappearance of an active market for a security because of financial difficulties.

Loss allowances for financial assets measured at amortized cost are deducted from the gross carrying amount of the assets. For debt securities at FVOCI, the loss allowance is charged to profit or loss and is recognized in other comprehensive income instead of reducing the carrying amount of the asset. The Company recognizes the amount of expected credit losses (or reversal) in profit or loss, as an impairment gain or loss.

The gross carrying amount of a financial asset is written off when the Company has no reasonable expectations of recovering a financial asset in its entirety or a portion thereof. For corporate customers, the Company individually makes an assessment with respect to the timing and amount of write-off based on whether there is a reasonable expectation of recovery. The Company expects no significant recovery from the amount written off. However, financial assets that are written off could still be subject to enforcement activities in order to comply with the Group's procedures for recovery of amounts due.

7) Derecognition of financial assets

The Company derecognizes a financial asset when the contractual rights to the cash flows from the financial asset expire, or it transfers the rights to receive the contractual cash flows in a transaction in which substantially all of the risks and rewards of ownership of the financial asset are transferred or in which the Company neither transfers nor retains substantially all of the risks and rewards of ownership and it does not retain control of the financial asset.

The Company enters into transactions whereby it transfers assets recognized in its statement of balance sheet, but retains either all or substantially all of the risks and rewards of the transferred assets. In these cases, the transferred assets are not derecognized.

(ii) Financial liabilities

1) Financial liabilities

Financial liabilities are classified as measured at amortized cost or FVTPL. A financial liability is classified as at FVTPL if it is classified as held-for-trading, it is a derivative or it is designated as such on initial recognition. Financial liabilities at FVTPL are measured at fair value and net gains and losses, including any interest expense, are recognized in profit or loss.

Other financial liabilities are subsequently measured at amortized cost using the effective interest method. Interest expense and foreign exchange gains and losses are recognized in profit or loss. Any gain or loss on derecognition is also recognized in profit or loss.

2) Derecognition of financial liabilities

The Company derecognizes a financial liability when its contractual obligations are discharged or cancelled, or expire. The Company also derecognizes a financial liability when its terms are modified and the cash flows of the modified liability are substantially different, in which case a new financial liability based on the modified terms is recognized at fair value.

On derecognition of a financial liability, the difference between the carrying amount of a financial liability extinguished and the consideration paid (including any non-cash assets transferred or liabilities assumed) is recognized in profit or loss.

(iii) Derivative financial instruments

The Company enters into a variety of derivative financial instruments to manage its exposure to price changes and foreign exchange rate risks, including foreign exchange forward contracts and petroleum swap contracts.

Derivatives are initially measured at fair value. Subsequent to initial recognition, derivatives are measured at fair value, and changes therein are generally recognized in profit or loss.

(f) Inventories

Inventories include raw materials, finished goods, work in process, semi-finished goods, merchandise, construction in progress, merchandise in transit-crude oil, and merchandise in transit-fuel oil. Inventories are stated at the lower of cost or net realizable value. Inventory write-downs are made by item, except where it may be appropriate to Company similar or related items. Net realizable value is the estimated selling price of inventories less all estimated costs of completion and costs necessary to make the sale.

Inventories are recorded at weighted-average cost on the balance sheet date.

(g) Investment in associates

An associate is an entity over which the Company has significant influence and that is neither a subsidiary nor an interest in a joint venture.

The Company uses the equity method to account for its investments in associates.

Under the equity method, investments in an associate are initially recognized at cost and adjusted thereafter to recognize the Company's share of the profit or loss and other comprehensive income of the associate. The Company also recognizes the changes in the Company's share of equity of associates.

If the cost of acquisition exceeds the Company's share of the net fair value of the identifiable assets and liabilities of an associate recognized at the date of acquisition, this excess is recognized as goodwill, which is included in the carrying amount of the investment and is not amortized. If the Company's share of the net fair value of the identifiable assets and liabilities exceeds the cost of acquisition, after reassessment, this excess is recognized immediately in profit or loss.

The entire carrying amount of the investment (including goodwill) is tested for impairment as a single asset by comparing its recoverable amount with its carrying amount. Any impairment loss recognized is deducted from the carrying amount of the investment. Any reversal of that impairment loss is recognized to the extent that the recoverable amount of the investment subsequently increases.

When the Company transacts with its associate, profits and losses resulting from the transactions with the associate are recognized in the Company's financial statements only to the extent of interests in the associate that are not related to the Company.

