GC

TOGETHER TO *Net Zero*

ANNUAL REGISTRATION STATEMENTS/ ANNUAL REPORT 2021

(Form 56-1 One Report)

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED

Sustainability Award
Gold Class 2022
S&P Global

Member of
Dow Jones Sustainability Indices
Powered by the S&P Global CSA

Global Compact LEAD
2021 PARTICIPANT

CDP
DISCLOSURE INSIGHT ACTION

IR NETWORK

We're moving beyond Number One towards Zero.

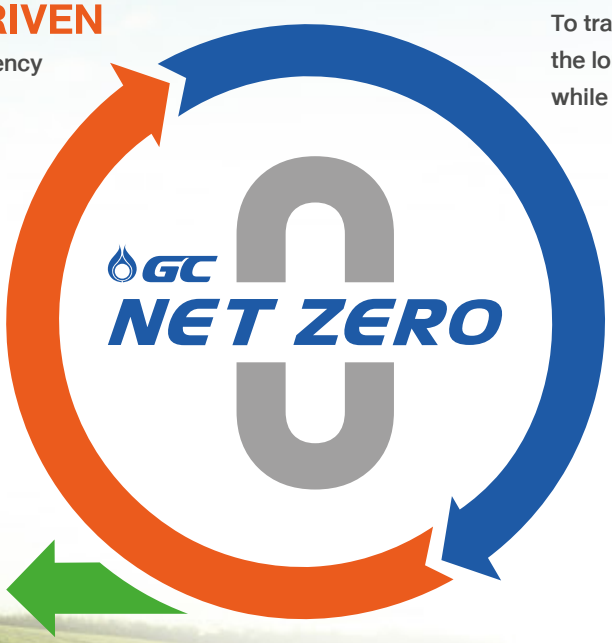
We have elevated our operations towards the creation of long-term added value to achieve Net Zero emissions within 2050 alongside sustainable growth. Our decarbonization plan follows these 3 low-carbon transition frameworks.

EFFICIENCY-DRIVEN

To increase operational efficiency and reduce waste emissions

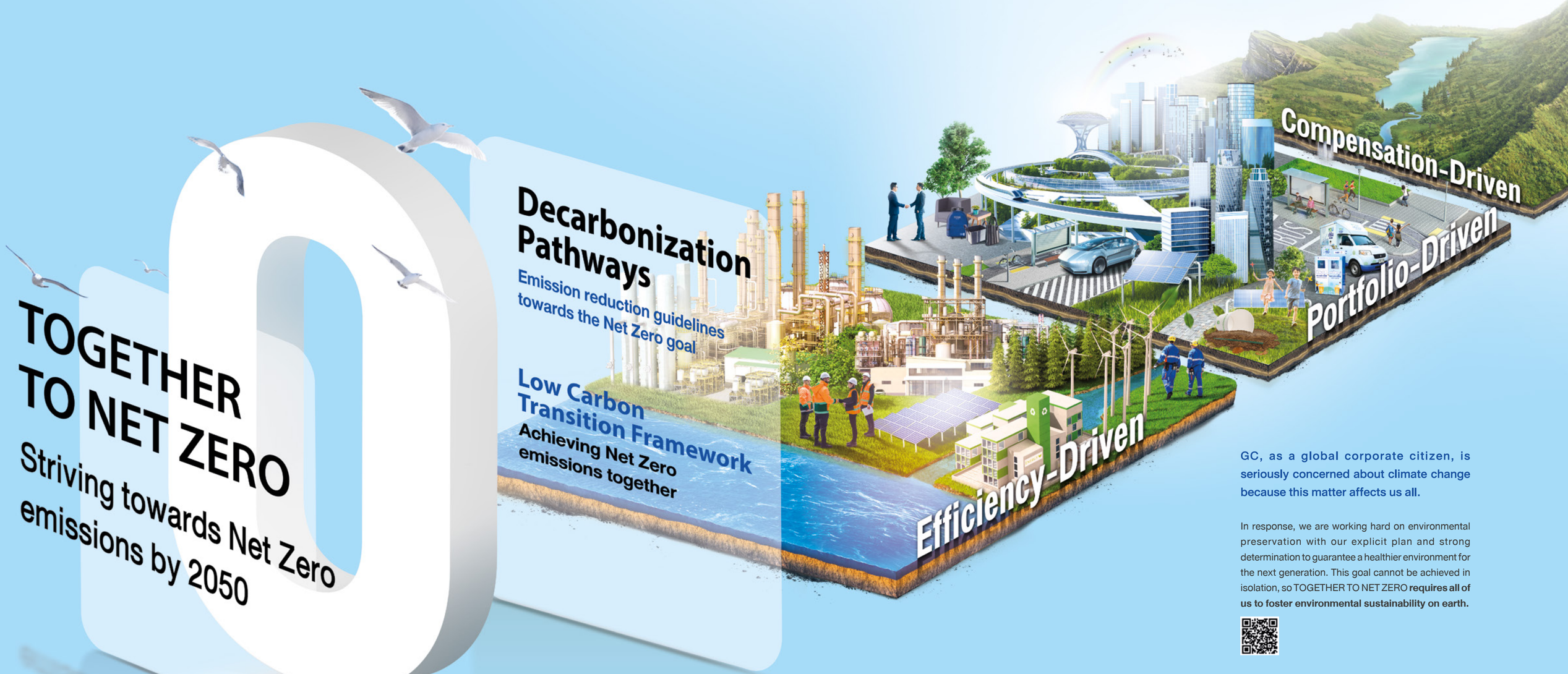
PORTFOLIO-DRIVEN

To transform business portfolio over the long-term into a low-carbon business, while maintaining corporate growth



COMPENSATION-DRIVEN

To apply nature-base and technology-base solutions to effectively drive decarbonization achieves to reach Net Zero



GC, as a global corporate citizen, is seriously concerned about climate change because this matter affects us all.

In response, we are working hard on environmental preservation with our explicit plan and strong determination to guarantee a healthier environment for the next generation. This goal cannot be achieved in isolation, so TOGETHER TO NET ZERO **requires all of us to foster environmental sustainability on earth.**

Efficiency-Driven

Leverage our expertises and technologies to maximize efficiency of our assets by reducing energy consumption and resources use. GC strives to develop & deploy emerging low-carbon technologies and renewable energy to further strengthen the business sustainability.

These are example of our projects which employ low-carbon technologies and renewable energy sources.

The Solar Rooftop Project

Generate up to
480
kilowatt - hour per day

Reduce Energy Consumption by
631
GJ per year

Reduce GHG Emissions by
47 tons CO_2 equivalent per year

Collaborations and investments through Corporate Venture Capital (CVC) in clean energy technology:

Green and Blue Hydrogen

Use of Biogas instead of hydrocarbon fuel to decrease greenhouse gas emissions

Portfolio-Driven

Transforming our long-term business structure to a low-carbon business by management processes relevance and reshape investment direction towards the High Value Business (HVB), green chemicals, and recycled products. While implementing Circular Economy concepts to create innovations & solutions to our customers.

Increasing investment in the low-carbon business groups to **35%** by 2030.

132 product grades certified with Carbon Footprint of Product (CFP) label and **84** product grades certified with Carbon Footprint Reduction (CFR) label

Conducting campaigns, in collaboration with our partners, to collect plastic waste for recycling. **310** tons were collected.

(From January to December 2021)

Placing YOUTURN Drop points at over **150** locations in Bangkok and vicinity.

Upcycling plastics into a variety of products, decreasing Greenhouse Gas by **719.2** tons of CO_2 equivalent, which is also equal to the planting of **34,444** large trees.

By obtaining the Circular Economy certification standard (BS8001:2017), YOUTURN is only the platform has been certified on its well management of all collected plastics for being recycled & upcycled.

Compensation-Driven

Carbon offsetting is another key decarbonization actions after the Efficiency-Driven and Portfolio-Driven pillars. We offset our emissions through nature-based solutions such as reforestation, and technology-based solutions such as Carbon Capture and Storage (CCS).

With a total area of **2,500** rai, the Huai Mahat Forest Restoration Project has removed **32,807** tons of CO_2 equivalent greenhouse gases, which is equivalent to planting **364,513** large trees.

Out of the targeted **693** rai of degraded forest, to **552** rai were planted with **49,663** trees. From 2013-2021 the reforestation project resulted in an bringing an income to the local community of THB **5,537,260.26**.

The Eco-Forest Rayong Wanarom, with **80** rai of forestation is capable of removing **1,270** tons of CO_2 equivalent greenhouse gases, which is equivalent to planting **141,107** large trees (as of 2016).

Our Carbon Capture and Storage (CCS) project has targeted **6.30** million tons by 2050.

GC HIGHLIGHTS IN 2021

Member of
Dow Jones Sustainability Indices
Powered by the S&P Global CSA

Dow Jones Sustainability Indices (DJSI)
GC has been ranked first in the world for sustainability in the 2021 Dow Jones Sustainability Indices (DJSI) Chemical Sector for three consecutive years, and placed among the top ten in the DJSI World Index and Emerging Market Index for nine consecutive years.

Global Compact LEAD 2021 PARTICIPANT

UN Global Compact LEAD
Since 2016, GC has been ranked in the top tier of the UN Global Compact LEAD initiative, along with 38 other organizations across the world, for our determination in developing strategies for achieving the UN SDGs goals through collaboration with our stakeholders.

CDP DISCLOSURE INSIGHT ACTION

Carbon Disclosure Project
GC was ranked as a leader in **water management (A Level) and environment management in climate change (A-Level)**, which is **the highest rank** of any business in Thailand's chemical industry.

NET ZERO

GC leveled up to **the low carbon transition framework and targeted the NET ZERO greenhouse gas emission by 2050.**

ISCC International Sustainability & Carbon Certification

International Sustainability & Carbon Certificate
GC subsidiaries (2 plants) i.e. **olefins cracker plant and polyethylene plant,** have been certified in sustainability and carbon reduction (ISCC PLUS) by International Sustainability & Carbon Certificate. This proves that **GC have commitment and plan to transform the corporate to support bio-economy and circular economy.**

THAILAND MINISTER's CLIMATE TALK AND BUSINESS LEADERS
to Share Vision and Experiences on Net - Zero Transformation

GC is focused on our drive toward **NET ZERO** emissions and shared our ideas on tackling **climate change** at the 2021 United Nations Climate Change Conference (COP26) in Glasgow, Scotland.

EFFICIENCY-DRIVEN

In 2021, GC has initiated **82 projects** for energy conservation.

Reduced energy consumption by **1,070,391 GJ and lowered costs** by **337 million baht.**

Greenhouse gas emissions (scope 1 and 2) are at **8.19 million tons CO_2 equivalent.**
achieving the targeted goal (not exceeding 8.56 million tons CO_2 equivalent)

SMART OPERATING
GC aims to enhance efficiency by **maximizing resource utilization** and raising awareness of the importance of energy conservation during the production process.

7 consecutive years of zero landfill disposal.

PORTFOLIO-DRIVEN

RESPONSIBLE CARING

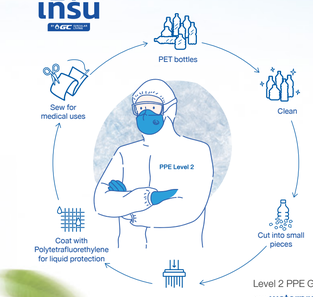
allnex The Coating Resins Company

Acquiring allnex led to GC becoming a global leader in the chemical business
GC increased its investment in allnex, the global leader in resin coatings, reflecting our vision to be a leader in the global chemical industry and grow high-value businesses. We shifted our portfolio from commodity chemicals to performance chemicals to meet our goal of increasing our production of performance chemicals to **35%** by 2030.

Moreover, allnex is the leader in green technology, and is committed to reduce its carbon emissions, while having been a pioneer in sustainable innovation for the resins coatings industry for over 70 years. GC's investment in allnex embodies the principle of **TOGETHER TO NET ZERO**.

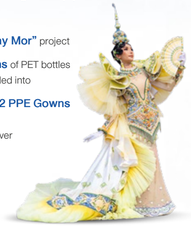
LOOP CONNECTING

YOU เทิร์น



The YOUTURN project success is being converted into a YOUTURN application, aiming **to cover the entire waste management pipeline.**

The **"Yak Kuad Chuay Mor"** project collected **120 tons** of PET bottles which have been upcycled into **6,345 Level 2 PPE Gowns** for medical staff. They were donated to over **50 hospitals** throughout Thailand.



Level 2 PPE Gowns are **waterproof**, washable, and can be reused up to **20 times**, reducing the amount of medical waste.

180 square meters of upcycled cloth was donated by GC to the **2021 Miss Earth Thailand competition.** The cloth was **produced from 2,520 PET bottles,** Which is equivalent to planting **25 large trees,** for 19 beauty contestants' evening dresses to raise awareness about social responsibility and environment preservation.

GC UPCYCLING Upstyle #2 2021

Upcycling Upstyling the second year is a home and living themed collaborative project between GC and world-renowned designers. Its goal is to build a loop connecting customers and stakeholders with efforts to recycle plastics and transform them into **upcycled products**.

COMPENSATION-DRIVEN

Huai Mahat Forest Restoration Project
certified by the Thailand Greenhouse Gas Management Organization (Public Organization), the project aims to promote private sector participation in the Low Emission Support Scheme (LESS) in forestation efforts.

From 2013 to 2018, the Project showed an uptake amount of **32,807 tons of CO_2 equivalents,** which is equivalent to planting **364,513 large trees.**

The Eco-Forest Rayong Wanarom Project
Is under supervision of the GC Group through GC Estate and is registered as a Thailand Voluntary Emission Reduction Program (T-VER), with the Thailand Greenhouse Gas Management Organization, under the forest and green area category. The project aims to plant a sustainable forest under the eco forest principle.

It has a greenhouse gas uptake of **1,270 tons of CO_2 equivalents,** which is equivalent to planting **141,107 large trees.**

Currently, GC is studying Carbon Capture Utilization and Storage (CCUS) as well as new technology access via corporate venture capital, with coordination among the company's groups, to increase business opportunities. **Our carbon capture target is 6.30 million tons by 2050.**

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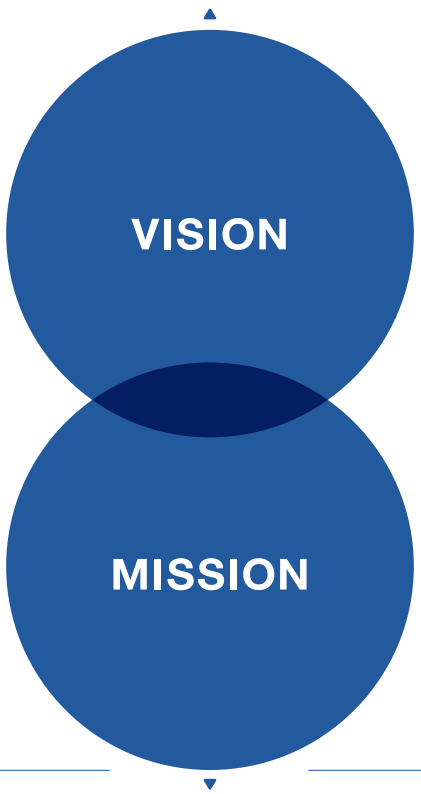
VISION, MISSION AND CORPORATE STRATEGIES

"Leading Global" means GC Group, a world-class chemical company.

"Chemical Company" means GC Group, producers of integrated petrochemicals and chemicals throughout the value chain, growing business through local and international investment, with a focus on high value-added products.

"Better Living" means GC Group, producers striving to deliver values to improve the quality of life with chemicals consumed in the downstream market, being responsible to the society and the environment, as well as playing part in encountering climate change.

To be a Leading Global Chemical Company for Better Living



We deliver the best business performance through trustworthiness to create fair and sustainable value for shareholders.

We integrate social and environmental responsibility into our business practices to achieve sustainable development.

We provide superior solutions from innovative products and services to be the best choice for our business partners.

We build an organization that is prepared for change and learning by providing a happy working environment that promotes the development of employees' capabilities and abilities, enabling them to meet new challenges with dedication to the organization and to professional excellence.

OBJECTIVES AND GOALS

PTT Global Chemical Public Company Limited (GC) systematically reviews its corporate vision, mission and direction annually for alignment with the current business context and long-term trends. It aspires to become a leader in three aspects as follow:

BUSINESS GROWTH

GC is committed to being a world-class petrochemical and chemical manufacturer with an integrated value chain, fostering growth, and generating profit in a sustainable and uninterrupted manner, with emphasis on growing investment in performance and specialty chemicals, low-carbon businesses, and international investments.

RETURN ON INVESTMENT

GC is committed to achieving a return on investment on par with leading industry players in Asia-Pacific.

SUSTAINABILITY

GC is committed to operating its businesses under the framework of sustainability by consistently working towards international acceptance as a global leader in sustainability.

CORPORATE STRATEGIES

Overall, in 2021, the economic conditions started to recover resulting from the rolling out of COVID-19 vaccination, the relaxation of border closure measures and the economic stimulus policies of various countries around the world. As a result, petroleum and petrochemical industry has improved overall. However, there remains instability from the spread of new variants of COVID-19 virus, competition pressure and trade barriers, including the implementation of stricter climate change policies as a result of global trend on environment. GC has closely monitored and analyzed various trends and timely adjusted working plans to be in line with existing situations resulting in excellent achievements in our operation amidst challenging business condition and standing as the leader in the area of sustainability whereby we have been ranked the 1st in the chemicals product sector by the 2021 Dow Jones Sustainability Indices (DJSI) for 3 consecutive years and remained within the top-10 for 9 consecutive years, being the only Asian and Thai petrochemical company that has been ranked first for three consecutive years. GC also set target for net zero greenhouse gas emission under both scope 1 and scope 2 by 2050, emphasizing our determination in being an organization that is an example on sustainability at an international level.

GC's business directions and strategic plans strive to build and maintain competitiveness, sustainable business growth, and readiness in various aspects in support of future growth. GC uses these directions and strategic plans as frameworks for business operations and regularly monitor outcomes to accomplish short-term and long-term corporate goals, with emphasis on the following 4 strategic focuses:

STEP CHANGE

GC actively strengthens its business competitiveness and improving various aspects of the operation so that the Company can sustainably carry on the business amidst challenges and fluctuation of external situations by enhancing resilience and creating an advantage over competitors to create a foundation for future growth. Below are the key strategies:

- Maintaining operational excellence by being determined to improve the operation to be at the 1st Quartile on a long-term basis with a goal to reach a world class operational excellence in safety and production stability, including to improve efficiency in areas on which the Company has been working continuously under MAX Infinity Project and Map Ta Phut Integration (MTP Integration) based on the creation of synergy among Map Ta Phut plants through integrated supply chain management, from feedstock sourcing and manufacturing to product delivery to customers. Furthermore, GC has improved its capacity to compete by updating the production facilities and enhancing the innovative operation (modernization and innovation) to create cost and value advantages over the competitors.
- Elevating the integration and diversification by making investments in upstream petrochemical businesses focusing on feedstock management and feedstock flexibility enhancement so as to achieve competitive production costs and long-term feedstock security and extend the value chain to downstream petrochemical businesses to meet the growing demand.
- Expand the home base and strategic market to foster long-term distribution security, increase market shares, and expanding opportunities to create business partners in Thailand, Cambodia, Laos, Myanmar, Vietnam, and Indonesia, all of which have consistently shown high growth, as core targets. GC has also set China and India as strategic markets to build sales agility.
- Implementing market-focused business strategies, placing emphasis on High Value Products (HVP) and diverse applications to better meet the needs of the market and end-users, while also fostering product development collaborations with partners across the value chain, developing markets of the existing products, and generating demand among new customers.

2

STEP OUT

GC is seeking to invest in High Value Businesses (HVB) with a focus on growth products with superior profitability which will meet consumer needs according to megatrends. In 2021, the Company is seeking to acquire the business of allnex Holding GmbH, a world-class producer of industrial coating materials, remarking an important step of the Company towards entering into a High Value Business (HVB) which will cause the Company to grow dramatically and increase the high value business ratio which in turn will help reduce risk from fluctuation of operating results of commodity product. GC also seeks new business opportunities by utilizing Corporate Venture Capital (CVC) to enter new businesses with outstanding technologies and innovations, including low-carbon business which can be used to further strengthen and expand current businesses. Furthermore, to strengthen the ability to compete in a long-run, GC seek opportunity to establish the second business base in other country (i.e., the second home base) to gain competitive feedstock advantages and market growth.

3

STEP UP

GC elevates its sustainability operation for business connectivity in response to industrial trends as well as strikes a sustainability balance in three aspects: economic, social, and environment, to become a model of sustainability operation at the international level and reduce the greenhouse gas emission under both scope 1 and 2 to net zero by 2050. The key activities are as follows:

- Tackling climate change relying on circular economy principle by cooperating with all stakeholders throughout the supply chain under (1) smart operating, (2) responsible caring and (3) loop connecting frameworks focusing on the integration of cost-effective use of resources and efficient waste management together with portfolio management for low emission business and creating consolidated product circularity in order to reduce the greenhouse gas emission and number of used plastic waste.
- Engaging in decarbonization via compensation to promote the work towards net zero carbon emission goal. The remaining carbon emission will compensated by the use of Carbon Capture for Utilization and Storage (CCUS) technology which is highly efficient and has competitive cost, and the use of nature-based solutions, e.g., forestation, forest restoration, efficient carbon credit management, etc.
- Maintaining leadership in sustainability by focusing on adopting international-standard sustainability-led practices in the main aspects of operation (i.e., Environmental, Social and Governance aspects (ESG)), sustainably creating value to the society, as well as extending sustainability-led practices to the Group in accordance with the decarbonization roadmap in order to achieve the net zero emission goal in 2050 and becoming a model in the petrochemical and other relevant industries.

4

TRANSFORMATION

In order to accomplish all of three strategies aforementioned, it is necessary for GC to transform its operation method so that it becomes efficient and ready to tackle business changes which are subject to fluctuation, and to be in line with the growth direction. GC has set out direction for organization transformation involving suitable process and working method which are highly flexible and and adjustable under the “FiT Project” by improving the end-to-end working process and introducing the use of digital platform in the working process to reduce costs, improve operational efficiency, enhance system effectiveness, boost agility, and decrease risks as well as carrying on people upskill and reskill so that existing staff become knowledgeable and holding skills which are in line with directions of the Company. Knowledgeable, and create a corporate culture that improves preparedness for change, as well as strengthen supporting units and lays down the foundation for effective Governance, Risk management and internal control, and Compliance (GRC), to ensure compliance with laws, rules, and regulations and assure transparency and accountability to its stakeholders.

BACKGROUND AND SIGNIFICANT DEVELOPMENT

PTT Global Chemical Public Company Limited (GC) was founded through the amalgamation of PTT Chemical Public Company Limited (PTTCH) and PTT Aromatics and Refining Public Company Limited (PTTAR). It was registered on October 19, 2011 to be PTT Group's Chemical Flagship.

At present

GC, registered and paid-up capital is Baht **45,088,491,170**

The number is common shares is **4,508,849,117** shares

the par value is Baht **10** per share

DEBENTURE ISSUANCE AND OFFERING

In 2021, GC Treasury Center Co.,Ltd., a 100% subsidiary of the company, issued and offered unsubordinated and unsecured USD debentures. The details are as follows:

SERIES 1:
10 Years

Due on March 18, 2031, bear the fixed interest rate at 2.98 percent per annum, payable every 6 months throughout the tenor of 10 years with principal amount of USD **700** million.

SERIES 2:
30 Years

Due on March 18, 2051, bear the fixed interest rate at 4.30 percent per annum, payable every 6 months throughout the tenor of 30 years with principal amount of USD **550** million.

FINANCIAL HIGHLIGHTS

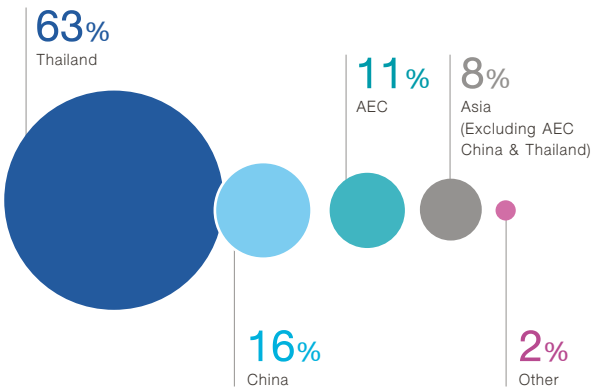
SALES REVENUE

465,128

Unit: Baht Million

SALES REVENUE OF MAIN PRODUCTS

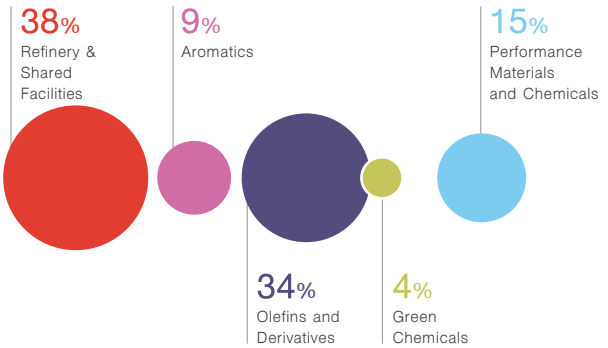
Breakdown by Geography Year 2021



Notes:
- Represent the sales revenue based on the geographical location of customers
- More than 90% of consolidated sales revenue is generated from companies in Thailand

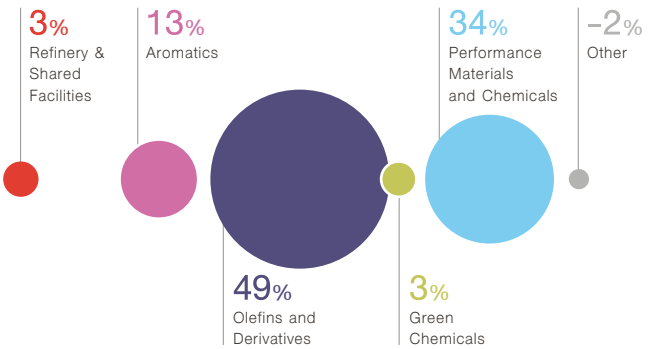
SALES REVENUE

Breakdown by Business Year 2021: **Baht 465,128 Million**



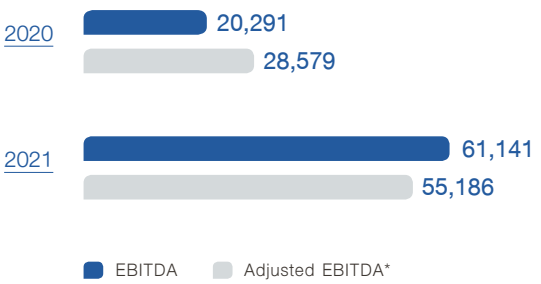
ADJUSTED EBITDA*

Breakdown by Business Year 2021: **Baht 55,186 Million**

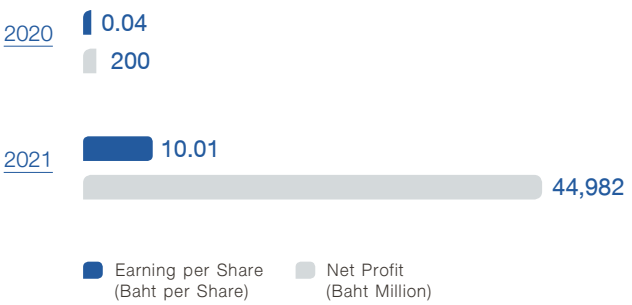


EBITDA & ADJUSTED EBITDA*

Unit: Baht Million



NET PROFIT



Note: * Adjusted EBITDA refers to EBITDA excluding Stock gain/(loss), NRV and Extra item

STATEMENT OF FINANCIAL POSITION (Baht Million)	2019	2020	2021
Total Assets	**452,514**	**489,383**	**753,862**
Cash and Cash Equivalents + Current investments in financial Assets	25,560	60,658	74,994
Other Current Assets	78,934	69,253	133,360
Property, Plant and Equipment	264,564	269,177	289,579
Non-Current Assets	83,457	90,295	255,929
Total Liabilities	**158,919**	**200,389**	**426,259**
Interest Bearing Debt (IBD)	107,087	155,083	275,375
Other Liabilities	51,832	45,306	150,884
Total Equity	**293,595**	**288,994**	**327,603**

STATEMENT OF FINANCIAL POSITION	2019	2020	2021
Current Ratio (times)	1.97	2.20	1.41
EBITDA to Tatal Revenues (%)	6.79	6.22	13.14
Net Profit on Total Revenues (%)	2.85	0.06	9.67
Return on Total Assets (%)	3.50	0.86	9.44
Return on Equity (%)	4.02	0.07	15.01
Interest Bearing Debt to Equity (times)	0.36	0.54	0.84
Net Interest Bearing Debt to Equity (times)	0.28	0.33	0.61
Net Interest Bearing Debt to EBITDA (times)	2.93	4.65	3.28

DIVIDEND PAID (Baht/Share)	2019	2020	2021[(1)]
1st Half	1.00	0.00	2.00
2nd Half	1.00	1.00	1.75
Full Year	2.00	1.00	3.75
Earning per Share (Baht/Share)	2.59	0.04	10.01
Dividend Payout Ratio (%)	77%	>200%	37%

Remark:

(1) The Board of Directors' Meeting No. 2/2022 held on February 14, 2022, agreed to propose the Annual General Meeting of Shareholders to consider and approve on the dividend payment for the year 2021 operating performance of Baht 3.75 per share, or dividend payout ratio at 37% of the net profit of consolidated financial statements, of which Baht 2.00 per share was paid as interim dividend on September 22, 2021. The remaining dividend of Baht 1.75 per share is to be proposed to the 2022 Annual General Meeting of Shareholders for approval.

AWARDS AND RECOGNITIONS

Our outstanding performance in the economic, social and environmental dimensions in 2021 has been recognized by leading organizations in both national and international levels.

INTERNATIONAL LEVEL

Member of Dow Jones Sustainability Indices
Powered by the S&P Global CSA

Dow Jones Sustainability Indices (DJSI)

GC has been ranked as the first in the 2021 Dow Jones Sustainability Indices (DJSI) in the chemicals sector for three consecutive years and also ranked among the top 10 companies in the DJSI World and Emerging Markets Index for the ninth consecutive year.

MSCI ESG Rating

GC has been listed in Top 10th of rating the Commodity Chemicals sector by MSCI. The assessment represents how GC gains investor confidence by running its operations in accordance with the Environmental, Social and Governance (ESG) principles.

Ecovadis Supplier Sustainability Ratings

GC has been evaluated in ESG in gold medal by EcoVadis, that the score is 70 with percentile at 97, has been ranked Top 3% in the Commodity Chemicals sector.

Carbon Disclosure Project (CDP)

GC has been rated at Leadership Level in Water Security (A Level) and environmental management in Climate Change (A- Level) by the CDP that is the highest rating in chemicals sector in Thailand.

The Asset Awards

GC received Platinum Award for ESG from the Asset Awards 2021, which organized by The Asset magazine, a regional leading financial magazine in Asia.

UN Global Compact LEAD

GC is 1 of 38 organizations across the world that has been recognized as Global Compact as Lead level since 2016 driven by commitment on continuous improvement that expanding throughout supply chain to supporting to achieve SDGs.

International Sustainability & Carbon Certificate

GC subsidiaries (2 plants) i.e., olefins cracker plant and polyethylene plant, have been certified in sustainability and carbon reduction (ISCC PLUS) by International Sustainability & Carbon Certificate. This proves that GC have commitment and plan to transform the corporate to support bio-economy and circular economy.

NATIONAL LEVEL

SET Sustainability Awards of Honor

GC has received SET Sustainability Award of Honor for four consecutive years. This reflected on the corporate operation that remarkably aligned with sustainable development, as well as comprehensive and transparent disclosure on the operation.

Thailand Corporate Excellence

GC received a Distinguished award in Innovation Excellence category from the Thailand Management Association (TMA). This award reflects GC's commitment to operating its business with a focus on research and development, including innovation to push the organization to sustainably grow with enforcement on the competitive capabilities.

Thai Chamber of Commerce (TCC) Outstanding Ethics Award

GC received the Business Ethics for Sustainable Development from Thai Chamber of Commerce (TCC). This demonstrates that GC conducts business under the good corporate governance and integrity, fairness for stakeholders, and awareness of resource efficiency. The award truly represents a sustainable achievement for the organization.

Thailand Sustainability Investment (THSI)

GC has been honored on the list of Thailand Sustainability Investment for the seventh consecutive year (2015-2021). This represents GC's efforts in creating a benefit on both internal and external stakeholders, in the aspect of Environmental, Social and Governance that is in line with the THSI assessment and international standards.

The Prime Minister's Industry Award

GC's subsidiaries received The Prime Minister's Industry Award from Ministry of Industry for four awards i.e., Quality Management, Circular Economy, Productivity, and Social Responsibility. This award pushes Thai industries to be performance excellence and being great role model for other corporates.

Sustainability Disclosure Award

GC received Sustainability Award from Thaipat Institute that reflects on being a great representative that excellent disclosure on information of sustainability.

Low Carbon and Sustainable Business Index (LCSi)

GC has been recognized as a leading company in the Low Carbon and Sustainable Business Index (LCSi) with an Outstanding score for three consecutive years. This demonstrates GC's commitment to lower greenhouse gas emissions with an aim to reduce environmental impact.

CSR-DIW Continuous Award

GC's subsidiaries (18 plants) received the CSR-DIW Continuous Award for the 14th consecutive year.

NACC Integrity Awards

GC was awarded a consolation prize for the 10th NACC Integrity Awards by Office of the National Anti-Corruption Commission (NACC) being recognized for its business operations with transparency, anti-corruption, and corporate social responsibility under good corporate governance principles as well as for its emphasis on human rights and compliance with the international ethics standard.

MAJOR EVENTS AND ACTIVITIES IN 2021

SUPPORTING THAI SOCIETY DURING THE COVID-19 PANDEMIC AND OTHER CRISES

In 2021, to support Thailand's resilience in the face of crises, (especially regarding the COVID-19 pandemic), GC Group promoted products related to COVID-19 prevention and offered assistance to medical personnel, frontline staff, and those suffering from the crisis throughout the country with the following contributions.

JANUARY FEBRUARY AND MAY 2021

GC initiated the **"How to Yeak...How to Manage Infectious Waste" Project** in collaboration with Royal Thai Government and private partners to support the correct sorting and disposal of infectious waste during the COVID-19 pandemic. GC has provided 120-litre contactless red bins with foot pedals for infectious waste and red disposal bags made from InnoPlus plastic resin that are durable, humidity-resistant and carbon-footprint certified to various locations. GC and its partners also communicated with foreign workers from Myanmar using the Burmese language, as they are a primary at-risk group. The initiative was carried out in areas of high community spread, such as Samut Sakhon, Chonburi, and Rayong.

2021

GC partnered with Royal Thai Government and private agencies to provide medical supplies under the "Greater Care by GC" brand to medical personnel. The supplies included PE gowns made from PE resin which were made from InnoPlus plastic resin; coveralls made of 100% recycled PET (rPET), which are the Level 2 PPE that can be reused 20 times; leg covers made from rPET; and GelCo hand sanitizer. The supplies were distributed to various hospitals and other locations around the country. Through projects initiated by GC and its partners and other agencies such as **"Millions Support... Ensuring a Safe Space for All" Project**, 4 million PE gowns were given to hospitals and public health agencies around the country. GC also collaborated with "Less Plastic Thailand" and partners to launch the "Sorting Bottles for Doctors" Project which provided PPE to the Mahidol University Faculty of Dentistry Foundation and the Chulabhorn International College of Medicine at Thammasat University for further donation to other areas in need.

SEPTEMBER 1, 2021

On September 1, 2021, amid growing COVID-19 case counts, GC, GC Marketing Solutions Co., Ltd. and 84 plastic manufacturing partners launched the **"Greater Care Charity by GC & Customers" Project** to support medical personnel in taking care of COVID-19 patients. In its primary phase, the project provided integrated plastic innovations and products to field hospitals and community isolation centers in Samut Sakhon, Samut Prakan, and Rayong. In the second phase, the project granted money to the Thai Red Cross Society for the development of 200 Chula High Flow Nasal Cannula (Chula HFNC) devices to be distributed to hospitals around the country.

The Chula HFNC was developed and manufactured jointly by the Thai Red Cross Society, the Chulalongkorn University Faculty of Medicine, and the alumni of the Chulalongkorn University Faculty of Engineering. It is a high-quality medical innovation developed by Thai people that is 3-4 times less expensive than imported devices and can be quickly distributed to hospitals in need in response to the COVID-19 crisis.

JUNE 9, 2021

On June 9, 2021, with Rayong as its second home, the **"Greater Care by GC" brand** provided coveralls and PE gowns made of plastic resin for medical personnel doing fieldwork and helping Samet Island, Rayong to become the first area in Thailand to have a 100% COVID-19 vaccination rate and the first place to use the "Tambon Health Promoting Hospital" as a vaccination location. The effort is the result of collaboration between Rayong Hospital and other organizations. GC also provided hand sanitizer, upcycled shirts for Ban Pae volunteers and Samet Island volunteers.

MARCH 4, 202

On March 4, 2021, having recognized drought as a recurring issue, which grows increasingly serious every year, GC, PTT, the Provincial Waterworks Authority Department of Water Resources, and the Provincial Electricity Authority launched the **"2021 Stopping Drought Crisis" Project** at the Royal Thai Army Headquarters to mitigate the effects of drought on farmers and other groups in remote rural areas.

OCTOBER AND NOVEMBER 2021

With severe flooding in several areas in Thailand affecting people in many communities, GC organized the **"GC Cares for Flooding" Project** to help mitigate the impact of flooding – in which GC distributed plastic rowboats that were provided to various state agencies to help people in many provinces.

The plastic rowboats were made of LLDPE compound plastic resin and manufactured through a rotational molding process to ensure the rowboats are durable, strong, flexible, impact-resistant, and scratch-resistant. The rowboats are also UV-resistant and suitable for extended outdoor use. The rowboats are 90 cm wide, 3 meters long and weigh 35 kg, while accommodating 2-3 people (net weight of 200 kg). As they are made from 100% plastic, they can be recycled if damaged or not used.

SUPPORTING STRATEGIES TO ENHANCE COMPETITIVENESS

JANUARY 28, 2021

GC AND PTT SIGNED A COLLABORATION AGREEMENT UNDER PROJECT ONE

GC signed on as a PTT PLC **Project ONE** collaborator at PTT headquarters, continuing their collaboration on value creation driven by supply & trading optimization that will lead to sustainable growth to the PTT Group, while ensuring power stability and enhanced competitiveness in the country.

FEBRUARY 10, 2021

GC SIGNED AGREEMENT WITH SAMSUNG ENGINEERING TO IMPROVE THE OLEFINS 2 FACTORY, ENSURING FLEXIBILITY IN USING THE MATERIAL, WHILE BUILDING ON THEIR DOWNSTREAM PETROCHEMICAL BUSINESS

GC held a **signing ceremony for the Olefins 2 Modification Project (OMP)** between GC, Samsung Engineering (South Korea) Ltd., and Samsung Engineering (Thailand) Co., Ltd. The project is a part of the Step Change strategy to ensure flexibility in using propane as feedstock, adding value to the downstream business, while enhancing competitiveness. GC signed an engineering design agreement to procure machinery and construction equipment. Commercial manufacturing is expected to begin in the first quarter of 2023 with investment value of 165 million US dollars or Baht 5.198 billion.

MARCH 19, 2021

GC ANNOUNCED THE DELISTING OF VINYTHAI PLC FROM LISTED SECURITIES AND A TENDER OFFER TO STRENGTHEN DOWNSTREAM CHEMICAL PRODUCTS AND DRIVE EXPANSION INTO CLMV MARKETS

GC informed The Stock Exchange of Thailand of its Board resolution to delist VinyThai PLC (VNT) from listed securities and tender offer for VNT securities. AGC Inc. (AGC) as a major stockholder of VNT does not intend to sell its shares of VNT common stock. After VNT securities are delisted, GC and AGC have plan to merge VNT and AGC Chemicals Co., Ltd. (AGC-TH) (a subsidiary with all shares held by AGC). Before the merger, AGC-TH will reorganize by merging PVC under AGC in Vietnam into AGC-TH. Post-merger, GC may consider buying rights offerings in the new company with volumes and prices to be considered later.

This investment will drive the capacity, strength, and development of the downstream businesses of GC, which are PVC and Chlor-Alkali both of which continue to experience rising demand in line with the economic growth. Moreover, this gives an opportunity for GC to expand into CLMV countries.

MARCH 25, 2021

GC HELD THE "INTELLIGENT PIPELINES INFRASTRUCTURE – WATER PIPING SYSTEM & DESIGN SOLUTION" SEMINAR TO ENHANCE THE PIPE MANUFACTURING INDUSTRY IN THAILAND

GC held the **"Intelligent Pipelines Infrastructure – Water Piping System & Design Solution" seminar** to enhance the pipe manufacturing industry and polymer products business in Thailand at The Energy Complex Building in Bangkok. This effort highlighted GC's commitment to develop polymer products in response to the piping needs of its customers and partners through collaboration among its partners in every sector. This should help enable Thai piping products to compete at the international level and to be part of the "thinking buddy" in improving the Thai pipe manufacturing industry.

JUNE 8, 2021

GC REDUCED ITS STAKE IN GLOBAL POWER SYNERGY PCL

GC informed The Stock Exchange of Thailand of its sale of Global Power Synergy PCL (GPSC) common stock. GC sold 305,000,000 shares, representing 10.82% of GPSC's available shares, to PTT PCL. Also 53,936,756 shares were sold to Siam Management Holding Co., Ltd. (1.91% of GPSC's available shares). In total, 358,936,756 shares (~12.73% of GPSC's available shares) were sold. The GPSC's common stock was sold to the contractual party on June 8, 2021. GC reduced its ownership of GPSC from 22.73% to 10% through these transactions.

The sale is accordance with GC's strategy to divest from non-core business while focusing on increasing its performance chemicals business lines.

DRIVING STRATEGY TO SEEK NEW OPPORTUNITIES TO GROW NEW BUSINESSES OR BUSINESSES OVERSEAS

JULY 13, 2021

PTTGC INTERNATIONAL (NETHERLANDS) B.V., A SUBSIDIARY OF GC ACQUIRED allnex, A GLOBAL LEADER IN THE RESIN COATINGS BUSINESS

PTTGC International (Netherlands) B.V. or GC BV, a wholly owned subsidiary of PTT Global Chemical Public Company Limited (GC), has signed an agreement with allnex Holdings S.à.r.l and allnex S.à.r.l, funds advised by Advent International (Advent), to acquire industrial coating resins producer allnex Holding GmbH (allnex). Being a global leader in the resin coatings, allnex manufactures and sells industrial coatings and additives used with a variety of materials such as wood, metal, and plastic. allnex is also a leader in offering solutions of in the application and development of industrial coatings for metals, automobiles, and packages.

This investment was a big step forward for GC in increasing its portfolio of chemical products, which strengthens itself as a leader in chemical products and integrates environmentally friendly innovations with state-of-the-art technology. GC will be a long-term strategic partner, helping allnex improve access to the Asia Pacific market and to expand into emerging markets through future investments.

SUPPORTING STRATEGIES TO FOSTER BUSINESS SUSTAINABILITY AND ADOPT CIRCULAR ECONOMY PRACTICES

FEBRUARY 4, 2021

GC PRESENTED UPCYCLED CHAIRS TO THE FACULTY OF FISHERIES, KASETSART UNIVERSITY FOR USE IN A CO-WORKING SPACE AND VISITED THE MARINE SCIENCE DEPARTMENT'S MARINE DEBRIS REDUCTION UNIT

GC presented upcycled chairs to the Faculty of Fisheries, Kasetsart University to use in a co-working space for students to use, to learn, exchange knowledge, be creative, or read. GC also presented red trash bags for infectious waste and contactless red bins with foot pedals as part of its "How to Yeak…How to Manage Infectious Waste" Project to encourage waste sorting and proper infectious waste disposal to prevent contamination and the spread of disease at Faculty of Fisheries, Kasetsart University.

The upcycled chairs were made of materials composed of 30-40% plastic. The seat cushion was made from waste plastic resins from the Waste Side Story exhibition that GC organized at Bangkok Design Week 2018. The chair structures were made with a wood-plastic composite made by mixing polyethylene (PE) from plastic bag handles with natural waste materials such as sawdust. It is formed to be strong and more durable than real wood.

MARCH 5, 2021

GC BUILT AN INTEGRATED PLASTIC WASTE MANAGEMENT PLATFORM BY PROCESSING CONTAMINATED PLASTIC WASTE, THROUGH A PARTNERSHIP WITH THE SURANAREE UNIVERSITY OF TECHNOLOGY

GC and the Suranaree University of Technology signed a collaboration agreement regarding the **"Study on Plastic Waste Management and Contaminated Plastic Waste Value Adding"** which is a pilot research and development project at the commercial plant level aimed at studying an end-to-end integrated process for managing plastic waste, and adding value to the contaminated plastic waste by using a chemical recycling process to allow the material to be reused as fuel or raw material for chemical products. GC also created an end-to-end management plan to strive for sustainable development and compliance with circular economy principles at the Energy Complex Building in Bangkok.

JUNE 15, 2021

GC JOINED "ALL THAILAND FOR SUSTAINABLE PLASTIC MANAGEMENT"

On June 15, 2021, as one of the founders of **the "Collaboration on Sustainable Plastic and Waste Management" Project (PPP Plastics)**, which aims at reducing plastic waste based on a sustainable waste management according to the circular economy and 3Rs principles, GC partnered with The Federation of Thai Industries (FTI), the private sector, and the Alliance to End Plastic Waste (AEPW) to launch the **"ALL Thailand for Sustainable Plastic Management" Project**. GC, PPP Plastics, FTI, and AEPW will jointly research systematic and sustainable plastic waste management processes which correspond with the Bio-Circular-Green Economy (BCG) guidelines. The project encompasses 1. Eco Digiclean Klongtoei Project which apply digital technology to manage plastic waste in big cities that is currently piloting in Khlong Toei, Bangkok; 2. Rayong Less-Waste Project which expands an already working waste management system to cover 68 municipalities in Rayong; and 3. Paving Green Roads Project that studies road construction using plastic waste and asphalt to reduce resource use intensity.

AUGUST 10, 2021

GC AND CARGILL HIGHLIGHTED THEIR GLOBAL LEADERSHIP IN SUSTAINABILITY, WHILE SUPPORTING THE BCG ECONOMY BY BUILDING A NEW FULLY-INTEGRATED BIOPLASTIC PRODUCTION FACILITY IN THAILAND

GC International Corporation, a subsidiary of GC, and Cargill Incorporated (Cargill) as a 50% stockholder in NatureWorks LLC, the No.1 manufacturer of polylactic acid (PLA), announced their plans to construct a new fully-integrated bioplastic production facility in Thailand to meet increased demand for sustainable materials in the global market. The project supports the Bio-Circular-Green economy model aimed at Thai economic growth and enhanced competitiveness to propel Thailand towards achieving the sustainable development goals.

This new production facility will use the world's most advanced biopolymer technology and sugar from Thai sugarcane farmers to help expand partnerships in the bio-polymer market, including the production and development of products to meet the demand for sustainable materials. Located in the Nakhon Sawan Biocomplex (NBC) in Nakhon Sawan, the production facility is a fully-integrated polylactide and PLA facility with an annual biopolymer capacity of 75,000 tons. This is the first project in Thailand that aligns with the BCG economy model according to the Royal Thai Government policy.

AUGUST 13, 2021

GC SUPPORTS A PR PROJECT ON FORESTATION UNDER THE "BREATH" CONCEPT

On August 13, 2021, the Ministry of Natural Resources and Environment and Royal Forest Department organized a PR project on forestation under **the "Breath" concept** to promote the conservation and rehabilitation of forests and the sustainable utilization of forestlands. The public sector, private sector and civil society support increasing green areas with net zero goals in Thailand. Having awareness of the importance of this project, GC encouraged the public to understand and be aware of the significance of forest resources and participation in adding more green areas.

SEPTEMBER 21, 2021

GC LAUNCHED "YOUTURN" TO HIGHLIGHT WAYS TO MANAGE USED PLASTIC

On September 21, 2021, in recognition of the need to start tackling the plastic waste issue, GC launched "YOUTURN", a plastic waste management platform, under the **"YOUTURN – starts from you" concept** where everyone can add value to plastic waste in an integrated way. People can drop their used plastic products, whether they are rigid such as water bottles, shampoo bottles, milk bottles, food containers or they are flexible such as plastic bags, or plastic wrap, at the YOUTURN Drop Point, located in many areas of Bangkok and in Rayong. The collected plastics will be forwarded to ENVICCO, a global standard plastic recycling factory owned by GC, or partner factories that meet appropriate standards of management, to be upcycled in accordance with the circular economy, instead of being sent to the landfill.

SEPTEMBER 30, 2021

GC JOINED THAIBEV AND THAI UNION AS FOUNDERS OF THAILAND SUSTAINABILITY EXPO TO HOLD "THAILAND SUSTAINABILITY EXPO 2021" TO HIGHLIGHT ITS SUCCESS IN SUSTAINABILITY FOR THE SECOND YEAR

GC, Thai Beverage PLC (ThaiBev) and Thai Union Group PLC (Thai Union) organized a virtual **"Thailand Sustainability Expo 2021"** under the sufficiency for sustainability concept from September 30, 2021, to October 10, 2021, to raise awareness of sustainable development and to create the opportunity to network regarding the application of theory on industrial practices.

OCTOBER 21, 2021

GC GROUP TARGETED "TOGETHER TO NET ZERO" GOALS, DRIVING BUSINESS FOR STRONG AND SUSTAINABLE GROWTH WHILE SERVICING CUSTOMERS

GC announced its goal of **"Together To Net Zero"** which aligns GC with the Paris Agreement. GC aims to reduce Greenhouse Gas (GHG) emission by 20% by 2030 on the journey to achieving net zero by 2050. The 3 pillars are 1. Efficiency-driven: lowering GHG by 20% by ensuring the least GHG emission through modifying current and future manufacturing process and applying new technologies; 2. Portfolio-driven: reducing GHG by 25% by restructuring future business lines to focus on environmentally friendly low-carbon businesses, such as performance chemicals, biochemicals, green and recycling businesses; and 3. Compensation-driven: reducing GHG by 55% by using various methods and streamlined technologies to compensate for the remaining carbon.

The effort is an important milestone for GC in highlighting its "Chemistry for Better Living" concept. GC strives to drive the business in a long-term oriented way by prioritizing the balance between the environment, society, and corporate governance as well as integrating circular economy principles that align with sustainable development goals. Its net zero goal reflects its aim to become a global leader in the chemical industry in the future. Believing that the net zero goal requires effort from all sectors, GC is ready to collaborate with global partners to reduce GHG emission, helping the world to reach the net zero goal together.

NOVEMBER 8, 2021

GC EXPRESSED ITS NET ZERO VISION IN THE "THAILAND MINISTER'S CLIMATE TALK AND BUSINESS LEADERS TO SHARE VISION AND EXPERIENCES ON NET-ZERO TRANSFORMATION" ON COP26

On November 8, 2021, representatives from Thailand and the Thailand Carbon Neutral Network (TCNN) organized an online event alongside the UN Climate Change Conference (COP26) at the Thai Pavilion in Glasgow, Scotland. GC shared its vision in the **"Thailand Minister's Climate Talk and Business Leaders to Share Vision and Experiences on Net-Zero Transformation"** to showcase its commitment in collaborating with the public and private sectors to reach net zero. GC highlighted its use of circular economy principles to run its business and its goal to produce chemical products that are environmentally friendly to improve people's lives. With its decarbonization goal to achieve net zero goal in 2030 which aligns with the Paris Agreement, GC stives to reduce GHG emission by 20% by 2030 on the way to achieving net zero by 2050. GC intends to meet the challenge through the 3 pillars which are Efficiency-driven, Portfolio-driven and Compensation-driven.

The COP26 was held from October 31, 2021, to November 12, 2021, and attended by leaders from 196 countries to discuss guidelines and agreements to prevent a 1.5 degree Celsius rise in global temperature and to prevent global impacts of natural disaster. Being one of ten countries affected by climate change, Thailand is determined to urgently develop and elevate climate change solutions to achieve carbon neutrality by 2050 and zero emissions by 2065.

DECEMBER 7, 2021

GC AND SIAM PIWAT CELEBRATED NEW YEAR 2022, INTRODUCING A CHRISTMAS TREE MADE FROM UPCYCLED HDPE PLASTIC

GC joined forces with Siam Piwat Co., Ltd. to celebrate New Year 2022 with a 10-meter tall **"Circular Living X'mas Tree 2021"** made from post-consumer HDPE plastics collected from employees of both companies. The objective of the event was to ensure that every sector is aware of the value and benefits of reusing plastic according to circular economy principles. After the event, the plastic bottles used for the Christmas tree were given to the YOUTURN Project to produce upcycled trash cans for infectious waste. The Christmas tree was displayed at Siam Discovery Plaza between December 7, 2021, and January 16, 2022.

DECEMBER 22, 2021

GC GROUP APPLIED SPECIALIZED KNOWLEDGE TO IMPROVE THE THIRD VERSION OF AN AIR PURIFIER FOR POLLUTION AND PM 2.5, WHICH WAS PRESENTED TO THE RAJAPRAJANUGROH FOUNDATION UNDER ROYAL PATRONAGE

On December 22, 2021, the Rajaprajanugroh Foundation Under Royal Patronage received the third version of a pollution and PM 2.5 air purifier. The GC Group applied its expertise to optimize the air treatment device, in collaboration with Associate Professor Singh Intrachooto, Ph.D., an expert in environmental design, who teaches at Kasetsart University. The air purifier was improved to have an appealing design and to be environmentally friendly. GC also worked with Associate Professor Sate Sampattagul, Ph.D., head of the research team on air quality measurement at Chiangmai University on the air quality measurement system and PM 2.5 filter. The effort aimed at solving environmental and air pollution issues in the long term as well as building a prototype for people to build their own air purifiers.

The third version of the air purifier prototype uses a 3-layer filtration system and GC's innovative plastic, made from a mixture of LLDPE and recycled plastic bottle caps through the rotational molding. The device was seamless, extra-durable, and resistant to UV – perfect for extended outdoor use. The UVC disinfection system was added in response to hygienic needs driven by the COVID-19 pandemic. The sensor and PM 2.5 measurement display were also installed to display instantaneous air quality information.

MESSAGE OF THE CHAIRMAN

"I believe that GC is ready to enter into the new decade in the world's chemicals industry arena, on account of the collaborative spirit and dedication of the Board of Directors, executives, and all employees who mutually strives to the directions and goals to pursue sustainable growth, and maximum benefits all shareholders and stakeholders — on the basis of fairness, environmental conservation and value creation for society to ensure a long-lasting collective prowess."

A decade of pride towards world-class petrochemical leadership and a **NET ZERO** goal for the sustainable growth GC and society

Ever since its initial inception as Thailand's first petrochemical producer, 37 years ago, PTT Global Chemicals Public Company Limited (GC) is marking the 10th anniversary of its consolidation and foundation – a decade of accumulating experience and fostering organizational strength to achieve unceasing growth, along with determination in striving for sustainable pursuits while complying to the principle of corporate governance – as a leading Thai organization that has proudly elevated itself to international caliber both on the paths of business and sustainability.

The year 2021 was yet another challenging year. Despite signs of recovery of the economic and industrial sectors, the world was beset by the spread of new variants of the COVID-19 throughout the year. However, due to the dedication of all parties, who continued to advance action plans to achieve the set goal in the face of business volatility, the company successfully achieved good operating results. In 2021, GC posted Baht 468,953 million in revenues from sales of goods and rendering of services, Bath 31,347 million in operating profit, and Baht 44,982 million in net profit, equivalent to Baht 10.01 in earnings per share.

On the business aspect, GC have successfully acquired allnex Holding GmbH, the world's number one producer of coating resins used in various industries, including steel, automotive, and packaging, and a leading developer of new coating applications for a range of surfaces, especially eco-friendly innovations. Not only has this acquisition enabled a great leap forward into a stable, high-value business with favorable returns on investment and reduce volatility, but also demonstrated the determination to enter businesses aligned with global megatrends with high-quality products which effectively meet the needs of consumers and the modern world.

With regards to sustainability, GC have demonstrated a clear stance to join the Paris Agreement in accordance with the United Nations Framework Convention on Climate Change (UNFCCC) and set a goal to achieve a Net Zero target by 2050 – one of the challenging goals that will enable a steady and sustainable growth in the long term. GC has also continued to place emphasis on fostering integration to achieve resource efficiency while also managing portfolio in transition towards low-carbon businesses and fostering collaboration with stakeholders across the supply chain.

Furthermore, the organization has been equipped for resilience towards new business models and challenges by carrying out the FiT Project, aiming to streamline work processes enterprise-wide, reduce costs, and boost efficiency and effectiveness by applying more digital technology to production and operations as well as enhance capabilities through upskilling and reskilling and foster the Conviction to Change corporate culture among employees at all levels.

The business approach to balancing all professional dimensions while aligning to the framework of good corporate governance and integrating governance has been continually emphasized by the company as ever. Governance Risk Management & Internal Control and Compliance (GRC) is one of the organization's corporate strategies in congruent to the principle of sustainable development in achieving Environmental, Social, and Governance (ESG) balance. Consequently, GC was placed at the top of the Dow Jones Sustainability Indices (DJSI) in the world's chemicals sector for the third consecutive year and ranked among the top ten for the ninth consecutive year, becoming the only chemicals company in Thailand and Asia to place first for three consecutive years. In addition, as a result of our anti-corruption efforts, GC received an Honorable Mention Award at the NACC Integrity Awards by the National Anti-Corruption Commission and attained a rating of Excellent on the Corporate Governance Report of Thai Listed Companies for 10 consecutive years.

Today, I believe that GC is ready to enter into the new decade in the world's chemicals industry arena, on account of the collaborative spirit and dedication of the Board of Directors, executives, and all employees who mutually strives to the directions and goals to pursue sustainable growth, and maximum benefits all shareholders and stakeholders — on the basis of fairness, environmental conservation and value creation for society to ensure a long-lasting collective prowess.

(Mr. Piyasvasti Amranand)
Chairman

GC seeks to develop innovations and technology to offer high quality and environmentally friendly products. We are committed to delivering the best possible products by paying great attention to the production process from source to end-user.

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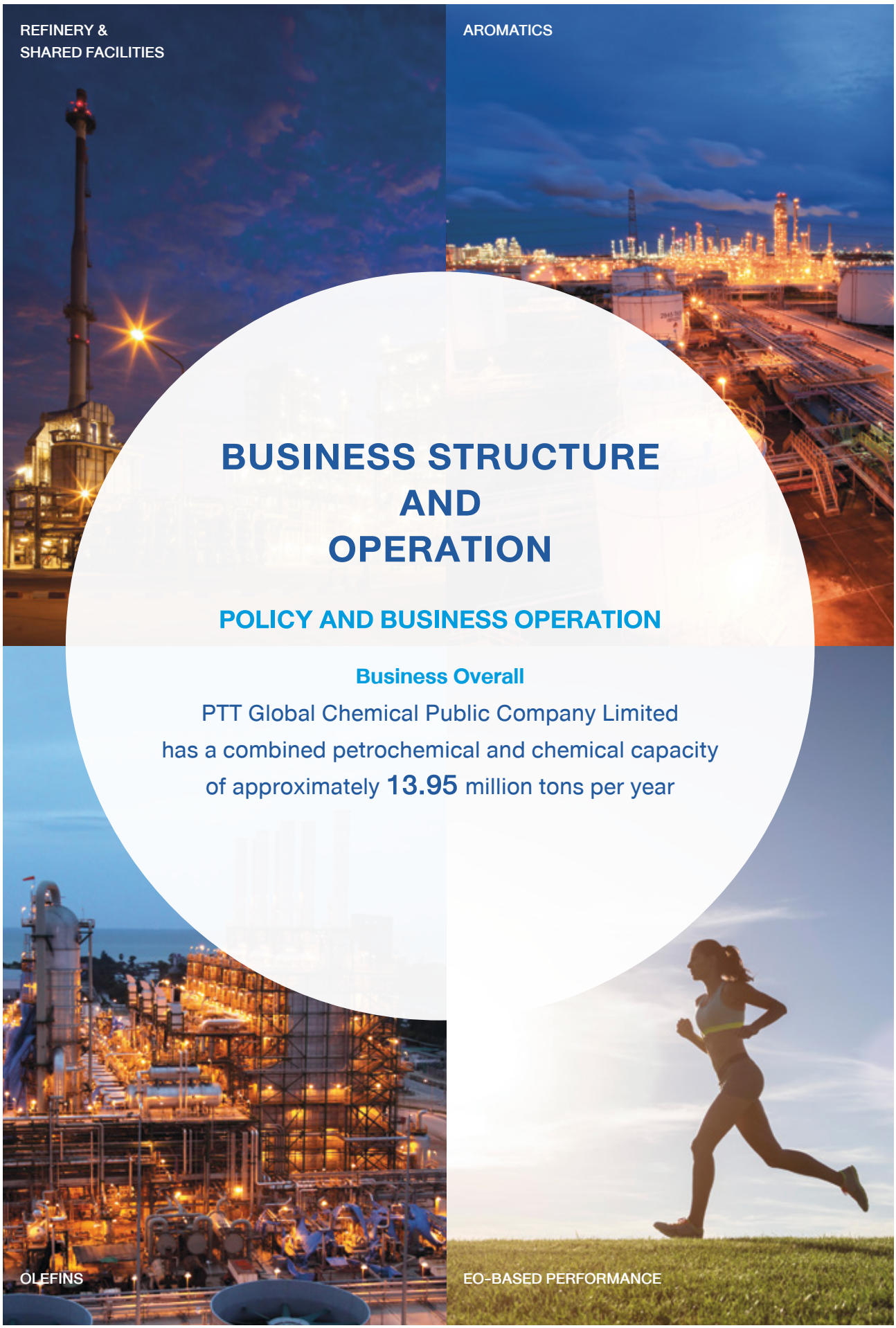
BUSINESS OPERATION AND PERFORMANCE



BUSINESS STRUCTURE AND OPERATION

POLICY AND BUSINESS OPERATION

Business Overall

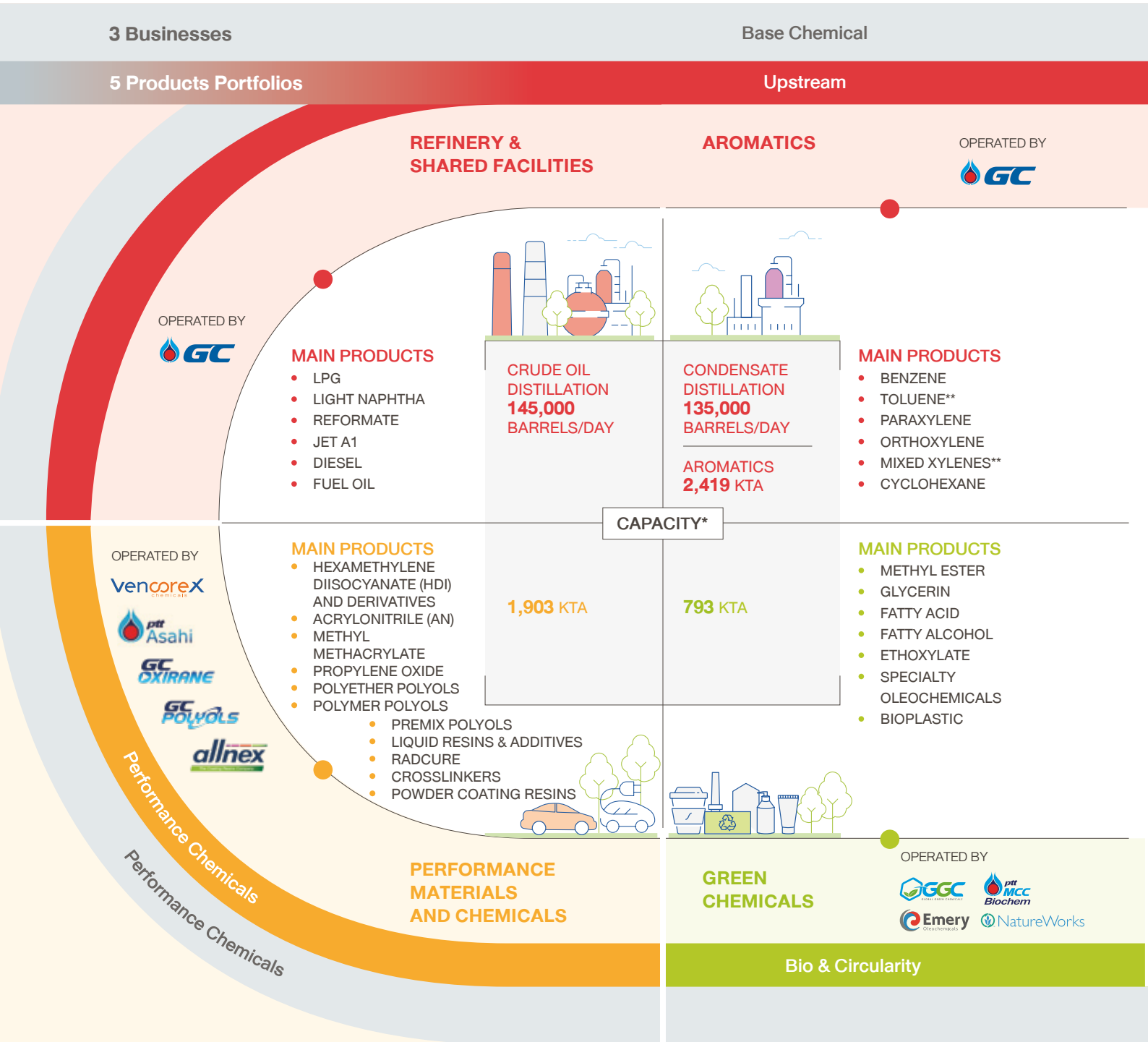
PTT Global Chemical Public Company Limited has a combined petrochemical and chemical capacity of approximately **13.95** million tons per year

GC is considered Thailand's largest integrated petrochemicals and chemicals and a leader in Southeast Asia in terms of size and the variety of petrochemical products. GC has policies to build portfolio of business ,which responses to global megatrends through High Value Business (HVB) and Low Carbon Business, matching with customers' needs, enhancement of life quality, and generating profit and sustainable return to stakeholder. GC consists of 3 core business group:

1. Base Chemicals: Upstream
2. Derivative and Bio Chemicals: Intermediates, Polymers & Chemicals, Bio & Circularity
3. Performance Chemicals

BUSINESS STRUCTURE

In 2021, GC, as a Chemical Flagship of PTT Group with a combined chemical and petrochemical capacity of 13.95 million tons per year and crude oil and condensate distillation capacity of 280,000 barrels per day. GC consists of 3 business groups and has other businesses and services which GC invested for supporting 5 business groups, summarized in the diagram as follows:

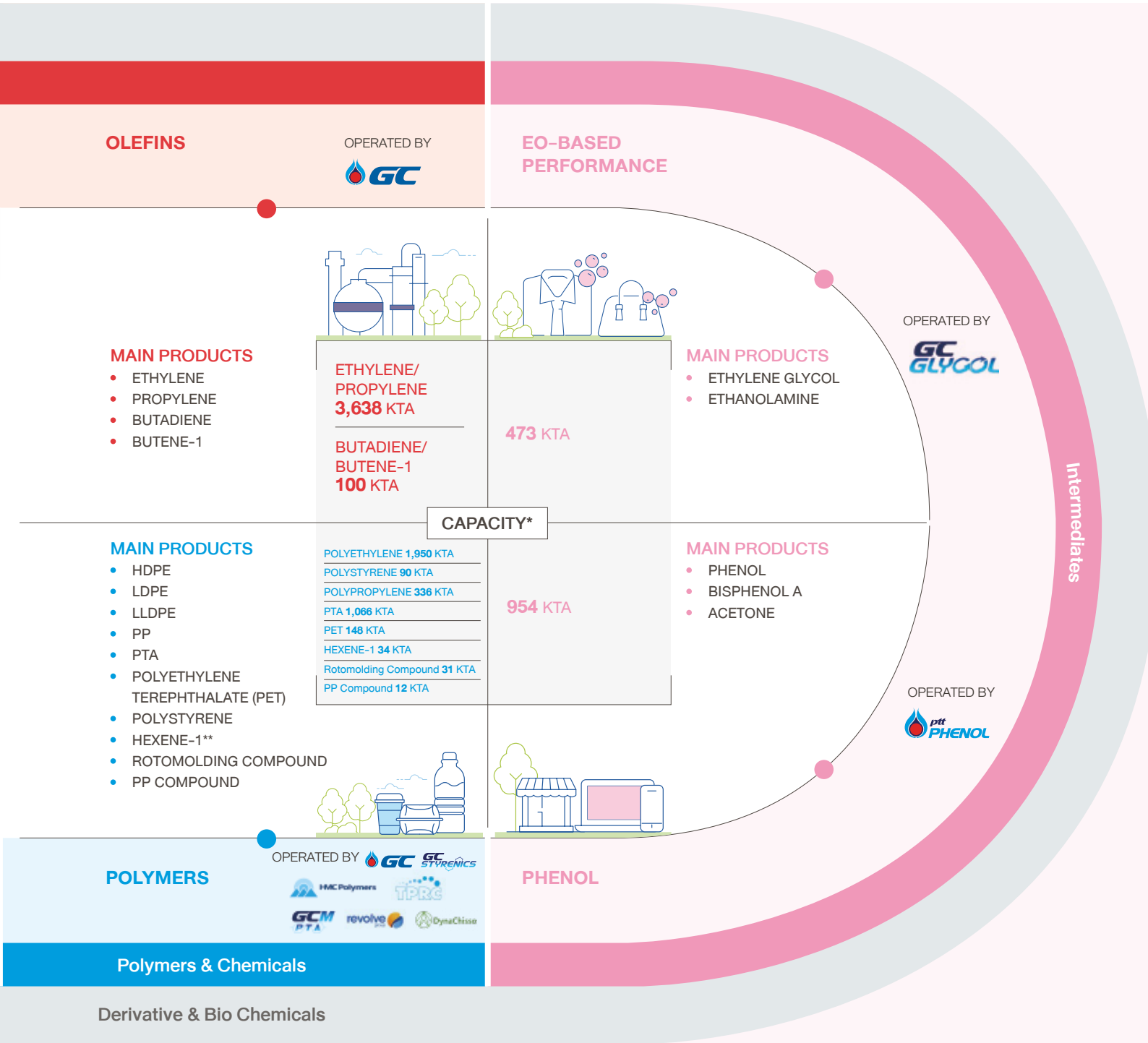


Remarks:
(1) Base Chemicals: Upstream
(2) Derivative and Bio Chemicals: Intermediates, Polymers & Chemicals, Bio & Circularity
(3) Performance Chemicals

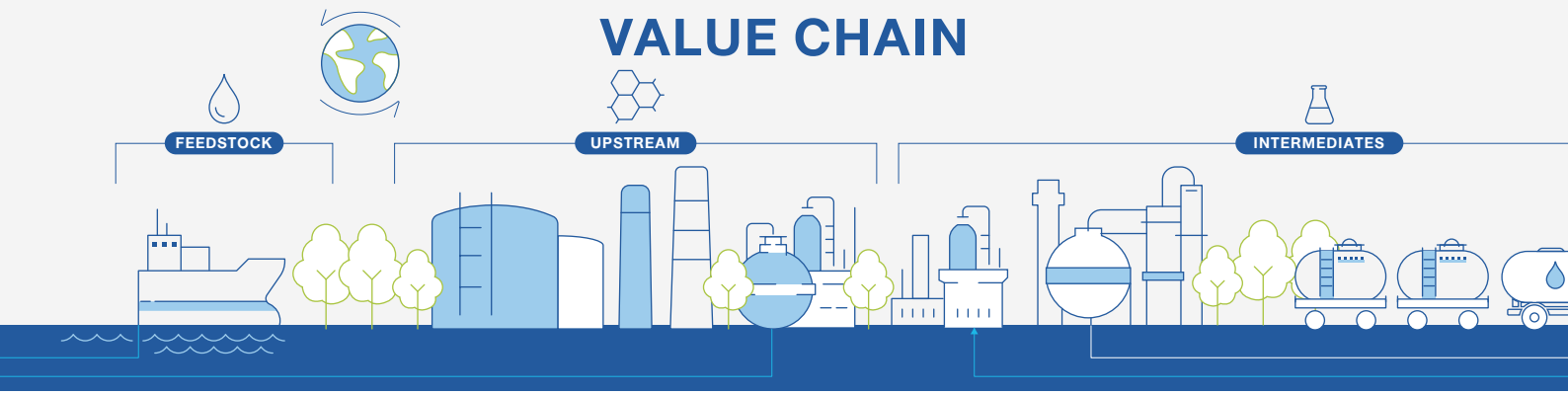
* Only capacity that GC hold equal to or more than 25% share and calculate proportion by percent share.
** For internal use

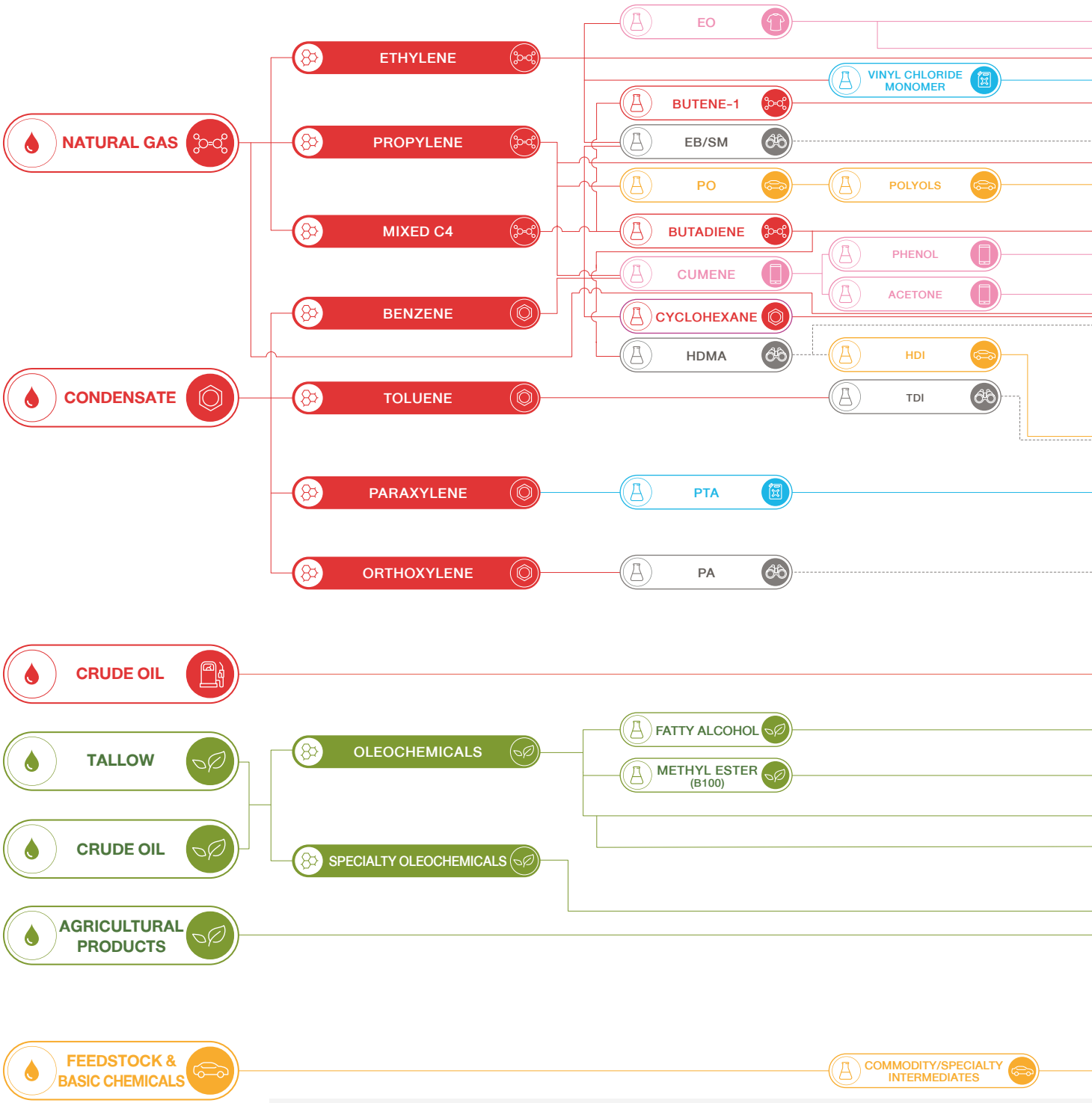
Services and Others

• Jetty and chemical tank farm	Operated by TTT
• Utility business	Operated by GPSC
• Plant maintenance and engineering design services	Operated by GCME and PTTES
• Safety, occupational health, and environmental, and security services	Operated by NPC S&E and NPCSG
• Pipeline infrastructural services	Operated by EFT
• Information and communication technology service	Operated by PTT Digital
• Labor outsourcing service	Operated by BSA
• Marketing and sales of methyl amine derivatives, plastic compounds, specialty products, and health and nutrition products	Operated by SUN
• Polymer sales services	Operated by GCM (Polymers Business Unit)
• Logistics services	Operated by GCL (Polymers Business Unit)
• GC Group's liquidity management and financing service	Operated by GCTC
• Management consultancy	Operated by PRS Rayong
• Manufacture procure, sell products and/or provide services that contributes to society	Operated by SPSE
• Plastic packaging development support	Operated by SPIG
• Land and property management	Operated by GCEC
• Corporate venture capital investment	Operated by GCV and GCVA



BUSINESS VALUE CHAIN





Group Performance Center-Refinery & Shared Facilities

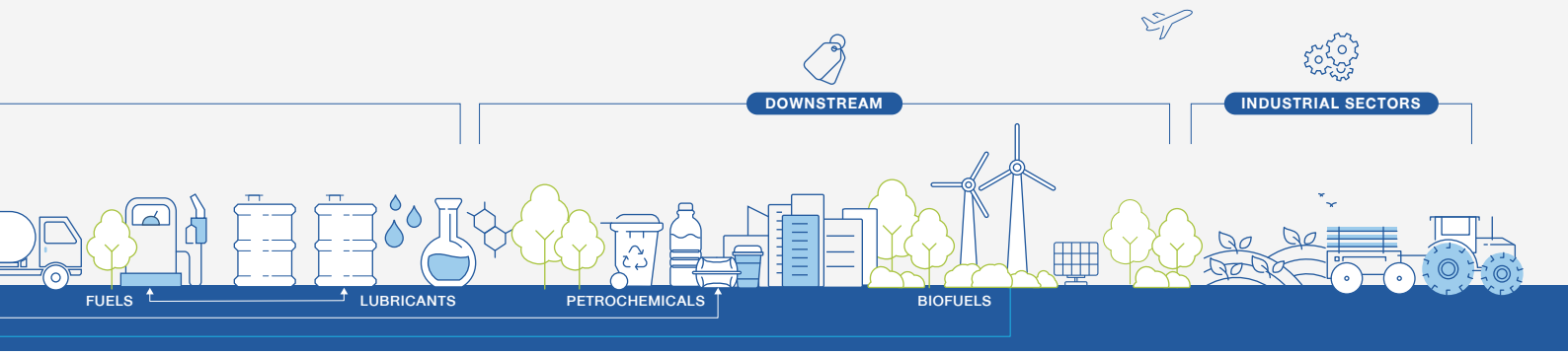
Group Performance Center Aromatics

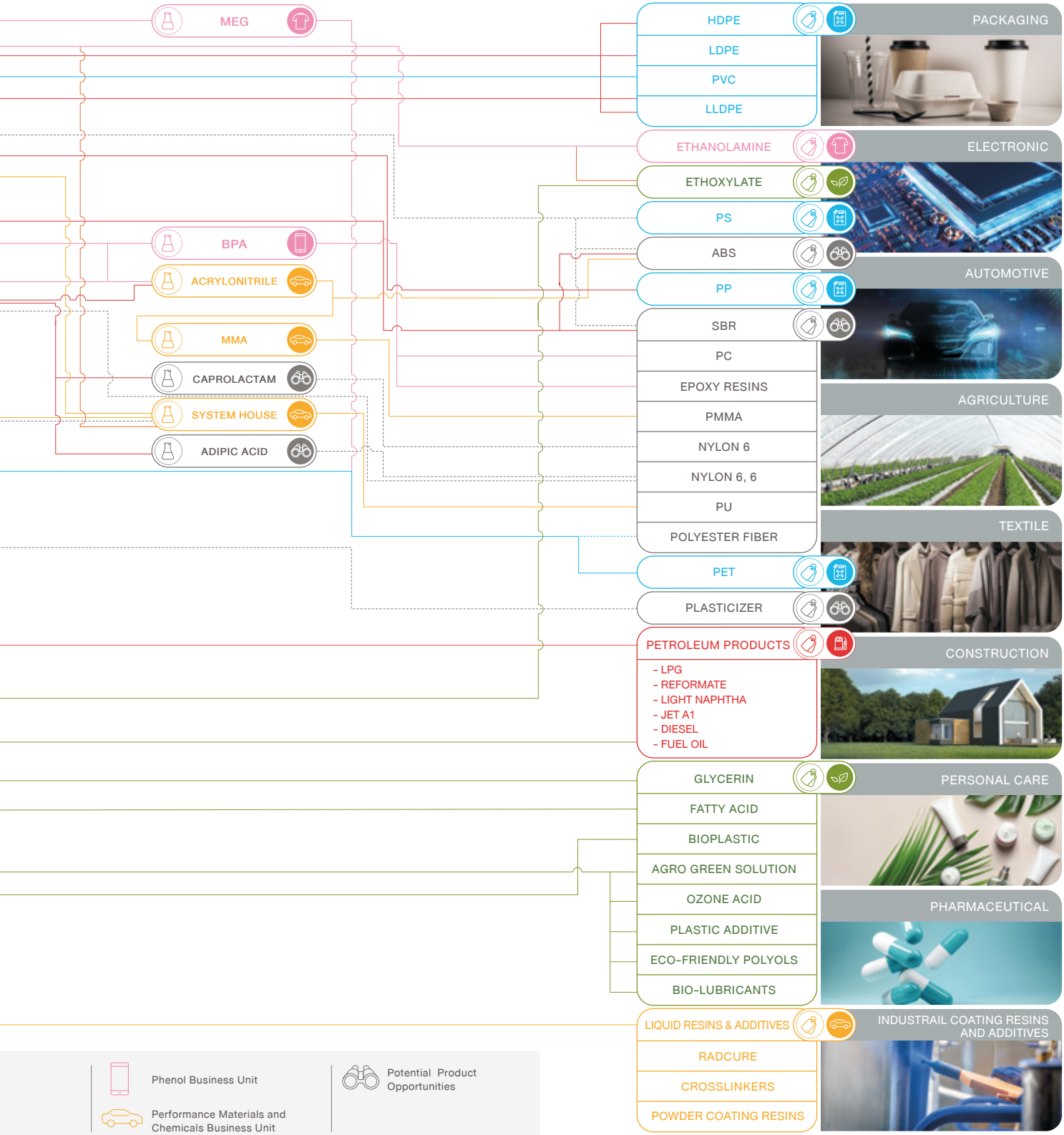
Group Performance Center-Olefins

Polymers Business Unit

EO-Based Performance Business Unit

Green Chemicals Business Unit


DOWNSTREAM
INDUSTRIAL SECTORS
FUELS
LUBRICANTS
PETROCHEMICALS
BIOFUELS


MEG
BPA
ACRYLONITRILE
MMA
CAPROLACTAM
SYSTEM HOUSE
ADIPIC ACID
HDPE
LDPE
PVC
LLDPE
PACKAGING
ETHANOLAMINE
ETHOXYLATE
ELECTRONIC
PS
ABS
PP
SBR
AUTOMOTIVE
PC
EPOXY RESINS
PMMA
NYLON 6
NYLON 6, 6
PU
POLYESTER FIBER
AGRICULTURE
PET
PLASTICIZER
TEXTILE
PETROLEUM PRODUCTS
- LPG
- REFORMATE
- LIGHT NAPHTHA
- JET A1
- DIESEL
- FUEL OIL
CONSTRUCTION
GLYCERIN
FATTY ACID
BIOPLASTIC
AGRO GREEN SOLUTION
OZONE ACID
PLASTIC ADDITIVE
ECO-FRIENDLY POLYOLS
BIO-LUBRICANTS
PERSONAL CARE
PHARMACEUTICAL
LIQUID RESINS & ADDITIVES
RADCURE
CROSSLINKERS
POWDER COATING RESINS
INDUSTRAIL COATING RESINS AND ADDITIVES
Phenol Business Unit
Performance Materials and Chemicals Business Unit
Potential Product Opportunities

COMPANY INFORMATION

NAME : PTT Global Chemical Public Company Limited

INITIAL : PTTGC	WEBSITE : www.pttgcgroup.com	REGISTERED NUMBER : 0107554000267

NUMBER AND VALUE : As at December 31, 2021,
the Company's registered share capital was of Baht 45,088,491,170
comprising of 4,508,849,117 common shares
at a par value of Baht 10 per share.
Paid-up capital was Baht 45,088,491,170

ESTABLISHMENT : October 19, 2011	FIRST DAY TRADE ON THE SET: October 21, 2011

BUSINESS STRUCTURE AND VALUE CHAIN

- Group Performance Center - Refinery & Shared Facilities
- Group Performance Center - Aromatics
- Group Performance Center - Olefins
- EO-Based Performance Business Unit
- Phenol Business Unit
- Polymers Business Unit
- Green Chemicals Business Unit
- Performance Materials and Chemicals
- Services & Others

NUMBER OF EMPLOYEES : 10,819 as of December 31, 2021

CONTACT

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Fax : +66 (0) 3899-4111

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Fax : +66 (0) 3899-4111

BRANCH 3 OLEFINS 2
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Fax : +66 (0) 3899-4111

BRANCH 4 AROMATICS 1
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Rayong Province 21150
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Fax: +66 (0) 3899-4111

BRANCH 5 AROMATICS 2
98/9 Rayong Highway Road 3191,
RIL Industrial Estate, Map Ta Phut Sub-District,
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Tel: +66 (0) 3897-1000
Fax: +66 (0) 3899-4111

BRANCH 6 REFINERY
8 I-8 Road, Map Ta Phut Industrial Estate,
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Rayong Province 21150
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BRANCH 7 JETTY AND BUFFER TANK FARM
19 Rong-Pui Road, Map Ta Phut Industrial Estate,
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Fax: +66 (0) 3899-4111

BRANCH 8 AROMATICS TANK FARM
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BRANCH 9 LABORATORY SERVICE CENTER
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BRANCH 15 GC Chemical Experience Campus
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NATURE OF BUSINESS

REVENUE STRUCTURE OF GC AND SUBSIDIARIES CATEGORIZED BY BUSINESS GROUPS

Business Group	2019		2020		2021	
	Revenue (Million THB)	%	Revenue (Million THB)	%	Revenue (Million THB)	%
Refinery and Shared Facilities						
Total	175,036	42.4	136,155	41.3	176,762	37.7
Aromatics						
Total	54,653	13.2	34,224	10.4	41,483	8.8
Olefins						
Total	22,437	5.4	16,744	5.1	24,154	5.2
EO-Based Performance						
Total	10,141	2.5	8,271	2.5	13,159	2.8
Polymers						
Total	99,760	24.2	81,232	24.7	123,341	26.3
Green Chemicals						
Total	12,017	2.9	16,593	5.0	18,982	4.0
Performance Materials and Chemicals						
Total	36,769	8.9	34,112	10.4	68,721	14.7
Services and Others						
Total	1,997	0.5	1,961	0.6	2,350	0.5
Net Total after deduction from connected transaction	412,810	100	329,291	100	468,953	100.0

REFINERY AND SHARED FACILITIES

NATURE OF PRODUCTS

As Thailand's leading refiner and distributor of petroleum products, GC owns and operates a modern complex refinery equipped with hydrocracker and visbreaker units, capable of converting low-value fuel oil to more valuable middle-distillate products. Our average refining capacity stands at 145,000 barrels per day of crude and 135,000 barrels per day of condensate. Additionally, our refining process is flexible, ready to be adjusted to accommodate customer demand and volatility in the market. Below is a summary of our refined products and their usage:

Petroleum Product		Usage
Light Distillate	Liquefied Petroleum Gas (LPG)	• Fuel • Petrochemical feedstock (Olefins plants)
	Light Naphtha	• Gasoline blending component • Petrochemical feedstock (Olefins plants)
	Reformate	• Gasoline blending component • Petrochemical feedstock (Aromatics plants)
Middle Distillate	Jet Fuel	• Aviation fuel
	Diesel	• Fuel for industrial and transport sectors
Heavy Distillate	Fuel Oil	• Fuel for industrial sector and maritime transport

FEEDSTOCK SOURCING

In 2021, GC distilled crude about 49.6 million barrels and feedstock from the aromatics plants, equivalent to 95% of its capacity. The capacity was also adjusted to suit the demand during the COVID-19 pandemic. GC secured crude oil at market prices through a long-term feedstock supply agreement with PTT.

POLICY AND MARKETING

One of the GC's key strategy is capital reduce by sourcing for low cost feedstocks from both domestic and international sources. In order to emphasize on domestic distribution, then local crude oil has been prioritized and also expand to CLMV market which has higher price opportunities. Furthermore, GC is the sole company in Thailand that ready to produce and distribute diesel fuel which has equivalent quality to EURO 5 and comply with the government regulation which will be announced in 2024. GC has collaborated with PTT Group in crude oil procurement and petroleum products distribution with competitive unit price and meet the market demand.

In 2021, GC sold a total of 57 million barrels of petroleum products from its refinery, with diesel as the primary products, 79% of which were sold domestically, accounting for a 20% market share of the domestic sales. GC's main customer was PTT Oil and Retail Business Public Company Limited (PTTOR), which has long-term purchase agreements with the Company. GC has plan to increase domestic sales to accommodate a rise in demand and expand to CLMV to grow its marketing base continuously.

In 2021,
GC sold a total of
57
million barrels
of petroleum products
from its refinery

AROMATICS

NATURE OF PRODUCTS

GC produces and distributes aromatics products, namely paraxylene, benzene, orthoxylene, mixed xylene, toluene, and cyclohexane. These products are used as feedstock in various industrial processes.

Aside from these products, GC's aromatics plants yield multiple by-products, including Liquefied Petroleum Gas (LPG), light naphtha, heavy aromatics, and condensate residue. LPG and light naphtha are used as feedstock in our olefins plants, while heavy aromatics and condensate residue are used as feedstock in our refinery to produce jet fuel, diesel, and fuel oil.

GC currently operates two aromatics plants with a combined capacity of 2,419 thousand tons per year. The table below details the nameplate capacity of each product:

Company	Product	Nameplate Capacity (thousand tons per year)
GC	Benzene	697
	Toluene*	50
	Paraxylene	1,310
	Orthoxylene	86
	Mixed Xylene*	76
	Cyclohexane	200

*Toluene and mixed xylene are currently used as feedstock at both aromatics plants

FEEDSTOCK SOURCING

In 2021, GC used approximately 4.5 million tons of condensates as the primary feedstock for the production of aromatics and by-products, consisting of 2.8 million tons of domestically-sourced and 1.7 million tons of imported condensates. GC has also entered into a long-term condensate purchase agreement with PTT to procure feedstock for its aromatics plants at market prices.

POLICY AND MARKETING

One of the key strategy is feedstock procurement for aromatic plants by sourcing from domestic condensates which has the most economic value and still continuously seeks for low-sulfur condensates to use as alternative feedstocks for aromatic plants. This will reflect in lower production cost, meanwhile, emphasize in domestic distribution. Nevertheless, GC has corporate with PTT Groups to strengthen the marking strategy and distribute these products in worldwide market, as well as develop the supply chain management, such as shared transportation.

Approximately 83% of GC's aromatic products are sold to domestic customers, most of whom are customers with long-term and short-term agreements. The remaining 17% aromatic products are exported primarily to customers in Asia and Europe.

In 2021, GC had a domestic aromatics market share of approximately 77%.

In 2021, GC had a domestic aromatics market share of approximately **77%**.

OLEFINS

NATURE OF PRODUCTS

GC's olefins plants are capable to produce olefins, consisting of ethylene and propylene with flexibility in vary the type of feedstocks such as ethane, propane, LPG and NGL, which are the product from natural gas, including LPG and light Naphtha from oil refinery and aromatics facilities.

The olefins plants also yield various by-products, such as pyrolysis gasoline, mixed C4, tail gas, cracker bottom, and hydrogen. GC enriches the values of these by-products through synergy with the refinery and aromatics plants. For example, pyrolysis gasoline is turned into aromatics products; cracker bottom is mixed with fuel oil into higher valued products; hydrogen is used in the refinery as a substitute for hydrogen produced by the Hydrogen Manufacturing Unit (HMU), which otherwise requires a higher production cost; and mixed C4 is turned into butadiene and butene-1 at the by-product value-added plant.

GC also produces utilities (electricity, steam, and industrial water) for our own use, which enhances its production capability and competitiveness. Surplus volumes of the utilities are sold to Electricity Generating Authority of Thailand (EGAT) and neighboring petrochemical plants.

GC has five olefins plants. In 2021, olefins plant unit 4 (Olefins Reconfiguration Project) began commercial production project, and increase overall nameplate capacity to 3,738 thousand tons per year. The details are shown in the table below:

Company	Product	Nameplate Capacity (thousand tons per year)
GC	Ethylene	2,876
	Propylene	762
	Butadiene	75
	Butene-1	25

FEEDSTOCK SOURCING

The primary feedstocks for GC's olefins production are ethane, propane, LPG, and NGL, which are natural gases. In 2021, GC secured 65% of these feedstocks from PTT and used more internally produced feedstocks. While GC relied heavily on PTT, PTT also has a high capacity to deliver these feedstocks as it operates five gas separation plants in Map Ta Phut, which are unlikely to halt production at the same time. PTT also has feedstock reserves, which enable PTT to deliver feedstocks to its customers. In addition, GC and PTT also work closely to ensure feedstocks are delivered as planned. GC has also entered into a long-term olefins purchase agreement with PTT to procure feedstock for its olefins plants at market prices.

In addition to the aforementioned feedstocks, GC also uses light naphtha and LPG, which are by-products from GC's refinery and aromatics plants. GC's feedstock security derives from flexibility in feedstock choice, which allows GC to produce olefins products with consistently high stability and meet the needs of downstream industries. In 2021, GC's olefins plants use natural gases and naphtha approximately in a ratio of 80:20.

POLICY AND MARKETING

GC's policy is to build its competitiveness on par with international standards by using diverse feedstocks, controlling costs to a competitive level, and increasing business opportunities from upstream to downstream businesses to give GC stability and management options. GC's domestic and international competitive capabilities have allowed for more agile marketing polices and increased options in selling its products, especially during times of high volatility. In addition, GC seeks opportunities to create the synergy within PTT Group, such as by sourcing quality feedstock at competitive prices and exchanging knowledge to jointly develop best practices.

Olefin products are primarily used to produce downstream petrochemical products for expanding and value adding to olefins products, while the rest is sold to its affiliated and domestic customers, such as GC Glycol Co., Ltd. (Glycol), HMC Polymers Co., Ltd. (HMC), Vinythai PLC (VNT), GC Oxirane Co., Ltd. (GCO) and other companies in Map Ta Phut Industrial Estate. GC's domestic market shares for ethylene and propylene are 38% and 48% respectively. The remaining products are exported. GC continuously seeks for opportunities through corporation with PTT groups to strengthen the marking strategy and distribute these products in worldwide market.

EO-BASED PERFORMANCE BUSINESS UNIT

NATURE OF PRODUCTS

To supplement value to current olefins products and satisfy rising demand from the industrial sector and general consumers, GC recognizes the need for high-value products which has not manufactured in Thailand yet. This is not only for import substitution, but also to raise Thailand's petrochemical competitiveness. GC has expanded businesses into ethylene oxide and other downstream products. Our key EO-based performance products and their applications are described as follows:

A) ETHYLENE OXIDE (EO)/ETHYLENE GLYCOL (EG)

As a downstream product of ethylene, EO used as feedstock for EG and other downstream products. EG-based products consist of mono ethylene glycol (MEG), diethylene glycol (DEG), triethylene glycol (TEG), and polyethylene glycol (PEG). Among these products, MEG is the main feedstock combined with PTA for the production of PET bottles and polyester textile.

B) ETHANOLAMINE (EA)

Derived from EO, EA primarily comes in either the monoethanolamine (MEA), diethanolamine (DEA), and triethanolamine (TEA) form. EA products are used as ingredients for the production of shampoos, hair conditioners, fabric softeners, and cosmetic products, as well as in pharmaceutical and cement industries, among others.

All of these EO-based products are produced by GC Glycol Co., Ltd. (Glycol).

In 2021, the EO-Based Performance Business Unit commercially operates two plants located in WHA Eastern Industrial Estate, Rayong. The breakdown of production capacities appears in the table below:

Company	Product	Nameplate Capacity (thousand tons per year)
Glycol	Mono Ethylene Glycol (MEG)	423
	Ethanolamine (EA)	50

FEEDSTOCK SOURCING

The primary feedstock of MEG production is ethylene, which Glycol obtains from GC through long-term purchase agreements. GC's olefin plants produce sufficient ethylene for MEG production.

POLICY AND MARKETING

It is policy of the EO-Based Performance Business Unit to sell its products to domestic business owners at prices and under trade conditions that are competitive with other manufacturers, focusing on creating maximum added value from EO products, which consist of the following:

EG Products: As Thailand's first and only EG producer, Glycol uses its strengths and business advantages in marketing, such as its position as a domestic producer of high-purity products, faster response and delivery time compared to other producers, and the ability to deliver products continuously from its storage tanks. In 2021 Glycol totally distributed MEG products about 452,000 tons which are 440,000 tons (97%) and 12,000 tons (3%) for domestic and international market, respectively.

EA Products: Glycol's policy is to maximize the domestic market share by focusing on direct sale to major clients and through distributors for retail customers. The remaining volume from domestic sale is exported internationally to countries that yield maximum benefits. Glycol also seeks new regional markets, such as in Asia and Australia. In 2021, Glycol produced approximately 38,000 tons of EA products in total. Of this, about 12,000 tons, (32%), was sold domestically, while the remaining 26,000 tons, (68%), was sold in international markets.

In 2021 Glycol totally distributed MEG products about **452,000** tons which are **440,000** tons (97%) for domestic market

PHENOL BUSINESS UNIT

NATURE OF PRODUCTS

Phenol is used as feedstock for the production of downstream products, such as engineering plastics. These products are in high demand in high-growth industries, including automotive, electrical appliance and electronics, and construction. GC Group operates the phenol business through PTT Phenol Company Limited (PPCL) with key products listed as follows:

A) Phenol

Phenol, an intermediate petrochemical derived from benzene and propylene, is a key feedstock for bisphenol A (BPA), phenolic resin, and various derivatives for the plastic, pharmaceuticals, and chemical industries.

B) Acetone

Acetone, a by-product from phenol production, is a very common solvent in various industries, such as chemical, cosmetics, and medical industries. Acetone is also used as feedstock for bisphenol A and methyl methacrylate, used in plastics and coating industries, among others.

C) Bisphenol A

Bisphenol A is an intermediate petrochemical and feedstock for polycarbonate (PC), an engineering plastic used in various industries, such as automotive industry, electrical appliance and electronics industry, and construction industry. BPA is also a key feedstock for epoxy resin, which is used in composite materials, coatings, and paint industry.

In 2021, PPCL operates three commercial plants located in WHA Eastern Industrial Estate, Rayong, as detailed in the following table:

Company	Product	Nameplate Capacity (thousand tons per year)
PPCL	Phenol	492
	Acetone	304
	Bisphenol A	158

FEEDSTOCK SOURCING

The primary feedstocks for the production of phenol are benzene and propylene, which PPCL sources through long-term purchase agreements. GC Group's plants produce sufficient feedstock for phenol manufacturing.

POLICY AND MARKETING

PPCL is a company in the Phenol Business Unit. Its policy is to sell products to manufacturers of derivative products and trade agents both in Thailand and overseas, focusing on boosting the sale of phenol, acetone, and bisphenol A in the domestic market, with the current domestic market share at 42%, while exporting the remaining volume to China, India, and countries in East Asia and Southeast Asia. GC expects more intense competition in China, which is its main market. It is also GC's policy to support selling to other markets, such as Vietnam, Taiwan, and South Korea, taking into account suitable return on investment and risk management plans.

PPCL's Marketing Excellence centers on increasing and retaining domestic market shares as well as expanding into potential international markets, especially niche markets. To achieve this, PPCL employs its business strengths and advantages, including its high-quality products, trade partners with marketing networks across the world, stable sources of feedstock, major domestic customers, and consistent customer relations activities.

POLYMERS BUSINESS UNIT

NATURE OF PRODUCTS

Polymers are downstream petrochemicals primarily used as feedstock for everyday plastic products. They are commonly molded into multiple shapes and forms of plastic packaging, such as bags, bottles, containers for food and general goods, lubricant containers, buckets, and crates. Polymers are also used as feedstock for other downstream industries, such as construction, packaging, agriculture, automotive, and electrical appliances. Our key polymer products are as follows:

- High-density polyethylene (HDPE)
- Linear low-density polyethylene (LLDPE)
- Low-density polyethylene (LDPE)
- Polypropylene (PP)
- Purified terephthalic acid (PTA)
- Polyethylene terephthalate (PET)
- Polystyrene (PS)
- Rotomolding compound
- PP Compound

Polyethylene (PE) and PE Compound are produced by GC and sold under the InnoPlus and Plastmate trademarks, respectively. Polypropylene (PP) are produced by HMC Polymers Co., Ltd., and sold under the Moplen, Purell, Clyrell, Adstif and Adsyl trademarks. Purified terephthalic acid (PTA) are produced by GC-M PTA Co., Ltd. (GC-M PTA), while polyethylene terephthalate (PET) are produced by Thai PET Resin Co., Ltd. (TPRC), and sold under the InnoPlus trademark. Polystyrene (PS), available as general-purpose polystyrene (GPPS) and High-Impact Polystyrene (HIPS), are produced by GC Styrenics Co., Ltd. (GCS) and sold under the DIAREX trademark. Rotomolding compound is produced by Revolve Group Limited (RGL) and sold under the Revolve trademark. PP compound is produced by DynaChisso Thai Co., Ltd. (DYCT) and sold under the Polypro trademark.

GC Group currently operates 19 commercial polymer plants in Map Ta Phut Industrial Estate and Pha Daeng Industrial Estate, Rayong. Rotomolding compound plants operate in the UK, Poland, Australia, New Zealand, and Malaysia. The PP compounding plant is located in the Amata Industrial Estate, Chonburi. The capacities of major polymer products are shown in the table below:

Company	Product	Nameplate Capacity (thousand tons per year)
GC	High-density polyethylene (HDPE)	850
	Linear low-density polyethylene (LLDPE)	800
	Low-density polyethylene (LDPE)	300
	Hexene-1*	34
HMC	Polypropylene (PP)	810
GC-M PTA	Purified terephthalic acid (PTA)	1,440
TPRC	Polyethylene terephthalate (PET)	200
GCS	Polystyrene (PS)	90
RGL	Rotomolding compound	64
DYCT	PP Compound	30

Remark: *For internal use as feedstock for LLDPE (metallocene)

FEEDSTOCK SOURCING

The PE plants primarily use ethylene produced by olefins plants in GC Group. The PP plant uses propylene from producers in Map Ta Phut and olefin plants in GC Group. The PTA plant uses paraxylene (PX) produced within GC Group as the primary feedstock. The PET plant relies on two main feedstocks, namely PTA obtained from PTA plants in GC Group and MEG obtained from MEG plants in GC Group. The PS plant uses styrene monomer (SM) as the primary feedstock, obtained both through purchase agreements with domestic producers and through imports from various regions to ensure supply stability and competitiveness. The rotomolding compound plants use LLDPE as the primary feedstock which partially procured from external sources The PP compounding plant obtains PP partially from PP plants in GC Group.

POLICY AND MARKETING

The Polymers Business Unit operates an integrated production and distribution business, as well as develops products consistently to meet customer needs. GC operates marketing and sale via GC Marketing Solutions Company Limited (GCM), a subsidiary in GC Group that plays a key role in domestic and international marketing and distributing the majority of GC Group's polymer products and by-products. Currently, GCM has authorized dealers both in Thailand and every region across the world, with two dealership offices in the People's Republic of China, namely in Shanghai and Guangzhou. In addition, GCM has five subsidiaries in Shanghai, the People's Republic of China; Ho Chi Minh City, the Socialist Republic of Vietnam; Dubai, the United Arab Emirates; Jakarta, Indonesia; and Yangon, the Republic of the Union of Myanmar, to adequately cater to demand for GC's products both domestically and internationally and maximize its trade opportunity. In terms of warehousing and transportation, GC has assigned GC Logistics Solutions Company Limited (GCL), a subsidiary of GC Group, to handle warehouse and transportation management for all its polymer products to create agility in the integrated logistics management as well as to enable GC to manage distribution and transportation costs to competitive levels and efficiently distribute its products to over 1,000 plastic forming manufacturers nationwide and overseas customers in over 80 countries across the world.

In 2021, approximately 59% of PE products and 43% of PS products were exported. The focus was on export to better geographic segmentation such as Cambodia, Laos, Myanmar and Vietnam and also develop high-value product (HVP) market by emphasize on these products: packaging, plastic pipes, beverage lids, rotomolding and also develop new commodity products to retain existing domestic customers. However, the polymer product selling price will define based on market price but vary by the demand or supply shifts of plastic pellets in that region or country.

GC has also built upon and add value to its PE products by developing products closely with both rotomoulder and end user to ensure that specific requirements have been taken into account and also provide technical problem solving dramatically.

PP compounds are considered an expansion business that creates value-added to GC Group's PP products for penetrating into the automotive, electrical appliance, and electronic industries.

GC has always been committed to environmental consciousness, sustainable development, and giving back to communities and society. Emphasizing in plastic waste reduction, GC has established several circularity system consecutively since 2018, such as Think Cycle Bank project, Plastic Reborn project in collaboration with PTTOR , Big Little Things project in collaboration with leading cosmetics brand, YOUTurn project and Community Waste Model project in collaboration with community enterprise recycle bank such as Chaklukya Temple community.

In 2021, approximately **59**% of PE products and **43**% of PS products were exported

GREEN CHEMICALS BUSINESS UNIT

NATURE OF PRODUCTS

Green chemicals are products manufactured from natural feedstocks such as palm oil, palm kernel oil, vegetable oil, animal fat, corn, sugar made from sugarcane, and cassava. These products can be used in various downstream industries, such as energy, personal care, pharmaceuticals, food, biochemicals, and bioplastics industries. Our green chemical products are divided into two key categories as follows:

A) Value Added Oleochemicals (VAO)

Methyl Ester

Methyl ester is a basic oleochemical. Also known as B100, it can be blended into diesel to make biodiesel that meets EN14214 European standards for diesel engines. Methyl ester helps augment the efficiency of diesel, for both lubrication and combustion and significantly reduce pollution or environmental impact which benefits in PM 2.5 pollution reduction.

Fatty Alcohol

Fatty alcohol is a basic oleochemicals used as a feedstock in the personal care industry. Also used as an ingredient or a component of many other products, including surfactants, plasticizers, solvents, aroma compounds for perfumes, detergents, foam stabilizers, lubricants, cosmetics, plastic intermediates, shampoos, as well as paints and coating products. They are also found in leatherwear and ink.

Fatty Alcohol Ethoxylate

Derived from fatty alcohol and EO, fatty alcohol ethoxylate is used as feedstock for personal care and home care products. In textiles, it is used as a scouring agent, which is part of the preparation process, and as a softener, which is the last step in fibre preparation.

Glycerin

Glycerin, a by-product of methyl ester and fatty alcohol production, is used in pharmaceuticals, food, and personal care industries and other industries.

Fatty Acid

Fatty acid is a basic oleochemical product used for personal care production, such as soap and cosmetics, also used as a feedstock in specialty oleochemicals downstream production.

Specialty Oleochemicals

Specialty oleochemicals are made from basic oleochemicals in a downstream process. Examples of specialty oleochemicals are ozone acid, ester compound from different fatty acid, and eco-friendly polyols. These specialty products are used in multiple industries, including cleaning products, personal care products, plastic additives, construction, agriculture, and oil well drilling.

B) Bioplastics and Biochemicals

Bioplastics and bio-based chemicals are derived from natural feedstock, including sugar from sugarcane, cassava, and corn. The feedstock, depend on the type, is turned into chemicals, such as lactic and succinic acids. These two chemicals are used in the production of bioplastic such as polylactic acid (PLA) and polyesters such as polybutylene succinate (PBS), respectively.

GC produces these value-added oleochemicals (VAO) through Global Green Chemical Public Company Limited (GGC) group, Emery Oleochemicals (M) Sdn. Bhd. (EOM), and Emery Specialty Chemicals Sdn. Bhd. (ESC) (EOM and ESC collectively called Emery), a joint venture between PTTGC International Private Limited ("GC Inter") and Sime Darby Plantation (M) Sdn. Bhd. ("SDP"), headquartered in Malaysia. Emery is a world-class producer and distributor of oleochemicals. Emery has plants in 3 countries covering key regions across the globe, including Malaysia, Germany, and the U.S., and a worldwide network of subsidiaries to support trading and marketing. Its distribution agents are also present in all geographical regions. On the other hand, in order to align with company's strategy in Investment Portfolio, GC and SDP have considered selling the company, Emery in Asia Pacific region or Malaysia which has basic oleochemical as a primary product. GC Inter and SDP have completed the sale of their collective 100% of ordinary shares in the ASIA Pacific business of Emery to Edenor Technology Sdn. Bhd. ("ETSB") on November 1, 2021. However, GC Inter and SDP still hold the Emery business in North America and Europe on a 50:50 basis under the company, namely Emery Oleochemicals UK Limited ("EOUK"). This transaction has aligned with GC long-term growth strategy.

GC operates the bioplastics and biochemicals business through NatureWorks LLC. NatureWorks, a joint venture between GC International Corporation ("GCI") and Cargill, Intercorporated (Cargill),US, is the proprietor of a polylactic acid (PLA) technology with a commercial capacity in US of 150,000 tons per year. In July 2021, Natureworks made a decision to expand the capacity by establishing the second plant at Nakhonsawan Biocomplex, Thailand. This plant produces Polylactide and PLA with the capacity of 75,000 tons per year, which is under constructing and aimed to start the

commercial production in the end of 2024. PTTMCC is a joint venture with Mitsubishi Chemical Corporation (MCC), established for the production and distribution of polybutylene succinate (PBS), an environment-friendly product composable in ambient temperature. PTTMCC is the world's sole producer of BioPBS, owning a plant in Rayong with a capacity of 20,000 tons per year.

The capacities of commercial plants in Thailand and abroad under the Green Chemicals Business Unit are shown in the table below:

Company	Product	Nameplate Capacity (thousand tons per year)
GGC	Methyl Ester	500
	Glycerin	51
	Fatty Alcohol	100
	Fatty Alcohol Ethoxylate	124
Emery	Basic Oleochemicals in US	291
	Specialty Oleochemicals in US	48
	Specialty Oleochemicals in EU	46
NatureWorks	Polylactic Acid (PLA)	150
PTTMCC	Polybutylene Succinate (PBS)	20

FEEDSTOCK SOURCING

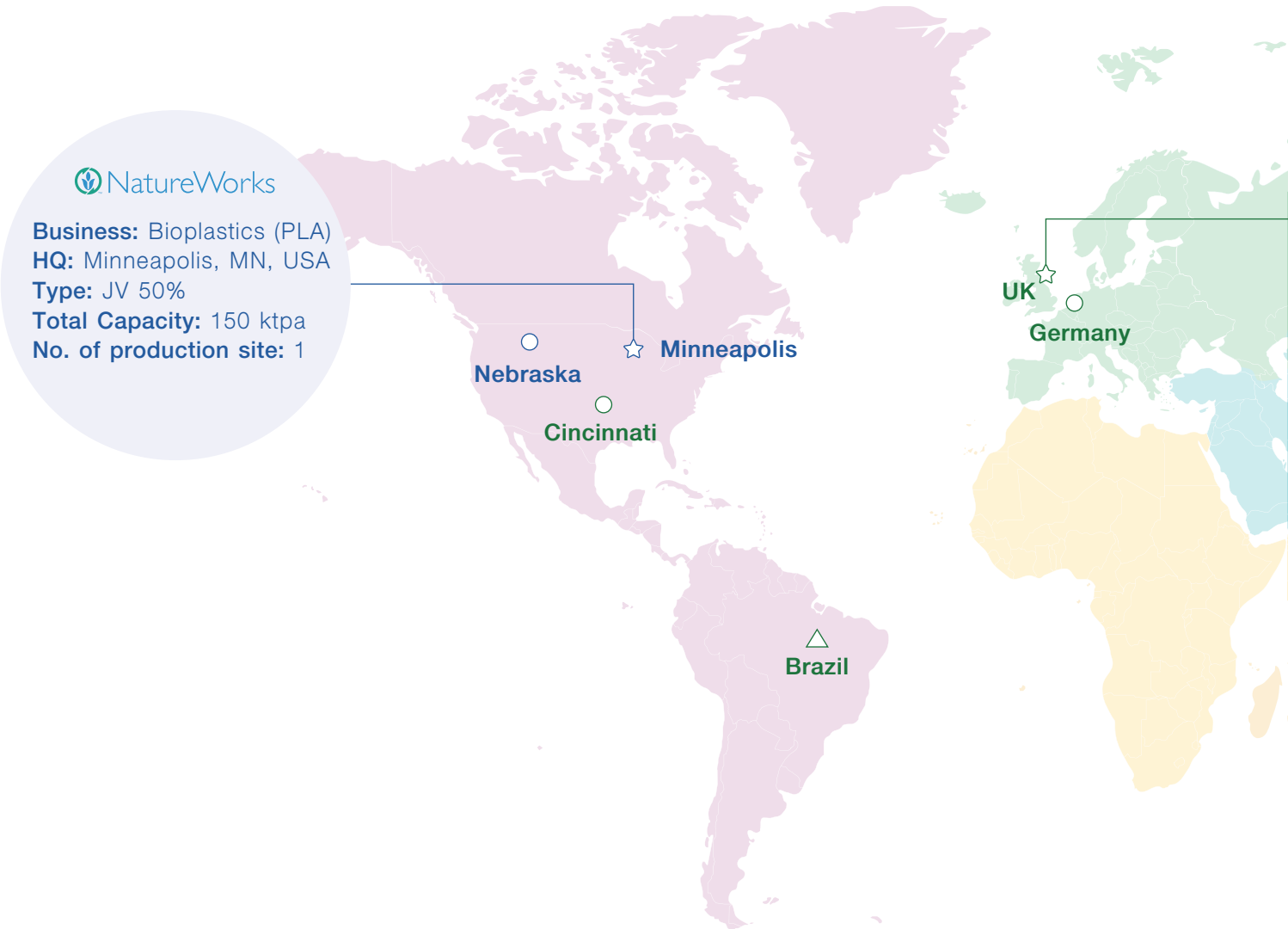
GGC's primary feedstocks for the production of methyl ester, fatty alcohol, and glycerin, are palm oil and palm kernel oil. These are generally sourced domestically to support domestic agriculture and related industries. PTTMCC's primary feedstocks for the production of BioPBS are Bio Succinic Acid (BSA) and 1, 4 Butanediol (BDO), both of which must be imported as there is no domestic manufacturer yet.

POLICY AND MARKETING

The demand for eco-friendly products has been rising due to greater awareness and campaigns on environmental conservation. In addition, it is expected that green technologies and chemicals will replace current ones in the sphere of health and personal care products. As a result, many countries are actively seeking alternative energy, reducing the use of synthetic chemicals, and looking for substitutes that consist or made of natural ingredients, while customer demand across the world for commodity goods featuring or produced from renewable natural feedstock has shown an upward trend. GC recognizes the significance of value addition to agricultural products and the sustainable growth of the green chemical industry and strives to become a world-class green chemical operator that stands out in every market it operates in. As part of GC's policy to ensure the clarity of its green chemical business operations, Global Green Chemical Public Company Limited (GGC) has been assigned as GC Group's Green Flagship Company. In addition, GC has invested in green chemical businesses domestically via PTTMCC and internationally via Emery and NatureWorks, thus giving GC a comprehensive range of products and services and an ability to cater to market needs efficiently. GC's production bases and distributors can be found in almost every continent as shown in the chart below:

Value Added Oleochemicals

GGC's main product is methyl ester, all which is sold to high-speed diesel manufacturers and blenders, which the major customers are almost entire domestic customers. GGC directly sells methyl ester to customers in the form of purchase agreements with clearly specified terms. Fatty alcohol is sold to both domestic and international customers, mostly manufacturers of basic supply, oleochemical product, as well as traders and distributors who buy fatty alcohol and resell to their customers. For domestic customers, GC sell to Thai Ethoxylate Co., Ltd. (TEX), meanwhile the major international customers are the company in these countries, including Asia, Europe, Latin America, and



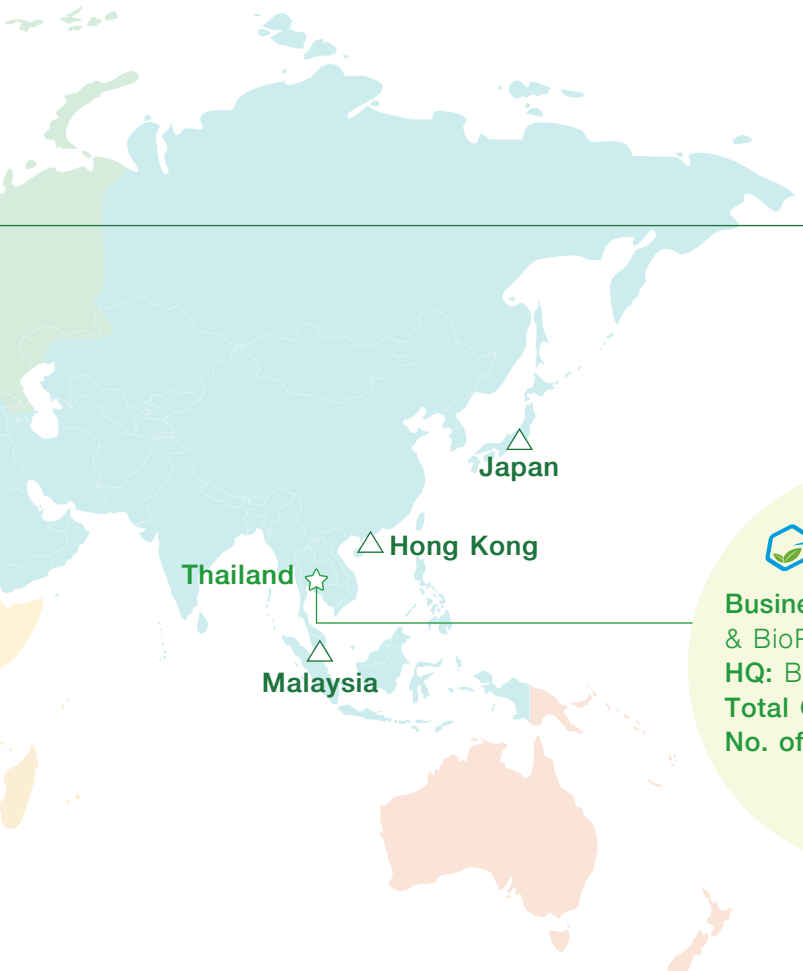
South Africa. Glycerin is sold to manufacturers and distributors of health and personal care products both domestically and internationally, primarily via distributors and partially via direct sale. Customers include multination corporations (MNC) in the domestic medical supply and hygiene industry and large pharmaceutical companies in South Asia.

Products manufactured by Emery, which has sales offices and production bases in various countries, are distributed by its sales offices both directly to customers and through dealerships.

Bioplastics

There has been a significant rise in global demand for compostable plastics as substitutes for single-use plastics. PLA produced by NatureWorks can be used to produce food-contact products, such as cold drink cups, spoons, forks, drinking straws, coffee capsules, and tea bags. It is also used to manufacture products in the computer industry, such as 3D printing filaments. For sales and marketing, NatureWorks also co-develop products with major international manufacturers whose policy is to use bioplastics in their products to increase trade opportunities and consistently expand the sale of its bioplastic products to meet the rising global demand for bioplastics. PLA is sold by NatureWorks LLC and dealerships.

BioPBS markets have shown significant growth in every region of the world in line with the rise of environmental conservation and consumer awareness of plastic waste issues. PTTMCC sells this product both via distributors and directly to customers. Most products on the market feature BioPBS in the form that is blended with PLA and other bioplastics to achieve suitable properties for desired applications. These products include coffee capsules, bioplastic carry bags, and mulch films. BioPBS is also used to coat paper in food containers or cups for hot and cold drinks and straw. The BioPBS market has expanded considerably as compostable plastics are also used as substitutes for regular plastics in single-use plastic products.



Emery

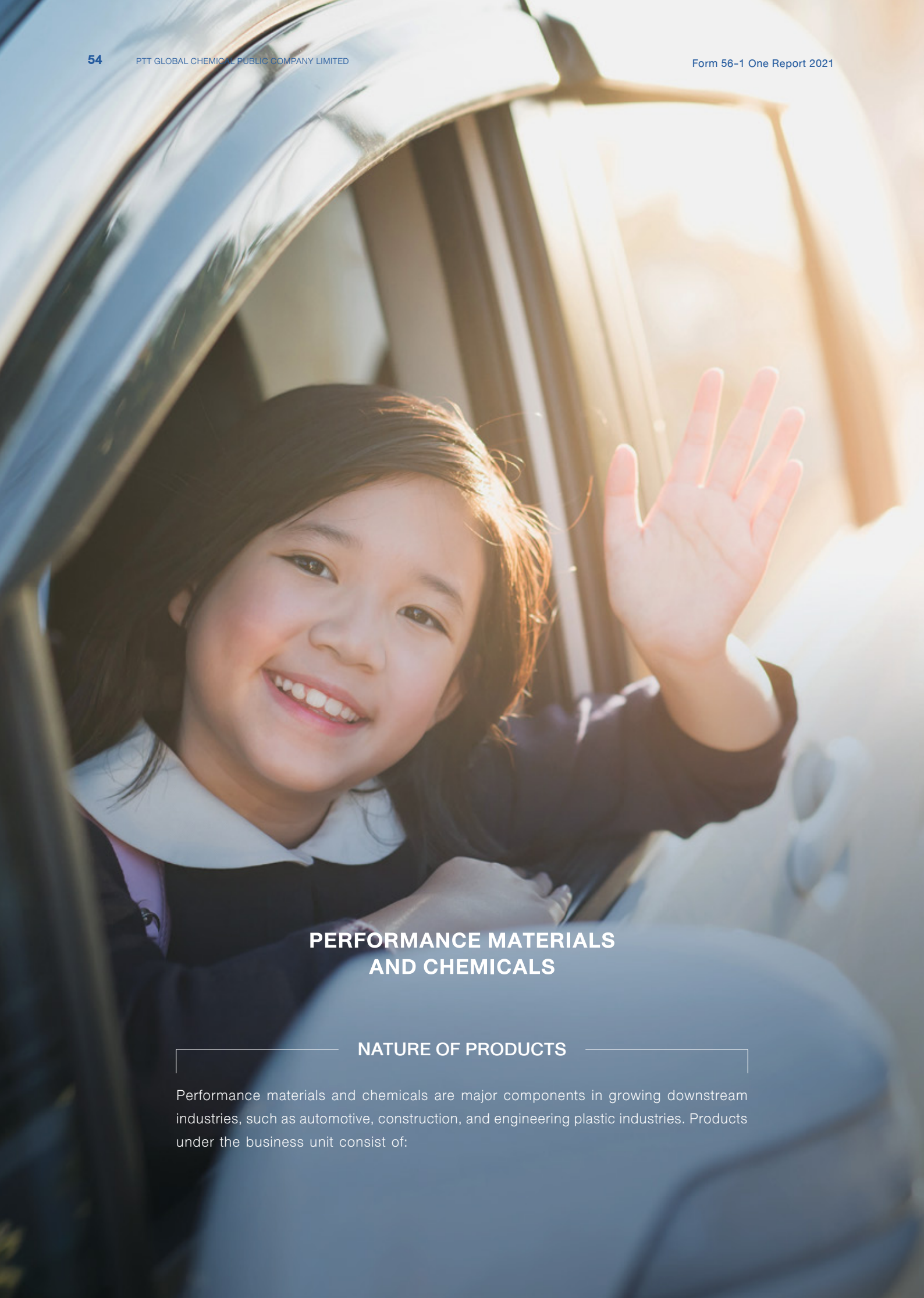
Business: Oleochemicals
HQ: Hampshire, UK
Type: JV 50%
Total Capacity: 385 ktpa
No. of production site: 2

GGC / **ptt MCC Biochem**

Business: Oleochemicals & BioPBS
HQ: BKK, Thailand
Total Capacity: 795 ktpa
No. of production site: 3

☆ Head Quarter
○ Production Site
△ Sales Representative

Source: GC



PERFORMANCE MATERIALS AND CHEMICALS

NATURE OF PRODUCTS

Performance materials and chemicals are major components in growing downstream industries, such as automotive, construction, and engineering plastic industries. Products under the business unit consist of:

Hexamethylene Diisocyanate (HDI) and HDI Derivatives: HDI is an intermediate petrochemical product used in the production of polyurethane (PU) coating, which plays a prominent role in construction and automotive industries. PU coating can also be applied to wood, metals, plastics, furniture, and vehicles to enhance their glossy and scratch-resistant properties. GC produces HDI and HDI derivatives through Vencorex Holding SAS ("Vencorex"), a joint venture between PTTGC International (Netherlands) B.V. (GC's affiliate) and Perstorp Holding AB ("Perstorp") from Sweden. Vencorex has 3 production plants in France, United States, and Thailand.

Acrylonitrile (AN): an intermediate petrochemical widely used as primary feedstock for the production of the following acrylonitrile polymers. (1) Acrylonitrile butadiene styrene (ABS) is generally molded into exterior shells of electrical and electronics appliances due to its strength and resistance to scratch, and adjustability. (2) Acrylic fibers or other synthetic fibers are used as components in the production of garments, carpets, and other fibers. (3) Acrylamide is used in wastewater treatment and petroleum drilling industries. (4) Nylon 6, 6 is widely used in the automotive industry to produce car parts due to its well-balanced hardness and toughness as well as good shape retention, which give the material superior resistance to impact, friction, heat, chemicals to regular plastics. (5) Nitrile Butadiene Latex (NBL) is synthetic rubber used in the manufacturing of medical gloves. (6) Carbon fiber compounds are lightweight high-strength material used in the aviation and sports industries and playing an increasingly significant role in the automotive industry.

Methyl Methacrylate (MMA): an intermediate petrochemical and the main feedstock for polymethyl methacrylate (PMMA) and PMMA acrylic sheets, which are components of furniture, commercial light boxes, smartphone screens, television screens, and computer screens. They are also an ingredient for emulsion and paint, commonly used in the construction industry as MMA helps improve adhesion and durability and prolong product life.

GC manufactures AN and MMA through PTT Asahi Chemical Company Limited (PTTAC), whose plant is located in WHA Eastern Industrial Estate, Rayong.

Propylene Oxide (PO): an intermediate petrochemical used as feedstock primarily for polyols, followed by propylene glycol.

Polyols: downstream petrochemicals used as feedstock for the production of polyurethane (PU). They are sold both in the form of feedstock and as Premix Polyols – a mixture of various polyols and additives co-developed with customers to achieve desired properties, such as the softness of PU foam during molding.

Polyurethane: a product with various industrial applications and is mostly used to produce polyurethane foam (PU foam), which is found in automotive parts, bedding, furniture, shoes, buildings, electrical appliances, electronics, and packaging.

Currently, GC has entered PO production through GC Oxirane Co., Ltd. (GCO), which is 100% owned by GC. The Company also produces polyols/Premix Polyols through GC Polyols Co., Ltd. (GCP), a joint venture between GC, Sanyo Chemical Industries, and Toyota Tsusho Corporation. The central strategy is to become an integrated manufacturer of feedstock for polyurethane and cater to the rising demand in the market. Both plants are located in in WHA Eastern Industrial Estate, Rayong.

Industrial Coating Resins and Additives: a polymer product which binds all other components of a coating together into a film and to the substrate (e.g. car door panel) providing the desired properties. Additionally, there are a range of additives that can be introduced into the formulations to improve particular technical properties of the film (e.g. anti-corrosion, UV resistance), as well as crosslinkers which are used to strengthen the network between the binding resins molecules and to increase the film hardness.

These products are used in various diversified industries such as automotive, packaging & inks, electrical appliances, industrial wood, manufacturing (industrial metal), construction, marine and aerospace. This product portfolio provides various properties such as durability, flexibility, color retention, hardness, anti-corrosion, resistance from chemical, liquid, sunlight and outstanding appearance. The production has been operated by allnex Holding GmbH (allnex) which is 100% owned by PTTGC International (Netherlands) B.V. Importantly, allnex has 4 major business units in their footprint, consisting of: liquid resins & additives (LRA), radcure (RAD), crosslinkers (XLR) and power coating resins (PCR), with 34 production facilities based in 18 countries across the world.

Nevertheless, GC Group also is capable to manufacture the following performance materials and chemicals:

Company	Product	Nameplate Capacity (thousand tons per year)
Vencorex	HDI and HDI Derivatives	127
PTTAC	Acrylonitrile (AN)	200
	Methyl Methacrylate (MMA)	85
GCO	Propylene Oxide (PO)	200
GCP	Polyether Polyols (PPG)	130
	Polymer Polyols (POP)	30
	Premix Polyols (PM)	20
allnex	Industrial Coating Resins and Additives	1,297

FEEDSTOCK SOURCING

The primary feedstock for HDI is hexamethylenediamine (HMDA), all of which is sourced from global leading producers through both short-term and long-term purchase agreements.

The AN plant uses propane, ammonia, and acetone as primary feedstocks. Propane is transported through the pipeline of the gas separation plants of PTT Public Company Limited. Ammonia is shipped from international producers to storage tanks and transported through a pipeline system to the company. Acetone is obtained from within GC Group.

The primary feedstocks for the MMA plant consists of acetone cyanohydrin (ACH), a by-product from the AN plant transferred via pipeline to the storage tanks of the plant, as well as methanol and sulfuric acid, which are shipped and transferred to storage tanks and subsequently transported to the company via pipeline or transport vehicles.

The PO plant uses propylene and cumene as the primary feedstocks. Propylene is transported via pipeline from GC, while cumene is obtained from within GC Group (PTT Phenol Company Limited) via pipeline.

The polyols plants relies on PO and EO as the main feedstocks. PO is transported via pipeline from GC Oxirane Company Limited, while EO is transported via pipeline from Glycol. Other feedstocks and chemicals are sourced both domestically and internationally.

The industrial coating resins and additives plants use various type of feedstocks based upon the manufacturing formulation and purposes, mainly consist of purified terephthalic acid (PTA), epoxy resin, neopentyl glycol, purified isophthalic acid, styrene, methyl methacrylate, acrylic acid, butyl acrylate, melamine, and formaldehyde. allnex use global procurement system to manage these feedstocks, in order to increase bargain power.

POLICY AND MARKETING

Vencorex is the world's second largest player in Aliphatic Isocyanates. Its policy is to sell HDI and HDI derivatives primarily to its key account customers and dealerships. Vencorex has three production plants in France, the U.S., and Thailand, and has customer bases in every

region across the world. Its core marketing strategies is to leverage its strength of having production bases in three regions across the world to access customers and cater to their needs promptly. In addition, Vencorex places importance on customer relations and has a research and development unit that specializes in developing new products and applications. The company also strives to provide technical services that meet customer needs.

Vencorex's main customers have been in Europe, Middle East, Africa, and the U.S. However, after the commercial operation of its Thai plant, Vencorex has expanded to HDI and HDI derivative markets to Asia in response to the rapidly growing demand in Asia, especially in China, India, and South Korea.

PTTAC is the only AN producer in Southeast Asia and the world's first plant to use propane as feedstock instead of propylene. It is also a MMA producer and uses acetone cyanohydrin (ACH), which is a byproduct of the AN plant, as feedstock.

AN and MMA are sold both domestically and internationally. PTTAC's main competitors for AN in the region are China, Taiwan, South Korea, and the U.S. On the other hand, there are both domestic and international competitors for MMA; the latter include Singapore, South Korea, and Saudi Arabia.

GCO is a manufacturer of propylene oxide (PO) that uses PO production technology from Japan's Sumitomo Chemical. Targeting both domestic and international markets, GCO delivers the majority of its PO to GCP and exports a portion to China, India, South Korea, Taiwan, among others.

GCP is a polyols producer who has received production technology and formulation from Sanyo Chemical, a joint venture partner. It seeks to create customer bases both domestically and international through the sale of standard-grade products and high-grade R&D products. In the previous year, GCP began exporting its products to 17 countries worldwide, namely Thailand, India, Vietnam, Indonesia, Malaysia, China, Peru, Brazil, Bangladesh, Philippines, Turkey, Singapore, Sri Lanka, Nepal, Pakistan, Taiwan, and Nigeria.

allnex is a world leading manufacturer of industrial coating resins and is widely regarded for its heritage and leadership position in terms of product development and innovation, technology and global reach. With 23 research and development centers across the world and more than 1,000 coating patents, it is also the leader in various technologies, such as high-end waterborne, high-solid solventborne, powder coating resins and UV-curable resins. allnex is focused on the higher value industrial coatings and inks resins segment, and its product portfolio is predominantly composed by green technologies and therefore is well positioned to capture the growth driven by trends in various regions towards green technologies.

allnex manufacturing facilities are active in 34 sites across 3 regions: 10 sites in Europe with combined capacity of 547,000 tons per year; 8 sites in Americas with combined capacity of 290,000 tons per year; and 16 sites in Asia with combined capacity of 459,000 tons per year, serving customers in the said regions.

SERVICES AND OTHERS

In addition to the eight business units and performance centers, GC values businesses and activities that support business stability and comprehensiveness of the business chain. These various endeavors are listed below:

1) MARKETING AND SALES OF PRODUCTS AND PACKAGING MARKET DEVELOPMENT

GC Marketing Solutions Co., Ltd. (GCM) is charged with marketing and sale of polymer-based products. Currently, GCM has authorized dealers both in Thailand and in all regions of the world. S.P. Petpack Inter Group Co., Ltd. and TBPI & Myanmar Star Company Limited (TPBIMS) support the development of plastic packaging markets to accommodate market growth in the Republic of the Union of Myanmar. As GC's marketing arm, Solution Creation Co., Ltd. is in charge of selling GC products while seeking marketing opportunities in niche markets. It also works on product development to create added value and satisfy the diverse demand of various industries, including packaging, household chemicals, electronics, textile, food and dietary supplements.

2) LOGISTICS, JETTY, UTILITIES, AND INFRASTRUCTURE

2.1) LOGISTICS SERVICES GC Logistics Solutions Co., Ltd. (GCL) is charged with providing integrated logistics services for producers of polymers under GC Group.

2.2) JETTY AND CHEMICAL TANK FARM Thai Tank Terminal Limited (TTT) provides terminals and liquid chemical storage for industrial customers in Map Ta Phut Industrial Estate.

2.3) PIPELINE INFRASTRUCTURE SERVICES Thai Tank Terminal Limited (TTT) provides terminals and liquid chemical storage for industrial customers in Map Ta Phut Industrial Estate.

2.4) UTILITY BUSINESS GC makes investments in this business through its shareholding of Global Power Synergy Public Company Limited (GPSC), producing and supplying electricity, steam, and industrial water to companies under PTT Group and other industrial plants.

2.5) LAND AND PROPERTY MANAGEMENT GC Estate Co., Ltd. (GCEC) manages land and property to support the Company's investment and/or strategic joint ventures.

2.6) INFORMATION AND COMMUNICATION TECHNOLOGY SERVICES PTT Digital Solutions Co., Ltd. (PTT Digital) provides integrated ICT services, including the design, development, and maintenance of ICT systems as per corporate requirements.

3) TECHNICAL, ENGINEERING, PLANT MAINTENANCE, SAFETY, OCCUPATIONAL HEALTH, ENVIRONMENTAL, AND SECURITY BUSINESSES

3.1) PLANT MANAGEMENT AND ENGINEERING DESIGN SERVICES GC Maintenance and Engineering Co., Ltd. (GCME) provides multiple services, including plant maintenance, design and engineering, construction, pipework, procurement, material work, and production administration, to petroleum and petrochemical operators in Map Ta Phut Industrial Estate, as well as other industries both in Thailand and Asia. GC has also joined hands with companies under PTT Group to establish PTT Energy Solutions Co., Ltd. (PTTES) to provide technical engineering consultation services.

3.2) SAFETY, OCCUPATIONAL HEALTH, ENVIRONMENTAL, AND SECURITY SERVICES NPC Safety and Environmental Service Co., Ltd. (NPC S&E), provides integrated services concerning safety, occupational health, and environmental training; design and installation of fire protection systems; and consultation on implementing international management systems standards for quality management and safety, occupational health, environment systems. NPC S&E Security Guard Co., Ltd. (NPCSG) provides security services as well as and safety consulting and training.

4) SOCIAL ENTERPRISES

4.1) MANAGEMENT CONSULTANCY Pracharath Rak Samakkee Rayong (Social Enterprise) Co., Ltd. (PRS RAYONG) offers consultation on business administration in various areas, such as agriculture and trading.

4.2) SOCIAL ENTERPRISE Sarn Palang Social Enterprise Co., Ltd. (SPSE), produces, buys, and sells products and services that benefits communities, society, and the environment.

5) OTHERS

5.1) GC GROUP'S LIQUIDITY MANAGEMENT AND FINANCING VEHICLE SERVICES GC Treasury Center Co., Ltd. (GCTC) manages financial affairs and fund acquisition for companies under GC Group.

5.2) CORPORATE VENTURE CAPITAL INVESTMENT (CVC) GC Ventures Co., Ltd. (GCV) and GC Ventures America Corporation (GCVA) invest both directly and indirectly in the form of corporate venture capital.

5.3) OUTSOURCING SERVICE Business Services Alliance Co., Ltd. (BSA) supplies manpower and contractors to PTT Group.

MARKET AND COMPETITION

ECONOMIC OVERVIEW

The global economic situation has been affected by the COVID-19 pandemic, continuing since 2020. Many countries have to implement lockdown measures and social distancing. As a result, the global economy has been severely sluggish. However, in 2021, the economy began to recover from the progress of vaccine distribution, the relaxation of pandemic control measures, and economic stimulus policies in many countries around the world. However, there was still some pressure from the rise of inflation and increased public debt from economic stimulus policies, including the mutation of the COVID-19 virus, Delta variant. They were negative factors affecting the economy. The global economy in 2021 was projected to increase by 5.9% compared to 2020 (IMF, October 2021), and the growth rate recovered to a level that was comparable to a pre-COVID-19 crisis in 2019.

The outlook of the world economy in 2022 is expected to continue improving, driven by large economies that have recovered rapidly after effective stimulus measures and vaccine distribution. But there are still some uncertainties about the situation of the COVID-19 pandemic; along with the mutation of the COVID-19 virus, the new Omicron variant, which has started to spread since the end of 2021, is the ongoing force. Consequently, the global economy is projected to recover and grow 4.9% compared to 2021 (IMF, October 2021).

The Thai economy in 2021 is expected to slightly grow 0.7% in response to the government's stringent COVID-19 measures, adversely affected the private consumption, household revenue, and tourism revenue that have been decelerated greatly. However, there were still some positive factors from government spending to stimulate the economy and exports that began to expand according to the recovery of trading counterparts. Meanwhile, the Thai economy in 2022 is likely to expand at 3.9% from the relaxation of pandemic control measures, the continuous distribution of vaccines, and the reopening measure will help stimulate the economy in both household and tourism sectors. However, there are still some risk factors for viral mutations and the continuity of government measures to support the economy in the long term. (Bank of Thailand, October, 2021).

MARKET OVERVIEW – PETROLEUM

The situation of the crude oil market in 2021 recovered from the COVID-19 situation due to the increasing number of vaccinations. As a result, global oil demand was likely to expand by 5.5 million barrels per day compared to 2020 (data from the International Energy Agency-IEA as of November 2021). The spreading of the Delta variant in India, Southeast Asia, Australia during the third quarter resulted in a slowdown in crude oil demand. However, at the beginning of the fourth quarter, the demand for oil increased, due to the light pandemic situation, especially in the Asian region. Ground travel across the world returned to near-normal, similar to pre-COVID-19 outbreak, while air travel recovered at 60%. During November, it was found that the outbreak of COVID-19 In Europe rose again during the winter from those who were not vaccinated, causing Europe to announce travel restrictions or lockdown measures again. In addition to the outbreak of the Omicron virus, a new variant of a mutant virus originating from South Africa, a country with a low vaccination rate, The World Health Organization was concerned about the spread of the Omicron virus including the uncertainty of vaccine efficacy. As a result, many countries announced travel restrictions or more stringent measures to prevent the spread of the new virus. As a result of this concern, oil demand slowed again at the end of the year.

In terms of crude oil production, it was found that large manufacturers such as OPEC Plus and the United States did not adjust the production volume to the extent of the recovered demand. The OPEC Plus group resolved to increase production by 400,000 barrels per day from July 2021 until September 2022, but the actual production volume was lower than the agreement. Because some member countries were unable to increase production capacity as targeted, such as Angola and Nigeria, due to the lack of investment and maintenance of production causing the oil price to rise continuously, this led major oil-user countries,

the United States, to call for OPEC Plus to increase production more than the original agreement to reduce the dramatically rising of oil prices. However, OPEC remained its resolution to increase production at 400,000 barrels per day, so the United States and major oil users such as the United Kingdom, India, Japan, and South Korea released and consumed oil from strategic petroleum reserves or SPR. This pushed down crude oil prices. However, the shortage of energy, including coal, natural gas, and oil, coupled with the long winter forecast encouraged power plants and industrial plants to switch to use oil and fuel. As a result, crude oil prices tended to stabilize at a high level. The Dubai crude oil spot price in 2021 averaged US$ 69.2 per barrel.

Petroleum prices and spreads in 2021 was increased mainly due to a recovery in demand after several countries eased lockdown measures as more people were vaccinated. The fastest-growing demand was gasoline because it was found that people in many countries were using personal cars 1.5-2.0 times more than what they had used during pre-COVID-19 pandemic. Old refineries closed down in many regions with a total production capacity of more than 1.9 million barrels per day. This was affected by the pandemic of COVID-19, including the adjustment of company's strategy to focus more on green business. In addition, China's petroleum product exports declined this year by about 40% compared to the previous year. Because China has the policy to control carbon dioxide emissions or the Dual Control Energy Policy. Therefore, the Chinese government has been trying to force inefficient refineries to reduce their refining capacity by reducing crude oil import quotas and refined oil export quotas. Each product detail is as follows.

Gasoline (ULG 95) over Dubai crude oil spread in 2021 was US$ 11.0 per barrel, a US$ 6.6 per barrel increase from 2020. With a supporting factor from increasing private cars traveling. This was a result of the increasing number of people being vaccinated against COVID-19, as well as the fact that many countries has shifted their policies from trying to reduce the number of COVID-19 cases to zero to living with COVID-19 virus (Live with COVID-19), which target the number of people who have been vaccinated instead of the goal of having zero infections.

Jet/kerosene over Dubai crude oil spread in 2021 was US$ 5.8 per barrel, a US$ 3.3 per barrel increase from 2020. With a supporting factor from the re-opening policies after people received more vaccinations. In some countries, there are still Travel Bubble measures specifically match countries that can control the spread of COVID-19 effectively to stimulate demand from tourism.

Diesel 10 PPM over Dubai crude oil spread in 2021 was US$ 8.4 per barrel, a US$ 1.2 per barrel increase from 2020. As a result of demand recovery in Europe, to which a large amount of diesel is imported, and the closing of the refineries, with the capacity of over 1.9 million barrels per day, suffered from the COVID-19 pandemic, the supply was relatively tight.

High-sulfur fuel oil over Dubai crude oil spread in 2021 was US$ -4.9 per barrel, a US$ 1.9 per barrel decrease from 2020. This spread was pressured by the new regulations of International Marine Organization (IMO), which were enforced in January 2020 and required a reduction of sulfur level from 3.5% to 0.5%, which drove demand for high-sulfur fuel oil down. However, with the supporting factor from most oil refineries to shift production to low-sulfur fuel oil. As a result, the supply of high-sulfur fuel oil declined, and demand from the power sector rose after LNG prices increased more than three times in the fourth quarter.

Low-sulfur fuel oil over Dubai crude oil spread in 2021 was US$ 12.6 per barrel, an increase of US$ 1.4 per barrel relative to 2020. With an enabling factor from the demand in the ocean shipping sector. After international air transport was closed due to the COVID-19 pandemic, LNG prices rose at the end of the year. As a result, demand for low-sulfur fuel oil for power generation in North Asia also increased. However, China cut imports by about 30-40% from the previous year as the government encouraged domestic refineries to be VAT exempted to stimulate the refineries to produce more low-sulfur fuel oil to be sold at a new port in Zhoushan, which China wanted it to be the new maritime fuel service center in North Asia.

FORECAST FOR THE PETROLEUM MARKET IN 2022

Crude oil situation in 2022, although there is still pressure from the crude oil production forecast. Crude oil major producers tend to increase their production continuously. The OPEC Plus group will continue to increase production until September 2022. Crude oil production by other major producers such as the United States is expected to increase continuously to an average of 12 million barrels per day, including

negotiating Iran's nuclear deal. As a result, crude oil production has a chance to recover. However, oil demand is expected to improve due to the country's opening up. Crude oil demand will return to normal in the third quarter of 2022 at 100 million barrels per day. Therefore, the average Dubai crude oil price in 2022 is expected to increase from 2021.

The prices and spreads of petroleum products 2022 are expected to improve compared to 2021 as a result of economic recovery, the easing of lockdown measures by adopting the Live with COVID-19 policy, and rallying travel demand, especially air travel, compared to the previous year which can still grow further. China is expected to reduce petroleum product exports after announcing the Dual Control Energy Policy policy. However, a force from the large refineries postpones the re-opening from 2021 to 2022 with a combined production capacity of approximately 1.9 million barrels per day, causing the supply of petroleum products to increase. However, due to the increase in overall demand, it is expected that the oil refinery production in 2022 will increase compared to 2021.

MARKET OVERVIEW – AROMATICS

PARAXYLENE

The COVID-19 pandemic and Omicron mutation adversely affected the paraxylene market in 2021 and dampened demand for paraxylene products, especially downstream products in the textile industry, which accounted for the largest portion. However, the market was positively influenced by rising demand for PET resin. This could be attributed to consumers' growing concern over hygiene, which prompted them to opt for single-use food and water packaging more and reuse used packaging less.

As for supply, the world's paraxylene capacity in 2021 was 67.1 million tons, a 2.0 million ton increase from 2020. This could be attributed primarily to China's policy to rely on domestic production and reduce imports, coupled with pressure from increased inventory and Dual Control Energy Policy, causing the upstream and downstream producers to reduce their capacity; the downstream producers in polyester chain reduced their capacity more than the upstream producers, resulting the pressure on paraxylene market. However, the additional supply of 2 million tons in 2021 was considered less than that of 8.5 million tons in 2020.

As a result of these factors, the paraxylene over naphtha spread in 2021 stood at US$ 210 per ton, a US$ 11 per ton increase compared to 2020.

BENZENE

On the demand side, the benzene market situation in 2021 was supported by increasing demand for Polystyrene (PS) products. Due to the pandemic situation of the COVID-19 and concerns about the mutation of the new COVID-19 variant -Omicron, causing consumer behavior to change, people pay more attention to hygiene, which resulted in the demand for Polystyrene (PS) and Styrene Monomer (SM) products in food packaging. The demand to use Phenol/Acetone as a cleaning solution (hand sanitizer) was in a good direction. In addition, many countries had measures to stimulate the economy. This increased the demand for industrial benzene products due to the work from home/stay at home behavior, reducing the use of public transportation, and turning to personal car travel instead. The demand for these products, such as household electrical appliances such as refrigerators, computer parts, mobile phones, the construction industry, and the automobile industry, was improved. Together with the Polar Vortex phenomenon in Q1/21, many benzene manufacturers in the US. stopped their production, and the global benzene market was in a tight position. As a result, the benzene and naphtha spread in Q2/21 increased to US$ 360 per ton. However, after the US. manufacturers resumed their normal operation, the spread of benzene and naphtha was reduced; coupled with the Dual Control Energy Policy in China, both upstream and downstream producers reduced their production capacity. Still, the downstream of styrene chain reduced their production more than upstream, thus causing ongoing pressure on the benzene market from Q3/21 to Q4/2021.

In terms of supply, the global benzene production capacity in 2021 was 72.6 million tons, which rose by 2.7 million tons from 2020 which was considered to be lower than the capacity expansion in 2020 at 3.1 million tons. The increase in capacity came mainly from China due to its reliance on domestic production and reducing imports from abroad. However, the benzene market still had supportive factors from the low inventory volume during the third quarter and the higher benzene spread in Asia and the US. (Arbitrage window opened) in Q4.

As a result of these factors, the benzene over naphtha spread in 2021 stood at US$ 268 per ton, a US$ 162 per ton increase compared to 2020.

FORECAST FOR THE AROMATICS MARKET IN 2022

For the paraxylene market in 2022, although demand for paraxylene products is expected to recover from 2021 due to the ease of the COVID-19 situation, global economy recovering, and the textile industry that can still be growing again to the near-normal situation from last year. Moreover, for tourism sector, more air travels, more re-opening of cities, and social activities will encourage more purchase of apparel on travel trips and more reintegration into society, coupled with increased capacity for the production of PTA derivatives in 2022. However, the supply will be pressured by new capacity, with a 7.2 million tons per year capacity added in 2022. Overall, the paraxylene market in 2021 shows stable signs relative to 2020.

For the benzene market in 2022, benzene demand is expected to improve as the COVID-19 situation improves and the global economy starts to recover, coupled with added capacity for the production of downstream products from Styrene Monomer and phenol in 2022. However, the supply will be adversely influenced by the additional 3.5 million tons per year capacity, a 2.7 million tons increase from 2021. Therefore, the overall benzene outlook is more pressured relative to 2021. Furthermore, the benzene price climbed up as a result of an irregular event at the beginning of 2021 supported by the polar vertex in the US which is the primary market. Thus, the overall of benzene market in 2022 is projected to weaken compared to 2021.

Overall, the aromatics market in 2022 although the demand is expected to improve as a result of economic recovery, the pressure from the new capacity in 2022 still remains, causing the average prices of paraxylene and benzene are similar from those in 2021.

MARKET OVERVIEW – OLEFINS

ETHYLENE

The ethylene market in the first quarter of 2021 was forced by the increase in the new production capacity of Asian producers about 1.9 million tons, resulting in more supply over demand, thus pushing down prices. However, there was a supply shortage in North America during the second quarter. Due to the Polar Vortex in the US., the supply from the US exports to Asia declined, and ethylene prices increased significantly in the second quarter.

During the third quarter, the COVID-19 situation was intensified again in Southeast Asia, causing demand to decline. Meanwhile, maintenance plans were postponed towards the end of Q3 and Q4, coupled with Chinese manufacturers continually adding a new production capacity of around 4.5 million tons, resulting in lower prices. However, due to the rising of raw material prices in the fourth quarter, including the Dual Control Energy Policy in China, the production capacity in China declined, and the demand increased after the ease of the lockdown. This improved ethylene prices, causing the ethylene price in Southeast Asia in 2021 to average at US$ 1,008 per ton, an increase of US$ 295 per ton from 2020. The ethylene over naphtha spread was US$ 362 per ton, growing from 2020 by US$ 29 per ton.

PROPYLENE

Under the same pressure as the ethylene market, the propylene market saw a significant drop in the propylene price in the first quarter of 2020. The new production capacity of Asian producers in the first quarter increased by approximately 2.3 million tons, and in the second quarter, it was increased by 2.2 million tons. However, propylene supply was scarce in the US and the EU due to the emergency shutdown for maintenance, causing the price to rise in the second quarter.

The production capacity expansion of Asian producers continued to increase in the second half of 2021, with an increase of approximately 4.5 million tons. This resulted in a decline in propylene prices and plant capacity for FCC Units-propylene production in many Asian countries increased their production capacity due to higher refinery cost causing the increase of supply in Asia. Meanwhile, demand was pressured by the decline of the automotive industry due to the semiconductor chip shortages. However, raw material prices rose in winter due to coal and natural gas shortages, and high-investment manufacturers reduced their production capacity. As a result, propylene prices in Southeast Asia in 2021 averaged at US$ 966 per ton, an increase of US$ 191 per ton from 2020. Propylene and naptha spread averaged US$ 320 per ton, down by US$ 75 per ton from 2020 as naphtha prices rose at a greater rate following high propane and natural gas prices in the second half of the year.

FORECAST FOR THE OLEFIN MARKET IN 2022

Although the demand for ethylene is expected to improve according to the economic recovery, it is also expected that there are supporting factors from the

Dual Control Energy Policy in China, which may result in the limited production capacity in China. But on the supply side, there is a force from new ethylene capacity in Asia in 2022, which will increase by 12.3 million tons per year with 7.2 million tons per year from China, 2.8 million tons per year from the United States, 1.5. million tons per year from South Korea and 0.7 million tons per year from other countries, so the overall price of 2022 tends to decrease compared to 2021.

The demand for propylene in 2022 is expected to improve as the economy recovers. In addition, it is expected that the raw material prices of the on-purpose plant, including coal, methanol, and propane gas, will remain high throughout the winter from late 2021 to early 2022, causing limited supply due to ineffective production cost. However, there is still pressure from the new propylene production capacity in Asia in 2022, which will approximately increase to 9.5 million tons per year where 7.3 million tons per year are mostly from China. Propylene in 2022 is likely to be stable compared to 2021.

The overall olefin price situation is expected to be positively influenced by greater demand in response to the global economy as well as the easing of COVID-19 measures despite a steady increase in capacity. Therefore, overall olefin prices are projected to remain stabilized relative to 2021.

MARKET OVERVIEW – ETYLENE OXIDE (EO)

In 2021, the demand for ethylene glycol products (MEG) was severely impacted by the continuous expansion of production units, especially from China and the US. However, demand for some downstream consumer products continued to grow well. In particular, PET and Polyester products had increased demand due to the recovering economy. The MEG market also received additional supports such as the Polar Vortex phenomenon in the US. that caused local units to halt production at some point abruptly. The imposition of European anti-dumping duties on major producing countries like Saudi Arabia and the US. resulted in changes in trade routes and the rising prices of crude oil and raw materials of chemical products such as naphtha and coal due to energy control policies in China, caused some production units to reduce their production capacity temporarily. From the above factors, the average price of MEG products at the China Reference Market (ASP) in 2021 was US$ 675 per ton, an increase of US$ 208 per ton from 2020.

In 2021, the ethanol amine (EA) market demand gradually recovered from last year. This was driven by economic recovery from the loosening of pandemic control measures. However, many manufacturing units halted production outside of planning, such as the US. from Polar Vortex or China that had to temporarily halt production from the Dual Control Energy Policy, therefore the market received additional supports from fundamental factors. The average price of EA products at the Chinese reference market in 2021 was US$ 1,167 per ton, increased by US$ 283 per ton. The spot market price of EA China in 2021 was US$ 1,167 per ton, increasing US$ 283 per ton from 2020.

FORECAST FOR THE EO MARKET IN 2022

The MEG market in 2022 is expected to see steady recovery as a result of more efficient COVID-19 pandemic measures. The economy is expected to rebound better, especially in China, the main market of MEG. However, there is still a new production unit planned to start next year continuously, including the postponement of plant operations from this year. This will remain the main pressuring factors on business and product prices.

The EA market in 2022 is projected the steady demand recovery, while the supply will gradually returns to normal, resulting in the quite balance of demand and supply in the market.

MARKET OVERVIEW – PHENOL

In 2021, phenol business profit margins remained close to 2020 due to tight supply for most of the year from the Polar Vortex phenomenon in the US during Q1, resulting in operational problems, ongoing emergency factory shutdowns, while the supply in the second quarter decreased due to the second outbreak of Delta COVID-19 variant caused the production to stop. Moreover, since Q3, manufacturers had encountered problems in shipping and the Dual Control Energy Policy in China, which resulted in some manufacturers having to stop production or reduce production. As a result of the above factors, the price of phenol products in 2021 increased to an average of US$ 1,178 per ton or an increase of US$ 429 per ton or 57%, with a difference between Product and raw material prices averaging US$ 448 per ton, or an increase of US$ 1 per ton compared to 2020.

In 2021, the acetone business slowed down compared to 2020 due to less tight market conditions. However, the supply decreased according to the situation of phenol production from the above factors. However, demand for isopropyl alcohol (IPA), methyl methacrylate (MMA), and other related industries was quite slow. In 2021, the average acetone product price was US$ 862 per ton, or an increase of US$ 64 per ton, or 8% compared to 2020, as a result of raw material prices driving up product prices in the petrochemical market.

In 2021, the Bisphenol A (BPA) business was at a record high on the impact of the Polar Vortex phenomenon in the United States. As a result, the market for epoxy products, which were downstream products, became tight, and prices increased dramatically coupled with the demand for wind turbine production in line with clean energy policy and carbon emission reduction in Europe, the US, and Northeast Asia, especially in China. In addition, there was the postponement of commercial production with a total production capacity of more than 610,000 tons per year. From the above factors, the price of bisphenol products was increased at an average of US$ 2,889 per ton, or increased by US$ 1,501 per ton, or 108%, and the difference between the product and raw material prices was at the average of US$ 1,649 per ton or increased by US$ 1,118 per ton compared to 2020.

FORECAST FOR THE PHENOL MARKET IN 2022

In 2022, the phenol business is expected to maintain a high-profit margin but may be weakened from 2021. Although supply in the first and second quarters remained tight due to the factory shutdowns in Northeast Asia, there will be more new supply, especially from China, with a new capacity to be added in 2022, initially at 330,000 tons per year (Effective capacity), while demand is expected to increase from BPA products and Cyclohexanone products that have greater demand due to economic recovery and growth in alternative energy businesses such as wind turbines.

The acetone business in 2022 is projected to weaken slightly as a result of plant expansion in China while the demand is expected to improve as the economy recovers from the COVID-19 pandemic. However, the profit margin of acetone shows signs of weakening due to the expectation of consistently lowered price of downstream products.

In 2022, the Bisphenol A (BPA) business is expected to weaken from 2021 due to an additional 930,000 tons of effective capacity from China, including 610,000 tons per year of new supply at the end of the year. The demand is expected improve with economic recovery and growth of alternative energy business, namely wind turbine.

MARKET OVERVIEW – POLYMERS

In 2021, the polyethylene (PE) market was better than in 2020, with global demand for PE products increased by 5.7 million tons to 115.3 million tons from 109.6 million tons, or 5.2%, due to the relaxation of the COVID-19 pandemic control measures around the world. This was a factor that increased the demand for PE products. Meanwhile, the production capacity of PE products increased by 7.4 million tons to 133.2 million tons from 125.8 million tons or 5.8%. Factors affecting PE product prices in 2021 included the tight supply of raw materials and petrochemical products worldwide during Q1 to early Q2 after US manufacturing disruption due to the Polar Vortex's impact, resulting in higher PE product prices. Until the end of the third quarter, the steady freight and container shortage impacted global supply chains. The Chinese government announced the Dual Control Policy, causing manufacturers in China affected by such measures to halt or cut their production capacities. However, the COVID-19 pandemic continued to be a key force on PE product prices throughout 2021, resulting in the average price of HDPE and LLDPE in Southeast Asia in 2021 at approximately $1,181 and $1,200 per ton, an increase of approximately 302 from 2020; 301 and 333 US$ per ton respectively. For LDPE products, the average price was around 1,516, increasing around $506/ton from 2020 due to tight supply conditions throughout the year. HDPE, LLDPE, and LDPE over naphtha spread in 2021 were US$ 536, 554, and 870 per ton, rising from US$ 36, 67, and 240 per ton in 2020, respectively.

In 2021, the polypropylene (PP) market was volatile from a continued decline in supply from the US., which were PP exporters to the South American market. As a result of the Polar Vortex phenomenon, the petrochemical plants were halted. while the ocean export volume among regions decreased, as the volume of available containers and ships decreased, PP supply from Asia, with the increase in volume from the new capacity, could not be exported to markets that experienced PP shortages or markets with the increase in PP demand, such as South America, the United States, or Europe

recovering from the COVID-19 pandemic. In addition, rising energy prices from energy-control policies in China and Europe forced factories in these regions to cut their production at certain times. As a result, PP prices rose and created volatility in the PP market. The price of PP film in Southeast Asia in 2021 stood at US$ 1,321 per ton, increasing from 2020 by US$ 329 per ton on average. The PP over naphtha spread in 2021 was US$ 675 per ton, climbing by US$ 63 per ton from 2020.

The purified terephthalic acid (PTA) market slightly strengthened relative to 2020. The regional demand in Asia increased 7.2% after the COVID-19 pandemic in 2020. However, the additional capacity, especially from China, consistently entered the marker, causing the price of PTA products in average climbed to US$ 668 per ton, an increase of more than US$ 199 per ton compared to 2021.

The polyethylene terephthalate (PET) market in 2021 was better than in 2020, with the demand for PET products increased by 3.9% compared to 2020, or 1 million tons, rising to 26 million tons. The COVID-19 pandemic is relatively limited for PET products as it is a packaging that is critical to the hygiene of food and beverages. At the same time, PET capacity increased 2.1% year-on-year, or 0.7 million tons, to 34 million tons, mainly from capacity expansion in the first half of Chinese manufacturers. As a result, the price of PET products in 2021 increased with rising petrochemical raw material prices due to the increasing demand for crude oil. Moreover, product supply was tight due to the Polar Vortex phenomenon in North America. In the late Q3, the Chinese government announced Dual Control Energy Policy measures, resulting in reduced production capacity averaging at US$ 972 per ton, an increase of US$ 265 per ton compared to 2020. The PET over feedstock spread (P2F) climbed to US$ 168 per ton, an increase of US$ 23 per ton.

The polystyrene (PS) market was fairly stabilized in 2021. The global demand climbed by 0.3 million tons, or 3.6%, from 11.3 million tons in 2019 to 10.7 million tons. The packaging products still had ongoing demand. This was mainly due to the changing behavior of end consumers during the COVID-19 pandemic. Meanwhile, the production capacity of electrical and electronic products at the beginning of the second quarter slowed down but tended to improve in the third quarter onwards due to the postponement of production from the second quarter, resulting in the overall price of PS products increased throughout 2021. The production capacity of PS products increased by 0.2 million tons to 14.0 million tons or 1.4%, resulting in the average price of PS products in Southeast Asia in 2021 at approximately US$ 1,469 per ton for GPPS product group and US$ 1,764 per ton for HIPS product group, representing an increase of approximately US$ 427 and US$ 594 per ton from 2020, respectively. The PS products over styrene monomers (SM) spread in 2021 stood at US$ 418 per ton, increasing from that of 2020 by about US$ 76 per ton.

FORECAST FOR THE POLYMER MARKET IN 2022

The PE market is expected to see the increasing demand of 5.3 million tons or 4.6%, from 115.3 million tons to 120.6 million tons. Due to the success in controlling the COVID-19 pandemic to support the recovery of the global economy, however, the shortage of ships and containers and the announcement of China's Dual Control Energy Policy may not be resolved in a short time. They will continue to be the main factor affecting the PE market situation continuously throughout 2022, including the expectation of new production volumes from China, India, the United States, and the Southeast Asian countries into the market about 9.7 million tons. As a result of these factors, the PE price is expected to slightly decline relative to 2021.

The PP market is expected to suffer pressure from new additional capacity in China and Southeast Asia, while regional demand will likely improve as a result of the recovery of the COVID-19 pandemic.

The PTA market is expected to remain stabilized as a result of economic recovery. However, the market is projected the weakening in the second half of the year as a result of additional capacity of approximately 8-9 million tons.

The global demand in PET market is expected to be 27 million tons, a million ton increase from 2021, while the capacity is projected to see 2 million tons increase, mainly from China. Thus, the combined capacity in 2022 will be 36 million tons. PET will still remain vital as everyday food and beverage packaging, showing the signs of relatively stabilized market similar to 2021.

The global PS market is expected to see the rise of global demand by 0.17 million tons to 11.5 million tons per year, as well as the additional capacity of 2.2 million tons per year from China to 14 million tons per year in 2021. Thus, the PS market is projected to remain stabilized compared to the previous year.

MARKET OVERVIEW – GREEN CHEMICALS

VALUE ADDED OLEOCHEMICALS

METHYL ESTER

Market situation of Methyl Ester (ME) in 2021, demand decreased from the previous year. The domestic demand for ME products was estimated at 4.4 million liters per day (1.4 million tons per year), a decrease of 0.57 million liters per day (0.18 million tons per year) or 11%, mainly due to the COVID-19 pandemic of Delta variant especially during the 3rd quarter resulting in lower diesel demand both in the tourism, transport of agricultural goods and consumption sectors. In addition, the government's policy that wanted to encourage people to use B10 biodiesel as the country's main diesel instead of B7 was not accepted. In addition, biodiesel blends were reduced to B6 in October and B7 in December. As a result, the country's overall ME demand was lower than the government's forecast of 7 million liters per day.

The supply in ME market was strongly competitive, especially in the last quarter of 2021 as a result of new producers and capacity expansion of current producers in total of 0.87 million liters per day (270,000 tons per year).

However, the domestic ME price increased Baht 9.8 per kilogram or 27%, consistent with the domestic crude palm oil price, to Baht 46.51 per kilogram.

FATTY ALCOHOL

The global fatty alcohol (FA) demand climbed, compared to the previous year, the outbreak of the COVID-19 virus began causing the closure of the buyers' countries in both America and Europe, including major buyers of fatty alcohols such as China and India to control the spread of the virus. In the second half of 2021, the COVID-19 pandemic of the Delta variant began to improve as a result of increasing vaccinations, particularly in the United States and European countries, causing signs of economic recovery in the countries as mentioned above, including China, which is a major customer in the market. In addition, demand for detergents and hygiene products continued to improve. Also, the production capacity of major Antioxidant producers was expanded, resulting in the increase of market demand and causing the total purchasing power of the fatty alcohol market to improve.

The supply remained relatively tight because the Middle East fatty alcohol producers changed their fatty alcohol production line to be used to produce other products instead, including that many manufacturers in China, due to the Chinese government's Dual Control Energy Policy, it was necessary to temporarily suspend production from the end of Q3 to the end of Q4 of 2021. This caused the overall supply of fatty alcohol in the market to decline.

As a result of these factors, the FA price in 2021 rose US$ 690 per ton, or 56%, from US$ 1,227 per ton in 2020 to US$ 1,917 per ton, consistent with the crude palm oil price.

FATTY ALCOHOL ETHOXYLATE

The market situation of fatty alcohol ethoxylate in 2021 showed a recovering growth rate due to the COVID-19 pandemic. As a result, the demand for sanitary-related products increased. However, it was also affected by external factors such as currency fluctuations. Tightness from unbalanced cargo ships and containers on each continent and higher shipping rates affected the volatility of fatty alcohol prices in late 2021.

Most fatty alcohol ethoxylate manufacturers had been operating at full capacity to respond to the available demand that continued throughout the year. However, important factors affected global supply, such as the shortage of shipping containers and greatly increased freight rates. As a result, customers had to adjust the supply of fatty alcohol ethoxylate by increasing the proportion of raw materials used mainly in the country. This reduced shipping costs and the risk of supply chain disruption that caused import delays. However, most manufacturers' capacity-building plans were still in place across all regions. From the big players in Europe, the demand for environmentally friendly products also increased.

The price of fatty alcohol ethoxylate in 2021 rose and moved within the range of US$ 1,400 - 1,780 ton, following the increase in raw material prices this year from the reduction of fatty alcohol and ethylene oxide production due to turnaround maintenance at key production sites in many countries. Fatty alcohol ethoxylate prices started to slow down in the third quarter, following a continued slowdown in fatty alcohol prices since the second quarter. In contrast, ethoxylated

fatty alcohol prices rose in the fourth quarter from the impact of the industrial halt in China due to the Dual Control Energy Policy. China had to import palm oil products to replace soybean oil that domestic factories could not produce. As a result, the price of palm oil and palm oil by-products such as fatty alcohols also rose sharply.

Bioplastics

The demand for PLA products has risen in response to consumers' increased eco-consciousness and efforts to push policies that promote bioplastic consumption in various countries. Due to its outstanding properties, including being produced from natural feedstock and biodegradability under an appropriate condition, bioplastics have shown continuous growth both domestically and globally.

For the BioPBS market situation in 2021, the demand volume increased compared to 2020 due to the market's recovery in the target countries such as China, the United States, and European countries. This was supported by better measures to manage the spread of the COVID-19 virus and higher vaccination rates that resulted in economic recovery. It also benefited from the Chinese government policy on banning single-use plastic drinking straws and plastic bags. As a result, BioPBS plastic pellets were pushed to be used more as a substitute for conventional plastic pellets due to their biodegradable properties.

FORECAST FOR THE GREEN CHEMICAL MARKET IN 2022

The demand for ME is expected to increase as the COVID-19 situation in Thailand is steadily improving from the distribution of the COVID-19 vaccination to the public more thoroughly causing the overall economic sector of Thailand to improve. This will result in higher demand for diesel for travel and transportation sectors, respectively. However, it is expected that the competition in the methyl ester market in 2022 will tend to be more intense from the expansion of production capacity of new manufacturers since the end of 2021.

The demand for FA is projected to improve as the COVID-19 situation improves and the lift of the lockdown measures in Asia and the European and US buying countries. In addition, the widespread distribution of vaccinations will enable more global economic recovery and increase the demand for fatty alcohol in the market, including changing consumer behavior with greater awareness of cleanliness and personal hygiene. This is another factor contributing to the increasing demand for fatty alcohol. In addition, the industry's overall supply tends to decline since 2021. Based on these factors, it is expected that fatty alcohol prices in 2022 tend to increase compared to 2021.

The overall fatty alcohol ethoxylate market is projected to grow by 3-4%, supported by the COVID-19 pandemic, which increases concerns about health and hygiene as well as demand for personal care and cleaning products and the reopening of countries that have received adequate vaccines resulting in increased demand from the hotel business and tourism. As well as the better economic recovery, the demand for industrial products has also increased. In addition, the demand for natural/renewable materials also drives demand for petroleum-based products such as Linear alkylbenzenes (LAB) to be gradually replaced by Natural Alcohol Ethoxylate (AE)/Alcohol Sulfates (AS)/Alcohol Ethoxysulfates (AES) products. However, the company is still aware of other external factors that will affect market uncertainties, such as fluctuating raw material costs, trade imbalances causing delays in the delivery of products to markets in other regions, currency exchange rate volatility. The company will consider adjusting the sales strategy accordingly to reduce the risk of such uncertainty.

In 2022, the global bioplastic market is expected to grow steadily, due to the economic recovery in many countries after the COVID-19 pandemic. In addition, various measures have been established to support and campaign the use of bioplastics as substitutes for petroleum-based plastics, bolstering demand for PLA. The market is starting to be less concerned about the continuity of PLA supply as there are new PLA manufacturers stepping into the market. Nevertheless, NatureWorks will maintain its leadership in the PLA market with its qualifications and marketing that respond to demands and customer needs. The PBS market is expected to grow about 10%; most PBS is used in coffee capsules, packaging, and plastic coating for paper. In 2022, the COVID-19 situation is expected to show signs of improvement, positively affecting the global economy and BioPBS demand.

MARKET OVERVIEW – PERFORMANCE MATERIALS AND CHEMICALS

Asia is the largest market for HDI and HDI derivatives. In Thailand, Vencorex is the first producer of HDI derivatives with a goal to support Vencorex global development and increase market shares. In 2021, the aliphatic diisocyanate business, which includes HDI and HDI derivatives, improved from 2020 as a result of the improving situation of the COVID-19 pandemic and macroeconomic recovery, causing the improving demand of HDI and HDI derivatives as well. Furthermore, the periodic scarcity of HDI and HDI derivatives occurred due to the production issues suffered by many producers and the global logistics disruptions, which resulted into an imbalanced supply/demand.

In 2021, the acrylonitrile (AN) business saw a global demand of about 6.3 million tons, climbing 11.5% from 2019 as the recovering demand after the easing of the COVID-19 pandemic measures. In addition, the recovery of the automobile market and the demand for home appliances and office equipment for working at home continued to grow. As a result, AN demand continued to grow better than pre-pandemic. As for the supply side, the situation in 2021 was tight. Especially at the beginning of the year, the Polar Vortex phenomenon in the US caused many AN manufacturing plants to shut down temporarily. As a result, there were not enough products to meet the market demand. Although the situation in the second half of the year began to improve, including the increase of new production capacity in China but the crisis in which the prices of raw materials and energy were rising around the world, including the Dual Control Energy Policy in China, various industrial plants, including AN plants, especially in China, were unable to operate normally. At the end of the year, it was affected by the Dual Control Energy Policy, causing a slight supply recovery in the market. As a result of these factors, the AN price in 2021 averaged US$ 2,239 per ton, increasing US$ 1,068 per ton from 2020.

In 2021, the methyl methacrylate (MMA) market saw a global demand of 3.8 million tons, a 9.6% increase from 2020. This was driven by the relaxation of COVID-19 control measures and the revival of the global economy, demand for MMA products recovered from the auto industry, construction activities, and decorative furniture started to resume more operations after the relaxation of controls. On the supply side, the MMA market was tight, especially in the United States with the Polar Vortex phenomenon at the beginning of the year, including the permanent closure of the Mitsubishi Chemical Methacrylates plant, with a production capacity of 155,000 tons per year, resulting in supply in North America and Europe continued to tighten through Q3, coupled with high MMA raw material prices pushing MMA prices globally and in Asia higher, despite the pressure from demand that tended to weaken after the new wave of COVID-19 outbreak in Southeast Asia. Furthermore on the supply side, China had an additional capacity of 100,000 tons per year and another 100,000 tons per year at the end of the year. The MMA price in 2021 was US$ 1,985 per ton, a climb of US$ 510 per ton compared to 2020.

The propylene oxide (PO) market had been continuously supported by market prices in late 2020 from several factors, such as the floods in China, the US Anti-Dumping Mattress announcement on Chinese mattress exports, including the halt of production according to maintenance plans of many major manufacturers, etc. In addition to the beginning of 2021, the Polar Vortex phenomenon had resulted in the announcement of the halt of all PO plants in the United States, especially LyondellBasell, which was one of the largest PO producers in the world and also the third-largest PO exporter to China, or about 20% of total imports. China was the largest importer globally, including additional factors from the planned shutdown of many factories in China and Asia. As a result, the price of PO products increased by more than US$ 200 per ton to US$ 2,375 per ton in March. This was the highest price in 10 years and remained above US$ 2,000 per ton until May. However, due to the continuous increase in the supply of new production capacity totaling about 800,000 tons per year in China between Q2 and Q3, relatively high PO prices resulted in a bargain between buyers and sellers to the Chinese market. As a result, the price dropped to US$ 1,775 per ton in June. However, it could rise again from positive factors that added in the second half of the year, due to the announcement of the Dual Control Energy Policy that many factories in China had to reduce their production capacity, rising polypropylene prices, the postponement of Lyondell Basell's exports from the US to China. In the fourth quarter, China's new production capacity increased by 200,000 tons per year. This resulted in a weakening of PO product prices, but due to the positive factor from planned shutdowns in China at the capacity of 290,000 tons per year and in Southeast Asia at 490,000 tons per year, it did not have a big impact on the price. As

a result of the said demand and supply, the average PO price in 2021 was US$ 2,133 per ton, or the PO over propylene spread or US$ 1,357 per ton in average.

The polyether polyols market in 2021 saw a global demand of about 8 million tons, an increase of approximately 3.4% from 2020. On the supply side, the capacity grew by 1,133,000 tons per year. However, in the first quarter of 2021 the scarcity of propylene oxide and polyether polyols as a result of the polar vortex in the US, coupled with the announcement of the Dual Control Energy Policy in China during the third quarter of 2021, caused the production disruptions. Nonetheless, the fourth quarter of 2021 saw the recovery of the target industries, including the automotive, bedding and furniture, electrical appliances and electronics, and packaging industries. bolstering the demand for polyether polyols. The polyether polyols price in 2021 was US$ 2,464 per ton, an increase of US$ 795 per ton compared to 2020.

The Coating Resins industry continued to exhibit high growth and rapid recovery after experiencing a slowdown in 2020 due to the COVID-19 pandemic. In 2021, the demand for a number industries such as: industrial metal, industrial wood, coil & pre-coated metal, tires, vehicle refinish and others increased.Although there was an increasing demand in the automotive industry after the COVID-19 pandemic, the production was affected in H2 2021 due to the shortage of electronic parts such as semiconductors used in such industries causing no resumption to normal market conditions.

FORECAST FOR THE PERFORMANCE MATERIALS AND CHEMICALS MARKET IN 2022

The COVID-19 situation is expected to consistently improve in 2022, thus positively influencing the global economy and helping the demand for HDI and HDI derivatives return to near-normal condition. However, the market is expected to rebalance with the return of most producers. The recovery rate will mainly depend on the recovery both the downstream industries in the automotive and construction categories as well as the availability and cost of sea freight.

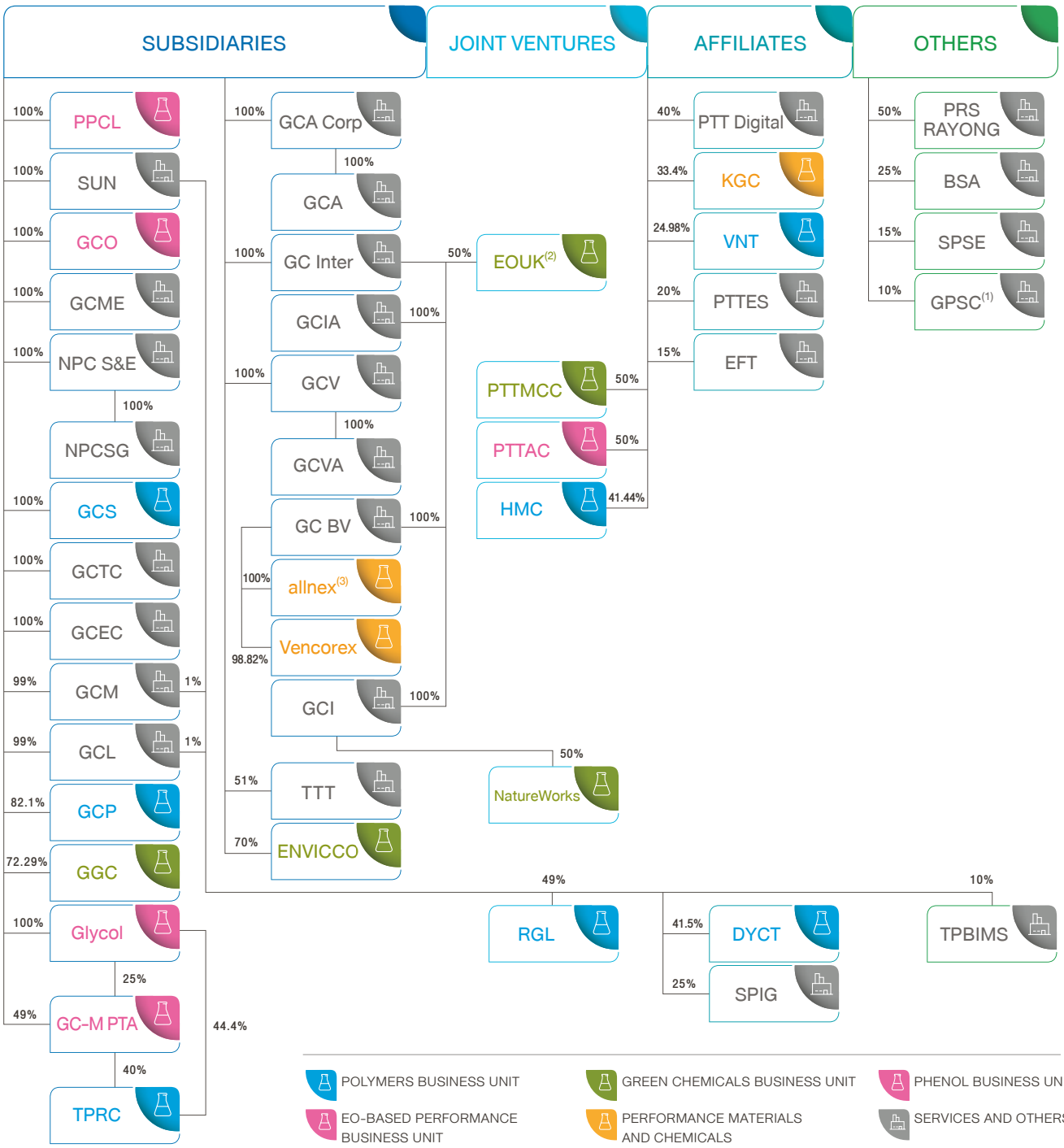
The prices of AN and MMA products in 2021 are projected to slightly decrease due to the easing of tight supply from 2021 and potential capacity expansion. On the supply side, the AN market saw three new production capacities from China, totaling 720,000 tons per year, higher than the original expectation at 318,000 tons per year. At the same time, there are more MMA manufacturers expected to operate in 2022, with three from China with a total production capacity of approximately 205,000 tons per year and another plant from India with a capacity of 60,000 tons per year, which exceeds the expected increase in demand by approximately 164,000 tons per year. Based on the growing demand due to economic recovery, relaxation of various control measures increased vaccination rates, and the demand for electrical appliances and office equipment under New Normal conditions, such as working from home, which will help support the demand for electrical appliances and sanitary equipment, will help support the downstream industries and the AN and MMA industries to continue to grow.

PO products in 2022 are expected to continue positively from 2021 due to China's Dual Control Energy Policy. However, there is also a negative factor from the sharp increase of supply in China at around 1,150,000 tons per year, with more than 60% of the capacity or equivalent to a production capacity of approximately 700,000 tons per year. They are factories that do not have downstream capacities to support (Non-Integrated plant). There is also a new production capacity of approximately 300,000 tons per year from the United States. It is estimated that more than 30% of this capacity will be exported to the Chinese and Asian markets. This is expected to result in a slight weakening of the propylene oxide market from the factors above.

The global demand for polyether polyols in 2022 is expected to recover steadily due to adjustments to the new normal, which bolstered the demand for bedding, furniture, electrical appliances, and electronic devices, coupled with an increase in purchase of personal vehicles to avoid being exposed in crowded area. The demand for polyether polyols is projected to grow by about 360,000 tons. However, the additional commercial production in Hungary with the capacity of 200,000 tons per year puts the pressure on the produce price. Thus, in 2022 it is projected to see the slightly weakening price compared to 2021 in the polyether polyols market.

The allnex business is expected to improve as a result of economic recovery. However, it is still expected to see the semiconductor scarcity in automotive industry until mid-2022, stressing the slight pressure on the coating resins demand. The situation is expected to be eased in the second half of 2022. In the long term, the growth of the coating resins industry during 2022-2025 is expected to be higher than the overall GDP growth. Furthermore, the Additives, another important business of allnex, also has a high growth prospect.

SHAREHOLDING STRUCTURE IN SUBSIDIARIES AND AFFILIATES



Remarks: Significant change in the shareholding structure in subsidiaries and affiliates from January 1st, 2021 to December 31st, 2021

(1) June 8th, 2021 : The company has completed the transfer of the shares in GPSC to the relevant parties. Therefore, the company's shareholding in GPSC decreased from 22.73% to 10%

(2) November 1st, 2021 : The company has completed the sale of their collective 100% of ordinary shares in EOM and ESC then transferring of business to Emery Oleochemicals UK Limited (EOUK). The company's shareholding in EOUK of 50%

(3) December 29th, 2021 : The company has completed to invest in High Value Business (HVB) by the acquisition of allnex through GC BV. The company's shareholding in allnex of 100%

SUBSIDIARIES

allnex	allnex Holding GmbH
GCO	GC Oxirane Company Limited
GCS	GC Styrenics Company Limited
Glycol	GC Glycol Company Limited
PPCL	PTT Phenol Company Limited
SUN	Solution Creation Company Limited
GCL	GC Logistics Solutions Company Limited
GCM	GC Marketing Solutions Company Limited
GCP	GC Polyols Company Limited
GGC	Global Green Chemicals Public Company Limited
ENVICCO	ENVICCO Limited
GC-M PTA	GC-M PTA Company Limited
TPRC	Thai PET Resin Company Limited
Vencorex	Vencorex Holding
GCEC	GC Estate Company Limited
GCME	GC Maintenance and Engineering Company Limited
GCTC	GC Treasury Center Company Limited
NPC S&E	NPC Safety and Environmental Service Company Limited
NPCSG	NPC S&E Security Guard Company Limited
TTT	Thai Tank Terminal Limited
GCI	GC International Corporation
GCIA	PTTGC Innovation America Corporation
GC Inter	PTTGC International Private Limited
GCV	GC Ventures Company Limited
GCVA	GC Ventures America Corporation
GCA Corp	PTTGC America Corporation
GCA	PTTGC America LLC
GC BV	PTTGC International (Netherlands) B.V.

JOINT VENTURES

EOUK	Emery Oleochemicals UK Limited
HMC	HMC Polymers Company Limited
NatureWorks	NatureWorks LLC
PTTAC	PTT Asahi Chemical Company Limited
PTTMCC	PTT MCC Biochem Company Limited
RGL	Revolve Group Limited

AFFILIATES

DYCT	Dynachisso Thai Co. Ltd
EFT	Eastern Fluid Transport Company Limited
KGC	Kuraray GC Advanced Materials Company Limited
PTT Digital	PTT Digital Solutions Company Limited
PTTES	PTT Energy Solutions Company Limited
SPIG	S. P. Petpack Inter Group Company Limited
VNT	Vinythai Public Company Limited

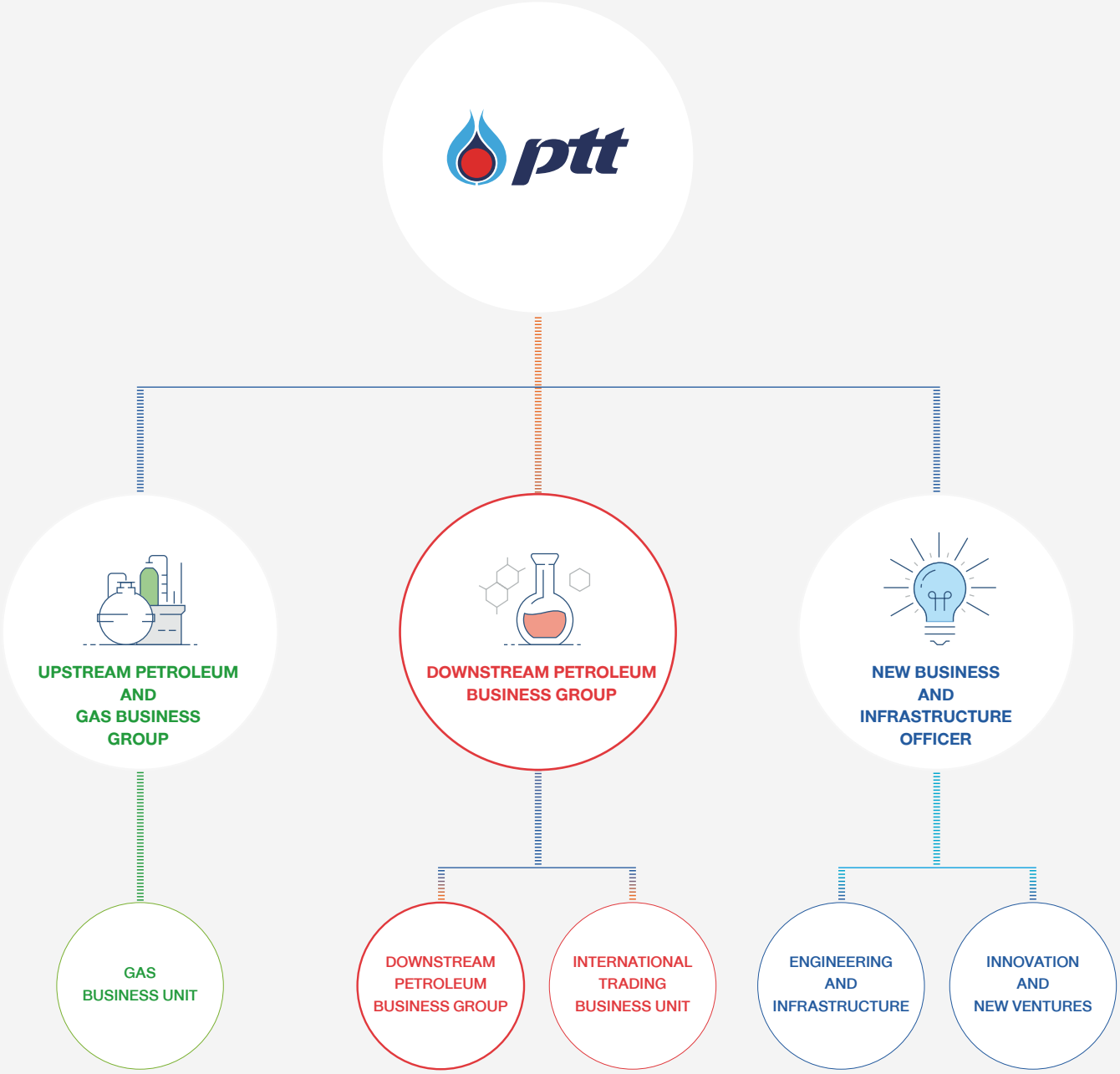
OTHERS

BSA	Business Services Alliance Company Limited
GPSC	Global Power Synergy Public Company Limited
PRS RAYONG	Pracharath Rak Samakkee Rayong (Social Enterprise) Company Limited
SPSE	Sarn Palung Social Enterprise Company Limited
TPBIMS	TPBI & Myanmar Star Company Limited

RELATIONS WITH THE MAJOR SHAREHOLDER'S BUSINESS GROUPS

GC is part of the Petrochemicals and Refining Business Group under the Downstream Petroleum Business Group of PTT Public Company Limited, as shown in the charts below, which show PTT's management structure, subsidiaries, and shareholding by business group respectively.

PTT'S MANAGEMENT STRUCTURE



Subsidiaries, and Shareholding by Business Group

Data as of 31 Dec 2021

E&P and Gas Business Group

Subsidiaries		Consolidate
PTT Exploration & Production Plc.	PTTEP	65.29%[2/]
PTT Natural Gas Distribution Co., Ltd.	PTTNGD	58.00%
PTT LNG Co., Ltd.	PTTLNG	100.00%
PTT Global LNG Co., Ltd	PITGL	50.00%
Joint Ventures		**Equity**
Trans Thai-Malaysia (Thailand) Co., Ltd.	TTM (T)	50.00%
Trans Thai-Malaysia (Malaysia) Sdn. Bhd.	TTM (M)	50.00%
Map Ta Phut Air Products Company Limited	MAP	49.00%

International Trading Business Group

Subsidiaries		Consolidate
PTT International Trading Pte.	PTTT	100.00%
PTT International Trading London Ltd	PTTT LDN	100.00%
PTT International Trading USA Inc.	PTTT USA	100.00%

Oil Business Group

Subsidiaries		Consolidate
PTT Oil & Retail Business Co., Ltd.	OR	75.00%

Petrochemicals & Refining Business Group

Petrochemical Subsidiaries		Consolidate
PTT Global Chemical Plc.[1/]	GC	48.18%[2/]
PTT Tank Terminal Co. Ltd.	PTTTANK	100.00%
Refining Subsidiaries		**Consolidate**
Thai Oil Plc.[1/]	TOP	48.03%[2/]
IRPC Plc.[1/]	IRPC	48.05%[2/]

Technology and Engineering Business Group

Subsidiaries		Consolidate
Global Power Synergy Co., Ltd.[1/]	GPSC	75.23%[2/]
PTT Digital Solutions Co., Ltd.[1/]	PTT DIGITAL	20.00%
PTT Energy Solutions Co., Ltd.[1/]	PTTES	40.00%
Energy Complex Co., Ltd.	EnCo	50.00%
Joint Ventures		**Equity**
District Cooling System and Power Plant	DCAP	35.00%
Others		**Fair value**
Baania (Thailand) Company Ltd.	Baania	2.73%
HG Robotics Plc.	HG Robotics	9.47%
Innospace (Thailand)	Innospace	13.61%
Sunfolding, Inc.	Sunfloding	5.59%
Luminar Technologies, Inc.	Luminar Technologies	0.07%
Ample, Inc.	AMPLE	1.13%

International Investment Business Group

Subsidiaries		Consolidate
PTT Energy Resources Co., Ltd.	PTTER	100.00%
PTT Green Energy Pte. Ltd.	PTTGE	100.00%
PTT Global Management Co., Ltd.	PTTGM	100.00%

Others

Subsidiaries		Consolidate
Business Service Alliance Co., Ltd.[1/]	BSA	25.00%[3/]
PTT Treasury Center Co. Ltd.	PTT TCC	100.00%
Joint Ventures		**Equity**
Suez Environmental Services Co.,Ltd.	SES	40.00%
Others		**Cost**
Sarn Palung Social Enterprise Company Ltd.	SPSE	20.00%
Dhipaya Insurance Plc.	TIPH	13.46%

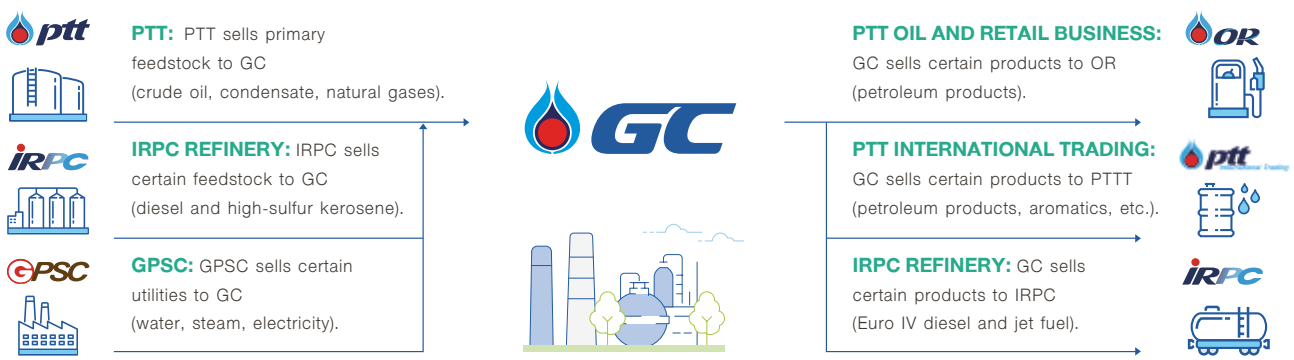
Remarks:

1/ Subsidiaries that PTT holds less than 50% but being consolidated because PTT has the power to control the financial and operating policies.

2/ Holding portion of PTT Group (direct & indirect)

3/ PTT holds 100% of BSA's ordinary shares, PTT's ownership interest in BSA is 100%

The chart below shows major relations between GC and other companies under PTT Group with significant connection to GC's main businesses.



SHAREHOLDING STRUCTURE

(a) List of top 10 major shareholders according to registered book closing date on September 6, 2021:

No.	Shareholders	Number of Shares	%
1.	PTT Public Company Limited (1)	2,037,220,915	45.18
2.	Thai NVDR Company Limited (2)	408,946,417	9.07
3.	Siam Management Holding Company Limited	135,240,000	3.00
4.	SOUTH EAST ASIA UK (TYPE C) NOMINEES LIMITED	91,459,044	2.03
5.	HMC Polymers Company Limited (3)	83,427,636	1.85
6.	THE BANK OF NEW YORK MELLON	66,206,457	1.47
7.	STATE STREET EUROPE LIMITED	60,786,106	1.35
8.	Social Security Office	58,043,751	1.29
9.	NORTRUST NOMINEES LIMITED-NT0 SEC LENDING THAILAND CL AC	57,148,759	1.27
10.	Bangkok Synthetics Company Limited	43,420,625	0.96

Remarks:

(1) Majority shareholder of PTT Public Company Limited is Ministry of Finance.

(2) Shareholders of Thai NVDR Company Limited holding Non-Voting Depository Receipt: NVDR, are ineligible for voting at shareholders' meeting except when exercising their voting right on delisting the shares from the Stock Exchange of Thailand.

(3) GC holds 41.44% of shares of HMC Polymers Company Limited.

(b) As of December 30, 2021, the major shareholders with significant influence on the establishment of GC's policy and strategy are PTT Group, holding 48.18% of shares of GC.

(c) Foreign Shareholders

As of December 30, 2021, there are 18 foreign shareholders of GC, holding a combined of 704,295,351 shares of GC or 15.62% of GC's paid-up capital.

GC has foreign shareholding limitation as specified in Article 8 of Article of Association that "GC's shares can be transferred without any restriction, except in the case where the said transfer would result in more than thirty-seven (37) percent of the Company's total paid-up shares being held by foreigners".

SECURITIES

As of December 31, 2021, the Company's registered share capital was of Baht 45,088,491,170, comprising of 4,508,849,117 common shares at a par value of Baht 10 per share. Paid-up capital was Baht 45,088,491,170.