(h) Property, plant and equipment

(i) Recognition and measurement

Items of property, plant and equipment are measured at cost less accumulated depreciation and accumulated impairment losses. Cost includes professional fees and borrowing costs eligible for capitalization.

Each part of an item of property, plant and equipment with a cost that is significant in relation to the total cost of the item shall be depreciated separately unless the useful life and depreciation method of that significant part are the same as those of another significant part of that same item.

The gain or loss arising from the derecognition of an item of property, plant and equipment is determined as the difference between the net disposal proceeds, if any, and the carrying amount of the item, and it shall be recognized in profit or loss.

(ii) Subsequent cost

Subsequent expenditure is capitalized only when it is probable that future economic benefits associated with the expenditure will flow to the Company. The carrying amount of those parts of fixed assets that are replaced is derecognized. Ongoing repairs and maintenance are expensed as incurred.

(iii) Depreciation

Such properties are depreciated and classified to the appropriate categories of property, plant and equipment when completed and ready for intended use.

Depreciation of the equipment in oil and gas production mine is computed using the unit-of-output method. Depreciation of the remaining property, plant and equipment is computed using the straight-line method. Each significant part is depreciated separately. The estimated useful lives, residual values and depreciation method are reviewed at the end of each reporting period, with the effect of any changes in estimates accounted for prospectively.

On derecognition of an item of property, plant and equipment, the difference between the sales proceeds and the carrying amount of the asset is recognized in profit or loss.

(i) Lease

(i) Lease

1) Identifying a lease

At inception of a contract, the Company assesses whether a contract is, or contains, a lease. A contract is, or contains, a lease if the contract conveys the right to control the use of an identified asset for a period of time in exchange for consideration. To assess whether a contract conveys the right to control the use of an identified asset, the Company assesses whether:

- a) the contract involves the use of an identified asset – this may be specified explicitly or implicitly, and should be physically distinct or represent substantially all of the capacity of a physically distinct asset. If the supplier has a substantive substitution right, then the asset is not identified; and
- b) the Company has the right to obtain substantially all of the economic benefits from use of the asset throughout the period of use; and
- c) the Company has the right to direct the use of the asset when it has the decision-making rights that are most relevant to changing how and for what purpose the asset is used. In rare cases where the decision about how and for what purpose the asset is used is predetermined, the Company has the right to direct the use of an asset if either:

- the Company has the right to operate the asset; or
- the Company designed the asset in a way that predetermines how and for what purpose it will be used.

2) Lessee

The Company recognizes a right-of-use asset and a lease liability at the lease commencement date. The right-of-use asset is initially measured at cost, which comprises the initial amount of the lease liability adjusted for any lease payments made at or before the commencement date, plus any initial direct costs incurred and an estimate of costs to dismantle and remove the underlying asset or to restore the underlying asset or the site on which it is located, less any lease incentives received.

The right-of-use asset is subsequently depreciated using the straight-line method from the commencement date to the earlier of the end of the useful life of the right-of-use asset or the end of the lease term. In addition, the right-of-use asset is periodically reduced by impairment losses, if any, and adjusted for certain remeasurements of the lease liability.

The lease liability is initially measured at the present value of the lease payments that are not paid at the commencement date, discounted using the interest rate implicit in the lease or, if that rate cannot be reliably determined, the Company's incremental borrowing rate. Generally, the Company uses its incremental borrowing rate as the discount rate.

Lease payments included in the measurement of the lease liability comprise the following:

- fixed payments;
- variable lease payments that depend on an index or a rate, initially measured using the index or rate as at the commencement date;
- amounts expected to be payable under a residual value guarantee; and
- payments for purchase or termination options that are reasonably certain to be exercised.

The lease liability is measured at amortized cost using the effective interest method. It is remeasured when:

- there is a change in future lease payments arising from the change in an index or rate; or
- there is a change in the Company's estimate of the amount expected to be payable under a residual value guarantee; or
- there is a change of its assessment on whether it will exercise a purchase, extension or termination option; or
- there is a change of its assessment of lease period on whether it will exercise extension or termination option; or
- there is any lease modifications

When the lease liability is remeasured, other than lease modifications, a corresponding adjustment is made to the carrying amount of the right-of-use asset, or in profit and loss if the carrying amount of the right-of-use asset has been reduced to zero.