ISSUANCE OF OTHER SECURITIES

BONDS

GC issued the following long-term bonds:

1. US DOLLAR DEBENTURES

- On November 19, 2012, GC issued unsecured, unsubordinated debentures with a maturity of 10 years in a total amount of US$ 1,000 million, with a fixed annual coupon rate of 4.25%, paid every six months, with a maturity date of September 19, 2022. On June 28, 2018, GC repurchased the existing US dollar debenture in a total amount of US$ 495.89 million, and GC Treasury Center Company Limited, its subsidiary, issued a new debenture with on-par terms and conditions of the existing debenture (par-for-par tender offer).
- On March 18, 2021, GC Treasury Center Co., Ltd., a subsidiary of GC, issued unsecured, unsubordinated debentures in US dollar presented below:
  - Maturity of 10 years in a total amount of US$ 700 million, with a fixed annual coupon rate of 2.98%, paid every six months, with a maturity date of March 18, 2031.
  - Maturity of 30 years in a total amount of US$ 550 million, with a fixed annual coupon rate of 4.30%, paid every six months, with a maturity date of March 18, 2051.

2. BAHT DEBENTURES

GC has 8 series of unsecured and unsubordinated Baht debentures, with the total issued amount of Baht 35,000 million, as detailed below.

Symbol	Outstanding Amount (Million Baht)	Annual Coupon Rate (%)	Maturity Date	Maturity (Year)	Credit Rating (Fitch Ratings)
PTTGC248A	10,000	2.90	August 22, 2024	5	AA+(tha)
PTTGC249A	1,500	2.20	September 5, 2024	5	AA+(tha)
PTTGC269A	7,000	2.43	September 5, 2026	7	AA+(tha)
PTTGC299A	1,500	2.75	September 5, 2029	10	AA+(tha)
PTTGC274A	1,530	2.60	April 8, 2027	7	AA+(tha)
PTTGC304A	3,310	2.99	April 8, 2030	10	AA+(tha)
PTTGC324A	4,360	3.29	April 8, 2032	12	AA+(tha)
PTTGC354A	5,800	3.50	April 8, 2035	15	AA+(tha)

The following are ratings from credit rating agencies:

Credit Rating Agency	MOODY'S	S&P Global	FitchRatings
Credit Rating	Baa2	BBB	AA+ (tha)
Latest Date of Credit Rating Review	July 19, 2021	August 31, 2021	July 22, 2021

DIVIDEND PAYMENT POLICY

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED

The Board of Directors Meeting No. 1/2012, held on October 19, 2012, resolved that the dividend payment policy of the Company is "to pay dividend at a rate of no less than 30% of net profit after tax and allocation to all reserve funds of the Company. Such dividend payment, however, is subject to the investment plan, other necessary and appropriate considerations in the future."

SUBSIDIARIES' DIVIDEND PAYMENT POLICY

The dividend payment policy for GC's subsidiaries shall be considered and proposed by the Board of Directors of each subsidiary for approval at the Annual General Meeting of each subsidiary. The dividend payment of subsidiaries shall be calculated based on the investment plans and other requirements and considerations, such as the adequacy of cash flow of each subsidiary after deducting reserve funds in accordance with the law.

Dividend Paid

Year	Dividend Payout (Baht/Share)			Earning per Share (Baht/Share)	Dividend Payout Ratio (%)
	1st Half	2nd Half	Full year		
2021(1)	2.00	1.75	3.75	10.01	37%
2020	-	1.00	1.00	0.04	>200%
2019	1.00	1.00	2.00	2.59	77%
2018	1.75	2.50	4.25	8.89	48%

Remark:

(1) The Board of Directors' Meeting No. 2/2022 held on February 14, 2022, agreed to propose the Annual General Meeting of Shareholders to consider and approve on the dividend payment for the year 2021 operating performance of Baht 3.75 per share, or dividend payout ratio at 37% of the net profit of consolidated financial statements, of which Baht 2.00 per share was paid as interim dividend on September 22, 2021. The remaining dividend of Baht 1.75 per share is to be proposed to the 2022 Annual General Meeting of Shareholders for approval.

RISK MANAGEMENT

RISK MANAGEMENT AND RISK FACTORS

RISK MANAGEMENT

In 2021, the Company continues to face challenges amid the severe economic and social impacts of the COVID-19 pandemic which affects employee health and safety, business continuity throughout the supply chain as well as results in the volatility of product prices. However, with a strong risk management system, the Company is able to deal with the challenges that arise. The Corona Virus Disease 2019 (COVID-19) Prevention and Control Committee, a specially appointed unit, is responsible for monitoring the pandemic situation and setting various preventive measures in accordance with the changing situation. The Company implements responsive measures by increasing the numbers of staff working remotely from 66% to 90-100% as soon as the outbreak returned. The Company also launches campaigns and procures vaccinations for 100% of the Company's personnel to ensure that they have thorough and quick access to the vaccines. In addition, measures that have been in place since the first wave of the outbreak are still strictly implemented in order to maintain business continuity. One of the measures is the "Lock up" policy, which is the prevention and control of the infection among employees involved in the production process. The employees' self-reporting measure through the GC COVID-19 Reporting System application is still also strictly enforced to monitor health condition, travel and vaccination of employees throughout the organization. The Company also conducts a Work from Home Survey to ensure that employees are able to effectively work from their places. In terms of the impact of product price volatility, both from the COVID-19 pandemic and other uncertainties such as oil price war and new petrochemical production capacity, upon which situations the Company has been closely monitoring and assessing the impacts on the operating results. Various mitigations are set to reduce risks and impacts including cost reduction, investment prioritization, adjustment of production and sales plans, using the Commodity Hedging tool to manage price and spread risks as well as reshaping product portfolio to cope with the rapidly changing market. As a result, GC is able to effectively cope with these challenges testifying the standard of the Company's risk management, which is systematically developed and integrated across the organization to reduce probability and impacts that may arise from the uncertainties and/or to acquire business opportunities. This will ultimately increase the competitiveness of the Company and create sustainable value for business.

The Company is committed to Integrating Risk Management into the strategy formulation process to maintain sustainable growth in line with the strategic objectives and the organizational main goals under an acceptable level of risks. This commitment covers risk management in all aspects including quality, security, safety, occupational health of employees, society and community, environment, laws, regulations and standards as well as any requirements of the countries in which the Company have business transaction and/or investments, to meet the international standards. The Company focuses on the anti-corruption policy and responds fairly to all stakeholders, whereby the Company has appropriate risk and crisis management systems based on the international standard of The Committee of Sponsoring Organizations of the Treadway Commission (COSO) or ERM COSO (2017), the International Organization for Standardization or ISO 31000:2018 and the Thai Corporate Governance Code for Listed Companies – 2017. In terms of anti-corruption guidelines and commitment, GC has been certified as a member of the Thai Private Sector Collective Action Against Corruption (CAC). Implementation results of anti-corruption policies and measures have been reported to the Audit Committee, the Corporate Governance and Sustainability Committee and the Board of Directors to ensure the continuity of adequate and appropriate policy implementation and monitoring processes. In addition, the Company also integrates organizational policies, rules, and operational standards into risk management, internal control and compliance

system (known as GRC), to prevent and reduce the impact of risk as well as to alleviate opportunities, enabling it to achieve strategic objectives and business goals.

In 2021, the Company has been rated as the world's number 1 member for sustainability in the Dow Jones Sustainability Indices (DJSI) chemicals sector for the 3rd consecutive year and also ranked among the top 10 companies in the DJSI World and Emerging Markets Index for the 9th consecutive year. Moreover, in the past year, the Company also received a top 10 score in Risk and Crisis Management, representing GC's internationally accepted risk management standards.

RISK MANAGEMENT STRUCTURE

GC's risk management structure is organized into three levels: corporate, business units, and operations. At the corporate level, the Board-appointed Risk Management Committee (RMC) is responsible for defining the direction of risk management guided by the risk appetite, risk policy, and five risk management frameworks: corporate, foreign exchange, product price and spread, subsidiaries, and investment. The committee is also tasked with monitoring progress and providing recommendations on GC's risk management. Furthermore, the Enterprise Risk Management Committee (ERMC), which is comprised of executives from each function, is responsible for regularly monitoring risk management progress to ensure its alignment with the policies and frameworks approved by the Risk Management Committee. In addition, all business units are required to conduct an adequacy assessment of the internal control systems through the Control Self-Assessment tool (CSA) as well as to manage the operational risks through the Operational Risk Management tool (ORM) to ensure that the control measures are in line with the policies, objectives, risk appetite, and risk management frameworks approved by the Risk Management Committee.

For specific business risks, GC has prescribed risk management at the business unit and functional level and/or appointed specific committees to enhance flexibility and ensure that the risk management is consistent with the operational environment, as detailed below:

- **Value Chain Management Committee (VCM)** is responsible for closely following the market situation on a weekly basis and providing guidelines for managing risks of feedstock, product price and exchange rate volatility to be in accordance with the risk management frameworks approved by the Risk Management Committee.
- **GC Group's Sustainable Development Committee (SDC)** is responsible for monitoring sustainable development performance to ensure appropriate sustainability risk management for both existing and future operations. In addition, the Sustainability Governance Structure has been set up in 2021, covering the operations of Decarbonization in seven key areas: (1) Asset & Efficiency Improvement, (2) Low Carbon Power & Heat, (3) Portfolio Evolution, (4) Circularity Business (5) New Technology & CVC Implementation, (6) Offsetting, and (7) Decarbonization Center of Excellence, to ensure achievement of the decarbonization goals and pathways in the short, medium and long term in 2050.
- **Investment Committee (IC)** is responsible for overseeing and reviewing investment projects to ensure their compatibility to GC's strategies as well as supervising risk assessment and risk management measures for such projects to enable the organization to efficiently manage its investments with maximum benefits.
- **Other Committees** include the GC Operational Excellence, the Safety, Health and Environment Governance Committee, the Information Technology Governance Committee, the Corona Virus Infection Prevention and Control Committee, the Water Management Taskforce, and the Personal Data Protection Act Working Team.

RISK MANAGEMENT TOOLS

GC has studied and adopted various risk management tools to identify, analyze, assess and monitor risks and uncertainties such as determining amount of risk the Company is willing to take in pursuit of objectives (Risk Appetite), assessing and prioritizing risks using a Risk Map, monitoring risk management through the Mitigation Plans and the Key Risk Indicators (KRIs). In addition, the Company also applies the Sensitivity Analysis and the Stress Testing to evaluate the potential impact of

risks under possible scenarios in order to prepare and put in to place proactive mitigation plans. The Company keeps track of changes in key external factors, trends, and emerging risk factors through an Early Warning System (EWS), which can be classified into six areas according to the PESTEL Analysis Framework, to ensure effective and proper risk management and mitigation measures.

RISK MANAGEMENT CULTURE

GC strives to foster an organization-wide culture of risk management and the integrated GRC management (Governance, Risk Management & Internal Control and Compliance) to ensure the Company's stable and sustainable growth through six components: Governance, Leadership, Risk management structure, Risk management techniques, Communication, and Risk management knowledge and understanding building. GC oversees risk management by defining policy, objectives, risk appetite, and risk management frameworks and has a risk management structure that covers every organizational level. The Company has reviewed and defined roles, duties, and guidelines in related to the risk management area for the Board of Directors, Executives, and employees. Furthermore, result and performance of the company's risk management performance is closely monitored and reported to Executives and the Board of Directors on a regular basis. GC also communicates risk issues and fosters an understanding of risk management through various programs regularly.

In 2021, GC introduced the e-Learning covering topics of governance, risk management and internal control, and Governance, Risk management, and Compliance (GRC). Training programs such as Fundamental of Enterprise Risk Management, Integrated GRC, developing BCMS with ISO 22301 were also conducted as well as sessions led by both internal and external experts providing updates on business situations, future trends, and emerging risks for all related parties to develop their ability to identify, assess risks, and define risk management measures. Furthermore, the Company has expanded its Integrated GRC initiatives to subsidiaries to strengthen the good corporate culture according to the GRC principles.

Risk Factors

GC is aware of risk factors that may have significant impacts on the business operations. The company have thus analyzed both internal and external risk factors in tandem with relevant economic, social, political, technological, industrial, competition trends, and the Company's competitiveness. Effective risk mitigation measures has been determined to minimize the impacts and help the Company to achieve business objectives according to the strategies and directions. The corporate risk factors can be categorized into three groups as follows:

Business as Usual Risk Factors

Corporate Risk Factor	Important Mitigation Measures
Operational and Safety Risk Safety and occupational health are one of the most critical areas in the Company's business operations. Improper safety management can result in interruption of the production process and may as well as affect the operation throughout the supply chain. To ensure that all operating areas are safe, working environment is hygienic and standard of the operational management is equivalent to the international leading industries, the Company has applied the Operational Excellence Management System (OEMS) and the Process Safety Management (PSM) to enhance the operational excellence with a target to be ranked in the 1st quartile both in terms of safety and operational stability performance and to prevent unplanned downtime.	GC has continuously carried out the following measures to maintain the operational reliability and safety. • Collaborate with PTT Group experts to continuously assess Operational Excellence Management System (OEMS) to ensure its efficiency and effectiveness as well as enhance technical standards and machinery maintenance to maintain operational performance within the first-quartile level. • Cooperate with external consultants to strengthen GC's Process Safety Management, raising it to an international standard within the 2017-2022 timeframe, while focusing on grooming executive at all levels into role models to inspire safety practices and enhance employees' capabilities and awareness. • Apply digital technologies to enhance the Reliability & Integrity of machines such as an online equipment and machine performance and working condition monitoring, the Non-Destructive Testing (NDT) for equipment and machinery defect, and shifting to advanced technology equipment. • Assess and monitor the result of suppliers' operational management including the utility system through monthly meeting with suppliers to ensure efficient machinery maintenance as well as operational safety and continuity of supplier, to enhance operational reliability. • Adopt the Business Continuity Management System (BCMS) and the Incident Management System tool (IMS) to manage emergencies and crises that may result in business interruption, to mitigate the impact of such incidents and/or shorten the recovery period. The business continuity planning (BCP) has also been rehearsed on a regular basis. • Implement several personal safety projects, including Near Miss Terminator, Management Safety Walk, Supervisor Skill Workshop, and the Hand Injuries Awareness Program, with the strict use of hand injury protective equipment to reduce the risks and accidents that may occur to the workers' hands and fingers. • Build experts and develop internal personnel, applying the knowledge jointly developed with consultants, and promote knowledge management between departments so as transfer new standards and knowledge to all business units and subsidiaries. • GC Group has the necessary insurance to lessen impacts resulting from unforeseen incidents.

Corporate Risk Factor	Important Mitigation Measures
Price Volatility Risk The outlook of the global economy is still uncertain from the COVID-19 pandemic situation, its recent mutations of the new strain, contraction in various economic activities. This is coupled with the new petrochemical production capacity pressuring both price and demand for petroleum and petrochemical products. These factors can lead to the business plan deviation.	The following are the measures that GC has put forth to mitigate its price volatility risks. • Closely monitor market situations, feedstock, and product prices and assess the impact on the operating results on the weekly basis to revise production and sales plan throughout the value chain to ensure their compatibility with rapidly changing situations. • Manage price and spread risks and carry out inventory hedging through derivative securities and/or futures contract according to the policy and frameworks defined by the Risk Management Committee, under the close supervision and monitoring of the Value Chain Management (VCM) Committee. • Study and develop the use of the Artificial Intelligence or AI as a tool to help in data analysis and prediction of the Company's main product prices to increase efficiency and accuracy. • In long term, certain strategies have been formulated to adjust the product portfolio by developing more High Value Products (HVPs) in order to mitigate the risk of commodity price volatility.
COVID-19 Pandemic Risk The spread of the COVID-19 virus around the world has not only triggered a global economic downturn but poses risks to employees and can lead to the suspension of various key activities. Strict and continuous measures to reduce risks from the spread of COVID-19 must be enforced to avoid impacts on the business operations amid the concerning situations of the new virus variants, unequal distribution of COVID-19 vaccine and its effectiveness in suppressing the mutant strains.	GC carries out the following measures to manage COVID-19 risks. • Appoint a working team to implement the Business Continuity Plan (BCP), and establish the Corona Virus Infection Prevention and Control committee to formulate guidelines and preventive measures in consistency with the rapidly changing situations, report progress of the measures implementation to the management team, as well as review the plan to implement various preventive measures in accordance with the situation. • Implement digital system in reporting, tracking employees' health conditions, travels and vaccinations to provide prompt screening, precautions and prevention of the spread of COVID-19. • Implement Lock Up measures for employees working in the critical production process and increase strict hygiene for the Lock Up employees, as well as prevent infection among staffs in the same shifts and cross-shifts within the same plant. • Implement the Work from Home policy to allow as much as 100% of the office employees to work remotely along with other various preventive measures to reduce the risk of COVID-19 transmission among employees and the spread of COVID-19 in the office. The Company has prepared an effective IT system to support working from home, as well as increased defensive measures of Cybersecurity. • Implement proactive screening and preventive measures to control the spread of COVID-19 among the Company's visitors including customers, contractors, and employees. • Collaborate with partners to develop innovative medical plastic equipment to support medical personnel and frontline health volunteers through projects such as the "Millions Support…Ensuring A Safe Space for All", providing four million pieces of PPE to hospitals across the country.

Corporate Risk Factor	Important Mitigation Measures
Feedstock Supply Risk Changing concession contract of gas production may result in fluctuation in both quantity and quality of gas and condensate from the Gulf of Thailand during the initial stage of operation. This may affect the Company's plan for feedstock used in the production process.	The Company has accelerated the implementation of various projects to increase feedstock flexibility in order to cope with aforementioned situation to mitigate the impact; the following actions have been taken. • Work closely with PTT Group through regular working group meetings to monitor gas situation in both quantity and quality aspects in order to plan and formulate supporting measures and solutions. • Implement Feedstock Flexibility strategy to increase flexibility in raw material sourcing and usage together with analyze and evaluate economic cost-benefit of different feedstocks accordance with the changing situation. • Monitor the government's policies regarding the clarity of the LNG free market and the proportion of electricity generated from alternative fuel sources to analyze trend in gas consumption from the Gulf of Thailand.
Cyber Threat These days, there are various forms of cyber-attacks using different advanced technologies. The sophistication of threats also increased from the application of emerging technologies along with the changing in business model and way of work. This presents cyber threats to GC's production system and operational networks connected to the internet. Failure to manage these risks would affect its business continuity, credibility, and reputation.	The Company is aware of the severity and effect of cyber threats. Several measures are therefore implemented for the risk management as followed: • Establish and announce regulations on GC's IT Security Policy to ensure efficient use of IT systems and networks and to provide guidelines for GC and its subsidiaries. • Implement an information security management system and asset security practices in accordance with international cyber-related standards. • Monitor and prepare for new threats to both GC's offices and plants and perform tests and assessments regularly to put in place a proactive preventive plan before the incident takes place. • Study and develop the detection and preventive systems in the form of Deception Technology to handle the cyber attack. • Implement the 2-factor authentication for the internet-facing applications. • Prepare work systems and increase information technology security measures to support the Work from Home policy. • Carry out cybersecurity drills and disaster recovery tests regularly to ensure prompt response and to minimize impacts on GC's information systems and business operations. • Introduce cyber security awareness programs such as continuously educating employees at all levels about the best practices, preventive measures, and information technology regulations.

Strategic Risk

Successful execution of established strategies plays a vital role in the achievement of long-term corporate goals. Since the volatility and rapid changes of the business environment may affect the ability to successfully implement its strategies, GC has taken the following steps to manage risk factors related to its strategies execution.

Corporate Risk Factor	Important Mitigation Measures
Investment Risk GC expands investments to enhance its competitiveness and foster long-term growth and sustainability. To this end, it places great importance on the management of investment-related risks in terms of financing, credit rating, and resource allocation. An aspect of sustainability must also be incorporated to secure business sustainable growth and returns in the future.	GC has introduced the following investment-related risk management measures. • Analyze, review and prioritize investment projects to be in consistent with trends and economic conditions as well as integrate an aspect of sustainability as one of the key criteria for investment consideration. • Implement a stage-gate process to govern investment decisions from the opportunity-seeking stage to investment approval by the Investment Supervision Committee, according to GC's Corporate Investment Management (CIM) process. For major investment projects with high capital investment and/or having significant impact on the Company's reputation or stakeholders, the Risk Management Committee shall provide recommendations and review the adequacy of risk assessment and mitigation measures to supplement the approval decision. • Perform a lookback analysis to evaluate completed projects and use lessons learned to improve GC's investment management and increase the probability of success of future investments. • Streamline project funding and financing as well as ensure the Company's liquidity according to the financial policy by considering financing method that is not affect the Credit Rating and the financial discipline.
Competitiveness Risk In response to the high volatile business environment, the entry of new players, intense market competition, the spread of the COVID-19 virus, changing consumer behaviors and the emergence of New Normal Trends, GC must enhance its strength and resilience to maintain its competitive advantage and ability to operate its businesses sustainably in the face of challenges and uncertainties brought on by external factors.	GC has implemented the following mitigation measures to enhance competitiveness. • Continuously improve operational efficiency and create added value through the MAX Infinity project and the MTP Integration which will create synergies among plants and companies within the PTT Group, suppliers, and customers in order to further enhance competitiveness in five areas, namely (1) Supply Chain Optimization (2) Polymer Marketing and Logistic Optimization (3) Energy and Utility Optimization (4) Value Added Enhancement and (5) Value Maintenance. In addition, the Company has strengthened innovation capabilities and adopted new technologies, especially the digital technology, to "Modernize and Innovate" its plants to increase production and operational efficiency as well as reduce costs and losses. • Implement "FiT project" for Lean & Process Improvement to increase efficiency and flexibility, as well as to minimize risks and costs.

Corporate Risk Factor	Important Mitigation Measures
	• Integrate and diversify business to enhance competitive advantage through various investment projects focusing on feedstock management, improvement of production units and infrastructures to accommodate feedstock flexibility in order to maintain the cost competitiveness in at least the 2nd Quartile. • Enhance cost competitiveness by reducing redundancies in the business processes, minimizing the maintenance costs yet still maintain plant reliability, improving energy and utility efficiency to reduce losses and pollutions. • Build long-term stability in sales and marketing by increasing market shares, strengthening the home base markets and sales, building business alliances in Southeast Asia and Strategic Market countries as a mean to create sales agility and explore new business opportunities. • Adjust product portfolio and create added value by implementing market-focused business strategies, placing emphasis on High Value Products (HVP) as well as seeking new business opportunities in accordance with the megatrends to meet the needs of customers and to better reach end users. • Invest in High Value Business (HVB) with a focus on high growth products with superior profitability that respond to consumer needs as well as emit low carbon.
Sustainable Water Management The ability to sustainably manage water, in terms of both quantity and cost, is essential to the Company's business operations. To prevent interruption of the production process, maintain competitiveness and secure future project investment plans, the Company must define proactive measures, drive sustainable water management at the national level, acquire additional alternative water sources and adopt water management technology to reduce water consumption and to ensure adequate amount of water at a reasonable cost for both existing business operation as well as future projects.	The Company has implemented measures related to water management as follows: • Continuously monitor and assess the risk of drought and formulate mitigative and adaptive action plans as well as business continuity management plans for the event of drought. • Implement tangible water management initiatives such as increasing the efficiency of water intake for the production process, water reuse and recycle, water-related technology investments, as well as finding alternative water sources e.g. Sea Water Reverse Osmosis project (SWRO) and Wastewater Reverse Osmosis project (WWRO), etc. • Conduct a study on the new models for alternative water sources and new water production technologies. • Promote sustainable integrated water management guidelines and policies at the national level through collaboration with the government, private, and industrial sectors, such as the Water and Environment Institute for Sustainability, Federation of Thai Industries, and the Eastern Water War Room, etc., along with drive the establishment of a regulatory body to oversee contract and pricing mechanisms for transparency and fair use in the industrial sector with an ultimate goal to uplift the country's competitiveness.

Corporate Risk Factor	Important Mitigation Measures
Climate Action Towards Net Zero Risk Many countries have announced their targets to reduce greenhouse gas emissions and formulated more intensive climate change policies, some of which are being used to create trade barriers such as a carbon tax scheme, the Carbon Border Adjustment Mechanism (CBAM). Other climate related initiatives that could directly impact the Company's operating costs and profits include the support of electric vehicle use and the clean energy sources etc. Thus, in response to the trends and government policies, leading petrochemical companies around the world have announced the Net Zero Carbon Emission target to meet sustainable development needs. As a global chemical company, GC Group commits to attain net zero greenhouse gas emissions for scope 1 and 2 by 2050 with a clear roadmap including development and adoption of new low-carbon technologies in the production process and expanding business portfolio into low-carbon businesses to seize opportunities from the growing demand of environmentally friendly products which will ultimately enhance GC's long-standing commitment and leadership on sustainability.	The Company has continuously implemented measures related to climate actions as follows: • Define Sustainability Governance Structure in every level to supervise overall operation of Decarbonization to achieve short, medium and long-term goals by 2050. Apart from the Board of Directors, the Sustainability Development Committee (SDC) has been set up at the management level, with the responsibilities to establish and follow-up strategies, frameworks, guidelines that promote GC's decarbonization pathways as well as monitor movements of global sustainability including government measures. At the operating level, the Company has set up specific working groups to drive decarbonization covering 7 areas; (1) Asset & Efficiency Improvement, (2) Low Carbon Power & Heat (3) Portfolio Evolution (4) Circularity business (5) New Technology & CVC Implementation (6) Offsetting and (7) Decarbonization Center of Excellence. • The Company has joined the pilot project of "Thailand Voluntary Emission Trading Scheme (Thailand V-ETS)" in order to prepare for the emission trading scheme. • Incorporate internal carbon pricing as a part of the investment consideration and define specific criteria for greenhouse gas emissions reduction project. • Promote decarbonization technology cooperation between companies within the PTT Group including Carbon Capture and Storage (CCS) and Renewable Energy technologies.
Product Liability Risk To enhance long-term competitiveness and sustainable growth, the Company has set the strategy to expand product portfolios to reach more end customers and markets. This creates a need for higher standards and product certifications. Thus, it is crucial for the Company to carefully manage risks related to legal, regulations and product standards along with the market and product development.	The Company realizes the importance of product development to respond to the standards, regulations and expectations of the end customers. Various measures are implemented to manage the risks in such matters as follows: • Closely monitor the markets and customers associated with GC Label along with establish annual inspection plan for products under GC label together with a standardized Third Party and determine a procedures for GC labeling products liability risk management. • Establish clear and effective product development, Quality Assurance (QA), and Quality Control (QC) processes with a great importance on quality of the product design as well as variables control in the production process.

Corporate Risk Factor	Important Mitigation Measures
	• Streamline product certification process and set a clear and concise quality control according to the standard requirements. • For compound products, there has been a review of related documents on the Product Liability Disclaimer between the Company and the finished goods manufacturers, as well as between the Company and the consumers. Moreover, the Company is now conducting a study on the Product Liability Insurance to transfer risks in the event of damages and claims.
People and Organization Risk To ensure that the Company can adapt to volatile business conditions and drive growth in all aspects according to the defined strategies, GC places importance on the organization, culture, and its people readiness to accommodate changes in work models, business environments as well as new business opportunities along with driving the Digital Transformation with strong data governance, infrastructure and security system to concretely increase work efficiency, strengthen competitiveness and maintain long-term sustainable growth.	The Company continuously places importance on the personnel, organization, and culture by implementing measures as follows: • Implement lean and process improvement through the FiT Project, which focuses on end-to-end process adjustment together with digitization and people competency development to reduce costs, improve operational efficiency, improve system effectiveness, enhance the employees' capabilities and skills, boost agility, and minimize risks. • Network data throughout the organization with an objective to enable accurate and quick decision-making process. • Initiate people development scheme for executives at all levels as well as employees with high potential (Top Talent) throughout the organization to ensure the sufficiency of workforces. Moreover, the Company also prepares succession plans that are in time for retiring executives and adequate for GC's growth plan. • Design a Learning and Development platform for employees that focuses on self-learning through digital technologies. • Promote agile and cross functional way of work to emphasize flexibility and operational efficiency. Besides, Work from Home (WFH) policy has been implemented as a normal working style in order to ensure work flexibility and adaptability to the COVID-19 pandemic while adhering to the demands of new generation employees. • Continuously foster an organization culture through GC SPIRIT, expressed through 4 Core Behaviors to build understanding, awareness and actions of employees at all levels. • Launch several well-being projects that focused on uplifting health, mindfulness, and wealth of employees to create friendly working environment and happy working conditions. In addition to this, employee surveys have been conveyed such as the Work from Home Survey and the Employee Engagement Survey therefore the results, employees' feedback and comments received through the survey have been used to improve GC's working environment and conditions.

Emerging Risk

Due to rapidly changing business environment, GC is aware of the emerging risk factors which could have significant impacts on the business operations over the next three to five years. The Company therefore identified and analyzed such potential risks including the impact on businesses and operations along with effective mitigation measures. This is to ensure that the Company achieve strategic objectives and business goals.

Corporate Risk Factor	Important Mitigation Measures
Disruptive Changes in Consumer Behaviors from Low Carbon Economy These days, climate change and environmental issues are being emphasized for both public and private sector. Governments around the world have implemented policies and legislations, such as the ban on single-use plastic bags and the promotion of recycled plastics, to tackle environmental problems, particularly the plastic wastes. Consequently, these climate concerns have significantly changed consumer behavior. The trend towards more conscious consumption has accelerated as consumers are becoming more eco-focused. Besides, the environmental issues have also heightened stakeholders' expectation on the Company to play a leading role in the sustainable management and to disclose its plans for sustainability.	The Company has implemented proactive measures to cope with the changes in consumer behaviors as follows: • Reduce business risks by decreasing the production of the plastic resins for single-use plastics and increasing the production for durable or semi-durable products instead. • Create clear sales and marketing plans to bring recycled plastic (rPET and rHDPE) from the Company's Plastic Recycling plant into the market as well as seek more opportunities through collaboration with partners to conduct business feasibility on new recycled plastic technology and investments. • Promote the use of bioplastics to replace the single-use and hard-to-recycle plastic products. The Company has developed the "GC Compostable" label to certify partner's products made from the Company's biodegradable plastic beads. This is to accentuate GC's commitment on innovative products development and environmental care. • Increase efficiency in every process by using the "5R" principles and digital technology to reduce resources and energy consumption while implementing new innovations such as applying solar rooftop systems in factories and warehouses and seeking new low-carbon technology to push beyond the limits of today's technology. • Adjust business portfolio to include low-carbon emissions business such as High Value Business (HVB), High Value Product (HVP), bioplastics and recyclable plastic, etc. • Create a completed product circularity system by bringing back plastic waste into the recycling process with a goal to be the Circular Economy Prototype for the country through collaboration with all sectors throughout the value chain. Examples of the projects are conducting a waste management model and creating awareness with universities, the "Our Khung BangKachao" Project, "Separate PET Bottle to Help Doctors" Project, "Send Plastic Home" Project and "YouTurn" Project, etc. • Raise awareness, inspire ideas, and create new approaches for the most cost-effective use of resources by focusing on the Circular in Action concept, applying the GC Circular Living approach in daily life and business operation. In addition, communication and workshop programs have also been launched for the customers' participation in eco-friendly product development under the circular economy concept.

Corporate Risk Factor	Important Mitigation Measures
Extreme Weather and Climate Events Adaptation Weather-related disasters from climate change are becoming more frequent and severe. The World Meteorological Organization (WMO) revealed that the number of disasters, such as floods and heatwaves, driven by climate change have increased fivefold and causing seven times more damage over the past 50 years. If the Company fails to prepare adequate adaptive mitigations and measures, this escalating natural disaster could affect the Company's assets as well as the continuity of business operations.	The Company is aware of the needs to prepare for such incidents in a timely manner. Certain measures have been carried out as follows: • Conduct crisis management drills and business continuity planning in different hypothetical situations at the corporate level, the business unit level and subsidiary companies in the GC group to allow executives and staffs to review roles and responsibilities as well as to practice responsive action plans. Therefore, the business continuity plan can be continuously improved from the lesson learned before the incident occurs. • Develop the Incident Management System (IMS) to manage data collected from the incident of emergencies which may escalate into crises and promulgate the Business Continuity Plan (BCP) to allow executives to monitor the situation, review details of the incident, roles and responsibilities for decision making and appropriate delegation of orders. • Provide trainings on Risk and Disaster Management to equip the personnel with knowledge and understanding about the natural disasters in various forms and prepare to deal with natural disasters that may occur. • Collaborate with external consultancies to assess the likelihood of the future natural disasters and forecast impacts on assets and the Company's business operations for surveillance and preparation for situation of risk under potential disasters according to the international standards of the Task Force on Climate-related Financial Disclosures framework (TCFD).
Impacts from Advanced and Deep Technology The rapid development of technology and digital technology has caused major changes on market landscape and business model. Such changes can be considered as both opportunities and challenges to the Company's business operations. As an example, the exponential growth of the Automation Machines, the Artificial Intelligence (AI), and the Robotics technology, which could potentially enhance the efficiency of the business operations, increase resilience, strengthen competitiveness, as well as create differentiation and new business opportunities. On the other hand, advanced technologies also come with challenges the Company need to address, both in the context of technology and digital infrastructure readiness, as well as personnel's capability. In addition, the introduction of the artificial intelligence technology which can access, utilize, learn and analyze Big Data, could also lead to human rights and ethical risks.	The Company is aware of the rapid changes of advanced technology and has managed the impact on the Company's business as follows: • Elevate innovation operations, including the introduction of new technology, especially the digital technology, to modernize and innovate plants to be the Smart Plant. • Appoint a unit to supervise the business transformation so that the Company can maintain sustainable competitiveness in the future by focusing on digital transformation in three main areas: (1) Business – Apply digital technology to increase competitiveness and respond to the stakeholders' needs, as well as assess the impact and formulate supporting measures for the potential risks. (2) Technology – Develop IT/ Data Architecture and enhance cyber security management. (3) Personnel – Foster knowledge and understanding of personnel to be in line with the advancement of new technology and digital technology transformation. • Establish a clear digital transformation action plan in three phases: (1) Digitization focuses on efficiency and productivity enhancement (2) Digital Transformation of Function (DTF) focuses on changing processes and working methods and adopting advanced analytics (3) Digital Transformation of Business (DTB) focuses on creating opportunities to expand into new businesses or change the format of existing business. • Leverage Corporate Venture Capital (CVC) investment as a tool to drive the Company's growth strategy by seeking investment opportunities in digital technology or new innovations.

GC strongly believes that these responsive mitigation measures can help the Company to minimize risks, increase opportunities for sustainable growth, and achieve business goals according to its established direction and strategic plans.

DRIVING BUSINESS TOWARDS SUSTAINABILITY

GC's business direction focuses on creating and retaining competitiveness. We stand ready to expand our business to the international level which will contribute to the achievement of our sustainability. Such efforts are in accordance with the "Step Up" strategy and are based on finding a balance between three aspects, namely economy, society and environment. This strategy is applied to all activities throughout our supply chain with special emphasis on circular economy and decarbonization in order to attain sustainability leadership.

SUSTAINABILITY MANAGEMENT POLICY AND GOALS

GC continues to pursue our aspiration "To be a leading Global Chemical Company for Better Living". We fully support the United Nations Sustainable Development Goals (UN SDGs) and apply them to all company activities through the following strategies:

Strategy 1 Managing Climate Change with Circular Economy

This strategy stresses on the integration of resource efficiency and effective waste management. This is coupled with the management of our portfolio towards low-carbon businesses and the establishment of cooperation with stakeholders across the supply chain to facilitate the utilization of low-carbon products. It also includes the creation of product circularity to curb greenhouse gas emissions and reduce used plastic waste while heading towards the goal to attain net zero emissions for scopes 1 and 2. Meanwhile, the strategy aims to build cooperation with suppliers and customers to cut down scope 3 emissions by 50 percent within 2050.

Strategy 2 Decarbonization via Compensation

To support the Net Zero Goal, the remaining amount of carbon emissions is offset with the Carbon Capture: Utilization and Storage (CCUS), which is a highly efficient carbon storage technology with competitive cost, and nature-based solutions, such as forestation, reforestation, etc.

Our actions towards the Net Zero Goal using Strategies 1 and 2 are implemented under the Low Carbon Transition Framework:

- **Efficiency-Driven:** Enhancing process efficiency, shifting to renewable energy or low-carbon energy, and developing and applying new low-carbon technology in the production process in order to reduce greenhouse gas emissions with more efficiency.
- **Portfolio-Driven:** Adjusting portfolio towards low-carbon businesses, such as High Value Business (HVB) and Green Chemical Business. GC also focuses on development of High Value Plastic (HVP) products and promotes the application of low-carbon products. Investing in a new portfolio with lower greenhouse gas emissions index will enable the company to retain our competitiveness and grow continuously without producing significant impact on the net greenhouse gas emissions. It also allows customers to benefit from our low-carbon products. Additionally, product circularity is also implemented to reintroduce used plastics into recycling and upcycling processes.
- **Compensation:** Using high performance carbon capture technology as well as compensation through nature-based solutions such as afforestation, reforestation, etc.

Strategy 3 Leadership

To become the leader in sustainability development, GC integrates Environmental, Social and Governance dimension (ESG) into the company business practices and expanding the results of such efforts to relevant stakeholders. Details are as follows:

- **Environmental:** Focus on complying with the Decarbonization Roadmap to achieve Net Zero Goal in 2050.
- **Social:** Emphasize on continuously creating value for a sustainable society by increasing the proportion of Social Enterprise (SE) and Creating Shared Value (CSV). This also includes combining such efforts into projects on circularity and forestation under the Decarbonization Roadmap. Furthermore,

GC also plans to conduct an assessment of the social impact/value of these projects and activities to analyze their cost-effectiveness and enhance efficiency.

- **Governance:** Raise level of governance and monitor sustainability performance by expanding the scope of responsibility of sub-committees and extending sustainability practices to subsidiaries. Additionally, GC plans to conduct ESG value assessment to streamline efficiency of operations and promote a sustainability culture within the organization through tangible actions.

GC has never ceased to improve our sustainability management operations. As a result, GC has been internationally and nationally rated by credible ranking institutions. At the global level, GC has been ranked No. 1 in the Chemicals Industry of the Dow Jones Sustainability Indices (DJSI) for the third consecutive year. GC has also earned the highest ranking among Thai companies in Climate Change Management and has scored an "A" (Leadership Level), which is the highest ranking, in Water Security based on the assessment framework of the globally trusted assessment institute, the CDP. In terms of our accomplishments at the national level, GC has been listed on the Thailand Sustainability Investment (THSI) for the seventh consecutive year and has earned the Excellence Score in the Low Carbon and Sustainable Business Index (LCSi) for the third consecutive year. These awards and recognitions are a reflection of our sustainable growth that is based on the balance of all three dimensions, namely economic growth, value creation for the society and excellent environmental management, which are carried out under the principles of Good Governance.

IMPACT MANAGEMENT FOR STAKEHOLDERS

The opinions of our stakeholders are vital to the improvement of our performance and efficiency. Therefore, GC reviews our stakeholder engagement activities and channels on an annual basis in order to ensure that our stakeholders can fully engage in our business and express their opinions transparently and appropriately. GC categorizes our key stakeholders into four groups:

1) Shareholder

Expectation	Action and Response
• Enhancement of competitiveness • Short-term and long-term enterprise risk management • Governance and transparent information disclosure	• Regularly review and improve business performance to confront dynamic situation • Analyze, examine and monitor current and future (3-5 years) enterprise risks • Set up the risk countermeasure • Transparently disclose information in accordance with international standards • Provide channels for shareholders to directly submit complaints and suggestions

2) Business Partner (including customers and investors)

Expectation	Action and Response
• Transparent and fair business conduct • Obtaining high-quality products and services at a fair price • Enhancing competitiveness and future business directions	• Establish the Supplier Code of Conduct • Conduct business with responsibility and comply with the principles and policy of corporate governance, business code of conduct and corporate compliance policy • Deliver goods and services that meets customers' expectation and establish feedback channel to receive customers' feedback • Organize capacity development programs for suppliers and customers e.g. collaboration with suppliers and clients to develop new products and services, and provision of knowledge and training session on safety topic to the suppliers, etc.

3) Community, Society and the Environment (including public sector, non-profit organizations and press)

Expectation	Action and Response
• Awareness of impact from company operations on society and environment • Collaboration with public and private sectors as well as non-profit organizations • Accurate and up-to-date disclosure of the company's news, information and performances • Transparent and accountable operations	• Conduct business with due care and comply strictly with the law while taking part in resolving and mitigating impact from climate change according to global and national goals • Communicate and disclose information on the Company's operations in a complete, accurate and timely manner • Establish and appoint responsible departments to appropriately liaise with the public sector • Monitor news from the press and include them in the process of direction planning

4) Employee

Expectation	Action and Response
• Benefits, compensation and fair working conditions • Occupational health and safety	• Provide channels for employees to submit opinions and their complaints • Develop employee capability, using clear performance indicators that are consistent with global standards • Encourage occupational health and safety • Provide adequate and fair compensation and benefits for employees

SUSTAINABILITY MANAGEMENT IN THE ENVIRONMENTAL DIMENSION

Climate Change Management

GC reaffirms our stance to partake in the Paris Agreement under the United Nations Framework Convention on Climate Change. We have, thereby, set the target to reduce greenhouse gas emissions (scopes 1 and 2) by 20 percent within 2030 and achieve the Net Zero Target as well as reduce scope 3 emissions by 50 percent within 2050. The company has assessed and disclosed information on risks and opportunities relating to climate change in line with the Task Force on Climate-related Financial Disclosures (TCFD). Furthermore, we have clearly defined short-term, medium-term and long-term policies and strategies pertaining to energy and climate change management. In doing so, the Sustainable Development Committee (SDC) has been appointed to drive these strategies and determine business directions to correspond with the Low Carbon Transition Framework:

- **Efficiency-Driven** highlights the implementation of diverse greenhouse gas reduction and energy enhancement projects, such as Energy Conservation, Maptaphut Integration (MTPi), Greenhouse Gas (GHG) Reduction through Alternative Energy, etc. We stress on energy and utilities management for maximum efficiency, loss reduction during transportation, greenhouse gas emissions reduction, and comprehensive waste management to reduce greenhouse gas emissions according to GC's "Together to Net Zero" goal.

- **Portfolio-Driven** features investment in high value business (HVB), green chemical business, and businesses that correspond to the Circular Economy principles. In 2021, GC has expanded investment in allnex Holding GmbH, the top global leader in coating resins and crosslinkers industries, including the delisting of the securities of Vinythai Public Company Limited (VNT) from being listed Company and making a tender offer for delisting. This will help expand the downstream business of the company. Moreover, GC has diluted shareholding in Global Power Synergy Public Company Limited as part of our business restructuring towards the Net Zero Target. GC has also steered the product market towards high value products (HVP) and developed the "YOUTURN PLATFORM" to implement end-to-end waste management as a solution to reduce plastic waste and GHG at the same time. These contribute to GC's Net Zero Target while preserving our competitiveness and enabling continuous growth.

- **Compensation-Driven** covers the continuous implementation of projects to restore and reinforce forest ecosystems in collaboration with government agencies, the private sector, the society and communities, spanning across a total area of 2,500 rai. These projects include the 80-rai Eco-Forest Rayong Wanarom which follows the Eco Forest principle and has been registered in the Thailand Voluntary Emission Reduction Program (T-VER), and the Khao Huai Mahat Forest Restoration and Water Conservation Project which has been carried out uninterruptedly since 2013 and has led to the restoration and recovery of the ecosystem of 2,500 rai of watershed forest. Additionally, GC has also built cooperation with our partner network and invested in Corporate Venture Capital (CVC) to gain access to Carbon Capture Utilization and Storage (CCUS) and other breakthrough technologies for future utilization.

Sustainable Water Management

GC's One Water Strategy comprises three key aspects, namely Governance, Water Stewardship and Resilience. The strategy reinforces on an integrated approach of water management. It also concentrates on optimizing water efficiency in the production process, using renewable water, supporting technological investments, streamlining the production process and exploring alternative water reserves in order to decrease the effects of business operations on water consumption and minimize impact from climate change.

Furthermore, GC has built networks with the public, private and industrial sectors, such as Water and Environment Institute for Sustainability (WEIS), Federation of Thai Industries, Water War Room, and Maptaphut Plant Manager Club (PMC), etc., in order to drive and promote policies and approaches on sustainable water management. This also includes water consumption risk management and cooperation between the public and private sectors in integrated water management.

GC further supports the water management strategy through our internal projects such as Optimization of Water Efficiency in Production Process, Sea Water Reverse Osmosis (SWRO) and Wastewater Reverse Osmosis (WWRO). In addition, GC is in the study phase of the Zero Liquid Discharge (ZLD) project which uses advanced technology to reduce waste and improve water efficiency, etc.

Waste Management

GC's waste management policy centers on reducing waste at the source and utilizing waste from the production process and other activities. This includes hazardous and non-hazardous waste disposal from all company activities, such as expansion of production capacity, annual turnaround activities. The Circular Economy principle has been applied to this effort in tandem with the 5Rs principle, consisting of Reduce, Reuse, Recycle, Renewable and Refuse.

In 2021, GC has carried out waste management projects based on eco-friendly waste management processes, such as Green Turnaround which efficiently reduced resource consumption and reduce generation of both hazardous and non-hazardous waste from turnaround activities. Our continuous endeavours in waste management have contributed to the accomplishment of the Zero Waste to Landfill Goal for the seventh consecutive year. Consequently, we have been invited to participate as a role model company in the "Enhancement of Zero Waste to Landfill Standards for Industrial Enterprises based on Universal Practices" program organized by the Department of Industrial Works.

Air Quality Control

GC has established an air quality management control plan in line with the standard and make continuous improvements on the air quality control system. We put special emphasis on reducing Volatile Organic Compounds (VOCs) diffusion and leakage by using the Code of Practice (CoP) in tandem with collaborating with external stakeholder to reduce as much benzene vapor and 1, 3-Butadiene from industrial plants as possible and lower than stipulated by the law. GC has also developed and improved process efficiency while planning regular audits and turnarounds of machinery and tools. Additionally, GC intends to eliminate the use of ozone-depleting substances by replacing R-22 with non-CFC refrigerants by 2030. In 2021, GC has expanded the scope of our VOCs management to cover relevant plants under GC Group in order to all companies understand these principles and able to compile a VOCs Inventory that is consistent throughout the Group.

Air quality control through the implementaion of projects and system improvement has led GC to attain our annual goal and has a continuous downward trend in air pollution emissions per ton production.

SUSTAINABILITY MANAGEMENT IN THE SOCIAL DIMENSION

Organization Transformation

GC strives to attract and retain high performance employees in tandem with developing their skills and capabilities and also supporting well-being for all employees to support our business growth and prepare the company to tackle business transformations in a timely manner. It also supports GC's business strategy to grow sustainably and to position ourselves as one of the leading organizations in the chemicals industry that attract high capability persons. GC emphasizes on three areas of resource management namely people, organization and culture.

People

GC targets to enhance employee performance and retain talents which contribute towards the organization's success according to current and future business directions. The implementation of the Lean Process Improvement Project to improve the company's work process, leverage digitalization to enhance appropriate workforce planning. Focusing on Reskilling and Upskilling to enhance employee capability consistent with the company's directions and focus on enabling all employees to self-educate. Additionally, GC places importance on recruiting high calibers align with business demand and provide care to ensure getting good experience throughout their life cycle in the organization.

Organization

Adhering to the "Fit, Fast, Flexible & Effective" approach, GC has adjusted organization structure to allow faster decision-making in response to the company's present and future strategies. GC focuses on a more flexible working and type that can handle rapidly changing business environment. Additionally, GC has strengthened the "Work from Home" (WFH) through improved work process and enhanced working tools to enable more efficiency in WFH. At the same time, we have also implemented smart office with a more modern format that is consistent with the new work environment for employees.

Culture

GC fosters a corporate culture that is in line with the GC SPIRIT and the 4 Core Behaviors by setting up theme "Conviction to Change: Speed with Challenge Status Quo". GC continues to foster a corporate culture that is in line with the GC SPIRIT and the 4 Core Behaviours. The theme in 2021 is "Conviction to Change: Speed with Challenge Status Quo". Our corporate culture is driven by projects and activities to prepare employees to cope with fast changes and acknowledging the company's directions and goals.

Safety and Reliability

GC has established the Quality, Security, Safety, Occupational Health, Environment, and Business Continuity (QSHEB) Policy and developed safety management infrastructure and guidelines based on the GC Management System (GCMS), Process Safety Management (PSM) and ISO 45001. We have also raised awareness of safety culture to employees, contractors and key suppliers using the B-CAREs concept to upgrade safety operations and achieve our ultimate goal in becoming a Zero Accident Organization.

Process Safety Management (PSM)

GC has established the Process Safety Management (PSM) Group & Subsidiary Taskforce as a guideline in process safety management for subsidiaries. We have also shared the PSM Good Practice to subsidiaries, enabling them to upgrade their PSM performance through exchange of knowledge, experience and practices in PSM. Furthermore, we have formulated the PSM Long Range Plan in collaboration with DuPont, a recognized global leader in safety, to raise the level of our process safety standard to World Class PSM as well as prevent loss from process safety incidents. In 2021, key PSM projects include Operational Discipline (OD) and PSM Deep Dive Assessment.

Personal Safety

GC stresses on the safe working behaviour of all operators, including employees and contractors. We have established the Management Safety Leadership Commitment for each level of the management, strengthened safety culture through the B-CAREs Strengthen scheme and encouraged operators' engagement in safety. The company has formulated the Zero Accident Strategy and implemented the 2021 B-CAREs Safety Culture Program as well as shared knowledge to employees and contractors. This has enabled them to monitor and govern safety in operations in order to strengthen personal safety and reduce work-related injury which will lead to the "Zero Accident" goal.

Human Rights Management along Value Chain

GC's human rights management policy has been conceived in accordance with the UN Guiding Principles on Business and Human Rights (UNGP). It has been applied across the value chain to prevent human rights violation within the Group, relevant businesses (joint ventures, mergers & acquisitions), business partners (suppliers, contractors, customers) and local communities.

GC conducts Human Rights Due Diligence (HRDD) and assesses human rights risks in all activities across the supply chain covering all six aspects of human rights, namely labour rights, community rights, supply chain, safety, environment and consumer rights. According to assessment on impact control and mitigation measures, it indicated that GC has one residual risk at a high level, which is vehicle accident in the operational areas, and six residual risks at a medium level as following details.

1. Turnaround-related issues
2. Wastewater pollution in Maptaphut area
3. Illegal forms of labour from Feedstock and Non-feedstock suppliers
4. Discrimination against suppliers providing products and other services
5. Oil leakage/spill
6. Possibility of customer data leakage

Such risks have prompted GC to execute measures and guidelines for effective control and mitigation, requiring strict compliance from departments and relevant parties to ensure that none of our business activities across the supply chain is in violation of human rights.

Contribution to Society

GC strives to conduct business with responsibility, adhering to the Social Enterprise (SE) principle and optimizing the use of resources according to the Circular Economy (CE) principle. This is carried out in conjunction with generating income for communities and the society,

improving quality of life and resolving environmental and plastic waste issues, which will ultimately lead to a low-carbon and sustainable society. Therefore, the company supports and improves the society and neighbouring communities by building relationships and engagement with various sectors. We have also integrated innovation and expertise to conduct CSR projects, which are prioritized based on three key elements, namely better living, sharing, and ecology, and cover economic, social and environmental aspects:

1. Better Living

GC has conducted the Community Waste Model project in collaboration with Wat Chaklukya Community Enterprise for Community Recycling Bank to set up the Recycle Hub in Wat Chak Luk Ya Community, which is the first model community in End-to-End Waste Management in Rayong province. This project employs the Social Enterprise Model and the YOUTURN platform. Subsequently, the project collected over 50,000 kilograms of recyclable waste per year, promoted employment, created jobs for the community and generated an income of more than 440,000 baht per year for the Social Enterprise. Therefore, GC plans to further implement the project in other communities.

2. Sharing

GC shares ideas and innovations to create value for communities and the society so that they may grow sustainably alongside industries. The company has collaborated with the Luffala Community Enterprise, the Nong Fab Community, and Hom Mahad Group, the Khao Phudon-Khao Huai Mahad community to develop eco-friendly products, such as LUFFALA Room Diffuser: Recreation Series. This collaboration takes into account the concept of sustainability and connects the environment, community, society and economy from upstream to downstream. The project uses organic methods to promote the cultivation of four herbs: Mint, Bustardcardamon, White mugwort, and Tayoy cardamom which found at Khao Huai Mahad in Rayong province under the Rayong Organic Living Program which employs the Smart Farming concept to control cultivation quality in order to acquire herbs of the highest quality for essential oil extraction. The extracted essential oil is then used to produce room diffuser by combining GC's Green Solvent innovation. It is, then, aromatized until the Luffala signature scent is achieved.

3. Ecology

GC has joined forces with our partners , which includes governmental agencies, academic institutions and local communities to carry out the "GC Collaborative Community-based Water Management" project in Rayong province since 2017. The project aims to alleviate floods and droughts, contribute to the provision of sufficient clean water for consumption, and raise local awareness about conserving water sources and using water wisely through various activities. For example, check dams have been constructed with GC's plastic flapped sacks to enhance water drainage efficiency, reduce sediment accumulation, and lower risks of flooding. Furthermore, GC has also conducted the Groundwater Bank project (closed system) to relieve the problems of saltwater intrusion as well as floods and droughts for orchard farmers by recharging rainfall into the ground. This helps create water security by using nature to help nature.

GC holds a long-term goal to demonstrate responsibility towards the society, focusing 70 percent of the efforts on social development in creating business value and 30 percent on donations to the society. Ultimately, we aim towards becoming the Partner of Choice by 2025.

SUSTAINABILITY MANAGEMENT IN THE ECONOMIC DIMENSION

Customer Relationship Management (CRM)

GC values the opinions, suggestions and expectations of our customers through collaborative product innovation projects in order to directly respond to the demands of customers and markets. Therefore, we have initiated various communication channels, such as Voice of Customer (VoC), CRM Mobile Application and Customer Solution Center (CSC). In 2021, GC has provided consultation to customers through the Visual Tour platform to facilitate customers in product development. Furthermore, GC is committed to grow sustainably with our strategic partners who are brand owners as well as expand cooperation in product development to educational institutions and government agencies in an effort to create opportunities in product development, expand trade opportunities and amplify customer base.

GC has employed customers' recommendations to enhance the efficiency of our customer relationship management by surveying customer satisfaction using the eQ™ Index in accordance with universal standards in performance tracking. According to the survey, GC has continuously maintained customer satisfaction at 93 percent, which is higher than the average of other companies in the same industrial group.

Innovation Management, Sustainable Product and Service Development

GC strives to research, develop and seek new technology and innovation to maintain our competitiveness and raise our capacity to the leading level in tandem with reducing greenhouse gas emissions to net zero within 2050. This year, the focus of GC's innovation management has been shifted towards three main aspects, namely 1) New Technology Uplift, 2) Market-focused Innovation and 3) Breakthrough Technology via Technology Integrator.

Furthermore, GC has establised an innovation research and development network to collaborate with leading organizations in developing high quality products that enhance performance and increase sustainability values for new products to meet customers' demands. At the same time, such action enhances production efficiency and contributes to our decarbonization efforts. In 2021, GC has invested over 8 million USD through startup and venture capital funds to accelerate its innovation capability in area of advanced material and sustainability.

GC aims to develop sustainable products and services based on the Circular Economy principles by creating eco-friendly products, reducing pollution and greenhouse gas throughout the product's life cycle and creating product circularity. We also create awareness in the management of used plastics in collaboration with our partners to promote recycling and upcycling with the highest efficiency while placing customers and stakeholders at the center of our business. We also consider the impact on the society, economy and environment throughout the life cycle in response to the need to elevate consumers' quality of life alongside business growth and the company's sustainability.

Examples of outstanding innovations in 2021 include Post-Consumer Recycled (PCR) Resin, which is high quality plastic product moulded from used HDPE plastic resin. This promotes the concept of Circular Economy, reduces the use of resources and energy, and lowers waste generation. It is estimated that the product will create a revenue of more than 750 million baht while reducing waste intended for landfill disposal by over 50,000 tons in 2024. Additionally, GC has developed high flow rotational molding grade plastic. This innovation requires low production energy and leads to lower greenhouse gas emissions in the production process. However, the plastic still retains its easy-to-shape features. Such plastic is suitable for the moulding of high quality products, for example, furnitures, plant pots, garden accessories, childrens' toys or engineering parts.

MANAGEMENT DISCUSSION AND ANALYSIS

EXECUTIVE SUMMARY

For 2021 performance, the Company had total sales revenue at Baht 465,128 million, increased by 43% from the previous year driven by products prices significantly increased mainly due to global economic recovery after the lockdown restriction of COVID-19 has been eased and global vaccination rate has gradually increased led to increase of demand for products. Additionally, tightening supply during some periods of the year also had a positive impact to products price. The Company had Net Operating Profit Recurring (excluding Stock Gain Net NRV, Foreign Exchange loss, and Loss from commodity hedging, and Extraordinary items) of Baht 31,347 million, increased more than 200% from the previous year. Although petrochemical and refinery Businesses continued to be recovered from the COVID-19, the Company continues to implement various efforts including cost saving program, production cost reduction, and enhancement of production efficiency which resulted to the Company's Adjusted EBITDA of Baht 55,186 million, increased by 93% from the previous year. The Company had Stock Gain Net NRV of Baht 5,955 million, Loss from commodity hedging of Baht 1,440 million, and Foreign Exchange loss of Baht 4,765 million, extraordinary items from selling ordinary shares in Global Power Synergy Public Company Limited (GPSC) of Baht 11,834 million and the remaining investment will be reclassified as non-current assets, which recognized and measure the fair value on the reclassification date of Baht 10,565 million. In addition, the Company had impact from the restructuring of investments in Emery and the impairment of assets at net loss of Baht 1,633 million. The Company recognized loss from impairment of assets of Baht 1,886 million, and provisions by a subsidiary for legal obligations of Baht 444 million. As a result, for the year 2021, the Company had Net Profit of Baht 44,982 million (Baht 10.01/share), increased more than 200% from the previous year.

In 2021, Olefins and Derivatives Business Unit's performance was continuously increased due to the increase in average price of Polyethylene (PE) tracking with crude oil price direction. In addition, PE market was supported by the easing of the lockdown restriction for COVID-19, the progress on vaccination, and Polyethylene products themselves are usually necessary for daily usage especially for packaging industry including the demand on Hygiene products. These resulted to increase in sale volume comparing with the previous year, even there was planned maintenance shutdown during the year. As a result, Adjusted EBITDA Margin of Olefins and Derivatives was at 20%, increased from the previous year. For Refinery Business Unit, the performance was improved due to the economic recovery after the easing of the lockdown restriction which led to the fuel consumption recovering and tightening supply during the year, while the Company has continued to adjust production by reducing Jet Fuel production and producing more Diesel, resulted to the market GRM for the year at 3.80 USD per barrel. For Aromatics Business Unit, Market P2F per ton BTX increased to 153 USD per ton supported by global economic recovery after the easing of the lockdown restriction, the continue of healthy downstream demand, and the low inventory levels in this year. Furthermore, Performance Materials & Chemicals Business Unit's performance was also improved, supported by tightening supply of Phenol and Bis-Phenol A along the year, while Propylene Oxide and Polyols prices have been increasing through the year. The Company had Share of profit of investment in JV and Associates of Baht 6,993 million, increased by 109%, mainly due to the recovery in petrochemical business, which overall products spread are significantly increased.

Performance Summary

(Unit: Million Baht)	2020	2021	YoY % +/(-)
Sales Revenue	326,270	465,128	43%
EBITDA	20,291	61,141	>200%
EBITDA Margin (%)	6%	13%	7%
Share of profit of investments in JV and Associates	3,340	6,993	109%
Net Profit	200	44,982	>200%
EPS (Baht/Share)	0.04	10.01	>200%
Adjusted EBITDA*	28,579	55,186	93%
Adjusted EBITDA Margin (%)	9%	12%	3%

Note: * Adjusted EBITDA refers to EBITDA excluding Stock gain/(loss), NRV and Extra item

Adjusted EBITDA Margin

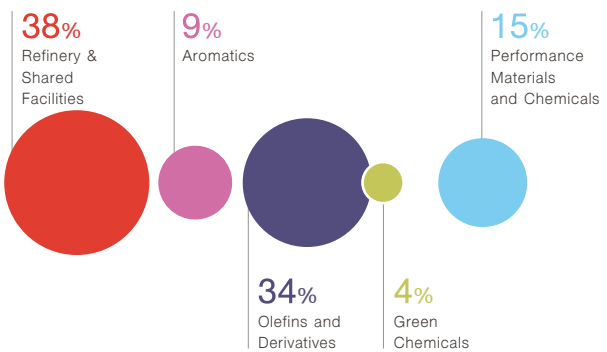
% Adj. EBITDA Margin	2020	2021
Business Unit:		
Refinery and Shared Facilities	2	1
Aromatics	11	11
Olefins and Derivatives*	16	20
Green Chemicals	7	8
Performance Materials and Chemicals	18	27
Average	**9**	**12**

Note: *If included PTA, PET %Adj. EBITDA in 2020 and 2021 are 14 and 17 respectively.

2021

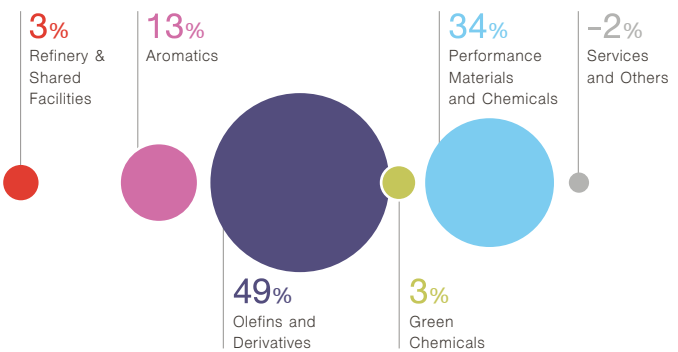
SALES REVENUE

465,128 MB



ADJUSTED EBITDA*

55,186 MB



PERFORMANCE ANALYSIS BY BUSINESS UNIT

Refinery & Shared Facilities Business Unit

Crude Price & Petroleum Product Spreads

(Unit: USD per bbl)	2020	2021	YoY % +/(-)
Dubai Crude Oil	42.21	69.24	64%
Gasoline-Dubai	4.43	11.01	148%
Jet-Dubai	2.52	5.83	131%
Diesel-Dubai	6.14	6.70	9%
HSFO-Dubai	-3.04	-4.87	-60%
LSFO-Dubai	11.21	12.62	13%

Since the beginning of 2021, Crude oil market has been supported by the high compliance rate of OPEC alliances on an agreement to maintain production level. In addition, crude oil market was supported by the $1.9 trillion economic stimulus plan of the United States, the progress on vaccination against COVID-19 in many countries, including the Unites States and European countries. Also, the impact of the Polar Vortex in the United States, associated with outbreaks of coldest temperatures in more than 30 years. In Q3/2021, the offline in U.S. Gulf of Mexico producers by 1.4 million barrel per day due to Hurricane Ida. Therefore, the overall supply increase was less than the increasing demand in the market. However, many countries issued new restrictions policy to reduce the impact from the Omicron variant at the end of Q4/2021 led to pressure in market demand, with average crude oil price in 2021 at 69.24 USD per barrel.

In 2021, the Petroleum products price and product spread over crude oil price had been increased mainly due to the back of a brighter demand outlook from the re-opening of cities in the US and European countries. Also, petroleum products were affected by the strain on the supply due to the U.S. Polar Vortex. Average Diesel over Dubai crude oil spread was 6.70 USD per barrel, increased from the previous year, due to the Lockdown easing in many countries, especially in Asia and Europe. In addition, the product spread was supported by lower supply due to seasonal refinery maintenance in Q2/2021 and lower export from China. Average Jet Fuel over Dubai crude oil spread was 5.83 USD per barrel, increased from the previous year, due to the implementation of Travel Bubbles and the increase in demand from the power plant in Japan and Korea as the unusual cold waves. Average Low Sulfur Fuel oil (LSFO) over Dubai crude oil spread was 12.62 USD per barrel which supported by the demand of Power plants in North Asia for substitute the higher prices of substitute fuels as LNG, caused by as the unusual cold waves

Gross Refinery Margin

(Unit: USD per bbl)	2020	2021	YoY % +/(-)
Market GRM	2.24	3.80	70%
CDU GRM	1.58	3.26	106%
CRS GRM	5.54	6.66	20%
Hedging Gain/(Loss)	0.17	-1.53	<-200%
Stock Gain/(Loss) net NRV	-3.20	1.72	154%
Accounting GRM	**-0.80**	**3.99**	**>200%**
Adjusted EBITDA (MB)*	**2,184**	**1,540**	**-30%**
Adjusted EBITDA (%)	**2%**	**1%**	**-1%**
Utilization Rate (%)	**97%**	**95%**	**-1%**

Note: *Adjusted EBITDA refers EBITDA excluding Stock gain/(loss), NRV and Extra item

For Refinery Business Unit in 2021, Market GRM was 3.80 USD per barrel with CDU utilization rate at 95%, decreased by 2% from the previous year due to there was planned maintenance shutdown in Q3/2021 for 25 days. The Company realized Stock Gain at 1.72 USD per barrel due to the increased crude oil price which compared with 2020. The Company recorded Loss from commodity hedging of 1.53 USD per barrel. These resulted to the Refinery Business Unit's accounting GRM at 3.99 USD per barrel, increased from 2020. The Adjusted EBITDA of Refinery Business Unit in 2021 was Baht 1,540 million, 30% decreased from 2020 while Adjusted EBITDA Margin was at 1% (Adjusted EBITDA and Adjusted EBITDA Margin excluding Loss from commodity hedging were 4,468 million Baht and 3%, increased from 1,853 million Baht and 1% in 2020 respectively).

AROMATICS BUSINESS UNIT

Aromatics Product Prices and Spreads over Condensate

(Unit: USD per ton)	2020	2021	YoY % +/(-)
Condensate	350	596	70%
Paraxylene (TW)	577	859	49%
Paraxylene (TW)-Condensate	227	263	16%
Paraxylene (FECP)	578	856	48%
Paraxylene (FECP)-Condensate	229	259	13%
Benzene (Spot Korea)	485	914	88%
Benzene-Condensate	136	318	134%
Naphtha-Condensate	30	50	65%

Paraxylene

In 2021, Economic recovery drove Paraxylene market growth better than last year. In addition, Paraxylene market was supported by new capacities of Purified Terephthalic Acid (PTA) plants operating in this year and strong demand from PET Resin product during COVID-19 situation led to higher demand for packaging product. On the contrary, Paraxylene market was under pressure from a decrease in textile demand and the implementation of energy consumption control policy in China that effected on Polyester production, led to a decrease in polyester operating rates in several regions. In term of supply, global Paraxylene capacity increased from the previous year, which mainly operated in China according to its self-sufficient economy policy to decrease import volume amid the increasing inventory level. These resulted to Paraxylene (FECP) over Condensate spread of 259 USD per ton, rose from 229 USD per ton in 2020.

Benzene

In 2021, Economic recovery drove Benzene market growth better than last year even COVID-19 pandemic. In Q2/2021 and Q3/2021 Benzene inventories decreased to be at lower-than typical level led to the strong Benzene spread. In addition, new Styrene Monomer plants has operated in 2021 led to higher demand and the demand for necessary products during Work from Home and the change in behavior to use personal vehicle, resulted to an increase in demand of home appliances sector, construction sector, and automotive sector which led to improvement in Benzene over Condensate spread this year. Average Benzene over Condensate spread in 2021 at 318 USD per ton, significantly increased from 136 USD per ton in the previous year.

Aromatics market P2F

(Unit: USD per ton)	2020	2021	YoY % +/(-)
Market P2F	130	153	17%
Hedging Gain/(Loss)	2.5	18.5	>200%
Stock Gain/(Loss) net NRV	-28.6	35.4	>200%
Accounting P2F	**104**	**206**	**99%**
Adjusted EBITDA (MB)*	**3,635**	**7,206**	**98%**
Adjusted EBITDA (%)	**11%**	**11%**	**0%**
Utilization Rate (%)	**96%**	**99%**	**3%**

Note: *Adjusted EBITDA refers EBITDA excluding Stock gain/(loss), NRV and Extra item

In 2021, Aromatics Business Unit had BTX utilization rate at 99%, increased from the previous year following the rise in demand and no major maintenance shutdown of Aromatics plant in this period, while there was planned maintenance shutdown of Aromatics plant 2 for 19 days in 2020. Market P2F per ton BTX increased to 153 USD per ton this period mainly due to both Paraxylene over Condensate spread, and Benzene over Condensate spread. Adjusted EBITDA for 2021 was Baht 7,206 million and Adjusted EBITDA Margin was 11% (Adjusted EBITDA and Adjusted EBITDA Margin excluding hedging gain was Baht 5,707 million and 9% respectively, increased from Baht 3,442 million and 10% last year). In this period, the Company had Stock Gain at 35.4 USD per ton and Gain from commodity hedging at 18.5 USD per ton, resulted to Accounting P2F of 206 USD per ton, decreased by 99% from the previous year.

Olefins and Derivatives Business Unit

Prices and Spreads of Olefins and Derivatives

(Unit: USD per ton)	2020	2021	YoY % +/(-)
Naphtha (MOPJ)	380	646	70%
Ethylene (SEA)	713	1,008	41%
Propylene (SEA)	775	966	25%
Avg. PE	919	1,299	41%
HDPE	880	1,181	34%
HDPE-Naphtha	500	536	7%
LLDPE	867	1,200	38%
LLDPE- Naphtha	487	554	14%
LDPE	1,010	1,516	50%
LDPE- Naphtha	630	870	38%
PP	992	1,321	33%
PP-Naphtha	612	675	10%
MEG (ACP)	627	846	35%
MEG-0.65 Ethylene	164	191	16%

In 2021, the average PE price was 1,299 USD per ton, increased by 41% from the previous year, as following the higher of Crude oil price. While the market was supported by easing lockdown in many countries due to the speed-up of the progress on vaccination which impacted to the demand growth, although was under pressure from the new supply in the market.

In 2021, MEG (ACP) price was 846 USD per ton, increased by 35% from 2020, as following the higher of Ethylene price, although was pressured by weaker demand in downstream industries.

Adjusted EBITDA of Olefins and Derivatives

(Unit: Million Baht)	2020	2021	YoY % +/(-)
Adjusted EBITDA	14,795	27,350	85%
Adjusted EBITDA (%)*	16%	20%	4%
Utilization Rate Olefins (%)	97%	91%	-6%
Utilization Rate Polymer (%)	101%	103%	2%

Note: *If included PTA, PET %Adj. EBITDA in 2020 and 2021 are 14% and 17% respectively.In 2021, Olefins plants had average utilization rate of 91%,

declined from 97% in 2020 due to some of utilities support providers was affected by the lighting strike incident in April 2021, which resulted to the slowdown in production. In addition, the Company has started commercial operation for the Olefins Reconfiguration Project (ORP) since June 2021. Polymer plant utilization rate of 103%, increased from 101% in 2020, as following the direction of market price, which was slightly increased, although there was planned maintenance shutdown in Q4/2021. In term of the price situation, overall products prices were supported by easing lockdown in many countries and the speed-up of the progress on vaccination, as following the Crude oil price. The Adjusted EBITDA of Olefins and Derivatives Business Unit was Baht 27,350 million, or Adjusted EBITDA Margin of 20%. In term of feedstock, the portion of feedstock used of Gas and Naphtha were 80% and 20% respectively.

Performance Materials and Chemicals Business Unit

Prices Market P2F and Adjusted EBITDA of Performance Materials and Chemicals

(Unit: USD per ton)	2020	2021	YoY % +/(-)
Phenol	749	1,178	57%
BPA	1,388	2,889	108%
Propylene Oxide (PO)	1,358	2,086	54%
Polyols	1,669	2,465	48%
Phenol P2F	447	448	0%
BPA P2F	532	1,649	>200%
Adjusted EBITDA (MB)	**6,020**	**18,578**	**>200%**
Adjusted EBITDA margin (%)	**18%**	**27%**	**9%**
Utilization Rate Phenol (%)	**109%**	**113%**	**4%**
Utilization Rate BPA (%)	**108%**	**111%**	**3%**
Utilization Rate PO (%)	**N/A**	**95%**	**95%**

Phenol

In 2021, Phenol price averaged at 1,178 USD per ton, increased by 429 USD per ton or 57% from 2020 mainly due to Phenol supply shortage resulted from Polar Vortex situation in the United States led to the difficulty in plant operations and unplanned production cuts in the region in Q1/2021. In Q2/2021, supply of phenol went down as several phenol plants curtail their operations during the COVID-19 Delta Variant. Also, there was a delay in logistic discharge and dual control policy stipulated in China led to the drop in phenol supply as well.

In 2021, BPA price averaged at 2,889 USD per ton, increased by 1,501 USD per ton or 108% from 2020 due to the supply shortage effected from Polar Vortex situation in the United States leading to a surplus demand of Epoxy resin and a rise in BPA downstream price. Moreover, wind turbine consumption, to generate renewable power and decrease low carbon emission, rose significantly in areas such as Europe, the United States, North Asia, especially in China.

Propylene Oxide (PO)

In 2021, Propylene Oxide (PO) price averaged at 2,086 USD per ton, increased by 54% from last year due to Polar Vortex in the United States and Dual control policy enforcement in China led to a drop in Propylene Oxide operation rates, while there was the new capacity of Polyols plant and Propylene glycol which led to the increase in Propylene Oxide demand.

In 2021, Polyols price averaged at 2,465 USD per ton, increased by 48% from last year aligned with a rise in Propylene Oxide market since Polyols supply declined due to Polar Vortex situation in the United States and some Chinese producer reduce their operating rates according to Dual control policy enforcement in China.

For Performance Materials and Chemicals Unit in 2021, the utilization rate of Phenol and BPA that was 113% and 111% respectively, which increased from last year because of a rise in demand. Market P2F per ton of Phenol decreased from 2020 to 448 USD per ton. Market P2F per ton of BPA increased from 2020 to 1,649 USD per ton. For Propylene Oxide and Polyols, the utilization rate of Propylene Oxide was 95% with full-year operations. Propylene Oxide price increased from last year to 2,465 USD per ton. These resulted to Adjusted EBITDA of Performance Materials and Chemicals Unit of Baht 18,578 million or Adjusted EBITDA Margin of 27%.

Adjusted EBITDA by Business Unit

Adjusted EBITDA (Million Baht)	2020	2021	YoY % +/(-)
Business Unit :			
Refinery and Shared Facilities	2,184	1,540	-30%
Aromatics	3,635	7,206	98%
Olefins and Derivatives	14,795	27,350	85%
Green Chemicals	1,228	1,609	31%
Performance Materials and Chemicals	6,020	18,578	>200%
Services and Others	717	(1,097)	<-200%
***Adjusted EBITDA (MB)**	**28,579**	**55,186**	**93%**

Note: * Adjusted EBITDA refers to EBITDA excluding Stock gain/(loss), NRV and Extra item

OPERATING PERFORMANCE

	Unit: MB	2020	2021	YoY % + /(-)
1	**Sales Revenue**	326,270	465,128	43%
2	Feedstock cost	(248,737)	(341,893)	37%
3	**Product to Feed Margin**	**77,533**	**123,235**	**59%**
4	Variable Cost	(26,395)	(34,107)	29%
5	Fixed OH	(14,866)	(18,556)	25%
6	Stock Gain/(Loss) and NRV	(8,288)	5,955	172%
7	Gain/(Loss) on Commodity Hedging	476	(1,440)	<-200%
8	Other Revenue	4,942	4,932	0%
9	SG&A Expenses	(13,111)	(18,878)	44%
10	**EBITDA**	**20,291**	**61,141**	**>200%**
11	Depreciation & Amortization	(20,578)	(23,593)	15%
12	Loss from impairment of assets	313	(1,886)	<-200%
13	Provision of contingent liabilities-subsidiary	-	(444)	100%
14	Gain on sale of investment	-	10,201	100%
15	Gain from remaining investment reclassification	-	10,565	100%
16	**EBIT**	**26**	**55,984**	**>200%**
17	Net financial expense	(3,166)	(5,434)	72%
18	FX Gain/(Loss)	343	(4,765)	<-200%
19	Share of gain/(loss) from investment	3,340	6,993	109%
20	Corporate Income Tax	109	(7,228)	<-200%
21	**Net Profit after Tax**	**652**	**45,550**	**>200%**
22	**Profit/(loss) attributable to:**			
	Non-controlling interests	452	568	26%
23	**Owners of the Company**	**200**	**44,982**	**>200%**
24	**Adjusted EBITDA***	**28,579**	**55,186**	**93%**

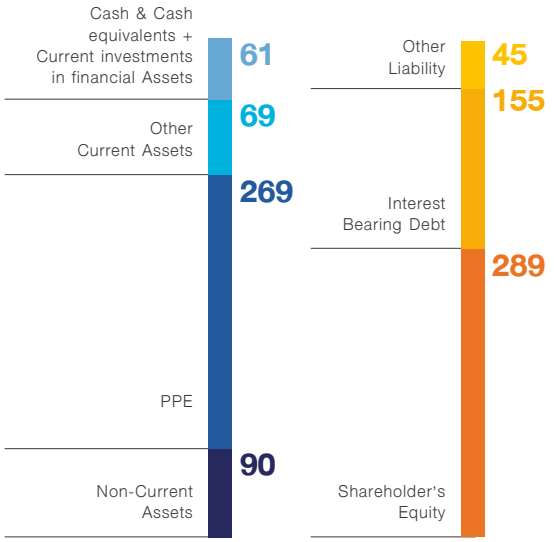
Note: *Adjusted EBITDA refers EBITDA excluding Stock gain/loss, net NRV and Extra item

In 2021, the Company had higher sales revenue than the previous year as the products price increased, particularly in Olefins and Derivatives, Phenol, and Refinery business. Variable Cost increased from the previous year mainly due to the start of commercial operation of Propylene Oxide (PO) and Polyols, the Olefins Reconfiguration Project (ORP), and PTA plant 1. Fixed overhead and SG&A expenses went up from the previous year because of Advisor fee for the Acquisition of Shares of allnex Holding GmbH, insurance expense, higher maintenance cost, higher freight, and Selling and Administrative Expenses, aligned with the growth of sales volume of Polymers. The Company had an increase in Financial Expenses from 2020 on account of additional debt financing In Q1/2021. Also, the Company had Foreign Exchange Loss in 2020 due to the depreciation in Baht currency while the Company had Foreign Exchange gain in 2021 due to the appreciation in Baht currency. In 2021, The Company had extraordinary items from gain from selling ordinary shares of 12.73% in Global Power Synergy Public Company Limited (GPSC) of Baht 11,834 million, and the classification of the remaining investment shares of 10% as Non-current Financial Assets which resulted in a gain of Baht 10,565 million from the fair value measurements on the reclassification date. The Company had impact from the restructuring of investments in Emery and the impairment of assets, which totaled in net loss of Baht 1,633 million from Emery. Also, the Company has Loss from impairment of assets related to the US Petrochemical complex project which are no longer applicable to the on-going project study of Baht 1,886 million, and provisions by a subsidiary for legal obligations of Baht 444 million. Additionally, the Company's share of profit from investments in JV and associates in 2021 increased from the previous year because of the performance of all companies were improved especially Petrochemical Business, as following the higher product prices.

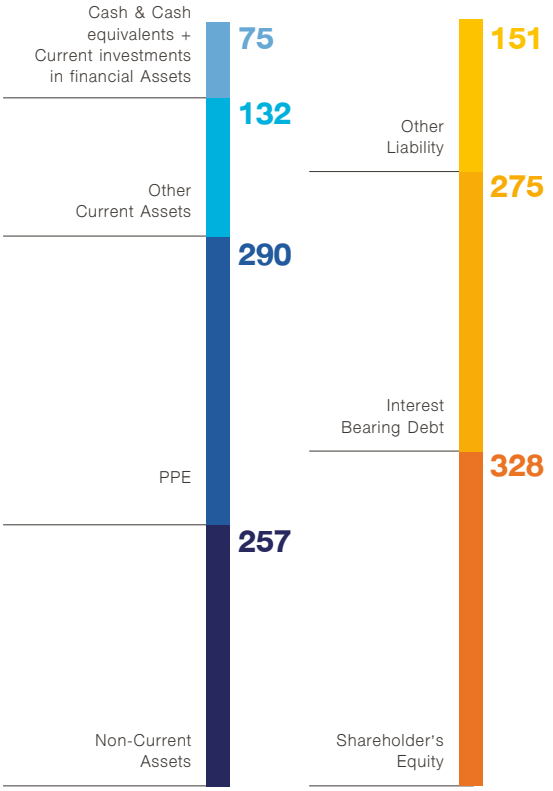
STATEMENTS OF FINANCIAL POSITION

BALANCE SHEET

Unit: Billion Baht



31 December 2020 **489** Billion Baht



31 December 2021 **754** Billion Baht

Assets

As of December 31, 2021, the Company had total asset of Baht 754,115 million, increased by 54% at Baht 264,733 million from December 31, 2020 and variance of assets were described as follows:

- Total Current asset increased by Baht 77,333 million mainly due to an increase in Cash and Cash Equivalents and Current Investments in financial assets by Baht 14,336 million resulted from cash flows provided by operating activities, cash outflows for the investment in allnex Holding GmbH, and cash inflows from GPSC shares disposal and Bonds issuance and loan in this period. The Company had a rise in Account Receivable by Baht 21,263 million. Also, Inventories was increased by Baht 36,279 million due to higher in raw material and product price.
- Property plant and equipment increased by Baht 20,403 million mainly due to the investment in allnex Holding GmbH in 2021, while the start of commercial operation of the Olefins Reconfiguration Project (ORP) in June 2021 incurred higher depreciation in this period.
- Non-current asset increased by Baht 166,997 million from the investment in allnex Holding GmbH, which included an increase in goodwill by Baht 74,587 million, intangible assets by Baht 78,329 million, and Rights of use assets by Baht 1,805 million.

Liabilities

As of December 31, 2021, the Company had total liabilities of Baht 426,512 million, increased by 113% or Baht 226,124 million from December 31, 2020 and movements of liabilities were as follows:

- Interest-bearing debt increased by Baht 120,291 million due to Bonds issuance by USD 1,250 million in March and a rise in borrowings from a related company by Baht 55,600 million.
- Other liabilities increased by Baht 105,832 million due to Account payable increased by Baht 49,836

million due to higher in both raw material price. Other current liabilities increased by Baht 19,344 million resulting from the investment in allnex Holding GmbH, which impact to increased Others Payable by Baht 8,568 million, and the increase in the Company's liabilities of derivatives related to financial and commodity hedging. Other non-current liabilities increased by Baht 36,652 million due to the investment in allnex Holding GmbH in 2021 resulting in increased Deferred tax liabilities by Baht 26,635 million.

Shareholder's Equity

As of December 31, 2021, the Company had total Shareholder's Equity of Baht 327,603 million, increased by Baht 38,609 million from December 31, 2020, as a result from Net profit as of December 31, 2021 at million 44,982 Baht, dividend payout for the year of 2020 amounting to Baht 4,486 million and interim dividend payout for the year 2021 amounting to Baht 8,973 million. Additionally, the Company had higher Other components of equity by Baht 5,404 million, which included the fair value measurements on the reclassification date of GPSC by Baht 3,648 million.

Cashflow statement

Cashflow (Unit: Million Baht)	For the year Ended 31 Dec 2021
Net cash flows provided by operating activities	68,650
Net cash flows used in investing activities	(148,843)
Net cash flows provided by financing activities	90,036
Net increase (decrease) in cash and cash equivalents, before effect from foreign exchange rate	**9,843**
Effects of exchange rates on cash and cash equivalents	1,458
Net decrease in cash and cash equivalents during the period	**11,301**
Cash and cash equivalents at the beginning of the period	44,313
Cash and cash equivalents at the end of the period	**55,613**
Current investments in financial assets at the end of the period	19,381
Net cash and cash equivalent and investment at the end of the period	**74,994**

For the period ended December 31, 2021, the company had cash flow activities as follows:

- Cash flows provided by operating activities of Baht 68,650 million.
- Cash flow used in investing activities of Baht 148,843 million. The Company had an increase in investment in subsidiaries, associates, and joint ventures amounting to Baht 134,411 million and payment for the acquisition of property, plant, and equipment, and intangible assets amounting to Baht 16,074 million. Besides, the Company had current financial assets of Baht 5,029 million. However, the Company had proceeds from GPSC shares disposal amounting to Baht 25,271 million and dividends received amounting to Baht 2,207 million.
- Cash flow provided by financing activities of Baht 90,036 million mainly due to the proceeds from Bonds issuance by Baht 40,000 million, and the proceeds from short-term and long-term borrowings from financial institutions by Baht 90,175 million. The Company had Bond redemption of Baht 20,000 million and total Dividend payment of Baht 14,080 million, of which were Dividend payment from the Company of Baht 13,459 million.

As a result, as of December 31, 2021, the Company had total Cash and Cash Equivalents of Baht 55,613 million, along with Current investments in financial assets of Baht 19,381 million. Hence, the Company had total cash and cash equivalent and investment of Baht 74,994 million. The Company had Net interest-bearing debt to equity at 0.61 times and Net interest-bearing debt to EBITDA at 3.28 times.

Key Financial Ratios

Financial Ratios		2019	2020	2021
Liquidity Ratios:				
Current Ratio	(Times)	1.97	2.20	1.41
Quick Ratio	(Times)	1.13	1.52	0.85
Operating Cash Flow Ratio	(Times)	0.48	0.40	0.67
Account Receivables Turnover	(Times)	10.75	10.36	11.72
Account Receivable Days	(Days)	33.96	35.31	31.14
Inventory Turnover	(Times)	10.33	9.10	7.94
Days Sales in Inventory	(Days)	35.33	40.22	45.95
Account Payables Turnover	(Times)	13.02	13.91	9.10
Account Payables Days	(Days)	28.03	26.31	40.11
Cash Cycle	(Days)	41.26	49.22	36.98
Profitability Ratios:				
Gross Margin Ratio	(%)	4.65	3.70	12.62
EBIT/Sales Revenue	(%)	3.93	1.23	12.52
Cashflow from Operation/EBIT	(%)	187.21	546.31	116.90
Net Profits to Sales Revenue	(%)	2.85	0.06	9.59
Return on Equity	(%)	4.02	0.07	15.01
Efficiency Ratios:				
Return on Total Assets	(%)	3.50	0.86	9.44
Return on Fixed Assets	(%)	12.12	7.79	24.55
Total Asset Turnover	(Times)	0.89	0.70	0.75
Leverage Ratios:				
Interest Bearing Debt to Equity	(Times)	0.36	0.54	0.84
Interest Coverage Ratio	(Times)	10.17	6.43	12.25
Dividend Payout Ratio	(%)	77	>200	37

PROJECTS PROGRESS

1. According to GC's strategy to further build its position in HVB business, the company acquired allnex Holding GmbH (allnex) for EUR 4.1 billion. The company fund from operation cash, loan from banks, and inter-company loan from PTT to support this acquisition which was completed on December 29, 2021. The acquisition of allnex highly fits to the Company Group's growth strategy with the aim to diversify the Company Group's business toward specialties arena, specifically to increase profit contribution from and capture growth opportunities in High Value Business ("HVB"), which matches the global megatrend. allnex who is a global leader in specialty coating resins and crosslinkers business can serve as future growth platform of the Company Group to further build its position in HVB business at the global level. The Company expects to collaborate with allnex to enhance the synergies while further add values to allnex's unique qualities and enhance its competitive edge, and to work together to preserve allnex's strength while creating more opportunities and synergies in business, growth, innovation, and operational excellence.

   In addition, the company considered to pursue loan refinance and accomplished for THB bond issuance amounting to THB 30,000 million to Institution Investors and/or High Net Worth Investors in January 2022. The company is also seeking for further appropriate funding to extend term loan and strengthen company balance sheet in the near future.

2. The Company has important projects in the pipeline:
   - The Company had approved an investment for the Recycle Plant that have signed a cooperation agreement to establish a Joint venture company to be called ENVICCO Limited. The joint venture company was established with the objectives to be manufacturer of high-quality recycled plastic resins, with rPET and rHDPE capacity of 45,000 ton per year including rPET 30,000 ton per year and rHDPE 15,000 ton per year. The plant is expected to start commercial operation within Q1/2022.
   - The Company and Kuraray Co. Ltd (KRR) set up a joint venture, Kuraray GC Advanced Materials Co. Ltd, with High Heat Resistant Polyamide-9T (PA9T) capacity of 13,000 ton per year and Hydrogenated Styrenic Block Copolymer (HSBC) capacity of 16,000 ton per year. The plant is expected to start commercial operation within 2022.
   - The Company had approved an investment for the Olefins 2 Modification Project which will allow the Company to increase Propane usage as feedstock and align with the Company's strategy to enhance feedstock flexibility and long-term competitiveness. The plant is expected to start commercial operation within Q1/2023.

Currently, the projects are remained on the development plan. The company will publicly announce the information once the implementation of the projects is officially made.

Estimated Annual CAPEX of PTTGC Group for the next 5 years

Projects	Total 2022-2026	Estimated Annual CAPEX (M.USD)				
		2022	2023	2024	2025	2026
1) Key Project						
- Recycle Plant	3	3				
- Super Engineering Plastic (KGC)	7	7				
- Olefin 2 Modification	115	65	50			
2) Other projects	297	156	81	39	20	0
3) allnex expansion & growth Capex	187	78	75	30	2	2
GC group Grand total	**608**	**309**	**206**	**69**	**22**	**2**

Notes: 1. Group annual maintenance ~ 310-360 M.USD (including allnex Holding GmbH)
2. Other projects such as IT & digital, new office facility, etc.
3. Excludes the proposed delisting of securities of Vinythai Public Company Limited and the tender offer for securities for the purpose of delisting which the company submitted tender offer on December 21, 2021.

ENVIRONMENT SOCIAL GOVERNANCE

GC strive to operate for the organization's growth as well as the balance of the three dimensions, namely Environment, Social and Governance (ESG). Our success has been reflected throughout the recognitions both national and international. GC has implemented sustainability strategies and achieved the objectives as our goals. We have also attained outstanding results under sustainability strategy (Step Up):

Climate Management

GC has continued to initiate energy efficiency enhancement projects which have largely contributed to the continuous decline in Greenhouse Gas (GHG) emission and achieved GHG scope 1 & 2 reduction target, Furthermore, we have uplifted new challenges to be more environmentally responsible by setting the target to reduce greenhouse gas (scope 1 and 2) by 20 percent within 2030 and achieve net zero emissions and cooperate with supplier and customers to reduce halving in scope 3 emissions within 2050.

Circular Economy

GC is the one of the first organizations in Thailand to implement Circular Economy with distinct examples of success. We have built and continuously expanded our partner network to become a role model for Circular Economy in tandem with creating business value. GC place importance and raise awareness in waste management to the society. GC has collaborated with our partners initiated "Yaek Khuat Chuai Mor (PET To PPE Project)" to install drop points to turn PET into PPE gowns for medical personnel. This creates an awareness about Circular Economy while also helping the nation to fight the ongoing crisis.

Society and community

GC strives to cooperate with various agencies and organizations to develop the communities and societies tandem with sustainable business operations. We aim to become a partner that creates sustainable shared value for the society. In this regard, Social Enterprises (SE) have been established with the target to generate sustainable income for local communities. The example of highlight project is Community Waste Model Project by developing smart Saleng (tricycles) in extension to the YOUTURN Platform, which help to systematically manage waste for delivery as feedstock to ENVICCO, GC's recycled plastic resin factory. This effort will reduce environmental problem and create jobs for local communities in a sustainable manner.

GC's firm commitment to sustainability is in line with the national approach and in accordance with international standards. As a result, GC has become the only chemical company in Thailand and Asia to have received No. 1 global ranking from the Dow Jones Sustainability Indices (DJSI) for the third consecutive year. The company has also earned the highest ranking in Thailand for Climate Change Management and scored an "A" (Leadership Level), which is the highest ranking, in Water Security based on the assessment framework of the Carbon Disclosure Project (CDP), a globally trusted assessment institute. Additionally, GC has received recognition from leading Thai institutes, such as the SET Sustainability Awards of Honor for the fourth consecutive year and the Thailand Sustainability Investment (THSI) Awards for the seventh consecutive year from the Stock Exchange of Thailand. These examples of success in sustainability leadership undoubtedly reflect GC's commitment to grow with ESG as our foundation.

MARKET AND BUSINESS OUTLOOK IN 2022

The outbreak of COVID-19 is continuing its spread across the world, which simultaneously impacts the global economy. However, this pandemic continues in the downward trend during half year 2021 as high progress in vaccination against COVID-19. These resulted to lockdown restriction of COVID-19 ease across the world, and stimulus packages to respond to the economic distress. The Company anticipates that the global economy continues to recover as the demand for products.

The Company anticipates that the average price of Dubai crude oil will be within the range of 79-84 USD per barrel. The International Energy Agency (IEA) had estimated the crude oil demand (as of December 2021) in 2022 at 99.7 million barrels per day, increased by 3.3 million barrels per day from the last year demand. Even there is an uncertainty amid COVID-19 pandemic, global energy shortage, and Geopolitics tensions.

For Petroleum products, the Company anticipates that products price and products spread will be recovered from unlocking the lockdown with the ease in traveling resulted in increased in Petroleum demand and decreased in export quota from China. As a result, Diesel over Dubai crude oil spread is expected to be 13-14 USD per barrel while Low Sulfur Fuel Oil (LSFO) over Dubai crude oil spread to be 13-14 USD per barrel. The HSFO over Dubai crude oil spread is expected to be -6 to -5 USD per barrel. The expected Gasoline over Dubai crude oil spread is 12-13 USD per barrel, supported by the increase in transportation. The company will continue to focus on the production and our contracts with suppliers and partners to ensure that the Company will be able to handle current and future crises and uncertainties. Moreover, the company also closely monitor on the market situations to manage, procure, and distribute both raw materials and products spread appropriately. The Company expects that the Refinery utilization rate of 2022 will be operated at around 87% as there will be the planned maintenance shutdown of refinery on Q4/2022.

For Petrochemical products, Aromatics products are expected to continue under pressure from new supply continues to enter the market. Paraxylene over Naphtha spread is expected to be 230-240 USD per ton. However, the expected demand from downstream business such as Fiber and Filaments industries, Purified Terephthalic Acid (PTA), and PET Bottle Resin are expected to gradually recover following the recovery in global economy through the next year. Benzene over Naphtha spread is expected to be 215-225 USD per ton, supported by the new capacity of downstream products such as Styrene Monomer (SM), and Phenol. The Company expects that the Aromatics utilization rate of 2022 will be 99%.

The outlook for Olefins and Derivatives product is expected to remain steady from this year, due to the recovery in demand during economic recovery. While Olefins and Polymer supply continue to increase by new productions and the recovery in refinery Business. The average HDPE price is expected to be 1,230-1,240 USD per ton and the HDPE Naphtha spread to be 500-510 USD per ton. For MEG market, MEG price is expected to maintain stable even MEG supply increases due to new capacity. However, MEG will be supported by higher raw material prices and downstream demand especially textile industry, and packaging industry which are expected to recovery. The Company expects that the average MEG (ASP) will be 650-660 USD per ton. The Company expects Olefins plants utilization rate to be around 91% due to the planned maintenance shutdown of Olefins plant 3 for 39 days and planned maintenance for the preparation for the commercial operation of Olefins plant 2/2 modification project in Q4/2022. The Company expects that Polymers plants utilization rate will be around 103%.

COMPANY INFORMATION AND OTHER IMPORTANT INFORMATION

COMPANY INFORMATION

REFERENCES

SECURITIES REGISTRAR
Thailand Securities Depository Company Limited
93, 14th Floor, Ratchadaphisek Road, Din Daeng Sub-District, Din Daeng District, Bangkok 10400
Tel: +66 (0) 2009-9999, Fax: +66 (0) 2009-9991
Website: www.set.or.th/tsd

REGISTRAR AND DEBENTURE HOLDERS REPRESENTATIVE
Bank of Ayudhya Public Company Limited
1222 Rama III Road, Bang Phongphang Sub-District, Yan Nawa District, Bangkok 10120
Tel: +66 (0) 2296-2030, 4808, 5557
Fax: +66 (0) 2683-1298
Website: www.krungsri.com

US$ BOND REGISTRAR
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c/o Citibank, N.A., Dublin Branch
1 North Wall Quay, Dublin 1, Ireland
Fax: +353 1622 2210

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2. Mr. Chavala Tienpasertkij, CPA No. 4301 or
3. Mr. Suwatchai Meakhaamnouychai, CPA No. 6638 or
4. Mr. Mongkol Somphol, CPA No. 8444

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Website: www.dsb.co.th

LEGAL PROCEEDINGS

a) Purchase and sales of raw materials agreement legal case

On December 3, 2009, a company filed for arbitration against PTT Plc. ("PTT") and the Company as a producer to perform according to purchase and sales of raw materials agreement, of which the said company has been committed by PTT, or to compensate for damages of approximately Baht 13,805 million. On March 8, 2010, the dispute was struck out of the case-list by the arbitration ruling that the Company was not a party to the contract.

On August 27, 2010, the said company filed a civil suit to the Civil Court against PTT and the Company as a producer to perform according to purchase and sales of raw materials agreement, of which the said company has been committed by PTT, or to compensate for damages of approximately Baht 9,380 million. In this regards, the Company filed an objection against the indictment with the Civil Court on the basis that the Company was not a party to the contract.

On May 21, 2013, the Civil Court considered that the arbitration process between such company and PTT has not yet been finalised; therefore, the Court has temporarily struck the case out of the case-list until the final decision has been reached under arbitration process. Then, both parties or either party can resubmit the case to the Civil Court for the further trial.

Subsequently, on March 25, 2016, the arbitration has reached a conclusion for PTT to compensate the damages in some amount. On June 30, 2016, PTT submitted a motion for setting aside the arbitral award to the Civil Court. Thereafter, on September 19, 2019, the Civil Court rendered the judgement for enforcement of the arbitral award. PTT has appealed against the Civil Court's judgement to the Supreme Court and the Supreme Court rendered the judgement for enforcement of the arbitral award. This case has become final and the Company has no any liability to compensate for any damage.

b) Oil spill incident legal case

During the third quarter of 2014, the number of people in Rayong filed several lawsuits with the Civil Court and the Rayong Provincial Court against the Company to claim the extra compensation from oil spill incident and to perform the rehabilitation of the sea and natural environmental recovery. Some cases have been dismissed and some cases have been passed a judgement by the Civil Court on August 25, 2016 by ordered the Company to compensate for damages including interest and rehabilitation of approximately Baht 11.26 million. The Company has appealed on February 17, 2017. Subsequently, on May 11, 2018, the Company made compromise agreements with majority plaintiffs at the Civil Court. On December 20, 2018, the Court of Appeal has passed the judgement according to the compromise agreements which the Company has already paid compensation in full amount. For the remaining plaintiffs, the Court of Appeal ordered the Company to pay compensation with its interest according to the judgement of the Court of First Instance and reduced the amount of interest. The Company has paid the compensation to all plaintiffs completely and no petition is submitted to Supreme Court by any plaintiffs. This case has become final.