When the lease liability is remeasured to reflect the partial or full termination of the lease for lease modifications that decrease the scope of the lease, the Company accounts for the remeasurement of the lease liability by decreasing the carrying amount of the right-of-use asset to reflect the partial or full termination of the lease, and recognize in profit or loss any gain or loss relating to the partial or full termination of the lease.

The Company presents right-of-use assets that do not meet the definition of investment and lease liabilities as a separate line item respectively in the statement of financial position.

The Company has elected not to recognize right-of-use assets and lease liabilities for short-term leases of machinery that have a lease term of 12 months or less and leases of low-value assets, including IT equipment. The Company recognizes the lease payments associated with these leases as an expense on a straight-line basis over the lease term.

3) Lessor

When the Company acts as a lessor, it determines at lease commencement whether each lease is a finance lease or an operating lease. To classify each lease, the Company makes an overall assessment of whether the lease transfers to the lessee substantially all of the risks and rewards of ownership incidental to ownership of the underlying asset. If this is the case, then the lease is a finance lease; if not, then the lease is an operating lease. As part of this assessment, the Company considers certain indicators such as whether the lease is for the major part of the economic life of the asset.

When the Company is an intermediate lessor, it accounts for its interests in the head lease and the sub-lease separately. It assesses the lease classification of a sub-lease with reference to the right-of-use asset arising from the head lease, not with reference to the underlying asset. If a head lease is a short-term lease to which the Company applies the exemption described above, then it classifies the sub-lease as an operating lease.

If an arrangement contains lease and non-lease components, the Company applies IFRS15 to allocate the consideration in the contract.

(j) Investment property

Investment properties are properties held to earn rentals and/or for capital appreciation (including property under construction for such purposes). Investment properties also include land held for a currently undetermined future use.

Investment properties are measured initially at cost, including transaction costs. Subsequent to initial recognition, investment properties are measured at cost less accumulated depreciation and accumulated impairment loss. Depreciation is recognized using the straight-line method.

On derecognition of an investment property, the difference between the net disposal proceeds and the carrying amount of the asset is included in profit or loss.

(k) Intangible assets

Intangible assets with finite useful lives that are acquired separately are initially measured at cost and subsequently measured at cost less accumulated amortization and accumulated impairment loss.

Amortization is recognized on a straight-line basis over the estimated useful lives of intangible assets from the date that they are available for use. The estimated useful life, residual value, and amortization method are reviewed at the end of each reporting period, with the effect of any changes in estimate accounted for on a prospective basis. The residual value of an intangible asset with a finite useful life should be assumed to be zero unless the Company expects to dispose of the intangible asset before the end of its economic life.

(l) Oil and gas interests and exploration expenses

All geological and geophysical exploration costs are charged to current income.

The costs of drilling exploratory wells ("exploration well expenses") in sites that have not yet proven to contain reserves of commercial quantities ("unproven sites") are initially charged to current income. Exploration well expenses are subsequently capitalized as part of "oil and gas interests" accounts when (i) sites are proven to contain mineral reserves of commercial quantities and (ii) the construction of the wellhead equipment or offshore production platforms and flow lines is complete. The exploration expenses incurred in the current year are reclassified from "exploration expenses" to assets. Costs already charged to income in prior years are recognized as assets and as "non-operating income."

The costs of drilling commercial wells, which are constructed after the sites are proven to contain mineral reserves of commercial quantities, are capitalized as assets. However, if the commercial wells turn out to be dry, such costs are charged to current income.

For oil site acquisitions, the Company's payments for this purchase or investments in foreign joint ventures involving interest in oil sites-including the Company's share in the costs of drilling commercial wells, production, transport and storage equipment but excluding the Company's share in the costs of drilling exploratory wells and other exploration expenses-are capitalized as oil and gas interests. The Company's share in joint ventures' net earnings (or net losses) is recognized as other operating revenues (or other operating costs). The Company recognizes earnings remitted by joint ventures as a reduction of oil and gas interests. These costs are amortized at the ratio of the actual quantity of minerals extracted from the wells for the year to the estimated mineral reserve. The amortized costs and operating expenses paid to joint ventures are regarded as the cost of the Company's share of the oil and gas extracted. The accompanying financial statements included the related sales and cost of goods sold attributable to the Company's share of the oil and gas sold by the joint ventures.