For the case at Rayong Provincial Court, on September 28, 2018, the Court has made the judgement ordering the Company to pay damage cost with its interest of approximately Bath 38 million by deducting the remedy payment paid to the plaintiffs of Baht 24 million. The Company deposited the remaining damage cost with its interest to the Rayong Provincial Court on February 25, 2019. Some plaintiffs filed an appeal with the Rayong Provincial Court and the Company has filed an answer to the appeal with the Rayong Provincial Court on October 2, 2019. Subsequently, on January 22, 2020, the Rayong Provincial Court sent an appointment to hear the judgment of the Court of Appeal Region 2 on March 19, 2020 and the Court of Appeal Region 2 has postponed the date of hearing the judgment. On September 1, 2020, the Court of Appeal Region 2 has made the judgement ordering the Company to pay damage cost with its interest to the plaintiffs. The Company deposited the amount of Baht 25 million to the Rayong Provincial Court on September 30, 2020. Afterwards, on October 14, 2020, the Rayong Provincial Court sent an appointment to hear the judgement or the order of the Court of Appeal Region 2 on November 26, 2020. Then, the plaintiffs have filed the Dika appeal period on March 1, 2021, and the case is currently under the consideration to receive the plaintiffs' Dika appeal of the Supreme Court. The Company is following up on the progress of the case.

c) Transfer of right for the payment of raw materials legal case of the subsidiary

On August 18, 2017, Anatta Green Company Limited ("Anatta"), later changed its name to Thai Bio Innovation Company Limited, the subsidiary and Asia Capital Group Public Company Limited ("ACAP") entered a tripartite MOU where Anatta agreed to responsible for supplying crude palm oil to the subsidiary and ACAP agreed to provide financial support to Anatta for payment to its suppliers. On the same day, Anatta entered into a loan agreement with ACAP and transferred its right to receive payment for raw materials to ACAP, along with notifying the transfer of such claim to the subsidiary and the subsidiary has given consent to such transfer.

During the 2nd quarter of 2018, the subsidiary disclosed the material event of inventory issue to the Stock Exchange of Thailand. At the same time, ACAP has demanded that the subsidiary pay for the raw materials purchased from Anatta under the transfer of claim, a total of 11 items. The subsidiary considered the documents received and clarified to ACAP that such documents were not in the subsidiary's system and did not find evidence of the delivery of the raw materials from Anatta as specified.

Subsequently, on August 20, 2018, ACAP filed a lawsuit in the Civil Court, claiming Anatta and the subsidiary jointly to pay damages totaling Baht 324.65 million and 15% interest per annum. The subsidiary's legal advisor had considered the relevant facts and evidences and provided opinion that the subsidiary is not liable for allegation. The subsidiary therefore appointed a lawyer and submitted a statement to defend.

The Court of First Instance issued its judgement on June 10, 2020, requiring the subsidiary to compensate ACAP in the amount of Baht 289.56 million plus interest of 15% per annum from the date of default until the payment is complete. If the subsidiary does not pay the said debt in full, Anatta shall pay the remaining balance. The subsidiary filed a legal appeal on November 25, 2020.

On January 20, 2022, the Appeal Court upheld the judgment of the Court of First Instance. However, the subsidiary did not agree with the Appeal Court's decision and will submit a request for a petition to the Supreme Court. The subsidiary believes that its defenses in facts, laws, and the exercising rights in court in good faith, in the end, the Supreme Court will consider evidences in the case and adjudicate the subsidiary not to be liable for payment of debts according to the judgments of the Court of First Instance and the Court of Appeal. The subsidiary also believes that evidences that the subsidiary has submitted additionally in the Court of Appeal as important evidences, directly related to the issue of the case, and is new evidence that the inquiry official in criminal cases has gathered and prepared from the investigation after the Court of First Instance decided the case, are solid evidences that will make the Supreme Court hear that the transaction documents prepared by Anatta, assisted by former employees of the subsidiary, and used by ACAP as evidences for filing against the subsidiary, are dishonest and unlawful acts. This is consistent with the fact that the SEC has found fraudulent acts related to inventory issue and unlawful exploitation which caused the subsidiary to be damaged. It is considered as an offense under the Securities and Exchange Act B.E. 2535. The inquiry official has made recommendation to pursue prosecution in some criminal cases and submitted the investigation documents to the public prosecutor already, therefore, the subsidiary believes that the subsidiary has no debts to be liable to ACAP under the contracts arising from dishonest and unlawful acts. However, the subsidiary has considered to record a reserve for damages from the said case in the amount of Baht 444 million.

FREQUENTLY CONTACTED FINANCIAL INSTITUTIONS

Bangkok Bank Public Company Limited
Address : 333 Silom Rd., Bangrak, Bangrak, Bangkok 10500
Tel : 0-2230-2328, 0-2230-2295, 0-2626-3646, and 0-2353-5421

Krungthai Bank Public Company Limited
Address : 35 Sukhumvit Rd., Klong Toey Nua, Wattana, Bangkok 10110
Tel : 0-2208-4845 - 47

Bank of Ayudhya Public Company Limited
Address : 1222 Rama III Rd., Bang Phongphang, Yan Nawa, Bangkok 10120
Contact location : 550 Phloenchit Rd., Lumphini, Pathumwan, Bangkok 10330
Tel : 0-2296-3999 and 0-2296-4776

Kasikornbank Public Company Limited
Address : 1 Soi Rat Burana 27/1, Rat Burana Rd., Rat Burana, Rat Burana, Bangkok 10140
Contact location : 400/22 Phahonyothin Rd., Samsen Nai, Phaya Thai, Bangkok 10400
Tel : 0-2470-3074

Siam Commercial Bank Public Company Limited
Address : 9 Ratchadapisek Rd., Chatuchak, Chatuchak Bangkok 10900
Tel : 0-2544-5740

Standard Chartered Bank (Thai) Public Company Limited
Address : 100 North Sathorn Rd., Silom Bangrak, Bangkok 10500
Tel : 0-2724-8989 and 0-2724-8842

GC strives to achieve sustainable growth under the corporate governance principle, with transparency, accountability and fairness for all stakeholders. Company growth is based upon the balance of business conduct and good corporate governance.

02

CORPORATE GOVERNANCE

CORPORATE GOVERNANCE POLICY

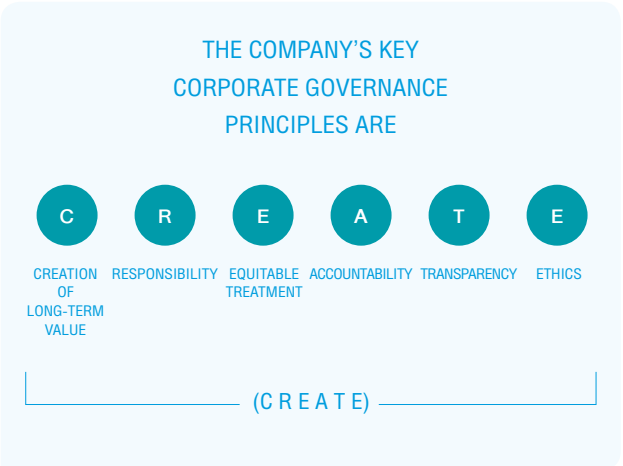
GC, under the supervision of the Board of Directors, is committed to maintaining its corporate governance standard in conformity with international standards since its establishment in 2011. To this end, Corporate Governance Policy has been established as part of the Business Operations Policy. The Corporate Governance and Sustainability Committee has been assigned to oversee relevant matters and ensure that GC's corporate governance practices meet international standards, align with the Company's business strategies and directions, and comply with any other requirements, laws and guidelines. The Board of Directors is also responsible for monitoring and assessing corporate governance performance on a yearly basis through meetings of each Sub-committee. The assessment results are regularly reported to the board.

OVERVIEW OF CORPORATE GOVERNANCE POLICY AND PRACTICES

The Board of Directors has established a fair management structure that governs the relationship of the Board of Directors, the management and shareholders. The Board of Directors also plays an important role in formulating visions, strategies, policies and important projects, ensuring that there are effective monitoring/assessing scheme, and risk management systems, in addition to maintaining its independence and accountability for outcomes of the performance of its duties pursuant to good corporate governance principles, with the following objectives:

- Strengthening the management system so that it is transparent and fair to all groups of stakeholders and complies with the applicable laws, regulations, rules and requirements of the government authorities and meets international and distinct standards, which will help enhance the Company's competitiveness and help the Company prevent and eliminate any potential conflicts of interest.
- Building confidence among investors and the general public both in Thailand and overseas and taking part in increasing the value of our shares in order to protect the Company's interests while taking into consideration the interests, rights and equality of the shareholders and relevant stakeholders.
- Serving as assessment tools for the Company's performance and inspecting the operation in order to improve, rectify and ensure a more effective operation.
- Determining the scope of responsibilities of the Board of Directors and Executives towards all stakeholders, including creating commitment of the management to ensure that their performance is within the determined scope of authority.

In this connection, the Board of Directors has established a Corporate Governance Policy as operational guidelines for all of the GC Group's Directors, Executives and employees by adhering to both domestic and international practices, e.g., the Stock Exchange of Thailand's Principles of Good Corporate Governance for Listed Companies 2012 (SET's CG Guidelines), the Corporate Governance Code for Listed Companies 2017 of the Securities and Exchange Commission (SEC's CG Code), the ASEAN Corporate Governance Scorecard (ACGS), the Dow Jones Sustainability indices (DJSI), etc. Moreover, the Board of Directors is determined to continuously improve the Company's corporate governance in accordance with international standards which include taking into consideration the shareholder's rights, equitable treatment of shareholders, emphasizing the roles of stakeholders, information disclosure and transparency and accountability of the Board of Directors.



These principles have been adopted by the Company as guidelines to ensure that our operation complies with the applicable laws and regulations of every country in which we operate. The Board of Directors and Executives serve as ethical leaders and role models in

complying with the Corporate Governance Policy, Anti-Corruption Policy, Corporate Governance and Business Code of Conduct Handbook of the GC Group. They also promote good corporate governance culture, attend to the stakeholders and promote practices and business operation which take into account human rights, consumer rights and fair labor practices. In addition, they shall put in place the auditing, monitoring, assessing and revision systems in order to ensure that all employees adhere to and follow the Corporate Governance Policy fully and enduringly. Details of corporate governance performance can be found under "Ensuring Compliance with Corporate Governance Policy and Practices."

POLICY AND PRACTICES FOR THE BOARD OF DIRECTORS

(1) BOARD OF DIRECTORS

The Board of Directors shall be appointed by the Annual General Meeting of Shareholders. All Directors shall be qualified and possess no prohibited characteristics stipulated by relevant laws and regulations. A board diversity policy has also been established as part of the Director nomination and selection process to ensure a suitable and diverse board composition in line with the Corporate Governance and Business Code of Conduct Handbook. Under this policy, the nomination takes into consideration the range of knowledge, competency, and expertise in various fields beneficial to the Company according to the Board Skills Matrix, such as engineering, industry, economics and finance, business administration, accounting, law, national security, sustainability, and information technology, and take into account gender diversity without discrimination on the grounds of ethnicity, nationality, skin color, race, or religion, in order to achieve a diverse range of expertise and perspectives necessary for GC's business strategies.

The Board of Directors comprises of 15 members, consisting of one Executive Director and 14 non-Executive Directors. Among these, eight (8) are Independent Directors, which is considered suitable for the size and type of business of the Company and allows for an effective delegation of duties. The duties and responsibilities of Directors are clearly defined based on laws, requirements, GC's Articles of Association, resolutions of shareholder meetings, and good corporate governance principles. The Chairman is responsible for overseeing the operation of the Board of Directors to ensure effectiveness and independence from the Management.

Further details appear under "Key Information on the Board of Directors".

(2) SUB-COMMITTEES

The Board of Directors has appointed four Sub-committees, namely the Audit Committee, the Nomination and Remuneration Committee, the Corporate Governance and Sustainability Committee and the Risk Management Committee, each consisting of members with the expertise and knowledge required to oversee specific issues that each is tasked with according to the GC articles of association. The charter of each Sub-committee prescribes its members' desired qualifications, terms of office, and scope of duties and responsibilities. Each Sub-committee regularly reports its performance to the Board of Directors at Board meetings and disclose its annual performance in the past year to regulatory agencies, shareholders, the general public in the Form 56-1 One Report on a yearly basis.

(3) NOMINATION AND APPOINTMENT OF DIRECTORS, INDEPENDENT DIRECTORS, AND CHIEF EXECUTIVE OFFICER

The Board of Directors has appointed and entrusted the Nomination and Remuneration Committee with the authority to search for and select qualified candidates suitable to take position as the Company's Director to replace resigning Directors or Directors due to retire by rotation in accordance with the Company's fair and transparent nomination criteria and procedures, as well as to search for and select candidates for the Chief Executive Officer and President position by considering the Directors who are qualified and suitable for the position and propose the name of such candidates to the Meeting of the Board of Directors and/or the General Meeting of Shareholders for consideration and approval. Such candidates shall have all qualifications and do not hold any of the prohibited characteristics as stipulated by the applicable laws and regulations, including the Public Limited Company Act B.E. 2535 (1992), the Securities and Exchange Act B.E. 2535 (1992), the Organic Act on Counter Corruption B.E. 2561 (2018), Notifications of the Capital Market Supervisory Board, Notifications of the Bank of Thailand, SEC's CG Code, rules and regulations of the Office of the Securities and Exchange Commission (SEC) and the Stock Exchange of Thailand (SET), articles of association of the Company and our Corporate Governance and Business Code of Conduct Handbook, and the independence and conflicts of interest of the Directors shall be also be taken into consideration in all aspect. Every Director shall perform their duties with responsibleness, considering the duty of care and duty of loyalty. In addition, the Nomination and Remuneration Committee may consider candidates from a list and director's pool of creditable organizations, such as, the State Enterprise Policy Office (SEPO), and list of chartered directors of the Thai Institute of Directors (IOD) which has compiled a list of knowledgeable and

competent persons who are specialized in different areas, who would benefit the operation of the Company. The list also recognize necessity of the Board diversity, including a ratio of female Directors (sexual diversity), Independent Directors, diversity of race and nationality and diversity of skills of existing Directors of the Company including knowledge, skills, expertise, experiences and specialization that would benefit the Company and correspond with business strategies pursuant to Board Skills Matrix of the Company, without any discrimination against gender, race, nationality, skin color, ethnicity or religion, in order to ensure the diversity of the Board composition, suitable and in line with the Board Diversity Policy and that the Board of Directors can effectively respond to the existing and future strategies and goals of the Company, as follows:

The nomination and appointment of Director to replace the Director retired by rotation. The Company gives opportunities to shareholders to nominate suitable and qualified persons for selection as Directors of the Company in advance of the Annual General Meeting of Shareholders every year. The Nomination and Remuneration Committee has an obligation to search for and select suitable and qualified candidates in accordance with the Director Nomination and Appointment Criteria and Procedures and propose the candidates to the Meeting of the Board of Directors for consideration and approval before proposing the list of such candidates to the General Meeting of Shareholders for consideration and approval. The approval of the General Meeting of Shareholders must be a majority of votes of shareholders who attends the meeting and is entitled to vote. In order to be in compliance with the corporate governance principles, the shareholders should be allowed to vote on each candidate for the election of Director. In case of nomination of a candidate who is previously a Director of the Company, the results of performance in the previous years, time dedication and participation as Director of each such candidate shall be taken into consideration.

The nomination and appointment of Director to replace the Director in cases other than retiring by rotation. In accordance with the articles of association of the Company, the Nomination and Remuneration Committee has an obligation to search for and select suitable and qualified candidates according to the Director Nomination and Appointment Criteria and Procedures and propose such candidates to the Meeting of the Board of Directors for consideration and appointing a candidate as Director to replace the director position in vacancy except in the case that the vacant seat has less than two (2) months left in its term. The Director who claims the seat shall remain in office for the remaining term of the Director one has replaced. On this matter, the approval of the Meeting of the Board of Director for such appointment requires at least 3/4 votes of the number of remaining Directors.

The nomination and appointment of members of Sub-Committees. The Nomination and Remuneration Committee has an obligation to search for and select suitable and qualified Directors of the Company in accordance with the Sub-Committee Nomination and Appointment Criteria and Procedures, which include the charter of each Sub-Committee, and propose the candidates to the Meeting of the Board of Directors for consideration and appointing as members of the Sub-committee. The member of the Sub-Committee shall hold the office for three (3) years per term. The approval of the Meeting of the Board of Directors for such appointment requires a majority of votes of the Meeting of Board of Directors. The member of the Sub-committee who retires by rotation may be re-appointed for another term by the Board of Directors. In case of vacancy other than by rotation, the replacing Director shall remain in office in the Sub-committee for the remaining period of the Director one has replaced.

Consideration of qualifications of the Independent Directors. The performance of Independent Director's duties is a key mechanism of administering the Company's business operation as it is to assure that the decisions of the Board of Directors will take into account the interests of shareholders as a whole and to ensure compliance with the corporate governance principles. In this connection, we have specified qualification of Independent Directors of the Company in the Corporate Governance and Business Code of Conduct Handbook and disclosed such manual on the Company's website. The qualifications of Independent Directors established by the Company is stricter than those prescribed by the Notification of the Capital Market Supervisory Board on the matter regarding the shareholding of no more than 0.5% (while the Notification of the Capital Market Supervisory Board requires only shareholding of no more than 1%) of total shares with voting rights of the Company, parent company, subsidiaries and affiliates, major shareholders or persons with controlling power over the Company whereby the shareholding of related persons of the Independent Director must be counted in. In addition, the Company requires that the Independent Directors may remain in office for no more than nine (9) consecutive years from the date of initial appointment. This requirement is included in the charter of Independent Directors which has been disclosed on the Company's website.

The nomination and appointment of the Chief Executive Officer and President (CEO). In case of vacancy of the CEO position, the Nomination and Remuneration Committee has an obligation to search for and select a candidate for the position from the list of Directors of the Company who possesses skills, experiences, professions and specific qualifications in areas necessary and suitable for the business operation of the Company in accordance with the Board Skills Matrix, which shall include knowledge, capability in business administration and experience in relevant fields, such as, energy, petroleum, petrochemical. Furthermore, the candidate must have leadership characteristics and has experience in being leader of a company well-regarded by the relevant business organizations. While the selection process must also take into account any conflicts of interest with the GC Group, and propose the candidate to the Meeting of the Board of Director for consideration and approval.

Details of performance in relation to the nomination and appointment of Directors, Independent Directors and high-level Executives can be found under "Nomination, Development, and Performance Assessment of the Board of Directors."

(4) REMUNERATION FOR THE BOARD AND EXECUTIVES

The Board of Directors. Details of remuneration of the Board of Directors can be found under "Meeting Attendance and Remuneration Payment to Each Board Member."

Executives. Details of remuneration of the Executives can be found under significant information relating to "Executives."

(5) DEVELOPMENT OF DIRECTORS AND EXECUTIVES

The Board of Directors places great importance on seminar attendance as a way to enhance Directors' knowledge and competence to enable them to enhance their duties as well as to prepare for any internal rotations and succession to the CEO position and other roles in the top management. The Board of Directors also encourages their participation in pertinent training courses and has prescribed the potential assessment of top executives to enhance their preparedness for executive-level duties. Key development initiatives can be summarized under "Development of Directors, Executives, and Company Secretary".

(6) ASSESSMENT OF DIRECTORS' PERFORMANCE

The Board of Directors has prescribed annual Board performance assessments to enable Directors to review their performance and review problems and obstacles during the year. There are three types of performance assessment, namely group assessment, self-assessment, and peer-assessment (assessing another Director). Furthermore, new Board KPIs have also been established according to the Thai Corporate Governance Code for Listed Companies 2017 (CG Code) and the international criteria of the Dow Jones Sustainability Indices (DJSI), comprising of four (4) aspects, which are, the Company's performance, the Board's group assessment results, Directors' meeting attendance, and Directors' engagement during Board meetings. Additionally, group assessment and self-assessment have been prescribed for the Company's Sub-committees, namely the Audit Committee, the Nomination and Remuneration Committee, the Corporate Governance and Sustainability Committee, and the Risk Management Committee. The assessment results and suggestions are subsequently presented to the Board of Directors and used to develop guidelines for practically optimizing the Board's performance. The assessment results are also disclosed in the Form 56-1 One Report and used by the Nomination and Remuneration Committee as a factor in the determination of Directors' annual remuneration in addition to the Company's performance.

The details are provided under "Nomination, Development, and Performance Assessment of the Board of Directors."

(7) GOVERNANCE OF GC AND GC GROUP

The Company grows in the petrochemical and chemical industry and engages in investment and joint venture expansion in various countries both by itself and through its subsidiaries, joint ventures, affiliates and others, as detailed under "Business Operation and Performance". The Board of Directors has approved the implementation of governance guidelines for the management of GC Group which are in line with GC Business Principle, as described in details under "Governance of Subsidiaries and Affiliates".

POLICY AND PRACTICES FOR THE SHAREHOLDERS AND STAKEHOLDERS

The business operation of the Company involves various groups of stakeholders ranging from shareholders, customers, business partners, creditors, competitors, government sectors and employees to communities, society and environment. Each stakeholder has different needs and, therefore, the Board of Director has established policies and good practice guidelines relating to responsibilities towards each stakeholder of the Company in accordance with the requirements of each group of stakeholders and included them in the

Corporate Governance and Business Code of Conduct Handbook and disclosed them on the Company's website.

SHAREHOLDER RIGHTS

The protection of shareholder rights is prioritized and has been included as part of the Corporate Governance and Business Code of Conduct Handbook to ensure full compliance.

(1) The Provision of Important and Pertinent Information to Shareholders

GC provided shareholders with clear, up-to-date information of importance and pertinence to its business operations. To this end, it also disclosed information deemed necessary, albeit not legally required, on its website and via the portal of the Stock Exchange of Thailand (SET).

(2) The 2021 Annual General Meeting of Shareholders

GC held the 2021 Annual General Meeting of Shareholders (AGM) at 09.00 a.m. on Monday, April 5, 2021, at Bangkok Convention Center, 5th Floor, Central Plaza Ladprao, Bangkok. GC has also accommodated to the conveniency of the attending shareholders during the COVID-19 pandemic as detailed below.

- Prior to the Meeting
  - GC clearly notified shareholders of the rules and procedures relating to rights of shareholders to propose matters to be included as agendas of the General Meeting of Shareholder and to nominate suitable and qualified persons for consideration and election of Director in advance of the General Meeting of Shareholders from September 16, 2020 to December 31, 2020 via SET and the Company's website. The nominated persons or proposed matters will be considered in accordance with the prescribed rules. The Nomination and Remuneration Committee will be in charge of considering the qualifications of such nominated persons and Corporate Governance and Sustainability Committee will consider the proposed matter deemed beneficial and which should be proposed as an agenda of the meeting before proposing to the Board of Directors for further consideration. In this regard, the Board of Directors will inform the shareholders of its decision and rational at the 2021 Annual General Meeting of Shareholders. In this connection, none of the shareholders has proposed a matter to be included as an agenda of the meeting or nominated any person to be considered for Director appointment to the Company.
  - According to the resolutions of the Board of Directors' meeting held on February 15, 2021, GC instantly notified SET after the meeting to disseminate the news to its shareholders that the 2021 AGM would be held on April 5, 2021, and the record date was set for March 1, 2021, to afford shareholders the rights to attend the 2021 AGM and receive dividend payment. This information was also published on GC's website.
  - GC published the invitation letter on GC's website, comprising the agenda items with the Board's opinions on each agenda item as well as the attachments, and measures and guidelines for attending the AGM during the COVID-19 pandemic, in both Thai and English, on March 4, 2021, over 30 days in advance to the meeting. In addition, GC sent an invitation letter, along with QR codes for registering to attend the 2021 AGM and for downloading the digital versions of the 2020 Annual Report and the 2020 Integrated Sustainability Report.
  - If a shareholder would like to assign a proxy to attend and vote at the AGM on their behalf or if they were unable to attend the AGM in person, GC provided them with a proxy statement that allowed them to specify their "for," "against," or "abstain" vote for each agenda item. Independent Directors' names and profiles were also included for their consideration. Details of the proxy assignment process and documents required to facilitate the procedure were enclosed with the invitation letter. All of the documents were available in both Thai and English.
  - The invitation letter was mailed to its shareholders on March 15, 2021, over 21 days ahead of the meeting. A map of the meeting venue and location and a phone number for inquiries were also included in the invitation letter.
  - GC provides for the shareholders to submit questions relating to any of the agendas of the meeting in advance of the meeting to the Company by E-mail at corporatesecretary@pttgcgroup.com or ir@pttgcgroup.com or cg@pttgcgroup.com.
- On the Day of the Meeting
  - During the outbreak of the coronavirus disease 2019 (COVID-19), GC introduced preventive measures in strict compliance with the orders of the center for COVID-19 Situation Administration (CCSA), announcement of the Bangkok Metropolitan Administration, as well as relevant laws and regulation. Such measures included screening points, disease screening forms for shareholders, alcohol gel and disinfectant stations, 1.5-meter physical distancing to avoid crowding, the 300-seat limit for each meeting hall, and mandatory check-in and check-out via Thai Chana application before registering to attend the AGM. Shareholders were required to wear cloth face masks or surgical face

masks at all times while in the meeting venue. No microphone was arranged for the Q&A session. Any attendee who wished to ask a question must proceed to QR Code scanning or write the question down on a piece of paper and passed it to the officer. In addition, it has managed that the AGM took place within mere 2 hours time.

- GC used barcode scanning in the registration process for conveniency and efficiency. GC also assigned staff to verify shareholders' documents ahead of time. The said registration began more than two hours before the meeting started.

- Arranged for the broadcast of the meeting via Web-Live Broadcast on the Company's website to facilitate those shareholders who could not attend the meeting in person and appointed a proxy to attend the meeting to be able to watch the meeting session and prepare for the circumstance where the meeting room becomes of full capacity. In this case, the shareholders would be able to post questions or query for information through the aforesaid system after which the Company would compile all the questions for response in the meeting room or in the minutes of the meeting. However, shareholders watching the meeting via this system would not be able to vote in the meeting.

- 2021 AGM was attended by all 15 Directors (14 Directors were present in the meeting hall, while the other Director was residing overseas and attended the AGM via electronic means). Top management, auditors, legal advisors, shareholders volunteering to witness the vote counting, and shareholders' right protecting volunteers from the Thai Investors Association responsible for evaluating the quality of the 2021 AGM were also present.

- Before the meeting began, shareholders were explicitly informed of the voting and vote-counting procedure for each agenda item. "For," "against," or "abstain" voting ballots for each agenda item were provided to shareholders and proxies.

- At the meeting, the Chairman proceeded with all agenda items in order and afforded all shareholders equal rights to express their opinions. During each agenda item, shareholders or proxies could submit inquiries in advance by scanning the QR code on the question form provided or write down their questions and submit them to the staff to be presented them to the Board of Directors. Sub-committee chairpersons, Chief Executive Officer and President, and any relevant top management were assigned to answer shareholders' questions. All expressed questions and opinions were fully recorded in the minutes of the AGM.

- After the Meeting

- GC disclosed its resolutions of the 2021 AGM through the SET Portal once the meeting was finished. The disclosed resolutions included a complete set of the "for," "against," "abstain," and invalid ballots of each agenda item.

- The minutes of the AGM were prepared in Thai and English, specifying the names of Directors and Executives attending the meeting, as well as other relevant attendees, key explanations, a list of questions and answers and a summary of opinions expressed. The minutes were submitted to SET and other relevant organizational authorities within 14 days after the meeting. They were also made available on www.pttgcgroup.com for shareholders' inspection. GC allowed the shareholders to object to the minute of the AGM within 30 days. In this regard, GC was evaluated for the quality of the 2021 Annual General Meeting of Shareholders and was rated "excellent" by receiving 100 point (from 100 point in total) for 10 consecutive years from 2012 to 2021.

(3) The Extraordinary General Meeting of Shareholders No. 1/2021

GC held the Extraordinary General Meeting of Shareholders No. 1/2021 (EGM 1/2021) at 09.00 a.m. on Monday June 7, 2021 by way of electronic meeting (E-EGM) pursuant to the Emergency Decree on Electronic Meeting B.E. 2563 (2020) and other applicable laws and regulations and in accordance with the suggestion of the SEC to limit the risk of COVID-19 transmission. In this connection, the objective of the EGM 2021 was for the shareholders to consider and approve the entering into a transaction for the sale of shares in Global Power Synergy Public Company Limited. GC fully attended to and facilitated the shareholders to exercise their rights to attending the E-EGM, including publishing the meeting invitation and documentation specifying process and method to register for attending the meeting by E-EGM and accepting proxy forms and documentation via the Company's website and information disclosure system of the SET in order to ensure that all shareholders received details and agendas of the meeting that are accurate and complete and could cast their votes pursuant to the objective of the meeting.

EQUITABLE TREATMENT OF SHAREHOLDERS

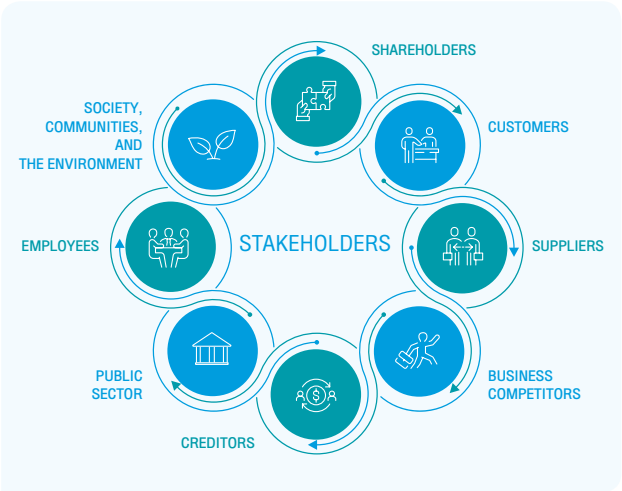
The Board of Directors ensures equitable treatment of all shareholders, whether majority or minority, Thai or foreign. GC's equitable treatment of shareholders is summarized as follows:

- The Company values all shareholders and has put in place measures to fairly and equitably safeguard the fundamental rights of every shareholder. These measures are aimed at fostering investors' trust and confidence in the Company and ensuring continuous and proper returns.

- Minority shareholders are given the opportunity to express their opinion, provide suggestions and submit complaints to the Board, Chairman of the Corporate Governance and Sustainability Committee (an Independent Director) and the Company Secretary via the GC website on Corporate Governance or email at cg@pttgcgroup.com. The Corporate Governance and Sustainability Committee will review the complaints submitted and take appropriate action. Institutional investors can request information or express their opinions via E-mail at ir@pttgcgroup.com under the care of Investor Relations.

ROLE OF STAKEHOLDERS

GC places importance on the rights of all stakeholders. Based on principles related to the rights and impacts on stakeholders, written good practice guidelines have been formulated and published on GC's website. Stakeholders are also provided with channels to express their opinions, suggestions, and recommendations. Stakeholder-related policies, guidelines, and actions in 2021, are summarized below:



Shareholders

GC respects the fundamental rights of shareholders and treats every shareholder equitably for their utmost satisfaction. These rights include the rights to participate in the AGM, the rights to vote, to propose meeting agenda items, and to nominate candidates for directorship. GC also listens to their opinions and suggestions and has provided them with contact channels via www.pttgcgroup.com and via E-mail addresses at ir@pttgcgroup.com and cg@pttgcgroup.com

With regard to the treatment of institutional and retail investors, GC held quarterly performance review meetings via Facebook Live and Microsoft Team and virtual roadshows, in which online booking channels were made available to enable interested institutional investors to directly make an appointment with GC.

In addition, the Company took part in the quarterly Opportunity Day as well as SET Digital Roadshow, an online meeting held in collaboration with the Stock Exchange of Thailand (SET) to provide investors with access to information sources and an opportunity to learn more about listed companies. To comply with the Code of Conduct for Investor Relations, GC refrained from meeting with investors for 14 calendar days prior to the disclosure of its operating results to protect and safeguard GC's confidential information not yet publicly disclosed.

Customers

To achieve customer satisfaction, GC has continued to maintain and improve the quality of its products and services and established a key account management unit to listen to the voice of the customer to inform the development of its products and services to meet their different demands and expand sale opportunities. GC has also collaborated with trade partners to develop eco-friendly products and protective equipment for COVID-19 to help the community.

GC has continuously improved and developed systems relating to facilities, management, sales, marketing and customer management to reinforce its strengths in customer management process and systematically improve the quality of information in order to deliver the best customer experience, including enhancing effectiveness and the speed of the internal operation as well as being able to communicate faster between each department.

Additionally, GC guarantees product qualities in accordance with various international standards to enhance customer confidence and has put in place a whistleblower channel for complaints about its products and services to systematically handle such complaints, track progress, and report solutions to customers in every business unit. It also discloses complete information about its products and services to customers by holding Coordinating Meetings between the Commercial and Supply Unit, the Production Unit, and customers to exchange market condition information, review result of operation, consult on the product quality. It also provides trainings through various channels, including organizing annual Knowledge Sharing of market condition for clients.

Furthermore, GC treats all customers equitably and protects confidential data by creating a Data Lost Protection (DLP) system and establishing a policy and working team to develop the management and protection measures for customer data in accordance with the Personal Data Protection Act (PDPA). The Company also supervises its operation to ensure absence of profiteering and unfair trade conditions.

Suppliers

GC has retained supplies of materials to ensure that we can delivery products and services with quality that meets the requirements of our customers as well as supports the confidence in our production process and continuous business expansion. Our supply policy is targeted to be effective, transparent, fair, verifiable and in compliance with laws together with prioritizing occupational health and safety principle, including responsible to the society and environment for sustainability and utmost benefits of the stakeholders.

GC also emphasizes on accountability to the suppliers by formulating supplier management strategy covering effective supplier selection process, supervising and supporting suppliers to operate their business with responsibleness to the environment, society and corporate governance in accordance with the Supplier Code of Conduct, supplier's performance evaluation, supplier relations management and supplier capability development.

GC has carried out environmental, social and governance (ESG) assessment on the key suppliers within the high spending group (i.e., the 1st Tier Critical Supplier) for six (6) consecutive years whereby assessing 91 key suppliers in total and carried out review of external ESG assessment of two (2) suppliers. From the review, there was no operation which violated the labour rights, human rights, breach of corporate governance, business code of conduct, or violated the applicable laws, regulations or rules. In conclusion, the safety and legal compliance management met the standards.

GC has held the Annual Supplier Conference to communicate our visions, operational plans and legal requirements as well as our strategies and business directions to our suppliers, and conveyed to them the business code of conduct and good corporate governance principles to emphasize our intention on anti-corruption on every aspect, ask for their co-operation on our no gift policy and support them to be a member of the Thai Private Sector Collective Action Against Corruption (CAC).

GC also gives priority to hearing and accepting complaints both from our staff and third parties through our Whistleblower system, being in compliance with human rights principles and carrying on green industry practice for sustainability.

Furthermore, GC has prepared itself in order to comply with the Personal Data Protection Act B.E. 2562 (2019) (PDPA) with regards to the procurement process, which is comprised of two (2) parts being personal data protection of the suppliers and personal data protection of our employees and third parties. In this connection, we have prepared documentation and work manual in line with the PDPA, which includes the notification on personal data protection, consent letter for personal data disclosure and supplier's PDPA compliance assessment. The operational guidelines have been communicated by the supply department to each of the stakeholders, including suppliers, users and supply staff and PDPA compliance pilot project has been rolled out in respect of supply function involving personal data and are monitored to ensure that the procedures put in place has been correctly implemented.

Business Competitors

To ensure that treatment of business competitors is consistent with international standards and within the scope of the laws on trade competition, GC has established its Business Code of Conduct on Treatment of Business Competitors in conformity to those principles to ensure fair and transparent competition by neither seeking confidential information of business competitors through fraudulent or inappropriate means nor tarnishing their reputation with slanders.

Creditors

GC treats its creditors fairly and responsibly and strictly complies with contractual terms and conditions. A Payment Tracking System (PTS) has been set up to enable creditors to conveniently track and check payment statuses. The Company, in collaboration with financial institutes, has introduced an E-mail Advice System, which is based on GC's Outsourced Payment System and informs its creditors in advance of a payment in process. An additional system has also been introduced to issue invoices, tax invoices, and receipts electronically. Accounts payable aging reports are also prepared for the benefit of tracking the resolution of overdue transactions. In the event that GC is unable to fulfill contractual obligations or terms, it will notify its creditors in advance to seek a common ground resolutions.

In collaboration with banking institutions, GC has utilized blockchain to manage documents and letters of guarantee with secured measures for tracking any alteration to the creditors' data to prevent cybersecurity risks and ensure that all transactions are accurate and appropriate. In addition, GC has worked together with a group of banks to employ E-Withholding tax system to allow creditors to be able to verify information on the Revenue Department's system by themselves. GC has also enforced a new standard for companies in GC Group requiring that they comply with the conditions between GC and creditors to ensure adherence to defined procedures, prudence, and accountability.

For financial institutions and debenture holders, GC gives equal opportunities for all financial institutes to propose transactions and maintains independence in decision making. It also acts on the basis of correctness without requesting, accepting, or offering any undue benefits in contacting financial institutions and debenture holders. All information of events related to GC's businesses is also regularly disclosed to financial institutions, debenture holders, and institutional investors. GC also fosters relations with creditors through series of activities every year.

Public Sector

Recognizing the significance of the public sector as one of its stakeholders, GC has established a policy on the treatment of the public sector in the countries in which it invests so as to avoid adverse consequences. This policy has been included in the Corporate Governance and Business Code of Conduct Handbook. GC is committed to comply with laws, rules, and governmental regulations in obtaining supports for our business activities, including (1) our strategies, such as, carrying forward rules, regulations and standards and cooperating in joint projects, and (2) our ordinary business operation, such as, permits, benefits, and concessions according to applicable laws, rules, and regulations as well as established procedures, processes, and practices. All contacts and communication with the public sector, including local authorities and state enterprises, must be transparent, with full disclosure of accurate information as per governmental requirements. To this end, GC has adopted the Online Permits & Privilege Licenses System in the planning and monitoring of operation progress to ensure compliance with governmental rules, regulations, and conditions.

GC has also established an emergency communication center, which is connected to Rayong's local communication centers. The names of officers assigned to communicate with government agencies have been publicly and pertinently disclosed so as to make known information communicated to relevant government agencies and local communities as well as create an accurate understanding of situations. GC seeks to foster relations with relevant government agencies through facilitation and partaking activities such as anti-corruption activities - which was aimed to establish understanding and reaffirmed mutual commitment to transparency and anti-corruption efforts - and providing venues for Knowledge Sharing meetings upon arising matters or on new laws, for instant.

During the COVID-19 Pandemic, GC has adjusted the working format with the government sector by increasing the work via online system. GC also supported the operation of its plants in monitoring various measures of Rayong Province to ensure accurate compliance and coordinated with the government sector to seek approval to operate its plants in accordance with the conditions stipulated by the government sector. During the drought situation, GC has participated in the working team to search for source of water reserve and has jointly carried the issue forward to the government section in order to establish a regulator for fairly controlling the water price, in which the process of is still in progress.

Employees

GC ensures that its employee care is in line with good corporate governance principles and business ethics by fostering positive experience for employees at every part of the employee life cycle, focusing on employee development through various forms of learning in order to promote practical application of knowledge. Such development supports include individual development plans (IDP) and a 24/7 digital learning platform where employees could learn anywhere and anytime. GC also ensures safety and a good workplace environment and conducts employee surveys on various topics to understand their issues and genuine needs in order to make improvements accordingly. As for remuneration scheme, GC considers its policy in a systematic manner, in parallel to its operating results. Furthermore, in preparation for employees in anticipation of business growth, a Talent and Succession Management System has also been laid out to accommodate such business demands in both domestic and overseas business.

In addition, it is within GC's policy to employ and promote occupations for people with disabilities, in line with the Empowerment of Persons With Disabilities Act, B.E. 2550. The details of GC's employee treatment with respect on human rights appear in key information on the "Employees".

- **Society, Communities, and the Environment**

  The Company conduct its business with responsibility towards communities, society, and the environment, reflected through activities, projects, and continuous stakeholder engagements. Under the strategy of creating balance through sustainable development principles focusing on Social Paradigm Shifts, GC have been investing in social enterprises (SE), Creating Shared Value (CSV), and Corporate Social Responsibility projects. All which aims to create shared value in three areas, namely the environment, economy, and society. GC also conducts site visits to consult and exchange dialogues with local medical professionals and communities, especially in the vicinity of its plants, to better understand their issues and true needs and support improvement. In addition, CG has initiated "RAYONG Get&Go", a delivery platform, to support income generation in the Map Tha Phut community, Rayong Province, by focusing on the delivery of food and merchandise from shops in the Map Tha Phut community and those which are under Pracharath Rak Samakkee Rayong (Social Enterprise) Company Limited with a plan to expand the service area to cover all areas of Rayong Province.

  GC has also adopted the world-class sustainability reporting framework known as Integrated Sustainability Report (ISR), which covers economic, social and environmental topics, as well as other issues that may significantly affect GC. Further details can be found in the "Integrated Sustainability Report 2021".

Compensation for violation of rights

GC has established guidelines for protection of rights of stakeholders who have been violated as a result of the business operation of GC Group by considering to provide compensation at a rate not lower than that prescribed by the law.

Prevention of Internal Information Use

The Company' Internal Information Use Policy has been included in the Corporate Governance and Business Code of Conduct Handbook and published on the Company's website for shareholders' ready access. Directors, Executives and employees are constantly reminded to comply with the policy, under which they are prohibited from using material insider information not yet publicly disclosed for personal gain or the benefit of others, including for trading GC's securities. The essence of the policy is summarized below:

(1) Directors and Executives under SEC's definition must report changes in their holding of the Company's shares to SEC within three business days as required by SEC. Additionally, the Company has established a policy requiring Directors and Executives to notify the Company Secretary of their intention to trade the Company's shares one day prior to when the transaction is due to be made.
(2) The Board of Directors monitors each individual's compliance with GC's Business Code of Conduct on internal information every month. The Company Secretary, who receives information from SEC via email on changes to Directors and Executives' shareholding when their shares are traded or transferred, will report such changes to the Board. The Company would also disclose such transactions at the beginning and the end of each fiscal year as well as during the year if any transaction has been made.
(3) GC notifies Directors and Executives in writing that they are prohibited from trading the Company's shares 30 days ahead of the disclosure of the quarterly and annual financial statements or that of other information that may affect the prices of the Company's shares. They are also prohibited from trading the Company's shares within 24 hours after the said disclosure.
(4) All Executives and employees are required to comply with the Company's guidelines on Confidentiality of Information and safeguard its information, business partners' information and personal information of related parties. They are also required to adhere to the Company's measures on the safeguarding of confidential information or information that has not yet been publicly disclosed.
(5) GC's Directors, Executives and employees are regularly kept up to date on regulations and policies regarding exclusive information as well as prescribed disciplinary sanctions in case of violation to ensure corporative acknowledgement and compliance.

Prevention of Conflicts of Interest

The Board of Directors has put in place policy and guidelines for determining transactions which have, or may have, conflicts of interest and included them in the Corporate Governance and Business Code of Conduct Handbook of the Company for Directors, Executives and employees to adhere to and be conscious in undertaking related party transactions and to ensure that related party transactions are not being undertaken

in violation of the regulations of the SEC and the SET. Directors and Executives pursuant to the definitions stipulated by the SEC have obligation to report any conflict of interest whether on personal involvement or through involvement of their connected parties to the Company. GC also puts in place a manual regarding entering into related party transactions and communicates to relevant departments within the Company and its Subsidiaries. In addition, we have compiled information of transactions as database for our relevant internal departments to search and use, as guidelines, when considering undertaking any transactions of the Company to avoid any operational misconduct.

Furthermore, GC has set up protective measures against conflict of interest by requiring Directors, Executive and employees at all levels to report on any transactions which may have conflicts of interest every year and should there be any of such transaction, it must be reported to the Company immediately using our conflicts of interest reporting form (in case of Directors) or via conflicts of interest report system on our intranet (in case of Executives and employees) so that the supervisors are informed and can make consideration on further appropriate action.

Anti-Corruption

GC has established an Anti-Corruption Policy, which has been approved by the Board, as well as written guidelines precluding all requests, offers, payments, and transactions with individuals or juristic persons involved in corruption, with disciplinary sanctions to be imposed on those who violates the guidelines clearly defined and has included them in the Corporate Governance and Business Code of Conduct Handbook for Directors, Executives and employees to follow. In addition, the Company is a member of Thai Private Sector Collective Action Against Corruption (CAC). Further details can be found under "Ensuring Compliance with Corporate Governance Policy and Practices."

BUSINESS CODE OF CONDUCT

Corporate Governance and Business Code of Conduct Handbook

The Board of Directors approved the compilation of "Corporate Governance and Business Code of Conduct Handbook," comprising of two parts. The first part is the corporate governance management structure and principles according to corporate governance policy; and the second part is the business code of conduct, consisting of principles and best practices for ethical business operations, such as observance of laws, rules and regulations; anti-fraud and anti-corruption measures; responsibility towards stakeholders; human rights; consumer rights; and fair labor. The handbook was distributed to Directors, Executives and all employees, who signed in acknowledgment of the handbook and their obligations to use it as guidance when carrying out their duties. The Business Code of Conduct Handbook has also been distributed to GC's joint ventures and business partners and published on the Company's website (www.pttgcgroup.com) under "Corporate Governance" for ready access for shareholders, investors, regulatory agencies, stakeholders, and those interested. The details of the Business Code of Conduct are shown in Appendix 5 under "GC Policy and Practices of Corporate Governance and Business Code of Conduct".

Additionally, the Board of Directors has implemented an annual review of the Corporate Governance and Business Code of Conduct Handbook to ensure its consistency with criteria and practices issued by regulators and assessment agencies, both domestic and international. In 2020, GC updated the handbook to ensure its currency and compliance with various standards, namely the Dow Jones Sustainability Indices (DJSI); the Electronic Transactions Act B.E. 2544; the Emergency Decree on Electronic Meetings, B.E. 2563; the Personal Data Protection Act B.E. 2562; GC's Personal Data Protection Policy, announced on May 29, 2020, etc.

Serving a crucial role in fostering and driving an ethical organizational culture, the Board of Directors and Executives have also cultivated "GC SPIRIT", an organizational value that places importance on integrity and ethics, as well as established a behavioral assessment accordingly to encourage its adoption. GC SPIRIT 4 Core behaviors has been communicated to all employees across the organization through CEO Townhall and Functional Townhalls and integrated into the working process in order to cultivate it into GC's corporate culture.

Corporate Compliance

Acknowledging that compliance with laws or even with a more stringent standards promotes sustainable development, GC places importance on operating its businesses in full compliance with relevant regulatory and legal requirements at home and overseas. The Company has adopted the ISO 19600 (Compliance Management Systems-Guidelines: 2014 (E)) international standard as its operational framework in order to ensure. an organization culture of integrity and compliance, which consists of 6 steps: (1) Establish; (2) Develop; (3) Implement; (4) Evaluate; (5) Maintain; and (6) Improve

ORGANIZATION CULTURE OF INTEGRITY AND COMPLIANCE, WHICH CONSISTS OF 6 STEPS:

(1) ESTABLISH (2) DEVELOP (3) IMPLEMENT
(4) EVALUATE (5) MAINTAIN (6) IMPROVE

At the operational level, the 1st line of defense has prepared and disseminated information on the corporate compliance comprising of three processes, namely (1) Assessment - to identify major non-compliance risks; (2) Prevention - to define measures for compliance control and minimize Non-Compliance risk; and (3) Correction and Improvement - to appropriately respond to or manage matters that deviate from the standard and to regularly review and improve compliance control measures.

GC has further improved our Compliance Management System by adopting internal control system principle so that operational officers can identify and evaluate compliance risks relating to the operation process and keep them as database for undertaking compliance assessment for the Company and our group companies in order to verify items which are deviated from or not in compliance with the applicable requirements and to put in place appropriate compliance control measures. In addition, GC has adopted ISO 37301: Compliance Management Systems – 2021 (E) as guidelines for improving compliance control so that it becomes more effective, protecting against risks and building sustainability of the Company

In addition, Management Committee is tasked with organization-wide Compliance Oversight and reporting the progress to the Corporate Governance and Sustainability Committee for their acknowledgement and comments. This is to ensure that GC's corporate compliance process is more efficient and consistent with international standards.

Dissemination of Good Corporate Governance Principles

GC communicates its key corporate governance principle entitled "C R E A T E," comprising six (6) elements: the Creation of Long-Term Value for the organization; Responsibility; Equitable Treatment of all stakeholders; Accountability for decisions made and being able to offer justification for such decisions; Transparency, which entails full, accurate, equitable and timely disclosure through appropriate channels; and Ethics in business conduct, to its employees for their acknowledgement from the first day of work. GC also continuously underlines and instills the corporate governance principle into its employees through training programs, seminars, and other activities. For example, GC offers a mandatory e-Learning program on its "Hook e-Learning" system, through which Executives and employees can sign to acknowledge the Corporate Governance and Business Code of Conduct Handbook and take an assessment test. An event entitled "PTT Group CG Day 2021: The Power of Business Integrity" was also organized to help employees understand how CG was driving the organization forwards in the new normal era. Additionally, GC's corporate governance practices are assessed by domestic regulatory authorities and examined cordially to international standards, such as the Thai Institute of Directors Association (IOD), the Thai Investors Association (TIA), and S&P in order to gauge the GC's corporate governance performance and keep its corporate governance practices in line with international standards.

Furthermore, Executives are responsible for communicating the principles of corporate governance and corporate compliance to employees through internal meetings of each business line and unit ("Hook Talk") to encourage them to behave ethically and perform their duties in strict compliance with good corporate governance principles, the Company's regulations, laws and rules. GC also regularly improves its best practices. In 2021, guidance involving frequently asked questions on corporate governance, corporate compliance, and business code of conduct was compiled and published on GC's intranet and the Hook e-Learning system as reference for Executives and employees in their discharge of duties.

MAJOR CHANGES AND DEVELOPMENTS IN CORPORATE GOVERNANCE POLICY, PRACTICES, AND SYSTEMS

In 2021, GC has undergone major changes and developments in our corporate governance policy, practices and systems to enhance effectiveness in the supervision and improve our corporate governance standards in accordance with the CG Code, as follows:

(1) Determination of goals, strategies and corporate cultures

- Setting goal to lessen the greenhouse gas emission to zero by 2050 in line with global direction and to demonstrate leadership in sustainability within the industry.
- Considering chance of Energy Transition emergence which could potentially affect GC's business operation and employ such consideration in formulating corporate strategies.
- Determine strategies to develop corporate cultures under the theme "Conviction to Change", emphasizing on making change by operating under the concept of "Speed with Challenge Status Quo".

(2) Fostering an effective Board of Directors body

- Improving criteria and procedures for director nomination and appointment to cover the applicable rules, regulation and conditions relating director nomination and appointment and to be in line with the guidelines in the Corporate Governance and Business Code of Conduct Handbook of the Company and conform to the performance of obligations of the Nomination and Remuneration Committee.
- Improving the performance assessment form for the Board of Directors (as a whole, as individual and peer-assessment) to be in line with the rules and good practices of regulators both in Thailand and overseas and contemporary obligations, roles, duties and responsibility of the Board of Directors of a Company as stipulated in the Company's Corporate governance and Business Code of Conduct Handbook.
- Improving the performance assessment form for a Sub-committee being the Audit Committee (both as a whole and as individual) to reflect true performance results in order to develop and improve the performance of the Audit Committee's duties and enhance efficiency.
- Improving the performance assessment form for the Board of Directors and Sub-committees from using hard-copy documents to online director assessment form to lessen to the use of papers and increase practicality of information keeping and processing.
- Improving charter of two (2) Sub-committees being (a) the Charter of the Nomination and Remuneration Committee by adjusting the composition of the Nomination and Remuneration Committee so that it comprises only Independent Directors and (b) the Charter of the Corporate Governance and Sustainability Committee by amending the objectives and scope of duties of the Corporate Governance and Sustainability Committee to cover the supervision over sustainable development work in line with the main target of the Company and adding duty on providing advice relating to receiving ratings for good corporate governance and sustainable development from external organizations and on the Governance, Risk Management and Internal Control and Compliance (GRC) in order to conform to the performance of the Corporate Governance and Sustainability Committee's duties.
- Changing the name of a Sub-committee by the resolution of the Meeting of the Board of Director No. 16/2021 on 13 December 2021 approving the change of name of "the Corporate Governance Committee" to "the Corporate Governance and Sustainability Committee" so that the name of the Sub-committee is in line with its scope of responsibilities which have been expanded to cover the supervision over sustainable development work in accordance with the Company's main objectives.

(3) Putting in place/improving policies, manuals and guidelines of the Company

- Putting in place and promulgating Data Governance Policy as framework for supervising and managing information of the Company to maintain security and quality of the Company's information.
- Putting in place and promulgating E-signature Policy as framework for supervising electronic transactions both inside and outside the Company.
- Improving the Corporate Governance Policy by adding contents relating to corporate resilience to promoting long-term competition capacity.
- Improving the Human Rights Policy to cover the merger/acquisition of business/business partners and freedom of joint negotiation, adding "Vulnerable Groups" definition to cover immigrants, outsourced labors, indigenous people, local communities, LGBTQ, and placing importance to equitable compensation.
- Improving the Digital and IT Policy by adding contents relating to compliance with laws, regulations, rules and requirements relating to digital, the development and employing to the best interest digital and IT as important tools for business operation, the enhancement of digital capacity of employees and the transparency of business operation within the data governance framework and stakeholder's information control.
- Improving the Anti-corruption Policy and guidelines of the Company to be in line with self-assessment form version 4.0 of the Thai Private Sector Collective Action Against Corruption (CAC).
- Improving the Complaint Accepting Policy to cover human rights matters in accordance with the Dow Jones Sustainability Indices (DJSI)
- Improving contents and guidelines in the Corporate Governance and Business Code of Conduct Handbook to be in line with the strategies and operation of the Company, including closing the

additional gaps pursuant to the criteria of both Thailand's and international corporate governance assessment.

(4) Supervision of policies and operation of group companies.

- Improving criteria and guidelines for appointing the Company's Executives to take a director position in any group company to enhance effectiveness of promoting the investment objectives of the Company.
- Putting in place the GC Subsidiaries Director's Governance Handbook to set a clearer scope of duties and responsibilities and to use as guidelines for Director's self-assessment on performance review.
- Holding site visit session to review the operation of the group companies in accordance with GC Way of Conduct and putting in place site visit close out as a mutual agreement between Executives and the relevant staff of the group companies including the Company's staff in order to successfully carry out the operation under GC Way of Conduct pursuant to the determined objectives.
- Develop webpage using share point system to create additional channel to receive news and updated information relating to GC Way of Conduct, e.g., news letter, Q&A, etc.
- Providing consulting engagement relating to internal control to newly established group company.
- Providing advice and supports to companies within GC Group to put in place their own corporate governance policy, anti-corruption policy, and corporate governance and business code of conduct handbook, being in line with organization structure and characteristics of business operation, and providing supports to companies within GC Group to have effective, transparent and verifiable management system in accordance with good corporate governance principles.
- Communicating and providing advice on assessment of process level control to group companies which are strategic owner and operator by taking into consideration internal control and compliance supervision using methodology of control self-assessment (CSA).

(5) Responsibility towards stakeholders

Customers/Suppliers

- Developing Sale Service system to support better customer's opinion management system.
- Putting in place privacy notice and consent form relating the keeping, use and disclosure of personal data and assessment of supplier' PDPA compliance.
- Improving the Approved Customers/Suppliers System, which is used to select customers and suppliers to procure raw material from or sell products to, so as to bring it up to standard and ensure verifiability.

Employees

- Improving the Performance Management System to allow regular communication between supervisors and staff (feedback), regular target review and performance assessment (dynamic), internal performance raking and mobile working support.
- Developing diverse learning channels including Online, Classroom, e-Learning and Micro-Learning.
- Providing training on "financial coach" as change agent of operation unit to give investment knowledge to every level of employees.
- Procuring COVID-19 vaccines to employees and providing quarantine facility in case any employee or any of their family members gets contracted with COVID-19 virus.

(6) Risk management and internal control

- Improving Risk Matrix to clearly prioritize the risks and improving criteria for evaluating effect and possibility of risks in order to assess the effect on the satisfaction of business objectives and strategies in 2022.
- Carrying out mitigation plan when encountering cyber attack crisis on the Operation Technology (OT) system both at the Cyber Incident Response level and at the Corporate Crisis Management Level.
- Developing IdeaMANI system to monitor the key risk indicator (KRI), a leading indicator, via online system.
- Developing COSO Connect assessment system to assess the adequacy of internal control system of the Company via online system.
- Carrying out anti-corruption actions, i.e., being CAC Change Agent to expand transparent business network to business partners, supporting group companies to be CAC members and putting in place automated CAC Checklist system to improve working procedures and efficiency of database management relating to the Company's anti-corruption measures, as well as monitoring, processing, analyzing, information reviewing and giving advice on CAC Checklist and referencing document via online system.
- Supervising and managing IT related matters, i.e., appointing Chief Information Security Officer (CISO), setting up cyber security project unit and data classification project to compile and classify confidential information and analyze risks in the Company's information, including providing advice on managing and protecting each class of information to be in accordance with international standard.

The Board of Directors recognizes its function of leadership as a governing body of the Company. To this end, the Board has prescribed a review of the application of the Corporate Governance Code for Listed Company 2017 (CG Code) to GC's business context at least once a year as well as an assessment of compliance with each item in CG Code to ensure that the outcome is appropriate and that development plans suitable for the business are consistently formulated.

From the review and assessment of the Company's compliance with each item in the GC Code in 2021, the Company could adopt most of the CG Code items pursuant to the apply or explain principles. The CG Code item that the Company is not yet able to adopt or has not been adopted by the Company have been recorded in the Board of Directors' resolutions, as follows:

Pracetice/Guidline	The Company's Practice
Item 3.1.2 The Board of Directors should determine appropriate number of directors to efficiently performing its duties whereby there shall be no less than five (5) directors and not exceeding 12 directors depending on the size, types and complexity of the business	• Currently, the Board of Directors is comprised of 15 directors. • The Company Corporate Governance and Business Code of Conduct Handbook stipulates that the Board of Director shall consist of no less than 5 directors but not exceeding 15 directors. The Meeting of the Board of Directors resolved that the aforesaid number of directors is appropriate for the complexity and diversity of business types of the Company.
Item 4.2.1 (1) The Board of Director should ensure the compensation structure by considering appropriatness of the ratio of salary, short-term operation results (e.g., bonuses) and long-term operation results (e.g., Employee Stock Ownership Plan).	• The Company is in the process of studying the appropriate compensation structure and the connection of compensation, long-term operation results, project duration, stock exchange conditions that would facilitate such undertakings.

COMPLIANCE WITH THE PRINCIPLES OF CORPORATE GOVERNANCE IN OTHER AREAS

GC consistently complies with corporate governance standards. Relevant activities in 2021 are summarized below.

(1) Board KPIs

The Board of Directors reviewed the Board KPIs to be implemented in 2022 to ensure their alignment with the best practices stipulated in CG Code and the Dow Jones Sustainability Indices (DJSI).

(2) Data Governance

With regards to IT compliance and management, GC adopted GCMS, which is its integrated management system, and used Data Governance Framework to maintain security and quality of information, ensuring that information important to the Company has been dealt with correctly and appropriately and the operation can be carried out continuously, effectively and in line with international standards. GC put in place administration guidelines throughout the life-cycle of information covering compiling, using, maintaining and destroying information to create the Company's capacity manage information to its best interests. The management is divided into three (3) levels as follows:

- **Governance Level** - Appointing the Chief Information Security Officer to supervise and be responsible for network infrastructure security maintenance and IT security and establishing the Data Governance Council which has a duty to make devision and set direction of information supervision, including setting up policies and objectives in accordance with missions and strategies of the Company, as well as providing advice, promoting, supporting and encouraging the information supervision of the Company.

- **Management Level** - Setting standard and information supervision process of the Company starting from making plan and continuously carry out the supervision, including setting goals, indicators and guidelines in accordance with standard and policies, information supervision issues, undertaking relating to information to be carried out to be in line with the framework for information supervision, and setting up roles and responsibilities of stakeholders and relevant parties.

- **Operation Level** - Comprising the operation relating to information supervision, giving supporting, analyzing, evaluating, controlling information access, prioritizing importance of each information. Information problem solving, controlling information quality and security in case there is a change of and to comply with information supervision standard, policy and framework, following indicators and being responsible and performing duties of operational officers.

Furthermore, in supervising organization information, the Company has executed the following actions:

- Data Governance Framework: referencing the DAMA International's Data Management Body of Knowledge (DAMA-DMBOK) standard to allow the information supervision working team being able to push forward and use as working framework for information supervising, including monitoring information management to ensure that it is transparent, create confidence in operating the business, verifiable and result in quality, security and full integration of information, as well as allowing information which is important to the company to be managed correctly in accordance with the life-cycle framework of information.

- Specifying confidentiality level and security maintenance of the Company's information to ensure that the management of important information of the Company are being carried out orderly, concisely, systematically and in accordance with the PDPA with an objective to put in place policy and confidential maintain of the Company's information.

(3) Integrated Operation for Corporate Governance, Risks Management and Internal Control and Supervision of Operation to be in compliance with the Laws, Rules and Regulations (Integrated GRC)

GC placed importance on the integration of corporate governance, risk management and internal control and compliance with laws, rules and regulations or GRC to support the satisfaction of business objectives effectively while being transparent and verifiable and lessen the risks that may affect the business.

GC has created working team responsible for driving GRC forward involving departments and working teams and allowing their full participation in establishing system and providing advice, suggestion, improvement and guidelines in accordance with GRC integration principles covering all group companies including subsidiaries. The working team responsible for GRC operation can by divided into four (4) working units consisting of (i) People and Communication, (ii) Process, (iii) Technology and (iv) Subsidiary, and work through the Integrated GRC Dashboard.

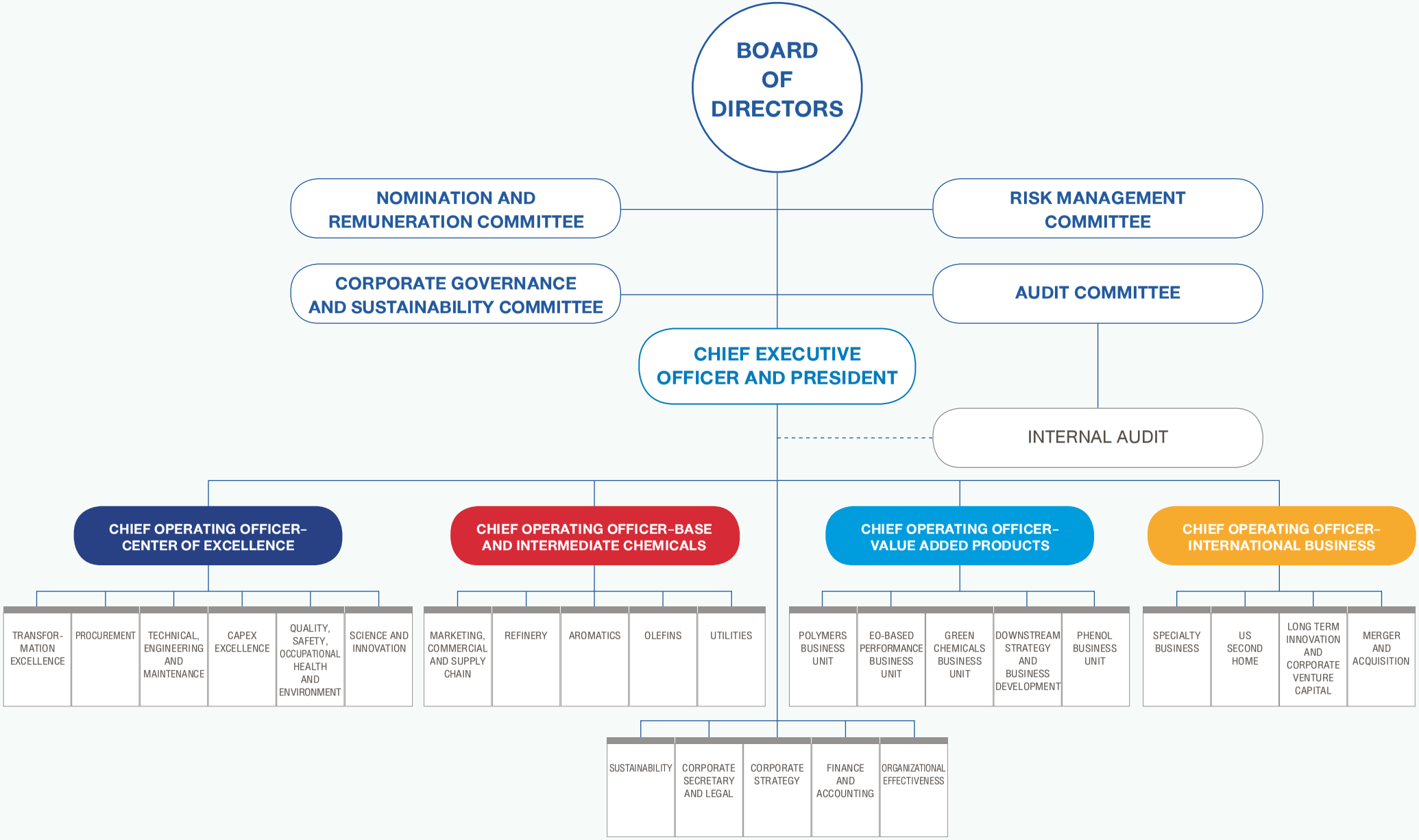
GC has promoted understanding and perception on Integrated GRC among Executive and employees of the Company and GC Group subsidiaries through various communication channels, in order to serve as concrete and effective guideline. It has also made such communication from Executives to employees (tone at the top) through the Company's CEO Townhall activity. Due to COVID-19 situation, the working format has been changed and the Company has adjusted ways to better communicate to employees by holding Integrated GRC (UP e-Learning) training to the Company's employees and subsidiaries so they understand the main principles and connection of GRC work, Control Self-assessment & Compliance Universe workshop to process owner of the Company and group companies which are subsidiaries so that they can identify and connect risks and evaluate the adequacy of internal control systems involving operation, reporting and compliance control at the operation level, as well as preparing GRC e-Newsletter and GRC Health Check to assess the perception, understanding and effectiveness of adopting the GRC for use within the Company and group companies which are subsidiaries.

As for the Process work unit, the GRC team has created FiT Project which serves as Subject Matter Expert (SME) and helped considering and providing advice on GRC related issues to initiatives of the Workstream, as well as participated in determining counter measures to resolve the risks found in the detailed study phase prior to the initiatives' proposal for further approval.

Under the situation with constantly occurring new challenges, GC keeps aiming to improve the integrated GRC continuously to create connection of operation between the GRC working teams and to use the same database in order to concretely lessen the redundancy of work and providing chances for Executive and employee to acquire work experiences so to have capacity to support the growth of the Company together alongside cultivation of desirable working culture in accordance with the integrated GRC, ultimately to build confidence among the Company's stakeholders.

ORGANIZATION STRUCTURE

As of 1 Febuary 2022



BOARD OF DIRECTORS

The Board of Directors as of December 31, 2021, is comprised of the following members:

Name	Position	Date of Appointment
1. Mr. Piyasvasti Amranand	Chairman/Chairman of the Independent Director	April 9, 2018
2. Mr. Apisak Tantivorawong	Independent Director/Chairman of the Audit Committee	January 24, 2020
3. Mr. Don Wasantapruek	Independent Director/Chairman of the Nomination and Remuneration Committee	November 1, 2015
4. Professor Somkit Lertpaithoon	Independent Director/Chairman of the Corporate Governance and Sustainability Committee	April 9, 2018
5. Mr. Grisada Boonrach	Independent Director/Chairman of the Risk Management Committee	June 2, 2020
6. Mrs. Watanan Petersik	Independent Director/Director to the Audit Committee/ Director to the Corporate Governance and Sustainability Committee	September 22, 2014
7. Mr. Pakorn Nilprapunt	Independent Director/Director to the Audit Committee/ Director to the Nomination and Remuneration Committee	April 9, 2018
8. Lieutenant General Nithi Chungcharoen	Independent Director/Director to the Nomination and Remuneration Committee/Director to the Corporate Governance and Sustainability Committee	September 22, 2014
9. Mr. Chansin Treenuchagron	Director/Director to the Corporate Governance and Sustainability Committee	September 21, 2020
10. Mr. Noppadol Pinsupa(1)	Director/Director to the Corporate Governance and Sustainability Committee	October 1, 2021
11. Mr. Disathat Panyarachun	Director/Director to the Risk Management Committee	October 22, 2018
12. Mr. Sarawut Kaewtathip	Director/Director to the Risk Management Committee	July 20, 2020
13. M.L. Peekthong Thongyai(2)	Director/Director to the Risk Management Committee	October 1, 2021
14. Mrs. Pantip Sripimol(3)	Director/Director to the Risk Management Committee	November 22, 2021
15. Mr. Kongkrapan Intarajang	Director and Secretary to the Board of Directors/ Director to the Risk Management Committee/ Chief Executive Officer and President	October 1, 2019

Remarks:

(1) Mr. Noppadol Pinsupa, Director, replaced Mr. Wittawat Svasti-xuto, effective October 1, 2021.

(2) M.L. Peekthong Thongyai, Director, replaced Mrs. Arawadee Photisaroo, effective October 1, 2021.

(3) Mrs. Pantip Sripimol, Director, replaced Mr. Prapas Kong-ied, effective November 22, 2021.

Directors who has resigned during the year 2021:

Name	Position	Term of Appointment
1. Mr. Wittawat Svasti-xuto	Director/Director to the Nomination and Remuneration Committee	Fabruary 19, 2018 - October 1, 2021
2. Mrs. Arawadee Photisaroo	Director/Director to the Risk Management Committee	October 22, 2018 - October 1, 2021
3. Mr. Prapas Kong-ied	Director/Director to the Corporate Governance and Sustainability Committee	November 1, 2019 - November 1, 2021

SHARES HELD BY THE BOARD OF DIRECTORS UNDER SEC'S DEFINITION, THEIR SPOUSES, AND THEIR MINORS AS OF DECEMBER 31, 2021

Name	Number of Shares		
	As of January 1, 2021	As of December 31, 2021	Increase/(Decrease) of Shares during the Year (Shares)
1. Mr. Piyasvasti Amranand	-None-	-None-	-No Change-
2. Mr. Apisak Tantivorawong	-None-	-None-	-No Change-
3. Mr. Don Wasantapruek	-None-	-None-	-No Change-
Spouse	-None-	3,000	3,000
4. Professor Somkit Lertpaithoon	-None-	-None-	-No Change-
5. Mr. Grisada Boonrach	-None-	-None-	-No Change-
6. Mrs. Watanan Petersik	-None-	-None-	-No Change-
7. Mr. Pakorn Nilprapunt	-None-	-None-	-No Change-
8. Lieutenant General Nithi Chungcharoen	-None-	-None-	-No Change-
9. Mr. Chansin Treenuchagron	-None-	40,000	40,000
10. Mr. Noppadol Pinsupa	N/A	-None-	-No Change-
11. Mr. Disathat Panyarachun	-None-	-None-	-No Change-
Spouse	80	80	-No Change-
12. Mr. Sarawut Kaewtathip	-None-	-None-	-No Change-
13. M.L. Peekthong Thongyai	N/A	-None-	-No Change-
14. Mrs. Pantip Sripimol	N/A	-None-	-No Change-
15. Mr. Kongkrapan Intarajang	-None-	-None-	-No Change-

COMPOSITION OF THE BOARD OF DIRECTORS

GC's Articles of Association mandates that the Board of Directors be composed of no fewer than five but no more than 15 Directors. Each Director is to serve a three-year term. At least one-third and no fewer than three Directors of the entire Board must be Independent Directors. According to good corporate governance principles, more than half of the Board of Directors must be Independent Directors. Furthermore, GC's good corporate governance principles prescribe that at least half of the Board of Directors must be residents of the Kingdom of Thailand. These Directors must also have the legally required qualifications, not possess any attributes prohibited by law, and not be over the age of 70.

The composition of the Board of Directors and its members' qualifications of GC is in with its Articles of Association, good corporate governance principles, and legal regulations. In addition, the Company's policy protects Directors from any form of gender discrimination. The Board of Directors is comprised of individuals from diverse fields of knowledge, expertise and professional experience which are beneficial to the Company's business operations. Furthermore, each Director may hold directorship in no more than five companies which are listed with the Stock Exchange of Thailand (SET) and in no more than three state enterprises or juristic persons whose shares are held by state enterprises, according to a resolution passed by the Cabinet. The Company's Board of Directors currently comprises of 15 Directors in total, an appropriate number for its business size and type. These Directors are divided into the following categories:

(1) 14 Non-Executive Directors
(2) 1 Executive Director, namely the Chief Executive Officer and President
(3) 8 Independent Directors (over half the number of the Board's total)
(4) 2 female Directors

AUTHORITY AND RESPONSIBILITIES OF THE BOARD OF DIRECTORS

The Board of Directors governs the Company's operations and ensures strict compliance with applicable laws, GC's objectives and Articles of Association, and shareholder resolutions, as well as good corporate governance principles and the Code of Best Practices of Directors of Listed Companies set forth by SET. All Directors possess the knowledge and capability needed to perform their duties for the benefit of the Company and its shareholders. The Board's authority and responsibilities are summarized below:

1) Discharge its duties and oversee the Company's operations to ensure strict compliance with applicable laws, GC's objectives and Articles of Association, and shareholder resolutions, as well as good corporate governance principles and the Code of Best Practices of Directors of Listed Companies set forth by SET.
2) Dedicate time and attention to establishing the Company's vision, mission, directions, and strategies as well as freely express opinions and seek useful information to determine the direction of the Company.
3) Review and approve key strategies, policies, objectives, financial goals, and corporate plans, as well as supervise and monitor the management's implementation of the Company's strategic plans in compliance with the defined directions and strategies to ensure that the management is able to achieve the Company's vision, directions and strategies with efficiency.
4) Establish Corporate Governance Policy and Business Code of Conduct, which appropriately outline principles and good practices for the Board, the management, and staff members, and cultivate responsibility awareness in all employees to promote an understanding of and strict compliance with these principles and guidelines, in addition to the Company's rules and regulations, to assure all stakeholders of fairness.
5) Exercise approval authority on various matters beyond the authority granted to the Chief Executive Officer and President in the Company's provision, such matters include GC Group's budget, investment, project implementation, as well as key contract entry, the appointment of Directors to replace those resigning during the year or to Sub-committee, naming of authorized Directors, and the appointment of the dates for the annual general meeting of shareholders and interim dividend payment.
6) Ensure that the corporate accounting system, financial reporting and auditing are credible, supervise the assessment of internal control's adequacy, and ensure that internal audits are performed efficiently and effectively.
7) Consider all relevant risk factors and devise comprehensive risk management guidelines, ensure that the Company's Executives are equipped with an efficient risk management system or process to mitigate risks as well as to explore business opportunities that may arise from these risks, and ensure that adequate and effective internal control is in place.
8) Monitor and manage all conflicts of interest as well as all connected transactions that may arise and value key transactions to maximize the benefit of shareholders and other stakeholders.
9) Provide appropriate channels of communication to each group of shareholders and ensure that the disclosure of information is accurate, clear, transparent, reliable, and of the highest standard.
10) Regularly conduct assessments and reviews of its own performance and the Chief Executive Officer and President.
11) Provide a suitable compensation system or mechanism for the Company's Executives in relation to the performance of the Company to induce short-term and long-term motivation.
12) Act as leaders and ethical role models in line with the Company's Corporate Governance Policy.
13) Assess performance adherence to the Company's Corporate Governance Policy and Business Code of Conduct at least once a year.
14) Provide an appropriate, transparent, and fair nomination system for all key managerial positions. Top executives, from Executive Vice Presidents to the Chief Executive Officer and President, are appointed by the Board's majority votes.
15) Report to the Company any conflict of interest that its members or their affiliates may have with the management of the Company or its subsidiaries.
16) Attend every Board meeting, as well as every shareholders' meeting. If, under any circumstance, attendance is impossible, the Chairman of the Board must be notified in writing.
17) Value corporate social and environmental responsibility and promote a better quality of life for Thai people sustainably, starting with improving the standard of living of communities around the Company's plants to foster an environment where its plants and these communities co-exist in a sustainable manner.
18) Provide support to all anti-fraud initiatives for the purpose of progress and sustainable growth.

Moreover, the Board of Directors must obtain permission from the shareholders' meeting before acting on the following issues:

- Acquisition or disposition of an important asset or any connected transaction as prescribed by laws and the Capital Market Supervisory Board.
- Sale or transfer of the Company's entire enterprise or its essential components to other entities.
- Acquisition or transfer of an enterprise to the Company.
- Initiation, modification, or termination of all or some key lease contracts of the Company, including the assignment of lease contracts to other individuals or entry into a partnership with another entity to share profits or losses.
- Making addenda or amendments to the Company's Memorandum or Articles of Association.
- Increasing or decreasing the registered capital.
- Issuance of debentures for sale to the public.
- Dissolution of the Company or merging it with another company.
- Announcing annual dividends.
- Other activities that require approval from the shareholders' meeting as mandated by law or the Company's Articles of Association.

For the shareholders and investors' confidence, via the Board of Directors, GC displays and expresses visions and direction of missions through the effective operation strategies. The systems were created to track, measure and supervise the management of the Executives who work independently from the management and are responsible for the results of the performance of their duties under the principles of good corporate governance in the following matters.

Conflict of Interest

(1) The Board of Directors determines policies and guidelines for considering transactions that involve or may involve in a conflict of interest between shareholders, directors, executives and others, both directly and indirectly. In the case of connected transactions which are under the shareholders' approvals, they shall be investigated by the Audit Committee to ensure fair, reasonable and beneficial transactions to the shareholders in accordance with the laws and regulations of SEC.

(2) The Board of Directors ensures that the given procedures are carefully followed, under the principles of rationality and independence with the transparency of process for transaction approvals, aiming for the best interests of the company in a complete and precise compliance with the regulations of SEC.

(3) The stakeholders may not take part in the decision-making to consider a transaction access. In every meeting of the Board of Directors, the Chairperson of the Board of Directors must inform the meeting to request for the cooperation among the Company's directors to follow the policy in considering transactions that may involve in a conflict of interest, by allowing the Company's Board of Directors to notify the meeting to abstain from voting, giving opinions or leaving the meeting on an agenda related to any of the interests.

(4) The Board of Directors accurately supervises the disclosure of transactions that may involve in conflicts of interest in the Form 56-1 One Report.

Risk Management

(1) The Board of Directors is committed to create added value and sustainability to the business under the principle of good governance. In order to achieve such goal, the Risk Management Committee has been set up at the Board of Directors level, to formulate policies, provide guidelines for the risk management as well as establish an efficient and effective risk management system to manage the crucial risks of the Company to ensure that they remain at acceptable level.

(2) The Board of Directors inspects and reviews the operation to ensure compliance with the risk management framework throughout the organization and provides advice on the important risk management. Their duties also include examining the risk management reports and monitoring important risks to ensure adequate and appropriate risk managements.

Internal Control and Internal Audit

(1) The Board of Directors is concerned of the importance to establish an internal control system to provide reasonable assurance in the efficiency and effectiveness of the operations, as well as reliability of financial reports and compliance with rules, regulations, policies and the anti-corruption principles, by setting up an internal audit function to independently evaluate the internal control system's adequacy and effectiveness, responding to the risks and report to the Audit Committee and the Board of Directors.

(2) The Board of Directors considers the annual reviews regarding the suitability and sufficiency of all five components of the internal control system which includes the Control Environment, the Risk Assessment, the Control Activities, the Information and Communication and the Monitoring Activities, in order to ensure achievement of the Company's objectives, goals and continual improvements of the internal control system.

(3) The Board of Directors provides a formal and transparent system to maintain relationships with external and internal auditors by requiring the

Audit Committee to support the performance of duties in accordance with the Board of Directors' responsibilities, to sufficiently review the Company's operations and other companies in the group, offering independent and fair opinions on the internal control system and risk management.

(4) The auditors are required to annually affirm their independence to the Audit Committee and report on all procedures used in the auditing office to assure the independence of the auditors.

(5) The auditors own the right to review reports or other financial reports issued by the Board of Directors in conjunction with their audited financial statements and have the right to file any anomalies in the reports which appear to be inconsistent with the audited financial statements.

(6) The audit fees and other fees paid to the auditors are disclosed in the 56-1 One Report Form to increase transparency in the auditor independency.

APPOINTMENT TO AND TERMINATION FROM THE BOARD OF DIRECTORS

GC's Articles of Association provide the following guidelines for the appointment to and termination from the Board of Directors:

APPOINTMENT

- The Board of Directors shall be elected annually (for replacements of directors who have retired by rotations). Shareholders at a shareholders' meeting shall vote to appoint Director(s) according to the following guidelines:
  - (1) Each shareholder shall have one vote per share held.
  - (2) In the event that the number of nominees for the election does not exceed the number of vacant positions, shareholders shall vote on these eligible nominees. Shareholders shall allocate all of their votes per (1) to one nominee without dividing their votes.
  - (3) In the event that the number of nominees exceeds the number of vacant positions, shareholders shall still allocate all of their votes per (1) to one individual nominee without dividing their votes. Nominees receiving the majority of the votes shall be appointed to the Board until there are no vacancies left. Additionally, in the event that the number of nominees with equal votes exceeds the number of available positions, The Chairman of the meeting shall cast the deciding vote.
- The Board of Directors shall nominate one Director as Chairman of the Board of Directors. Decisions made during a Board meeting are based on majority votes. In the event of a tie, the Chairman of the meeting shall cast an additional vote as a casting vote. In the event that a Director's position becomes vacant for any reason other than retirement by rotation, the Board may appoint an individual who is qualified and does not possess any attributes prohibited by law as Director to attend the next Board meeting, unless the remaining term is less than two months. The new Director shall serve only the remaining term of his or her predecessor. This decision shall be made only with the agreement of at least three-quarters of the remaining Directors.
- In the event that vacancies cause the number of Directors to fall below the quorum, the remaining Directors shall have the only authority to call for a shareholders' meeting in which shareholders shall vote to appoint new Directors to fill these vacancies only. This process must be completed within one month from the date on which the number of Directors no longer constitutes the quorum. These newly appointed Directors shall serve only the remaining terms of their predecessors.

TERMINATION

- At each Annual General Meeting of Shareholders, one-third of the serving Directors shall retire by rotation. In the event that the number of serving Directors is not equally divisible by three, the number of Directors retiring shall be as close to one-third as possible. Directors to retire in the first and second years after Company registration shall be randomly selected; however, in later years, Directors serving the longest terms shall retire. Directors who retire by rotation may be re-elected to the Board.
- In addition to retirement by rotation, other causes for directorship termination include death, resignation, disqualification, and prohibition by law. Additionally, Directors can be terminated by a shareholders' meeting resolution or a court order.
- Resigning Directors must submit their resignation notice to the Company. The resignation is effective from the day the Company receives such notice. In addition, Directors may submit their resignation notice through the registrar. At a shareholders' meeting, shareholders may pass a resolution to force the termination of a Director before his or her term ends with three quarters of the attending and eligible shareholders' votes. Additionally, these majority votes must constitute at least half of the shares held by attending and eligible shareholders.

INDEPENDENT DIRECTORS

According to the Company's corporate governance principles, more than half of the Board of Directors must be Independent Directors. They shall not serve in the office for over nine consecutive years from the first date of appointment. They must also be experienced and independent as per the Capital Market Supervisory Board's requirements. Additionally, they must hold no more than 0.5% of the Company's shares (a stricter regulation than the Securities and Exchange Commission's limit of 1%). The definition of Independent Directors is publicized in the Company's Corporate Governance Handbook and on the Company website.

Independent Directors must attend meetings regularly. They are allowed to freely express their opinions during these meetings and, to this end, are entitled to adequate access of the company's financial and business information. They are also tasked with protecting stakeholders' interests and preventing conflicts of interest among the Company, its executives, Board of Directors and major shareholders.

Currently, the Company has a total of eight Independent Directors, constituting more than one-third of the Board and exceeding the legal requirement. In addition, this number is in line with the Company's corporate governance principles, which has been stipulated that more than half of Board members must be Independent Directors. Moreover, the Charter of Independent Directors has been established to clearly outline their duties. Under the Charter recently amended to suit the current situation, the duties and responsibilities of Independent Directors are as follows:

- Advise and provide recommendations to the Board of Directors on key issues that the Company should act upon or issues that could be beneficial to the Company, its shareholders, and other relevant stakeholders.
- Ensure the Company's full compliance with its Anti-Corruption Policy and measures.
- Value corporate social and environmental responsibility.
- Seek consultation from external, independent consultants if necessary. The expenses incurred will be borne by the Company.
- Ensure that the Company operates according to the regulations and requirements relevant to Independent Directors issued by regulatory bodies for listed companies and review the definition of an Independent Director to make sure that it is appropriate and complete according to legal requirements.
- Review the adequacy of their charter annually and propose recommended amendments, if any, to the Board of Directors for approval.
- Perform other duties as assigned by the Board of Directors, provided that these duties do not interfere with the independent nature required of Independent Directors.

AUTHORIZED DIRECTORS

According to GC's Articles of Association and Certification of Incorporation from the Department of Business Development of the Ministry of Commerce, as of November 29, 2021, the authorized signatory Directors of GC specifies that: "(1) Mr. Kongkrapan Intarajang, Chief Executive Officer and President, can sign and affix the Company's seal on behalf of GC; or (2) two of the following three Directors can jointly sign and affix the Company's seal on behalf of GC, namely Mr. Disathat Panyarachun, M.L. Peekthong Thongyai, and Mr. Noppadol Pinsupa."

ROLES OF THE CHAIRMAN AND THE CHIEF EXECUTIVE OFFICER AND PRESIDENT

The Chairman of the Board of Directors and the Chief Executive Officer and President are not the same person. Their duties and responsibilities are distinct and separate, as described below:

The Chairman of the Board of Directors is an Independent Director whose main role is to ensure that the Board of Directors efficiently performs its duties and in compliance with the Company's good corporate governance principles and the business code of conduct, being independent from the management. In addition, the Chairman works with CEO to determine meeting agenda but refrains from participating in day-to-day business management. The Chairman of the Board of Directors will be the chairman of both Board meetings and shareholders' meetings and is prohibited from serving in any Sub-committee as explicitly prescribed in the scope of responsibilities of the Board of Directors and Sub-committees to ensure a clear and suitable separation of duties as well as independent judgment.

The Chief Executive Officer and President is the highest-ranking executive officer whom the Board of Directors chooses and appoints from one of the Directors under the GC's Articles of Association to oversee the Company under Board-assigned policies and directions in accordance with the scope of authority set forth in GC's Articles of Association and regulations. The CEO also serves as Secretary to the Board of Directors. Furthermore, GC's Articles of Association states that the CEO is entitled to compensation and benefits for his role as the highest-ranking executive officer in addition to what he receives as a Director. The CEO's roles, duties, and responsibilities, as well as compensation, are published on the Company website in Thai and English.

SUB-COMMITTEES

The Board of Directors at Meeting No. 1/2011, held on October 19, 2011, appointed four Sub-committees, namely the Audit Committee, the Nomination and Remuneration Committee, the Corporate Governance and Sustainability Committee and the Risk Management Committee. Directors serving in these Sub-committees possess the expertise and knowledge required to oversee specific issues that each is tasked with according to GC's Articles of Association. The charter of each Sub-committee prescribes its members' desired qualifications, terms in office, and scope of duties and responsibilities, list of directors' names, responsibility, number of meetings and number of times each director attends the meeting. Serving a three-year term, Directors appointed to these Sub-committees are to perform their specific tasks with diligence and efficiency. All Sub-committees report their performance to the Board of Directors at Board meetings regularly as well as disclose their annual performances to shareholders in Form 56-1 One Report. The names and duties of each Sub-committee as of December 31, 2021, are listed below.

AUDIT COMMITTEE

Name	Position	Date of Appointment
1. Mr. Apisak Tantivorawong[(1)]	Chairman of the Audit Committee (Independent Director)	January 24, 2020
2. Mr. Pakorn Nilprapunt	Director to the Audit Committee (Independent Director)	April 23, 2018
3. Mrs. Watanan Petersik[(1) (2)]	Director to the Audit Committee (Independent Director)	January 25, 2021

Mr. Amorn Putiphrawan, Senior Vice President of Internal Audit, serves as Secretary to the Audit Committee.

Remarks:

(1) Mr. Apisak Tantivorawong and Mrs. Watanan Petersik possesses an education background and work experiences in accounting and finance with regard to reviewing the credibility of financial statements.

(2) Mrs. Watanan Petersik was appointed Director to the Audit Committee, replacing Mr. Prapas Kong-ied, on January 25, 2021.

The Audit Committee shall comprise of at least three Independent Directors. Each term lasts three years or until the termination of directorship, resignation, or dismissal. Member of the Audit Committee who retire by rotation may be re-appointed by the Board of Directors. Independent Directors may serve no more than nine consecutive years in office from the date of appointment. They shall also have qualifications and perform all duties in accordance with the announcement of the Securities and Exchange Commission and the scope of work prescribed by the announcement of the Capital Market Supervisory Board.

The Board of Directors has approved the Charter of the Audit Committee, which stipulates the composition, qualifications, terms of office, and scopes of duties according to good corporate governance principles. Details of the charter are disclosed in the Company's Corporate Governance and Business Code of Conduct Handbook and on the Company website.

The Audit Committee consists solely of Independent Directors, with at least one of whom being a recognized expert with experience in finance and accounting. The Board believes that the Directors can carry out their duties independently and have continuously undergone trainings to enhance their expertise for the benefit of ensuring the credibility of the Company's financial and auditing reports, including their adherence to accounting standards, applicable laws, and other relevant standardized practices. Furthermore, the Audit Committee ensures adequate and effective internal control and risk management systems while also overseeing internal processes regarding whistleblowers and complaint submissions. The Audit Committee nominates auditors and submits dismissal recommendations to the Board in the event that a auditor lack capability, neglect, or wrongfully performs one's duties. It also reviews the suitability and effectiveness of the Company's internal audit system and oversees the functions of Internal Audit to ensure compliance with International Standards for the Professional Practice of Internal Auditing. The Audit Committee reviews the Company's compliance with securities and exchange laws, regulations of the Stock Exchange of Thailand (SET), and other applicable laws. It also reviews connected transactions and conflicts of interest to achieve compliance with applicable laws and the requirements of the Stock Exchange of Thailand (SET) and Securities and Exchange Commission (SEC) and ensure their sensibility, the utmost benefit of the Company, and full disclosure.

In 2021, the Audit Committee convened a total of nine meetings and one additional meeting with the auditor, fulfilling its role according to the scope of authority and responsibilities stipulated by the Charter of the Audit Committee and as assigned by the Board of Directors. The Audit Committee also reported its performance outcomes to the Board of Directors on a regular basis and subsequently disclosed its performance summary to shareholders in Form 56-1 One Report.

NOMINATION AND REMUNERATION COMMITTEE

Name	Position	Date of Appointment
1. Mr. Don Wasantapruek	Chairman of the Nomination and Remuneration Committee (Independent Director)	April 23, 2018
2. Lieutenant General Nithi Chungcharoen	Director to the Nomination and Remuneration Committee (Independent Director)	November 1, 2019
3. Mr. Pakorn Nilprapunt(1)	Director to the Nomination and Remuneration Committee (Independent Director)	October 22, 2018

Mrs. Pilasphan Udomjarumanee, Senior Vice President, Corporate Secretary and Legal, serves as Secretary to the Nomination and Remuneration Committee.

Remarks:

(1) Mr. Pakorn Nilprapunt was appointed Director to the Nomination and Remuneration Committee, replacing Mr. Noppadol Pinsupa, on November 22, 2021. And Mr. Noppadol Pinsupa was appointed Director to the Nomination and Remuneration Committee, replacing Mr. Wittawat Svasti-xuto, on October 1, 2021.

The Nomination and Remuneration Committee is composed of at least three Directors of the Board, all of whom shall be Independent Directors. The Chairman shall also be an Independent Director. These Directors serve a three-year term or until the termination of directorship, resignation, or dismissal.

The Nomination and Remuneration Committee nominates candidates for appointment to the Board or Sub-committees as well as nominates candidates to be appointed as the Chief Executive Officer and President according to a well-structured and transparent process. The Committee is also charged with establishing remuneration guidelines for the Directors, Directors to Sub-committees and CEO. Nomination criteria for Directors include experiences, profession, skills, expertise diversity, and specific qualifications required for the Company's businesses defined in the Board Skills Matrix. These criteria strike a balance among all business fields and yield the utmost benefit to the Company. In addition, the Committee considers candidates from the Director's Pool developed by credible organizations and present candidates to the Board and/or at the shareholders' meeting for appointment. The Committee also establishes criteria for the annual performance assessment of the Board of Directors and CEO as well as assessed the performance of CEO to ensure alignment with good corporate governance principles.

The Board of Directors has approved the Charter of the Nomination and Remuneration Committee, which stipulates the composition, qualifications, terms of office, and scopes of duties according to good corporate governance principles. Details of the charter are disclosed in the Company's Corporate Governance Handbook and on the Company website. In 2021, the Nomination and Remuneration Committee convened a total of eight meetings to fulfill its role according to the scope of authority and responsibilities stipulated by the Charter of the Nomination and Remuneration Committee and as assigned by the Board of Directors. The Committee also reported its performance outcomes to the Board and subsequently disclosed its performance summary to shareholders in Form 56-1 One Report.

CORPORATE GOVERNANCE AND SUSTAINABILITY COMMITTEE*

Name	Position	Date of Appointment
1. Professor Somkit Lertpaithoon	Chairman of the Corporate Governance and Sustainability Committee (Independent Director)	April 23, 2018
2. Lieutenant General Nithi Chungcharoen	Director to the Corporate Governance and Sustainability Committee (Independent Director)	September 22, 2014
3. Mrs. Watanan Petersik	Director to the Corporate Governance and Sustainability Committee (Independent Director)	April 23, 2018
4. Mr. Chansin Treenuchagron	Director to the Corporate Governance and Sustainability Committee	September 21, 2020
5. Mr. Noppadol Pinsupa(1)	Director to the Corporate Governance and Sustainability Committee	November 22, 2021

Mrs. Pilasphan Udomjarumanee, Senior Vice President, Corporate Secretary and Legal, serves as Secretary to the Corporate Governance and Sustainability Committee.

Remarks:

(1) Mr. Noppadol Pinsupa was appointed Director to the Corporate Governance and Sustainability Committee, replacing Mr. Prapas Kong-ied, on November 22, 2021. (Mr. Prapas Kong-ied was additionally appointed Director to the Corporate Governance and Sustainability Committee from January 25, 2021 to November 1, 2021)

* The Company's Board of Directors passed approval for the Committee's name amendment during the Board of Director Meeting No. 14/2021 on December 13, 2021. The resolution has been proposed to and acquired approval from the Annual General Meeting of Shareholders for the year 2022 on April 4, 2022.

The Corporate Governance and Sustainability Committee is composed of at least three Directors of the Board, more than half of whom shall be Independent Directors. Its Chairman shall also be an Independent Director. These Directors serve a three-year term or until the termination of directorship, resignation, or dismissal.

The Corporate Governance and Sustainability Committee is responsible for determining policies, supervising and promoting the implementation of sustainable development. The committee strives to appropriately and transparently offer consultations and guidelines for compliance with good corporate governance principles and sustainable development of the Company, to create a balance in Environmental, Social and Governance (ESG) aspects for the benefit of creating values and sustainable business growth to build confidence and credibility among stakeholders. In 2021, the Corporate Governance Sustainability Committee convened a total of five meetings to fulfill its role according to the scope of authority and responsibilities stipulated by the Charter of the Corporate Governance Sustainability Committee and as assigned by the Board of Directors. The Committee also reported its performance outcomes to the Board and subsequently disclosed its performance summary to shareholders in Form 56-1 One Report.

RISK MANAGEMENT COMMITTEE

Name	Position	Date of Appointment
1. Mr. Grisada Boonrach	Chairman of the Risk Management Committee (Independent Director)	June 22, 2020
2. Mr. Disathat Panyarachun	Director to the Risk Management Committee	June 22, 2020
3. Mr. Sarawut Kaewtathip	Director to the Risk Management Committee	July 20, 2020
4. M.L. Peekthong Thongyai(1)	Director to the Risk Management Committee	October 1, 2021
5. Mrs. Pantip Sripimol(2)	Director to the Risk Management Committee	November 22, 2021
6. Mr. Kongkrapan Intarajang	Director to the Risk Management Committee	October 1, 2019

Miss Kanoknun Buranapunsri, Vice President of Corporate Risk Management and Internal Control System, serves as Secretary to the Risk Management Committee.

Remarks:

(1) M.L. Peekthong Thongyai was appointed Director to the Risk Management Committee, replacing Mrs. Arawadee Photisaro, on October 1, 2021.

(2) Mrs. Pantip Sripimol was additionally appointed Director to the Risk Management Committee on November 22, 2021.

The Risk Management Committee is composed of at least three Directors of the Board, at least one of whom shall be an Independent Director. These Directors serve a three-year term or until the termination of directorship, resignation, or dismissal.

The Risk Management Committee's role is to establish policies related to the Company's risk appetite and risk tolerance as well as risk management guidelines that serve as a framework within which the entire GC Group operates with especial importance placed upon early admonition. The Committee also oversees that risks are identified and ranked by impact and likelihood. In extension, the Committee establishes appropriate risk mitigation measures, monitors, and assesses the effectiveness of the Company's risk management. Furthermore, the Committee offers its opinions and recommendations on possible risk issues of investment project or a legally binding agenda item that is complex in nature or contains potential impact to the Company's reputation in a significant manner. It also ensures that the Company's business operations comply with relevant laws and standards.

In 2021, the Risk Management Committee convened a total of eight meetings to fulfill its role according to the scope of authority and responsibilities stipulated by the Charter of the Risk Management Committee and as assigned by the Board of Directors. The Committee also reported its quarterly performance outcomes to the Board and subsequently disclosed its performance summary to shareholders in Form 56-1 One Report.

EXECUTIVES

To ensure efficient organizational management and operations that adhere to the policies and directions established by the Board of Directors, the Chief Executive Officer and President, endowed with the power vested upon him by GC's Articles of Association, has formed the Management Committee (MC) and the Group Management Committee (GMC). Both committees are composed of top management under the CEO's direct supervision whose level are from Senior Vice President upwards. The CEO, as head of the Company's employees, has the authority and duties to ensure that the Company operates according to the policies, plans, and budgets approved by the Board.

The MC is responsible for devising and aligning operational directions and guidelines with the Board's established policies. It reviews and offers suggestions on the Company's policies and operational guidelines in relation to marketing, commercial and supply; risk management, capital allocation and management; human resources management and development; quality, safety, occupational health and environmental management; and social responsibility as well as matters that may cause significant changes to its Business Units and Group Performance Centers. The MC also reviews and offers suggestions on the Board meeting agenda prior to presenting them to the Board at the meeting. Additionally, the MC oversees the Company's compliance with the law and regulations of external regulatory authorities as well as its own rules and regulations and the Company's relevant legal actions to ensure that the conduct of GC's business is in compliance with good corporate governance principles and in conformity to international standards. The MC also follows up on and implements the Board's resolutions, suggestions, and opinions given at Board meetings as well as oversees and monitors diverse aspects of GC's progress as a whole and internationally.

Meanwhile, the GMC is tasked with reviewing and offering opinions and recommendations on the alignment of Company policies with those of its Group Performance Centers in relation to the operational guidelines for Group Performance Centers' production management, marketing, commercial and supply, and risk management, including human resource management and development; quality, safety, occupational health and environmental management; and social responsibility. It also monitors the performance of Group Performance Centers and progress on innovation and technology initiatives as well as projects that contribute to the efficiency of their operations.

The MC holds at least three meetings monthly, while the GMC holds at least one monthly meeting. In 2021, the MC convened a total of 42 meetings, and GMC convened a total of 12 meetings. The Senior Vice President of Corporate Secretary and Legal serves as Secretary to both committees.

EXECUTIVES UNDER THE ORGANIZATIONAL STRUCTURE AS OF FEBRUARY 1, 2022

Name	Position
1. Mr. Kongkrapan Intarajang	Chief Executive Officer and President
2. Mr. Varit Namwong	Chief Operating Officer – Value Added Products Acting Senior Vice President – Green Chemicals Business Unit
3. Mr. Toasaporn Boonyapipat	Chief Operating Officer – Base and Intermediate Chemicals
4. Mr. Wiboon Chuchepchunkamon	Chief Operating Officer – Center of Excellence
5. Mr. Narongsak Jivakanun	Chief Operating Officer – International Business
6. Miss Pattaralada Sa-Ngasang	Executive Vice President – Finance and Accounting
7. Mrs. Warawan Tippawanich	Executive Vice President – Corporate Strategy
8. Mr. Saroj Putthammawong	Executive Vice President – Marketing, Commercial and Supply Chain
9. Mr. Pirun Krimwongrut	Executive Vice President – Organizational Effectiveness
10. Mr. Pornsak Mongkoltrirat	Executive Vice President – Polymers Business Unit
11. Mr. Pukpong Wungrattanasopon	Executive Vice President – Olefins
12. Mr. Chaya Chandavasu	Executive Vice President – Sustainability
13. Mrs. Jeeranee Pimthanothai	Senior Vice President – Technical, Engineering and Maintenance
14. Mr. Amorn Putiphrawan	Senior Vice President – Internal Audit
15. Mrs. Pilasphan Udomjarumanee	Senior Vice President – Corporate Secretary and Legal
16. Mr. Ratchada Sawasdirak	Senior Vice President – Refinery
17. Mr. Anutin Chuaypen	Senior Vice President – Aromatics
18. Mr. Vitaya Pinmuangngarm	Senior Vice President – EO-Based Performance Business Unit
19. Mr. Paisarn Sarapee	Senior Vice President – Phenol Business Unit
20. Mr. Supasit Tongsupachok	Senior Vice President – Utilities
21. Mrs. Chananchida Wiboonkanarak	Senior Vice President – Downstream Strategy and Business Development
22. Mr. Khomson Piyawattanaviroj	Senior Vice President – CAPEX Excellence
23. Mr. Sakesiri Piyavej	Senior Vice President – Quality, Safety, Occupational Health and Environment
24. Mrs. Chatsuda Kanjanarat	Senior Vice President – Transformation Excellence
25. Mr. Paranai Waitayasewee	Senior Vice President – Procurement
26. Mr. Kamel Ramdani	Senior Vice President – Science and Innovation Acting Senior Vice President – Long Term Innovation and Corporate Venture Capital
27. Mrs. Rattiya Chandavasu	Senior Vice President – Specialty Business Acting Senior Vice President – Merger and Acquisition
28. Mr. Panod Awaiwanond	Senior Vice President – US Second Home

Remark: Executives in numbers 1-6 are executives as per SEC's announcement

CHANGES IN EXECUTIVES FROM JANUARY 1, 2021 – FEBRUARY 1, 2022

1) Miss Pattaralada Sa-Ngasang was appointed Executive Vice President – Finance and Accounting on January 1, 2021.
2) Mr. Toasaporn Boonyapipat was appointed Senior Executive Vice President - Base and Intermediate Chemicals on January 1, 2021.
3) Mr. Vitaya Pinmuangngarm was transferred to the position of Senior Vice President – EO-Based Performance Business Unit on January 1, 2021.
4) Mr. Paranai Waitayasewee was appointed Senior Vice President – Procurement on February 16, 2021.
5) Mrs. Wilawan Songjaroen was transferred to the position of Senior Vice President – Center of Excellence on March 16, 2021.
6) Mr. Monton Rochvatanaboon was appointed Senior Vice President – Downstream Strategy and Business Development on April 1, 2021.
7) Mr. Piroj Samutthananont was transferred to the position of Senior Vice President – Downstream Strategy and Business Development on May 1, 2021.
8) Mr. Kevin Thomas Corby retired on October 1, 2021.
9) Mr. Kamel Ramdani was appointed Senior Vice President – Science and Innovation on December 1, 2021 and Acting Senior Vice President – Long Term Innovation and Corporate Venture Capital on February 1, 2022.
10) Mr. Patipan Sukorndhaman retired on December 31, 2021.
11) Mr. Wirat Boonbumrungchai retired on December 31, 2021.
12) Mr. Sakesiri Piyavej was appointed Senior Vice President – Quality, Safety, Occupational Health and Environment on January 1, 2022.
13) Mr. Varit Namwong was transferred to the position of Chief Operating Officer – Value Added Products and Acting Senior Vice President – Green Chemicals Business Unit on February 1, 2022.
14) Mr. Wiboon Chuchepchunkamon was appointed Chief Operating Officer – Center of Excellence on February 1, 2022.
15) Mr. Toasaporn Boonyapipat was transferred to the position of Chief Operating Officer – Base and Intermediate Chemicals on February 1, 2022.
16) Mr. Narongsak Jivakanun was appointed Chief Operating Officer – International Business on February 1, 2022.
17) Mr. Chaya Chandavasu was appointed Executive Vice President – Sustainability on February 1, 2022.
18) Mrs. Rattiya Chandavasu was appointed Senior Vice President – Specialty Business and Acting Senior Vice President – Merger and Acquisition on February 1, 2022.
19) Mr. Panod Awaiwanond was appointed Senior Vice President – US Second Home on February 1, 2022.

REMUNERATION POLICY FOR EXECUTIVE DIRECTORS AND EXECUTIVES

The Company evaluates the performance of its Executives annually against the pre-determined Key Performance Indicators (KPIs). These include financial performance, implementation of long-term strategic goals, personal performance, the Company's performance and practices of other listed companies of a similar size in the same industry. The evaluation also takes into account their responsibilities, management development and overall economic conditions.

TOTAL REMUNERATION FOR EXECUTIVE DIRECTORS AND EXECUTIVES FROM THE COMPANY AND ITS SUBSIDIARIES

The remuneration for the Chief Executive Officer and President is appropriately determined using transparent, fair, and reasonable criteria. The position's duties and responsibilities are also taken into account in conjunction with individual performance. The Nomination and Remuneration Committee is charged with reviewing and proposing the remuneration of the Chief Executive Officer and President to the Board of Directors for approval. It should be noted that, at the highest level of the Company's management hierarchy, the Chief Executive Officer and President is awarded compensation and other benefits in addition to those received as a Director on the Board of Directors.

TOTAL REMUNERATION OF GC AND GC'S SUBSIDIARIES PAID TO THE EXECUTIVES UNDER SEC'S DEFINITION SERVING IN 2021 (INCLUDING THOSE WHO RETIRED AND RESIGNED IN 2021)

Type of Remuneration	Number of Executives	Total (Million Baht)		
		GC	GC's Subsidiaries	Total
Total Combined Salaries	6	53	5	58
Total Combined Special Bonuses	6	27	-	27
Provident Fund Contributions	6	7	-	7
Total		**87**	**5**	**92**

SHARES HELD BY THE EXECUTIVES UNDER SEC'S DEFINITION, THEIR SPOUSES, AND THEIR MINORS AS OF DECEMBER 31, 2021

Name	Number of Shares		
	As of January 1, 2021	As of December 31, 2021	Increase/(Decrease) of Shares during the Year (Shares)
1. Mr. Kongkrapan Intarajang	-None-	-None-	-No change-
2. Mr. Varit Namwong	108,939	108,939	-No change-
3. Mr. Toasaporn Boonyapipat	-None-	-None-	-No change-
4. Wiboon Chuchepchunkamon	-None-	-None-	-No change-
Spouse	198	198	-No change-
5. Mr. Narongsak Jivakanun[(1)]	-None-	-None-	-No change-
6. Miss Pattaralada Sa-Ngasang	-None-	-None-	-No change-

Remark:

(1) Mr. Narongsak Jivakanun was appointed Chief Operating Officer – International Business on February 1, 2022.
Mr. Patipan Sukorndhaman retired on December 31,2021.

EMPLOYEES

PEOPLE MANAGEMENT AND DEVELOPMENT POLICY

Healthy organization and people are an important mechanism to augment our competitiveness and enhance effective contribution to operational excellence. While serving corporate domestic and international growth, enabling us to fullfill our aspiration "To be a Leading Global Chemical Company for Better Living."

GC is determined to prepare organization and people readiness to meet future business needs and ensure expected result as planned. GC has developed HR strategy in corporated with GC Group's people direction, strategic business directions and corporate goals for the utmost effective and efficient management in three major areas focusing on people, organization, and culture with the following actions:

1. PEOPLE

GC is committed to increasing the efficiency and competitiveness of business today and in the future. In 2021, the following actions have been taken:

1.1 Manpower Plan Strategy

- The improvement of work processes, focusing on the Lean & Process Improvement through the FiT project. GC established the "FiT" project which focuses on the Lean & Process Improvement on an End to End process to increase Efficiency, Productivity and Agility of the process with the aim of the results as follows:
  1) Efficient working process managements and effective operating models
  2) Data network across the organization
  3) Accurate, fast and efficient decision-making process
  4) Quality, skillful and knowledgeable personnel to keep pace with changes

- Adoptation of digital technology as a strategic driver of the organization (Digitalization) through the implementation of various projects to harvest added values, aiming for four Smart goals which are (a) Smart Plant, (b) Smart Sales & Marketing, (c) Smart Work Process and (d) Smart Workplace. This includes improving and modernizing the infrastructure to support the business in parallel with the development of skills and abilities.

- GC plans the manpower framework to suit the organizational missions and control the company's manpower ratio by reviewing the vacancies to replace resigned and retired staffs to ensure proper and sufficient manpower and continuously operate the business, in accordance with the situation, vision and strategy of the organization, as well as the response of the needs to step into the digital era for the maximum benefit of the company's business operations.

1.2 Upskill/Reskill

- The Upskill/Reskill development are arranged to ensure knowledge and skills of the staff in consistent with the directions and requirements of the Company. GC categorizes important knowledge and skills into three groups as follows:
  - Corporate Course: Legal courses and the Company's basic policies
  - Leadership Learning Solution: Courses for leadership skills development
  - Functional Learning Solution: Courses to develop skills that are relevant to the responsibilities set for each position

Furthermore, GC also organizes various courses to enhance new skills and knowledge. The key development programs including Data Science and Engineering Program which aims to develops skills in data analysis for employees at all levels to develop data-oriented personnel.

In addition, to create and maintain the "Valued employee with the expected performance and behavior" who will drive business for the next generation, GC has also set up a Talent Management system that focuses on enhancing leadership and the six characteristics of future leaders: agility, resilience, entrepreneurship, digital literacy, mobility and language proficiency. Therefore, the Company pushes its Top Talent employees to be responsible to design and plan for a Self-Directed Learning program for such employees to come up with innovative ideas and for the entrepreneurs to be inspired and bring out new knowledge for the Company's benefits

and able to build a business network. GC has defined the Top Talent employees into three groups as follows:

1) Track 1: Organic Growth Driver (a group with potential growth according to the current structure of the organization): This group emphasizes on the development of professional knowledge and skills (Professional Certification Development) for the benefit of the Company, as well as being evident in that body of knowledge both within and outside the Company and create a concrete Return on Investment.

2) Track 2: GC NextGEN (a group with potential of advancing into new business): This group focuses on developing skills and mindsets for the GC's new business operations. In the past year, the target staffs were developed through the GC NextGEN Program, which is a Hackathon and Pitching learning method for the Business Idea Challenge that can be elaborated into a business generating income for the Company.

3) Scholarship employee for whom the Company provides scholarships of master's and doctorate degrees in world-leading universities in subject areas that are in line with the company's strategy, such as machine learning, artificial intelligence, data science, polymers, advanced chemicals, mechanical engineering, environmental engineering, and cyber law.

- Increase learning opportunities for all employees to have accesses to self-learning platforms. GC focuses on employee development through various forms of learning in order to promote practical application, which includes individual development plans (IDP) and a 24/7 digital learning platform where employees could learn anywhere and anytime. In this regard, GC has prepared a variety of projects to develop knowledge, abilities and potentials of employees. It has begun to arrange the e-Learning Platform (UP Platform), allowing more courses to be organized with more versatilities, as well as more joining applicants in the programs. Furthermore, GC encourages the English skill development to enhance the English skills and knowledge. GC has employed an online application developed by VOXY, a language institute recognized by the world's leading educational institutions.

1) Manage the e-Learning system for new hire emploees as follows:
   - The Self-Orientation Program for new employees which can be self-learned via the Company's online system, including the Inside HR and the e-Learning Platform (UP Platform).
   - Strong Start for New VP & DM is an online learning system in the form of Blended Learning between the e-Learning and the assigned activities under supervisions of a mentor throughout the 90-day period for the appointed employee to take up the position and be prompted with the basic knowledge necessary for working in a management position.

2) Set up the Internal Instructor Development projects to Upskill/Reskill to create and transfer knowledge in various forms to promote the self-learning of the employee for GC to become a learning organization in the future. These projects include:
   - STAR Interviewer Certified Trainer Program which is an internationally developed program of the world's leading institutions to create internal lecturers and supervisors at all levels and equip them with the ability to interview for recruitment of the new potential employees and effective selections for the employees' promotions.
   - GC Basic Internal Instructor Program which is a course to develop internal lecturers who are Subject Matter Experts in various fields to be able to act as professional lecturers.
   - Content Influencer which is a course that develops employees who desire to create an e-Learning Content that responds to self-learning in the Learning Management System.

1.3 Recruitment Strategy

To drive corporate strategies towards success critical position to sustain business growth. In addition, GC shall not employ government officers, according to the anti-corruption policy. This year, various projects were undertaken such as:

- Mid-Career Candidate Pool which is designed to expand the database of applicants among those with 3-5 years of experiences such as researchers, analysts, business planners, workers in Maintenance and Engineering Group, the Process Technology Group and the Sales Group.
- Joining the Virtual Conferences due to the situation of COVID-19. Applicants can join the virtual recruitment event such as:

- In 2021, GC participated in the Samaggi Virtual Careers Fair (SACC) with the Samaggi Samagom which was the first time in organizing a Career Fair through an online channel to promote awareness of the Company's image among Thai students of high potential in the UK by organizing a Live Session, allowing the students to speak with GC representatives from five different fields, all of whom are performers from the Synergos project, to share their challenging GC experiences.
- Organized a GC Virtual Open House 2021 event, "The First Step to a Dream Career" to welcome students from the Faculty of Engineering, Chulalongkorn University, under the ChAMP Engineering (Chulalongkorn Alumni Mentorship Program). The session was done via MS Teams system to display an overview business of GC Groups and to share experiences by GC representatives from various interesting positions such as Data Scientist and Researcher. There was also a session offering advice on techniques for a job application preparation and job interviews.

In addition, GC continues to create Social Media Content Engagement through recruiting channels such as Facebook, Line and LinkedIn to inspire and provide knowledge for preparation in the New Normal era, in accordance with the Company's strategy to Upskill/Reskill, such as a positive attitudes leading to success, key skills GC looks for, professional presentation techniques and etc.

Moreover, the company has prepared to adjust the recruitment process to support the Personal Data Protection Act that will be effective in 2022.

Other supports for the employees

The Company appropriately takes care of its employees in various aspects throughout their life cycles, in line with the internal and external environments to create a good working experience for employees as follow:

Performance Management System To motivate employees to sprint their capability in order to bring the best of achievement, GC integrated activities of performance management system end to end process and policy. GC has reviewed, improved, and integrated its performance assessment system through the performance assessment policy, beginning with setting the annual goals, followed by conducting the mid-year reviews and year-end assessments. Also, GC has cascaded KPI (Key Performance Indicator) from the Company's goals to the top management personnel's goals. KPI alignment is also conducted within each to ensure the standard. Moreover, Periodic performance check-ins are also enforced, allowing supervisors to monitor the progress of their supervisees and to offer assistance whenever needed at least every quarter. This is to support the practice of WFH to encourage supervisors to conduct coaching with their subordinates such as appreciation, prioritization and encouragement in order to develop the potential of and enhance performance. After the year-end assessment is conducted, supervisors compare the outcome with the results of the peer review to identify disparity, which affects the annual salary adjustment according to the company's remuneration policy. GC has developed a performance appraisal system to be up-to-date and more user-friendly for better usage along different steps of the appraisal system via mobile phones or tablets in addition to Personal Computer (PCs) or notebooks. The system also prompts users to review and propose improvements to KPIs during the year to increase the dynamics. In 2021, the performance appraisal for those appointed for Special Assignment was also implemented to promote Rewards & Recognitions, build the employees' morale and encourage better performance. It also facilitates the Agile working style and cross-function works. Furthermore, to ensure that these assessments truly lead to continuous development, GC has integrated individual development planning into the employee performance assessment system. This is achieved by adding to the performance assessment system a communication channel through which employees can express their own wishes regarding their career in the next 1-3 years. Their wishes are then taken into account in the consideration of job rotations, people development, and future recruitment.

Remuneration GC offer competitive remuneration and benefits to its employees compared to leading companies in the same industry. The Company participates in the Remuneration Survey conducted by the benefit and compensation consultants every year, to achieve information and maintain competitiveness, especially when compared to companies in the Oil & Gas business. In addition, the appropriate remuneration is determined in accordance with the performance and duties to create utmost efficiency and effectiveness for both the Company and the employees. In this regard, GC has provided information and supported the preparation of the salary structure of the companies in the group and the joint ventures to ensure a provision of comparable remuneration policy, comparing to other companies in the same business and in line with GC Group Companies.

Employee Relation To give employees a happy working life and foster employee engagement, GC has carried out well-being projects since 2018 to take care of its employees in terms of health, wealth, and mindfulness by adjusting various activities to comply with the WFH as follows:

- Organize a virtual meeting to create an understanding of the existing welfare (ER ma Share) and review the healthcare benefits.
- Hold a quarterly meeting of the Welfare Committee through the MS Teams to build relationships and understandings between the Company and its employees.
- Arrange the V-Health application provided by the health insurance companies and hospitals to offer online treatment services (Virtual Teleconsultant) through the "Consult on Screen and Wait for Medicine at Home" project.
- Organize activities to promote physical, mental and financial management through various online channels as well as the mental health hotline for employees and their families through the MS Teams, including the Tele Physio program: Conquer the Office Syndrome, the Online Talk activities and the games created to provide the employees the self-examination, stress and financial management courses, such as the Financial Mentors, the Investment Planning for Wealth and the Debt Management programs, etc.

Furthermore, GC also encourages employees to enhance employee morale and to award long service employees to honor their loyalty in the occasion of their work completion, as well as various provisions to personnel who will happily retire as follows:

- Prepare an Exit Interview to make surveys on the employees' opinions for further improvement, sustain the welfare and various matters and create a good experience for the employees.
- Organize the Knowledge Sharing to transfer knowledge and experiences of the retiring employees onto the current employees and prepare them for retirement in the future through the Happy Retirement Project 2021 to provide useful knowledge such as financial management and self-care for health.
- Provide useful knowledge such as health care, financial management and Outplacement Program for the MSP employees.

Caring for the employees during the COVID-19 pandemic GC is concerned about the health of all employees. Therefore, various measures have been continuously issued since before the outbreak of COVID-19 until now, to ensure their safety during the COVID-19 pandemic:

- COVID-19 insurance has been provided to personnel considered to be in the risk group under the criteria of the Ministry of Health. At-risk employees are requested to take a COVID-19 test; the insurance covers all medical expenses if they test positive.
- A lock-up measure has been introduced for personnel working in sensitive areas or control rooms, and the "Chit Chat" activity has been organized to allow them to meet their families.
- Certain groups of employees have been assigned to Work from Home (WFH) to reduce risks.
- Measures have been introduced to heighten safety in office areas, such as mandatory face masks, screening points, temperature checks, and office space redesigning to ensure physical distancing.
- Provide home-delivery service to ensure that all employees have protective health equipments such as the alcohol sprays, medical face masks and the Antigen Test Kits.

2. ORGANIZATION

GC is aimed to enhance business operation with the Fit, Fast, Flexible & Effective to respond to the Company's business strategy both in present and in the future. In 2021, GC has taken the following actions:

2.1 Organization Restructuring for Quick Decision Making

- Designing an organizational structure to support long-term business strategy focusing on the sustainability of business growth, including the high-value products business, the enhancement of responding to the customers' demands, the business expansion to the international level and the support for long-term strategies to challenge the Net Zero Target of the green house gas emissions. These plans are implemented to ensure that GC organization structure encourages the quick decision making, the agility and increased efficiency in operation of all departments, in order to achieve more competitiveness throughout the Value Chain.
- Embed a management of change process to ensure smooth organization restructuring, minimize risks amd impacts from organization restructuring, and to ensure smooth execution by executives and other employees in their new assignments.

- Driving organizational agility through Cross Functional Initiative that allow employees to propose new ideas, focusing on enhancing the speed and operational efficiency according to business needs.

2.2 Work from Home (WFH)

- Annoucing Work from Home (WFH) as a new regular way of working for the office workers in order to create more flexibility that suits the current situation and meet the needs of new generations of employees, as well as conducting employee opinion surveys both on the working and living aspects to improve tools, systems and technologies such as the e-Signature, the HR systems to enhance employees' efficiency. GC has announced a WFH manual. The purpose of the WFH Manual is to describe duties and responsibilities of both the supervisors and employees under WFH and to support employees in all aspects. In addition, to reduce the stress of employees from working the long hours or from meetings, GC therefore arranges the "Say Yes to No-Meeting Hours" project by stipulating that every Wednesday from 3-5 p.m. is a meeting-free period, so that the employees can manage their own works, self-study or join activities etc.
- Set up the Smart Office to in line with the new working conditions of the employees, to provide working flexibility by continually conducting the opinion surveys and adopt technologies to improve tools and systems, such as an arrangement of Functional Seat where employees can sit and work without having to be assigned of specific seats. In this regard, the Company has arranged the LAN cables and Wi-Fi to be accessible from every seat and prepared the Meeting Pods for the convenience of conferences via MS Teams, responding to the conditions of the New Normal era to provide employees with convenience and flexibility when working in the office.

3. CULTURE

GC drives GC SPIRIT 4 Core Behaviors through communication, day-to-day activities, and fundamental systems in order to gear all employees and process to one direction to uplifting company performance. Ultimately, all these lead to GC vision "To be a Leading Global Chemical Company for Better Living."

In doing this, GC has worked to promote the Executives as role models, such as organizing a workshop for reviewing the carrying out of GC SPIRIT 4 Core Behaviors under the 2021 theme, which was the "Conviction to Change: Speed with Challenge Status Quo". A Culture Talk session was organized to exchange knowledge from the top executives. The executives have also conveyed their vision, mission and direction through the Narrative Speech to inspire other employees. The VDO lead by example was created to portray perspectives in the team building to follow the GC SPIRIT 4 Core Behaviors. In addition, there have also been working groups of the Culture Committee and the Change Agent performing to drive culture throughout the organization. These were various activities, such as organizing a Change Agent Virtual Outing to achieve the drive in corporate culture policies via the Change Agents, who also produced various initiatives to promote the GC SPIRIT 4 Core Behaviors in each function and conducted concrete achievement measurements, to ensure that the organizational culture building process has reached the desired results. For examples, the Culture Survey, the GC Hero, the GC Team Hero, and the 360-degree assessment were done by the supervisors, the co-workers, and subordinates in order to achieve clearer assessments which will be able to reflect expected behaviors of the employees. The results of the assessments were then analyzed to find areas that need improvements and used for further employee developments.

Moreover, the company has prepared an e-Culture Playbook as a tool to create common understandings into practice and creating the comprehensions of various matters such as the reasons and the needs to embrace "Change" for the better, the concept of "Change" for better behaviors, including the scenarios to practice to "Change" together. GC has also organized a Chit Chat session with a Change Agent for them to understand and exchange opinions or ideas gained from reading the e-Culture Playbook so that they can be conveyed and pushed for concrete changes in their line of works in the future.

GC strives to promote a happy work life, better living, as well as safety and occupational health for its employees. GC has also been committed to improving and enhancing its organizational and personnel management capabilities as people are the most valuable resources to GC's strong and sustainable growth.

EMPLOYEES

As of December 31, 2021, the Company hired a total of 10,819 employees, including those employed by its subsidiaries, according to business structure, which can be divided into the following functions:

1. Direct reports to the Chief Executive Officer and President	14 employees
2. Internal Audit	26 employees
3. International Business Operations	4,480 employees
4. Corporate Strategy	54 employees
5. Finance and Accounting	176 employees
6. Organizational Effectiveness	205 employees
7. Corporate Secretary and Legal	41 employees
8. Sustainability and Corporate Branding	69 employees
9. Direct reports to Senior Executive Vice President - Upstream Petrochemical Business	145 employees
10. Group Performance Center - Aromatics	320 employees
11. Group Performance Center - Refinery and Shared Facilities	306 employees
12. Group Performance Center - Olefins	709 employees
13. Group Performance Center - Utilities	244 employees
14. Direct reports to Senior Executive Vice President - Downstream Petrochemical Business	110 employees
15. Polymers Business Unit	999 employees
16. EO-Based Performance Business Unit	137 employees
17. Phenol Business Unit	216 employees
18. Green Chemicals Business Unit	270 employees
19. Downstream Strategy and Business Development	232 employees
20. Marketing, Commercial and Supply	96 employees
21. Direct reports to Chief Operating Officer - Center of Excellence	965 employees
22. Technical, Engineering and Maintenance	462 employees
23. CAPEX Excellence	152 employees
24. Quality, Safety, Occupational Health and Environment	172 employees
25. Transformation Excellence	68 employees
26. Procurement	94 employees
27. Science and Innovation	57 employees

Remark : GC will announce new organizational structure in line with the upcoming business conducts which will be effective from 1st Febuary 2022 onwards.

TOTAL REMUNERATION PAID TO EMPLOYEES IN 2021

Type of Remuneration	Total (Million Baht)
Salaries, Bonus, Wages, and Other Welfares	15,938
Provident Fund Contributions	684
Post-Employment Benefits	486
Other Long-Term Employee Benefits	137
Total	**17,245**

The number of employees joining the provident fund scheme accounts for 73% of all employees. Through its provident fund committee, GC selects a provident fund manager who is a signatory of the Investment Governance Code for Institutional Investors (I Code) as well as takes into consideration past investment performance.

OTHER IMPORTANT INFORMATION

NAMES OF THE CORPORATE SECRETARY, CHIEF ACCOUNTANT, HEAD OF INTERNAL AUDIT AND HEAD OF CORPORATE COMPLIANCE

COMPANY SECRETARY

Under the Securities and Exchange Act (No. 4) B.E. 2551 (2008), Sections 89/15 and 89/16, the Board of Directors at Meeting No. 10/2562 held on August 19, 2019 appointed Mrs. Pilasphan Udomjarumanee, Senior Vice President, Corporate Secretary and Legal, as Company Secretary. By law, the responsibilities of Company Secretary include the preparation and safekeeping of important company documents, including the register of directors, meeting notices, Board and shareholders' meeting minutes, 56-1 One Report and conflicts of interest form filled by Directors and Executives. The Company Secretary is in charge of organizing Board and shareholders' meetings and submitting copies of reports on Directors and Executives interests to the Chairman of the Board of Directors and the Chairman of the Audit Committee. The Company Secretary also advises the Board and Executives on the rules and regulations they should be aware of, organizes training and orientation for current and new Directors, as well as providing them with information essential to their performance of duties as Directors. Moreover, the Company Secretary oversees compliance with laws, regulations and resolutions passed in Board and shareholders' meetings, as well as collaborates with relevant agencies on compliance. The Company Secretary has undergone training courses necessary for her to duly perform her roles. The qualifications of the Company Secretary are disclosed in Attachment 1 "Details of Directors, Executives, Controllers and Company Secretary".

CHIEF ACCOUNTANT

In 2021, GC assigned Mrs. Sutha Suwanrath, Vice President – Financial Accounting 1 as of August 1, 2020, to oversee the Company's accounting and ensure its compliance with relevant standards, laws, and regulations. The qualifications of the Chief Accountants are disclosed in Attachment 1 "Details of Directors, Executives, Controllers, and company secretary".

HEAD OF INTERNAL AUDIT

The Audit Committee meeting No. 8/2017 convened on September 18, 2017 resolved to approve the appointment of Mr. Amorn Putiphrawan as Senior Vice President, Internal Audit, responsible for evaluating and enhancing the internal control effectiveness, supervising the operations of the internal audit function to be in accordance with the objectives and the international standards, including objectivity and independent consulting on the company's subsidiaries and report directly to the Audit Committee. The qualifications of the Head of Internal Audit are disclosed in Attachment 1 "Details of Directors, Executives, Controllers and Company Secretary".

HEAD OF CORPORATE COMPLIANCE

Mrs. Rattana Nakasiri as Vice President, Corporate Governance, has been assigned as Head of Corporate Compliance on October 15, 2015. The responsibilities include overseeing corporate compliance, promoting corporate governance in business practices, and ensuring that the Executives and employees of GC Group comply with laws, rules, and regulations in countries where GC operates. The qualifications of the Head of Corporate Compliance are disclosed in Attachment 3 "Details of Heads of the Internal Audit and Compliance Units".

HEADS OF INVESTOR RELATIONS AND CONTACT INFORMATION

VICE PRESIDENT – CORPORATE FINANCE & INVESTOR RELATIONS

Mr. Jittasak Soonthornpan
Tel : 02-265-8172
E-mail : Jittasak.s@pttgcgroup.com

DIVISION MANAGER – INVESTOR RELATION

Mr. Jittasak Soonthornpan
Tel : 02-265-8172
E-mail : Jittasak.s@pttgcgroup.com

AUDIT FEE AND NON-AUDIT FEE

(1) AUDIT FEE

GC and its subsidiaries paid the audit fee to:

- Deloitte Touche Tohmatsu Jaiyos Audit Co., Ltd., which is the auditor of GC and its subsidiaries for the fiscal year of 2021 amounting to THB 10,442,000. Of this amount, GC paid THB 3,000,000 and its subsidiaries paid THB 7,442,000.

- The audit company that the auditor worked for, including persons or entities that are related to the auditors and the audit company for the fiscal year of 2021 amounting to SGD 25,000, USD 29,500, EUR 216,000 and VND 476,000,000.

(2) NON-AUDIT FEE

GC and its subsidiaries paid the non-audit fee for performing agreed-upon procedures in connection with the requirements of the Board of Investment ("BOI"), consulting and document certifying for participation in the Thai Private Sector Collective Action Against Corruption ("CAC"), assurance report on the compilation of unaudited pro forma consolidated financial information and comfort letter for bond issuing of subsidiary, tax consulting services and other audits by agreed-upon procedures to:

- Deloitte Touche Tohmatsu Jaiyos Audit Co., Ltd., which is the auditor of GC and its subsidiaries for the fiscal year of 2021 amounting to THB 6,900,500 and for incomplete services in the fiscal year of 2021 that will be paid for a total of THB 11,650,000.

- The audit company that the auditor worked for, including persons or entities that are related to the auditors and the audit company for the fiscal year of 2021 amounting to THB 1,741,000, USD 103,007 and EUR 58,632 plus incomplete services in the fiscal year of 2021 that will be paid for a total of THB 795,000, USD 83,900 and EUR 122,652.

BOARD OF DIRECTORS

1. Mr. Piyasvasti Amranand
Chairman / Chairman of the Independent Director
(Non-executive Director)

2. Mr. Apisak Tantivorawong
Independent Director (Non-executive Director) /
Chairman of the Audit Committee

3. Mr. Don Wasantapruek
Independent Director (Non-executive Director) /
Chairman of the Nomination and Remuneration Committee

4. Professor Somkit Lertpaithoon
Independent Director (Non-executive Director) /
Chairman of the Corporate Governance
and Sustainability Committee

5. Mr. Grisada Boonrach
Independent Director (Non-executive Director) /
Chairman of the Risk Management Committee

6. Mr. Pakorn Nilprapunt
Independent Director (Non-executive Director) /
Director to the Audit Committee /
Director to the Nomination & Remuneration Committee

7. Lieutenant General Nithi Chungcharoen
Independent Director (Non-executive Director) /
Director to the Nomination & Remuneration Committee /
Director to the Corporate Governance
and Sustainability Committee

8. Mrs. Watanan Petersik
Independent Director (Non-executive Director) /
Director to the Audit Committee /
Director to the Corporate Governance
and Sustainability Committee

9. Mr. Chansin Treenuchagron
Director (Non-executive Director) /
Director to the Corporate Governance
and Sustainability Committee

10. Mr. Sarawut Kaewtathip
Director (Non-executive Director) /
Director to the Risk Management Committee

11. Mrs. Pantip Sripimol
Director (Non-executive Director) /
Director to the Risk Management Committee

BOARD OF DIRECTORS

12. Mr. Noppadol Pinsupa
Director (Non-executive Director) /
Director to the Corporate Governance
and Sustainability Committee

13. Mr. Disathat Panyarachun
Director (Non-executive Director) /
Director to the Risk Management Committee

14. Mom Luang Peekthong Thongyai
Director (Non-executive Director) /
Director to the Risk Management Committee

15. Mr. Kongkrapan Intarajang
Director (Executive Director)
and Secretary to the Board of Directors /
Director to the Risk Management Committee /
Chief Executive Officer and President

GC EXECUTIVES

1. Mr. Kongkrapan Intarajang
Chief Executive Officer and President (CEO)

2. Mr. Varit Namwong
Chief Operating Officer – Value Added Products and
Acting Senior Vice President, Green Chemicals Business Unit

3. Mr. Toasaporn Boonyapipat
Chief Operating Officer – Base and Intermediate Chemicals

4. Mr. Wiboon Chuchepchunkamon
Chief Operating Officer – Center of Excellence

5. Mr. Narongsak Jivakanun
Chief Operating Officer – International Business

GC EXECUTIVES

6. Miss Pattaralada Sa-Ngasang
Executive Vice President – Finance and Accounting

7. Mrs. Warawan Tippawanich
Executive Vice President – Corporate Strategy

8. Mr. Saroj Putthammawong
Executive Vice President – Marketing, Commercial and Supply Chain

9. Mr. Pirun Krimwongrut
Executive Vice President – Organizational Effectiveness

10. Mr. Pornsak Mongkoltrirat
Executive Vice President – Polymers Business Unit

11. Mr. Pukpong Wungrattanasopon
Executive Vice President – Olefins

12. Mr. Chaya Chandavasu
Executive Vice President – Sustainability

13. Mrs. Jeeranee Pimthanothai
Senior Vice President – Technical, Engineering and Maintenance

14. Mr. Amorn Putiphrawan
Senior Vice President – Internal Audit

GC EXECUTIVES

15. Mrs. Pilasphan Udomjarumanee
Senior Vice President – Corporate Secretary and Legal and Company Secretary

16. Mr. Ratchada Sawasdirak
Senior Vice President – Refinery

17. Mr. Anutin Chuaypen
Senior Vice President – Aromatics

18. Mr. Supasit Tongsupachok
Senior Vice President – Utilities

19. Mr. Vitaya Pinmuangngarm
Senior Vice President – EO-Based Performance Business Unit

20. Mr. Paisarn Sarapee
Senior Vice President – Phenol Business Unit

21. Mrs. Chananchida Wiboonkanarak
Senior Vice President, Downstream Strategy and Business Development

22. Khomson Piyawattanaviroj
Senior Vice President – CAPEX Excellence

23. Mrs. Chatsuda Kanjanarat
Senior Vice President – Transformation Excellence

GC EXECUTIVES

24. Mr. Paranai Waitayasewee
Senior Vice President –
Procurement

25. Mr. Sakesiri Piyavej
Senior Vice President –
Quality, Safety, Occupational
Health and Environment

26. Mr. Kamel Ramdani
Senior Vice President –
Science and Innovation
and Acting Senior Vice President
of Long Term Innovation and
Corporate Venture Capital

27. Mrs. Rattiya Chandavasu
Senior Vice President –
Specialty Business
and Acting Senior Vice President –
Merger and Acquisition

28. Mr. Panod Awaiwanond
Senior Vice President –
US Second Home

EXECUTIVE VICE PRESIDENT AND SENIOR VICE PRESIDENT APPOINTED AS EXECUTIVE OF GC'S SUBSIDIARIES/PROJECT LEADER

1. Mr. Siridech Kumvongdee
President of HMC Polymers Company Limited

2. Mr. Monton Rochvatanaboon
Managing Director of GC Oxirane Company Limited

3. Mr. Amnuai Phrom-Anant
Director of GC Logistics Solutions Company Limited

4. Mr. Thitipol Artsanchorn
Managing Director of GC Marketing Solutions Company Limited

5. Miss Kornkamol Korpaisarn
Managing Director of GC Polyols Company Limited

6. Mr. Piroj Samutthananont
Managing Director of Global Green Chemicals Public Company Limited

7. Mr. Narongchai Pisutpunya
President of GC-M PTA Company Limited and Thai PET Resin Company Limited

8. Mrs. Wilawan Songjaroen
Managing Director of GC Maintenance and Engineering Company Limited

9. Mr. Kridsada Prasertsuko
Managing Director of NPC Safety and Environmental Service Company Limited

10. Mr. Theerapol Muenpakdee
Managing Director of Thai Tank Terminal Limited

11. Miss Somsri Phanichrungruang
President of PTT MCC Biochem Company Limited

12. Mrs. Panida Chinayone
Senior Vice President Reporting to Chief Executive Officer & President, Business Process Redesign Project Leader

CORPORATE GOVERNANCE REPORT

SUMMARY OF THE BOARD OF DIRECTOR'S PERFORMANCE

Nomination, Development, and Performance Assessment of the Board of Directors

(1) Nomination of Directors and Chief Executive Officers and President

The Nomination and Remuneration Committee, consisting of three Directors, as prescribed in its Charter, is responsible for searching for and selecting candidates with the required qualifications and do not hold any of the prohibited characteristics as stipulated by the applicable laws and regulations in accordance with the the Board of Directors nomination and appointment criteria and procedure and propose candidates for Directors, Sub-committee, Chief Executive Offier and President to the Meeting of the Board of Directors and/or the General Meeting of Shareholders (details of criteria, procedures and practices for nomination and appointment of Directors, Independent Directors and Executives are as set out in "Policies and Practices in relation to the Board of Directors"). In 2021, the Nomination and Remuneration Committee has performed its duty in nominating and appointing of Directors, Independent Directors and Sub-committee, as follows:

The nomination and appointment of Director to replace the Director retired by rotation. In the 2021 Annual General Meeting of Shareholders held on April 5, 2021, there were 5 directors retired from office by rotation, i.e., Mr. Piyasvasti Amranand, Prof. Somkit Lertpaithoon, Mr. Pakorn Nilprapunt, Lieutenant General Nithi Chungcharoen and Mr. Disathat Panyarachun. The Company has given opportunity to shareholders to nominate qualified candidates for an election as Directors in advance of the meeting from September 16, 2020 to December 31, 2020. At the end of such period, no shareholder had proposed any candidate to the Company for the election. In this connection, the Nomination and Remuneration Committee, excluding those Directors who had conflict of interest, had searched for and selected suitable and qualified candidates in accordance with the Director Nomination and Appointment Criteria and Procedures and deemed it appropriate to propose all of the retiring Directors for be appointed as Directors for another term. In this regard, the Meeting of the Board of Directors and the Annual General Meeting of Shareholders had resolved to approve the appointment of Directors in accordance with the proposal of the Nomination and Remuneration Committee.

The provisions in articles of association of the Company relating to the holding and voting of the General Meeting of Shareholders stipulates that the voting by shareholders for the election of Directors shall be done by way of use of ballots whereby each shareholder cast all their votes to each of the nominated persons consecutively for the election process to be in line with the corporate governance principles.

The nomination and appointment of Director to replace the Director in cases other than retiring by rotation. In 2021, three Directors had resigned from office, being, Mr. Wittawat Svasti-Xuto, Mrs. Orawadee Potisaro and Mr. Prapas Kong-ied. In order to ensure the continuity of the performance of duties of the Board of Directors in accordance with its obligations and responsibilities, the Nomination and Remuneration Committee had searched for and selected suitable and qualified candidates in accordance with the Director Nomination and Appointment Criteria and Procedures by considering the qualifications in accordance with the applicable law and regulations, the Company's articles of association and corporate governance principles of the Company, as well as their knowledge, proficiency and the Board Skills Matrix, and considering the list of chartered directors of the Thai Institute of Directors (IOD), and had proposed candidates for appointment as Director to replace the resigned Directors, namely, Mr. Noppadol Pinsupa, M.L. Peekthong Thongyai and Mrs. Pantip Sripimol. In this regard, the Meeting of the Board of Director had resolved to approve the appointment of Directors in according to the proposal of the Nomination and Remuneration Committee.

The nomination and appointment of members of Sub-Committees. In 2021, the Nomination and Remuneration Committee had searched for and selected Directors of the Company who are suitable and qualified in accordance with the Sub-committee Nomination and Appointment Criteria which include the charter of each Sub-committee for proposing the candidates to the Meeting of the Board of Directors for consideration and appointment as members of the Audit Committee, the

Corporate Governance and Sustainability Committee, the Nomination and Remuneration Committee and the Risk Management Committee. In this regard, the Meeting of the Board of Directors had resolved to approve the appointment of members of the Sub-committee in accordance with the proposal of the Nomination and Remuneration Committee.

Consideration of qualifications of the Independent Directors. In 2021, the Company had 8 Independent Directors out of a total of 15 Directors which is more than the ratio prescribed by the Notification of the Capital Market Supervisory Board (pursuant to which requires that listed companies shall have at least one independent director per three directors but shall not have less than three independent directors). All of the Independent Directors hold all qualifications of Independent Directors of the Company in accordance with the Independent Director Charter and the Notification of the Capital Market Supervisory Board. They can independently give opinions in accordance with the applicable rules and corporate governance principles.

(2) Development of Directors, Executives, and Company Secretary

Development and Training for Directors

GC has put in place a process to support the consistent development of its Directors. In 2021, the Company carried out the following activities:

- Orientation for new Directors: Newly appointed Directors must attend the Board Orientation, which includes a presentation on GC's nature of business, business data and practices, applicable rules and regulations, corporate governance principles and the business code of conduct, and useful information for the position. Additionally, the Company prepares handbooks and other documents required to perform the Directorial roles, namely the strategic plan, the Company's Articles of Association, Memorandum of Association, annual report, related rules and regulations, and the Corporate Governance and Business Code of Conduct Handbook.

- GC encouraged Directors to participate in the following programs/seminars required for their duties:

Director	Program/Institute
1. Professor Somkit Lertpaithoon	• Director Accreditation Program (DAP) Class 181/2021 Thai Institute of Directors Association (IOD) • Corporate Governance for Executive (CGE) Class 17/2021 Thai Institute of Directors Association (IOD)
2. Mr. Chansin Treenuchagron	• Driving Company Success with IT Governance Class 18/2021 Thai Institute of Directors Association (IOD)

- GC held a lecture for the Board entitled "Decarbonization Pathway to Net Zero," led by Boston Consulting Group (BCG) to report on the current working progress of the Company to tackle climate change and various technologies that will take part in supporting the operation of the Company towards net zero goal, e.g., hydrogen technology, carbon capture for utilization and storage (CCUS) technology, etc., as well as stipulating long-term business operation strategy of the Company.

- GC held activities to promote corporate governance on responsibility towards society and environment especially during the COVID-19 pandemic which affect the community, economic condition and national environment. The Board of Directors, on behalf of the Company, had been providing GC Greater Care Bags to government organization and local communities, and participated in coral reef restoration and releasing aquatic animals in order to expand the safe zone for coral reef and enhance conservation of aquatic animals to maintain good condition of the environment within important tourism area of the country.

Development and Training for Executives and Company Secretary

GC encourages its Executives and the Company Secretary to pursue further education and participate in training programs to acquire knowledge beneficial to their duties as well as their roles in supporting GC and the Board of Directors, including:

- GC held trainings by the Thai Institute of Directors (IOD) for Executives for Deputy Managing Director and above and Executives who held director position in the subsidiaries within GC Group covering 3 topics, as follows:
  - Topic 1: Director's Legal Liabilities, taught by Mr. Warathorn Wongsawangsiri, a partner and authorized director of Herbert Smith Freehills (Thailand) Company Limited, aims to create understanding on roles and obligations of director and management under corporate governance principles and liabilities under applicable laws relating to director's obligations through case studies of incidents affiliating with law enforcement and corporate governance principles' implementation.

- Topic 2: Ethical Leadership for New Era, taught by Dr. Narumol Sinhaseni, senior executive vice president of MC Group Public Company Limited, aims to create awareness of importance of organization's leaders to carry on the business with ethics and to learn about challenging issues of doing business in current situation and in the future, including activity on guidelines for making important organizational decisions.
- Topic 3: High Performing Board: Board Effectiveness, taught by Mr. Kulvech Janvatanavit Chief Executive Officer of Thai Institute of Directors Association (IOD), aims to create understanding of roles and duties of directors including important compositions affecting efficiency of performance of the board of directors, as well as guidelines, trends and expectation on compositions of the board of directors of a listed company.

In addition to the trainings by the IOD, GC has set up courses and programs to develop every level of our Executives, the details of which are as shown in the section titled "Employee".

- GC encouraged the Company Secretary to attend training programs to support the Board of Directors. In 2021, the Company Secretary attended the program offered by the Thai Institute of Directors Association (IOD), namely Company Secretary Refreshment Training Program (RFP) Class 4/2021, and GC's in-house programs, namely, the Director's Legal Liabilities session, Ethical Leadership for new Era session and High Performing Board & Board Effectiveness 2021 session.

(3) Board Performance Assessment

Board of Directors

CG Code stipulates board performance assessment, which GC carries out annually using 3 performance assessment forms, namely, group assessment, self-assessment and cross-assessment (individual assessment of other directors). In 2021, there were 15 directors completing the online director assessment forms in the following details.

GROUP ASSESSMENT: The group assessment form comprises of six main sections: 1) Board policy, 2) Board performance, 3) Board structure (composition and qualifications), 4) Board style, 5) Board meeting, and 6) Board development. *The average group assessment score is 95.5%.*

SELF-ASSESSMENT (ASSESSMENT OF INDIVIDUAL DIRECTORS): The assessment form comprises of three main sections: 1) Directors' knowledge and expertise, self-development, and teamwork, 2) Board performance of duties, and 3) dedication of time and meeting attendance. *The average self-assessment score is 94.4%*.

CROSS-ASSESSMENT (INDIVIDUAL ASSESSMENT OF OTHER DIRECTORS): The assessment form comprises of three main sections: 1) the Director's knowledge and expertise, self-development, and teamwork, 2) Board performance of duties, and 3) dedication of time and meeting attendance. *The average cross-assessment score is 97.1%.*

SUB-COMMITTEES

The Company's 4 Sub-committees have conducted the annual performance assessment, both as a committee (group) and on individual level. In 2021, every Sub-committee reviewed and revised the assessment questionnaires and criteria to ensure alignment with good corporate governance practices prior to its execution.

(1) AUDIT COMMITTEE

The group assessment comprises of two parts: the first part is the composition, covering the topics of the Audit Committee's Charter, qualifications, meetings, learning and data access; and the second part is performance of duties, covering the topics of responsibilities and performance reporting to the Board.

The individual assessment comprises of the following topics: qualifications, meetings, roles and responsibilities.

The average score of the group assessment is 99.8%, and the average score of the individual assessment is 95.6%.

(2) NOMINATION AND REMUNERATION COMMITTEE

The group assessment comprises of the following topics: composition and qualifications, performance of duties, guidelines for Directors, meeting attendance, and reporting and performance evaluation.

The individual assessment comprises of the following topics: knowledge and expertise, performance of duties, guidelines for Directors, and dedication of time and meeting attendance.

The average score of the group assessment is 91.1%, and the average score of the individual assessment is 92.4%.

(3) CORPORATE GOVERNANCE AND SUSTAINABILITY COMMITTEE

The group assessment comprises of the following topics: composition and qualifications, performance of duties, guidelines for Directors, meeting attendance, reporting and performance evaluation.

The individual assessment comprises of the following topics: knowledge and expertise, performance of duties, guidelines for Directors, and dedication of time and meeting attendance.

The average score of the group assessment is 97%, and the average score of the individual assessment is 95.8%.

(4) RISK MANAGEMENT COMMITTEE

The group assessment comprises of the following topics: composition and qualifications, roles and responsibilities, and meeting attendance.

The individual assessment comprises of the following topics: responsibilities, adherence to business ethics and code of conduct, and dedication of time to duties and self-development.

The average score of the group assessment is 98.5%, and the average score of the individual assessment is 97.8%.

Meeting Attendance and Remuneration of Individual Directors

Board of Directors' Meeting

The date and time of the Meetings of the Board of Directors are fixed in advance for the entire year and the agendas of each meeting are opt to be orderly established. The Meeting of the Board of Directors is fixed to be held on Monday of the fourth week of each month and special Meeting of the Board of Directors may be held as appropriate and necessary. Members of the Board of Directors would received meeting invitation, draft minutes of meeting of the previous meeting and information supplementing agendas of the Meeting for consideration within at least 7 days prior to the date of the Meeting. For conveniency and reduction of paper usage, the Company sent such information to each Director via the D-Join system (i.e., Digital Join Application) with information security system being put in place. In 2021, there were 14 Meetings of the Board of Directors which have been fixed in advance and 2 special Meetings of the Board of Directors, totaling 16 Meetings. The Directors who were engaged in urgent business and could not attend the Meeting would notify the Chairman of the Board of Directors in writing specifying the grounds of such business and the Chairman would inform the Meeting of such matter at the beginning of each Meeting.

The Chairman of the Board of Directors would serve as a chairperson of the Meeting and would give opportunities to all Directors to participate in the Meeting and provide their opinions independently. At each Meeting of the Board of Directors, there must be at least two-thirds of the total Directors of the Company attending the Meeting to form a quorum and such quorum would be required throughout the period of the Meeting in order to vote on any matter. The Chairman may allow Directors to attend the Meeting via electronic means whereby the Meeting must be carried out in accordance with the criteria and security standards required for electronic meetings pursuant to the applicable laws and the regulations issued by the competent government authorities. In order to vote in any matter, each Director shall have one vote and a resolution of the Meeting on any matter would require a simple majority of votes. The chairperson of the Meeting shall have a casting vote in case of an equality of votes. In this connection, the Board of Directors placed importance on the management of conflict of interests of the relevant persons so that it be prudent, fair and transparent by disclose such information fully. In the case that any Director had conflict of interests with the matter being considered, such director shall refrain from making decision on that matter.

When the Meeting was concluded, the Company Secretary had the duty to prepare minutes of the Meeting and propose it to the next Meeting of the Board of Director for confirmation and the Chairman of the Board of Director will sign to confirm the accuracy of the minutes. The minutes which had been confirmed together with supplement documentations would be maintained in an electronic form in accordance with the Company's confidentiality level for the ease of reference.

Furthermore, in accordance with the corporate governance principles, the Board of Directors had set up meetings of Non-executive Directors for them to be able to provide opinions and guidelines towards the management and business operation of the Company and meetings of Independent Directors for them to be able to exchange opinions, review roles and operation of Independent Directors every year. In 2021, there were one meeting of Non-executive Directors (on July 27, 2021) and one meeting of Independent Directors (on November 22, 2021). These meetings would prepare a summary of the meeting to propose to the Board of Directors for acknowledgment.

The number of the Meetings of the Board of Directors, Independent Directors, Non-executive Directors and Sub-committee held in 2021 and Director's attendance are as set out in the following table.

Director's Meetings (As at December 31, 2021)

Name	Meetings in 2021							2021 Annual General Meeting of Shareholders	1/2021 Extraordinary General Meeting of Shareholders
	Board of Directors	Independent Directors	Non-Executive Directors	Audit Committee	Nomination and Remuneration Committee	Corporate Governance and Sustainability Committee	Risk Management Committee		
	16 Times	1 Times	1 Times	9 Times	8 Times	5 Times	8 Times	1 Times	1 Times
1. Mr. Piyasvasti Amranand	16/16	1/1	1/1	-	-	-	-	1/1	1/1
2. Mr. Apisak Tantivorawong	16/16	1/1	1/1	9/9	-	-	-	1/1	1/1
3. Mr. Don Wasantapruek	16/16	1/1	1/1	-	8/8	-	-	1/1	1/1
4. Professor Somkit Lertpaithoon	16/16	1/1	1/1	-	-	5/5	-	1/1	1/1
5. Mr. Grisada Boonrach	16/16	1/1	1/1	-	-	-	8/8	1/1	1/1
6. Mrs. Watanan Petersik	16/16	1/1	1/1	9/9	-	5/5	-	1/1	1/1
7. Mr. Pakorn Nilprapunt	16/16	1/1	1/1	9/9	1/1	-	-	1/1	1/1
8. Lieutenant General Nithi Chungcharoen	15/16	1/1	1/1	-	8/8	5/5	-	1/1	1/1
9. Mr. Chansin Treenuchagron	16/16	-	1/1	-	-	5/5	-	1/1	1/1
10. Mr. Noppadol Pinsupa	3/3	-	-	-	2/2	1/1	-	-	-
11. Mr. Disathat Panyarachun	16/16	-	1/1	-	-	-	8/8	1/1	1/1
12. Mr. Sarawut Kaewtathip	16/16	-	1/1	-	-	-	8/8	1/1	1/1
13. M.L. Peekthong Thongyai	3/3	-	-	-	-	-	2/2	-	-
14. Mrs. Pantip Sripimol	2/2	-	-	-	-	-	-	-	-
15. Mr. Kongkrapan Intarajang	16/16	-	-	-	-	-	8/8	1/1	1/1
Directors who resigned in 2021									
1. Mr. Wittawat Svasti-xuto	13/13	-	1/1	-	5/5	-	-	1/1	1/1
2. Mrs. Arawadee Photisaro	13/13	-	1/1	-	-	-	6/6	1/1	1/1
3. Mr. Prapas Kong-ied	13/14	-	1/1	-	-	4/4	-	1/1	1/1

Remark: Directors who could not be attending the meeting due to urgent business had notified the Chairman of the Board of Directors in advance of such meeting.

Remuneration of Directors

The Board of Directors has set up a fair and reasonable remuneration policy for its Directors in accordance with good corporate governance principles. The Nomination and Remuneration Committee determines suitable remuneration for Directors based on the Company's financial standing, taking in consideration the remuneration for Directors in companies listed on the Stock Exchange of Thailand (SET) of a similar size in the industry, as well as each Director's responsibilities. Directors appointed to Sub-Committees are entitled to additional remuneration due to their additional responsibilities.

Directors' remuneration must be approved by the shareholders. At the 2021 Annual General Meeting of Shareholders, held on April 5, 2021, shareholders passed a resolution approving the 2021 remuneration of Directors and Directors to Sub-Committees and their bonus for the year 2020 as follows:

(1) Remuneration for the Board of Directors and Sub-committees

Type of Remuneration	Remuneration Rate
1. Board of Directors	Monthly Remuneration • Chairman Baht 62,500 /Month • Director Bath 50,000 /Month/Director Remuneration for Meeting Attendance • Chairman Baht 50,000 /Month • Director Baht 40,000 /Month/Director
2. Sub-committees • Audit Committee • Nomination and Remuneration Committee • Corporate Governance and Sustainability Committee • Risk Management Committee	Remuneration for Meeting Attendance • Chairman Baht 56,250 /Month • Director Baht 45,000 /Month/Member
3. Others	No other benefits

(2) With regards to the bonus for the year 2020 as the resolution of the 2021 Annual General Meeting of Shareholders, the Board of Directors as a group is to be awarded a bonus for the year when a dividend payment is made to the shareholders. The total sum of this bonus equals 0.30% of the year's net profit and up to Baht 60 million. Each Director's bonus is calculated based on the time served in the corresponding year, and the Chairman's bonus is to be 25% higher than those of other Directors. On April 5, 2021, the Board of Directors as a group was awarded a bonus for 2021 totaling Baht 598,821.

DIRECTORS' REMUNERATION IN 2021

Name	Monthly Remuneration for GC Directors (Baht)	Remuneration for Meeting Attendance (Baht)	Remuneration for Sub-Committees Meeting Attendance (Baht)				2020 Bonus paid in 2021 (Baht)*	Total (Baht)
			Audit Committee	Nomination and Remuneration Committee	Corporate Governance and Sustainability Committee	Risk Management Committee		
1. Mr. Piyasvasti Amranand	750,000.00	800,000.00					49,902.00	1,599,902.00
2. Mr. Apisak Tantivorawong	600,000.00	640,000.00	562,500.00				37,281.00	1,839,781.00
3. Mr. Don Wasantapruek	600,000.00	640,000.00		450,000.00			39,922.00	1,729,922.00
4. Professor Somkit Lertpaithoon	600,000.00	640,000.00			281,250.00		39,922.00	1,561,172.00
5. Mr. Grisada Boonrach	600,000.00	640,000.00				450,000.00	23,227.00	1,713,227.00
6. Mrs. Watanan Petersik	600,000.00	640,000.00	405,000.00		225,000.00		39,922.00	1,909,922.00
7. Mr. Pakorn Nilprapunt	600,000.00	640,000.00	450,000.00	45,000.00			39,922.00	1,774,922.00
8. Lieutenant General Nithi Chungcharoen	600,000.00	600,000.00		360,000.00	225,000.00		39,922.00	1,824,922.00
9. Mr. Chansin Treenuchagron	600,000.00	640,000.00			225,000.00		10,943.00	1,475,943.00
10. Mr. Noppadol Pinsupa	150,000.00	120,000.00		90,000.00	45,000.00			405,000.00
11. Mr. Disathat Panyarachun	600,000.00	640,000.00				360,000.00	39,922.00	1,639,922.00
12. Mr. Sarawut Kaewtathip	600,000.00	640,000.00				360,000.00	18,154.00	1,618,154.00
13. M.L. Peekthong Thongyai	150,000.00	120,000.00				90,000.00		360,000.00
14. Mrs. Pantip Sripimol	65,000.00	80,000.00						145,000.00
15. Mr. Kongkrapan Intarajang**	600,000.00	640,000.00				360,000.00	39,922.00	1,639,922.00
Directors who resigned and retired by rotation in 2020-2021 and earned remuneration in 2021								
1. Mr. Wittawat Svasti-xuto*****	450,000.00	520,000.00		225,000.00			39,922.00	1,234,922.00
2. Mrs. Arawadee Photisaro*****	450,000.00	520,000.00				270,000.00	39,922.00	1,279,922.00
3. Mr. Prapas Kong-ied*****	500,000.00	520,000.00	45,000.00		180,000.00		39,922.00	1,284,922.00
4. Mr. Prasert Bunsumpun***							16,695.00	16,695.00
5. Mrs. Premrutai Vinaiphat****							21,309.00	21,309.00
6. Mr. Supattanapong Punmeechaow****							22,090.00	22,090.00
Grand Total	**9,115,000.00**	**9,680,000.00**	**1,462,500.00**	**1,170,000.00**	**1,181,250.00**	**1,890,000.00**	**598,821.00**	**25,097,571.00**

Remarks:

(1) The company provides a corporate vehicle for the chairman throughout his term for corporate-related activities only.

* Bonus for 2020 performance paid in 2021 for time served in 2020 within a budget of Baht 60 million.

** Remuneration for directorship only; Executive remuneration is not included.

*** One Director who retired by rotation in 2020 was Mr. Prasert Bunsampan. His term ended on June 2, 2020.

**** The two Directors who resigned in 2020 were Mrs. Premrutai Vinaiphat (effective July 16, 2020) and Mr. Supattanapong Punmeechaow (effective July 23, 2020).

***** The three Directors who resigned in 2021 were Mr. Wittawat Svasti-xuto and Mrs. Arawadee Photisaro (effective October 1, 2021), and Mr. Prapas Kong-ied (effective November 1, 2021).

REMUNERATION RECEIVED BY THOSE SERVING AS INDEPENDENT DIRECTORS OF A PARENT COMPANY

GC's Independent Director who is an Independent Director of PTT Public Company Limited, the parent company, received remuneration as follows:

No.	Name - Surname	PTT Public Company Limited (PTT)				
		Position	Remuneration for the Year 2021		Bonus 2021 (Baht)	Total (Baht)
			Meeting Allowance (Including Monthly Allowance) (Baht)	Sub-Committee Meeting Allowance (Baht)		
1	Mr. Don Wasantapruek	Independent Director/ Chairman of the Nominating Committee	1,260,000.00	412,500.00	3,758,894.11	5,431,394.11

DIRECTORS' REMUNERATION FOR DIRECTORSHIP AT MAJOR SUBSIDIARIES

The Company's Directors hold directorships at subsidiaries to ensure that their businesses are operated in compliance with GC Group's policies.

Name - Surname	Position	Total Remuneration
PTTGC International Private Limited (100% owned subsidiary)		
Mr. Kongkrapan Intarajang	Chairman	15,000 SGD
Global Green Chemicals Public Company Limited (72.29 shareholding)		
Mr. Kongkrapan Intarajang	Chairman	Baht 823,619.59

GOVERNANCE OF SUBSIDIARIES AND AFFILIATES

The Board of Directors has implemented the following governance mechanisms for overseeing the management and operation of GC's subsidiaries and affiliates to protect the Company's interests and investments.

(1) The Chief Executive Officer and President has the authority to establish policies, guidelines, conditions, and methods needed to appoint an employee or individual as a Director of companies under GC Group as part of the Company's human resource management regulations. Those appointed are entrusted with the responsibility of acting in the best interests of the organization where he or she serves as Director.

(2) Ensuring that any major policies of companies under GC Group, such as Corporate Governance Policy, Corporate Compliance Policy, Finance, Accounting, Tax and Budget Policy, Quality, Security, Safety, Occupational Health, Environment and Business Continuity Policy, Human Resources Management Policy, Sustainability Management Policy, Risk Management Policy and Internal Control Policy, as well as any other relevant policies, are in compliance with the regulations of the Stock Exchange of Thailand, the Securities and Exchange Commission and any other relevant laws.

(3) Reviewing the implementation of the "GC Way of Conduct" to use as guidelines for practices and supervision of companies in which GC hold shares, deployed via GC's representatives that have been appointed as director or management of such subsidiary, or via the internal department responsible for supervising the subsidiary.

(4) The 2021 GC Way of Conduct Work Plan was established and communicated to the management and governance units in companies in GC Group as well as to GC Way of Conduct coordinators, who are responsible for driving the adoption of GC's operational standards in companies in GC Group, to standardize governance and management practices and to ensure that they are connected and have the same direction. For 2021, the GC Way of Conduct can be summarized as follows:

- Framework Improvement: monitoring the results of operation under the Multi-Level Governance Principles or supervising the subsidiaries at all levels under the GC Way of Conduct by monitoring the operation of the subsidiaries which have established their own way of conduct in line with the GC Way of Conduct to ensure the supervision and constructive suggestions, based on their business risks and in line with investment objectives and business strategies of GC Group.
- Execution & Assessment: establishing and communicating working plans and setting up assessment on the operation in accordance with the GC Way of Conduct by employing the Apply & Explain principle, and having the subsidiaries conduct their self-assessment to evaluate the consistency of its operation and set standards of operations of GC Group.
- Monitoring & Reporting: monitoring and reporting on the progress of operation in accordance with the 2021 GC Way of Conduct to the Management Committee.

(5) Holding the GC Way of Conduct (WoC) Site Visit sessions to audit the operation in accordance the GC Way of Conduct of 8 target subsidiaries, i.e., GCM, GCL, NPC S&E, SUN, GGC, GC-M PTA, TPRC and TTT to create confidence, clarity and understanding in the operations under the GC Way of Conduct to executives and relevant persons, such as the Governance Area Owners, BU Governance and Corporate Risk Management and Internal Control System Team (GC Way of Conduct Focal Point), to create channels for update on the operation of the subsidiaries, and to exchange experiences and learn about the operations within the subsidiaries and CG team and that such matters are acknowledged and brought up for developing the GC Way of Conduct to that it can be used efficiently with a subsidiary as appropriate based on its business.

(6) Establishing the "GC Way of Conduct (WoC) Site Visit Close Out as a common ground between the executives and relevant persons of the subsidiaries and GC team in order to successfully carry out the operation in line with the GC Way of Conduct in accordance with the set objectives.

(7) Establishing GC Way of Conduct webpage to the Share Point System which serves as system improvement in order to increase channels for receiving information and news relating to GC Way of Conduct updating regularly and promptly, including communication, GC Way of Conduct contents, frequently asked questions and contact points, etc., whereby every GC employees including the relevant employees of the subsidiaries can access such database any time.

ENSURING COMPLIANCE WITH CORPORATE GOVERNANCE POLICY AND PRACTICES

GC considers good corporate governance a priority and has thus established and included relevant policies and practices in its Corporate Governance and Business Code of Conduct Handbook. The Company also promotes its adoption to foster confidence among GC's stakeholders.

In 2021, GC conducted various activities to ensure compliance with the corporate governance policy of GC and GC Group. From the monitoring results, the Company has fully operated in accordance with the Corporate Governance and Business Code of Conduct as follows:

(1) DISCLOSURE OF INFORMATION AND TRANSPARENCY

GC is committed to transparent and timely disclosure of accurate and complete information, financially and non-financially, to stakeholders in conformity to applicable laws, rules, and regulations via the SET Link and the Company's website at www.pttgcgroup.com. Its Investors Relations (IR) and Corporate Secretary (CS) are in charge of information disclosure and addressing inquiries.

- Disclosure of Material Information in Form 56-1 One Report
  - Financial Information: GC's financial statements are audited by a professional auditor for the accuracy of their material information and conformance to financial auditing standards. Each set of financial statements has been approved by the Audit Committee and the Board of Directors before its disclosure to shareholders and the public. The Board of Directors' statement on the accountability of its financial reports is disclosed alongside the auditor's report in Form 56-1 One Report.
  - Non-financial Information: Non-financial information includes the operating structure of GC Group, risk management, business operations for sustainability, corporate governance, and material information about the Board of Directors, Sub-committees, Executives, and employees.

- Channels for the Disclosure of Essential Information in Thai and English
  - The SET Link;

- GC's website, www.pttgcgroup.com, where channels for contacting the Board and other divisions are also fully and clearly displayed as well as timely updated;
- Information and news were disclosed to stakeholders via E-mail, exhibitions, press release, and other activities, such as newspapers and social media.

- Investor Relations: The Investor Relations Department serves as the center of communication, where essential information is made known to shareholders, institutional and minor investors, analysts, and relevant regulatory authorities. It also oversees the quality of financial reporting processes and essential information that could affect the price of its securities, such as financial statements, performance results, earnings reports and quarterly and annual Management Discussion and Analysis (MD&A). These are all indicators of the Company's financial standing, performance, and future trends. The Investor Relations Department also manages the disclosure of information via the SET Community Portal to foreign and domestic investors. Furthermore, an Investor Relations Code of Conduct has been established to determine the roles and best practices that enable investor relations officers to treat all shareholders equitably.

In 2021, GC's Executives regularly met with shareholders, financial analysts, investors, and employees through activities adapted to the new normal in order to present GC's performance. These activities included analyst meetings, domestic and international roadshows, and retail-investor events. Below is a summary of these events:

Investor Meetings	
Investor Meetings through virtual roadshows / conferences	32 times
Meetings with Financial Analysts	5 times
Teleconferences	35 times
Information Disclosure	
Disclosure via SET Portal and Company Website	62 times
Activities	
Basic Training with Financial Analysts	2 times

Investors or interested persons may contact the Company via the following channels for more information:

(1) Mail : Investor Relations Department, PTT Global Chemical Public Company Limited 555/1 Energy Complex, Building A, 14th-18th Floors, Vibhavadi Rangsit Road Chatuchak, Bangkok 10900
(2) Phone : 66 (0) 2265-8400 ext. 8172, 8665, 8513, 8533 and 8534
(3) E-mail : ir@pttgcgroup.com
(4) Fax : 66 (0) 2265-8500
(5) Website : www.pttgcgroup.com

In addition, the Company offers swift and convenient communication via E-mail. The E-mail address is displayed on the Company website under "Corporate Governance". Shareholders, investors, and the public may contact the Board of Directors or the Chairman of the Corporate Governance and Sustainability Committee directly. They may also contact the Company Secretary for company information at cg@pttgcgroup.com.

(2) ENVIRONMENTAL, OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT

With its operations abiding by the quality, security, safety, occupational health, environment, and business continuity policy (QSHEB policy) in accordance with international standards and based on good corporate governance principles and strict adherence to applicable standards, regulations and laws on safety, occupational health and environment, GC Group has won praises and honors. This is a testimony to our commitment to business practices that strive for excellence.

QUALITY, SECURITY, SAFETY, OCCUPATIONAL HEALTH, ENVIRONMENT, AND BUSINESS CONTINUITY POLICY

PTT Global Chemical Public Company Limited aspires to be the Leading International Chemical Company that harnesses innovation and environmentally-friendly technology in striving towards becoming the role model organization that develops and sustainably grows with determined responsibility to our presided economy, society, and environment. GC is committed to continually

enhancing our effectiveness in the management of Quality, Security, Safety, Occupational Health, the Environment, and Business Continuity, by adhering to the following principles:

1. Observe and adhere to legal requirements in Quality, Security, Safety, Occupational Health, the Environment, and Business Continuity, as well as observing standards, rules, regulations, and other related local and international requirements.
2. Manage Quality throughout the entire organization by employing Quality, Knowledge, and Productivity Management tools, to satisfy our customers' requirements while advancing innovations that are environmentally-friendly.
3. Manage risks to prevent hazards, work-related illnesses, loss from accidents, injuries, property damages, and promoting a B-CAREs Safety Culture, as well as Process Safety Management (PSM), to assure and care for the Safety of all.
4. Exercise awareness and alertness for security threats and setting up emergency management guidelines to protect the lives of staff and company assets, information, and business continuity.
5. Exercise due care in occupational health and work-place environment and promoting a good health and work-life balance.
6. Assess and prevent detriment to the environment and ecosystem, preserving biodiversity via an integrated environment management system encompassing energy, air, water, and waste management, as well as efficient and sustainable resources utilization in accordance with Circular Economy principles, to optimize resources utilization throughout the supply chain, maintain efficiency in reduction of greenhouse gasses, and adaptability to climate change, with focus on fortifying an environmental culture, by communicating to and encouraging all employees and stakeholders to be conscientious of and contribute to GC's environmental culture.

Executives and employees at all levels must be accountable for achieving objectives and goals of GC, as well as being a role model in the development and perpetuation of the Quality, Security, Safety, Occupational Health, Environmental, and Business Continuity Management System, provide sufficient resources to enable all staff to be able to take part in and contribute to the adoption of policies and putting them into action as well as communicating these policies to all related parties to achieve internal and intra-organizational collaboration, for the sustainability of the organization henceforth.

The summary of GC's safety, occupational health and environmental safety management in 2021

1. SAFETY MANAGEMENT

1.1) Personal Safety

GC considers the safety and occupational health management one of the most vital issues in its business operations as improper safety management could result in production disruptions and impact to the operation of stakeholders throughout the supply chain. To this end, GC has developed safety structure and best practices in line with GC Management System (GCMS), the Process Safety Management (PSM) Standard, and the ISO 45001 safety standard. The Company also fosters a safety culture among internal and external employees, covering all activities of employees, contractors, and suppliers, through B-CAREs culture and the Contractor Safety Coaching Program, with the goal of elevating GC's safety management and achieving the ultimate goal of becoming a zero-accident organization. Safety projects carried out in 2021 are as follows:

- Safety Culture Promotion Program (B-CAREs strengthening)

  The Company promoted various safety activities under B-CAREs to develop skills and raise awareness among employees and contractors about the safety culture by integrating with the Operational Discipline Procedures to emphasize the safety culture under the "perseverance of safety culture with higher operational discipline" practices by referring to leadership, ownership and partnership procedures from the Executive level to the site workers. The Management also demonstrated their commitment by paying a visit to production areas to foster a sense of safety responsibility through different activities, namely the Management Safety, Energy, and Reliability Walk, Line Walk, and Onsite Verifier, which played a key role in creating a sustainable safety culture, demonstrating the felt-leadership of the Management to employees and contractors.

- Top Personal Risk Analysis and Identification

  GC applied the Loss Causation Model to analyze causes of accidents and losses among employees and contractors. The Company also sought to foster three components of personal operational discipline, namely knowledge of proper and safe working methods, awareness of factors contributing to accidents, and commitment to complying with operational rules and regulations, through projects

such as Field Risk Assessment, Line Walk (Safety Walk), Understand Risk, and Stop Work Authority. The assessment results were used to establish robust and sustainable safety control measures.

- Hand Injury Protective Tools Project

  The safety risk assessment results as well as accident and loss statistics revealed that hand and finger injuries were the most common injuries. To this end, GC started the Hand Injuries Awareness Program in 2017 to raise awareness of such accidents among employees and collaborate with contractors to develop suitable tools to reduce such injuries. In 2021, GC applied the principle of engineering control to develop equipment with greater hand-related injury prevention efficiency, such as wrenches with straps and slugging wrenches with spring-loaded handles, as well as compiled handbooks for workers on working methods and the selection of suitable equipment for each kind of work.

  In addition, GC included the prevention of hand and finger-related accident as one of the criteria in supplier and contractor assessment and required suppliers and contractors to use risk-reducing equipment approved by the Company in their operations.

- Driving Safety

  GC has elevated the driving safety standard for its employees, suppliers, and contractors by initiating the Driving Safety Project to reduce road accidents involving the use of GC's vehicles. Based on the framework of the BS39001:2012 industrial standards, GC established safety practices and guidelines, which included the following measures and requirements for GC's drivers:
  - Verification of basic qualifications, such as driver's licenses, training, and experience
  - Health check-up and readiness assessment
  - Annual training
  - Vehicle safety feature assessment
  - Developing vehicle maintenance requirements
  - Developing emergency procedures and requirements for reporting accidents in an emergency

  As a result of this project, GC reported a 70% reduction in motor accidents.

Beside internal safety programs, GC values the safety of its employees and their families outside the operating areas and has thus begun projects to promote a safety culture outside of work to ensure employee safety both on- and off-site.

- GC Group SEEK Day 2021 (Safety, Environmental, Energy and Knowledge Management Day)

  The activity was held to raise safety, occupational health, and environmental awareness under GC's Process Safety Management (PSM) and B-CAREs. The CEO, the President presented zero total recordable injury rate (TRIR) and zero PSM of the areas which have had no personal accident or process safety incident throughout the year as a good example of operational safety and environmentally friendly practices. The event also featured exhibits from different business units to share knowledge as well as foster pride among employees in GC's successful safety, occupational health, and environmental performance.

1. 2. 3.

1- 2 SAFETY CULTURE PROMOTION PROGRAM (B-CARES STRENGTHEN)
3 3 COMPONENTS OF PERSONAL OPERATIONAL DISCIPLINE (OPERATIONAL DISCIPLINE)

In addition, GC Group's plants won the Outstanding Safety, Occupational Health and Work Environment Award: Gold Level for the 23rd consecutive year (1998-2021), testifying to GC's national outstanding safety performance.

Thanks to the extensive safety, occupational health, and environmental management, GC's 2021 safety performance was ranked in the first quartile internationally with the Total Recordable Injury Rate (TRIR) of 0.12 person per 200,000 working hours. Furthermore, GC also adjusted its operation management, stressed the importance of adherence to safety principles among employees and contractors through these projects, and encouraged its employees and contractors to participate in safety projects at all levels, with the ultimate goal of becoming a zero-accident organization.

1.2) Process Safety

GC has jointly established the PSM Long Range Plan with DuPont, a leading company that is globally reputable for operational safety to elevate the Process Safety Management (PSM) standard towards world-class PSM and achieve high plant reliability as well as to prevent loss from Process Safety Incidents. In 2021, the outstanding PSM project were Operational Discipline Project and the PSM Deep Dive Assessment Project.

- Operational Discipline: OD

  GC focuses on the employee mindset by providing knowledge, building understanding and continuously promoting operational discipline, and has established operational discipline projects since 2020 in order to develop strengths and positive qualities in GC's Executives and employees at all levels, covering four major areas: Leadership, Process, Standard, and Culture:

  1) Leadership
     Developing leaders who are inspirational and set a good example of following safe work practices for employees across the organization.
  2) Process
     Using innovations and developing experts (SMEs) on proactive accident management and prevention to enable employees to analyze dangers or irregularity in the process as well as investigate the true cause of the incident as to prevent process safety incidents and establish effective preventive measures.
  3) Standard
     Strengthening the Process Safety Management (PSM) System and sharing knowledge to employees, suppliers, and contractors to enable them to monitor and oversee safety practices within the organization by themselves.
  4) Culture
     Integrating the safety culture and safety systems into one by fostering operational discipline.

- PSM Audit/Assessment System Development Project and PSM Deep Dive Assessment Project

  GC has cooperated with advisors from DuPont in developing the PSM Audit/Assessment so that it become robust by focusing on developing (1) the capacity of the auditors, (2) tools and methods of assessment which are important parts to create sustainability of the operation of production process safety.

In addition, GC has set up a plan to conduct site validation by the PSM Deep Dive Assessment to deeply evaluate the PSM management system in the OLE3 and Phenol operation areas. In this connection, GC will take the assessment result to its consideration to determine the strength level of its PSM management system with an aim to reach a world-class practice.

From the intention to continuously develop and enhance the operational safety of the production process, the operation results of the Company has been excellent.

1.3) Fire-fighting and Emergency Crisis

- Emergency Mutual Aid Group: EMAG

  GC is a founding member of the Emergency Mutual Aid Group (EMAG), established as a center for industries in Map Ta Phut municipality, to cooperate and support others in emergencies. GC actively participated in drafting an Emergency Plan for Rayong and an Emergency Action Plan for Map Ta Phut Industrial Estate Group. In collaboration with a group of industrial plants in Map Ta Phut, GC conducted emergency drills at the provincial level and carried out evacuation drills in nearby communities. In addition, the Company designated employees with expertise in emergency response and mitigation to support the Governor of Rayong, Rayong Province Disaster Prevention and Mitigation Office, Map Ta Phut Municipality, and a number of industrial plants in Map Ta Phut to help support the community in developing their emergency plans and conducting drills in case an accident arises in the plant and affects the community.

- Security Drills for International Ships and Ports (NASMAX)
  GC organized drills for international ship and port security plans (NASMAX) in collaboration with government agencies, local administrative organizations, and ships and ports, as well as identified maritime threats and established measures for preventing potential risks to ships or ports so as to assess threats and continuously improve the security measures of GC/ports to achieve maximum efficiency, in line with the International Ship and Port Facility Security Code (ISPS Code).

- Business Continuity Management System (BCM)
  The Company implemented the Business Continuity Management System (BCM) to ensure its readiness and ability to coordinate, respond to situations, and recover effectively after the incident so that business can continue operating smoothly. GC established a structure to define responsible parties in various fields in a form of the Business Continuity Plan (BCP), to be used as a business recovery standard for all GC Group's plants.

- Proactive Fire Fighting Reliability Audit
  GC conducted a proactive inspection of firefighting equipment to improve its readiness for usage to meet standards as well as put in place a contingency plan for critical equipment or systems. GC also established guidelines for inspecting and testing the firefighting system, along with appropriate handbooks that had been revised, categorized, and made ready for use.

- Integration of Technology into Safety Management
  GC integrated technology and innovation into its safety management to improve the safety systems and enable a prompt risk analysis as well as quick, accurate monitoring, thus reducing the risk of production accident and workplace injuries.

2. OCCUPATIONAL HEALTH MANAGEMENT

GC considers employee health a top priority and strives to consistently develop its practices towards international standards. To this end, GC has adopted IPIECA-IOGP's Health Performance Index (HPI), an occupational health management standard assessment system, which is in line with the United Nations's Sustainable Development Goal No. 3: Good Health and Well-being. In addition, GC has developed its HPI system in accordance with IPIECA-IOGP's standards for both internal and external management and established an assessment team through an internal cross audit.

Promoting Employee Health and Wellbeing during the COVID-19 Pandemic

GC has appointed the Coronavirus Disease 2019 (COVID-19) Control and Prevention Committee to analyze and closely monitor the situation as well as to formulate preventive policies and measures across GC Group's operations to reduce the risk of infection among its employees, contractors, and visitors.

GC has set up measures to prevent the spread of COVID-19 by requiring every employee and contractor to take COVID-19 test and screening by using the COVID-19 Antigen Test Kit (ATK) on every worker before coming to work. The Company also followed up and controlled the risks of every employee, contractor, and person who enter the Company's premises and those persons must report the ATK result through the GC COVID-19 Reporting System. A monitoring process has been set out to monitor every employee whose screening results show that there was a potential risk. The Company has set up the COVID-19 Support Team (CST) to monitor, investigate, screen, and give assistance to employees and their families so that they can be tested and receive treatment on a timely manner.

In this regard, GC has procured and purchased vaccines and provide vaccination service to all of the employees and contractors to that they can receive the first and second doses of COVID-19 vaccination including the boosters. At the moment, 99% of our employees have received the second dose of COVID-19 vaccine.

Fitness For Work Assessment

GC assessed the health readiness of employees in high-risk jobs, such as those working in confined spaces or high places, fit teams, drivers, and food preparation, according to a health checkup list and criteria for each specific job position. Any employee found to have an irregular result was required to undergo treatment process and re-confirm fitness for work as certified by a doctor. These measures ensured that employees were given better care and from the operation results of the project, we have been able to decrease the number of unhealthy employees who are not ready to work efficiently.

In addition to this program, GC also introduced a digital technology system to protect the health of its employees amid the COVID-19 pandemic and used proactive safety approaches to ensure employee health and wellbeing. Related projects include the Ergonomics Project and the Stress Management Project.

- **Ergonomics Project**

  GC cares for the health of its employees, especially those working from home or use computers at work for over 4 hours a day and are thus at risk of ergonomic issues. To this end, GC has procured software for employee's self-assessment and software which notifies when there is a risk involving employee has been working continuously as well as established an ergonomic standard for office equipment and allowed employees to borrow office equipments to use at home. GC also developed PR materials such as video clips and newsletters to raise awareness of proper ergonomics while working.

- **Stress Management Project**

  Stress Management Project In addition to projects focusing on physical health, GC also places importance on the mental health of its employees. Every employee must take the stress evaluation test before doing the annual physical check-up and for those employees determined as being stressed, GC has implemented activities with psychologists to create awareness and understanding, including monitoring those employees with a high level of stress that could not be resolved by themselves to receive treatment under close medical supervision. Furthermore, it organized the GC Virtual Recreation & Challenge Club (VRCC) activity to foster relations among employees via Facebook Live. In addition, GC also launched a mental health hotline for employees and their families, through which they could consult experts on work and personal matters to cope with stress during the period of social distancing amid the COVID-19 pandemic.

- **RUK HUJAI Project**

  GC placed high importance on health of our employees. We analyzed the physical check-up results of out employees and determined risks from calculating chances of coronary artery disease development within ten years period and risk of other non-communicable diseases. The analysis was conduct on every employee and included following up with the employee to receive treatment, giving exercise advice and medicine monitoring. The project resulted in employees having 25% better health. In this connection, the monitoring will be carried out continuously.

GC has also developed software to enhance the efficiency of its occupational health management as follows.

- **Health Risk Assessment Software**

  The software was created to assess health risks and review work-related illness prevention measures, especially for process operators. In addition, the assessment results could be used to proactively revise employees' health checkup programs and industrial hygiene measures for work areas. The data obtained could also be used to ensure a safer work environment.

- **e-Health Book**

  This technology collects employees' health checkup results and makes them electronically available to employees at all times. The data could also be analyzed to inform the development of future health promotion projects that are suitable for employees.

- **Safety Data Sheet: SDS**

  SDS is a system where employees can quickly and conveniently search and access chemical safety information. It is also now accessible via mobile application.

- **Medical Clinic Service**

  The system collects employees' medical history at a medical facility of the Company. The data obtained through this system could be analyzed to inform future healthcare planning.

GC also regularly organizes health promotional activities for employees and contractors to keep them healthy and enhance their efficiency at work. This is part of organizational development for sustainable business excellence.

3. ENVIRONMENTAL MANAGEMENT

GC strives to become a leader in the international chemical business that integrates green innovation and technology into its operations for sustainable development without impact on the environment, communities, and

society throughout the value chain. GC also aims to become a leader in the management and development of green product design and operates its business in compliance with national and international environmental standards and requirements as well as the National Economic and Social Development Plan No.12 (2017-2021), the 20-year National Strategic Plan (2017-2036), and the Sustainable Development Goals (SDGs) set by the United Nations (UN) in the following ways.

3.1) Strict Compliance with Environmental Standards and Requirements

GC values the prevention of environmental impacts. To this end, it thus puts in place control and protection measures from the design stage before a project begins and carries out a comprehensive environmental impact study covering different aspects of the project to produce a detailed Environmental Impact Assessment report (EIA). GC also strictly complies with measures to prevent and reduce impacts as well as regularly reports the results of the implementation to regulatory agencies. Furthermore, the Company has adopted the ISO 14001: 2015 Environmental Management System as a baseline standard for its operations as well as applied several other international standards, guidelines, and best practices, such as the Guidance on Chemical Risk Assessment of the International Council of Chemicals Association (ICCA) and the water shortage risk assessment using the Aqueduct Water Risk Atlas tools of the World Resources Institute (WRI), etc. Furthermore, external verification on environment related operating results has been carried out every year.

3.2) Proactive Environmental Management (PEM) and Development of Key Performance Indicators for Sustainability

Since 2008, GC has systematically adopted the philosophy of resource management alongside sustainable business operations known as Eco-efficiency from the Manual of the United Nations Conference on Trade and Development (UNCTAD) as an indicator of its environmental performance. The intention is to improve resource efficiency and reduce environmental impacts caused by its activities and production processes in compliance with the BS 8001: 2017 framework of circular economy practices. In tandem, GC has also developed an Environmental Performance Database under the framework of Global Reporting Initiative (GRI) Standards, which is in line with UN SDG 12: Responsible Consumption and Production. GC is Thailand's first petrochemical and refinery organization to continuously conduct greenhouse gas (GHG) emissions accounting and report GHG production and reduction across all plants of its subsidiaries in accordance with the ISO 14064-1 standard.

In addition, GC has developed proactive environmental management plans in operating plants and its surrounding areas by applying the circular economy concept as a basis for driving resource efficiency in the organization to keep the environmental quality above the standard and reduce impacts on the environment and communities. Examples of its activities in this regard are as follow:

- Resource and Waste Management

  GC strives to manage resources and waste according to the concept of circular economy, which places emphasis on maximizing resource efficiency. This initiative begins with the product development stage, in which GC minimizes waste by exchanging leftover products, feedstock, and fuels from production between plants to create added value. GC also raises awareness among all concerned parties, both internal and external, by applying the concept of circular economy and expanding towards a green culture and green resource and waste management, employing the 5Rs (Reduce, Reuse, Recycle, Refuse, Renewable) to reduce waste and maximize resource efficiency across the value chain, and ultimately achieve the goal of zero industrial waste to landfill. These initiatives have been carried out since 2015 and are still ongoing. Moreover, GC has continuously implemented the Green Turnaround Management Project, in which measures have been established to prevent and reduce environmental impacts resulting from the maintenance of machinery and equipment. For example, GC began treating wastewater generating from the cleaning of equipment and machinery during a turnaround in a plant to reduce the amount of water destined for incineration.

- Air Quality Control

  GC has carried out projects to control air pollution in both process areas and fence lines. It has also applied air pollution reduction innovation and technology through collaborations with the public sector and petrochemical operators to maximize efficiency.

Control and Reduction of Volatile Organic Compounds (VOCs)

GC controls and reduces Volatile Organic Compounds (VOCs) at the sources, beginning with the annual inventory of VOCs emission. In case TVOCs exceed GC's internal control limit, that more stringent than the governmental limit, the Company immediately repairs equipment to reduce potential impacts and implements a maintenance program of equipment to minimize VOCs released to the atmosphere. GC has also installed a Vapor Recovery Units (VRU) and Vapor Return Lines to transport the vapors of hydrocarbons which might potentially be released into the atmosphere, and bring them back into the storage tanks for proper usage or management. To further control and reduce VOCs, GC in collaboration with five petrochemical industrial estates and one terminal industrial estate in Map Ta Phut have initiated a pilot project to manage Benzene vapors and 1, 3-Butadiene by introducing Code of Practices (COP), to help solve the release of the chemicals from industrial plants. GC has also applied innovation and technology to the proactive air quality monitoring and control both inside and around GC's sites during day-to-day business conductivity and during turnarounds, while also implementing vapour control measures by requiring the measurement of vapour prior to equipment operation to ensure that it does not exceed our internal control limit which is stricter than the limit stipulated by the applicable laws, including installed scrubbers to extract and draw vapour back to the production process and not being released to the atmosphere, e.g. installing blower to extract and draw vapour into the activated carbon system, to ensure that GC's activities have no impact on the environment and the areas in the vicinity of its sites.

3.3) Leadership in Sustainable Environmental Management

Operating on the basis of sustainability, GC actively prioritizes and drives solutions as well as mitigation of impacts of climate change and water management issues, which have grown increasingly severe, so as to achieve the goal of the Paris Agreement and the United Nations' Sustainable Development Goals (SDGs).

- Climate Strategy

  GC strives to become a world-class leader in the management of greenhouse gas (GHG) emissions as well as support Thailand's GHG targets and the direction of the Paris Agreement under the 26th session of the Conference of the Parties (COP26) of the UN Framework Convention on Climate Change. It has also taken part in affirming its commitment to GHG reduction to meet the United Nations' SDG 13: Climate Action. GC has set a goal to reduce the emission of greenhouse gas to zero (Net-Zero Emission) under both scope 1 and 2 and reduce the emission of greenhouse gas under scope 3 by 50% within 2050 by applying the Circular Economy principle combining with various methods of decarbonization. With regards to its climate policy and continuous climate actions, GC received the highest rating of A in Leadership Level under the assessment framework of the Carbon Disclosure Project (CDP), one of the world's most reliable sustainability assessment institutions – a testament to GC's commitment to climate change management.

- Water Management

  GC strives to contribute to the achievement of the United Nations' SDG 6: Clean Water and Sanitation and focuses on sustainable water management and water crises, both internally and externally, through its One Water Strategy and governance under the

supervision of the Water Management Taskforce and the Supply Chain Management Taskforce to achieve water stewardship, resilience, and maximum efficiency in production. GC also fosters the participation of stakeholders to minimize impacts of water scarcity and maintain an adequate reserve for consumption. As droughts are increasingly intensified by climate change and the demand for water among the industrial sector, the agricultural sector, and communities has been rising continuously, GC's production may be faced with a water crisis, both in terms of amount and quality. In effect, GC assesses water risks to identify water stress areas, using the Aqueduct Water Risk Atlas, so as to reduce the need to draw freshwater from natural sources and decrease water consumption in the production process as well as monitor the water situation in reservoirs and promote water conservation in collaboration with the public and industrial sectors and communities to conserve water and preserve water quality. In addition, GC discloses its water management and impacts in a transparent manner, in line with the international requirements of the GRI Standards and CEO Water Mandate. As a result, GC has also been awarded, for the second consecutive year, the highest rating of A in Leadership Level under the assessment framework of the Carbon Disclosure Project (CDP) for its commitment to water security initiatives.

- Product Stewardship

  GC seeks to operate a customer-centric business and create green products that are safe to consumers and in line with the concept of circular economy, while also taking into account social and environmental impacts throughout the product life cycle so as to meet consumer needs, elevate the quality of life, and foster sustainable growth. As a result of climate change and the COVID-19 pandemic in the previous years, customer behaviors and needs shifted towards products that were safe for health and the environment. In response, GC developed products to cater to the needs of customers and consumers by adopting the Eco-design Guidelines and the Eco-design Criteria, based on the ISO 14062 standard, along with the principle of product life cycle assessment to minimize social and environmental impact across the value chain. Furthermore, GC established the B-to-B Touch C Plan with the goal of creating value to products in accordance with the concept of circular economy and making such value accessible to consumers (C) through business-to-business collaborations (B-to-B) between converters and brand owners as well as partners across the value chain. In addition, GC developed a strategic plan for product stewardship to serve as guidelines for its product development. Under this plan, GC takes into account environmental impacts and increases the safety of the products through its life cycle by conducting a Life Cycle Assessment (LCA) for all products so as to better serve customer needs for environmental friendly products in the future. In addition, all GC Group's products have been certified with the Carbon Footprint of Products (CFP) and Carbon Footprint Reduction (CFR) label from the Thailand Greenhouse Gas Management Organization (Public Organization) (TGO) under the Ministry of Natural Resources and Environment. GC also has also encouraged all companies under GC Group to have all their products certified with the Water Footprint label by the Water and Environment Institute for Sustainability, the Federation of Thai Industries.

  Furthermore, GC has been selected as the first piloting company to apply for Carbon Footprint of Circular Economy Product (CE-CFP) Certification in Thailand to promote an increase of the manufacturing of products following circular economy principle using resources efficiently and result in a reduction in greenhouse gas emission both on the industry level and national level, and serve as a mean to increase the ability of Thai industry to compete in the global market and get ready to face trading measures on a long-term basis both at ASEAN level and international level.

3.4) Expanding Sustainable Environmental Management to GC's Networks

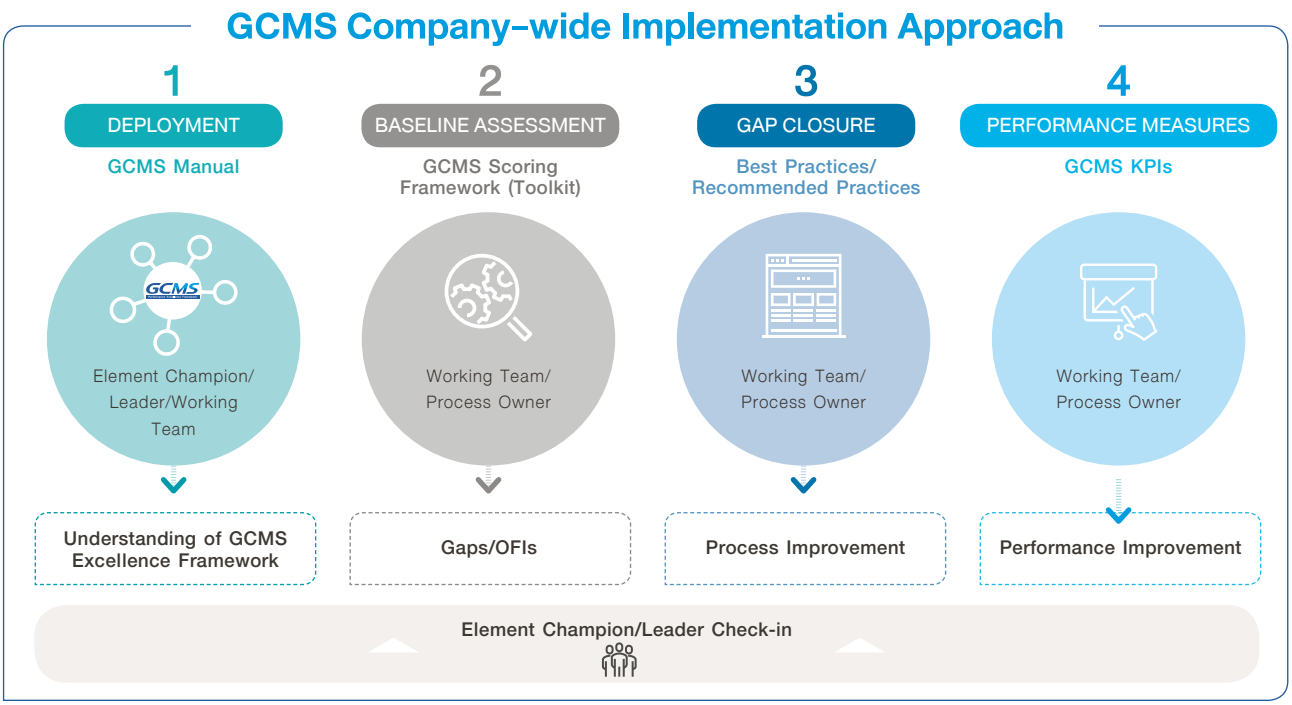
GC has integrated environment management by cooperating with stakeholders both within and outside the organization. GC has set up environment working team comprising environment specialists of the Group Company to work as a strong network on environment management, as well as cooperating with the government sector on national projects, for example, cooperating with the government agency and petrochemical business operator in Map Ta Phut area to formulate the Code of Practice to control Benzene, 1,3-Butadiene and was selected a model to participate in and develop the Zero Waste to Landfill standard enhancement project of the Department of Industrial Works to set national standard for industrial business operators.

Due to its initiatives to expand its sustainable environmental management across its networks in all sectors, all of GC's plants have been certified Eco Factory by the Federation of Thai Industries since 2015 and obtained the Green Industry Level 5 certificates from the Ministry of Industry since 2016. This highest level of certification demonstrates GC's commitment to becoming a green network leader.