For domestic sites and sites of product-sharing contracts, the Company amortizes the amount recognized in oil and gas interests by the ratio of actual quantity produced in the period over total estimated production quantity of the site. The Company accounts for minerals produced at amortized cost plus the site operation expenses paid, and recognizes crude oil inventory and natural gas inventory by the output value method. The Company recognizes sales and cost of goods sold on the sale of inventory.

For sites of Provision of Services Contract, the Company amortized the amount recognized in oil and gas interests in the same method of that of domestic sites and sites of product-sharing contract. The Company accounts for the amortized amount and the site operation expenses paid as other operating costs. On the other hand, the Company recognized other operating income by multiplying produced quantity to a revenue rate contracted with local oil site governments.

The Company recognizes earnings from Sanga Sanga and translation adjustments based on the financial statements of Sanga Sanga for the same reporting period as that of the Company.

Profit and loss generated from the derecognition of oil and gas interest is measured as the difference between the net disposal proceeds and the carrying amount of the asset and recognized in statement of income in the period of derecognition.

(m) Impairment of non financial assets

The carrying amounts of the Company's non financial assets, other than assets arising from inventories and deferred tax assets are reviewed at each reporting date to determine whether there is any indication of impairment. If any such indication exists, then the asset's recoverable amount is estimated. If it is not possible to determine the recoverable amount (the higher of its fair value less costs of disposal and its value in use) for the individual asset, then the Company will have to determine the recoverable amount for the asset's cash generating unit (CGU).

The recoverable amount for an individual asset or a CGU is the higher of its fair value less costs to sell and its value in use. When evaluating value in use, the pretax discount rate is used to estimate the future cash flows. The discount rate should reflect the evaluation of specific risk resulting from the impact of the current market on the time value of money and on the asset or CGU.

If, and only if, the recoverable amount of an asset is less than its carrying amount, the carrying amount of the asset shall be reduced to its recoverable amount; and that reduction will be accounted as an impairment loss, which shall be recognized immediately in profit or loss.

An assessment is made at the end of each reporting period as to whether there is any indication that an impairment loss recognized in prior periods for an asset may no longer exist or may have decreased. If any such indication exists, the recoverable amount of that asset is estimated.

An impairment loss recognized in prior periods for an asset is reversed if, and only if, there has been a change in the estimates used to determine the asset's recoverable amount since the last impairment loss was recognized.

(n) Provisions

A provision, including those arising from the contractual obligation specified in a service concession arrangement to maintain or restore the infrastructure before it is handed over to the grantor, is recognized if, as a result of a past event, the Group has a present obligation that can be estimated reliably, and it is probable that an outflow of economic benefits will be required to settle the obligation. Provisions are determined by discounting the expected future cash flows at a pre-tax rate that reflects the current market assessments of the time value of money and the risks specific to the liability. The unwinding of the discount is recognized as finance cost.

(o) Revenue recognition

Revenue is measured based on the consideration to which the Company expects to be entitled in exchange for transferring goods or services to a customer. The Company recognizes revenue when it satisfies a performance obligation by transferring control of a good or a service to a customer. The accounting policies for the Company's main types of revenue are explained below.

(i) Sale of goods

The Company manufactures and sells its products to consumers in the retail market. The Company recognizes revenue when a customer takes possession of the product. Payment of the transaction price is due immediately when the customer purchases the product.

(ii) Customer loyalty program

The Company operates a customer loyalty program to its customers. Customers obtain points for purchases made, which entitle them to discount on future purchases. The Company considers that the points provide a material right to customers that they would not receive without entering into a contract. Therefore, the promise to provide points to the customer is a separate performance obligation. The transaction price is allocated to the product and the points on a relative stand-alone selling price basis. Management estimates the stand-alone selling price per point on the basis of the discount granted when the points are redeemed and on the basis of the likelihood of redemption, based on past experience. The stand-alone selling price of the product sold is estimated on the basis of the retail price. The Company has recognized contract liability at the time of sale on the basis of the principle mentioned above. Revenue from the award points is recognized when the points are redeemed or when they expire.

(p) Employee benefits

(i) Short-term employee benefits

Liabilities recognized in respect of short-term employee benefits are measured at the undiscounted amount of the benefits expected to be paid in exchange for the related service.

(ii) Retirement benefits

Payments to defined contribution retirement benefit plans are recognized as an expense when employees have rendered service entitling them to the contributions.