As a result, in 2021, GC earned the top score for environmental management in the Dow Jones Sustainability Indices (DJSI) in the chemical business category for the third consecutive year in addition to being awarded the highest rating of A in Leadership Level for both climate change and water security management based on the assessment framework of the Carbon Disclosure Project (CDP). These accolades not only testify to GC's success in incorporating into account quality, safety, occupational health, and environmental concerns into its business operations but also demonstrate its leadership in the chemical industry and its position as an innovative organization with social responsibility and the aspiration to elevate the quality of life as well as a model for cultivating awareness and promoting the adoption of relevant practices to achieve tangible results in a sustainable manner.

4. GC MANAGEMENT SYSTEM (GCMS)

In 2019, GC successfully developed GC Management System (GCMS) under the Baldridge Performance Excellence Framework and integrated applicable requirements from other international management system standards. GC has deployed and implemented GCMS as a pilot in Corporate Functions and two Business Units, namely EO-Based Performance (EOB) and Group Performance Center-Utilities (UTY). In 2021, GC continued implementing GCMS in all Business Units and Corporate Functions based on the following GCMS Company-wide Implementation Approach:



1. Deployment: communicated and delivered training to build understanding of GCMS contents to relevant staff and managements.
2. Baseline Assessment: conducted Baseline assessment using GCMS Scoring Toolkit to analyze and establish gap closure plan to improve processes and performances according to GCMS requirements.
3. Gap Closure: implemented Gap Closure Plan for process and performance improvement.
4. Performance Measures: measured and monitored all required KPIs to ensure continuous improvement of their effectiveness.

According to the GCMS implementation plan, GC will use GCMS as a framework for internal assessment in 2022 and will expand to GC's subsidiaries from 2023 onwards.

(3) IT Governance

GC adopted GCMS, which is its integrated management system, as well as COBIT 5 (IT Framework), TQA (Thailand Quality Award) and GC Way of Conduct as frameworks for establishing its IT standards, which place emphasis on various aspects of IT systems, namely the quality, security, and availability of data and information, the specifications of hardware and software, cybersecurity, and availability in case of emergency. The management is divided into three levels as follows:

Governance Level

- GC Group's Digital and IT Steering Committee (DISC) is responsible for defining the group's digital and IT direction, policies, and goals to ensure uniformity and the level of standard comparable to that of leading international companies in the same industry, with the Chief Executive Officer and President serving as the chairmen of DISC.
- The Digital & IT Investment Management Committee (DIM) consists of DIM1, responsible for reviewing investments worth over Baht 10 million but not exceeding Baht 300 million, and DIM2, responsible for reviewing investments worth under Baht 10 million.
- The Information Safety and Security Committee (ISMS Committee) is charged with ensuring that GC's information security, cybersecurity, and cloud security are consistent with international standards.
- The Enterprise Architecture Committee (EA Committee) is charged with the management of the Company's IT structure to ensure its alignment with usage requirements and currency as well as maximum benefits in use.
- The Chief Information Security Officer (CISO) has duties to set target and security maintenance policies to be in line with the strategies and plans of the Company, develop IT security policies, standards, procedures and guidelines to ensure that the Company can maintain confidentiality of information, integrity of information and IT system availability, and controlling and reporting cyber attack incidents to the Executives and the National Cyber Security Agency.

Management Level

- Establishing data and information management policies, such as information security (IS), cybersecurity policy, cloud security policy, and service level agreement (SLA), Secure System Development Life Cycle (SSDLC) and Data Protection.
- Adopting the ISO Series (ISO 27001, ISO 27701 and ISO 22301) as compliance framework and control for users to ensure the accuracy and availability of data and information; and introducing internal and external audit systems to the audit and review of its processes to ensure the accuracy, reliability, and integrity of the data and information.

Operation Level

- Establishing systems, procedures, and services for users; publishing and storing them on the internet as reference for users; and sending out IT updates via email every two weeks, except emergencies, for which users will be given an immediate notification.
- Tracking progress and using the results to further improve the Company's IT management and services; overseeing and keeping IT security up to date; and reporting progress to Executives and responsible Sub-committees regularly.
- Assessing IT resource risk every year to ensure the resources are sufficient to protect the accuracy, integrity, reliability, and currency of data and information.

Additionally, GC has carried out the following activities in relation to IT management:

- *Data and Information Security:* GC has implemented a data and information security system that uses ISO 27001 as framework. A real-time monitoring system is also employed to review risks related to IT threats on a monthly basis.

- *Data and Information Availability:* GC has established data and information usage plans in line with its corporate strategic plans and surveyed the needs of all business groups to formulate IT strategic plans. In addition, a data recovery site (DR Site) has been set up for 24-hour backup of important information, which can be readily retrieved. The Company has also formulated disaster recovery plans for the main data system in accordance with business continuity management standards (ISO 22301), along with recovery procedures for handling an emergency that impacts the main data system. Additionally, IT Disaster Recovery Drills are conducted every year.

- *Standard Control and Specifications of Hardware and Software:* GC has introduced policies to control hardware and software standards, which require, for instance, the replacement of IT equipment every three years; quarterly preventive maintenance; the installation of a server monitoring system that notifies administrators via SMS and email upon detecting irregularities for prompt troubleshooting; annual vulnerability assessment and remediation; the installation and regular updating of antivirus software in server and client computers; as well as daily, weekly, and monthly data backup.

- *Information Security and Safety:* GC has implemented various measures, including the identification of key information assets according to ISO 27001 and ISO 22301 and risk assessment for safety planning. The Company has also established relevant policies, compiled handbooks, installed defense systems, and appointed a cyber response team to cope with cyber attacks, examine damage, and initiate recovery according to the cyber security incident procedure, as well as fostered a cybersecurity culture and cultivated cybersecurity awareness in all employees.

(4) Use of Internal Information

An Internal Information Use Policy has been established and included in the Corporate Governance and Business Code of Conduct Handbook. It has also been published on the Company's website for shareholders' ready access. Directors, Executives and employees are constantly reminded to strictly comply with the policy, and must not disclose any internal information received from performing their duties to anyone or use such information to seek profits or benefit from unlawful trading of security or causing the Company to lose benefits either directly or indirectly. The details of the policy appear under "Prevention of Internal Information Use" of "Policy and Practices Related to Shareholders and Stakeholders."

In 2021, it was not found that any Directors or Executives traded securities during GC's blackout period. Changes in the shareholding of the Board of Directors, their spouses, and their minors appear under Key Information on the "Board of Directors" and "Executives".

(5) Prevention of conflicts of interest

GC prioritizes the interests of the Company and its stakeholders in its business operation as an important policy and has thus established best practices to demonstrate its commitment to transparency and accountability. Under these practices, it is the duty of GC's Directors, Executives, and employees at all levels, including related persons, to avoid involving in a conflict of interest or acting in such a matter that may bring about a conflict of interest. In case such avoidance is impossible, responsible units must supervise the transaction to ensure its transparency and clarity for the best interests of the Company.

In this regard, GC has set standards and guidelines for performing of duties and engaging in other activities which may give rise to stake or conflict of interest, as follows:

1. Refrain from any action that will cause one to have stake or conflict of interest with the Company either by contact with trade partners of the Company, take opportunity, or use information received by being employee of the company to seek personal benefits and engage in business which competes with the Company or engage in other work outside of the Company affecting work of the Company.
2. In case the Company's employee or its related person is obligated in transaction with the Company for the benefit of the Company, the undertaking of such transaction must be on an arm's-length basis with normal commercial terms.
3. The consideration and disclosure on stake, connected transaction or conflict of interest must be carried out strictly and carefully in accordance with the applicable laws and regulations of the Security and Exchange Commission and the Thailand's Stock Exchange whereby the Directors, Executives and/or employee having conflict of interests must not be included in the consideration of the transaction and, if it is necessary for such person to provide information and details for consideration, such person shall not vote nor give any opinion in the consideration approving the entry into such transaction for independency of the consideration.
4. An entry into business transaction must be carried out with honesty, trustworthiness, reasonability and independency within the scope of corporate governance and taking best benefit of the Company into consideration.
5. In case there is an undertaking or circumstance that may cause or deem to give rise to conflict of interest with the Company, a written report on the aforesaid transaction in the form specified by the

Company or via electronic means must be filed to the supervisor and the business supervision department of GC immediately to initiate consideration process to determine whether there is conflict of interest against the Company and what further process should be.

In addition, GC place importance on reporting action either in the case where there is incident leading to conflict of interest or not by requiring reporting duty every year and during the year if there is any occurrence of a conflict of interest incident.

GC's activities for the prevention of conflicts of interests in 2021 are summarized below:

- GC conducted follow-ups and successfully achieved 100% submission of annual conflict of interest disclosure reports by GC Groups' Executives and employees through its system.
- The Internal Audit function conducted an audit of GC's procedures and communications related to the disclosure of conflicts of interest and found that they were in compliance with relevant regulations.
- To enhance the internal organization supervision, in 2021, the Company has reviewed workflow in the Related Party Transaction to be in line with the current operation and regulations and procedures stipulated by the notifications of the SEC and SET on Related Party Transaction.

(6) Anti-Corruption

The GC group has objectives and focusing on carrying out the business by emphasizing anti-corruption efforts, GC also strives to comply with laws against fraud and corruption as well as bribery of both Thai and foreign public officials or officers of private organizations. The Company also seeks to cultivate anti-corruption consciousness in its employees at all levels to combat corruption of all forms.

The Board of Directors has developed anti-corruption policy and included them in the Corporate Governance Handbook and Business Code of Conduct to ensure that Group Company observes the established policies and to serve as policy to which Directors, Executives, employee, contractor and any person that acts for the benefit of the company can hold on to as a standardized operation. Any violation of law is considered wrong and against GC's policies and will result in disciplinary action and punishment according to applicable laws.

Principles

Directors, Executives, employees, contractors and any other person acting for the benefit of the Group Company has duties to follow the applicable laws, rules, regulations on anti-corruption, as well as the Corporate Governance and Business Code of Conduct Manual, policies, rules, practices and guidelines of the Company, perform their duties with transparency, refrain from any act which could be perceived as intentional fraud or corruption, be prohibited from asking for, undertaking or accepting corruption for one's own and/or related persons' benefits including friends and acquaintances, and be ready for examination on the performance of duty by auditor or the competent authority at any time. In this regard, the subsidiaries may consider to adopt such and operational measures of the Company to use in its operation as appropriate.

Operation Measures of the Company

1. GC has established the Anti-corruption promotion working team whose duty was to ensure that the operation of the Company upholds the principles according to the Anti-corruption measures arbitrary to and in accordance with the Company's commitment to become a member of the Thai Private Sector Collective Action against Corruption (CAC).
2. GC has procedures to review, examine and improve the Anti-corruption measures and report it to the Corporate Governance and Sustainability Committee annually in order to measure efficiency, improve and develop the measures to be included with the changing corruption risks.
3. GC has carried out the corruption risks evaluation and set up protective measures for operational control, environmental control and financial control, all of which documents has been observed.
4. GC has guidelines to assure the internal control relevant to the process for recording financial report, account book preparation and the maintaining of information. Any materiality of control weakness impact financial report will be reported to the Board of Directors.
5. GC is politically neutral and does not have policy to provide financial supports, resources or other properties either directly or indirectly to politicians or political parties or other political groups for the benefit of such politicians or political parties or groups.
6. GC does not have policy to make any facilitation payment to ease its business activity neither directly nor indirectly. This extensively includes any action or neglect of action considerable as unethically easing business activities.

7. GC has established criteria for government officer procurement appropriately and clearly in order to protect and ensure that the process is not considered as plausible for beneficial exploitation and has established measure to disclose any information relating to the procurement with any government agency to the general public for transparency.
8. GC has Human Resource Management Policies and procedures relating to the nomination and selection, work evaluation, consideration, and promotion of its staff which reflect the intention on anti-corruption principles.
9. GC has announced publicly to its employees that it will not relegate, discipline or cause any adverse effect on staff who refuses to be involved in fraud or corruption even though such refusal will cause GC Group to lose business opportunities.
10. GC provides trainings on anti-corruption measures and to give related information to the GC group's employees continuously.
11. GC has communicated its policies on anti-corruption and fraudulent acts and practices to its subsidiaries, affiliates, companies in which GC has controlling power, customers, suppliers, business partners and stakeholders, as well as to the general public through various communication channels in order for them to be familiar with the topic and can comply with the anti-corruption measures.
12. GC has adopted guidelines on anti-corruption and fraudulent acts regarding gifts, entertainment and other benefits (i.e., No Gift Policy) of the GC Group for the employees to adhere and act accordingly.
13. The implementation of the policies on anti-corruption and fraudulent acts is in accordance with the guidelines specified in the Corporate Governance and Business Code of Conduct Manual including other regulations, policies, rules and guidelines put in place by the Company.
14. GC reviews the policies on anti-corruption and fraudulent acts every three years in accordance with the preparation for obtaining the certification of member of Thai Private Sector Collective Action Against Corruption (CAC) or any other period as appropriate and in accordance with the amendments of applicable laws, regulations and rules whereby the amendment will be proposed to the Board of Directors for consideration and approval.

Disciplinary Measures

1. GC has put in place disciplinary measures for Directors, Executives and Employees who does not comply with the policies on anti-corruption and fraudulent acts which include discharging Director from office and other disciplinary actions in accordance with the rules on disciplinary measures for Executives and employees, as well as taking legal actions in accordance with the applicable laws, rules, regulations and corporate governance practices relating to such act.
2. In case that any person related to the GC group or any customer, supplier or business partner does not comply with the anti-corruption measures, the GC group may consider to terminate any transaction with such person.

GC demonstrated its intention to join the Thai Private Sector Collective Action Against Corruption (CAC) on July 18, 2012 and was first certified as a member on July 4, 2014. It has been re-certified for the third time on June 30, 2020.

In 2021, GC carried out activities that demonstrated its commitment to anti-corruption efforts. A summary is provided below.

- Making amendment to the anti-corruption policies and guidelines to be in line with the CAC checklist (updated version 4.0) issued by the IOD.
- The Anti-corruption promotion working team has cooperated with the relevant and responsible departments to review the status of anti-corruption policy compliance of the Company in order to update information on any corruption related risks which are important to the business, including measures and other supplement documents so that they are in accordance with the CAC checklist (totaling 71 items) and are up-to-date.
- Putting in place the automated CAC checklist system to develop self-assessment system for CAC Checklist to be on a digital platform which causes the working process to be more efficient, take less time and reducing any human error in compiling information.
- Supporting Company's Subsidiaries to apply for CAC's member certification by providing guidance and advice on making intention on becoming a member of CAC as well as provide training on anti-corruption measure self-assessment.
- Providing training, knowledge and communication on the topic continuously.

Internal Activities

- Providing training on "ACPG Anti-Corruption & Working Paper" to the Anti-corruption promotion working team to build understanding on self-assessment pursuant to the CAC checklist (version 4.0) and the making of working paper, by Mr. Pana Ratanabanangkoon, the director of the CAC and Ms. Wilaiporn Ittiwiroon, partner of the audit department of EY Office Company Limited.
- Providing training on "Ethical Leadership: Turning Ethic into Action (2021)" to department managers of the GC Group via UP e-Learning system, by Asst. Prof. Dr. Opas Kitkumheang, the dean of Business Management Faculty of Siam Technology College to build awareness on roles of leaders in performing duties and making responsible and ethical decisions.
- Providing training on "Anti-Corruption Program: Strengthening Action Against Fraud & Corruption" to department managers of the GC group to create understanding on theory and definition of corruption, corruption related risk assessment and appropriate internal control system, by Prof. Vicha Mahakun and Mr. Tossaporn Rattanamastip from the Thailand's Anti-Corruption Academy, Rangsit University via Microsoft Teams application.
- Providing training on "Ethical Leadership for New Era" to the Executives to build awareness on the importance of leaders of organizations to carry on business with ethics, to learn about challenges of business operation in current situation and in the future and guidelines for making importation decisions relating to the organization by Dr. Narumol Sinhaseni, senior executive vice president of MC Group Public Company Limited via Microsoft Teams application.
- Providing mandatory training on "Hook Acknowledgement and Learning" via e-Learning system to employees at every level to learn about corporate governance supervision, compliance with law, rules and regulations and the Company's business code of conduct.
- Putting in place communication on conflict of interest matters, receiving of complaints and protection measures for tips providers and those who cooperate with the process to make awareness among Executives and employees upon the importance of whistleblowing and enhance confidence to provide tips via the provided channels and to create understanding of the procedures and protection measures related to the process. (details of which can be found under "Whistleblowing" section).
- Communicating business code of conduct of the Company every month (i.e., "Tone at the Top" and "Hook Talk", during TownHall and other meetings of the Company.)

External activities with stakeholders

- Participating in CAC Change Agent Program on September 16, 2021 to expand network of transparent business to supplier whereby the Company has communicated and emphasized on the anti-corruption policies and guidelines of the GC group, as well as promoting suppliers to apply for membership of CAC in the Supplier conference which is being held every year. The satisfaction evaluation result from the suppliers who received the communication in 2021 was at 90.2%.
- Informing all business partners of guidelines on the No Gift policy of the GC group which include no asking for/accepting gifts, presents, entertainments and other special treatments from business partners to avoid any act which may lead to discrimination or conflict of interest and to jointly maintain working standard of transparency and efficiency.
- Informing people outside the company of the no gift policy by publicizing clearly on the website of the Company and setting up noticeable information board within the office areas especially at the contact points.
- Putting in place channels which people outside the company can make contact and ask questions in case they have any questions or suggestions relating to corporate governance and business code of conduct which they can send the matter to the corporate governance's E-mail at cg@pttgcgroup.com.

- Participating in activities with external organization, for example:
  - Participating in the 2021 Anti-corruption Day online activities held by Anti-corruption organization via online platform on September 6, 2021.
  - Participating in and showing GC Group's spirit in proclaiming its intention to carry out business with transparency and corruption-free in the

2021 Anti-corruption Day online activities held by the Office of the National Anti-corruption Commission on December 9, 2021.

- Putting in place channels for making reports on violation of anti-corruption policies or corruption act and putting in place protection measures for the report makers (details of which can be found in "Whistleblowing" section).
- Preparing summary report on operation results of anti-corruption measures in order to monitor anti-corruption operation result and proposing the matter to the Sub-committee, i.e., the Corporate Governance and Sustainability Committee and the Audit Committee for their acknowledgement and provide a summary report to the shareholders in the 56-1 One Report.

(7) Whistleblowing

GC recognizes the important roles of all stakeholders in its Corporate Governance. Whenever they witness any violation of the Business Code of Conduct, any form of fraud and corruption, or any other case, they may submit a report, notification, or complaint directly to either the Chairman of the Corporate Governance and Sustainability Committee, the head of Internal Audit, Executives or the Company Secretary, or via the provided complaint channels the Company has put in place, or any other channels that they trust.

Chairman of the Corporate Governance and Sustainability Committee Head of Internal Audit Executives or Company Secretary	: PTT Global Chemical Public Company Limited 555/1 Energy Complex, Building A, 18th Floor Vibhavadi Rangsit Road, Chatuchak Bangkok 10900
E-mail	: whistleblower@pttgcgroup.com
Website	: www.pttgcgroup.com

Whistleblowing Policy Procedure

GC has formulated and announced the following Whistleblower Policy Procedures:

(1) Complaint Screening: The responsible department screens the essential information under the established policy. Even anonymous complaints will also be considered if they provide clear reasons and sufficient evidences. If the whistleblower has provided his or her name or contact information, he or she will be notified by the Company.

(2) Investigation: For valid complaints, CEO will appoint an investigation committee under the Company's work regulations to conduct an investigation and fact-finding as well as to determine disciplinary action according to the Company's regulations so as to ensure fairness to all parties.

(3) Reporting: Once the complaint has been dealt with, the whistleblower will be notified of the outcome if the contact information is provided. The outcome will also be reported to the Corporate Governance and Sustainability Committee and the Audit Committee.

Whistleblower and Witness Protection

Whistleblowers or witnesses who collaborate in the investigation will be provided with the following protections under the Whistleblower Policy:

(1) A whistleblower, a stakeholder, or any person who cooperates in good faith in the investigation will be protected from retaliation (non-retaliation).

(2) Information of the whistleblower or of any persons involved will be classified as confidential according to GC's regulations on information

(3) The Company will provide suitable mitigation measures to the whistleblower or the affected party.

Complaint Statistics

In 2021, the Company received a total of 117 complaints under 7 categories as follows:

Category	Number of Complaints	Progress
Voice of Customer	84	• 80 cases have been resolved. • 4 cases under process
Voice from Community	11	11 cases have been resolved.
Employee	12	12 employment termination
Safety, Occupational Health and Environment	-	-
Business Code of Conduct	7	• 4 cases with no violation. • 2 cases with violation • 1 cases under process
Discipline or non-comply	2	• 1 case with no violation • 1 case under process
Fraud or corruption	1	1 employment termination

Audit Committee Report

The Audit Committee has held the meetings, the details of which are as set out in "Meeting Attendance and Remuneration of Individual Directors".

In this regard, details of the performance of the Audit Committee in 2021 are as set out in "Audit Committee Report".

Summary of Other Sub-committees' Performance

Other Sub-committees of the Company consist of the Corporate Governance and Sustainability Committee, the Nomination and Remuneration Committee and the Risk Management Committee had held meeting, the details of which (include number of meetings and meeting attendance of each member) are as set out in "Meeting Attendance and Remuneration of Individual Directors".

In this regard, details of the performance of other Sub-committees in 2021 are as set out in "Report of the Corporate Governance and Sustainability Committee", "Report of the Nomination and Remuneration Committee" and "Report of the Risk Management Committee".

AUDIT COMMITTEE REPORT

PTT Global Chemical Public Company Limited, GC, has appointed the Audit Committee and engages the Internal Audit Function to provide assurance and support to the business activities of GC to assure of good corporate governance, adequate risk management and internal control, and compliance with business-related laws and regulations.

The Audit Committee is composed of and with qualifications consistent with the announcement of the Capital Market Supervisory Board, comprising 3 independent directors with in-depth expertise and rich experience in accounting or finance, law, etc. The Audit Committee independently and fairly executes its duties as prescribed by the Audit Committee Charter and as assigned by the Board of Directors, in alignment with the announcement of the Stock Exchange of Thailand and Good Governance practices of the Securities and Exchange Commission.

The Audit Committee continues to focus upon the further uplift of quality of internal audit works to enhance the confidence of and create added value for the organization while taking into account the needs of stakeholders in all aspects, namely:

- Conceptually approve internal audit supervision principles and guidelines, through Assurance services as well as continually promoting the Consulting role in Good Corporate Governance, Risk Management and Internal Control systems that are adequate and appropriate, and support the achievement of domestic and international corporate objectives.
- Accentuates the continual improvement and uplift of the quality of the internal audit. In 2021, internal audit works have been assessed in quality against International Standards for the Professional Practice of Internal Auditing which required that external independent assessors be engaged every 5 years to perform a quality assessment and deploy recommendations and best practices to improve and uplift the quality of the internal audit.
- Spotlighting the significance of managing Cybersecurity Risks that could impact the security and stability of the Company's Information and Operations Technology Management System, through monitoring and assessment for adequacy of control measures and preparations for readiness to handle and respond to probable Cyber threats.
- Support the utilization of technology in internal audit in preparation for the internal audit transformation via Data Analytics and Detection Rule design to enable timely detection of anomalies in operations.
- Foster the development of required skills essential for the performance of internal audit via Re-skilling and Up-skilling in Data Analytics and Data Visualization, to increase the capability and potentials of the Internal Audit Function whilst uplifting internal audit quality to add value to the organization.
- Enhance Corporate Governance to drive the organization towards sustainable growth by advocating the Internal Audit Function's role in providing assurance and consultation on Sustainability as well as the disclosure of Sustainability information in a transparent and trustworthy manner to all stakeholders.

In 2021, 9 Audit Committee meetings were held, from which major activities of the Audit Committee can be listed as follows:

1. Review of financial reports

The Audit Committee reviewed material information of the quarterly financial statements and the annual financial statements, including the review of transactions that may pose conflicts of interest among business groups. They also reviewed material issues, special items, and other significant matters that includes the clarification from the auditor and the Management, to ensure that the financial statements are correct, complete and trustworthy and that the disclosure of the notes to financial statements are adequate, useful, and properly meet the financial reporting standards and legal requirements. The Audit Committee thus approved the financial statements—which the auditor has reviewed and audited—without any condition.

Additionally, the Audit Committee held an exclusive meeting with the auditor without the presence of the Management, to independently discuss the obtaining of information, the audit of material information in the preparation of the financial statements, Key Audit Matters from the audit of the financial statements, and independence in performance of duties. The auditor received full cooperation from the management in the review of the financial reports and did not have any material observations nor discover suspicious circumstances.

2. Review of risk management

The Audit Committee acknowledged the organization's risk management report as presented to the Board of Directors meeting, and from the review of Risk Management together with the audit reports of the Internal Audit Function, to ensure that the company efficiently manages key risk factors that may affect the Company's operations, has a designated responsible party, and has adequate measures to support and cover all short and long term risk factors.

3. Review of internal control

The Audit Committee performed an internal control review based on the internal audit report and the report on the implementation of the recommendations from the Audit Committee conducted by the management, and also reviewed the internal control in accounting and finance based on the audit and review from the auditor. There were no significant issues nor deficiencies that may affect the financial statements. The Audit Committee also reviewed the adequacy and appropriateness of the internal control system utilizing the Securities and Exchange Commission (SEC) assessment form as completed by the Management. There were no significant issues or deficiencies that may affect the Company's main objectives. It is thus reasonable to believe that the Company has an adequate and appropriate internal control system for business operations that is able to support the operations of the company and achieve the specified objectives and goals.

4. Review of good corporate governance

The review of corporate governance was performed through scrutiny of reports summarizing the complaints from stakeholders of GC and subsidiaries, and reports on the implementation of anti-corruption measures. Emphasis was also placed on compliance with the Stock Exchange of Thailand's requirements for the disclosure of sufficient information that will ensure that business operations are carried out in accordance with the corporate governance principles to sustainably create value for the business. Additionally, the Audit Committee has also promoted and encouraged group companies to join Thailand's Private Sector Collective Action Coalition Against Corruption (CAC) project and also supported the company in implementing additional novel anti-corruption measures on top of activities stated in the updated version 4.0 of the Self Assessment Form, to instill confidence in the stakeholders.

5. Supervision of internal audit

The Audit Committee has overseen that the internal audit activities are independent and efficient, and that there a quality assessment of the internal audit according to International Standards for the Professional Practice of Internal Auditing. Furthermore, they also reviewed and approved the Internal Audit Function Charter, the strategies and goals of the Internal Audit Function, the Annual Audit Plan, the assessment for sufficiency and adequacy of human resources and budget, as well as acknowledging the internal audit reports, providing recommendations and following up key audit matters.

6. Review of compliance with applicable laws

The Audit Committee has reviewed the Company's business operations on compliance with the regulations on securities and exchange requirements of the Stock Exchange of Thailand, laws and regulations in industrial works, environment, and other laws related to the Company's business operations, through the internal audit reports of the Internal Audit function. They also mandated the follow up of new laws that will become effective in the future that may affect the Company in domestic operations and overseas investment locations.

7. Appointment of auditors

The Audit Committee has selected and proposed the appointment of the auditors based on the qualifications, namely knowledge, experience in business auditing, audit approach, performance, and independence of the auditor in accordance with the professional ethics in auditing as required by the Federation of Accounting Professions and according to the regulations of the Securities and Exchange Commission, and appropriate audit fees. The Audit Committee will propose the appointment of the auditor to the Board of Directors for consideration and approval which shall be presented in the General Meeting of shareholders.

In 2021, the shareholders approved the appointment of Deloitte Touche Tohmatsu Jaiyos Audit Company Limited as the Company's auditor for the year 2021.

8. Consideration of connected transactions or transactions that may lead to conflicts of interest, in accordance with the laws and regulations of the Stock Exchange of Thailand

The Audit Committee has reviewed and remarked on connected transactions or transactions that have or may have conflicts of interest with the Company, based on the principles of justifiability, transparency, adequate disclosure of information, and in the best interest of the Company and the shareholders and also oversaw that the disclosure of information was completed, accurate and adequate in accordance with the stipulations of the Stock Exchange of Thailand. In 2021, there were no significant connected transactions or transactions that deviate from the contract conditions that required disclosure of information according to the regulations of the Stock Exchange of Thailand. The review of the internal audit report on connected transactions reported that no significant issues were found to affect the achievement of the organizational objectives. Moreover, the Audit Committee did not receive reports on irregularities from the auditor on connected transactions.

9. Other matters

The Audit Committee performed the annual review of the Audit Committee Charter for alignment with the principles and guidelines specified by the Securities and Exchange Commission and reported its performance to the Board of Directors periodically. Furthermore, the Audit Committee completed individual and collective performance assessments and reported the results to the Board of Directors for acknowledgment, as a further enhancement of the performance of the Audit Committee.

The Audit Committee has thoroughly fulfilled their duties and responsibilities as stated in the Audit Committee Charter and as prescribed to them by the Board of Directors whilst adhering to the principles of righteousness, thoroughness, independence, all the while being mindful of equitable treatment to all stakeholders.

The Audit Committee is thus of the opinion that the Company has an accurate and reliable accounting and financial reporting system, adequate information disclosure, compliance with Generally Accepted Accounting Principles and Financial Reporting Standards, compliance with laws and regulations related to the Company's business operations, with good corporate governance, adequate risk management and appropriate internal controls for business operations, a good internal audit system, diligent monitoring of the various changes in preparation for the confrontation of all current and future risks.

Lastly, in performing the duties of the Audit Committee throughout 2021, excellent collaboration from the Board of Directors, Executives, auditors and all concerned parties were received. The Audit Committee would like to take this opportunity to express thanks and appreciation to all.

On behalf of the Audit Committee

(Signed) Apisak Tantivorawong

(Mr. Apisak Tantivorawong)
Chairman of the Audit Committee

REPORT OF THE CORPORATE GOVERNANCE AND SUSTAINABILITY COMMITTEE

Dear Shareholders,

In 2022, the Corporate Governance and Sustainability Committee comprised of its Chairman, Professor Somkit Lertpaithoon and its Committee members, namely Lieutenant General Nithi Chungcharoen, Mrs. Watanan Petersik, Mr. Chansin Treenuchagron, and Mr. Noppadol Pinsupa. The Committee performed its duties as stipulated by the Corporate Governance and Sustainability Committee Charter and executed tasks as assigned by the Board of Directors. The Committee held a total of five meetings. A summary of its activities is provided below.

1. Ensuring Compliance with Requirements, Laws, Rules, Regulations, and Best Practices

- Overseeing and monitoring GC's corporate governance to ensure compliance with international standards and criteria set forth by domestic regulatory agencies.
  - Overseeing the preparation of the 2021 Annual General Meeting of Shareholders (AGM) and Extraordinary General Meeting (EGM) No. 1/2021 during the COVID-19 pandemic to ensure compliance with announcements, orders, and measures issued by the government, applicable laws, corporate governance principles, and best practices. To this end, GC received a perfect assessment score of 100 on the 2021 AGM checklist, with a rating of Excellence, from the Thai Investors Association (TIA).
  - Setting guidelines for establishing criteria providing opportunity for shareholders to propose the meeting agenda and nominate any person for election as Director of the Company in advance of the 2022 Annual General Meeting of Shareholders.
  - Supervising the Company's disclosures to ensure complete details in accordance with the criteria stipulated by the regulators, i.e., the 56-1 One Report, report on integrated sustainability and on the Company's website. As a result, in 2021 GC continued to receive the "Excellent" rating on the Corporate Governance Report of the Thai Listed Companies (CGR) of Thai Institute of Directors Association (IOD).
  - Monitoring and giving advice on receiving corporate governance operation assessment result from regulators both in Thailand and overseas, i.e. ASEAN Corporate Governance Scorecard, Corporate Governance Report of Thai Listed Companies (CGR) of the IOD, and AGM Checklist.
  - Reviewing the appropriateness of the adoption of the Corporate Governance Code for Listed Companies 2017 (CG Code), providing comments and suggestions to the Board of Directors to improve and develop their performance of duties in accordance with the business situation and context, and disclosing relevant information in Form 56-1 One Report.
  - Supporting the Company to become CAC Change Agent to expand transparent business network to cover suppliers and monitoring the progress of becoming a member of CAC.
- Overseeing the operation of GC and its subsidiaries to ensure corporate compliance. The Corporate Governance and Sustainability Committee supported the establishment of Compliance Universe, a compilation of relevant laws that process owners could use to inform the impact and likelihood compliance risk assessment.

- Overseeing complaint handling through the Whistleblower channel to ensure compliance with the Whistleblower Policy, monitoring complaints filed through other channels with respect to shareholders and investors, the environment, communities, and customers through quarterly reports, and encouraging other companies in GC Group to establish their own whistleblower system.

- Promoting the implementation of integrated organization management which include corporate governance, risk management and internal control and compliance (GRC).

2. Ensuring Compliance with Corporate Governance Policy and Business Code of Conduct

- Monitoring and supervising the corporate governance work of the Company to be in accordance with the Corporate Governance and Business Code of Conduct Manual and policies, in line with strategies and business direction of the company, and promoting the development of the Company's corporate governance in various aspects, e.g., updating policies and guidelines on anti-corruption in according to CAC Checklist (version 4.0), updating the complaint receiving policies to cover human rights issues in accordance with the criteria of Dow Jones Sustainability Indices (DJSI) and promoting the use of digital platform to help increase the work efficiency in response to the new working style of the Company (i.e., smart governance), etc.

- Overseeing, monitoring, and promoting the development and improvement of GC's corporate governance practices under GC Way of Conduct to standardize practices across GC Group and improve propriety and alignment with the business context of each company.

- Reviewing policies and practices in the Corporate Governance and Business Code of Conduct Handbook to ensure that they are au courant, compliance with domestic and international standards, and fitting for application across the organization.

- Commenting and advising on anti-corruption measures and corruption risk assessment in GC's procedures, and approving GC's anti-corruption plan for 2022, to ensure its clarity and plausibility for GC's business context, and in line with relevant regulations, such as the criteria issued by Thai Private Sector Collective Action Against Corruption (CAC) and the Transparent Organization Project under the Office of the National Anti-Corruption Commission (NACC).

- Reviewing and approving GC's corporate governance plan for 2022 to serve as guidelines for executing, monitoring, and assessing GC Group's corporate governance performance in a tangible manner.

3. Supervising Sustainable Development Operations

- Supervising the sustainability work progress to be in accordance with the strategies of the Company (i.e. Step Up) through 4 strategies: (1) Pursuance of operation to sustainably handle climate change and water management, (2) Business integration to enhance the operation on circular economy enhancement, (3) Enhancement of CSR operation to create sustainable value to the society (i.e. CSR Transformation to Social enterprise Model), (4) Enhancement of sustainable business operation leadership in creating a well-balanced sustainability in every aspect, including economic, social and environmental. This also includes monitoring the Company's sustainable development to ensure alignment with international standards, such as the Dow Jones Sustainability Indices (DJSI), the UN Global Compact and Carbon Disclosure Project (CDP), etc., to maintain its position as the world's leader in sustainability.

- Promoting a thorough revision of every elements within the sustainability framework of the Company to be in line with the world's situation and new challenges, providing opinions on sustainability operation working plans and and indicators for the Company's operation during the five year period (2022 – 2027) and on a long-term basis. As well as providing suggestions for sustainable development related Rankings acquisitions from external organization both in Thailand and overseas.

- Overseeing GC's business operations to ensure responsibility towards stakeholders in accordance with good corporate governance principles; advising on and monitoring the results of relevant activities continuously through reports; and putting in place communication to build understanding with stakeholders every year and take opinions and expectations into consideration when making decision, reviewing material sustainability issues and making plan on business operation of the Company.

- Promoting and valuing stewardship of communities and society of Rayong, GC's operating base, in collaboration with all sectors through CSR projects (Rayong Programs) designed to solve problems and meet the expectations of Rayong communities. The Committee also advised and monitored the CSR projects through regular reporting.

4. Reporting the Performance, Assessment, and Development of Directors

- Reporting the performance as well as group and self-assessment results of the Committee for 2021 to the Board of Directors for their acknowledgment.

- Reviewing the Corporate Governance and Sustainability Committee Charter to ensure that the contents align with their roles and duties and any applicable rules and regulations.

- Reviewing the Corporate Governance and Sustainability Committee's assessment forms (group assessment and self-assessment) to ensure alignment with the current situation and compliance with international standards and criteria of domestic regulatory agencies.

- Continuously ensuring Director development under good corporate governance principles by encouraging them to attend training courses of Thai Institute of Directors Association (IOD).

- Pre-setting the dates for its meetings for the entire year, arranging at least one meeting per quarter and may hold special meeting as necessary. Ad-hoc meetings were allowed to be held if necessary. In these meetings, the Committee considered and acknowledged the Company's performance and report as well as provided any recommendations to the Board of Directors and the Management.

The Corporate Governance and Sustainability Committee places great importance on ensuring GC's strict compliance with the Corporate Governance Policy and Business Code of Conduct. The Committee is also committed to continually enhancing corporate governance practices on par with international standards. GC believes that good corporate governance is a vital factor in promoting operational efficiency and business sustainability, which will enable the Company to earn the confidence of its stakeholders as well as international recognition.

On behalf of the Corporate Governance and Sustainability Committee

(Signed) Professor Somkit Lertpaithoon

(Professor Somkit Lertpaithoon)
Chairman of the Corporate Governance
and Sustainability Committee

REPORT OF THE NOMINATION AND REMUNERATION COMMITTEE

Dear Shareholders,

In 2021, the Nomination and Remuneration Committee has reviewed and amended the composition and qualifications of the Nomination and Remuneration Committee by requiring that all members of the Nomination and Remuneration by Independent Directors in order for the performance of their duties by independent in accordance with corporate governance principles. The Nomination and Remuneration Committee comprised of its chairman, Mr. Don Wasantapruek (Independent Director) and its committee members, namely Lieutenant General Nithi Chungcharoen (Independent Director) and Mr. Wittawat Svasti-xuto.

In 2021, the Nomination and Remuneration Committee performed its duties as stipulated by its charter and executed tasks as assigned by the Board of Directors. The Committee held a total of eight meetings. A summary of its activities is given below.

1. Nomination and Selection of Directors and Sub-committee Members

- Reviewing and amending the criteria and procedures for selection and appointment of Directors by adding details on the law, rules and regulations applicable to the selection and appointment Directors and members of Sub-committee to ensure completeness, precision and alignment with the corporate governance principles and the performance of duties of the Nomination and Remuneration Committee in order to propose it to the Board of Directors for consideration and approval. The revised criteria and procedure shall be utilized as materials for the establishment of the regulations providing shareholders the rights to propose meeting agenda and nominate person for election as a Director in advance, for the 2022 Annual General Meeting of Shareholders.
- Nominating candidates to replace Directors who retired by rotation at the 2021 Annual General Meeting of Shareholders (AGM) for consideration and approval under the criteria and processes for nomination and appointment of Directors. Shareholders were given over three months period prior to the AGM to nominate candidates for vacant positions. Since there were no submissions of candidates from shareholders, the Committee resolved to nominate Mr. Piyasvasti Amranand, Professor Somkit Lertpaithoon, Mr. Pakorn Nilprapunt, Lieutenant General Nithi Chungcharoen, and Mr. Disathat Panyarachun to be re-elected as directors for another term. The candidates possessed all the required qualifications and did not have any prohibited characteristics according to relevant laws and criteria. They also possessed knowledge, competency, and experience that aligned with the Company's business strategies. The 2021 AGM thus resolved to approve the appointment of these candidates as Directors as instructed by the Committee.
- Nominating qualified candidates to replace Directors who resigned during 2021, namely Mr. Noppadol Pinsupa, M.L. Peekthong Thongyai and Mrs. Pantip Sripimol. The list of candidates was presented to the Board of Directors for consideration and approval under the criteria and processes for nomination and appointment of Directors. The Committee took into consideration the qualifications required by applicable laws and criteria, GC's Articles of Association, good corporate governance principles, and the Board Skills Matrix. The Committee also considered the Director's Pool of the State Enterprise Policy Office and the Thai Institute of Directors Association. The Board of Directors approved the appointment of the candidates as Directors as instructed by the Committee.
- Nominating Directors to fill vacant positions on 4 Sub-committees, namely the Audit Committee, the Corporate Governance and Sustainability Committee, the Nomination and Remuneration Committee and the Risk Management Committee and presenting a list of candidates to the Board of Directors for consideration and approval under the criteria and processes for nomination and appointment of Directors in the Sub-committees. The Committee took into consideration the qualifications of each Directors in accordance with relevant laws and regulations of the Securities and Exchange Commission (SEC) and the Stock Exchange of Thailand (SET), GC's Articles of Association, and the charters of Sub-committees. The Board Skills Matrix and specialized experience that could benefit their role on the Sub-committees were also taken into account.

2. Remuneration of Directors, Sub-committee Members, and Chief Executive Officer

- Considering and proposing the 2021 remuneration for the Board of Directors and for the Directors of each Sub-committee as well as the Board's bonus for 2020 to the Board of Directors and the Annual General Meeting of Shareholders (AGM) for consideration and approval. The proposed remuneration was determined in accordance with Good Corporate Governance Principles, based on GC's operating results in 2020, the current economic situation of petroleum and

petrochemical businesses, the principles and policies approved by shareholders, the duties and responsibilities of the Board of Directors, the results of Board performance assessment, compared to the remunerations of Directors working at other listed companies under the PTT Group and at other listed companies. The 2021 AGM resolved to approve the Board's remuneration and bonus as instructed by the Committee.

- Determining the remuneration of the Chief Executive Officer (CEO) and President for 2021 according to transparent, fair and reasonable criteria, based on his performance, following the CEO KPIs assessment, and assigned responsibilities, before proposing the remuneration to the Board of Directors for consideration and approval.

3. Performance Assessment of the Board of Directors and Chief Executive Officer

- Reviewing the Board of Directors' assessment form (group assessment, self-assessment, and peer-assessment) for 2021 to ensure its completeness, promptness, and compliance with the Corporate Governance Code for Listed Companies 2017 (CG Code), the Dow Jones Sustainability Indices (DJSI), the ASEAN Corporate Governance Scorecard, and the performance of duties of the Board of Directors.
- Reporting the performance of Board of Directors for 2021 and establishing the Board's key performance indicators (Board KPIs) for 2022, ensuring their alignment with CG Code and DJSI standards with regard to the roles and responsibility of the board. The Board KPIs were then presented to the Board of Directors for approval.
- Considering and approving the 2021 performance assessment of the Chief Executive Officer and the President (CEO KPIs) and acknowledging the 2021 performance assessment of the President (President KPIs) assessing the performance of the CEO and President to determine suitable and fair remuneration, which were then presented to the Board of Directors for approval. The Committee also acknowledged and provided recommendations on the performance of the President in 2021.

4. Other affiliated duties of the Committee

- Pre-setting the dates for its meetings for 2022, arranging at least four meetings per year. Ad-hoc meetings were allowed to be held if necessary. In these meetings, the Committee considered and acknowledged the Company's performance and reports as well as provided any recommendations to the Board of Directors and the Management.
- Revising the Committee's assessment form (group assessment and self-assessment) for 2021 to ensure its completeness, alignment with the current situation, and compliance with CG Code, the Dow Jones Sustainability Indices (DJSI), and the Nomination and Remuneration Committee Charter.
- Conducting the Committee's assessment for 2021 and reporting its assessment results to the Board of Directors before disclosing them in the Form 56-1 One Report.
- Considering, reviewing and updating the composition and qualifications section on the Nomination and Remuneration Committee Charter by requiring that members of the Nomination and Remuneration Committee be Independent Director in order for them to perform their duties independently and give opinions freely which is in accordance with the Corporate Governance and Business Code of Conduct, ASEAN Corporate Governance Scorecard and the Corporate Governance Report of Thai Listed Companies of the IOD.
- Considering and reviewing the Board Skills Matrix so that it remains appropriate and in alignment with the Corporate Governance and Business Code of Conduct, good practices of nomination committee of the IOD, DJSI assessment, Global Industry Classification Standard (GICs) and the Skills Matrix guidelines of the State Enterprise Policy Office, which will be taken into consideration in the search and selection of Director and member of Sub-committees to ensure that the composition of the Board of Directors is diverse in the aspect of knowledge, skills and experience which are beneficial to the business operation.

The Nomination and Remuneration Committee has performed its duties with responsibleness, ethics and independence in accordance with the corporate governance in order to ensure that the nomination and remuneration procedures are transparent, fair and in accordance with the application criteria which will help enhance efficiency of the Board of Directors to steer the operation of the Company forward in line with the established strategies and direction efficiently, as well as to build confidence among the shareholders, investors and all stakeholders.

On behalf of the Nomination and Remuneration Committee

(Signed) Mr. Don Wasantapruek

(Mr. Don Wasantapruek)

Chairman of the Nomination and Remuneration Committee

REPORT OF THE RISK MANAGEMENT COMMITTEE

Dear shareholders,

Throughout 2021, GC faced with various crises and challenges brought on by the COVID-19 pandemic, which grew in severity on the global level and affected the economy, society, the safety and health of humanity, as well as business continuity across the supply chain, causing high volatility in product prices and spread. This was further compounded by various uncertainties, including trade wars, oil price volatility, and new petrochemicals capacity, as well as other factors which GC places emphasis on, such as the trend towards environmental conservation and the implementation of environmental and climate change policies.

Amid such volatility and challenges, effectiveness of risk management has become one of GC's top priorities and a key factor that would enable it to navigate through crises, identify opportunities, and foster its competitiveness and growth sustainably. During the previous year, the Risk Management Committee performed its duties to the utmost of its ability to provide comments and suggestions on GC's measures for the management of risks and crises. Consequently, with the cooperation of all parties involved, GC was able to cope with all the challenges effectively testifying to the standard and strength of GC's risk management system, which is continuously improved in line with the ever-changing business environment. Furthermore, the Company places great importance to an organization-wide culture of risk management, which GC believes will play a vital role in enabling GC to achieve its business objectives and targets, prevent and minimize potential loss, as well as serve as a tool for creating business opportunities. In 2021, GC has been rated as the world's number 1 member for sustainability in the Dow Jones Sustainability Indices (DJSI) chemicals sector for the third consecutive year and scored among the top ten for risk and crisis management – a testament to GC's internationally recognized risk management standard.

The Risk Management Committee efficiently performed its duties within its scope of roles and responsibilities as prescribed by its charter. In 2021, the Committee convened a total of eight meetings to provide comments and suggestions and acknowledge agenda items under its responsibility as detailed below.

- Reviewing the risk management policy, the risk appetite, and the risk management frameworks and practices, consisting of management frameworks for price and spread risks, foreign exchange risks, subsidiaries, and investment risks, to ensure their applicability to the business circumstances and flexibility for proper implementation.
- Monitoring and providing opinions and suggestions on GC's corporate risk and crisis management in 2021 to ensure its adequacy, suitability, timeliness and that it covered emerging risks; monitoring risk trends through leading key risk indicators and lagging key risk indicators; advising the Management on the revision of risk management measures to ensure its alignment with the current circumstances; and reporting performance of the Risk Management Committee to the Board of Directors on a regular basis.
- Closely monitoring situations of the petroleum and petrochemical markets and exchange rates, providing recommendations, and monitoring the outcome of implementing commodity hedging for price and spread risk management as well as FX hedging on a monthly basis to ensure that the measures are flexible and suitable for the situation so as to minimize impact on GC's performance.

- Reviewing and providing opinions and recommendations on the risk assessment and management of the following major projects to supplement the decision making process of the Board of Directors: (1) the high value businesses investment, (2) the delisting of Vinythai Public Company Limited and the launching of the tender offer delisting of securities of Vinythai Public Company Limited from the Stock Exchange of Thailand, and (3) the dilution in the Company's shareholding portion in Global Power Synergy Public Company Limited.
- Overseeing and providing recommendations on GC's 2021 corporate risk factors and mitigation measures to be in line with economic conditions, industrial trends, and other uncertainties to ensure the Company's ability to accomplish its targets according to its strategies as well as business goals in the face of more complicated risk factors.
- Reviewing the information on risk management and risk factors disclosed in the Annual Registration Statements to assure shareholders that GC had analyzed risks that might affect its business targets and provided systematic management measures in place.

In 2022, the Company is still facing uncertainties resulting from COVID-19 despite the recovery of the overall global economy, with mutated variants of the coronavirus and limited distribution of vaccines in various countries continuing to exert pressure. Other external factors that may contribute to the overall uncertainty include domestic and international politics, trade and oil price wars, greater emphasis on environmental conservation in the state policies, consumer behaviors, and the net-zero carbon initiatives. Since these issues have both direct and indirect impacts on the demand of GC's products, prices and the spread between product and feedstock prices, as well as the implementation of strategies for future business sustainability, the Risk Management Committee will closely monitor these factors and provide opinions as well as adequate and suitable suggestions for the management of such risks.

In summary, the Risk Management Committee has adequately and properly fulfilled its roles in management key corporate risks as prescribed in the charter. A corporate risk management system has been developed and improved to align with the rapidly changing standards, climate of the industry, and future trends. Besides, the Committee has continuously monitored and commented on all aspects of the Company's risk management, covering all key short-term and long-term risks as well as the emerging risks potentially affecting GC's future businesses to ensure that GC has suitable and effective risk management with a proper risk appetite that will enable the achievement of business goals and the sustainable value in the long run.

On behalf of the Risk Management Committee

(Signed) Mr. Grisada Boonrach

(Mr. Grisada Boonrach)
Chairman of the Risk Management Committee

INTERNAL CONTROL AND CONNECTED TRANSACTIONS

INTERNAL CONTROL

PTT Global Chemical Public Company Limited (GC) runs an Internal Control System in accordance with the international standards of the Committee of Sponsoring Organizations of the Treadway Commission (COSO) to achieve internal control objectives relating to operations, reporting, and compliance with laws and regulations.

During the Board of Directors Meeting 2/2022 held on February 14, 2022, the GC's system was evaluated based on an internal control assessment report prepared by executives following Securities and Exchange Commission (SEC) guidelines. Together with the results of the Audit Committee's internal control review, the Board of Directors viewed that GC's internal control was adequate and effective for its businesses. No significant problems or material shortcomings were detected that could interfere with achieving internal control objectives. GC's Internal Control System functioned properly in an adequate manner. The operation was efficiently managed with sufficient numbers of qualified and competent employees and processes. In addition, GC implemented a monitoring system to ensure the achievement of business objectives with effective and efficient operations, reliable reporting, and compliance with applicable laws and regulations as well as safeguarding GC's assets against misuse or unauthorized use by the Board of Directors, executives, and employees.

GC improved on internal control procedures and processes in 2021 to increase robustness and speed in identifying risks including enhanced internal control. GC's Internal Control System in accordance with COSO can be summarized in five categories:

1. CONTROL ENVIRONMENT

The Board of Directors and executives strive to promote a corporate culture that focuses on integrity and ethics. They also supervise operations to ensure compliance with the organizational vision and mission and to ensure that GC's control environment is appropriate for implementing the Internal Control System, as detailed below.

- The Board of Directors and executives establish the Corporate Governance Policy, Business Code of Conduct, Corporate Compliance Policy and Anti-Corruption Policy and Guidance setting out preferred practices for the Board of Directors, executives, and employees. Executives and employees are required to acknowledge Corporate Governance and Business Code of Conduct Handbook in Hook Acknowledgement & Learning System to sign and acknowledge their compliance in the policy, principles, and business ethics. The Company also emphasizes on communicating these policies and consequential penalties to executives and employees and any potential Conflict of Interest shall be declared annually in the online system. GC also expanded the online system to subsidiaries for strengthening the good corporate governance.

- GC regularly builds awareness in Ethic and Business code of conduct to executives and employees through training courses, orientation, E-mail communication and other activities. One of the key meetings is Management Talk (Hook Talk), conducted by top management in order to communicate ethics and business code of conduct to employees and promote a good corporate governance culture. In additional, GC also announces corporate governance and code of conduct principles on the Company's website to emphasize the policy to suppliers/vendors, joint-venture partners, and company representatives to operate their businesses with integrity. In 2021, the Company launched an online Ethical Leadership training for executives and employees of GC group to acknowledge and aware of the leader's role in fulfilling duties with ethical responsibilities.

- The Board of directors is independent from executives and responsible for supervising overall operations as well as expressing views on the direction and strategy to formulate business and operating plans. Furthermore, the Board of directors regularly monitors GC's performance and its sub-committees to ensure that GC achieves

objectives and goals. In addition, GC commits in driving long-term sustainable business practices by balancing its focus among the environment, society, and corporate governance (ESG), while integrating the Circular Economy principles in accordance with the Sustainable Development Goals (SDGs) framework. In 2021, GC committed and provided clear pathway to improving people's quality of life through transformation to low carbon business with the goal of reducing net greenhouse gas emissions to zero (Net Zero) by 2050.

- GC's corporate structure is grouped into business units and functions that best support efficient business operations and good governance. This structure embedded with checks and balances principal, in which duties and responsibilities were delegated appropriately. Furthermore, all employees acknowledge their roles, authorities, responsibilities, and accountabilities.

- GC specifies the qualifications for all positions, which form the basis of recruitment and personnel development aligned with corporate culture. Succession plans are in place for key management positions to ensure business continuity. The performance-management and fair-reward systems are in place including encourage regularly update, monitor performance targets quarterly. The performance target also can be considered and reviewed to be more measurable and achievable. GC implements 360-degree evaluation—a tool to evaluate employee's behavioral attributes against GC SPIRIT 4 Core Behaviors by supervisors, subordinates, peers, and outside stakeholders. This evaluation is also part of the annual performance evaluation. GC aims to be the learning organization by encouraging all employees to enhance their capabilities and knowledges through the e-Learning platform "UP" that contains various contents and be simply accessible. In 2021, GC established mandatory courses for employee such as Cyber Security and Data Science & Engineering program to enhance the employee's skills, in addition, it organized the "Speed Drive with Challenge Status Quo" program to promote the corporate culture to be ready for the business transformation.

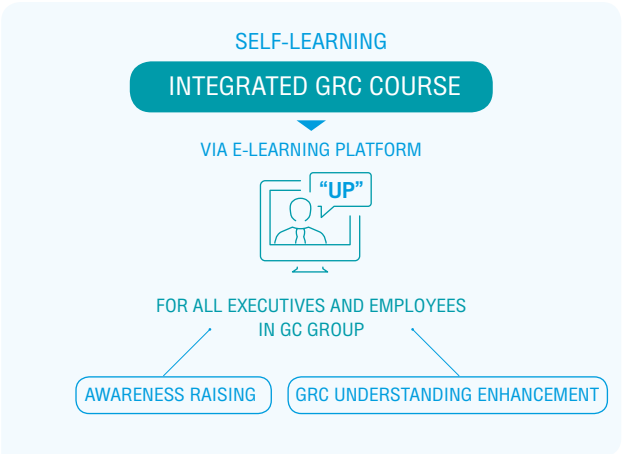
- GC establishes the Internal Control Policy that all employees are accountable for their internal control activities and consistently communicates with executives and employees through training courses, public communication, and other activities to ensure accurate understanding of everyone's roles and responsibilities in relation to the internal control system. In addition, GC implements Three Lines Model regarded as an international framework for governance and define role which consists of the owners of job functions acted as the first line of defense to comply with the defined policies and guidelines, with Internal Control System, Corporate Risk Management, Corporate Governance and Corporate Compliance, together with other support divisions as the second line of defense, responsible for consulting and facilitating of other functions so as to bring their operations up to the established standard, and with Internal Audit Functions as the third line of defense, evaluate and provide independent opinions on the adequacy and effectiveness of internal controls as well as strengthen corporate governance and risk management.

- GC applies Governance, Risk Management & Internal Control and Compliance principle (GRC) in the Company's business process to ensure efficient and effective operations. The Company appoints GRC personnel to major business unit to strengthen and ensure GRC integration. GRC principle is also deployed to subsidiaries through GRC committees to govern, review, monitor, and assess GRC performance. Additionally, GRC Health Check questionnaire is annually conducted to assess the understanding and compliance of employees. This

"NongTemJai"

PROMPTLY PROVIDE GRC INFORMATION TO ALL EMPLOYEES ALL THE TIME

result will finally be used to analyze and plan GRC execution to be more efficient. Furthermore, the Company regularly communicates GRC through GRC Newsletter. The GRC awareness is regular emphasized from top management to employees (Tone at the top) in the CEO townhall. In 2021, GC increased communication channel via Chatbot "NongTemJai" which can provide GRC information all the time and launched Integrated GRC Course in e-Learning platform "UP" to enhance and increase awareness and understanding of GRC to all executives and employees.



2. RISK ASSESSMENT

The Board of Directors and executives emphasize on risk management to ensure the achievement in both short-term and long-term goals. The Risk Management Committee is appointed by the Board of Directors, along with the Enterprise Risk Management Committee and taskforces are appointed by the CEO to manage business risk and specific issues. This structure is appropriated, allowing the Company to have flexibility and ensure efficiency and effectiveness.

GC announces Risk Management policy and implements the Integrated Enterprise Risk Management systematically and continuously throughout the organization according to the international risk management framework and guidelines. The risk assessment is conducted in various aspects, including current business-related risk factors, future business-related risk factors, emerging risk factors, and the potential for fraud and corruption, thus the mitigation plans are developed accordingly. Risk factors and mitigation plans are reviewed and monitored regularly to assure short-term and long-term GC's goals. GC develops Key Risk Indicators (KRI) linked with Key Performance Indicator (KPI) to evaluate short-term and long-term the Company's goals and monitor changes in risk factors and efficiently manage risk in timely manner. In 2021, GC revised Risk Matrix to enhance the efficiency of the risk prioritization, as well as revised the likelihood and impact evaluation criteria for risk assessment in 2022.

GC annually tests the robustness of Business Continuity plan (BCP) in business unit level and corporate level by simulating events that could disrupt business operations and affect business continuity to assure that GC is well prepared to cope with such crises effectively. The BCP plan is continuously improved from the lesson learn before the incident occurs. In 2021, GC tested the robustness of BCP in corporate level by simulating 2 events- "Hazard Chemicals Leak and Fire" and "Cyber Attack Operating System" together with relevant operations and support functions.

Detailed are described under Risk Management part.

3. CONTROL ACTIVITIES

GC have defined control activities to mitigate risks of not achieving the Company's goals and ensure that the residual risks are at acceptable level. These include:

- The designed control activities align with internal control principles, such as segregation of duties, check and balance system, conflict-of-interest declaration. To ensure that the business is operated in a transparent, fair, and auditable manner for utmost benefit to the organization.

- Rules, regulations, policies, and procedures are in place with clear boundaries of authorization to limit the power and authority of the CEO, executives, and other employees. Furthermore, operations are reviewed regularly to ensure compliance with rules, regulations, policies, and procedures.

- GC implements the automated control in crucial processes: For example, SAP GRC Access Control is in place to ensure that SAP operating system access rights accord with good practices in segregation of duties. GC also uses the Continuous Control Monitoring System (CCMS) for crucial processes – sales and payment received processes to help detect and follow up exceptional transactions and to notify designated employees to correct problematic transactions in a timely manner. Moreover, the Company applies the digital tools such as; Robotics Process Automation (RPA) in procurement process, Blockchain technology in bank guarantee management process, and Salesforce CRM system in sales and service processes. In 2021, GC continually developed the automated control in corresponding to the situations. The Company implemented Approve Customer and Supplier List system to gather information about customers and suppliers from data entry to approval, create sales orders or contracts through the online system for reducing working time and increasing operational efficiency and enhancing corporate governance.

- GC initials the FiT project which focuses on business transformation; operational efficiency enhancement with respect to costs, quality, and agility using digital technology in operational process and alignment with GRC principle as well as human development for emerging jobs in order to bolster its capabilities in support of its future missions.

- GC has in place an Information Technology Security Policy in accordance with the ISO27001 – Information Security Management standards and international standards framework and guidance. The policy is reviewed and updated regularly. All executives and employees are required to sign and pledge to comply with the policy to ensure information security and continually business operation of GC group. Furthermore, Cyberthreat prevention training and communication are regularly provided to all employees for up-lifting information security standards according to current situations. In 2021, GC conducted assessment under the NIST Cybersecurity Framework (CSF) which assist organizations in planning to prevent, detect and respond to threats in timely manner while the business continues to operate. In addition, a Real-Time Vulnerability Management project was implemented to conduct continuous vulnerability checks on the server, network, and security equipment continuously as well as reporting the results immediately. This shall create an awareness of the vulnerabilities and lead to corrections and improvements and definitely decrease the risk of threats occurring in a prompt response. Besides, GC set up the special function to closely oversee information technology security.

- The Corona Virus infection prevention and control committee (COVID-19) is accountable for monitoring and analyzing the COVID-19 situation, establishing policies, supporting including formulating measures. In 2021, the measures were upgraded to be more intensive, such as adopting the guideline for preventing cluster (Bubble) and limiting the location to reduce the likelihood of infection from outside (Seal), preventive measures for factory areas and construction projects The Vaccine Service Center was set up with communication measures to raise understanding and lead to comply and prevention. GC looks after employees as well as visitors who come into the company's area to ensure that the safety of all parties engaged, and the Company's business can continue despite the severe COVID-19 outbreak.

- GC governs and manages its subsidiaries to ensure that their directions, policy, and procedure align with GC. Subsidiaries' performance is monitored regularly and continuously. GC developed the guideline called "GC Way of Conduct", which is regularly improved and continually communicated to subsidiaries in the GC group. The training programs are arranged to executives of GC Group to raise understanding and awareness. The assessment is conducted every year to evaluate the implementation for further improvement and enforcement. The progress of this program is regularly reported to top management for acknowledgment.

4. INFORMATION AND COMMUNICATION

GC values the quality of information and communication that supports the effectiveness of its Internal Control System, as detailed below.

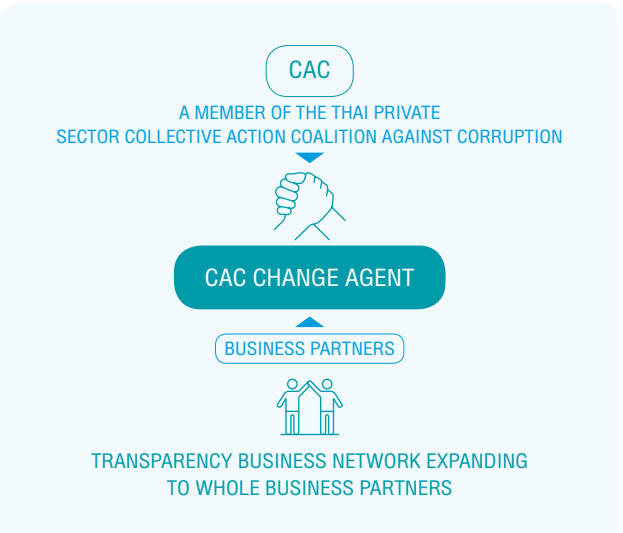
- GC establishes information classification along with instructions for filing important and controlled documents, including information from both internal and external sources. This process ensures security, accuracy, and completeness of information for the future use.
  - GC implements SAP ECC 6.0 to process key business transactions, reducing duplication of small legacy systems, and enhancing the efficiency of management reporting.
  - GC implements the "IdeaMANI" (Multi Access for New Initiatives) program that centralized the information of operational development and investment projects. and systematically monitoring the implementation of projects. In 2021, GC developed proactive tracking between key risk indicators, key performance indicators and long-term strategies. This allows for more effective achievement evaluation of organizational goals and could revise strategic plans to achieve goals based on the situation.
  - In 2021, GC implemented a personal data management system within GC group including establishing a division which responsible of personal data protection operations to support the enforcement of the Personal Data Protection Act 2019 in the year 2022.
  - In 2021, GC implemented data governance to ensure the proper management of organization's data-efficacy, availability, and confidentiality of information by announcing the Data Governance Policy which executives and employees are required for policy acknowledgement. Data Governance framework and tools are established and deployed in GC, while the Data Governance Council is responsible for ensuring that the company's data have properly controlled throughout the data life cycle. Furthermore, Data Governance awareness and understanding have been raised to employees through various types of communication, apart from the awareness enhancement, the training was organized to employees to educate about the data governance policy, standards, and relevant best practices.
  - GC has formed team of analysts call "GC EYE" to update analysis on external factors to report potential business impact to executives and relevant parties through mobile application platform and organized GC EYE FORUM activities by inviting external experts to lecture on various topics.
- GC communicates relevant information to the Board of Directors, executives, employees, and stakeholders to support efficient operations and internal controls.
  - The Board of Directors meeting's documents are delivered to directors before Board meetings to allow sufficient time for them to study and review to make decisions. When necessary, the Board of Directors may request additional information from management team. Furthermore, to dispatch information and meeting documents easily and swiftly, GC has developed and utilized the application called "Digital Join", in which all directors have access to the electronic documents, protected by data encryption, on their devices.
  - GC creates multi-channels communication within organization. These include the organization's intranet, E-mail, feed important information through online orientation and Town Hall activities for facilitating communication from top management to employee which was held through Microsoft Teams Live Streaming. In addition, the CEO podcast serves as communication channel for all employees in the organization. In 2021, a CEO Special Talk was launched to continuously communicate GC corporate agenda.
  - GC communicates with external stakeholders, through the Company's website, Facebook, Twitter, and LINE GC official. In addition, designated departments are responsible for disclosing important information to all stakeholders regularly. A Customer Solutions Center (CSC) was established as a one-stop service center to provide information relating to GC products and services to customers and interested parties.

- GC allows shareholders to propose agenda for the Annual General Meeting of Shareholders (AGM) and names of qualified candidates to be nominated for election as company directors to enhance good corporate governance regarding the rights and equitable treatment of shareholders. GC arranges the Annual General Meeting of Shareholders for the year 2021 through Web-live Broadcast via the Company's website for shareholders and arrange The Extraordinary General Meeting of Shareholders via Electronic Means according to the Emergency Decree on Electronic Meeting B.E. 2563. In addition, GC modifies the Analyst meeting to announce the Company's performance via Microsoft Teams and Facebook Live.
- GC establishes an open communication channel for whistleblowers. This allows employees and external individuals to be confident that any complaints will be handled with transparency, straightforwardness, confidentiality, and in a timely manner, as well as continuously encouraging subsidiaries to implement policy and guideline for handling complaints.

5. MONITORING ACTIVITIES

GC continually monitors and evaluates the adequacy of its internal controls. Development and improvement plans are also in place to ensure efficient and effective internal controls as shown below.

- GC evaluates the adequacy of corporate internal controls system annually for both organization and process level, in which the process owners conduct Control Self-Assessment (CSA) in online system. The adequacy and appropriateness of assessment results are verified by the Internal Control System Division and GRC personnel who also provide recommendations for correcting any internal control deficiencies. Reporting and monitoring procedures are also in place to report deficiencies to executives and track remediation progress to ensure that problems are addressed in a timely manner.
- Internal Audit, an independent function reporting directly to the Audit Committee, examines and evaluates the effectiveness and operation of internal control activities according to the audit plan approved by the Audit Committee. This audit plan is aligned with GC's strategy and its associated risks. Deficiencies of control and recommendations are communicated to the Executives to further determine improvement of the internal control. The audit reports and findings are presented to the Audit Committee regularly. Internal controls for financial reporting are reviewed by auditors who report to the Audit Committee quarterly and yearly. In 2021, GC considered the technology to make the internal audit work more automated.
- GC' s continually performed compliance monitoring and reporting through compliance checklist to ensure that all activities comply to policy, rules, laws and regulation. In 2021, GC provided assessment in process level and Compliance Universe which is compiled of laws, rules, and regulations to serve as a database and guideline for process owner.
- GC was certified as a member of the Thai Private Sector Collective Action Coalition Against Corruption (CAC). The Company sets up the anti-corruption working group to annually conduct the anti-Corruption self-assessment. In 2021, GC applied CAC Change Agent project to invite business partners to certify. This shows the importance of expanding transparent business networks to business partners.



CONNECTED TRANSACTION

CONNECTED TRANSACTION BETWEEN RELATED COMPANIES

As at 31 December 2021 accounting period, GC conducted significant business transactions with its subsidiaries and related companies with common shareholders and/or Directors. Connected transactions with other entities which may result in conflicts of interest are based on market or contractual prices (the prices agreed in previous contracts) - if there are no reference market prices. Details of the relationships with these companies are as follows:

Company	Relationship As at 31st December 2021	Connected Transaction	2019	2020	2021
					(million baht)
1. PTT Public Company Limited (PTT)	• Major shareholder holding 45.18% of the shares in GC • Common Directors: 1. Mr. Don Wasantapruek • Directors who are PTT Executives: 1. Mr. Noppadol Pinsupa 2. M.L. Peekthong Thongyai 3. Mr. Disathat Panyarachun 4. Mr. Kongkrapan Intarajang • Common Management: 1. Mr. Kongkrapan Intarajang • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	29,047	17,738	19,503
		Purchases of goods or receiving of services	237,553	176,071	272,177
		Other income	26	519	10,068
		Interest expense	-	16	17
		Other expense	193	74	159
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	2,265	2,056	2,063
		Other accounts receivable – related parties	38	168	497
		Trade accounts payable – related parties	17,400	12,427	47,164
		Other accounts payable – related parties	90	57	99
		Lease liabilities - related parties	-	355	560

Company	Relationship As at 31st December 2021	Connected Transaction	2019	2020	2021
					(million baht)
2. Global Power Synergy Public Company Limited (GPSC)	• Associate, 22.73% shareholding by the Company until the date of selling some shares in June 2021. Subsequently, other related party, 10% shareholding. • Major shareholder (PTT) holds 42.53% of the shares • Common Director: 1. Mr. Noppadol Pinsupa • Executive who is Director of GPSC: 1. Mr. Kongkrapan Intarajang • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	69	99	118
		Purchases of goods or services	9,405	9,025	10,232
		Interest income	163	4	-
		Other income	7	103	16
		Interest expense	-	1	2
		Other expense	2	2	3
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	25	13	26
		Other accounts receivable – related parties	173	105	141
		Trade accounts payable – related parties	1,024	1,082	442
		Other accounts payable – related parties	6	8	2
		Payables to contractors – related parties	21	3	3
		Lease liabilities - related parties	-	70	71
3. PTT Digital Solutions Company Limited (PTT DIGITAL)	• Associate company (GC holds 40% of the shares) • Major shareholder (PTT) holds 20% of the shares • Executive who is Director of PTT DIGITAL: 1. Mr. Pirun Krimwongrut 2. Mrs. Chatsuda Kanjanarat • Services transaction	**Statements of Income Transactions**			
		Purchases of goods or services	5	4	1
		Other income	55	46	59
		Other expense	451	470	450
		Statements of Financial Position Balances			
		Other accounts receivable – related parties	29	13	33
		Other accounts payable – related parties	104	144	92
		Payables to contractors – related parties	79	66	56
4. PTT Energy Solutions Company Limited (PTTES)	• Associate company (GC holds 20% of the shares) • Major shareholder (PTT) holds 40% of the shares • Common Director: 1. Mr. Wittawat Svasti-xuto (Resigned as the Company's director, effective 1 October 2021) • Executive who is Director of PTTES: 1. Mrs. Jeeranee Pimthanothai • Services transaction	**Statements of Income Transactions**			
		Sales of goods or rendering of services	7	6	8
		Purchases of goods or services	103	93	95
		Other expense	2	8	-
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	-	-	4
		Other accounts receivable – related parties	1	1	-
		Other accounts payable – related parties	1	4	-

Company	Relationship As at 31st December 2021	Connected Transaction	2019	2020	2021
					(million baht)
5. TOP Solvent Company Limited (TS)	• Subsidiary of TOP • Sales/Purchase transaction of products	**Statements of Income Transactions**			
		Sales of goods or rendering of services	130	176	264
		Purchases of goods or services	206	105	174
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	6	15	16
		Trade accounts payable – related parties	10	8	15
		Other accounts payable – related parties	3	5	-
6. Dhipaya Insurance Public Company Limited (TIP)	• Major shareholder (PTT) holds 13.46% of the shares until August 2021 • Common Director: 1. Mr. Prapas Kong-ied (Resigned as the Company's director, effective 1 November 2021) • Services transaction	**Statements of Income Transactions**			
		Purchases of goods or services	653	732	824
		Other income	39	444	1
		Other expense	22	48	42
		Statements of Financial Position Balances			
		Other accounts receivable – related parties	477	1,064	-
		Trade accounts payable – related parties	1	2	-
		Other accounts payable – related parties	3	10	-
		Payables to contractors – related parties	-	2	-
7. Thai Paraxylene Company Limited (TPX)	• Subsidiary of TOP • Sales/Purchase transaction of products	**Statements of Income Transactions**			
		Sales of goods or rendering of services	55	-	-
8. Thai Oil Public Company Limited (TOP)	• Major shareholder (PTT) holds 45.03% of the shares • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	1,557	2,286	2,666
		Other income	4	-	1
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	100	147	207
		Other accounts payable – related parties	4	-	-

Company	Relationship As at 31st December 2021	Connected Transaction	2019	2020	2021
					(million baht)
9. Business Services Alliance Company Limited (BSA)	• GC holds 25% of the preference shares • Major shareholder (PTT) holds 100% of the shares • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	1	-	-
		Purchases of goods or services	142	122	133
		Other income	4	-	-
		Other expense	126	125	140
		Statements of Financial Position Balances			
		Other accounts receivable – related parties	4	1	1
		Trade accounts payable – related parties	93	40	-
		Other accounts payable – related parties	63	46	66
		Payables to contractors – related parties	3	1	1
10. PTT Oil and Retail Business Public Company Limited (PTTOR)	• Major shareholder (PTT) holds 75% of the shares • Common Director: 1. Mr. Disathat Panyarachun • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	123,025	99,346	123,579
		Purchases of goods or services	108	88	122
		Other income	12	69	78
		Other expense	2	3	4
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	8,705	4,521	9,155
		Other accounts receivable – related parties	77	86	64
		Trade accounts payable – related parties	6	8	-
		Other accounts payable – related parties	105	20	6
11. PTTEP Siam Limited (PTTEPS)	• Subsidiary of PTTEP • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	2	6	2
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	-	2	1
12. PTTEP International Limited (PTTEPI)	• Subsidiary of PTTEP • Services transaction	**Statements of Income Transactions**			
		Sales of goods or rendering of services	-	1	-

Company	Relationship As at 31st December 2021	Connected Transaction	2019	2020	2021
					(million baht)
13. PTT Exploration and Production Public Company Limited (PTTEP)	• Major shareholder (PTT) holds 63.79% of the shares • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	13	8	14
		Other expense	8	4	4
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	1	2	3
		Other accounts receivable – related parties	-	-	1
		Lease liabilities - related parties	-	3	-
14. PTT Tank Terminal Company Limited (PTT TANK)	• Major shareholder (PTT) holds 100% of the shares • Common Director: 1. M.L. Peekthong Thongyai • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	47	48	70
		Other expense	-	-	8
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	6	5	15
		Other accounts payable – related parties	1	-	-
15. PTT International Trading Pte. (PTTT)	• Major shareholder (PTT) holds 100% of the shares • Common Director: 1. Mr. Disathat Panyarachun • Sales/Purchase transaction of products	**Statements of Income Transactions**			
		Sales of goods or rendering of services	9,889	9,962	19,354
		Purchases of goods or services	1,317	33	378
		Other income	2	5	28
		Other expense	13	-	3
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	2,374	1,217	1,004
		Other accounts receivable – related parties	93	-	89
		Trade accounts payable – related parties	221	-	-
		Other accounts payable – related parties	29	174	263
16. PTT LNG Company Limited (PTTLNG)	• Major shareholder (PTT) holds 100% of the shares • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	4	6	8
		Other income	-	-	3
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	3	5	3
		Other accounts receivable – related parties	-	-	3

Company	Relationship As at 31st December 2021	Connected Transaction	2019	2020	2021
					(million baht)
17. PTTEP Services Limited (PTTEP Services)	• Subsidiary of PTTEP • Services transaction	**Statements of Income Transactions**			
		Other expense	1	1	-
18. Labix Company Limited (LABIX)	• Subsidiary of TOP • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	10	2	-
19. Sak Chaisidhi Co., Ltd. (SAKC)	• Subsidiary of TOP • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	2,124	1,309	803
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	206	131	-
20. Sport Services Alliance Company Limited (SSA)	• Major shareholder (PTT) indirectly holds shares • Executive who is Director of SSA: 1. Mr. Pirun Krimwongrut • Services transaction	**Statements of Income Transactions**			
		Other expense	37	11	12
21. UBE Chemicals (Asia) Public Co., Ltd. (UCHA)	• Associate of IRPC • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	22	22	3,384
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	2	2	308
22. Energy Complex Company Limited (ENCO)	• Major shareholder (PTT) holds 50% of the shares • Services transaction	**Statements of Income Transactions**			
		Sales of goods or rendering of services	46	48	51
		Other income	-	2	2
		Interest expense	-	3	2
		Other expense	213	146	128
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	9	8	9
		Other accounts receivable – related parties	1	1	3
		Other accounts payable – related parties	4	5	2
		Lease liabilities - related parties	-	54	179

Company	Relationship As at 31st December 2021	Connected Transaction	2019	2020	2021
					(million baht)
23. IRPC Polyol Company Limited (IRPCP)	• Joint venture of IRPC • Sales/Purchase transaction of products	**Statements of Income Transactions**			
		Sales of goods or rendering of services	13	57	905
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	5	30	94
		Other accounts receivable – related parties	-	29	-
24. IRPC Public Company Limited (IRPC)	• Major shareholder (PTT) holds 45.05% of the shares • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	19,892	12,056	16,383
		Purchases of goods or services	14,150	6,168	9,246
		Other income	1	26	18
		Other expense	9	-	1
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	1,816	1,008	2,527
		Other accounts receivable – related parties	3	25	2
		Trade accounts payable – related parties	1,224	618	1,460
		Other accounts payable – related parties	3	-	-
25. TOP Solvent (Vietnam) LLC. (TSV)	• Subsidiary of TOP • Sales/Purchase transaction of products	**Statements of Income Transactions**			
		Sales of goods or rendering of services	54	165	176
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	1	17	16
26. Sarn Palung Social Enterprise Company Limited (SPSE)	• Other related company (GC holds 15% of the shares) • Major shareholder (PTT) holds 20% of the shares • Executive who is Director of SPSE: 1. Mr. Chaya Chandavasu • Services transaction	**Statements of Income Transactions**			
		Other expense	3	2	3
		Statements of Financial Position Balances			
		Other accounts payable – related parties	-	1	2

Company	Relationship As at 31st December 2021	Connected Transaction	2019	2020	2021
					(million baht)
27. Glow Energy Public Company Limited (GEN)	• Subsidiary of GPSC • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	261	315	98
		Purchases of goods or services	2,851	3,388	3,437
		Other income	-	5	1
		Other expense	3	3	3
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	26	33	2
		Other accounts receivable – related parties	2	2	2
		Trade accounts payable – related parties	323	299	289
		Other accounts payable – related parties	1	1	-
28. Glow SPP 2 Company Limited (GSPP2)	• Subsidiary of GPSC • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	9	11	10
		Purchases of goods or services	-	80	77
		Other income	-	-	1
		Other expense	-	2	2
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	2	2	3
		Trade accounts payable – related parties	-	7	-
29. Glow SPP 3 Company Limited (GSPP3)	• Subsidiary of GPSC • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	6	8	8
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	2	2	1
30. Glow SPP 11 Company Limited (GSPP11)	• Subsidiary of GPSC • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	3	4	5
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	1	1	1
31. Glow IPP Company Limited (GIPP)	• Subsidiary of GPSC • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	2	3	3
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	-	-	1

Company	Relationship As at 31st December 2021	Connected Transaction	2019	2020	2021
					(million baht)
32. GHECO-One Company Limited (GHECO1)	• Subsidiary of GPSC • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	7	10	19
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	2	2	4
33. PTTEP South Asia Limited (PTTEPSA)	• Subsidiary of PTTEP • Services transaction	**Statements of Income Transactions**			
		Sales of goods or rendering of services	1	-	-
34. AI and Robotics Ventures Company Limited (ARV)	• Subsidiary of PTTEP • Services transaction	**Statements of Income Transactions**			
		Other expense	-	10	-
35. PTTEP SP Limited (PTTEPSP)	• Subsidiary of PTTEP • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	-	1	-
36. Combined Heat and Power Producing Co., Ltd. (CHPP)	• Subsidiary of GPSC • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	-	-	6
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	-	-	2
37. PTT International Trading USA Inc. (PTTTUSA)	• Major shareholder (PTT) holds 100% of the shares • Services transaction	**Statements of Income Transactions**			
		Other income	-	-	1
38. PT.Tirta Surya Raya (PTSR)	• Subsidiary of TOP • Sales/Purchase transaction of products	**Statements of Income Transactions**			
		Sales of goods or rendering of services	-	-	22
39. Siam Management Holding Co., Ltd. (SMH)	• Subsidiary of PTTGM • Sales transaction of investment	**Statements of Income Transactions**			
		Other income	-	-	1,778
40. PTT International Trading London Ltd (PTTTLDN)	• Major shareholder (PTT) holds 100% of the shares • Common Director: 1. Mr. Disathat Panyarachun (Resigned as a chairman of PTTTLDN, effective 8 October 2021) • Sales/Purchase transaction of products	**Statements of Income Transactions**			
		Other income	-	-	11
		Statements of Financial Position Balances			
		Trade accounts receivable – related parties	-	-	11
41. PTT Treasury Center Company Limited (PTTTCC)	• Major shareholder (PTT) holds 100% of the shares • Services transaction	**Statements of Income Transactions**			
		Interest expense	-	-	19
		Statements of Financial Position Balances			
		Borrowings from related parties	-	-	55,600
42. Thai Petroleum Pipeline Co., Ltd. (THAPPLINE)	• Associate of PTTOR • Sales/Purchase transaction of products and services	**Statements of Income Transactions**			
		Sales of goods or rendering of services	-	-	1
		Other income	-	-	2
		Statements of Financial Position Balances			
		Other accounts receivable – related parties	-	-	2

MEASURE AND PROCEDURE FOR APPROVAL OF CONNECTED TRANSACTION

The Company's Articles of Association stated that a Director can acquire or dispose of GC assets or perform any business transaction involving GC either by himself or herself or on behalf of others only with the approval from the Audit Committee and the Board of Director. However, any Director who personally gains from any acquisition or disposal of GC asset or any transaction of GC is not allowed to vote on that matter.

After receiving approval from the Audit Committee and the Board of Directors, GC can perform any business transactions or acquire or dispose of major assets in line with the announcement of the Stock Exchange of Thailand (SET) and the Securities and Exchange Commission, Thailand (SEC). This also applies to GC's subsidiaries in the SET announcement concerning connected transaction of listed companies as well as the buying and selling of registered company assets.

NECESSITY AND JUSTIFICATION OF CONNECTED TRANSACTION

The sales of products by GC to connected companies have been carried out mainly so that they may process its products into their own products for sale at prices corresponding to long-term off-take agreements or spot prices. Prices must prove mutually beneficial and based on market prices without any undue transfer of interests or extraordinary items to both parties. When providing services to connected companies, transactions must cover transportation or storage costs of products. The charges for services are both market-based and benefit-based without any undue transfer of interests or extraordinary items.

For the product and feedstock supply and/or services as well as the volume of products, feedstock or services given by connected companies must meet the needs and business operation of GC. Prices of products trading or services are as agreed by GC and connected companies without any undue transfer of interests or extraordinary items. In addition, GC is required to purchase feedstock from connected companies because the capacity and quality of such feedstock meet its needs. GC also saves on transportation expenses since the feedstock can be transferred safely by GC's pipeline systems from their plants in Map Ta Phut Industrial Estate, Rayong.

OPINION OF INDEPENDENT DIRECTORS

The Independent Directors agreed with the Board of Directors.

POLICY AND TREND ON FUTURE CONNECTED TRANSACTION

Future connected transactions between GC and connected companies will be conducted as part of the normal course of business with no special favors and no transfer of benefits. For the pricing policy between GC and connected companies, the price of products or feedstock purchased will be set in agreement and or linked to market prices. In addition, service charges paid to connected companies will also be at arm's length. The price of product sold or purchased between GC and connected companies will, as a rule, be linked to market prices.

Disclosure of the Company's connected transaction must be in compliance with the rules and regulations of the Securities and Exchange Commission, Thailand (SEC) and the Stock Exchange of Thailand (SET). The audit standards for connected parties will be as specified by the Federation of Accounting Professions under The Royal Patronage of His Majesty the King.

Beyond growth and profit is the sustainability of the environment's health and the earth.

Beyond possession is the search for innovative solutions to natural resources conservation.

Beyond Receiving is giving and sharing

GC commits to preserve and maintain the environment and do its part toward building an environmentally sustainable business for the world by shifting to low carbon emissions business lines and setting out achieve NET ZERO greenhouse gas emissions by 2050.

03

FINANCIAL REPORTS AND FINANCIAL STATEMENTS

REPORT OF THE BOARD OF DIRECTORS' ACCOUNTABILITY TO FINANCIAL REPORT

The consolidated financial statements of PTT Global Chemical Public Company Limited and its subsidiaries were prepared in accordance with relevant laws and regulations of the Securities Exchange Commission as well as financial reporting standards prescribed by the Federation of Accounting Professions, accounting laws, and generally accepted accounting practices in Thailand.

The Company's Board of Directors is accountable for the financial report of PTT Global Chemical Public Company Limited and its subsidiaries, prepared to provide reasonable assurance that the financial report fairly presents the financial position, financial performance, and cash flows. The accounting data is sufficiently and accurately recorded to preserve the Company's assets and prevent fraud and irregularity. The financial report has been prepared according to appropriate accounting policy and consistent practices, and in compliance with the Thai Financial Reporting Standards. Material information has been sufficiently disclosed in notes to financial statements, and the auditor expressed an opinion on the financial statements of PTT Global Chemical Public Company Limited and its subsidiaries in the auditor's report.

(Signed) Mr. Piyasvasti Amranand

(Mr. Piyasvasti Amranand)
Chairman

(Signed) Mr. Kongkrapan Intarajang

(Mr. Kongkrapan Intarajang)
Chief Executive Officer
& President

REPORT OF THE INDEPENDENT CERTIFIED PUBLIC ACCOUNTANTS

TO THE SHAREHOLDERS AND BOARD OF DIRECTORS

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED

Opinion

We have audited the consolidated financial statements of PTT Global Chemical Public Company Limited and its subsidiaries (the "Group") and the separate financial statements of PTT Global Chemical Public Company Limited (the "Company") which comprise the consolidated and separate statements of financial position as at December 31, 2021, and the related consolidated and separate statements of profit or loss, comprehensive income, changes in shareholders' equity and cash flows for the year then ended, and notes to the consolidated and separate financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying consolidated and separate financial statements present fairly, in all material respects, the financial position of PTT Global Chemical Public Company Limited and its subsidiaries and of PTT Global Chemical Public Company Limited as at December 31, 2021, and financial performance and cash flows for the year then ended in accordance with Thai Financial Reporting Standards ("TFRSs").

Basis for Opinion

We conducted our audit in accordance with Thai Standards on Auditing ("TSAs"). Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Consolidated and Separate Financial Statements section of our report. We are independent of the Group in accordance with the Federation of Accounting Professions' Code of Ethics for Professional Accountants together with the ethical requirements that are relevant to the audit of the consolidated and separate financial statements, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Key Audit Matters

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the consolidated and separate financial statements of the current period. These matters were addressed in the context of our audit of the consolidated and separate financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters.

Key Audit Matter	Audit Responses
Business Acquisition On December 29, 2021, the Group completed the acquisition of investment in a subsidiary operating in special coating resins and crosslinkers business resulting in the recording of goodwill in the consolidated statements of financial position as at December 31, 2021, which is disclosed in notes to financial statements no. 4. The acquisition method of accounting for business combinations is complex and requiring the Group to determine the fair value of assets and liabilities acquired, and consideration transferred with any resulting differences recognised as goodwill or gain on bargain purchase. Due to the significant of the transactions to the consolidated financial statements and the complexities involved in determining the fair value of assets and liabilities acquired, we considered accounting for business acquisition as a key audit matter. The accounting policy of business acquisition and the detail of business acquisition are disclosed in notes to the financial statements no. 3.1 and 4, respectively.	Key audit procedures included: • Read the sale and purchase agreement to understand key terms and conditions. • Evaluated the appropriateness of the identification of assets and liabilities acquired at the acquisition date including understanding on the procedures on identification of fair value which was prepared by the management. • Evaluated the independence and competency of independent asset appraiser of the Group. • Evaluated significant assumptions in determining fair values reference to internal and external information and mathematical accuracy. • Tested the calculation of fair values intangible assets as well as the management's key assumptions used in the estimation of future cash flows. • Evaluated the adequacy of the disclosures in accordance with the relevant Thai Financial Reporting Standards.
The measurement of inventories valuation Inventories of the Group are significant balance to the consolidated and separate financial statements. The raw material and finished goods are commodities that contain intense price volatility. This volatility may lead to the net realizable value less than cost that resulting in the misstatement of inventories valuation. The accounting policy of inventories valuation of the Group and the detail of inventories are disclosed in notes to the financial statements no. 3.5 and 8, respectively.	Key audit procedures included: • Gain understanding and performing test of design and implementation as well as operating effectiveness of the relevant controls over inventories valuation measurement process. • Assessed the appropriateness of the methodology used to calculate the net realizable value of inventories at the reporting period, considered the reasonableness of the market prices used by reference to expected selling price of commodity, and tested the accuracy of the calculation. • If the net realizable value is lower than the cost, consider to propose the adjustment of allowance for diminution in value of inventories in the consolidated and separate financial statements. • Assessed the adequate disclosure in relation to the estimation of allowance for diminution in value of inventories in notes to the financial statements.

Emphasis of Matter

We draw attention to note 4 to the consolidated financial statements, the Group completed the acquisition of the investment in a subsidiary resulting in the recording of goodwill in the consolidated statements of financial position as at December 31, 2021. The fair value of business acquired and the allocation of purchase price have been provisionally determined and are subject to potential amendment. Our opinion is not modified in respect of this matter.

Other Information

Management is responsible for the other information. The other information comprises the information included in the annual report, but does not include the consolidated and separate financial statements and our auditor's report thereon.

Our opinion on the consolidated and separate financial statements does not cover the other information and we do not express any form of assurance conclusion thereon.

In connection with our audit of the consolidated and separate financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the consolidated and separate financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of Management and Those Charged with Governance for the Consolidated and Separate Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated and separate financial statements in accordance with TFRSs, and for such internal control as management determines is necessary to enable the preparation of consolidated and separate financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated and separate financial statements, management is responsible for assessing the Group's and the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Group and the Company or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Group's financial reporting process.

Auditor's Responsibilities for the Audit of the Consolidated and Separate Financial Statements

Our objectives are to obtain reasonable assurance about whether the consolidated and separate financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with TSAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated and separate financial statements.

As part of an audit in accordance with TSAs, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated and separate financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Group's and the Company's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's and the Company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group and the Company to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the consolidated and separate financial statements, including the disclosures, and whether the consolidated and separate financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with those charged with governance, we determine those matters that were of most significance in the audit of the consolidated and separate financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

Mongkol Somphol

Certified Public Accountant (Thailand) Registration No. 8444

DELOITTE TOUCHE TOHMATSU JAIYOS AUDIT CO., LTD.

BANGKOK

February 14, 2022

STATEMENTS OF FINANCIAL POSITION

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED AND SUBSIDIARIES

AS AT DECEMBER 31, 2021

Unit : Baht

		Consolidated financial statements		Separate financial statements	
	Notes	2021	2020	2021	2020
ASSETS					
CURRENT ASSETS					
Cash and cash equivalents	5	55,613,241,053	44,313,023,735	33,304,227,557	31,535,290,773
Current investments in financial assets	12	19,380,910,606	16,345,335,498	19,054,028,078	15,945,335,498
Trade receivables	6	50,540,468,307	29,276,983,757	32,344,345,314	22,591,899,926
Other receivables	7	6,024,649,078	3,725,913,018	6,350,627,794	2,013,182,817
Short-term loans to related parties	27	-	-	2,828,988,826	2,401,461,599
Current portion of long-term loans to related parties	27	52,514,143	537,230,897	52,514,143	537,230,897
Inventories	8	69,724,559,701	33,445,076,435	36,980,087,494	22,588,222,395
Receivable from oil fuel fund		810,729,488	352,786,655	810,729,488	352,786,655
Value-added tax receivable		2,395,610,343	1,017,003,656	176,237,768	-
Current derivative assets	36	1,308,079,086	126,419,586	1,297,793,040	102,956,057
Other current assets		1,393,526,001	771,178,572	860,712,287	438,395,600
Total Current Assets		207,244,287,806	129,910,951,809	134,060,291,789	98,506,762,217
NON-CURRENT ASSETS					
Investments in subsidiaries	9	-	-	107,307,337,592	76,486,497,045
Investments in joint ventures	10	34,329,199,417	32,537,248,418	15,372,927,810	15,372,927,810
Investments in associates	11	10,510,990,013	31,872,568,662	5,165,938,913	27,545,624,981
Investments in non-current financial assets	12	29,156,576,134	1,088,132,065	27,371,974,437	391,765,312
Long-term loans to related parties	27	709,611,195	176,910,584	103,797,010,864	176,910,584
Investment properties	13	6,073,511,176	6,059,315,512	1,740,783,392	1,740,783,392
Property, plant and equipment	14	289,579,487,469	269,176,931,994	177,490,859,203	182,435,178,148
Right-of-use assets	15	10,412,443,139	7,039,246,740	7,506,943,399	6,247,321,966
Goodwill	16	75,518,440,582	931,328,672	-	-
Intangible assets	17	86,501,042,833	8,591,696,182	5,452,753,262	5,832,116,969
Deferred tax assets	18	2,892,037,405	1,193,775,690	-	-
Non-current derivative assets	36	62,686,509	-	62,686,509	-
Other non-current assets		1,125,180,992	804,546,537	281,986,728	237,170,701
Total Non-current Assets		546,871,206,864	359,471,701,056	451,551,202,109	316,466,296,908
TOTAL ASSETS		754,115,494,670	489,382,652,865	585,611,493,898	414,973,059,125

Notes to the financial statements form an integral part of these statements

STATEMENTS OF FINANCIAL POSITION (CONTINUED)

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED AND SUBSIDIARIES

AS AT DECEMBER 31, 2021

Unit : Baht

		Consolidated financial statements		Separate financial statements	
	Notes	2021	2020	2021	2020
LIABILITIES AND SHAREHOLDERS' EQUITY					
CURRENT LIABILITIES					
Short-term borrowings from financial institutions	19.1	2,423,446,246	19,000,000	-	-
Trade payables	21	69,950,688,650	20,114,248,744	50,695,043,003	14,813,013,042
Other payables	22	27,504,973,115	12,505,402,375	10,670,074,656	6,237,433,297
Payables to contractors		2,692,942,933	2,955,798,483	2,960,367,331	2,020,050,501
Current portion of long-term borrowings from financial institutions	19.2	4,305,116,387	1,974,396,723	997,978,060	-
Current portion of long-term borrowings from other parties	19.2	45,955,862	44,720,765	-	-
Current portion of long-term borrowings from a related party	19.2 and 27	-	-	16,645,292,631	-
Current portion of debentures	19.3	33,484,375,947	19,997,512,767	16,924,370,884	19,997,512,767
Current portion of lease liabilities	20	1,618,566,872	1,056,561,073	1,197,347,473	1,104,511,331
Short-term borrowings from related parties	19.1 and 27	-	-	10,088,874,563	5,607,533,287
Income tax payable		1,471,453,755	218,499,158	-	-
Current provisions		666,114,941	38,040,125	-	-
Current derivative liabilities	36	1,861,550,383	100,644,196	1,331,169,027	98,520,508
Other current liabilities		981,642,644	16,664,501	-	-
Total Current Liabilities		147,006,827,735	59,041,488,910	111,510,517,628	49,878,574,733
NON-CURRENT LIABILITIES					
Long-term borrowings from financial institutions	19.2	92,933,237,707	60,977,020,390	31,875,582,459	32,831,030,148
Long-term borrowings from other parties	19.2	210,206,396	249,277,714	-	-
Long-term borrowing from a related party	19.2 and 27	55,600,000,000	-	106,996,823,620	14,947,739,623
Debentures	19.3	76,016,443,449	65,034,485,827	34,969,273,442	50,166,555,151
Lease liabilities	20	8,737,551,202	5,730,475,260	6,314,581,265	4,959,309,709
Deferred tax liabilities	18	32,391,560,110	1,722,849,607	4,903,516,822	905,155,989
Provisions for employee benefits	23	11,120,601,931	6,378,372,984	4,571,647,977	4,549,218,304
Other non-current provisions		1,578,529,452	675,728,127	-	-
Non-current derivative liabilities	36	17,933,787	95,878,510	-	-
Other non-current liabilities		899,436,256	483,116,039	660,546,306	396,595,553
Total Non-current Liabilities		279,505,500,290	141,347,204,458	190,291,971,891	108,755,604,477
TOTAL LIABILITIES		426,512,328,025	200,388,693,368	301,802,489,519	158,634,179,210

Notes to the financial statements form an integral part of these statements

STATEMENTS OF FINANCIAL POSITION (CONTINUED)

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED AND SUBSIDIARIES

AS AT DECEMBER 31, 2021

Unit : Baht

		Consolidated financial statements		Separate financial statements	
	Notes	2021	2020	2021	2020
LIABILITIES AND SHAREHOLDERS' EQUITY					
(CONTINUED)					
SHAREHOLDERS' EQUITY					
Share capital	24				
Authorized share capital					
4,508,849,117 ordinary shares of					
Baht 10 each		45,088,491,170	45,088,491,170	45,088,491,170	45,088,491,170
Issued and paid-up share capital					
4,508,849,117 ordinary shares of					
Baht 10 each		45,088,491,170	45,088,491,170	45,088,491,170	45,088,491,170
Treasury stock	26	-	(1,187,603,325)	-	(1,187,603,325)
Premium on ordinary shares	25	36,936,829,684	36,936,829,684	36,936,829,684	36,936,829,684
Premium on treasury stock	25 and 26	1,553,065,959	1,386,740,109	1,553,065,959	1,386,740,109
Difference arising from business combination under common control	25	636,103,835	1,690,706,891	77,453,518	77,453,518
Difference arising from the change in the ownership interest in an investment	11	-	(3,407,679,334)	-	-
Put option over non-controlling interest		(1,286,083,982)	(1,286,083,982)	-	-
Retained earnings					
Appropriated					
Legal reserve	25	4,512,930,269	4,512,930,269	4,512,930,269	4,512,930,269
Loan repayment reserve		807,802,564	807,802,564	807,802,564	807,802,564
Projects expansion reserve		12,446,994,126	12,446,994,126	12,446,994,126	12,446,994,126
Treasury stock reserve	25 and 26	-	1,187,603,325	-	1,187,603,325
Unappropriated		213,213,982,065	183,652,322,579	180,098,471,379	155,067,062,758
Other components of shareholder's equity		4,331,721,796	(813,946,776)	2,286,965,710	14,575,717
Total attributions to owners of the parent		318,241,837,486	281,015,107,300	283,809,004,379	256,338,879,915
Non-controlling interests		9,361,329,159	7,978,852,197	-	-
TOTAL SHAREHOLDERS' EQUITY		327,603,166,645	288,993,959,497	283,809,004,379	256,338,879,915
TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY		754,115,494,670	489,382,652,865	585,611,493,898	414,973,059,125

Notes to the financial statements form an integral part of these statements

STATEMENTS OF PROFIT OR LOSS

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED AND SUBSIDIARIES

FOR THE YEAR ENDED DECEMBER 31, 2021

Unit : Baht

		Consolidated financial statements		Separate financial statements	
	Notes	2021	2020	2021	2020
Revenues from sale of goods and rendering of services		468,953,182,988	329,291,166,983	379,941,440,907	270,233,104,363
Cost of sale of goods and rendering of services		(409,783,254,914)	(317,093,362,394)	(348,950,755,062)	(268,328,751,453)
Gross profit		59,169,928,074	12,197,804,589	30,990,685,845	1,904,352,910
Investment income	32	11,229,136,531	362,352,831	24,492,455,250	3,501,096,568
Net gain from sale of investment in joint venture and associate	10 and 11	10,201,106,624	-	12,382,867,826	-
Other income		1,106,944,913	1,920,160,459	2,036,951,814	2,704,704,537
Selling and distribution expenses		(6,701,004,341)	(3,687,133,983)	(2,019,772,999)	(1,823,419,161)
Administrative expenses		(15,026,336,751)	(11,194,067,223)	(9,861,805,235)	(7,404,040,088)
Reversal of (expenses from) impairment losses on assets		(1,891,717,008)	312,702,016	(3,853,559,867)	-
Net derivative gain (loss)	33	(5,942,033,436)	1,168,860,166	(4,972,358,490)	629,245,829
Net loss on foreign exchange rate		(263,044,261)	(349,539,489)	(1,330,373,704)	(274,500,540)
Profit (loss) from operating activities		51,882,980,345	731,139,366	47,865,090,440	(762,559,945)
Finance costs	30	(5,945,134,552)	(3,511,095,162)	(5,324,814,178)	(3,276,306,464)
Share of profit of investments in joint ventures	10	4,155,316,877	863,193,963	-	-
Share of profit of investments in associates	11	2,685,268,657	2,459,356,255	-	-
Profit (loss) before income tax benefit (expense)		52,778,431,327	542,594,422	42,540,276,262	(4,038,866,409)
Income tax benefit (expense)	18	(7,228,351,078)	109,285,418	(5,411,579,383)	659,318,891
PROFIT (LOSS) FOR THE YEAR		45,550,080,249	651,879,840	37,128,696,879	(3,379,547,518)
PROFIT (LOSS) ATTRIBUTABLE TO					
Owners of the parent		44,982,387,544	199,606,690	37,128,696,879	(3,379,547,518)
Non-controlling interests		567,692,705	452,273,150	-	-
		45,550,080,249	651,879,840	37,128,696,879	(3,379,547,518)
BASIC EARNINGS (LOSS) PER SHARE	34	10.01	0.04	8.26	(0.75)

Notes to the financial statements form an integral part of these statements

STATEMENTS OF COMPREHENSIVE INCOME

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED AND SUBSIDIARIES

FOR THE YEAR ENDED DECEMBER 31, 2021

Unit : Baht

	Notes	Consolidated financial statements		Separate financial statements	
		2021	2020	2021	2020
PROFIT (LOSS) FOR THE YEAR		45,550,080,249	651,879,840	37,128,696,879	(3,379,547,518)
OTHER COMPREHENSIVE INCOME (LOSS)					
Items that will be reclassified subsequently to profit or loss					
Exchange differences on translating financial statements		786,249,719	239,453,623	-	-
Loss on remeasurement of investments in financial assets measured at fair value through other comprehensive income		(1,553,247)	(17,597,358)	(1,553,247)	(17,597,358)
Gain (loss) on cash flow hedges		35,100,913	293,797,310	(940,548,243)	82,695,848
Share of other comprehensive income of joint ventures	10	315,122,937	54,122,545	-	-
Share of other comprehensive income of associates	11	243,541,397	89,762,492	-	-
Items that will not be reclassified subsequently to profit or loss					
Gain (loss) on remeasurements of defined benefit plans		293,180,073	(344,793,249)	173,984,103	(216,626,068)
Gain (loss) on remeasurement of investments in financial assets measured at fair value through other comprehensive income		3,648,840,100	(9,592,392)	3,214,491,483	-
Share of other comprehensive income of joint ventures	10	74,770,585	224,643,094	-	-
Share of other comprehensive income (loss) of associates	11	35,946,752	(55,376,370)	-	-
OTHER COMPREHENSIVE INCOME (LOSS) FOR THE YEAR, NET OF TAX		5,431,199,229	474,419,695	2,446,374,096	(151,527,578)
TOTAL COMPREHENSIVE INCOME (LOSS) FOR THE YEAR		50,981,279,478	1,126,299,535	39,575,070,975	(3,531,075,096)
TOTAL COMPREHENSIVE INCOME (LOSS) ATTRIBUTABLE TO					
Owners of the parent		50,386,279,753	642,584,328	39,575,070,975	(3,531,075,096)
Non-controlling interests		594,999,725	483,715,207	-	-
		50,981,279,478	1,126,299,535	39,575,070,975	(3,531,075,096)

Notes to the financial statements form an integral part of these statements

STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED AND SUBSIDIARIES

FOR THE YEAR ENDED DECEMBER 31, 2021

									Retained earnings		
	Notes	Issued and paid-up share capital	Treasury stock	Premium on ordinary shares	Premium on treasury stock	Difference arising from business combination under common control	Difference arising from the change in the ownership interest in an investment	Put option over non-controlling interest	Legal reserve	Loans repayment reserve	Projects expansion reserve
BALANCE AS AT JANUARY 1, 2020											
- AS PREVIOUSLY REPORTED		45,088,491,170	(1,187,603,325)	36,936,829,684	1,386,740,109	1,690,706,891	(3,407,679,334)	-	4,512,930,269	807,802,564	12,446,994,126
Effects from first-time adoption of new accounting policies		-	-	-	-	-	-	(1,286,083,982)	-	-	-
BALANCE AS AT JANUARY 1, 2020 - RESTATED		45,088,491,170	(1,187,603,325)	36,936,829,684	1,386,740,109	1,690,706,891	(3,407,679,334)	(1,286,083,982)	4,512,930,269	807,802,564	12,446,994,126
Dividends paid	35	-	-	-	-	-	-	-	-	-	-
Increase investment in a subsidiary		-	-	-	-	-	-	-	-	-	-
Profit for the year		-	-	-	-	-	-	-	-	-	-
Other comprehensive income (loss)		-	-	-	-	-	-	-	-	-	-
BALANCE AS AT DECEMBER 31, 2020		45,088,491,170	(1,187,603,325)	36,936,829,684	1,386,740,109	1,690,706,891	(3,407,679,334)	(1,286,083,982)	4,512,930,269	807,802,564	12,446,994,126
BALANCE AS AT JANUARY 1, 2021		45,088,491,170	(1,187,603,325)	36,936,829,684	1,386,740,109	1,690,706,891	(3,407,679,334)	(1,286,083,982)	4,512,930,269	807,802,564	12,446,994,126
Sale of treasury stock	26	-	1,187,603,325	-	166,325,850	-	-	-	-	-	-
Dividends paid	35	-	-	-	-	-	-	-	-	-	-
Increase investment in a subsidiary		-	-	-	-	-	-	-	-	-	-
Impact of business restructuring	10	-	-	-	-	(1,054,603,056)	-	-	-	-	-
Changes in ownership interest in associate	11	-	-	-	-	-	3,407,679,334	-	-	-	-
Acquisition of businesses	4	-	-	-	-	-	-	-	-	-	-
Profit for the year		-	-	-	-	-	-	-	-	-	-
Other comprehensive income (loss)		-	-	-	-	-	-	-	-	-	-
BALANCE AS AT DECEMBER 31, 2021		45,088,491,170	-	36,936,829,684	1,553,065,959	636,103,835	-	(1,286,083,982)	4,512,930,269	807,802,564	12,446,994,126

Notes to the financial statements form an integral part of these statements

Unit : Baht

Consolidated financial statements

		Other components of shareholders' equity								
Treasury stock reserve	Unappropriated	Exchange differences on translating financial statements	Gain (loss) on remeasurement of investments in financial assets measured at fair value through other comprehensive income	Gain (loss) on arising on hedging instruments from cash flow hedges	Share of other comprehensive income (loss) of joint ventures	Share of other comprehensive income (loss) of associates	Total other components of shareholders' equity	Total attributions to owners of the parent	Non-controlling interests	Total shareholders' equity
1,187,603,325	187,854,749,537	(1,124,423,219)	85,561,284	(248,559,917)	161,404,813	(361,378,344)	(1,487,395,383)	285,830,169,633	7,765,178,543	293,595,348,176
-	501,104,973	-	(71,362,242)	-	(3,255,570)	(111,721,683)	(186,339,495)	(971,318,504)	-	(971,318,504)
1,187,603,325	188,355,854,510	(1,124,423,219)	14,199,042	(248,559,917)	158,149,243	(473,100,027)	(1,673,734,878)	284,858,851,129	7,765,178,543	292,624,029,672
-	(4,486,328,157)	-	-	-	-	-	-	(4,486,328,157)	(537,692,786)	(5,024,020,943)
-	-	-	-	-	-	-	-	-	267,651,233	267,651,233
-	199,606,690	-	-	-	-	-	-	199,606,690	452,273,150	651,879,840
-	(416,810,464)	210,617,614	(27,189,749)	275,037,181	339,258,608	62,064,448	859,788,102	442,977,638	31,442,057	474,419,695
1,187,603,325	183,652,322,579	(913,805,605)	(12,990,707)	26,477,264	497,407,851	(411,035,579)	(813,946,776)	281,015,107,300	7,978,852,197	288,993,959,497
1,187,603,325	183,652,322,579	(913,805,605)	(12,990,707)	26,477,264	497,407,851	(411,035,579)	(813,946,776)	281,015,107,300	7,978,852,197	288,993,959,497
(1,187,603,325)	1,187,603,325	-	-	-	-	-	-	1,353,929,175	-	1,353,929,175
-	(13,458,875,686)	-	-	-	-	-	-	(13,458,875,686)	(620,860,475)	(14,079,736,161)
-	-	-	-	-	-	-	-	-	282,182,600	282,182,600
-	-	-	-	-	-	-	-	(1,054,603,056)	-	(1,054,603,056)
-	(3,519,337,172)	-	-	-	-	111,657,838	111,657,838	-	-	-
-	-	-	-	-	-	-	-	-	1,126,155,112	1,126,155,112
-	44,982,387,544	-	-	-	-	-	-	44,982,387,544	567,692,705	45,550,080,249
-	369,881,475	763,361,363	3,647,877,959	40,518,487	311,635,959	270,616,966	5,034,010,734	5,403,892,209	27,307,020	5,431,199,229
-	213,213,982,065	(150,444,242)	3,634,887,252	66,995,751	809,043,810	(28,760,775)	4,331,721,796	318,241,837,486	9,361,329,159	327,603,166,645

STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY (CONTINUED)

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED AND SUBSIDIARIES

FOR THE YEAR ENDED DECEMBER 31, 2021

	Notes	Issued and paid-up share capital	Treasury stock	Premium on ordinary shares	Premium on treasury stock	Difference arising from business combination under common control	Legal reserve
BALANCE AS AT JANUARY 1, 2020							
- AS PREVIOUSLY REPORTED		45,088,491,170	(1,187,603,325)	36,936,829,684	1,386,740,109	77,453,518	4,512,930,269
Effects from first-time adoption of new accounting policies		-	-	-	-	-	-
BALANCE AS AT JANUARY 1, 2020 - RESTATED		45,088,491,170	(1,187,603,325)	36,936,829,684	1,386,740,109	77,453,518	4,512,930,269
Dividends paid	35	-	-	-	-	-	-
Loss for the year		-	-	-	-	-	-
Other comprehensive income (loss)		-	-	-	-	-	-
BALANCE AS AT DECEMBER 31, 2020		45,088,491,170	(1,187,603,325)	36,936,829,684	1,386,740,109	77,453,518	4,512,930,269
BALANCE AS AT JANUARY 1, 2021		45,088,491,170	(1,187,603,325)	36,936,829,684	1,386,740,109	77,453,518	4,512,930,269
Sale of treasury stock	26	-	1,187,603,325	-	166,325,850	-	-
Dividends paid	35	-	-	-	-	-	-
Profit for the year		-	-	-	-	-	-
Other comprehensive income (loss)		-	-	-	-	-	-
BALANCE AS AT DECEMBER 31, 2021		45,088,491,170	-	36,936,829,684	1,553,065,959	77,453,518	4,512,930,269

Notes to the financial statements form an integral part of these statements

Unit : Baht

Separate financial statements							
Retained earnings				Other components of shareholders' equity			
Loans repayment reserve	Projects expansion reserve	Treasury stock reserve	Unappropriated	Gain (loss) on remeasurement of investments in financial assets measured at fair value through other comprehensive income	Gain (loss) on arising on hedging instruments from cash flow hedges	Total other components of shareholders' equity	Total shareholders' equity
807,802,564	12,446,994,126	1,187,603,325	163,299,727,947	85,561,284	(68,891,286)	16,669,998	264,573,639,385
-	-	-	(150,163,446)	(67,192,771)	-	(67,192,771)	(217,356,217)
807,802,564	12,446,994,126	1,187,603,325	163,149,564,501	18,368,513	(68,891,286)	(50,522,773)	264,356,283,168
-	-	-	(4,486,328,157)	-	-	-	(4,486,328,157)
-	-	-	(3,379,547,518)	-	-	-	(3,379,547,518)
-	-	-	(216,626,068)	(17,597,358)	82,695,848	65,098,490	(151,527,578)
807,802,564	12,446,994,126	1,187,603,325	155,067,062,758	771,155	13,804,562	14,575,717	256,338,879,915
807,802,564	12,446,994,126	1,187,603,325	155,067,062,758	771,155	13,804,562	14,575,717	256,338,879,915
-	-	(1,187,603,325)	1,187,603,325	-	-	-	1,353,929,175
-	-	-	(13,458,875,686)	-	-	-	(13,458,875,686)
-	-	-	37,128,696,879	-	-	-	37,128,696,879
-	-	-	173,984,103	3,212,938,236	(940,548,243)	2,272,389,993	2,446,374,096
807,802,564	12,446,994,126	-	180,098,471,379	3,213,709,391	(926,743,681)	2,286,965,710	283,809,004,379

STATEMENTS OF CASH FLOWS

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED AND SUBSIDIARIES

FOR THE YEAR ENDED DECEMBER 31, 2021

Unit : Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
CASH FLOWS FROM OPERATING ACTIVITIES				
Profit (loss) for the year	45,550,080,249	651,879,840	37,128,696,879	(3,379,547,518)
Adjustments for:				
Income tax (benefit) expense	7,228,351,078	(109,285,418)	5,411,579,383	(659,318,891)
Depreciation and amortization	22,738,223,413	20,291,818,509	15,545,434,102	14,322,549,643
Investment income	(642,073,978)	(394,040,492)	(13,474,258,536)	(3,532,784,229)
Net gain from sale of investment in joint ventures and associate	(10,201,106,624)	-	(12,382,867,826)	-
Finance costs	5,945,134,552	3,511,095,162	5,324,814,178	3,276,306,464
Unrealised (gain) loss on derivatives	1,293,833,763	(762,191,080)	897,582,018	(266,620,570)
(Gain) loss on foreign exchange rates	6,266,945,743	145,131,878	6,350,502,373	(102,674,163)
(Gain) loss on remeasurement of investments in financial assets measured at fair value	(10,587,062,553)	31,687,661	(11,018,196,714)	31,687,661
Expected credit loss of receivables	20,744,068	18,605,911	-	8,870,997
(Gain) loss on obsolete inventories	281,813,897	(10,485,624)	245,551,833	4,800,289
(Reversal of) loss on inventories devaluation	216,663,984	(275,457,874)	223,574,346	(236,874,043)
Loss from written-off of assets	62,344,618	84,007,489	47,603,282	36,134,970
(Reversal of) impairment losses on assets	1,891,717,008	(312,702,016)	3,853,559,867	-
Loss on disposal of property, plant and equipment and right-of-use assets	724,767,790	108,089,715	382,251,787	34,440,191
Provision expenses	443,570,129	-	-	-
Provision for employee benefits	622,577,678	592,025,240	357,443,091	425,344,122
Other revenues	(16,951,225)	(11,388,015)	(16,951,225)	(10,910,452)
Share of profit of investments in joint ventures	(4,155,316,877)	(863,193,963)	-	-
Share of profit of investments in associates	(2,685,268,657)	(2,459,356,255)	-	-
Profit from operations before changes in operating assets and liabilities	64,998,988,056	20,236,240,668	38,876,318,838	9,951,404,471
Operating assets (increase) decrease				
Trade receivables	(12,879,449,351)	4,840,046,689	(9,763,632,322)	5,368,317,930
Other receivables	(581,574,492)	(317,538,768)	(855,860,372)	32,091,018
Inventories	(20,020,509,539)	5,003,944,314	(14,908,594,562)	4,011,782,026
Value-added tax receivable	(839,824,166)	713,859,858	(176,237,768)	492,422,615
Other current assets	(1,458,458,919)	(292,450,496)	(880,196,175)	(129,871,876)
Other non-current assets	(37,922,909)	(223,918,175)	(19,611,037)	3,976,372
Operating liabilities increase (decrease)				
Trade payables	37,806,268,634	(5,513,946,257)	35,881,064,714	(5,108,399,197)
Other payables	5,839,346,864	(1,546,144,943)	4,184,306,026	(2,176,382,563)
Current provisions	19,692,001	(65,887,076)	-	-
Other current liabilities	24,281,964	(16,183,807)	-	-
Cash paid for provisions for employee benefits	(198,429,727)	(240,429,549)	(131,874,033)	(141,782,676)
Other non-current provisions	213,016	23,040,419	-	-
Other non-current liabilities	180,293,980	(13,346,055)	106,967,585	(8,900,807)
Cash received from operations	72,852,915,412	22,587,286,822	52,312,650,894	12,294,657,313
Cash (paid) received for income tax	(4,203,034,368)	(441,525,689)	(2,869,834,163)	203,609,645
Net cash flows provided by operating activities	68,649,881,044	22,145,761,133	49,442,816,731	12,498,266,958

Notes to the financial statements form an integral part of these statements

STATEMENTS OF CASH FLOWS (CONTINUED)

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED AND SUBSIDIARIES

FOR THE YEAR ENDED DECEMBER 31, 2021

Unit : Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
CASH FLOWS FROM INVESTING ACTIVITIES				
Interest received	432,017,884	345,062,304	465,866,861	291,907,332
Dividends received	2,207,407,729	2,762,834,580	10,094,634,546	3,201,503,566
Acquisition of property, plant and equipment and intangible assets	(16,074,140,395)	(25,059,291,918)	(8,284,582,339)	(14,897,302,064)
Proceeds from sale of property, plant and equipment	195,899,262	112,161,140	62,521,546	31,815,106
Increase of investments in financial assets in debt instruments	(4,771,375,955)	(7,628,656,269)	(4,851,375,954)	(9,954,679,903)
Cash paid for investments in financial assets in equity instruments	(257,913,979)	(123,242,102)	-	-
Proceeds from sales of investments in financial assets in equity instruments	-	182,576,677	-	182,576,677
Acquisition of investments in subsidiaries, joint ventures and associates	(134,410,843,700)	(1,549,450,000)	(36,862,425,568)	(4,668,357,405)
Proceeds from sale of investment in joint ventures and associate	25,271,201,231	-	25,125,572,920	-
Proceeds from short-term loans to related parties	165,326,000	1,122,984,335	1,964,531,885	1,122,984,335
Increase in short-term loans to related parties	(12,548,848,502)	-	(2,423,834,812)	(1,972,158,712)
Proceeds from long-term loans to related parties	597,492,016	1,560,553,399	597,492,016	1,560,553,399
Increase in long-term loans to related parties	(9,649,611,689)	-	(103,676,852,401)	-
Net cash flows used in investing activities	(148,843,390,098)	(28,274,467,854)	(117,788,451,300)	(25,101,157,669)
CASH FLOWS FROM FINANCING ACTIVITIES				
Finance costs paid	(6,316,429,890)	(3,364,687,807)	(5,078,261,394)	(3,141,230,556)
Dividends paid	(14,079,736,161)	(5,024,020,943)	(13,458,875,686)	(4,486,328,157)
Cash paid for lease liabilities	(1,378,301,475)	(982,065,003)	(1,425,569,376)	(1,056,547,971)
Proceeds from short-term borrowings from financial institutions	2,036,666,492	10,400,000	-	-
Proceeds from short-term borrowings from related parties	-	-	4,709,609,205	2,587,547,946
Proceeds from long-term borrowings from financial institutions	40,491,755,134	36,108,345,000	-	30,000,000,000
Proceeds from long-term borrowings from related parties	55,600,000,000	-	104,039,889,380	-
Repayment of short-term borrowings from financial institutions	-	(2,036,354,170)	-	-
Repayment of short-term borrowings from related parties	-	-	(228,267,929)	(20,924,678)
Repayment of long-term borrowings from financial institutions	(7,907,646,400)	(8,142,495,000)	-	(7,111,495,000)
Repayment of long-term borrowings from other parties	(45,861,270)	(42,929,835)	-	-
Proceeds from increase in investment in subsidiaries from non-controlling interests	282,182,600	267,651,233	-	-
Proceeds from debentures	39,999,512,500	15,000,000,000	-	15,000,000,000
Repayment of debentures	(20,000,000,000)	-	(20,000,000,000)	-
Proceeds from sale of treasury stock	1,353,929,175	-	1,353,929,175	-
Net cash flows provided by financing activities	90,036,070,705	31,793,843,475	69,912,453,375	31,771,021,584
Net increase in cash and cash equivalents, before effect from foreign exchange rate	9,842,561,651	25,665,136,754	1,566,818,806	19,168,130,873
Effect from foreign exchange rate in cash and cash equivalents and effect from translation differences on financial statements	1,457,655,667	(192,416,843)	202,117,978	(30,257,435)
Net increase in cash and cash equivalents	11,300,217,318	25,472,719,911	1,768,936,784	19,137,873,438
Cash and cash equivalents as at January 1,	44,313,023,735	18,840,303,824	31,535,290,773	12,397,417,335
Cash and cash equivalents as at December 31,	55,613,241,053	44,313,023,735	33,304,227,557	31,535,290,773
Non-cash items				
Payables to contractors	2,692,942,933	2,955,798,483	2,960,367,331	2,020,050,501

Notes to the financial statements form an integral part of these statements

NOTES TO THE FINANCIAL STATEMENTS

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED
AND SUBSIDIARIES
FOR THE YEAR ENDED DECEMBER 31, 2021

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1. THE COMPANY'S OPERATIONS AND GENERAL INFORMATION

PTT Global Chemical Public Company Limited (the "Company") was registered on October 19, 2011 in accordance with the Public Company Limited Act, B.E. 2535. The Board of Governors of the SET approved the listing of the Company on the day that the Registrar accepted the registration on October 19, 2011.

The Company is a company in the PTT Public Company Limited ("PTT") group of companies. PTT is incorporated in Thailand and is the major shareholder of the Company, holding 45.18% of the Company's issued and paid-up share capital.

The Company is incorporated in Thailand and has its registered offices as follows:

Head Office	:	555/1, Energy Complex, Building A, 14th - 18th Floor, Vibhavadi-Rangsit Road, Chatuchak, Bangkok, Thailand
Branch 1 (Rayong office Branch)	:	59, Radniyom Road, Tambon Noenphra, Amphoe Mueang Rayong, Rayong, Thailand
Branch 2 (Olefin 1 Branch)	:	14, I-1 Road, Tambon Map Ta Phut, Amphoe Mueang Rayong, Rayong, Thailand
Branch 3 (Olefin 2 Branch)	:	9, I-4 Road, Tambon Map Ta Phut, Amphoe Mueang Rayong, Rayong, Thailand
Branch 4 (Aromatics 1 Branch)	:	4, I-2 Road, Tambon Map Ta Phut, Amphoe Mueang Rayong, Rayong, Thailand
Branch 5 (Aromatics 2 Branch)	:	98/9, Rayong 3191 Road, Tambon Map Ta Phut, Amphoe Mueang Rayong, Rayong, Thailand
Branch 6 (Refining Branch)	:	8, I-8 Road, Tambon Map Ta Phut, Amphoe Mueang Rayong, Rayong, Thailand
Branch 7 (Jetty and Buffer Tank Farm Branch)	:	19, Rong Pui Road, Tambon Map Ta Phut, Amphoe Mueang Rayong, Rayong, Thailand
Branch 8 (Aromatics reserve Branch)	:	11, I-4 Road, Tambon Map Ta Phut, Amphoe Mueang Rayong, Rayong, Thailand
Branch 9 (Lab Service Center Branch)	:	24/9, Pakorn Songkrao-Rat Road, Tambon Map Ta Phut, Amphoe Mueang Rayong, Rayong, Thailand
Branch 10 (PTTGC 10 Branch)	:	555/1, Energy Complex, Building A, 1st Floor, Vibhavadi-Rangsit Road, Chatuchak, Bangkok, Thailand
Branch 11 (Olefin 3 Branch)	:	8, Phadang Road, Tambon Map Ta Phut, Amphoe Mueang Rayong, Rayong, Thailand
Branch 12 (Polyethylene Branch)	:	8, Map Ta Phut Industrial Estate, I-10 Road, Tambon Map Ta Phut, Amphoe Mueang Rayong, Rayong, Thailand
Branch 13 (Innoplus Solution Center Branch)	:	83/9-10, Moo 5, Tambon Tabma, Amphoe Mueang Rayong, Rayong, Thailand
Branch 14 (Maintenance office)	:	32, Rong Pui Road, Tambon Map Ta Phut, Amphoe Mueang Rayong, Rayong, Thailand
Branch 15 (GC Chemical Experience Campus)	:	66, National highway 363 Road, Tambon Noenphra, Amphoe Mueang Rayong, Rayong, Thailand

The principal businesses of the Company are refining and provision of integrated petroleum products, production and distribution of aromatics products including aromatic derivatives and production and distribution of ethylene, propylene, polyethylene plastic pellets and biochemical products. By-products are mixed C4, cracker bottom and tail gas. Minor activities are production and distribution of electricity, water, steam and other utilities. In addition, the Company also operates production support facilities such as jetty and buffer tank farm services for liquid chemical, oil and gas.

Coronavirus Disease 2019 Pandemic

The Coronavirus disease 2019 ("COVID-19") pandemic is continuing to evolve, resulting in an economic slowdown and adversely impacting most businesses and industries. This situation may bring uncertainties and have an impact on the operating environment. The Company and its subsidiaries' (the "Group") management considered that there is no financial impact in respect of valuation of assets, provisions and contingent liabilities. However, the Group's management will continue to monitor the ongoing situation.

2. BASIS FOR PREPARATION AND PRESENTATION OF THE FINANCIAL STATEMENTS

2.1 The Group maintains its accounting records in Thai Baht and prepares its statutory financial statements in the Thai language in conformity with Thai Financial Reporting Standards (TFRS) and accounting practices generally accepted in Thailand.

2.2 The Group's financial statements have been prepared in accordance with the Thai Accounting Standard (TAS) No. 1 "Presentation of Financial Statements", which was effective for financial periods beginning on or after January 1, 2021 onward, and the Regulation of The Stock Exchange of Thailand (SET) dated October 2, 2017, regarding the preparation and submission of financial statements and reports for the financial position and results of operations of the listed companies B.E. 2560 and the Notification of the Department of Business Development regarding "The Brief Particulars in the Financial Statements (No.3) B.E. 2562" dated December 26, 2019.

2.3 The financial statements have been prepared under the historical cost convention except as disclosed in the significant accounting policies.

2.4 An English version of the financial statements have been prepared from the financial statements that is in the Thai language under law. In the event of a conflict or a difference in interpretation between the two languages, the Thai language financial information shall prevail.

2.5 The consolidated financial statements included the accounts of the Group, after elimination of intercompany transactions, of which the percentage of shareholding as at December 31, 2021 and 2020, are as follows:

Name of the entity	Type of business	Country of incorporation	Ownership interest (%)	
			2021	2020
Direct subsidiaries				
Global Green Chemicals Plc.	Manufacturing and distributing biochemical products	Thailand	72.29	72.29
GC Glycol Co., Ltd.	Manufacturing and distributing petrochemical products	Thailand	100	100
GC Polyols Co., Ltd.	Manufacturing and distributing petrochemical products	Thailand	82.10	82.10
GC Marketing Solutions Co., Ltd.	Development, marketing and distributing polymers products, by-products and other polymers-related products	Thailand	100	100
GC Maintenance and Engineering Co., Ltd.	Factory maintenance and engineering services	Thailand	100	100

Name of the entity	Type of business	Country of incorporation	Ownership interest (%)	
			2021	2020
GC Logistics Solutions Co., Ltd.	Transportation, warehouse and bagging packing management of polyethylene plastic pellets	Thailand	100	100
GC Ventures Co., Ltd.	Invest in form of Corporate Venture Capital (CVC)	Thailand	100	100
GC Treasury Center Co., Ltd.	Financial service management for the group	Thailand	100	100
GC Styrenics Co., Ltd.	Manufacturing and distributing petrochemical products	Thailand	100	100
GC Oxirane Co., Ltd.	Manufacturing and distributing petrochemical products	Thailand	100	100
GC-M PTA Co., Ltd. (49% Direct interest and 25% Indirect interest)	Manufacturing and distributing petrochemical products	Thailand	74	74
GC Estate Co., Ltd.	Real estate development for rent and to invest in petrochemical and related industries	Thailand	100	100
Solution Creation Co., Ltd.	Manufacturing and distributing petrochemical products and health and nutrition products	Thailand	100	100
Thai Tank Terminal Limited	Service for the storage and handling of liquid chemicals, oil and gas	Thailand	51	51
PTT Phenol Co., Ltd.	Manufacturing and distributing petrochemical products	Thailand	100	100
NPC Safety and Environmental Service Co., Ltd.	Safety and environmental services	Thailand	100	100
Envicco Co., Ltd.	Manufacturing, distributing and developing recycled plastic and by-products	Thailand	70	70
PTTGC America Corporation	Holding and operating international business	United States of America	100	100
PTTGC International Private Limited	Holding and operating international business	Singapore	100	100

Name of the entity	Type of business	Country of incorporation	Ownership interest (%)	
			2021	2020
Indirect subsidiaries				
GGC Biochemicals Co., Ltd.	Holding and operating in Thailand	Thailand	72.29	72.29
Thai Fatty Alcohols Co., Ltd.	Manufacturing and distributing biochemical products	Thailand	72.29	72.29
Thai Pet Resin Co., Ltd.	Manufacturing and distributing petrochemical products	Thailand	74	74
PL Global Transport Co., Ltd.	Transportation of polyethylene plastic pellets	Thailand	100	100
NPC S&E Security Guard Co., Ltd.	Safety services	Thailand	100	100
GC Logistics Solutions (Vietnam) Co., Ltd.	Transportation, warehouse and bagging packing management of polyethylene plastic pellets	Vietnam	100	100
GC Ventures America Corporation	Invest in form of Corporate Venture Capital (CVC) outside Thailand	United States of America	100	100
GCM Polymer Trading DMCC	Distributing polymer products and other polymers-related products	United Arab Emirates	100	100
GC Marketing Solutions Myanmar Co., Ltd.	Distributing polymer products and other polymers-related products	Myanmar	100	100
GC Marketing Solutions Vietnam Co., Ltd.	Distributing polymer products and other polymers-related products	Vietnam	100	100
PT GCM Marketing Solutions Indonesia	Distributing polymer products and other polymers-related products	Indonesia	67	67
GC Marketing Solutions (Shanghai) Co., Ltd.	Distributing polymer products and other polymers-related products	China	100	-
PTTGC America LLC	Operating petrochemical business	United States of America	100	100
PTTGC Innovation America Corporation	Research and development of bio-based chemicals	United States of America	100	100
PTTGC International (Netherlands) B.V.	Holding and operating international business	Netherlands	100	100
GC International Corporation	Holding and operating international business	United States of America	100	100
Vencorex Holding	Manufacturing and distributing chemical specialties	France	90.82	90.82
Allnex Holding GmbH	Manufacturing and distributing industrial coating resins and additives	Germany	100	-

2.6 Thai Financial Reporting Standards affecting the presentation and disclosure in the current period financial statements

During the year, the Group has adopted the revised financial reporting standards and the Conceptual Framework for Financial Reporting guidelines on accounting issued by the Federation of Accounting Professions which are effective for fiscal years beginning on or after January 1, 2021. These financial reporting standards were aimed at alignment with the corresponding International Financial Reporting Standards, with most of the changes directed towards revisions to references to the Conceptual Framework in TFRSs, the amendment for definition of business, the amendment for definition of materiality and accounting requirements for interest rate reform. The adoption of these financial reporting standards does not have any significant impact on the Group's financial statements.

2.7 Thai Financial Reporting Standards announced in the Royal Gazette but not yet effective

The 2021 amendment to Thai Financial Reporting Standards No. 16 "Leases" ("TFRS 16") added the requirements for the temporary exception arising from interest rate benchmark reform, which the Group shall apply these amendments for annual reporting periods beginning on or after January 1, 2022 with earlier application permitted. This revised TFRS 16 has been announced in the Royal Gazette on January 27, 2021.

Subsequently, the 2021 amendment to TFRS 16 - Phase 2 has been announced in the Royal Gazette on May 13, 2021, which permits a lessee to apply the practical expedient regarding COVID-19-related rent concessions to rent concessions for which any reduction in lease payments affects only payments originally due on or before June 30, 2022. A lessee shall apply this amendment for annual reporting periods beginning on or after April 1, 2021 with earlier application is permitted.

In addition, the Federation of Accounting Professions has issued the Notification regarding Thai Financial Reporting Standards ("TFRSs") that are relevant to Interest Rate Benchmark Reform Phase 2 amendments ("Phase 2 amendments") and amends Thai Financial Reporting Standards No. 4 "Insurance Contracts", Thai Financial Reporting Standards No. 7 "Financial Instruments: Disclosures" and Thai Financial Reporting Standards No. 9 "Financial Instruments". The Phase 2 amendments address issues that might affect financial reporting during the reform of an interest rate benchmark, including the effects of changes to contractual cash flows or hedging relationships arising from the replacement of an interest rate benchmark with an alternative benchmark rate. Such TFRSs have been announced in the Royal Gazette on June 28, 2021 and will be effective for the financial statements for the periods beginning on or after January 1, 2022 onwards with earlier application permitted.

The Group's management will adopt such TFRSs in the preparation of the Group's financial statements when they become effective. The Group's management is in the process to assess the impact of these TFRSs on the financial statements of the Group in the year of initial application.

In addition, the Federation of Accounting Professions has issued the Notification regarding the amendments to Thai Financial Reporting Standards and guidelines on accounting which have been announced in the Royal Gazette on December 22, 2021. Such Thai Financial Reporting Standards and guidelines on accounting are not applicable to the Group.

3. SIGNIFICANT ACCOUNTING POLICIES

The significant accounting policies are as follows:

3.1 Basis of consolidation

The consolidated financial statements relate to the Company and its subsidiaries and the Group's interests in joint ventures and associates.

Business combinations

The Group applies the acquisition method for all business combinations when control is transferred to the Group, as describe in subsidiaries section, other than those with entities under common control.

The Group recognises goodwill at the acquisition date measured as the excess of (1) over (2) as:

(1) The aggregate of:

- the fair value of the consideration transferred;
- the recognised amount of any non-controlling interests in the acquiree; and
- if the business combination is achieved in stages, the fair value of the existing equity interest in the acquiree.

(2) The net fair value of the assets and liabilities acquired.

If value of (1) is less than (2), difference is contributed to gain on bargain purchase and recognised immediately in profit or loss.

The consideration transferred is recognised at fair value at the acquisition date.

Transaction costs that the Group incurs in connection with a business combination, such as legal fees, and other professional and consulting fees are expensed as incurred.

If the initial accounting for a business combination is incomplete by the end of the reporting period in which the combination occurs, the Group reports provisional amounts for the items for which the accounting is incomplete. Those provisional amounts are adjusted during the measurement period, or additional assets or liabilities are recognised, to reflect new information obtained about facts and circumstances that existed at the acquisition date that, if known, would have affected the amounts recognised at that date.

Acquisitions from entities under common control

Business combinations under common control are accounted for using a method similar to the pooling of interest method. Under that method the acquirer recognises assets and liabilities of the acquired businesses at their carrying amounts in the consolidated financial statements of the ultimate parent company at the moment of the transaction. The difference between the carrying amounts of the acquired net assets and the consideration transferred is recognised as surplus or discount from business combinations under common control in shareholder's equity. The surplus or discount will be transferred to retained earnings upon divestment of the businesses acquired.

The results from operations of the acquired businesses will be included in the consolidated financial statements of the acquirer from the beginning of the comparative period or the moment the businesses came under common control, whichever date is later, until control ceases.

Subsidiaries

Subsidiaries are entities controlled by the Group. The Group controls an entity when it has rights to variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. The financial statements of subsidiaries are included in the consolidated financial statements from the date on which control commences until the date on which control ceases.

Non-controlling interests

At the acquisition date, the Group measures any non-controlling interest at its proportionate interest in the identifiable net assets of the acquiree.

Changes in the Group's interest in a subsidiary that do not result in a loss of control are accounted for as equity transactions.

Loss of control

When the Group loses control over a subsidiary, it derecognises the assets and liabilities of the subsidiary, and any related non-controlling interests and other components of equity. Any resulting gain or loss is recognised in profit or loss. Any interest retained in the former subsidiary is measured at fair value when control is lost.

Interests in equity-accounted investees

The Group's interests in equity-accounted investees comprise interests in joint ventures and associates.

A joint venture is an arrangement in which the Group has joint control, whereby the Group has rights to the net assets of the arrangement. Associates are those entities in which the Group has significant influence, but not control or joint control, over the financial and operating policies.

Interests in joint ventures and associates are accounted for using the equity method. They are recognised initially at cost. Subsequent to initial recognition, the consolidated financial statements include the Group's share of the profit or loss and other comprehensive income of equity-accounted investees, until the date on which joint control or significant influence ceases.

Transactions eliminated on consolidation

Intra-group balances and transactions and any income or expenses arising from intra-group transactions are eliminated in the preparing of the consolidated financial statements. Unrealised gains and losses arising from transactions with joint ventures and associates are eliminated against the investment to the extent of the Group's interest in the investee.

3.2 Foreign currencies

Foreign currency transactions

Transactions in foreign currencies are translated to the respective functional currency of Group entities at exchange rate at the dates of the transactions.

Monetary assets and liabilities denominated in foreign currencies at the reporting date are translated to the functional currency at the exchange rate at the reporting date.

Non-monetary assets and liabilities measured at cost in foreign currencies are translated to the functional currency at the exchange rate at the dates of the transactions.

Foreign currency differences arising on retranslation are generally recognised in profit or loss. However, foreign currency differences arising from the translation of qualifying cash flow hedges to the extent that the hedges are effective are recognised in other comprehensive income.

Foreign operations

The assets and liabilities of foreign operations, including goodwill and fair value adjustments arising on acquisition of foreign operations, are translated to Thai Baht at the exchange rates at the end of the reporting date.

The revenues and expenses of foreign operations are translated to Thai Baht at the average rates during the year.

Foreign exchange differences are recognised in other comprehensive income and presented in the foreign currency translation reserve in equity until disposal of the investment, except to extent that the translation difference is allocated to non-controlling interest.

3.3 Cash and cash equivalents

Cash and cash equivalents are cash on hand and all types of deposits at bank and financial institutions with original maturity of three months or less from the date of acquisition, excluding deposits at banks used as collateral. (if any)

3.4 Trade and other receivables

Trade and other receivables are stated at their invoice value less allowance for expected credit losses.

The allowance for expected credit losses is disclosed in Note 3.6.

3.5 Inventories

Inventories are stated at the lower of cost or net realisable value.

Cost is calculated using the weighted average cost principle, and comprises all costs of purchase, costs of conversion and other costs incurred in bringing the inventories to their present location and condition. In the case of manufactured inventories and work-in-progress, cost includes an appropriate share of production overheads based on normal operating capacity.

Net realisable value is the estimated selling price in the ordinary course of business less the estimated costs to complete and to make the sale.

Provision is made for obsolete and slow-moving of finished goods, raw materials, factory supplies and spare parts based on the items that are obsoleted and expected to be unsalable.

3.6 Financial Instruments

The Group shall recognise a financial asset or a financial liability in its statement of financial position only when the Group becomes party to the contractual provisions of the instrument.

Recognition, Measurement and Classification of financial assets

Regular way of purchases and sales of financial assets are recognised on trade-date, the date on which the Group commits to purchase or sell the asset. Financial assets are derecognised only when the rights to receive cash flows from the financial assets have expired or when the Group has transferred the financial assets which transferred substantially all the risks and rewards of ownership of the financial assets.

At initial recognition, the Group measures a financial asset as follows:

- A financial asset measured at amortised cost and a financial asset measured at fair value through other comprehensive income are measured at theirs fair value, plus transaction costs that are directly attributable to the acquisition or issuance of the financial assets.

- A financial asset measured at fair value through profit or loss is measured at its fair value. Transaction costs are expensed in profit or loss.

Subsequent measurement of financial assets depends on the Group's business model for managing the financial asset and the cash flow characteristics of the financial assets. There are three measurement categories into which the Group classifies its financial assets:

- Amortised cost - A financial asset will be measured at amortised cost when the financial asset is held within a business model whose objective is to hold financial assets in order to collect contractual cash flows. In addition, the contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding. Interest income from these financial assets is using the effective interest rate method. Any gain or loss arising on derecognition and reclassification are recognised directly in profit or loss and impairment losses are presented in profit or loss.

- Fair value through other comprehensive income (FVTOCI) - A financial asset will be measured at FVTOCI when it is held within a business model whose objective is achieved by both collecting contractual cash flows and selling financial assets. In addition, the contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding. Movements in the carrying amount are taken through other comprehensive income, except for the recognition of impairment losses and interest income using effective interest rate method. When the financial asset is derecognised, the cumulative gain or loss previously recognised in other comprehensive income is reclassified to profit or loss or retained earnings.

- Fair value through profit or loss (FVTPL) - A financial asset that does not meet the criteria for amortised cost or FVTOCI are measured at FVTPL.

Impairment

The Group assesses on a forward-looking basis the expected credit loss associated with its financial assets carried at amortised cost and investments in debt instruments that are measured at FVTOCI. The Group applies general or simplified approach for credit-impaired consideration which depends on the significant of credit risk.

In determining allowance of expected credit loss, the financial asset is considered to have low credit risk and no significant incremental of credit risk since initial recognition. The Group will not recognize any allowance of expected credit loss.

Reversals of impairment

An impairment loss in respect of a financial asset is reversed if the subsequent increase in recoverable amount can be related objectively to an event occurring after the impairment loss was recognised in profit or loss.

Derecognition of financial assets

The Group derecognizes a financial asset only when the contractual rights to the cash flows from the asset expire, or when it transfers the financial asset and substantially all the risks and rewards of ownership of the asset to another entity.

On derecognition of a financial asset measured at amortized cost, the difference between the asset's carrying amount and the sum of the consideration received and receivable is recognized in profit or loss. In addition, on derecognition of an investment in a debt instrument classified as at FVTOCI, the cumulative gain or loss previously accumulated in the investments revaluation reserve is reclassified to profit or loss. In contrast, on derecognition of an investment in equity instrument which the Group has elected on initial recognition to measure at FVTOCI, the cumulative gain or loss previously accumulated in the investments revaluation reserve is not reclassified to profit or loss, but is transferred to retained earnings.

Recognition, Measurement and Classification of financial liabilities and equities

Financial instruments issued by the Group must be classified as financial liabilities or equity instruments by considering contractual obligations.

- Where the Group has an unconditional contractual obligation to deliver cash or another financial asset to another entity and is unable to deny or avoid the settlement of the obligation indefinitely, it is considered a financial liability.

- Where the Group has no contractual obligation or has an unconditional right to avoid the settlement of the obligation, it is considered an equity instrument.

At initial recognition, the Group measures financial liabilities, which are not measured at FVTPL, at fair value minus transaction costs that are directly attributable to the acquisition or issuance of the financial assets. The Group classifies all financial liabilities as subsequently measured at amortised cost, except for some financial liabilities.

Derecognition of financial liabilities

The Group derecognizes financial liabilities when, and only when, the Group's obligations are discharged, cancelled or have expired. The difference between the carrying amount of the financial liability derecognized and the consideration paid and payable is recognized in profit or loss.

When the Group exchanges with the existing lender one debt instrument into another one with the substantially different terms, such exchange is accounted for as an extinguishment of the original financial liability and the recognition of a new financial liability. Similarly, the Group accounts for substantial modification of terms of an existing financial liability or part of it as an extinguishment of the original financial liability and the recognition of a new financial liability. It is assumed that the terms are substantially different if the discounted present value of the cash flows under the new terms, including any fees paid net of any fees received and discounted using the original effective interest rate is at least 10 percent different from the discounted present value of the remaining cash flows of the original financial liability. If the modification is not substantial, the difference between; (1) the carrying amount of the liability before the modification; and (2) the present value of cash flows after modification; is recognized in profit or loss as the modification gain or loss within other gains and losses.

Derivatives

Derivatives are used to manage exposure to foreign exchange, commodity price and interest rate arising from operating, financing and investing activities. Derivatives are not used for trading purposes. However, derivatives that do not qualify for hedging instruments are accounted for as trading instruments.

Derivatives are recognised initially at fair value; attributable transaction costs are recognised in profit or loss when incurred. Subsequent to initial recognition, they are remeasured at fair value. The gain or loss on remeasurement is recognised immediately in profit or loss.

The fair value of simple over-the-counter financial derivative and commodity derivative instruments are based on broker quotes. Those quotes are tested for reasonableness by discounting expected future cash flows using market interest rate for a similar instrument at the measurement date. Fair values reflect the credit risk of the instrument and include adjustments to take account of the credit risk of the Group and counterparty when appropriate.

Hedge accounting

When a derivative is designated as the hedging instrument in a hedge of the variability in cash flows, the effective portion of gain or loss from subsequent measurement of fair value of the derivative is recognised in other comprehensive income and presented in the hedging reserve in equity. Any ineffective portion is recognised immediately in profit or loss.

When a hedge item subsequently results a recognition of a non-financial asset or non-financial liability, the Group will take the gain or loss from derivative measurement recognised in other comprehensive income to be included in the cost of the non-financial asset or non-financial liability. When the hedge item causes the recognition of a financial asset or financial liability, the Group will take the gain or loss from derivative measurement recognised in other comprehensive income to be recognised as profit or loss if the hedge item affects profit or loss.

Discontinuing hedge accounting

When the hedging instrument expires or is sold, terminated, or no longer qualifies for hedge accounting, the hedge accounting is discontinued prospectively. Any cumulative gain or loss on the hedging instrument existing in equity is retained in equity. When the hedge item ultimately occurs, the Group will comply with the hedge accounting as mentioned above.

When the hedge item is no longer expected to occur, the cumulative gain or loss that was reported in equity is recognised in profit or loss immediately.

3.7 Investments in subsidiaries, joint ventures and associates

Investments in subsidiaries, joint ventures and associates in the separate financial statements of the Company are accounted for using the cost method less allowance for impairment. Investments in joint ventures and associates in the consolidated financial statements are accounted for using the equity method.

Disposal of investments

On disposal of an investment, the difference between net disposal proceeds and the carrying amount is recognised in profit or loss in the statement of income.

If the Group disposes of part of its holding of a particular investment, the deemed cost of the part sold is determined using the weighted average method applied to the carrying value of the total holding of the investment.

3.8 Investment properties

Property that is held for long-term rental yields or for capital appreciation or both, and that is not occupied by the companies in the consolidated Group, is classified as investment properties.

Investment properties of the Group are land and buildings held for long-term rental yields or for capital appreciation.

Investment properties are measured initially at its cost, including related transaction costs and borrowing costs. Borrowing costs incurred for the purpose of acquiring, constructing or producing a qualifying investment properties are capitalised as part of its cost.

After initial recognition, investment properties are carried at cost less accumulated depreciation and accumulated impairment losses.

Land and investment property under construction are not depreciated. Depreciation on other investment properties which are buildings and buildings improvement are calculated using the straight line method to allocate their cost to their residual values over their estimated useful life for 8 to 27 years.

Subsequent expenditure is capitalised to the asset's carrying amount only when it is probable that future economic benefits associated with the expenditure will flow to the Group and the cost of the item can be measured reliably. All other repairs and maintenance costs is expensed when incurred. When part of an investment property is replaced, the carrying amount of the replaced part is derecognised.

3.9 Property, plant and equipment

Recognition and measurement

Land are stated at cost less accumulated impairment losses.

Land improvement, plant and equipment are measured at cost less accumulated depreciation and accumulated impairment losses.

Cost includes expenditure that is directly attributable to the acquisition of the asset. The cost of self-constructed assets includes the cost of materials and direct labour, any other costs directly attributable to bringing the assets to a working condition for their intended use, the costs of dismantling and removing the items and restoring the site on which they are located, and capitalised borrowing costs. Cost also may include transfers from other comprehensive income of any gain or loss on qualifying cash flow hedges of foreign currency purchases of property, plant and equipment. Purchased software that is integral to the functionality of the related equipment is capitalised as part of that equipment.

When parts of an item of property, plant and equipment have different useful lives, they are accounted for as separate items (major components) of property, plant and equipment.

Any gains and losses on disposal of an item of property, plant and equipment are determined by comparing the proceeds from disposal with the carrying amount of property, plant and equipment, and are recognised in profit or loss.

Subsequent costs

The cost of replacing a part of an item of property, plant and equipment is recognised in the carrying amount of the item if it is probable that the future economic benefits embodied within the part will flow to the Group, and its cost can be measured reliably. The carrying amount of the replaced part is derecognised. The costs of the day-to-day servicing of property, plant and equipment are recognised in profit or loss as incurred.

Depreciation

Depreciation is calculated based on the depreciable amount, which is the cost of an asset, or other amount substituted for cost, less its residual value.

Depreciation is charged to profit or loss on a straight-line basis over the estimated useful lives of each component of an item of assets. The estimated useful lives are as follows:

Land improvement	5-30	years
Plant, machinery, equipment and factory tools	4-40	years
Buildings and buildings improvement	5-50	years
Furniture, fixtures and equipment	3-10	years
Vehicles	5-25	years

No depreciation is provided on land and assets under construction.

Depreciation methods, useful lives and residual values are reviewed at the end of reporting period and adjusted if appropriate.

3.10 Leases

The Group as lessee

The Group assesses whether a contract is or contains a lease, at inception of the contract. The Group recognises a right-of-use asset and corresponding lease liability with respect to all lease arrangements in which it is the lease, except for short-term leases with a lease term of 12 months or less and leases of low value assets, in which the lease payments are recognised as operating expense on a straight-line basis over the lease term and presents as an expense in the statement of income.

The lease liability is initially measured at the present value of the lease payments that are not paid at that date, discounted by using the interest rate implicit in the lease. If this rate cannot be readily determined, the Group uses its incremental borrowing rate.

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

- Fixed payments (including in-substance fixed payments), less any lease incentives receivable;
- Variable lease payments that depend on an index or a rate, initially measured using the index or rate as at the commencement date;
- Amount expected to be payable by the lease under residual value guarantees;
- Exercise price of purchase options, if the lease is reasonably certain to exercise the options;
- Payments of penalties for terminating the lease, if the lease term reflects the lessee exercising an option to terminate the lease.

The lease liability is subsequently measured using the effective interest method and by reducing the carrying amount to reflect the lease payments made. The Group recognises interest from lease liability in the statement of profit or loss.

The Group remeasures the lease liability and makes a corresponding adjustment to the related right-of-use asset whenever:

- The lease term has been changed resulting in a change in the assessment of exercise of a purchase option to purchase the underlying asset, in which case the lease liability is remeasured by discounting the revised lease payments using a revised discount rate.
- The lease payments have been changed due to changes in an index or a rate or a change in expected payment under a guaranteed residual value, in which cases the lease liability is remeasured by discounting the revised lease payments using an unchanged discount rate.
- A lease contract is modified and the lease modification that is not accounted for as a separate lease, in which case the lease liability is remeasured based on the lease term of the modified lease by discounting the revised lease payments using a revised discount rate at the effective date of the modification.

The right-of-use assets comprise the initial measurement of the corresponding lease liability, including lease payments made at or before the commencement day, any initial direct costs, less any lease incentives received. They are subsequently measured at cost less accumulated depreciation and accumulated impairment losses.

Right-of-use assets are depreciated over the shorter period of lease term or useful life of the underlying asset. If a lease transfers ownership of the underlying asset and the Group expects to exercise a purchase option, the related right-of-use is depreciated over the useful life of the underlying asset. The depreciation starts at the commencement date of the lease. In addition, the right-of-use assets are assessed for impairment in accordance with TAS 36 “Impairment of assets”.

The Group as lessor

Leases for which the Group is a lessor are classified as operating leases.

Rental income from operating leases is recognised on a straight-line basis over the term of the relevant lease. Initial direct costs incurred in negotiating and arranging an operating lease are added to the carrying amount of the leased asset and recognised on a straight line basis over the lease term.

3.11 Intangible assets

Goodwill

Goodwill that arises upon the acquisition of businesses is included in intangible assets. Subsequent to initial recognition, goodwill is measured at cost less accumulated impairment losses.

Goodwill in investment in joint ventures and associates is included in the carrying amount of the investment in joint ventures and associates, impairment loss on such an investment is deducted directly in investment in joint ventures and associates.

Other intangible assets

Other intangible assets that are acquired by the Group and have finite useful lives are measured at cost less accumulated amortisation and accumulated impairment losses.

Subsequent expenditure

Subsequent expenditure is capitalised only when it increases the future economic benefits embodied in the specific asset to which it relates. All other expenditure, including expenditure on internally generated goodwill and brands, are recognised in profit or loss as incurred.

Amortisation

Amortisation is calculated based on the cost of the asset less its residual value.

Amortisation is recognised in profit or loss on a straight-line basis over the estimated useful lives of intangible assets, other than goodwill and trademark, from the date that they are available for use, since this most closely reflects the expected pattern of consumption of the future economic benefits embodied in the asset. The estimated useful lives are as follows:

Production licence fees	10-30	years
Computer software	3-10	years
Customer contracts and the related customer relationships	11-23	years
Right to use - others	8-50	years

Amortisation methods, useful lives and residual values are reviewed at the end of reporting period and adjusted if appropriate.

3.12 Impairment

The carrying amounts of the Group's assets are reviewed at each reporting date to determine whether there is any indication of impairment. If any such indication exists, the assets' recoverable amounts are estimated. For goodwill and intangible assets that have indefinite useful lives or are not yet available for use, the recoverable amount is estimated each year at the same time.

An impairment loss is recognised if the carrying amount of an asset or its cash-generating unit exceeds its recoverable amount. The impairment loss is recognised in profit or loss.

Calculation of recoverable amount

The recoverable amount of a non-financial asset is the greater of the asset's value in use and fair value less costs to sell. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset. For an asset that does not generate cash inflows largely independent of those from other assets, the recoverable amount is determined for the cash-generating unit to which the asset belongs.

Reversals of impairment

An impairment loss in respect of goodwill is not reversed.

Impairment losses recognised in prior periods in respect of other non-financial assets are assessed at each reporting date for any indications that the loss has decreased or no longer exists. An impairment loss is reversed if there has been a change in the estimates used to determine the recoverable amount. An impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortisation, if no impairment loss had been recognised.

3.13 Employee benefits

Defined contribution plans

Obligations for contributions to defined contribution plans are expensed as the related service is provided in profit or loss. The defined contribution plans comprise provident funds established by the Group for its employees. Membership to the funds is on a voluntary basis. Contributions are made monthly by the employees at the minimum rate as required by law not exceeding 15% of their basic salaries and the Group contributes at the minimum rate as required by law not exceeding 15% of the employees' basic salaries. The provident funds are registered with the Ministry of Finance as juristic entities and are managed by a licensed Fund Manager.

Defined benefit plans

The Group's net obligation in respect of defined benefit plans is calculated separately for each plan by estimating the amount of future benefit that employees have earned in the current and prior periods, discounting that amount net with fair value of plan assets.

The calculation of defined benefit obligations is performed every 3 years by a qualified actuary using the projected unit credit method. The recognized asset is limited to the present value of economic benefits available in the form of any future refunds from the plan or reductions in future contributions to the plan.

Remeasurements of the defined benefit liability, actuarial gain or loss are recognised immediately in other comprehensive income. The Group determines the interest expense on the defined benefit liability for the period by applying the discount rate used to measure the defined benefit obligation. Interest expense and other expenses related to defined benefit plans are recognised in profit or loss.

When the benefits of a plan are changed or when a plan is curtailed, the resulting change in benefit that relates to past service or the gain or loss on curtailment is recognised immediately in profit or loss. The Group recognises gains and losses on the settlement of a defined benefit plan when the settlement occurs.

Other long-term employee benefits

The Group's net obligation in respect of long-term employee benefits is the amount of future benefit that employees have earned in return for their service in the current and prior periods. That benefit is discounted to determine its present value. Remeasurements are recognised in profit or loss in the period in which they arise.

Termination benefits

Termination benefits are expensed at the earlier of when the Group can no longer withdraw the offer of those benefits and when the Group recognises costs for a restructuring. If benefits are not expected to be settled wholly within 12 months of the end of the reporting period, then they are discounted.

Short-term employee benefits

Short-term employee benefits are expensed as the related service is provided. A liability is recognised for the amount expected to be paid if the Group has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee and the obligation can be estimated reliably.

3.14 Provisions

A provision is recognised if, as a result of a past event, the Group has a present legal or constructive 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 current market assessments of the time value of money and the risks specific to the liability. The unwinding of the discount on provisions is recognised as finance cost.

3.15 Repurchase of share capital (treasury stock)

When share capital recognised as equity is repurchased, the amount of consideration paid, including directly attributable costs, is classified as treasury stock and recognised as a deduction from equity. An equal amount is appropriated from retained earnings and taken to a reserve for treasury stock within equity. When treasury stock are sold, the amount received is recognised as an increase in equity by crediting the cost of the treasury stock sold, calculated using the weighted average method, to the treasury stock account and transferring the equivalent amount back from treasury stock reserve to retained earnings. Surpluses on the sale of treasury stock are taken directly to a separate category within equity, 'Premium on treasury stock'. Net deficits on sale or cancellation of treasury stock are debited to retained earnings after setting off against any remaining balance of premium on treasury stock.

3.16 Revenue

Revenue excludes value added taxes and is arrived at after deduction of trade discounts.

Revenues from sale of goods and rendering of services

Revenues from sale of goods is recognised when control of the goods has transferred to the customer, being at the point the goods are delivered to the customer. Revenues from rendering of services is recognised as a performance obligation satisfied at a point in time when services underlying the particular performance obligation is transferred to the customer or is recognised over time based on the stage of completion of the contract.

Investment income

Investment income consists of dividend income, interest income from investments and bank deposits, and net gain or loss arises from financial assets or financial liability measured at FVTPL. Dividend income is recognised in profit or loss on the date the Group's right to receive payments is established. Interest income is recognised on a time basis, based on the principle outstanding and the applicable interest rate.

Other income

Other income is recognised on an accrual basis.

3.17 Finance costs

Finance costs is recognised using the effective interest method and comprise interest expense on borrowings, unwinding of the discount on provisions and contingent consideration.

Borrowing costs that are not directly attributable to the acquisition, construction or production of a qualifying asset are recognised in profit or loss using the effective interest method

3.18 Income tax

Income tax expense for the year comprises current and deferred tax. Current and deferred tax are recognised in profit or loss except to the extent that they are relate to the items recognised in equity are recognised in other comprehensive income.

Current tax is the expected tax payable or receivable on the taxable income for the year, using tax rates enacted at the end of the reporting period, and any adjustment to tax payable or receivable in respect of previous years.

Deferred tax is recognised in respect of temporary differences between the carrying amounts and taxable value of assets and liabilities, using tax rates enacted or substantively enacted to the temporary differences when they reverse.

Deferred tax is not recognised for the following temporary differences:

- the initial recognition of goodwill and related transactions
- the initial recognition of assets or liabilities in a transaction that is not a business combination and that affects neither accounting nor taxable profit or loss
- differences relating to investments in subsidiaries to the extent that it is probable that they will not reverse in the foreseeable future.

The measurement of deferred tax reflects the tax consequences that would follow the manner in which the Group expects, at the end of the reporting period, to recover or settle the carrying amount of its assets and liabilities.

In determining the amount of current and deferred tax, the Group takes into account the impact of uncertain tax positions and whether additional taxes and interest may be due. The Group believes that its accruals for tax liabilities are adequate for all open tax years based on its assessment of many factors, including interpretations of tax law and prior experience. This assessment relies on estimates and assumptions and may involve a series of judgements about future events. New information may become available that causes the Group to change its judgement regarding the adequacy of existing tax liabilities; such changes to tax liabilities will impact tax expense in the period that such a determination is made.

Deferred tax assets and liabilities on different tax entities are offset if there is a legally enforceable right to offset current tax assets and liabilities, and they relate to income taxes levied by the same tax authority.

A deferred tax asset is recognised to the extent that it is probable that deferred tax assets can be utilised as future tax benefit. Deferred tax assets are reviewed at each reporting date and reduced to the extent that it is no longer probable that the related tax benefit will be realised.

3.19 Basic earnings (loss) per share

Basic earnings (loss) per share (“EPS”) is calculated by dividing profit (loss) for the year attributable to owners of the parent by the weighted average number of ordinary shares outstanding during the year, adjusted for treasury shares.

3.20 Financial information by segment

Segment results that are reported to the Group’s Management Committee (the chief operating decision maker) include items directly attributable to a segment as well as those that can be allocated on a reasonable basis.

3.21 Measurement of fair values

A number of the Group's accounting policies and disclosures require the measurement of fair values, for both financial assets and liabilities and non-financial assets.

When measuring the fair value of an asset or a liability, the Group uses observable market data as far as possible. Fair values are categorised into different levels in a fair value hierarchy based on the inputs used in the valuation techniques as follows:

- Level 1: quoted prices (unadjusted) in active markets for identical assets or liabilities that the entity can access at the measurement date.
- Level 2: inputs other than quoted prices included in Level 1 that are observable for the asset or liability, either directly or indirectly.
- Level 3: inputs for the asset or liability that are not based on observable market data (unobservable inputs).

If the inputs used to measure the fair value of an asset or liability might be categorised in different levels of the fair value hierarchy, then the fair value measurement is categorised in its entirety in the same level of the fair value hierarchy as the lowest level input that is significant to the entire measurement.

3.22 Use of management's judgments

The preparation of financial statements in conformity with TFRS requires the Group's management to exercise judgments in order to determine the accounting policies, estimates and various assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the end of the reporting period and the reported amounts of revenues and expenses during the reporting period. Although these estimates are based on management's reasonable consideration of current events, actual results may differ from these estimates. The significant uses of management's judgements are as follows:

3.22.1 Fair value measurements and valuation processes

Some of the Group's assets and liabilities are measured at fair value for financial reporting purposes.

In estimating the fair value of an asset or liability, the Group uses market-observable data to the extent it is available. Where Level 1 inputs are not available, the Group uses other observable information either directly or indirectly or other unobservable information according to level of fair value respectively.

Information about valuation techniques and inputs used in determining the fair value of various assets and liabilities are disclosed in Note 36.

3.22.2 Calculation of recoverable amount

In the calculation of recoverable amount, the Group's management estimated the future cash flows discounted to their present value using an appropriate discount rate that reflects current market assessments of the time value of money and the risks specific to the asset.

3.22.3 Impairment of goodwill

Determining whether goodwill is impaired requires an estimation of the value in use of the cash-generating units to which goodwill has been allocated. The value in use calculation requires the Group's management to estimate the future cash flows expected to arise from the cash-generating unit and a suitable discount rate in order to calculate present value where the actual future cash flows are less than expected, an impairment loss may arise.

3.22.4 Recognition of deferred tax assets

The recognition of deferred tax assets is based upon whether it is probably that sufficient taxable profits will be available in the future against which the reversal of temporary differences can be deducted which involves judgement regarding the future financial performance of the Group.

4. ACQUISITION OF BUSINESSES

On July 10, 2021, the Group entered into the Shares Purchase Agreement to acquire 100% share of Allnex Holding GmbH, who is a leader in special coating resins and crosslinkers business directly from Allnex Holdings S.à.r.l. Subsequently on December 29, 2021, the Group completed the share acquisition of subsidiaries for a cash consideration of Euro 3,561 million or approximately equivalent to Baht 136,741 million in December 2021.

Management believes that the acquisition is harmonised with the business strategy of the Company toward the business of specialties arena, specifically to increase profit contribution from and capture growth opportunities in High Value Business, which matches the global megatrend.

The purchase under this condition is in accordance with TFRS 3 Business Combinations, requires the recognition of assets, liabilities and contingent liabilities acquired at the acquisition date at fair value within the measurement period, which must not exceed one year from the acquisition date. The Group hired an independent appraiser to determine the fair value of assets and liabilities acquired, from the acquisition date to reflect new information obtained about facts and circumstances that existed as of the acquisition date. However, the fair value of assets and liabilities acquired has not yet completed. Upon the completion of the fair value determined by independent appraisers, the fair value of assets and liabilities acquired will be adjusted accordingly. Accordingly, the fair value of assets and liabilities acquired have been provisionally determined at the acquisition date.

Such business acquisition was completed on December 29, 2021. However, the Group considered to use the financial information as at December 31, 2021 for determine the fair value of assets and liabilities acquired because of immaterial variance.

The following summarises the major classes of consideration transferred, and the recognised amounts of assets and liabilities acquired at the acquisition date:

Assets and liabilities acquired as at December 31, 2021:

	Fair value ***(in million Baht)***
Cash and cash equivalents	4,068
Trade receivables	8,261
Other receivables	1,649
Inventories	16,770
Investments in joint ventures	722
Non-current investments in financial assets	191
Property, plant and equipment	27,278
Right-of-use assets	1,805
Intangible assets	78,329
Deferred tax assets	1,839
Other assets	272
Short-term borrowings	(12,717)
Trade payables	(12,020)
Other payables	(8,568)
Long-term borrowings	(9,358)
Lease liabilities	(1,902)
Deferred tax liabilities	(26,635)
Provisions for employee benefits	(4,638)
Other liabilities	(2,886)
Net identifiable assets acquired, and liabilities assumed	**62,460**
Non-controlling interest acquired	(1,126)
Net assets and liabilities acquired	**61,334**
Loss on derivatives	820
Goodwill	74,587
Total consideration	**136,741**
Cash acquired	(4,068)
Net consideration	**132,673**

Acquisition-related costs

The Group incurred acquisition-related costs of Baht 1,425 million related to external legal fees and due diligence costs. The legal fees and due diligence costs have been included in administrative expenses in the Group's consolidated statement of income in the period that the transactions have occurred.

5. CASH AND CASH EQUIVALENTS

5.1 Cash and cash equivalents as at December 31, 2021 and 2020 consisted of:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	**2020**	**2021**	**2020**
Cash on hand	2	2	2	2
Cash at banks - current accounts	6,206	2,307	85	100
Cash at banks - savings accounts	18,851	30,262	6,096	20,633
Cash at banks - foreign accounts	28,288	2,484	27,073	1,838
Financial assets at amortisation costs				
- Deposit at bank	2,218	9,257	-	8,961
Financial assets at fair value through other comprehensive income				
- Treasury bills	42	1	42	1
- Deposit at bank (private funds)	6	-	6	-
Total	**55,613**	**44,313**	**33,304**	**31,535**

As at December 31, 2021 and 2020, bank accounts of two subsidiaries totalling Baht 6,136 million and Baht 726 million, respectively, are pledged as collateral to secure credit facilities obtained from financial institutions. However, the pledged bank accounts can be withdrawn in accordance with the objective and conditions stipulated in the loan agreements for use as working capital required in the normal course of business (see Note 19.2).

5.2 Reconciliation of liabilities arising from financing activities

The table below details changes in the liabilities arising from financing activities, including both cash and non-cash changes.

As at December 31, 2021

Unit : Million Baht

			Consolidated financial statements								
			Non-cash changes								
	Balance as at January 1, 2021	**Net financing cash flows**	**Interest expense**	**Interest expense capitalised as part of fixed assets**	**Amortisation of deferred financing fees**	**Increase in lease liabilities**	**Amortisation of deferred interest from lease**	**Loss on exchange rate**	**Business acquisition**	**Others**	**Balance as at December 31, 2021**
Accrued interest expense	952	(6,316)	5,716	(211)	957	-	-	37	2	-	1,137
Lease liabilities	6,787	(1,378)	-	-	-	2,800	273	42	1,902	(70)	10,356
Short-term borrowings from financial institutions	19	2,037	-	-	-	-	-	1	366	-	2,423
Long-term borrowings from financial institutions	62,951	32,584	-	-	(95)	-	-	1,562	236	-	97,238
Long-term borrowing from a related party	-	55,600	-	-	-	-	-	-	-	-	55,600
Long-term borrowings from other parties	294	(46)	-	-	-	-	-	8	-	-	256
Debentures	85,032	20,000	-	-	(661)	-	-	5,130	-	-	109,501
Total	**156,035**	**102,481**	**5,716**	**(211)**	**201**	**2,800**	**273**	**6,780**	**2,506**	**(70)**	**276,511**

As at December 31, 2020

Unit : Million Baht

			Consolidated financial statements							
			Non-cash changes							
	Balance as at January 1, 2020	**Net financing cash flows**	**Interest expense**	**Interest expense capitalised as part of fixed assets**	**Amortisation of deferred financing fees**	**Increase in lease liabilities**	**Amortisation of deferred interest from lease**	**(Gain) loss on exchange rate**	**Others**	**Balance as at December 31, 2020**
Accrued interest expense	846	(3,365)	4,118	(867)	220	-	-	-	-	952
Lease liabilities	401	(982)	-	-	-	7,220	170	17	(39)	6,787
Short-term borrowings from financial institutions	2,021	(2,026)	-	-	-	-	-	24	-	19
Long-term borrowings from financial institutions	34,626	27,966	-	-	(152)	-	-	511	-	62,951
Long-term borrowings from other parties	310	(43)	-	-	-	-	-	27	-	294
Debentures	70,131	15,000	-	-	22	-	-	(121)	-	85,032
Total	**108,335**	**36,550**	**4,118**	**(867)**	**90**	**7,220**	**170**	**458**	**(39)**	**156,035**

As at December 31, 2021

Unit : Million Baht

			Separate financial statements							
			Non-cash changes							
	Balance as at January 1, 2021	**Net financing cash flows**	**Interest expense**	**Interest expense capitalised as part of fixed assets**	**Amortisation of deferred financing fees**	**Increase in lease liabilities**	**Amortisation of deferred interest from lease**	**Loss on exchange rate**	**Others**	**Balance as at December 31, 2021**
Accrued interest expense	970	(5,078)	5,229	(198)	300	-	-	-	-	1,223
Lease liabilities	6,064	(1,426)	-	-	-	2,637	249	-	(12)	7,512
Short-term borrowings from related parties	5,608	4,481	-	-	-	-	-	-	-	10,089
Long-term borrowings from financial institutions	32,831	-	-	-	43	-	-	-	-	32,874
Long-term borrowing from a related party	14,948	104,040	-	-	(269)	-	-	4,923	-	123,642
Debentures	70,164	(20,000)	-	-	23	-	-	1,707	-	51,894
Total	**130,585**	**82,017**	**5,229**	**(198)**	**97**	**2,637**	**249**	**6,630**	**(12)**	**227,234**

As at December 31, 2020

Unit : Million Baht

			Separate financial statements						
			Non-cash changes						
	Balance as at January 1, 2020	**Net financing cash flows**	**Interest expense**	**Interest expense capitalised as part of fixed assets**	**Amortisation of deferred financing fees**	**Increase in lease liabilities**	**Amortisation of deferred interest from lease**	**(Gain) loss on exchange rate**	**Balance as at December 31, 2020**
Accrued interest expense	863	(3,141)	3,456	(407)	199	-	-	-	970
Lease liabilities	289	(1,057)	-	-	-	6,672	160	-	6,064
Short-term borrowings from related parties	3,041	2,567	-	-	-	-	-	-	5,608
Long-term borrowings from financial institutions	10,073	22,889	-	-	(156)	-	-	25	32,831
Long-term borrowing from a related party	14,991	-	-	-	18	-	-	(61)	14,948
Debentures	55,221	15,000	-	-	6	-	-	(63)	70,164
Total	**84,478**	**36,258**	**3,456**	**(407)**	**67**	**6,672**	**160**	**(99)**	**130,585**

6. TRADE RECEIVABLES

Trade receivables as at December 31, 2021 and 2020 consisted of:

Unit : Million Baht

	Note	Consolidated financial statements 2021	Consolidated financial statements 2020	Separate financial statements 2021	Separate financial statements 2020
Related parties	27	18,070	11,150	28,398	17,794
Other parties		32,619	18,186	3,965	4,817
Total		**50,689**	**29,336**	**32,363**	**22,611**
Less Allowance for credit losses		(149)	(59)	(19)	(19)
Total trade receivables		**50,540**	**29,277**	**32,344**	**22,592**

The following table shows the details of trade receivables as at December 31, 2021 and 2020, classified by aging and expected credit losses ("ECL"):

Unit : Million Baht

	Consolidated financial statements					
	Trade receivables					
As at December 31, 2021	**Not due**	**Past due**				**Total**
		Less than 3 months	**Over 3 months but less than 6 months**	**Over 6 months but less than 12 months**	**Over 12 months**	
Expected credit loss rate	0.01%	0.80%	31.79%	24.03%	95.34%	
Expected total gross carrying amount at default						
- Related parties	17,961	98	6	5	-	**18,070**
- Other parties	31,357	1,074	43	26	119	**32,619**
Lifetime ECL	(3)	(9)	(16)	(8)	(113)	**(149)**
Total trade receivables	**49,315**	**1,163**	**33**	**23**	**6**	**50,540**

Unit : Million Baht

	Consolidated financial statements					
	Trade receivables					
As at December 31, 2020	**Not due**	**Past due**				**Total**
		Less than 3 months	**Over 3 months but less than 6 months**	**Over 6 months but less than 12 months**	**Over 12 months**	
Expected credit loss rate	0.00%	0.12%	30.32%	73.90%	90.82%	
Expected total gross carrying amount at default						
- Related parties	11,128	22	-	-	-	**11,150**
- Other parties	17,625	483	21	3	54	**18,186**
Lifetime ECL	-	(1)	(7)	(2)	(49)	**(59)**
Total trade receivables	**28,753**	**504**	**14**	**1**	**5**	**29,277**

Unit : Million Baht

As at December 31, 2021	Separate financial statements Trade receivables Not due	Past due Less than 3 months	Over 3 months but less than 6 months	Over 6 months but less than 12 months	Over 12 months	Total
Expected credit loss rate	0.00%	0.00%	0.00%	0.00%	100.00%	
Expected total gross carrying amount at default						
- Related parties	28,397	1	-	-	-	**28,398**
- Other parties	3,615	331	-	-	19	**3,965**
Lifetime ECL	-	-	-	-	(19)	**(19)**
Total trade receivables	**32,012**	**332**	**-**	**-**	**-**	**32,344**

Unit : Million Baht

As at December 31, 2020	Separate financial statements Trade receivables Not due	Past due Less than 3 months	Over 3 months but less than 6 months	Over 6 months but less than 12 months	Over 12 months	Total
Expected credit loss rate	0.00%	0.00%	0.00%	0.00%	100.00%	
Expected total gross carrying amount at default						
- Related parties	17,793	1	-	-	-	**17,794**
- Other parties	4,789	9	-	-	19	**4,817**
Lifetime ECL	-	-	-	-	(19)	**(19)**
Total trade receivables	**22,582**	**10**	**-**	**-**	**-**	**22,592**

The normal credit term granted by the Group ranges from 7 days to 135 days *(2020: 14 days to 90 days)*.

The following table shows the movement in lifetime ECL that has been recognised for trade receivables in accordance with the simplified approach set out in TFRS 9.

Unit : Million Baht

	Consolidated financial statements	Separate financial statements
Balance as at January 1, 2021	59	19
Business acquisition (see Note 4)	68	-
Net remeasurement of loss allowance	21	-
Amounts recovered	(1)	-
Foreign exchange gains and translation differences	2	-
Balance as at December 31, 2021	**149**	**19**

Unit : Million Baht

	Consolidated financial statements	Separate financial statements
Balance as at January 1, 2020	49	19
Net remeasurement of loss allowance	33	-
Amounts recovered	(25)	-
Foreign exchange gains and translation differences	2	-
Balance as at December 31, 2020	**59**	**19**

7. OTHER RECEIVABLES

Other receivables as at December 31, 2021 and 2020 consisted of:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Prepaid expenses and advance payment	2,568	1,760	1,032	937
Accrued dividend income	-	150	2,859	-
Receivable from oil hedging contracts	500	34	500	34
Accrued income	218	469	349	500
Other receivables	1,401	943	904	458
Receivable from The Revenue Department	832	210	676	69
Others	506	160	31	15
Total	**6,025**	**3,726**	**6,351**	**2,013**

8. INVENTORIES

Inventories as at December 31, 2021 and 2020 consisted of:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Finished goods	31,043	11,604	13,962	7,620
Work in progress	2,686	1,446	1,503	855
Raw materials	16,184	5,868	9,718	4,544
Factory supplies and spare parts	13,433	11,749	9,572	8,596
Goods in transit	7,120	2,960	2,734	1,014
Total	**70,466**	**33,627**	**37,489**	**22,629**
Less Allowance for decline in value	(245)	(28)	(227)	(3)
Allowance for obsolescence	(496)	(154)	(282)	(38)
Net	**69,725**	**33,445**	**36,980**	**22,588**

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Inventories recognised as an expense in cost of sales of goods				
- Cost of sales	407,048	315,658	348,488	268,282
- Loss on (reversal of) devaluation of inventories	217	(275)	224	(237)
Net	**407,265**	**315,383**	**348,712**	**268,045**

As at December 31, 2021 and 2020, the Company's inventories included petroleum legal reserve of 246 million liters with approximated value of Baht 4,104 million and 227 million liters with approximated value of Baht 2,204 million, respectively.

9. INVESTMENTS IN SUBSIDIARIES

Movements of investments in subsidiaries for the years ended December 31, were as follows:

Unit : Million Baht

	Separate financial statements	
	2021	2020
Subsidiaries		
As at January 1,	76,486	72,551
Acquisitions	34,674	3,935
Allowance for impairment	(3,853)	-
As at December 31,	**107,307**	**76,486**

Investments in subsidiaries as at December 31, 2021 and 2020, and dividend income for the years ended December 31, 2021 and 2020 were as follows:

Unit : Million Baht

	Separate financial statements													
	Ownership Interest (%)		Paid-up capital		Cost		Impairment		At cost-net		Fair value of listed securities		Dividend income	
	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020
Subsidiaries														
Global Green Chemicals Plc.	72	72	9,725	9,725	7,400	7,400	-	-	7,400	7,400	8,362	6,956	259	148
GC Glycol Co., Ltd.	100	100	5,395	5,395	5,395	5,395	-	-	5,395	5,395	-	-	-	-
GC Polyols Co., Ltd.	82	82	4,002	3,693	3,286	3,032	-	-	3,286	3,032	-	-	-	-
GC Marketing Solutions Co., Ltd.	99	99	40	40	451	451	-	-	451	451	-	-	315	422
GC Maintenance and Engineering Co., Ltd.	100	100	137	137	155	155	-	-	155	155	-	-	266	6
GC Logistics Solutions Co., Ltd.	99	99	1,200	1,200	1,607	1,607	-	-	1,607	1,607	-	-	30	30
GC Ventures Co., Ltd	100	100	781	567	781	567	(36)	-	745	567	-	-	-	-
GC Treasury Center Co., Ltd.	100	100	10	10	10	10	-	-	10	10	-	-	19	29
GC Styrenics Co., Ltd.	100	100	190	190	190	190	-	-	190	190	-	-	-	-
GC Oxirane Co., Ltd.	100	100	7,537	7,136	7,537	7,136	-	-	7,537	7,136	-	-	-	-
GC-M PTA Company Limited	49	49	4,800	4,800	2,903	2,903	-	-	2,903	2,903	-	-	-	-
GC Estate Co., Ltd.	100	100	7,200	7,200	7,200	7,200	-	-	7,200	7,200	-	-	-	-
Solution Creation Co., Ltd.	100	100	826	826	826	826	-	-	826	826	-	-	-	-
Thai Tank Terminal Limited	51	51	900	900	459	459	-	-	459	459	-	-	541	500
PTT Phenol Co., Ltd.	100	100	11,851	11,851	13,155	13,155	-	-	13,155	13,155	-	-	9,580	460
NPC Safety and Environmental Service Co., Ltd.	100	100	165	165	165	165	-	-	165	165	-	-	-	11
ENVICCO Limited	70	70	1,026	270	719	189	-	-	719	189	-	-	-	-
PTTGC America Corporation	100	100	-	-	5,171	5,058	-	-	5,171	5,058	-	-	-	-
PTTGC International Private Limited	100	100	64,039	30,877	64,039	30,877	(14,106)	(10,289)	49,933	20,588	-	-	-	-
Total investments in subsidiaries					**121,449**	**86,775**	**(14,142)**	**(10,289)**	**107,307**	**76,486**	**8,362**	**6,956**	**11,010**	**1,606**

Change in investments in subsidiaries

GC Polyols Co., Ltd.

On December 17, 2020, GC Polyols Co., Ltd. ("GCP") has called for paid-up capital from the capital increase by the 2020 Annual General Meeting of shareholders of the subsidiary held on April 8, 2020 for conducting a Polyols & PU System Project at Baht 254.02 million, of which fully received in January 2021.

During the year ended December 31, 2020, GCP has called for paid-up capital from the capital increase by the Board of Directors' Meeting of GCP held on November 11, 2019 for conducting a Polyols & PU System Project at Baht 294.23 million, of which fully received in January 2020 and March 2020. Subsequently on April 8, 2020, GCP registered for capital increase by the Annual General Meeting for the year 2020 of shareholders of GCP totalling 9,520,000 shares at Baht 100 per share amounting to Baht 952 million, in which the GCP's registered capital increased from the original registered capital amounting to Baht 3,050 million to a new registered capital amounting to Baht 4,002 million, and called for paid-up capital from the capital increase totalling at Baht 642.60 million from the shareholders, of which fully received amounting to Baht 527.57 million from the Company during the year ended December 31, 2020.

GC Ventures Co., Ltd.

During the year ended December 31, 2021, GC Ventures Co., Ltd. ("GCV") has called for paid-up capital from the capital increase by the 2020 Annual General Meeting of shareholders of the subsidiary held on March 19, 2020, the 2021 Annual General Meeting of shareholders of the subsidiary held on March 30, 2021 and the 2021 Extraordinary Annual General Meeting of shareholders of the subsidiary held on July 5, 2021 for investment in Corporate Venture Capital (CVC) totalling at Baht 214.54 million, of which fully received during the year ended December 31, 2021.

On August 3, 2020, GCV has called for paid-up capital from the capital increase by the Annual General Meeting for the year 2020 of shareholders of the subsidiary held on March 19, 2020 for investment in Corporate Venture Capital (CVC) at Baht 102.13 million, of which fully received in August 2020.

GC Oxirane Co., Ltd.

On January 5, 2021, GC Oxirane Co., Ltd. ("GCO") has called for paid-up capital from the capital increase by the Board of Directors' Meeting of the subsidiary held on January 15, 2020 for conducting a Propylene Oxide Project at Baht 401.58 million, of which fully received in January 2021.

On January 3, 2020, GCO has called for paid-up capital from the capital increase by the Board of Directors' Meeting of GCO held on October 5, 2017 for conducting a Propylene Oxide Project at Baht 262.68 million, of which fully received in January 2020. In addition, GCO registered for capital increase by the Extraordinary General Meeting of shareholders of GCO held on December 9, 2019 totalling 22,310,000 shares at Baht 100 per share amounting to Baht 2,231 million, in which the GCO's registered capital increased from the original registered capital amounting to Baht 5,530 million to a new registered capital amounting to Baht 7,761 million. During the year ended December 31, 2020, GCO has called for paid-up capital from the capital increase by the Board of Directors' Meeting of GCO held on January 15, 2020 totalling at Baht 1,606.32 million, of which fully received during the year ended December 31, 2020.

Solution Creation Co., Ltd.

On July 22, 2020, Solution Creation Co., Ltd. has called for paid-up capital from the capital increase by the Extraordinary General Meeting of shareholders of the subsidiary held on May 7, 2020 to invest in Dynachisso Thai Co., Ltd. at Baht 302.12 million, of which fully received in July 2020.

ENVICCO Limited

During the year ended December 31, 2021, ENVICCO Limited ("ENVICCO") has called for paid-up capital from the capital increase by the Board of Directors' Meeting of the subsidiary held on July 23, 2020 for conducting a Recycled Plastic Project totalling at Baht 529.20 million, of which fully received during the year ended December 31, 2021.

On July 22, 2019, the Board of Directors' Meeting of the Company approved to establish ENVICCO as a subsidiary in which share capital held by the Company as 70% and ALPHA TH Recyclingbeteiligungsgesellschaft m.b.H. as 30%. The purpose of ENVICCO is for conducting a Recycled Plastic Project. On February 3, 2020, ENVICCO registered the establishment with registered capital of 1,000 shares at Baht 100 per share amounting to Baht 0.10 million and called for paid-up capital of 1,000 shares at Baht 25 per share, totalling Baht 25,000 from the Company. Subsequently on February 20, 2020, ENVICCO registered for capital increase totalling 10,799,000 shares at Baht 100 per share amounting to Baht 1,079.90 million, in which the ENVICCO's registered capital increased from the original registered capital amounting to Baht 0.10 million to a new registered capital amounting to Baht 1,080 million, and called for paid-up capital of 25% of registered capital amounting to Baht 270 million from the shareholders, of which fully received amounting to Baht 189 million from the Company in March 2020.

PTTGC America Corporation

During the year ended December 31, 2021, PTTGC America Corporation has called for paid-up capital from the capital increase by the Board of Directors' Meeting of the subsidiary held on January 12, 2021 for the purpose of US Petrochemical Complex Project investment totalling at USD 3.56 million or equivalent to Baht 113.32 million, of which fully received during the year ended December 31, 2021.

During the year ended December 31, 2020, PTTGC America Corporation has called for paid-up capital from the capital increase by the Board of Directors' Meeting of the subsidiary held on July 15, 2016 and September 15, 2020 for the purpose of US Petrochemical Complex Project investment totalling at USD 20.84 million or equivalent to Baht 651.18 million, of which fully received during the year ended December 31, 2020.

PTTGC International Private Limited

During the year ended December 31, 2021, PTTGC International Private Limited has called for paid-up capital from the capital increase by the Board of Directors' Meeting of the subsidiary held on July 1, 2021 for the purpose of corporate operation and investment in PTTGC International (Netherlands) B.V. totalling at EUR 831 million or equivalent to Baht 31,819.41 million, and the Board of Directors' Meeting of the subsidiary held on August 17, 2021 for investment in Emery Oleochemicals UK Limited at USD 39.50 million or equivalent to Baht 1,342.33 million, of which fully received during the year ended December 31, 2021.

Impairment loss on investment in a subsidiary

GC Ventures Co., Ltd.

During the year ended December 31, 2021, the Company recognised impairment loss on the investment in GC Ventures Co., Ltd. at Baht 36.19 million in the separate statements of profit or loss as the recoverable amount of investment in Arevo Inc., an investment in financial asset at fair value through other comprehensive income of the Group, was less than its carrying amount.

PTTGC International Private Limited

During the year ended December 31, 2021, the Company recognised impairment loss on the investment in PTTGC International Private Limited at Baht 3,817.37 million in reversal of (expenses from) impairment losses on assets in the separate statements of profit or loss as the recoverable amounts of investments in Emery Oleochemicals (M) Sdn. Bhd. and Emery Specialty Chemicals Sdn. Bhd., indirect joint ventures of the Group, were less than their carrying amounts.

10. INVESTMENTS IN JOINT VENTURES

Movements of investments in joint ventures for the years ended December 31, were as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Joint ventures				
As at January 1,	32,537	32,444	15,373	15,373
Acquisitions	2,404	522	-	-
Business acquisition (see Note 4)	722	-	-	-
Disposals	(4,760)	-	-	-
Share of profit of investments in joint ventures	4,155	863	-	-
Share of other comprehensive income of joint ventures	390	279	-	-
Dividend income	(919)	(1,600)	-	-
Effect from translation differences on foreign investment	(200)	33	-	-
Effect from first-time adoption of new accounting policy	-	(4)	-	-
As at December 31,	**34,329**	**32,537**	**15,373**	**15,373**

Investments in joint ventures as at December 31, 2021 and 2020, and dividend income for the years ended December 31, 2021 and 2020 were as follows:

Unit : Million Baht

		Consolidated financial statements													
		Ownership Interest (%)		Paid-up capital		Cost		Equity method		Impairment		Equity method - net		Dividend income	
	Note	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020
Direct joint ventures															
PTT Asahi Chemical Co., Ltd.		50	50	13,819	13,819	996	996	11,802	10,449	-	-	11,802	10,449	-	-
PTT MCC Biochem Co., Ltd.		50	50	1,860	1,860	160	160	242	160	-	-	242	160	-	-
HMC Polymers Co., Ltd.		41	41	3,790	3,790	14,217	14,217	13,001	12,624	-	-	13,001	12,624	828	289
						15,373	**15,373**	**25,045**	**23,233**	**-**	**-**	**25,045**	**23,233**	**828**	**289**
Indirect joint ventures															
Thai Ethoxylate Co., Ltd.		50	50	420	420	210	210	647	602	-	-	647	602	91	66
Emery Oleochemicals (M) Sdn. Bhd.		-	50	-	4,530	-	4,966	-	4,398	-	-	-	4,398	-	-
Emery Specialty Chemicals Sdn. Bhd.		-	50	-	818	-	407	-	-	-	-	-	-	-	-
Nature Works LLC		50	50	43,167	43,167	4,793	4,793	4,025	3,033	-	-	4,025	3,033	-	1,245
GGC KTIS Bioindustrial Company Limited		50	50	2,618	2,093	1,309	1,046	1,232	1,021	-	-	1,232	1,021	-	-
Revolve Group Limited		49	49	3	3	270	270	273	250	-	-	273	250	-	-
Emery Oleochemicals UK Limited		50	-	140	-	2,141	-	2,385	-	-	-	2,385	-	-	-
Entis Co., Ltd.	*4*	50	-	-	-	203	-	203	-	-	-	203	-	-	-
Synthese (Thailand) Co., Ltd.	*4*	48	-	100	-	519	-	519	-	-	-	519	-	-	-
						9,445	**11,692**	**9,284**	**9,304**	**-**	**-**	**9,284**	**9,304**	**91**	**1,311**
Total investments in joint ventures						**24,818**	**27,065**	**34,329**	**32,537**	**-**	**-**	**34,329**	**32,537**	**919**	**1,600**

Unit : Million Baht

	Separate financial statements											
	Ownership Interest (%)		Paid-up capital		Cost		Impairment		At cost - net		Dividend income	
	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020
Joint ventures												
PTT Asahi Chemical Co., Ltd.	50	50	13,819	13,819	996	996	-	-	996	996	-	-
PTT MCC Biochem Co., Ltd.	50	50	1,860	1,860	160	160	-	-	160	160	-	-
HMC Polymers Co., Ltd.	41	41	3,790	3,790	14,217	14,217	-	-	14,217	14,217	828	289
Total investments in joint ventures					**15,373**	**15,373**	**-**	**-**	**15,373**	**15,373**	**828**	**289**

Joint ventures

The following table summarises the financial information of the joint ventures as included in their own financial statements, adjusted for fair value adjustments at acquisition and differences in accounting policies. The table also reconciles the summarised financial information to the carrying amount of the Group's interest in these companies.

Unit : Million Baht

	PTT Asahi Chemical Co., Ltd.		HMC Polymers Co., Ltd.	
	2021	2020	2021	2020
For the years ended December 31,				
Statement of profit or loss				
Revenues	15,928	8,293	31,241	25,128
Depreciation and amortisation	1,228	1,361	1,495	1,709
Profit (loss) for the year	2,705	(843)	2,971	703
Other comprehensive income (loss)	-	(14)	(66)	688
Total comprehensive income (loss) for the year	**2,705**	**(857)**	**2,905**	**1,391**
As at December 31,				
Statement of financial position				
Current assets	7,419	3,407	9,491	7,615
Non-current assets	23,942	24,904	31,192	29,089
Current liabilities	(2,730)	(1,793)	(5,912)	(2,462)
Non-current liabilities	(5,028)	(5,619)	(10,730)	(11,109)
Net assets	**23,603**	**20,899**	**24,041**	**23,133**
Proportion of the Group's ownership interest in joint ventures (%)	50.00	50.00	41.44	41.44
	11,802	10,449	9,963	9,586
Investment amount over net assets at acquisition date	-	-	3,038	3,038
Carrying amount of interest in investee	**11,802**	**10,449**	**13,001**	**12,624**
Remark:				
Cash and cash equivalents	2,807	1,097	1,280	1,835

The reconciliation of the summarised financial information to the carrying amount of the Group's interest in these companies.

Unit : Million Baht

	PTT Asahi Chemical Co., Ltd.		HMC Polymers Co., Ltd.	
	2021	2020	2021	2020
Group's interest in net assets of investee as at January 1,	10,449	10,878	12,624	12,337
Total comprehensive income (loss) attributable to the Group	1,353	(429)	1,205	576
Dividends received during the year	-	-	(828)	(289)
Carrying amount of interest in investee as at December 31,	**11,802**	**10,449**	**13,001**	**12,624**

Immaterial joint ventures

The summarised financial information for the Group's interest in immaterial joint ventures based on the amounts reported in the Group's consolidated financial statements:

Unit : Million Baht

	Immaterial joint ventures	
	2021	2020
For the years ended December 31,		
Carrying amount of interests in immaterial joint ventures	9,526	9,464
Group's share of:		
- Profit for the year	1,370	1,026
- Other comprehensive income (loss)	417	(2)
- Total comprehensive income for the year	1,787	1,024

Change in investments in joint ventures

Entering into a share sale and purchase agreement of investments in joint ventures

On August 17, 2021, the Board of Directors' Meeting of the PTTGC International Private Limited ("GC Inter"), a subsidiary of the Company, approved GC Inter to enter into a share sale and purchase agreement to sell shares of Emery Oleochemicals (M) Sdn. Bhd. ("EOM") and Emery Specialty Chemicals Sdn. Bhd. ("ESC") in which GC Inter holding 50% to Edenor Technology Sdn. Bhd. ("Edenor"). The share sale and purchase agreement has been signed on August 19, 2021. The divestment is conditional upon the business restructuring of the Group of EOM and ESC into separate standalone groups in respect of its Asia Pacific business and the North America and Europe business. After the restructuring, Asia Pacific business will remain under EOM and ESC, which will be divested to Edenor, while the business in North America and Europe will be transferred out from EOM and ESC to Emery Oleochemicals UK Limited which is to be held directly by GC Inter and Sime Darby Plantation Berhad on a 50:50 basis. Consequently, such aforementioned restructuring has completed on October 12, 2021.

On November 1, 2021, the sale of shares in EOM and ESC to Edenor resulted to the loss from sale of investments in joint ventures recognised in the consolidated statements of profit or loss amounting to Baht 1,632.95 million. As a result, the Company has reversed the impairment loss on the investments in EOM at Baht 3,020.56 million, which has been previously recognised in the consolidated statements of profit or loss in the second quarter.

GGC KTIS Bioindustrial Co., Ltd.

On December 21, 2020 and during the year ended December 31, 2021, GGC KTIS Bioindustrial Company Limited ("GKBI"), an indirect joint venture of the Group, has called for paid-up capital from the capital increase totalling of Baht 262.88 million, from GGC Biochemicals Company Limited, of which fully received during the year ended December 31, 2021.

During the year ended December 31, 2020, GKBI, an indirect joint venture of the Group, has called for paid-up capital from the capital increase of Baht 522.50 million from GGC Biochemicals Company Limited, of which fully received during the year ended December 31, 2020.

Emery Oleochemicals UK Limited

On October 12, 2021, PTTGC International Private Limited, a subsidiary, acquired 50% of shares of Emery Oleochemicals UK Limited from EOM and ESC, the previous shareholders. The acquisition of such shares is a business combination under common control of the subsidiary. The subsidiary paid for the share purchase totalling Pound Sterling 24 million or equivalent to Baht 1,055 million, which record as difference arising from business combination under common control in the consolidated statements of changes in shareholders' equity and recorded the investment as cost of Baht 2,141 million. The investment is aligned with the business restructuring plan of the Group of EOM and ESC, and the Company's strategy that focusing on investment in high value business products.