Defined benefit costs (including service cost, net interest and remeasurement) under the defined benefit retirement benefit plans are determined using the projected unit credit method. Service cost (including current service cost) and net interest on the net defined benefit liability (asset) are recognized as employee benefits expense in the period they occur. Remeasurement, comprising actuarial gains and losses and the return on plan assets (excluding interest), is recognized in other comprehensive income in the period in which they occur. Remeasurement recognized in other comprehensive income is reflected immediately in unappropriated earnings and will not be reclassified to profit or loss.

Net defined benefit liability represents the actual deficit in the Company's defined benefit plan.

(iii) Other long-term employee benefits

Other long-term employee benefits are accounted for in the same way as the accounting required for defined benefit plan except that remeasurement is recognized in profit or loss.

(q) Borrowing costs

Borrowing costs directly attributable to the acquisition, construction or production of qualifying assets are added to the cost of these assets until such time as the assets are substantially ready for their intended use or sale.

Investment income earned on the temporary investment of specific borrowings pending their expenditure on qualifying assets is deducted from the borrowing costs eligible for capitalization.

Other than stated above, all other borrowing costs are recognized in profit or loss in the period in which they are incurred.

(r) Income taxes

Income tax expenses include both current taxes and deferred taxes. Except for expenses related to business combinations or recognized directly in equity or other comprehensive income, all current and deferred taxes are recognized in profit or loss.

Current taxes include tax payables and tax deduction receivables on taxable gains (losses) for the year calculated using the statutory tax rate on the reporting date or the actual legislative tax rate, as well as tax adjustments related to prior years.

Deferred taxes arise due to temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and their respective tax bases.

A deferred tax asset is recognized for the carry forward of unused tax losses, unused tax credits, and deductible temporary differences to the extent that it is probable that future taxable profit will be available against which the unused tax losses, unused tax credits, and deductible temporary differences can be utilized. Such unused tax losses, unused tax credits, and deductible temporary differences are also revaluated every year on the financial reporting date, and adjusted based on the probability that future taxable profit will be available against which the unused tax losses, unused tax credits, and deductible temporary differences can be utilized.

Deferred tax liabilities are recognized for taxable temporary differences associated with investments in associates, except where the Company can control the reversal of the temporary difference and it is probable that the temporary difference will not reverse in the foreseeable future. Deductible temporary differences associated with such investments and interests are only recognized to the extent that it is probable that there will be sufficient taxable profits against which to utilize the temporary differences and they are expected to reverse in the foreseeable future.

Deferred tax liabilities and assets are measured at the tax rates that are expected to apply in the period in which the liability is settled or the asset realized, based on tax rates and laws that have been enacted or substantively enacted by the end of the reporting period. The measurement of deferred tax liabilities and assets reflects the tax consequences that would follow from the manner in which the Company expects, at the end of the reporting period, to recover or settle the carrying amount of its assets and liabilities.

(s) Earnings per share

Basic earnings per share is calculated as the profit attributable to ordinary shareholders of the Company divided by the weighted average number of ordinary shares outstanding. Diluted earnings per share is calculated as the profit attributable to ordinary shareholders of the Company divided by the weighted average number of ordinary shares outstanding after adjustment for the effects of all potentially dilutive ordinary shares. The Company does not have potentially dilutive ordinary shares.

(t) Operating segments

An operating segment is a component of the Company that engages in business activities from which it may earn revenues and incur expenses (including revenues and expenses relating to transactions with other components of the Company). Operating results of the operating segment are regularly reviewed by the Company's chief operating decision maker to make decisions about resources to be allocated to the segment and to assess its performance. Each operating segment consists of standalone financial information.

(5) Significant accounting assumptions and judgments, and major sources of estimation uncertainty:

The preparation of the financial statements in conformity with the accounting laws and regulations governing state-owned enterprises, the Regulations and with the IFRSs, IASs, interpretations as well as related guidance endorsed by the FSC of the Republic of China requires management to make judgments, estimates, and assumptions that affect the application of the accounting policies and the reported amount of assets, liabilities, income, and expenses. Actual results may differ from these estimates.

The management continues to monitor the accounting estimates and assumptions. The management recognizes any changes in accounting estimates during the period and the impact of those changes in accounting estimates in the following period.

Information about judgments made in applying accounting policies that have the most significant effects on the amounts recognized in the financial statements is as follows:

Judgment regarding significant influence of investees

The company holds 35%-49% of the voting shares of several investee companies, but because the remaining equity of these investee companies are concentrated in very few shareholders, the company cannot exercise more than half of the voting rights, nor can it obtain a majority of directors' seats. Therefore, the company has only significant influence on these investee companies.

Among the uncertainties of the assumptions and estimates, the relevant information that has significant risks may cause critical adjustments in the following years is as follows:

(a) Estimated impairment of trade receivables

The Company has estimated the loss allowance of trade receivable that is based on the risk of a default occurring and the rate of expected credit loss. The Company has considered historical experience, current economic conditions and forward-looking information at the reporting date to determine the assumptions to be used in calculating the impairments and the selected inputs. The relevant assumptions and input values, please refer to note 6(c).

A Five-year Financial Summary

(In Thousands of New Taiwan Dollars)

	<u>2022</u>	<u>2021</u>	<u>2020</u>	<u>2019</u>	<u>2018</u>
Sales and other operating revenues	1,221,856,842	903,772,722	721,700,943	1,014,108,034	1,034,575,286
Profit (loss) before income tax	(216,055,749)	(47,131,715)	(7,703,206)	33,337,332	43,762,837
per dollar of sales and other operating revenues (NT\$)	-0.177	-0.052	-0.011	0.033	0.042
Cash dividends	0	0	0	24,678,319	1,314,441
per dollar of capital (NT\$)	0.00	0.00	0.00	0.19	0.01
Owner's equity	73,497,958	262,121,184	294,099,129	306,048,146	297,598,941
per dollar of capital (NT\$)	0.56	2.01	2.26	2.35	2.29
General taxes and import duties	52,559,557	41,285,677	36,921,621	46,614,084	58,228,141
Commodity tax	49,148,032	66,285,387	71,066,139	71,598,649	72,007,592
Total taxes	101,707,589	107,571,064	107,987,760	118,212,733	130,235,733
Working capital (current assets less current liabilities)	(326,569,633)	(118,101,309)	(62,628,400)	(48,410,303)	(52,777,478)
Ratio of current assets to current liabilities	48.09%	64.71%	69.84%	81.17%	79.91%
Long-term Liabilities	112,400,000	75,000,000	75,150,000	76,050,000	88,050,000
Properties, plant, and equipment-gross	948,901,353	940,305,423	924,745,805	909,097,079	914,752,212
Properties, plant, and equipment-net	462,939,340	446,820,912	434,621,786	421,334,223	423,460,997
Exploration expenses (including all dry holes)	1,758,418	2,119,987	1,712,403	2,031,934	2,573,975
Total assets	973,525,368	842,284,751	737,278,927	801,948,280	769,502,334
Employed capital (Equity, long-term debt)	185,897,958	337,121,184	369,249,129	382,098,146	385,648,941
Employees on December 31	16,682	16,293	16,123	15,836	15,712
Sales and other operating revenues per employee	73,244	55,470	44,762	64,038	65,846

A Five-year Operation Summary

	<u>2022</u>	<u>2021</u>	<u>2020</u>	<u>2019</u>	<u>2018</u>
Crude oil produced-total KL	375,283	285,671	261,688	265,278	180,062
daily average KL	1,028	783	717	727	493
Natural gas produced-total MCM	457,208	502,328	494,772	519,833	240,026
MCM per day	1253	1,376	1,356	1,424	658
Liquefied petroleum gas produced-total MT	4,729	8,999	2,184	3,929	-
MT per day	13	25	6	11	-
Wells drilled during the year	3	1	3	3	2
Crude oil processed-total KL	22,187,561	21,854,071	20,543,276	23,763,205	22,213,776
daily average KL	60,788	59,874	56,283	65,105	60,860
Natural gas sold-total MCM	26,539,452	25,560,250	23,554,348	21,733,213	22,171,345
MCM per day	72,711	70,028	64,532	59,543	60,743
Refined products sold-total KL	22,630,890	22,949,808	30,453,406	34,312,260	34,661,601
daily average KL	62,002	62,876	83,434	94,006	94,963
Petrochemicals sold-MT	3,807,983	4,388,136	4,147,178	4,253,913	4,281,652
daily average MT	10,433	12,022	11,362	11,655	11,731



2022 CPC Taiwan image aminated film-Diverse Service

2022 CPC Taiwan image aminated film-Always Here

2022 CPC Taiwan image aminated film-International Certification

Supreme Quality • Superb Service • Selfless Contribution



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