11. INVESTMENTS IN ASSOCIATES

Movements of investments in associates for the years ended December 31, were as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Associates				
As at January 1,	31,873	29,829	27,546	26,813
Acquisition	373	1,027	373	733
Disposal	(23,733)	-	(22,753)	-
Share of profit of investments in associates	2,685	2,459	-	-
Share of other comprehensive income of investments in associates	280	34	-	-
Reversal of (allowance) for impairment	9	(9)	-	-
Dividend income	(976)	(1,294)	-	-
Effect from first-time adoption of new accounting policy	-	(173)	-	-
As at December 31,	**10,511**	**31,873**	**5,166**	**27,546**

Investments in associates as at December 31, 2021 and 2020, and dividend income for the years ended December 31, 2021 and 2020 were as follows:

Unit : Million Baht

	Consolidated financial statements													
	Ownership Interest (%)		Paid-up capital		Cost		Equity method		Impairment		Equity method - net		Dividend income	
	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020
Direct associates														
Global Power Synergy Plc.	-	23	-	28,197	-	22,753	-	23,378	-	-	-	23,378	641	833
Kuraray GC Advanced Materials Co., Ltd.	33	33	5,321	4,203	1,777	1,404	1,714	1,336	-	-	1,714	1,336	-	-
PTT Energy Solutions Co., Ltd.	20	20	150	150	30	30	38	48	-	-	38	48	-	-
PTT Digital Solutions Co., Ltd.	40	40	150	150	60	60	1,170	1,014	-	-	1,170	1,014	52	38
Vinythai Plc.	25	25	7,111	7,111	3,297	3,297	7,259	5,761	-	-	7,259	5,761	266	415
Eastern Fluid Transport Co., Ltd.	23	23	10	10	2	2	9	12	-	-	9	12	12	8
					5,166	**27,546**	**10,190**	**31,549**	**-**	**-**	**10,190**	**31,549**	**971**	**1,294**
Indirect associates														
Thai Eastern Top Seeds Oil Co., Ltd.	30	30	222	222	67	67	-	9	-	(9)	-	-	-	-
S.P. Petpack Inter Group Co., Ltd.	25	25	200	200	50	50	39	40	-	-	39	40	-	-
Dynachisso Thai Co., Ltd.	42	42	120	120	294	294	282	284	-	-	282	284	5	-
					411	**411**	**321**	**333**	**-**	**(9)**	**321**	**324**	**5**	**-**
Total investments in associates					**5,577**	**27,957**	**10,511**	**31,882**	**-**	**(9)**	**10,511**	**31,873**	**976**	**1,294**

Unit : Million Baht

	Separate financial statements													
	Ownership Interest (%)		Paid-up capital		Cost		Impairment		At cost - net		Fair value of listed securities		Dividend income	
	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020
Associates														
Global Power Synergy Plc.	-	23	-	28,197	-	22,753	-	-	-	22,753	-	47,267	641	833
Kuraray GC Advanced Materials Co., Ltd.	33	33	5,321	4,203	1,777	1,404	-	-	1,777	1,404	-	-	-	-
PTT Energy Solutions Co., Ltd.	20	20	150	150	30	30	-	-	30	30	-	-	-	-
PTT Digital Solutions Co., Ltd.	40	40	150	150	60	60	-	-	60	60	-	-	52	38
Vinythai Plc.	25	25	7,111	7,111	3,297	3,297	-	-	3,297	3,297	11,397	9,473	266	415
Eastern Fluid Transport Co., Ltd.	15	15	10	10	2	2	-	-	2	2	-	-	8	6
Total investments in associates					**5,166**	**27,546**	**-**	**-**	**5,166**	**27,546**	**11,397**	**56,740**	**967**	**1,292**

Associates

The following table summarises the financial information of the associate as included in its own financial statements, adjusted for fair value adjustments at acquisition and differences in accounting policies. The table also reconciles the summarised financial information to the carrying amount of the Group's interest in the associate (no significant associates in year 2021).

	Unit : Million Baht Global Power Synergy Plc. 2020
For the years ended December 31,	
Statement of profit or loss	
Revenue	68,757
Profit for the year	7,509
Other comprehensive loss	(146)
Total comprehensive income for the year	**7,363**
As at December 31,	
Statement of financial position	
Current assets	43,453
Non-current assets	213,146
Current liabilities	(22,063)
Non-current liabilities	(122,726)
Net assets	**111,810**
Non-controlling interests	(8,961)
Total attributions to owners of the parent	**102,849**
Proportion of the Group's ownership interest in associate (%)	22.73
Carrying amount of interest in investee	**23,378**
Remark:	
Cash and cash equivalents	20,289

The reconciliation of the summarised financial information to the carrying amount of the Group's interest in this associate.

	Unit : Million Baht Global Power Synergy Plc. 2020
Group's interest in net assets of investee as at January 1,	22,599
Total comprehensive income attributable to the Group	1,785
Dividends received during the year	(833)
Effect from first-time adoption of new accounting policy	(173)
Carrying amount of interest in investee as at December 31,	**23,378**

Immaterial associates

The summarised financial information for the Group's interest in immaterial associates based on the amounts reported in the Group's consolidated financial statements:

Unit : Million Baht

	Immaterial associates	
	2021	**2020**
For the years ended December 31,		
Carrying amount of interests in immaterial associates	10,511	8,495
Group's share of:		
- Profit for the year	2,685	691
- Other comprehensive income (loss)	279	(45)
- Total comprehensive income for the year	2,964	646

Change in investment in associates

Sale of an investment and disposal of shareholding in Global Power Synergy Public Company Limited

At the Board of Directors' Meeting of the Company held on April 22, 2021, the Board approved the Company to sell ordinary shares in Global Power Synergy Public Company Limited ("GPSC") at par value of Baht 10 per share to PTT Public Company Limited ("PTT") in the number of 305,000,000 shares, which is equivalent to 10.82% of the total issued and paid-up shares of GPSC and Siam Management Holding Company Limited ("SMH"), a juristic person with PTT holding 100%, in the number of 53,936,756 shares, which is equivalent to 1.91% of the total issued and paid-up shares of GPSC, totalling 358,936,756 shares, which is equivalent to 12.73% of the total issued and paid-up shares of GPSC, at Baht 70.0 per share (after adjusted the dividend paid in April 2021) in the total amount of approximately Baht 25,126 million. However, such amount may be adjusted to reflect the effect from dividend payment of GPSC and income tax of the relevant parties associated with the dividend payment (if any), but not exceeding Baht 30 million, and approved that the Company to enter into a share sale and purchase agreement with both PTT and SMH. At the Extraordinary Shareholders Meeting No. 1/2021 of the Company held on June 7, 2021, the meeting approved the Company to perform such transactions.

The Company has completed the sale of ordinary shares in GPSC to PTT and SMH on June 8, 2021, with gain from sale of investment in an associate recognised in the consolidated and separate statements of profit or loss amounting to Baht 11,834 million and Baht 12,383 million, respectively. As a result, the Company's shareholding interest in GPSC decreased from approximately 22.73% before the sale of shares to 10.00% after the sale of shares. The Company has reclassified the remaining investment of 10.00% in GPSC to non-current investment in financial assets measured at fair value through other comprehensive income in which gain on remeasurement of fair value at the date of investment reclassification was presented as part of investment income in the consolidated and separate statements of profit or loss amounting to Baht 10,565 million and Baht 10,997 million, respectively (see Note 32).

Kuraray GC Advanced Materials Co., Ltd.

During the year ended December 31, 2021, Kuraray GC Advanced Materials Co., Ltd., a direct associate of the Group, has called for paid-up capital from the capital increase of 3,734,120 shares at Baht 100 per share, totalling Baht 373.41 million, of which fully received during the year ended December 31, 2021.

On December 25, 2019 and during the year ended December 31, 2020, Kuraray GC Advanced Materials Co., Ltd., a direct associate of the Group, has called for paid-up capital from the capital increase of 7,331,300 shares at Baht 100 per share, totalling Baht 733.13 million, of which fully received during the year ended December 31, 2020.

Delisting plan of securities of Vinythai Public Company Limited from being listed on the Stock Exchange of Thailand and a tender offer for delisting of securities

On March 18, 2021, at the Extra Board of Directors' Meeting of the Company approved the collaboration between the Company and AGC Inc. about the delisting plan of securities of Vinythai Public Company Limited ("VNT") from being listed on the Stock Exchange of Thailand ("SET"). The Company will make a complete tender offer for all ordinary shares of VNT, excluding its ordinary shares owned by the Company, of 889,154,755 shares, or equivalent to 75.02% of VNT's issued and paid-up share capital, for delisting of securities of VNT from being listed on the SET with tender offer price at Baht 39 per share. Currently, the Company is the major shareholder of VNT, direct shareholding of 296,038,689 shares, or equivalent to 24.98% of VNT's issued and paid-up share capital. AGC Inc. is the shareholder with the controlling power over VNT, direct shareholding of 696,663,509 shares, or equivalent to 58.78% of VNT's issued and paid-up share capital. Launching the tender offer for delisting of all securities of VNT by the Company, AGC Inc. had an intention not to sell all the common shares of VNT in which directly held by AGC Inc.

Consequently, on December 21, 2021 the Company has already submitted the tender offer for the securities of VNT totalling 192,491,246 shares, when deducting the ordinary shares which AGC Inc. agreed not to sell, or equivalent to 16.24% of VNT's issued and paid-up share capital with the tender offer price at Baht 39 per share. Such transaction is expected to be completed in March 2022. The tender offer to delist the securities of VNT is a part of the restructuring process of chemicals business unit of the Company and AGC Inc. After the tender offer to delist the securities of VNT has been completed, the Company and AGC Inc. will support the amalgamation between VNT and a subsidiary under AGC Inc. to form a new company with a plan to offer the newly issued ordinary shares to the Company for further consideration after the amalgamation is completed. However, such amalgamation and capital increase will depend on the success of various conditions including seeking approval from the shareholders' meeting of the merger companies.

Sale of an investment in Thai Eastern Top Seeds Oil Co., Ltd.

On September 15, 2021, the Board of Directors' Meeting of the Global Green Chemicals Plc. ("GGC"), a subsidiary of the Company, approved to sell shares of Thai Eastern Top Seeds Oil Co., Ltd. ("TETSO") in which GGC holding 30%. Subsequently, on January 13, 2022 GGC has completed the sales of shares in TETSO to a company amounting to Baht 1.

Dynachisso Thai Co., Ltd.

On July 31, 2020, Solution Creation Co., Ltd., a subsidiary, acquired 41.5% shares of Dynachisso Thai Co., Ltd. to advance in the PP compound engineering plastic business from Dynachem (Hong Kong) Limited. The subsidiary paid for the share purchase totalling Baht 293.82 million according to Share Sale and Subscription Agreement. The investment is aligned with the Company's business strategy to enhance competitiveness and add value to products to meet customer's demands.

12. INVESTMENTS IN FINANCIAL ASSETS

Investments in financial assets as at December 31, 2021 and 2020 consisted of:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Current investments in financial assets				
Financial assets at amortisation costs				
- Deposit at bank	18,385	12,779	18,058	12,379
- Bond	-	3,496	-	3,496
Financial assets at fair value through other comprehensive income				
- Deposit at bank (private fund)	100	-	100	-
- Bond	896	70	896	70
Total current investments in financial assets	**19,381**	**16,345**	**19,054**	**15,945**

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Non-current investments in financial assets				
Financial assets at fair value through profit or loss				
- Debt instruments	407	382	374	352
- Equity instruments	191	-	-	-
Financial assets at fair value through other comprehensive income				
- Debt instruments	1,969	36	1,969	36
- Equity instruments	26,590	670	25,029	4
Total non-current investments in financial assets	**29,157**	**1,088**	**27,372**	**392**

The fair value of the investments and the valuation methodology for these investments are disclosed in Note 36 and the dividends received in respect of these investments as recorded in the consolidated and separate financial statements totaling Baht 148 million.

Other gains (losses) arising on these investments for the year ended December 31, were as follows:

Unit : Million Baht

	Consolidated financial statements	Separate financial statements
	2021	2021
Net gain arising on financial assets mandatorily measured at FVTPL	22	22
Total	**22**	**22**

Unit : Million Baht

	Consolidated financial statements	Separate financial statements
	2020	2020
Net loss arising on financial assets mandatorily measured at FVTPL	(32)	(32)
Reclassification of net gain on debt investments classified as at FVTOCI from equity to profit or loss upon disposal	34	34
Total	**2**	**2**

13. INVESTMENT PROPERTIES

Investment properties as at December 31, 2021 and 2020 consisted of:

Unit : Million Baht

	Consolidated financial statements				Separate financial statements
	Land	Buildings and buildings improvement	Investment property under construction	Total	Land
Cost					
As at January 1, 2020	6,459	41	-	6,500	1,741
Transfers	(420)	(14)	-	(434)	-
Disposals	(4)	-	-	(4)	-
As at December 31, 2020 and January 1, 2021	**6,035**	**27**	**-**	**6,062**	**1,741**
Additions	-	-	1	1	-
Transfers	-	4	11	15	-
As at December 31, 2021	**6,035**	**31**	**12**	**6,078**	**1,741**
Accumulated depreciation					
As at January 1, 2020	-	(2)	-	(2)	-
Depreciation charge for the year	-	(2)	-	(2)	-
Transfers	-	1	-	1	-
As at December 31, 2020 and January 1, 2021	**-**	**(3)**	**-**	**(3)**	**-**
Depreciation charge for the year	-	(2)	-	(2)	-
Transfers	-	1	-	1	-
As at December 31, 2021	**-**	**(4)**	**-**	**(4)**	**-**
Net book value					
As at January 1, 2020	**6,459**	**39**	**-**	**6,498**	**1,741**
As at December 31, 2020 and January 1, 2021	**6,035**	**24**	**-**	**6,059**	**1,741**
As at December 31, 2021	**6,035**	**27**	**12**	**6,074**	**1,741**

The fair value of investment properties of the Group as at December 31, 2021 of Baht 6,834 million *(2020: Baht 8,019 million)* was determined at open market values on an existing use basis and income approach. The fair value measurement for investment properties has been categorised as Levels 2 and 3 fair value, respectively.

The fair value of investment properties of the Company as at December 31, 2021 of Baht 3,700 million *(2020: Baht 3,700 million)* was determined at open market values on an existing use basis. The fair value measurement for investment properties has been categorised as a Level 2 fair value.

Measurement of fair value

Level 2 fair value

The fair value of investment properties for land was determined by independent property valuers at open market values by scoring and weighted other different factors.

Level 3 fair value

The fair value of investment properties for land and buildings was determined by the Group at income approach. The significant unobservable inputs comprise yield rate and finance costs.

Amounts recognised in the statements of profit or loss that are related to investment properties for the years ended December 31, are as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Rental income	133	130	169	167

14. PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment as at December 31, 2021 and 2020 consisted of:

Unit : Million Baht

		Consolidated financial statements						
	Note	Land and land improvement	Plant, machinery, equipment and factory tools	Buildings and buildings improvement	Furniture, fixtures and equipment	Vehicles	Assets under construction	Total
Cost								
As at January 1, 2020		12,212	372,157	17,911	2,554	733	60,270	465,837
Additions		39	1,220	37	207	6	20,805	22,314
Transfers		654	32,293	1,743	19	54	(33,983)	780
Disposals		(67)	(2,873)	(8)	(39)	(19)	(21)	(3,027)
Effect from exchange differences on translating financial statements		18	801	119	1	2	(37)	904
As at December 31, 2020 and January 1, 2021		**12,856**	**403,598**	**19,802**	**2,742**	**776**	**47,034**	**486,808**
Additions		36	1,454	11	93	10	14,630	16,234
Business acquisition	*4*	2,751	30,126	6,535	1,785	113	2,140	43,450
Transfers		138	38,281	1,058	142	68	(40,984)	(1,297)
Disposals		(483)	(4,314)	(85)	(201)	(38)	(1,295)	(6,416)
Reclassification		-	371	-	-	-	-	371
Effect from exchange differences on translating financial statements		114	443	56	8	1	773	1,395
As at December 31, 2021		**15,412**	**469,959**	**27,377**	**4,569**	**930**	**22,298**	**540,545**

Unit : Million Baht

		Consolidated financial statements						
	Note	Land and land improvement	Plant, machinery, equipment and factory tools	Buildings and buildings improvement	Furniture, fixtures and equipment	Vehicles	Assets under construction	Total
Accumulated depreciation and allowance for impairment								
As at January 1, 2020		(1,371)	(187,955)	(8,426)	(1,967)	(467)	(1,464)	(201,650)
Depreciation charge for the year		(92)	(17,158)	(738)	(207)	(62)	-	(18,257)
Transfers		(4)	(440)	(2)	23	(44)	-	(467)
Disposals		2	2,724	7	38	18	-	2,789
Reversal of impairment losses		-	371	-	-	-	-	371
Effect from exchange differences on translating financial statements		2	(374)	(50)	(1)	1	5	(417)
As at December 31, 2020 and January 1, 2021		**(1,463)**	**(202,832)**	**(9,209)**	**(2,114)**	**(554)**	**(1,459)**	**(217,631)**
Depreciation charge for the year		(99)	(18,825)	(840)	(239)	(67)	-	(20,070)
Business Acquisition	*4*	(77)	(12,415)	(2,557)	(1,051)	(72)	-	(16,172)
Transfers		-	-	-	-	(57)	-	(57)
Disposals		25	1,877	30	194	38	-	2,164
Impairment losses		-	-	-	-	-	(1,833)	(1,833)
Reversal of impairment losses		450	1,681	49	7	-	1,267	3,454
Reclassification		-	(371)	-	-	-	-	(371)
Effect from exchange differences on translating financial statements		(30)	(305)	(28)	(8)	(1)	(78)	(450)
As at December 31, 2021		**(1,194)**	**(231,190)**	**(12,555)**	**(3,211)**	**(713)**	**(2,103)**	**(250,966)**

Unit : Million Baht

	Consolidated financial statements						
	Land and land improvement	Plant, machinery, equipment and factory tools	Buildings and buildings improvement	Furniture, fixtures and equipment	Vehicles	Assets under construction	Total
Net book value							
As at January 1, 2020							
Owned assets	10,841	184,202	9,485	587	266	58,806	264,187
	10,841	**184,202**	**9,485**	**587**	**266**	**58,806**	**264,187**
As at December 31, 2020 and January 1, 2021							
Owned assets	11,393	200,755	10,593	628	222	45,575	269,166
Assets under hire purchase agreement	-	11	-	-	-	-	11
	11,393	**200,766**	**10,593**	**628**	**222**	**45,575**	**269,177**
As at December 31, 2021							
Owned assets	14,218	238,760	14,822	1,358	217	20,195	289,570
Assets under hire purchase agreement	-	9	-	-	-	-	9
	14,218	**238,769**	**14,822**	**1,358**	**217**	**20,195**	**289,579**

The gross amount of the Group's fully depreciated buildings and equipment that was still in use as at December 31, 2021 amounted to Baht 33,048 million *(2020: Baht 25,026 million)*.

Security

As at December 31, 2021, net book value of assets of the Group of Baht 36,539 million *(2020: Baht 14,638 million)* were registered to secured loan from financial institutions (see Note 19.2). In addition, the Group pledged some of the machinery, bank accounts and various rights as collateral as reported to the financial institutions.

Property, plant and equipment under construction

As at December 31, 2021, capitalised borrowing costs, relating to the acquisition of the land and the construction of the new factory, were included in a part of purchases of assets amounted to Baht 249 million in the consolidated statements of financial position *(2020: Baht 947 million)*. The Group capitalised borrowing costs using the rates of 2.65% to 5.00% per annum *(2020: 2.60% to 5.00% per annum)*.

Impairment of assets in PTTGC America LLC

For the year ended December 31, 2021, there is the conclusion of project feasibility study that some assets are inconsistency with current project feasibility study phase. The Group recognized impairment loss on assets under construction which included in property, plant and equipment amounted to Baht 1,833 million and other non-current assets amounted to Baht 54 million.

Unit : Million Baht

	Separate financial statements						
	Land and land improvement	**Plant, machinery, equipment and factory tools**	**Buildings and buildings improvement**	**Furniture, fixtures and equipment**	**Vehicles**	**Assets under construction**	**Total**
Cost							
As at January 1, 2020	4,952	286,600	9,798	1,570	490	31,736	335,146
Additions	3	638	19	152	-	12,954	13,766
Transfers	50	6,375	327	35	52	(6,849)	(10)
Disposals	(3)	(2,455)	-	(17)	(14)	(5)	(2,494)
As at December 31, 2020 and January 1, 2021	**5,002**	**291,158**	**10,144**	**1,740**	**528**	**37,836**	**346,408**
Additions	-	545	7	44	4	8,728	9,328
Transfers	118	36,067	545	94	48	(37,283)	(411)
Disposals	(11)	(1,182)	(8)	(81)	(21)	(19)	(1,322)
As at December 31, 2021	**5,109**	**326,588**	**10,688**	**1,797**	**559**	**9,262**	**354,003**
Accumulated depreciation							
As at January 1, 2020	(651)	(146,574)	(4,727)	(1,202)	(265)	(270)	(153,689)
Depreciation charge for the year	(45)	(12,019)	(414)	(132)	(52)	-	(12,662)
Transfers	-	-	-	(5)	(41)	-	(46)
Disposals	2	2,393	-	17	12	-	2,424
As at December 31, 2020 and January 1, 2021	**(694)**	**(156,200)**	**(5,141)**	**(1,322)**	**(346)**	**(270)**	**(163,973)**
Depreciation charge for the year	(45)	(12,805)	(432)	(159)	(56)	-	(13,497)
Transfers	-	-	-	-	(38)	-	(38)
Disposals	4	885	6	80	21	-	996
As at December 31, 2021	**(735)**	**(168,120)**	**(5,567)**	**(1,401)**	**(419)**	**(270)**	**(176,512)**

Unit : Million Baht

	Separate financial statements						
	Land and land improvement	Plant, machinery, equipment and factory tools	Buildings and buildings improvement	Furniture, fixtures and equipment	Vehicles	Assets under construction	Total
Net book value							
As at January 1, 2020							
Owned assets	4,301	140,026	5,071	368	225	31,466	181,457
	4,301	**140,026**	**5,071**	**368**	**225**	**31,466**	**181,457**
As at December 31, 2020 and January 1, 2021							
Owned assets	4,308	134,958	5,003	418	182	37,566	182,435
	4,308	**134,958**	**5,003**	**418**	**182**	**37,566**	**182,435**
As at December 31, 2021							
Owned assets	4,374	158,468	5,121	396	140	8,992	177,491
	4,374	**158,468**	**5,121**	**396**	**140**	**8,992**	**177,491**

The gross amount of the Company's fully depreciated buildings and equipment that was still in use as at December 31, 2021 amounted to Baht 18,988 million *(2020: Baht 16,428 million)*.

Property, plant and equipment under construction

As at December 31, 2021, capitalised borrowing costs, relating to the acquisition of the land and the construction of the new factory, were included in a part of purchases of assets amounted to Baht 235 million in the separate statements of financial position *(2020: Baht 459 million)*. In 2021 and 2020, the Company capitalised borrowing costs using the rates of 3.5 - 5.00% and 5.00% per annum, respectively.

15. RIGHT-OF-USE ASSETS

Movements of right-of-use assets during the year ended December 31, 2021 and 2020 were as follows:

Unit : Million Baht

		Consolidated financial statements					
	Note	Land and land improvement	Plant, machinery, equipment and factory tools	Buildings and buildings improvement	Furniture, fixtures and equipment	Vehicles	Total
Cost							
As at January 1, 2020		-	-	-	-	-	-
Effect from first-time adoption of new accounting policy		4,309	1,275	331	430	554	6,899
Additions		2,360	199	15	104	183	2,861
Transfers		11	362	-	23	(55)	341
Termination		-	(15)	-	(21)	(18)	(54)
Modification		-	-	(1)	-	(5)	(6)
Effect from exchange differences on translating financial statements		(1)	9	7	-	3	18
As at December 31, 2020 and January 1, 2021		**6,679**	**1,830**	**352**	**536**	**662**	**10,059**
Additions		1,518	747	246	72	333	2,916
Business acquisition	*4*	176	699	1,126	90	320	2,411
Transfers		5	16	-	1	(66)	(44)
Termination		(219)	(18)	(112)	(20)	(68)	(437)
Modification		(5)	11	-	-	(1)	5
Effect from exchange differences on translating financial statements		36	4	17	1	-	58
As at December 31, 2021		**8,190**	**3,289**	**1,629**	**680**	**1,180**	**14,968**

Unit : Million Baht

		Consolidated financial statements					
	Note	Land and land improvement	Plant, machinery, equipment and factory tools	Buildings and buildings improvement	Furniture, fixtures and equipment	Vehicles	Total
Accumulated depreciation and allowance for impairment							
As at January 1, 2020		-	-	-	-	-	-
Effect from first-time adoption of new accounting policy		(999)	(343)	(7)	(166)	(109)	(1,624)
Depreciation charge for the year		(343)	(309)	(126)	(150)	(205)	(1,133)
Transfers		-	(268)	-	(24)	44	(248)
Termination		-	2	-	21	9	32
Loss on impairment of assets		(49)	-	-	-	-	(49)
Effect from exchange differences on translating financial statements		3	(1)	-	-	-	2
As at December 31, 2020 and January 1, 2021		**(1,388)**	**(919)**	**(133)**	**(319)**	**(261)**	**(3,020)**
Depreciation charge for the year		(486)	(362)	(126)	(138)	(202)	(1,314)
Business acquisition	*4*	(9)	(161)	(312)	(36)	(88)	(606)
Transfers		-	(12)	-	-	56	44
Termination		100	18	111	20	60	309
Reversal of impairment loss		49	-	-	-	-	49
Effect from exchange differences on translating financial statements		(9)	(2)	(6)	-	(1)	(18)
As at December 31, 2021		**(1,743)**	**(1,438)**	**(466)**	**(473)**	**(436)**	**(4,556)**
Net book value							
As at January 1, 2020		**3,310**	**932**	**324**	**264**	**445**	**5,275**
As at December 31, 2020 and January 1, 2021		**5,291**	**911**	**219**	**217**	**401**	**7,039**
As at December 31, 2021		**6,447**	**1,851**	**1,163**	**207**	**744**	**10,412**

Unit : Million Baht

	Separate financial statements					
	Land and land improvement	Plant, machinery, equipment and factory tools	Buildings and buildings improvement	Furniture, fixtures and equipment	Vehicles	Total
Cost						
As at January 1, 2020	-	-	-	-	-	-
Effect from first-time adoption of new accounting policy	3,531	1,841	96	323	388	6,179
Additions	2,337	134	2	82	92	2,647
Transfers	-	2	-	(7)	(52)	(57)
Termination	-	(4)	-	(14)	(7)	(25)
Modification	-	(6)	(1)	-	-	(7)
As at December 31, 2020 and January 1, 2021	**5,868**	**1,967**	**97**	**384**	**421**	**8,737**
Additions	1,519	700	159	58	229	2,665
Transfers	3	-	-	-	(48)	(45)
Termination	(32)	(3)	(95)	-	(37)	(167)
Modification	(4)	(15)	-	-	-	(19)
As at December 31, 2021	**7,354**	**2,649**	**161**	**442**	**565**	**11,171**
Accumulated depreciation and allowance for impairment						
As at January 1, 2020	-	-	-	-	-	-
Effect from first-time adoption of new accounting policy	(946)	(316)	-	(124)	(72)	(1,458)
Depreciation charge for the year	(239)	(552)	(55)	(114)	(136)	(1,096)
Transfers	-	(3)	-	7	41	45
Termination	-	1	-	13	5	19
As at December 31, 2020 and January 1, 2021	**(1,185)**	**(870)**	**(55)**	**(218)**	**(162)**	**(2,490)**
Depreciation charge for the year	(391)	(693)	(55)	(103)	(134)	(1,376)
Transfers	-	(2)	-	-	38	36
Termination	32	3	95	-	36	166
As at December 31, 2021	**(1,544)**	**(1,562)**	**(15)**	**(321)**	**(222)**	**(3,664)**
Net book value						
As at January 1, 2020	**2,585**	**1,525**	**96**	**199**	**316**	**4,721**
As at December 31, 2020 and January 1, 2021	**4,683**	**1,097**	**42**	**166**	**259**	**6,247**
As at December 31, 2021	**5,810**	**1,087**	**146**	**121**	**343**	**7,507**

Amount recognised in profit and loss for the year ended December 31, 2021 and 2020 are as follows:

Unit : Million Baht

	Consolidated financial statements 2021	Separate financial statements 2021
Depreciation expense on right-of-use assets	1,314	1,376
Interest expense on lease liabilities		
- net of interest capitalised as part of asset under construction	273	249
Expense relating to short-term leases	62	24
Expense relating to leases of low value assets	41	28
Expense relating to variable lease payments not included in the measurement of the lease liability	1	71
Income from sub-leasing right-of-use assets	1	2

Unit : Million Baht

	Consolidated financial statements 2020	Separate financial statements 2020
Depreciation expense on right-of-use assets	1,133	1,096
Interest expense on lease liabilities		
- net of interest capitalised as part of asset under construction	170	160
Expense relating to short-term leases	114	206
Expense relating to leases of low value assets	14	6
Expense relating to variable lease payments not included in the measurement of the lease liability	1	57
Income from sub-leasing right-of-use assets	1	2

The maturity analysis of lease liabilities is presented in Note 20.

16. GOODWILL

Goodwill as at December 31, 2021 and 2020 consist of:

Unit : Million Baht

	Consolidated financial statements
Cost	
As at January 1, 2020	1,648
As at December 31, 2020 and January 1, 2021	**1,648**
Business acquisition (see Note 4)	74,587
As at December 31, 2021	**76,235**
Allowance for impairment	
As at January 1, 2020	(717)
As at December 31, 2020 and January 1, 2021	**(717)**
As at December 31, 2021	**(717)**
Net book value	
As at January 1, 2020	**931**
As at December 31, 2020 and January 1, 2021	**931**
As at December 31, 2021	**75,518**

17. INTANGIBLE ASSETS

Intangible assets as at December 31, 2021 and 2020 consist of:

Unit : Million Baht

		Consolidated financial statements						
	Note	Production licence fees	Computer software	Customer contracts and the related customer relationships	Right to use pipe rack	Right to use others	Intangible assets under development	Total
Cost								
As at January 1, 2020		7,707	4,997	137	547	2,380	677	16,445
Effect from first-time adoption of new accounting policy		-	-	-	(440)	(56)	-	(496)
Additions		215	44	-	-	-	1,097	1,356
Transfers		887	425	-	(51)	(327)	(1,324)	(390)
Disposals		-	(9)	-	-	-	-	(9)
Effect from exchange differences on translating financial statements		-	10	1	-	80	-	91
As at December 31, 2020 and January 1, 2021		**8,809**	**5,467**	**138**	**56**	**2,077**	**450**	**16,997**
Additions		39	45	-	-	-	474	558
Business acquisition	*4*	34	4,094	40,755	-	48,955	291	94,129
Transfers		75	684	-	-	-	(711)	48
Disposals		-	(451)	-	-	(960)	-	(1,411)
Effect from exchange differences on translating financial statements		-	8	14	-	98	2	122
As at December 31, 2021		**8,957**	**9,847**	**40,907**	**56**	**50,170**	**506**	**110,443**

Unit : Million Baht

		Consolidated financial statements						
	Note	Production licence fees	Computer Software	Customer contracts and the related customer relationships	Right to use pipe rack	Right to use others	Intangible assets under development	Total
Accumulated amortisation and allowance for impairment								
As at January 1, 2020		(2,866)	(2,989)	(137)	(418)	(1,792)	(22)	(8,224)
Effect from first-time adoption of new accounting policy		-	-	-	345	-	-	345
Amortisation charge for the year		(299)	(374)	-	(2)	(71)	-	(746)
Transfers		-	-	-	19	253	-	272
Disposals		-	4	-	-	-	-	4
Effect from exchange differences on translating financial statements		-	(10)	(1)	-	(45)	-	(56)
As at December 31, 2020 and January 1, 2021		**(3,165)**	**(3,369)**	**(138)**	**(56)**	**(1,655)**	**(22)**	**(8,405)**
Amortisation charge for the year		(417)	(411)	-	-	(79)	-	(907)
Business acquisition	*4*	(23)	(2,407)	(6,457)	-	(6,913)	-	(15,800)
Disposal		-	334	-	-	226	-	560
Loss from impairment assets		-	(15)	-	-	-	-	(15)
Reversal of impairment loss		-	-	-	-	734	-	734
Effect from exchange differences on translating financial statements		-	(7)	(14)	-	(88)	-	(109)
As at December 31, 2021		**(3,605)**	**(5,875)**	**(6,609)**	**(56)**	**(7,775)**	**(22)**	**(23,942)**
Net book value								
As at January 1, 2020		**4,841**	**2,008**	**-**	**34**	**532**	**655**	**8,070**
As at December 31, 2020 and January 1, 2021		**5,644**	**2,098**	**-**	**-**	**422**	**428**	**8,592**
As at December 31, 2021		**5,352**	**3,972**	**34,298**	**-**	**42,395**	**484**	**86,501**

Security

As at December 31, 2021, net book value of intangible assets of the Group of CNY 48 million (equivalent to Baht 251 million) were registered to secured loan from financial institutions (see Note 19.2).

Unit : Million Baht

	Separate financial statements					
	Production licence fees	Computer software	Right to use pipe rack	Right to use others	Intangible assets under development	Total
Cost						
As at January 1, 2020	5,792	3,832	454	-	382	10,460
Effect from first-time adoption of new accounting policy	-	-	(403)	-	-	(403)
Additions	213	16	-	-	428	657
Transfers	25	344	(51)	61	(379)	-
As at December 31, 2020 and January 1, 2021	**6,030**	**4,192**	**-**	**61**	**431**	**10,714**
Additions	8	36	-	-	340	384
Transfers	63	516	-	-	(579)	-
Disposals	-	(429)	-	-	-	(429)
As at December 31, 2021	**6,101**	**4,315**	**-**	**61**	**192**	**10,669**
Accumulated amortisation						
As at January 1, 2020	(2,047)	(2,249)	(333)	-	(22)	(4,651)
Effect from first-time adoption of new accounting policy	-	-	316	-	-	316
Amortisation charge for the year	(243)	(298)	(2)	(4)	-.	(547)
Transfers	-	-	19	(19)	-	-
As at December 31, 2020 and January 1, 2021	**(2,290)**	**(2,547)**	**-**	**(23)**	**(22)**	**(4,882)**
Amortisation charge for the year	(315)	(324)	-	(6)	-	(645)
Disposals	-	311	-	-	-	311
As at December 31, 2021	**(2,605)**	**(2,560)**	**-**	**(29)**	**(22)**	**(5,216)**
Net book value						
As at January 1, 2020	**3,745**	**1,583**	**34**	**-**	**360**	**5,722**
As at December 31, 2020 and January 1, 2021	**3,740**	**1,645**	**-**	**38**	**409**	**5,832**
As at December 31, 2021	**3,496**	**1,755**	**-**	**32**	**170**	**5,453**

18. INCOME TAX EXPENSE AND DEFERRED TAX

Income tax (benefit) expense

Income tax (benefit) expense for the years ended December 31, 2021 and 2020 consisted of:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Current tax (benefit) expense				
Current year	4,079	750	2,263	-
Over provided in prior years	(41)	(49)	-	(51)
	4,038	701	2,263	(51)
Deferred tax (benefit) expense				
Movements in temporary differences	3,190	(810)	3,149	(608)
Total	**7,228**	**(109)**	**5,412**	**(659)**

Reconciliation of effective tax rate

Unit : Million Baht

	Consolidated financial statements			
	2021		2020	
	Rate (%)		*Rate (%)*	
Profit before income tax		52,778		543
Income tax using the Thai corporation tax rate	20.0	10,556	20.0	109
Effect of different tax rates in foreign jurisdictions		1,823		(42)
Income not subject to tax		(1,873)		(154)
Non-deductible tax expenses		1,315		538
Expenses deductible at a greater amount		(3,471)		(933)
Tax loss carryforward		(2,112)		(574)
Over provided in prior years		(41)		(49)
Share of profit of investments in joint ventures and associate		(1,368)		(665)
Temporary differences		3,190		(810)
Others		(791)		2,471
Income tax (benefit) expense	**13.7**	**7,228**	**-**	**(109)**

Unit : Million Baht

	Separate financial statements			
	2021		2020	
	Rate (%)		*Rate (%)*	
Profit (loss) before income tax		42,540		(4,039)
Income tax using the Thai corporation tax rate	20.0	8,508	20.0	(808)
Income not subject to tax		(3,018)		(640)
Non-deductible tax expenses		1,379		26
Expenses deductible at a greater amount		(2,741)		(435)
Over provided in prior years		-		(51)
Temporary differences		3,149		(608)
Others		(1,865)		1,857
Income tax (benefit) expense	**12.7**	**5,412**	**-**	**(659)**

Deferred Tax

Movements in total deferred tax assets and liabilities during the years were as follows:

Unit : Million Baht

	Consolidated financial statements					
		(Charged) / credited to:				
	As at January 1, 2021	Profit or loss	Other comprehensive loss	Exchange differences	Acquisition of businesses (see Note 4)	As at December 31, 2021
Deferred tax assets						
Provisions for employee benefits	1,145	64	(43)	-	866	2,032
Property, plant and equipment	778	177	-	-	122	1,077
Lease liabilities	82	66	-	-	325	473
Tax loss carry forward	1,633	(1,135)	-	1	894	1,393
Others	25	153	(4)	5	(368)	(189)
Total	**3,663**	**(675)**	**(47)**	**6**	**1,839**	**4,786**
Deferred tax liabilities						
Property, plant and equipment	(4,027)	(86)	-	(4)	(22,709)	(26,826)
Right-of-use assets	(1)	(12)	-	-	-	(13)
Others	(164)	(2,417)	(931)	(8)	(3,926)	(7,446)
Total	**(4,192)**	**(2,515)**	**(931)**	**(12)**	**(26,635)**	**(34,285)**
Net	**(529)**	**(3,190)**	**(978)**	**(6)**	**(24,796)**	**(29,499)**

Unit : Million Baht

	Consolidated financial statements				
		(Charged) / credited to:			
	As at January 1, 2020	Profit or loss	Other comprehensive income (loss)	Exchange differences	As at December 31, 2020
Deferred tax assets					
Provisions for employee benefits	990	89	66	-	1,145
Property, plant and equipment	682	96	-	-	778
Lease liabilities	-	82	-	-	82
Tax loss carry forward	704	930	-	(1)	1,633
Others	102	(27)	(52)	2	25
Total	**2,478**	**1,170**	**14**	**1**	**3,663**
Deferred tax liabilities					
Property, plant and equipment	(3,696)	(319)	-	(12)	(4,027)
Right-of-use assets	-	(1)	-	-	(1)
Others	(174)	(40)	50	-	(164)
Total	**(3,870)**	**(360)**	**50**	**(12)**	**(4,192)**
Net	**(1,392)**	**810**	**64**	**(11)**	**(529)**

Unit : Million Baht

		Separate financial statements (Charged) / credited to:		
	As at January 1, 2021	Profit or loss	Other comprehensive loss	As at December 31, 2021
Deferred tax assets				
Provisions for employee benefits	903	23	(29)	897
Property, plant and equipment	432	109	-	541
Lease liabilities	20	51	-	71
Tax loss carry forward	930	(930)	-	-
Others	12	47	(3)	56
Total	**2,297**	**(700)**	**(32)**	**1,565**
Deferred tax liabilities				
Property, plant and equipment	(3,117)	(106)	-	(3,223)
Others	(85)	(2,343)	(818)	(3,246)
Total	**(3,202)**	**(2,449)**	**(818)**	**(6,469)**
Net	**(905)**	**(3,149)**	**(850)**	**(4,904)**

Unit : Million Baht

		Separate financial statements (Charged) / credited to:		
	As at January 1, 2020	Profit or loss	Other comprehensive income (loss)	As at December 31, 2020
Deferred tax assets				
Provisions for employee benefits	791	77	35	903
Property, plant and equipment	416	16	-	432
Lease liabilities	-	20	-	20
Tax loss carry forward	-	930	-	930
Others	22	2	(12)	12
Total	**1,229**	**1,045**	**23**	**2,297**
Deferred tax liabilities				
Property, plant and equipment	(2,719)	(398)	-	(3,117)
Others	(102)	(39)	56	(85)
Total	**(2,821)**	**(437)**	**56**	**(3,202)**
Net	**(1,592)**	**608**	**79**	**(905)**

19. BORROWINGS AND DEBENTURES

19.1 Short-term borrowings

Short-term borrowings balances as at December 31, 2021 and 2020 were as follows:

Unit : Million Baht

		Consolidated financial statements		Separate financial statements	
	Note	2021	2020	2021	2020
Short-term borrowings from financial institutions					
- Secured		830	19	-	-
- Unsecured		1,593	-	-	-
Short-term borrowings from related parties					
- Unsecured	*27*	-	-	10,089	5,607
Total		**2,423**	**19**	**10,089**	**5,607**

19.2 Long-term borrowings

Long-term borrowings balances as at December 31, 2021 and 2020 were as follows:

Unit : Million Baht

	Note	Consolidated financial statements 2021	Consolidated financial statements 2020	Separate financial statements 2021	Separate financial statements 2020
Current					
Current portion of long-term borrowings from financial institutions					
- Secured		2,475	764	-	-
- Unsecured		1,830	1,210	998	-
Current portion of long-term borrowings from a related party					
- Unsecured	*27*	-	-	16,645	-
Current portion of long-term borrowings from other parties					
- Unsecured		46	45	-	-
Total current		**4,351**	**2,019**	**17,643**	**-**
Non-current					
Long-term borrowings from financial institutions					
- Secured		20,311	20,594	-	-
- Unsecured		72,622	40,383	31,876	32,831
Long-term borrowing from a related party					
- Unsecured	*27*	55,600	-	106,997	14,948
Long-term borrowings from other parties					
- Unsecured		210	249	-	-
Total non-current		**148,743**	**61,226**	**138,873**	**47,779**
Total		**153,094**	**63,245**	**156,516**	**47,779**

As at December 31, 2021, the Group had unutilised credit facilities totalling Baht 60,408 million *(2020: Baht 14,670 million)*.

As at December 31, 2021, the Group pledged some bank accounts, some of the property, plant and equipment and various rights as collateral as reported to financial institutions. However, the pledged bank accounts can be withdrawn with the objective and conditions stipulated in loan agreements (see Notes 5.1, 14 and 17)

As at December 31, 2021, the Group and the Company had long-term and revolving long-term credit facility agreements with several financial institutions totalling Baht 97,238 million and Baht 32,874 million, respectively *(2020: Baht 62,951 million and Baht 32,831 million, respectively)* bear different interest rates and repayment terms as specified in each agreement. The Group is required to comply with certain covenants pertaining to maintain of certain financial ratios, percentage of share held by the major shareholder and other conditions as specified in each agreement.

Details of the Group's borrowings from financial institutions as at December 31, 2021 were as follows:

Currency	Facilities *(in million)*	Interest Rates (% p.a.)	Repayment Terms
The Company			
Baht	5,000	THBFIX 6M plus margin	Principal is repayable in 2 instalments in December 2020 and June 2023.
Baht	10,000	THBFIX 6M plus margin	Principal is repayable once in June 2025.
Baht	10,000	THBFIX 6M plus margin	Principal is repayable on a semi-annual basis, in 12 instalments commencing from January 2022.
Baht	10,000	MLR minus margin	Principal is repayable on a quarterly basis, in 12 instalments commencing from December 2022.
Subsidiaries			
EUR	180	EURIBOR 3M plus margin	Principal is repayable on an annual basis, in 6 instalments commencing from 2021.
EUR	30	EURIBOR 3M plus margin	Principal is repayable on a semi- annual basis, in 10 instalments commencing from 2022.
Baht	1,200	Fixed rate	Principal is repayable on a quarterly basis, in 17 instalments commencing from December 2022.
Baht	900	Highest interest rate for 6 month-fixed deposit plus margin	Principal is repayable on a semi-annual basis, in 14 instalments commencing from April 2016.
Baht	900	Highest interest rate for 6 month-fixed deposit plus margin	Principal is repayable on a semi-annual basis, in 14 instalments commencing from May 2016.
Baht	900	Highest interest rate for 6 month-fixed deposit plus margin	Principal is repayable on a semi-annual basis, in 12 instalments commencing from May 2017.
Baht	8,653.87	Highest interest rate for 6 month-fixed deposit (4 Banks averaged) plus margin	Principal is repayable on a semi-annual basis, in 17 instalments commencing from September 2018.
Baht	500	Fixed rate	Principal is repayable on a quarterly basis, in 13 instalments commencing from March 2021.
Baht	575	BIBOR 3M plus margin	Principal is repayable on a quarterly basis, in 13 instalments commencing from September 2019.
Baht	14,357	THBFIX 3M plus margin	Principal is repayable on a semi-annual basis, in 24 instalments commencing from February 2021.

Currency	Facilities *(in million)*	Interest Rates (% p.a.)	Repayment Terms
Baht	6,004	THBFIX 3M plus margin	Principal is repayable on a semi-annual basis, in 20 instalments commencing from February 2021.
Baht	1,250	THBFIX 6M plus margin	Principal is repayable on a semi-annual basis, in 15 instalments commencing from April 2023.
Baht	755	Highest interest rate for 6 month-fixed deposit plus margin	Principal is repayable on a semi-annual basis, in 10 instalments commencing from June 2024.
EUR	250	EURIBOR plus margin	Principal is repayable once in December 2023.
EUR	150	EURIBOR plus margin	Principal is repayable once in December 2023.
EUR	120	EURIBOR plus margin	Principal is repayable once in December 2023.
USD	120	LIBOR plus margin	Principal is repayable once in December 2023.
USD	120	LIBOR plus margin	Principal is repayable once in December 2023.
USD	125	SOFR plus margin	Principal is repayable once in December 2023.
USD	100	LIBOR 6M plus margin	Principal is repayable on a semi-annual basis, in 11 instalments commencing within March 2024.
Baht	700	THOR	Principal is repayable on a semi-annual basis, in 15 instalments commencing from October 2022.
Baht	700	Highest interest rate for 6 month-fixed deposit plus margin	Principal is repayable on a semi-annual basis, in 12 instalments commencing from April 2023.
Baht	400	MLR minus margin	Principal is repayable on a semi-annual basis, in 10 instalments commencing from June 2024.
RUB	250	MOSPRIME 3M plus margin	Principal is repayable on a semi-annual basis, in 11 instalments commencing from July 2021.
CNY	700	LPR minus margin	Principal is repayable on a semi-annual basis, in 18 instalments commencing from December 2021.
BRL	10	Fixed rate	Principal is repayable on a monthly basis, in 21 instalments commencing from March 2021.

As at December 31, 2021, the subsidiaries' long-term borrowings and debentures were guaranteed by the Company totalling Baht 95,215 million *(2020: Baht 20,353 million)* (see Note 37).

19.3 Debentures

Debentures balances as at December 31, 2021 and 2020 were as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Current				
Current portion of debenture				
- Unsecured	33,484	19,998	16,924	19,998
Total current	**33,484**	**19,998**	**16,924**	**19,998**
Non-current				
Debentures				
- Unsecured	76,016	65,034	34,969	50,166
Total non-current	**76,016**	**65,034**	**34,969**	**50,166**
Total	**109,500**	**85,032**	**51,893**	**70,164**

Details of the Group's debentures as at December 31, 2021 were as follows:

	Currency	Facilities *(in million)*	Face value per share	Years	Interest rates (% p.a.)	Repayment Terms
The Company						
Unsubordinated debenture at 99.108% of the face value unsecured with a debenture holders' representative and the debenture issuer can early redeem regarding the rights and obligations	USD	504.11	1,000	10	4.25	Interest is payable on a semi-annual basis and maturity in September 2022.
Unsubordinated debenture unsecured with a debenture holders' representative and debenture issuer has right to redeem the debentures prior to maturity after one year of issuance	Baht	10,000	1,000	5	2.90	Interest is payable on a semi-annual basis and maturity in August 2024.
Unsubordinated debenture unsecured without a debenture holders' representative	Baht	1,500	1,000	5	2.20	Interest is payable on a semi-annual basis and maturity in September 2024.
Unsubordinated debenture unsecured without a debenture holders' representative	Baht	7,000	1,000	7	2.43	Interest is payable on a semi-annual basis and maturity in September 2026.
Unsubordinated debenture unsecured without a debenture holders' representative	Baht	1,500	1,000	10	2.75	Interest is payable on a semi-annual basis and maturity in September 2029.

	Currency	Facilities *(in million)*	Face value per share	Years	Interest rates (% p.a.)	Repayment Terms
Unsubordinated debenture unsecured with a debenture holders' representative	Baht	1,530	1,000	7	2.60	Interest is payable on a semi-annual basis and maturity in April 2027.
Unsubordinated debenture unsecured with a debenture holders' representative	Baht	3,310	1,000	10	2.99	Interest is payable on a semi-annual basis and maturity in April 2030.
Unsubordinated debenture unsecured with a debenture holders' representative	Baht	4,360	1,000	12	3.29	Interest is payable on a semi-annual basis and maturity in April 2032.
Unsubordinated debenture unsecured with a debenture holders' representative	Baht	5,800	1,000	15	3.50	Interest is payable on a semi-annual basis and maturity in April 2035.
Subsidiaries						
Unsubordinated debenture at 100.00% of the face value unsecured with a debenture holders' representative and the debenture issuer can early redeem regarding the rights and obligations	USD	495.89	1,000	4.2	4.25	Interest is payable on a semi-annual basis and maturity in September 2022.
Unsubordinated debenture at 98.68% of the face value unsecured with a debenture holders' representative and the debenture issuer can early redeem regarding the rights and obligations	USD	700	1,000	10	2.98	Interest is payable on a semi-annual basis and maturity in March 2031.
Unsubordinated debenture at 98.41% of the face value unsecured with a debenture holders' representative and the debenture issuer can early redeem regarding the rights and obligations	USD	550	1,000	30	4.30	Interest is payable on a semi-annual basis and maturity in March 2051.

The periods to maturity of interest-bearing liabilities, excluding finance lease liabilities, as at December 31, 2021 and 2020 were as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Within one year	40,258	22,036	44,656	25,605
After one year but within five years	149,522	84,502	113,582	69,671
After five years	75,239	41,759	60,260	28,274
Total	**265,019**	**148,297**	**218,498**	**123,550**

20. LEASE LIABILITIES

The periods to maturity of lease liabilities, as at December 31, 2021 and 2020 were as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Within one year	1,964	1,279	1,430	1,305
After one year but within five years	3,762	2,249	2,156	1,917
After five years	8,113	5,311	6,105	4,635
	13,839	**8,839**	**9,691**	**7,857**
Less Deferred interest expense	(3,483)	(2,052)	(2,179)	(1,793)
	10,356	**6,787**	**7,512**	**6,064**
Classification				
- Current portion of lease liabilities	1,619	1,057	1,197	1,105
- Lease liabilities	8,737	5,730	6,315	4,959
	10,356	**6,787**	**7,512**	**6,064**

21. TRADE PAYABLES

Trade payables as at December 31, 2021 and 2020 consisted of:

Unit : Million Baht

		Consolidated financial statements		Separate financial statements	
	Note	2021	2020	2021	2020
Related parties	*27*	50,883	14,884	49,586	13,737
Other parties		19,068	5,230	1,109	1,076
Total		**69,951**	**20,114**	**50,695**	**14,813**

22. OTHER PAYABLES

Other payables as at December 31, 2021 and 2020 consisted of:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Accrued operating expenses	5,903	2,436	2,369	633
Accrued interest expenses	1,137	952	1,223	970
Other payables	14,678	4,384	6,615	3,985
Deposits and advances received	4,645	4,037	129	158
Payable to the Revenue Department	890	661	275	485
Accrued other tax expenses	57	1	57	1
Others	195	34	2	5
Total	**27,505**	**12,505**	**10,670**	**6,237**

23. PROVISIONS FOR EMPLOYEE BENEFITS

Provisions for employee benefits as at December 31, 2021 and 2020 consisted of:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Post-employment benefits	9,407	5,604	4,070	4,036
Other long-term employee benefits	4,906	774	502	513
Fair Value of Plan Assets	(3,192)	-	-	-
Total	**11,121**	**6,378**	**4,572**	**4,549**

Movement in the present value of the defined employee benefit obligations were as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
As at January 1,	6,378	5,558	4,549	4,014
Include in profit or loss:				
Current service costs	496	389	290	262
Interest on obligation	89	148	67	115
Past service costs	46	1	-	-
Actuarial (gain) loss	(8)	54	-	48
	623	592	357	425
Included in other comprehensive income				
Actuarial (gain) loss	(335)	410	(202)	251
Exchange differences on translating financial statement	16	53	-	-
	(319)	463	(202)	251
Others				
Benefits paid by the plan	(199)	(240)	(132)	(141)
Defined benefit obligations from acquisition of business	7,830	-	-	-
Defined benefit obligations from fair value of plan assets	(3,192)	-	-	-
Recorded as cost of assets under construction	-	5	-	-
	4,439	(235)	(132)	(141)
As at December 31,	**11,121**	**6,378**	**4,572**	**4,549**

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
For the years ended December 31,	2021	2020	2021	2020
Recognised in profit or loss:				
Post-employment benefits	486	467	311	332
Other long-term employee benefits	137	125	46	93
Total	**623**	**592**	**357**	**425**

The expense is recognised in the following line items in the statement of profit or loss:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Cost of sales	381	331	202	233
Selling and distribution and administrative expenses	242	261	155	192
Total	**623**	**592**	**357**	**425**

Actuarial assumptions

The principal actuarial assumptions as at December 31, 2021 and 2020 (expressed as weighted-averages) were as follows:

Unit: %

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Discount rate	0.4 - 6.5	0.5 - 1.7	1.9	1.5
Future salary growth	1.5 - 7.0	2.5 - 7.0	6.0	6.0
Employee turnover	0.0 - 50.0	0.0 - 50.0	0.0 - 3.0	0.0 - 3.0
Retirement age	55 - 67 years	55 - 65 years	60 years	60 years

Assumptions regarding future mortality have been based on published statistics and mortality tables.

As at December 31, 2021, the weighted-average duration of the defined benefit obligation was 10 years *(2020: 10 years)*.

Sensitivity analysis

Reasonably possible changes at the reporting date to one of the relevant actuarial assumptions, holding other assumptions constant, would have affected the defined benefit obligation by the amounts shown below:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	Increase	Decrease	Increase	Decrease
As at December 31, 2021				
Discount rate (1% movement)	(1,546)	1,887	(453)	535
Future salary growth (1% movement)	1,094	(950)	497	(428)
As at December 31, 2020				
Discount rate (1% movement)	(715)	820	(478)	567
Future salary growth (1% movement)	735	(628)	481	(415)

Although the analysis does not take account of the full distribution of cash flows expected under the plan, it does provide an approximation of the sensitivity of the assumptions shown.

Plan asset

The major categories and fair value of plan assets at the end of the reporting period for each category were as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Equity Securities	383	-	-	-
Government and Corporate Bonds	309	-	-	-
Property	52	-	-	-
Others	2,448	-	-	-
Total	**3,192**	**-**	**-**	**-**

Provident fund contributions for their employees and recorded as expense in the statements of profit or loss for the years ended December 31, were as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Provident fund expense	684	657	527	515

24. SHARE CAPITAL

Unit : Million Shares / Million Baht

	Par value per share (Baht)	2021 Number	2021 Amount	2020 Number	2020 Amount
Authorised					
As at January 1, ordinary shares	10	4,508.8	45,088.5	4,508.8	45,088.5
As at December 31, ordinary shares	10	**4,508.8**	**45,088.5**	**4,508.8**	**45,088.5**
Issued and paid-up					
As at January 1, ordinary shares	10	4,508.8	45,088.5	4,508.8	45,088.5
As at December 31, ordinary shares	10	**4,508.8**	**45,088.5**	**4,508.8**	**45,088.5**

25. ADDITIONAL PAID-IN CAPITAL AND RESERVES

Share premium

Section 51 of the Public Companies Act B.E. 2535 requires companies to set aside share subscription monies received in excess of the par value of the shares issued to a reserve account ("share premium"). Share premium is not available for dividend distribution.

Premium on treasury stock

The premium on treasury stock represents the accumulated premium on sale of treasury stock, net of any deficits on sale or cancellation of treasury stock. The premium on treasury stock is not available for dividend distribution.

Difference arising from business combination under common control

Difference on common control transactions arising within equity represents the difference of the book values of certain entities or businesses under common control under or over their cost as of the date of their acquisition. The reserve is non-distributable and will be retained until the respective businesses are sold or otherwise disposed of.

Put option over non-controlling interest

Put option over non-controlling interest is a present value of expected payments at the acquisition date. Under the securityholders agreement, non-controlling interest is granted the right to sell the remaining 9.18% holding in Vencorex Holding with conditions and exercise prices as stipulated in the agreement.

Legal reserve

Section 116 of the Public Companies Act B.E. 2535 requires that a company shall allocate not less than 5% of its annual net profit, less any accumulated losses brought forward (if any), to a reserve account ("legal reserve"), until this account reaches an amount not less than 10% of the registered authorised capital. The legal reserve is not available for dividend distribution.

Treasury stock reserve

The treasury stock reserve represents the amount appropriated from retained earnings equal to the cost of the Company's own shares held by the Company. The treasury stock reserve is not available for dividend distribution.

Other components of equity

Exchange differences on translating financial statements

The exchange differences on translating financial statements account within equity comprises all foreign currency differences arising from the translation of the financial statements of foreign operations, as well as from the translation of liabilities that hedge the Company's net investment in a foreign operation.

Remeasurement of investments in financial assets measured at fair value through other comprehensive income

Gain or loss on remeasurement of investments in financial assets measured at fair value through other comprehensive income account within equity comprises the cumulative net change in the fair value of investments in financial assets until the investments are derecognised or impaired.

Cash flow hedges

The cash flow hedges account within equity comprises the cumulative net change in the fair value of cash flow hedges related to hedged transactions that have not yet occurred for effective portion.

Movements in reserves

Movements in reserves are shown in the statements of changes in equity.

26. TREASURY STOCK

At the Board of Directors' Meeting held on May 27, 2019, the Board approved a share repurchase program for financial management purpose not exceeding 50 million shares, or approximately 1.1 percent of the total issued shares, with the maximum amount of Baht 3,000 million. The Company may purchase the shares through the Stock Exchange of Thailand within 6 months, during the period from June 11, 2019 to December 9, 2019. Treasury stock has to be resold after 6 months but no later than 3 years from the completion date of share repurchases.

On December 9, 2019, the Company has repurchased the shares under the program totalling 22.30 million shares, equivalent to 0.49% of issued share and paid-up capital, at a total cost of Baht 1,187.60 million with an equivalent amount had been appropriated from retained earnings to treasury stock reserve.

At the Board of Directors' Meeting of the Company held on May 24, 2021, the Board approved the sale of 22.30 million treasury shares, equivalent to 0.49% of issued share and paid-up capital. The specified selling period is from June 7, 2021 to December 9, 2022, which is subject to the basis of the Stock Exchange of Thailand. According to the notification of the Stock Exchange of Thailand, when selling treasury shares, the Company must disclose information to the Stock Exchange of Thailand.

In September 2021, the Company has sold 22.30 million treasury shares, amounting to Baht 1,353.93 million and recognised surplus on treasury shares of Baht 166.33 million under shareholders' equity in the consolidated and separate statements of financial position. As at December 31, 2021, the Company has no treasury shares outstanding.

27. TRANSACTIONS WITH RELATED PARTIES

A related party is as follows:

- An individual or an entity which has the ability, directly or indirectly, to control or joint control or exercise significant influence over the Group in making financial and operating decisions or;
- An individual or an entity which is subject to common control or common significant influence with the Group or;
- The Group has the ability, directly or indirectly, to control or joint control or exercise significant influence over an individual or an entity in making financial and operating decisions.

Relationships with significant related parties were as follows:

Name of entities	Country of incorporation/ nationality	Nature of relationships
PTT Plc.	Thailand	Parent, common director and management and the Company's director as management
Global Green Chemicals Plc.	Thailand	Subsidiary, 72.29% shareholding, common director and the Company's management as director
GC Glycol Co., Ltd.	Thailand	Subsidiary, 100% shareholding and the Company's management as director
GC Polyols Co., Ltd.	Thailand	Subsidiary, 82.10% shareholding and the Company's management as director
GC Maintenance and Engineering Co., Ltd.	Thailand	Subsidiary, 100% shareholding and the Company's management as director
GC Marketing Solutions Co., Ltd.	Thailand	Subsidiary, 100% shareholding by the Group, and the Company's management as director
GC Logistics Solutions Co., Ltd.	Thailand	Subsidiary, 100% shareholding by the Group
GC Ventures Co., Ltd.	Thailand	Subsidiary, 100% shareholding
GC Treasury Center Co., Ltd.	Thailand	Subsidiary, 100% shareholding and the Company's management as director
GC Styrenics Co., Ltd.	Thailand	Subsidiary, 100% shareholding
GC Estate Co., Ltd.	Thailand	Subsidiary, 100% shareholding and the Company's management as director
GC Oxirane Co., Ltd.	Thailand	Subsidiary, 100% shareholding and the Company's management as director
Solution Creation Co., Ltd.	Thailand	Subsidiary, 100% shareholding and the Company's management as director
Thai Tank Terminal Limited	Thailand	Subsidiary, 51% shareholding and the Company's management as director
PTT Phenol Co., Ltd.	Thailand	Subsidiary, 100% shareholding and the Company's management as director

Name of entities	Country of incorporation/ nationality	Nature of relationships
GC-M PTA Company Limited	Thailand	Subsidiary, 49% shareholding by the Company and 25% shareholding by subsidiary and the Company's management as director
NPC Safety and Environmental Service Co., Ltd.	Thailand	Subsidiary, 100% shareholding and the Company's management as director
ENVICCO Limited	Thailand	Subsidiary, 70% shareholding
PTTGC America Corporation	United States of America	Subsidiary, 100% shareholding, common director and the Company's management as director
PTTGC International Private Limited	Singapore	Subsidiary, 100% shareholding, common director and the Company's management as director
GGC Biochemicals Co., Ltd.	Thailand	Indirect subsidiary, 100% shareholding by subsidiary
Thai PET Resin Co., Ltd.	Thailand	Indirect subsidiary, 84.40% shareholding by subsidiaries and the Company's management as director
Thai Fatty Alcohols Co., Ltd.	Thailand	Indirect subsidiary, 100% shareholding by subsidiary
PL Global Transport Co., Ltd.	Thailand	Indirect subsidiary, 100% shareholding by the Group
NPC S&E Security Guard Co., Ltd.	Thailand	Indirect subsidiary, 100% shareholding by the Group
Vencorex (Thailand) Co., Ltd.	Thailand	Indirect subsidiary, 100% shareholding by indirect subsidiary
GCM Polymer Trading DMCC	United Arab Emirates	Indirect subsidiary, 100% shareholding by the Group
GC Logistics Solutions (Vietnam) Co., Ltd.	Vietnam	Indirect subsidiary, 100% shareholding by the Group
GC Marketing Solutions Myanmar Co., Ltd.	Myanmar	Indirect subsidiary, 100% shareholding by the Group
GC Marketing Solutions Vietnam Co., Ltd.	Vietnam	Indirect subsidiary, 100% shareholding by the Group
GC Marketing Solutions (Shanghai) Co., Ltd.	China	Indirect subsidiary, 100% shareholding by the Group
GC Ventures America Corporation	United States of America	Indirect subsidiary, 100% shareholding by the Group
PTTGC America LLC	United States of America	Indirect subsidiary, 100% shareholding by the Group, common director and the Company's management as director

Name of entities	Country of incorporation/ nationality	Nature of relationships
PTTGC Innovation America Corporation	United States of America	Indirect subsidiary, 100% shareholding by the Group and the Company's management as director
PTTGC International (Netherlands) B.V.	Netherlands	Indirect subsidiary, 100% shareholding by the Group, common director
GC International Corporation	United States of America	Indirect subsidiary, 100% shareholding by the Group, common director and the Company's management as director
PT GCM Marketing Solutions Indonesia	Indonesia	Indirect subsidiary, 67% shareholding by the Group
Vencorex France S.A.S.	France	Indirect subsidiary, 100% shareholding by indirect subsidiary
Vencorex Holding	France	Indirect subsidiary, 90.82% shareholding by subsidiary and the Company's management as director
PTT Asahi Chemical Co., Ltd.	Thailand	Joint venture, 50% shareholding and the Company's management as director
PTT MCC Biochem Co., Ltd.	Thailand	Joint venture, 50% shareholding
HMC Polymers Co., Ltd.	Thailand	Joint venture, 41.44% shareholding and the Company's management as director
Synthese (Thailand) Co., Ltd.	Thailand	Indirect joint venture, 48% shareholding by the Group
GGC KTIS Bioindustrial Company Limited	Thailand	Indirect joint venture, 50% shareholding by subsidiary
Thai Ethoxylate Co., Ltd.	Thailand	Indirect joint venture, 50% shareholding by subsidiary
NatureWorks Asia Pacific Co., Ltd.	Thailand	Indirect joint venture, 50% shareholding by the Group
ENTIS Co., Ltd.	South Korea	Indirect joint venture, 50% shareholding by the Group
Emery Oleochemicals LLC	United States of America	Indirect joint venture, 50% shareholding by the Group until October 2021
Emery Oleochemicals UK Ltd.	United States of America	Indirect joint venture, 50% shareholding by subsidiary
Emery Oleochemicals (M) Sdn. Bhd.	Malaysia	Indirect joint venture, 50% shareholding by the Group and the Company's management as director until October 2021
NatureWorks LLC	United States of America	Indirect joint venture, 50% shareholding by the Group

Name of entities	Country of incorporation/ nationality	Nature of relationships
Matrix Polymers Australia Pty Ltd.	Australia	Indirect joint venture, 49% shareholding by the Group
Matrix Polymers Ltd.	England	Indirect joint venture, 49% shareholding by the Group
Matrix Polymers New Zealand Pty Ltd.	New Zealand	Indirect joint venture, 49% shareholding by the Group
Revolve Group Limited	England	Indirect joint venture, 49% shareholding by the Group and the Company's management as director
Revolve Matrix Polymers Malaysia Sdn. Bhd.	Malaysia	Indirect joint venture, 49% shareholding by the Group
Kuraray GC Advanced Materials Company Limited	Thailand	Associate, 33.40% shareholding and the Company's management as director
PTT Energy Solutions Co., Ltd.	Thailand	Associate, 20% shareholding, shareholding by parent company
PTT Digital Solutions Co., Ltd.	Thailand	Associate, 40% shareholding and shareholding by parent company
Vinythai Plc.	Thailand	Associate, 24.98% shareholding and the Company's management as director
Eastern Fluid Transport Co., Ltd.	Thailand	Associate, 15% shareholding by the Company and 15% shareholding by subsidiary
Dynachisso Thai Co., Ltd.	Thailand	Indirect associate, 41.50% shareholding by subsidiary
Thai Eastern Topseeds Oil Co., Ltd.	Thailand	Indirect associate, 30% shareholding by subsidiary
Advanced Biochemical (Thailand) Co., Ltd.	Thailand	Indirect associate, 24.98% shareholding by the Group
S.P. Petpack Inter Group Co., Ltd.	Thailand	Indirect associate, 25% shareholding by the Group
Global Power Synergy Plc.	Thailand	Associate, 22.73% shareholding by the Company until the date of selling some shares in June 2021. Subsequently, other related party, 10% shareholding, shareholding by parent company and common director
Combined Heat and Power Producing Co., Ltd.	Thailand	Indirect associate, 22.73% shareholding by the Group until the date of the Company's selling some shares in June 2021. Subsequently, other related party, shareholding by parent company
GHECO-One Company Limited	Thailand	Indirect associate, 22.73% shareholding by the Group until the date of the Company's selling some shares in June 2021. Subsequently, other related party, indirect shareholding by parent company

Name of entities	Country of incorporation/ nationality	Nature of relationships
Glow Energy Public Company Limited	Thailand	Indirect associate, 22.73% shareholding by the Group until the date of the Company's selling some shares in June 2021. Subsequently, other related party, indirect shareholding by parent company
Glow SPP 2 Company Limited	Thailand	Indirect associate, 22.73% shareholding by the Group until the date of the Company's selling some shares in June 2021. Subsequently, other related party, indirect shareholding by parent company
Glow SPP 3 Company Limited	Thailand	Indirect associate, 22.73% shareholding by the Group until the date of the Company's selling some shares in June 2021. Subsequently, other related party, indirect shareholding by parent company
Glow SPP 11 Company Limited	Thailand	Indirect associate, 22.73% shareholding by the Group until the date of the Company's selling some shares in June 2021. Subsequently, other related party, indirect shareholding by parent company
Glow IPP Company Limited	Thailand	Indirect associate, 22.73% shareholding by the Group until the date of the Company's selling some shares in June 2021. Subsequently, other related party, indirect shareholding by parent company
Thai Petroleum Pipeline Co., Ltd.	Thailand	Other related party, indirect shareholding by parent company
Dhipaya Insurance Plc.	Thailand	Other related party, shareholding by parent company until August 2021
Thai Paraxylene Co., Ltd.	Thailand	Other related party, indirect shareholding by parent company
Thai Oil Plc.	Thailand	Other related party, shareholding by parent company
TOP Solvent Co., Ltd.	Thailand	Other related party, indirect shareholding by parent company
TOP Solvent (Vietnam) LLC.	Vietnam	Other related party, indirect shareholding by parent company
Business Services Alliance Co., Ltd.	Thailand	Other related party, shareholding by parent company, the Company and two Company's associates, each of 25% shareholding of preferred stock
PTT Natural Gas Distribution Co., Ltd.	Thailand	Other related party, shareholding by parent company

Name of entities	Country of incorporation/ nationality	Nature of relationships
PTT Retail Services Co., Ltd.	Thailand	Other related party, indirect shareholding by parent company
PTT Retail Management Co., Ltd.	Thailand	Other related party, indirect shareholding by parent company
PTT Oil and Retail Business Plc.	Thailand	Other related party, shareholding by parent company, common director
PTTEP Siam Limited	Thailand	Other related party, indirect shareholding by parent company
PTTEP International Limited	Thailand	Other related party, indirect shareholding by parent company
PTT Exploration and Production Plc.	Thailand	Other related party, shareholding by parent company
PTT Tank Terminal Limited	Thailand	Other related party, shareholding by parent company
PTT Energy Resources Co., Ltd.	Thailand	Other related party, shareholding by parent company
PTT LNG Co., Ltd.	Thailand	Other related party, shareholding by parent company
Rak Phasak Co., Ltd.	Thailand	Other related party, indirect shareholding by parent company
LABIX Co., Ltd.	Thailand	Other related party, indirect shareholding by parent company
Sak Chaisidhi Co., Ltd.	Thailand	Other related party, indirect shareholding by parent company
Siam Management Holding Co., Ltd.	Thailand	Other related party, indirect shareholding by parent company
Sport Services Alliance Co., Ltd.	Thailand	Other related party, indirect shareholding by parent company
Sarn Palung Social Enterprise Company Limited	Thailand	Other related party, 15% shareholding and shareholding by parent company
Amata Natural Gas Distribution Co., Ltd.	Thailand	Other related party, indirect shareholding by parent company
Energy Complex Co., Ltd.	Thailand	Other related party, shareholding by parent company
AI and Robotics Ventures Company Limited	Thailand	Other related party, indirect shareholding by parent company
UBE Chemicals (Asia) Plc.	Thailand	Other related party, indirect shareholding by parent company

Name of entities	Country of incorporation/ nationality	Nature of relationships
IRPC Plc.	Thailand	Other related party, shareholding by parent company
IRPC Polyol Co., Ltd.	Thailand	Other related party, indirect shareholding by parent company
Carigali-PTTEPI Operating Company Sdn. Bhd.	Malaysia	Other related party, indirect shareholding by parent company
PT.Tirta Surya Raya	Indonesia	Other related party, indirect shareholding by parent company
PTTEP South Asia Limited	Cayman Islands	Other related party, indirect shareholding by parent company
PTT Treasury Center Company Limited	Thailand	Other related party, shareholding by parent company
PTT International Trading London Ltd.	England	Other related party, shareholding by parent company
PTT International Trading Pte. Ltd.	Singapore	Other related party, shareholding by parent company, common director
TPBI & Myanmar Star Co., Ltd.	Myanmar	Other related party, shareholding by subsidiary

The pricing policies for particular types of transactions are explained further below:

Transactions	Pricing policies
Sale of goods	Contract price / Regional market price / World market price
Rendering of services	Contract price
Purchase of goods / raw materials / services	Contract price / Market price
Interest on loan	Average cost of fund / Contractually agreed rate
Key management personnel compensation (Meeting allowance and bonus)	The rate approved by the Board of Directors and shareholders

Significant transactions for the years ended December 31, 2021 and 2020 with related parties were as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Parent				
Sales of goods or rendering of services	19,503	17,738	19,375	17,630
Purchases of goods or receiving of services	272,177	176,071	271,128	175,664
Gain from sales of investment in an associate	10,056	-	10,522	-
Other income	12	519	12	518
Interest expense	18	16	16	16
Other expense	160	74	152	66
Expense capitalised to fixed assets	138	88	136	81

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Subsidiaries				
Sales of goods or rendering of services	-	-	137,451	83,074
Purchases of goods or receiving of services	-	-	3,933	4,124
Interest income	-	-	81	26
Dividend income	-	-	11,010	1,606
Net derivative gain	-	-	75	-
Other income	-	-	1,298	1,100
Interest expense	-	-	2,181	824
Other expense	-	-	1,481	1,444
Expense capitalised to fixed assets	-	-	2,088	3,382
Joint ventures				
Sales of goods or rendering of services	11,531	8,299	4,842	3,720
Purchases of goods or receiving of services	4,166	3,868	260	99
Interest income	15	66	13	64
Dividend income	-	-	828	289
Other income	1,493	111	80	89
Other expense	16	-	1	-
Income capitalised to fixed assets	(71)	-	(71)	-
Associates				
Sales of goods or rendering of services	6,098	4,622	4,903	4,010
Purchases of goods or receiving of services	6,444	12,982	3,160	7,352
Interest income	-	4	-	4
Dividend income	4	3	967	1,292
Other income	186	254	186	161
Interest expense	1	2	1	1
Other expense	452	505	359	373
Expense (Income) capitalised to fixed assets	(279)	237	(315)	196
Other related parties				
Sales of goods or rendering of services	167,850	125,521	156,606	115,747
Purchases of goods or receiving of services	19,142	7,248	14,205	6,841
Gain from sale of investment in an associate	1,778	-	1,861	-
Net derivative gain (loss)	(205)	134	(205)	134
Dividend income	141	-	141	-
Other income	141	547	137	544
Interest expense	22	3	21	3
Other expense	347	350	236	238
Expense (Income) capitalised to fixed assets	5	20	(2)	23
Key management personnel				
Key management personnel compensation				
Short-term benefits	316	289	164	180
Post-employment benefits and other long-term employee benefits	7	5	5	4
Total key management personnel compensation	**323**	**294**	**169**	**184**

Key management personnel in term of post-employment benefits and other long-term benefits of the subsidiaries will be paid by the Company, which is recognised as part of provisions for employee benefits.

Balances as at December 31, 2021 and 2020 with related parties were as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Trade receivables - related parties				
Parent	2,063	2,056	2,011	2,027
Subsidiaries	-	-	12,785	8,490
Joint ventures	1,764	1,391	441	305
Associates	841	586	633	519
Other related parties	13,402	7,117	12,528	6,453
Total	**18,070**	**11,150**	**28,398**	**17,794**

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Other receivables - related parties				
Parent	497	168	497	168
Subsidiaries	-	-	3,267	225
Joint ventures	42	180	29	21
Associates	40	127	39	22
Other related parties	318	1,205	173	1,047
Total	**897**	**1,680**	**4,005**	**1,483**

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Derivatives - Current assets				
Other related parties	79	18	79	18
Total	**79**	**18**	**79**	**18**

Loans to related parties

Unit : Million Baht

	Interest rate (% per annum)		Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020	2021	2020
Short-term loans						
Subsidiaries	1.25 - 1.33	1.48 - 2.19	-	-	2,829	2,401
Total			**-**	**-**	**2,829**	**2,401**
Long-term loans						
Subsidiaries	3.41	-	-	-	103,088	-
Joint ventures	LIBOR plus margin	LIBOR plus margin	762	714	762	714
Total			**762**	**714**	**103,850**	**714**
Summary of loans to related parties						
Short-term loans			-	-	2,829	2,401
Long-term loans			762	714	103,850	714
Total			**762**	**714**	**106,679**	**3,115**

Movements during the years ended December 31, 2021 and 2020 of loans to related parties were as follows:

Loans to related parties

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	**2020**	**2021**	**2020**
Short-term loans				
Subsidiaries				
As at January 1,	-	-	2,401	429
Increase	-	-	2,261	1,972
Decrease	-	-	(1,799)	-
Effect of change in exchange rates	-	-	(34)	-
As at December 31,	**-**	**-**	**2,829**	**2,401**
Joint venture				
As at January 1,	-	-	-	-
Increase	163	-	163	-
Decrease	(165)	-	(165)	-
Effect of change in exchange rates	2	-	2	-
As at December 31,	-	-	-	-
Associate				
As at January 1,	-	1,123	-	1,123
Decrease	-	(1,123)	-	(1,123)
As at December 31,	**-**	**-**	-	-
Total				
As at January 1,	-	1,123	2,401	1,552
Increase	163	-	2,424	1,972
Decrease	(165)	(1,123)	(1,964)	(1,123)
Effect of change in exchange rates	2	-	(32)	-
As at December 31,	-	-	**2,829**	**2,401**
Long-term loans				
Subsidiaries				
As at January 1,	-	-	-	-
Increase	-	-	103,110	-
Effect of change in exchange rates	-	-	(22)	-
As at December 31,	**-**	**-**	**103,088**	**-**
Joint ventures				
As at January 1,	714	2,275	714	2,275
Increase	567	-	567	-
Decrease	(597)	(1,561)	(597)	(1,561)
Effect of change in exchange rates	78	-	78	-
As at December 31,	**762**	**714**	**762**	**714**
Total				
As at January 1,	714	2,275	714	2,275
Increase	567	-	103,677	-
Decrease	(597)	(1,561)	(597)	(1,561)
Effect of change in exchange rates	78	-	56	-
As at December 31,	**762**	**714**	**103,850**	**714**

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Investments in subsidiaries *(Note 9)*	**-**	**-**	**107,307**	**76,486**
Investments in joint ventures *(Note 10)*	**34,329**	**32,537**	**15,373**	**15,373**
Investments in associates *(Note 11)*	**10,511**	**31,873**	**5,166**	**27,546**

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Trade payables - related parties				
Parent	47,288	12,427	47,164	12,367
Subsidiaries	-	-	166	111
Joint ventures	372	373	14	8
Associates	102	1,408	35	649
Other related parties	3,121	676	2,207	602
Total	**50,883**	**14,884**	**49,586**	**13,737**

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Other payables - related parties				
Parent	103	57	99	53
Subsidiaries	-	-	1,504	911
Joint ventures	8	2	2	1
Associates	141	158	93	115
Other related parties	379	263	341	243
Total	**631**	**480**	**2,039**	**1,323**

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Derivatives - Current liabilities				
Other related parties	86	3	86	3
Total	**86**	**3**	**86**	**3**

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Payables to contractors - related parties				
Subsidiaries	-	-	1,135	1,376
Associates	57	69	56	61
Other related parties	5	3	4	2
Total	**62**	**72**	**1,195**	**1,439**

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Lease liabilities - related parties				
Parent	560	356	529	343
Subsidiaries	-	-	490	881
Joint ventures	6	7	-	-
Associates	14	79	7	31
Other related parties	250	58	176	41
Total	**830**	**500**	**1,202**	**1,296**

Borrowings from related parties

Unit : Million Baht

	Interest rate (% per annum)		Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020	2021	2020
Short-term borrowings						
Subsidiaries	0.25 - 0.50	1.10	-	-	10,089	5,608
Total			**-**	**-**	**10,089**	**5,608**
Long-term borrowing						
Subsidiary	3.59 - 4.90	4.68	-	-	68,042	14,948
Other related parties	2.45	-	55,600	-	55,600	-
Total			**55,600**	**-**	**123,642**	**14,948**

Movements during the years ended December 31, 2021 and 2020 of borrowings from related parties were as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Short-term borrowings				
Parent				
As at January 1,	-	-	-	-
Increase	-	4,000	-	4,000
Decrease	-	(4,000)	-	(4,000)
As at December 31,	**-**	**-**	**-**	**-**
Subsidiaries				
As at January 1,	-	-	5,608	3,041
Increase	-	-	4,710	2,588
Decrease	-	-	(228)	(21)
As at December 31,	**-**	**-**	**10,090**	**5,608**
Total				
As at January 1,	-	-	5,608	3,041
Increase	-	4,000	4,710	6,588
Decrease	-	(4,000)	(228)	(4,021)
As at December 31,	**-**	**-**	**10,090**	**5,608**

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Long-term borrowing				
Subsidiary				
As at January 1,	-	-	14,948	14,991
Increase	-	-	48,440	-
Effect of change in exchange rate	-	-	4,924	(61)
	-	-	**68,312**	**14,930**
Amortise deferred financing cost	-	-	(270)	18
As at December 31,	**-**	**-**	**68,042**	**14,948**
Other related parties				
As at January 1,	-	-	-	-
Increase	55,600	-	55,600	-
As at December 31,	**55,600**	**-**	**55,600**	**-**
Total				
As at January 1,	-	-	14,948	14,991
Increase	55,600	-	104,040	-
Effect of change in exchange rate	-	-	4,924	(61)
	55,600	**-**	**123,912**	**14,930**
Amortise deferred financing cost	-	-	(270)	18
As at December 31,	**55,600**	**-**	**123,642**	**14,948**

Significant agreements with related parties

The Group has significant agreements with related parties as at December 31, 2021 as follows:

Olefins Sales and Purchase Agreements

The Company has 5 Ethylene sales and purchase agreements with 3 related parties. Selling prices are determined based on Ethylene price in the world market. Three agreements are for the periods from 10 years to 21 years, commencing from the effective date specified in each agreement and expiring from May 2022 to December 2031 and two agreements are for the period of 10 years and 15 years, start from the plant commercial operation date.

The Company has 5 Propylene sales and purchase agreements with 3 related parties. Selling prices are determined based on Polypropylene plastic pellets and Propylene prices in the world market. Four agreements are for the periods from 4 years to 15 years, commencing from the effective date specified in each agreement and expiring from December 2024 to December 2035 and another agreement is for the period of 15 years, start from the plant commercial operation date.

The Company has a Butadiene sales and purchase agreement with a related party. Selling prices are determined based on Butadiene price in the world market. The agreement is for the period of 15 years, start from the plant commercial operation date.

The Company has a Raffinate sales and purchase agreement with a related party. The sales and purchase prices are based on Naphtha price in the world market. The agreement is for the period of 15 years, start from the plant commercial operation date.

By-Product Sales and Purchase Agreements

The Company has Hydrogen sales and purchase agreements with 3 related parties. Selling price in the agreements are determined based on Natural Gas price for the industry. These agreements are for the periods from 9 years 9 months to 15 years, commencing from the date as specified in each agreement and expiring from March 2024 to December 2035.

The Company has a Tail Gas sales and purchase agreement with a related party. Selling price in the agreement is determined based on Natural Gas price for the industry. The agreement is for the period of 15 years, commencing from the date as specified in the agreement, which is subsequently extended for an additional 15 years expiring in August 2036.

Utilities and Other Services Agreements

The Company has 3 Power Supply agreements with 3 related parties. Selling prices in these agreements are determined based on reference price from the Provincial Electricity Authority. These agreements are for the periods of 6 years 8 months and 15 years, commencing from the date as specified in each agreement and expiring in September 2022, June 2027 and September 2028.

The Company has 6 Utilities agreements covering electricity, steam and demineralised water with a related party. These agreements are for the periods from 12 years to 19 years 9 months, commencing from the date as specified in each agreement and expiring in December 2028.

The Company and certain related parties have many Utilities agreements for the industries covering electricity, steam, and water for industrial use with 2 related parties. These agreements are for the periods from 4 years 5 months to 25 years, commencing from the date as specified in each agreement and expiring from June 2023 to June 2045.

The Company has Tank Farm Storage and Service Agreement with a related party covering tank storage, utilities for product warehouse and transportation of Methanol. This agreement is for the period of 15 years, commencing from the effective date as specified in the agreement and expiring in March 2034, with the service charge as stipulated in the agreement.

Feedstock and Fuel Gas Sales and Purchase Agreements

The Company has a Natural Gas sales and purchase agreement with a parent company. The selling price is determined based on gas price as specified in the agreement. The agreement is for the period of 1 year, commencing from the date as specified in the agreement and expiring in March 2022.

The Company has 2 Natural Gas sales and purchase agreements with a parent company. Selling prices are determined based on gas price as specified in each agreement and Thailand Producer Price Index as classification of products by activity (CPA). These agreements are for the periods of 10 years, commencing from the date as specified in each agreement and expiring in May 2023 and December 2029.

The Company and 2 related parties have various Natural Gas sales and purchase agreements with a parent company. Selling prices in these agreements are determined based on fuel oil prices and Thailand Producer Price Index (PPI). These agreements are for the periods from 10 years to 15 years, commencing from the date as specified in each agreement and expiring from January 2022 to December 2029.

The Company has an Ethane, Propane, LPG and NGL sales and purchase agreement with a parent company. Selling price in an agreement for Ethane is determined based on Polyethylene plastic pellets price. Selling price for Propane and LPG is determined based on Propane and Butane price in the world market and selling price for NGL is determined based on Naphtha price in the world market. The agreement is for the period of 11 years, commencing from the date as specified in the agreement and expiring in December 2030.

The Company has an Ethane Rich Gas sales and purchase agreement with a related party. The selling price is determined based on Polyethylene plastic pellets, Olefins, and Propane price in the world market and Natural gas price in Thailand. The agreement is for the period of 9 years 7 months, commencing from the date as specified in the agreement and expiring in December 2030.

Petroleum Product Offtake Agreement

The Company has a Petroleum Product sales and purchase agreement with a parent company and a related party. For domestic sales, the product price reflects prices prevailing in Thailand for products of a similar quality that are sold in or imported to Thailand. For export sales, the product price reflects the prevailing international spot price for that product. This agreement is for the period of 18 years, commencing from the date as specified in the agreement and expiring in February 2024. The agreement is automatically renewed except for advance cancellation through written notice by each party.

Expansion Phase Product Offtake Agreement

The Company has an expansion phase product offtake agreement with a parent company and a related party, which a parent company and a related party agree to purchase 100% of the volume of refined petroleum products produce by reforming and upgrading complexes. As specified in the Product Offtake Agreement, at least 50% - 80% of such volume will be sold at a competitive domestic market price and the remaining sold at a competitive export market price or other mutually agreed price. The agreement is for the period of 18 years, commencing from the date as specified in the agreement and expiring in February 2024. The agreement is automatically renewed except for advance cancellation through written notice by each party.

Long-term Crude Oil and Other Raw materials Supply Agreements

The Company has entered into 2 supply agreements for crude oil and other raw materials with a parent company, the reference price being based on market price of crude oil and other raw materials. One agreement is for the period of 18 years, will expire in February 2024 and another agreement is for the period of 20 years, was automatically renewed and will expire in December 2022. These agreements are automatically renewed except for advance cancellation through written notice by each party.

Crack Spread Swap Agreements

The Company has entered into many crack spread swap agreements with a related party to hedge the Company's oil refinery margin. The floating amount of the basket refinery margin (calculated crack spread based on the Singapore price of refined petroleum products, which are Naphtha, Gasoline, Gasoil, Kerosene and Fuel Oil, against the price of Dubai crude oil) is swapped for a fixed amount of the basket refinery margin for a fixed quantity per month. Under the agreements, the Company shall receive or make payment for the crack spread difference according to terms and conditions stipulated in the agreements.

Product Spread Swap Agreements

The Company has entered into many petrochemical product margin spread swap agreements with a related party to hedge the Company's petrochemical margin. The floating amount of the petrochemical margin (calculated margin spread based on the key markets petrochemical products, which are Paraxylene, Benzene and other products against the Naphtha price) is swapped for a fixed amount of the petrochemical margin for a fixed quantity per month. Under the agreements, the Company shall receive or make payment of the product spread difference according to terms and conditions stipulated in the agreements.

Crude Oil Price Hedging Agreements

The Company has entered into many crude oil price hedging agreements to mitigate price risk with a related party. As at December 31, 2021, the Company has no oil volume under the agreements.

Commodities forward Agreements

The Company has entered into many commodities forward agreements to mitigate price risk with a related party. As at December 31, 2021, the Company has no volume under the agreements.

Sales and Purchase Aromatics Product Agreements

The Company, a parent company, related parties and various other companies have entered into many raw material and product sales and purchase agreements. The sales and purchase prices of raw material and product are based on the prices specified in the agreements. These agreements are for the periods from 1 year to 11 years 9 months, commencing from the effective date as specified in each agreement. The agreements will expire from March 2022 to December 2026. Other agreements are automatically renewed except for a cancellation through written notice by each party.

Polyethylene plastic pellets Sales and Purchase Agreements

The Company and a related party have 2 Polyethylene plastic pellets sales and purchase agreements with another related party. The Company and a related party agree to sell all Polyethylene plastic pellets to the other related party for distributing to the customers in the market. The Polyethylene pricing structure is linked to the Polyethylene product price that the related party sells to end customers, adjusted by the marketing expenses specified in the agreements. These agreements are for the period of 15 years, commencing from the effective date as specified in each agreement. One agreement will expire in June 2023 and another agreement has been extended for 5 years and will expire in December 2026.

Lending and Borrowing Agreements

The Company has unsecured short-term lending agreements for the period of 3 years through Liquidity Management System ("LMS") with 9 related parties with the credit facility of Baht 3,500 million, Baht 3,000 million, Baht 1,500 million, Baht 800 million, Baht 500 million, Baht 300 million, Baht 100 million and Baht 20 mlillion. These loans bear interest based on market rate referenced to BIBOR O/N plus interest rate spread.

The Company has an unsecured short-term lending agreement for the period of 6.5 months with a related party with the credit facility of USD 100 million. This loan bears interest at the fixed rate.

The Company has a secured long-term lending agreement for the period of 5 years with a related party with the credit facility of USD 7.90 million. This loan bears interest based on market rate referenced to LIBOR plus interest rate spread.

The Company has an unsecured long-term lending agreement for the period of 2 years with a related party with the credit facility of USD 17 million. This loan bears interest based on market rate referenced to LIBOR plus interest rate spread.

The Company has an unsecured long-term lending agreement for the period of 2 years minus 6 days with a related party with the credit facility of EUR 2,321 million. This loan bears interest at the fixed rate.

The Company has an unsecured long-term lending agreement for the period of 2 years minus 6 days with a related party with the credit facility of USD 491 million. This loan bears interest at the fixed rate.

The Company has unsecured short-term borrowing agreements for the period of 3 years through LMS with 9 related parties with the credit facility of Baht 8,000 million, Baht 4,000 million, Baht 800 million, Baht 500 million, Baht 400 million, Baht 300 million, Baht 60 million and Baht 50 million. These loans bear interest based on market rate referenced to BIBOR O/N minus interest rate spread.

The Company has an unsecured long-term borrowing agreement for the period of 4.2 years with a related party with the credit facility of USD 495.89 million. This loan bears interest at the fixed rate.

The Company has an unsecured long-term borrowing agreement for the period of 10 years with a related party with the credit facility of USD 690.75 million. This loan bears interest at the fixed rate.

The Company has an unsecured long-term borrowing agreement for the period of 30 years with a related party with the credit facility of USD 541.25 million. This loan bears interest at the fixed rate.

The Company has an unsecured long-term borrowing agreement for the period of 8 years with a related party with the credit facility of USD 100 million. This loan bears interest based on market rate referenced to LIBOR plus interest rate spread.

The Company has an unsecured long-term borrowing agreement for the period of 2 years minus 6 days with a related party with the credit facility of EUR 269 million. This loan bears interest based on market rate referenced to EURIBOR plus interest rate spread.

The Company has an unsecured long-term borrowing agreement for the period of 2 years with a related party with the credit facility of Baht 73,920 million. This loan bears interest at the fixed rate, with the objective of providing financial support for investment in Allnex group.

The Company has an uncommitted and unsecured short-term Inter-Company Borrowing & Lending agreement (ICBL) for the period of 1 year with a parent company with the borrowing credit facility of Baht 10,000 million and lending credit facility of Baht 4,000 million. The agreement was expired on December 19, 2021 and has been extended for an additional period until December 19, 2022. This facility bears interest based on market rate referenced to BIBOR or LIBOR plus interest rate spread by taking into account the return on short-term investment, short-term interest rate and the credit ratings of the Company or the borrowing company.

Service Agreements

The Company has Shared Service agreements with 27 related parties for the provision of general services. All of these agreements are effective from the date as specified in the agreements and the service charges will be agreed in the fourth quarter of each year.

The Company has Management and Engineering agreement, Design, Supply, Construction and Installation agreement, Inspection of Construction, Equipment and Machinery agreement and Management and Maintenance Work agreement with a related party. These agreements are for the periods from 1 year 6 months to 5 years, commencing from the date as specified in the agreements and expiring in June 2023.

The Company has a Security Service agreement with a related party. Under which the related party agrees to provide security service to asset, employees and visitors in the location of the Company. The agreement is for the period of 2 years and will expire in December 2022.

The Company has a Safety Inspection Service agreement and an Emergency Control Center agreement with a related party. These agreements are for the period from 2 years to 3 years and will expire in December 2023 with service rate as stipulated in the agreements.

The Company has Warehouse Management agreements with a related party. The agreements are for the periods from 1 year to 21 years 3 months and expiring in December 2030.

The Company has a Logistics Services agreement with a related party. The agreement is for the period of 2 years 9 months and will expire in December 2023.

The Company has entered into Information and Communication Technology Service agreements with a related party. Under which the related party agrees to provide Information Technology system maintenance and support services, system structure and data centre management, system supporting and advisory, including system design and development as the Company's requirements. These agreements are for the periods from 1 year to 15 years, commencing from the date as specified in each agreement and expiring in December 2027.

The Company has a Technical Services agreement with a related party. Under which the Company agreed to obtain certain technical advisory services. The agreement is for the period of 3 years and will expire in December 2022.

Rental Agreements

The Company has various Land Lease agreements with related parties. These agreements are for the periods from 14 years to 30 years, commencing from the date as specified in the agreements, and expiring from February 2029 to June 2040 with land lease rate and condition as specified in the agreements.

A subsidiary has Land Lease and Office Rental agreements with 6 related parties. These agreements are for the periods from 3 years to 30 years, commencing from the date as specified in the agreements, and expiring from August 2023 to July 2043. The renewal of the contract will be subject to negotiation with the counter party.

28. FINANCIAL INFORMATION BY SEGMENT

The Group has significant business segments which offer different products and services, and are managed separately. For each of the business segments, the chief operating decision maker (CODM) reviews internal management reports on at least a quarterly basis. The operations in each of the Group's reportable segments have 7 reportable segments as follows;

Segment 1	Refinery
Segment 2	Aromatics
Segment 3	Olefins and Derivatives
Segment 4	Green Chemicals
Segment 5	Performance Materials and Chemicals
Segment 6	Service and Others
Segment 7	Investments in Other Joint Ventures and Associates

Performance information of each reportable segment is measured based on segment profit before finance cost, income tax, depreciation and amortisation which as included in the internal management reports that are reviewed by the Group's CODM. Management believes that using profit before finance cost, income tax, depreciation and amortisation to measure performance is the most relevant in evaluating the results of certain segments relative to other entities that operate within these industries.

Information about reporting segments for the year ended December 31, 2021

Unit : Million Baht

	Refinery	Aromatics	Olefins and Derivatives	Green Chemicals	Performance Materials and Chemicals	Service and Others	Investments in Other Joint Ventures and Associates	Elimination	Total
External revenues	175,939	41,425	161,606	18,982	68,721	2,280	-	-	468,953
Inter-segment revenues	30,506	90,153	20,077	1,941	-	6,717	-	(149,394)	-
Total revenues	**206,445**	**131,578**	**181,683**	**20,923**	**68,721**	**8,997**	**-**	**(149,394)**	**468,953**
Cost of sales and rendering of services	(198,119)	(122,144)	(144,901)	(18,709)	(47,168)	(6,482)	-	148,920	(388,603)
Selling, distribution and administrative expenses	(716)	(1,140)	(10,165)	(754)	(3,106)	(3,798)	-	803	(18,876)
Profit before finance costs, income tax, depreciation, amortisation and others	**4,838**	**9,836**	**26,863**	**1,609**	**18,571**	**148**	**-**	**(724)**	**61,141**
Investment income	68	40	320	6	48	22,194	-	(11,447)	11,229
Gain from sale of investment in joint ventures and an associate	-	-	-	-	-	9,932	-	269	10,201
Finance costs	(729)	(418)	(1,425)	(52)	(1,022)	(2,707)	-	408	(5,945)
Depreciation and amortisation	(2,966)	(3,811)	(11,105)	(733)	(4,749)	(644)	-	1,196	(22,812)
Reversal of (loss on) impairment of assets	(128)	(112)	(296)	(436)	(253)	(2,671)	-	785	(3,111)
Share of profit of investments in joint ventures and associates	-	-	41	76	-	-	6,741	(17)	6,841
Others	377	(60)	(542)	5	180	(4,318)	-	(408)	(4,766)
Profit before income tax	**1,460**	**5,475**	**13,856**	**475**	**12,775**	**21,934**	**6,741**	**(9,938)**	**52,778**
Profit for reportable segment									
Owners of the parent	**1,540**	**5,204**	**12,752**	**287**	**12,051**	**16,334**	**6,741**	**(9,927)**	**44,982**

Information about reporting segments for the year ended December 31, 2020

Unit : Million Baht

	Refinery	Aromatics	Olefins and Derivatives	Green Chemicals	Performance Materials and Chemicals	Service and Others	Investments in Other Joint Ventures and Associates	Elimination	Total
External revenues	136,155	34,218	106,253	16,592	34,112	1,961	-	-	329,291
Inter-segment revenues	13,938	42,777	9,534	1,610	-	6,494	-	(74,353)	-
Total revenues	**150,093**	**76,995**	**115,787**	**18,202**	**34,112**	**8,455**	**-**	**(74,353)**	**329,291**
Cost of sales and rendering of services	(154,007)	(74,977)	(94,066)	(16,217)	(26,256)	(6,066)	-	73,303	(298,286)
Selling, distribution and administrative expenses	(637)	(1,170)	(7,292)	(782)	(2,078)	(1,913)	-	761	(13,111)
Profit (loss) before finance costs, income tax, depreciation, amortisation and others	**(4,072)**	**1,563**	**15,065**	**1,244**	**6,019**	**1,737**	**-**	**(1,265)**	**20,291**
Investment income	54	30	110	19	25	3,204	-	(3,080)	362
Finance costs	(750)	(267)	(680)	(77)	(321)	(1,588)	-	172	(3,511)
Depreciation and amortisation	(2,911)	(3,336)	(10,451)	(717)	(3,133)	(329)	-	500	(20,377)
Reversal of (loss on) impairment of assets	(47)	(15)	359	(130)	(30)	(56)	-	31	112
Share of profit of investments in joint ventures and associates	-	-	36	53	-	-	3,241	(7)	3,323
Others	28	(32)	53	17	(186)	(55)	-	518	343
Profit (loss) before income tax	**(7,698)**	**(2,057)**	**4,492**	**409**	**2,374**	**2,913**	**3,241**	**(3,131)**	**543**
Profit (loss) for reportable segment									
Owners of the parent	**(7,541)**	**(1,883)**	**4,796**	**245**	**2,485**	**1,985**	**3,241**	**(3,128)**	**200**

Unit : Million Baht

	Refinery	Aromatics	Olefins and Derivatives	Green Chemicals	Performance Materials and Chemicals	Service and Others	Investments in Other Joint Ventures and Associates	Elimination	Total
As at December 31, 2021									
Segment assets	77,147	110,184	178,887	13,823	225,851	407,017	42,367	(301,161)	754,115
Investment in joint ventures and associates	-	-	594	1,879	-	-	42,367	-	44,840
Change in non-current assets (excluding deferred tax assets and derivatives)	319	(3,288)	(194)	(324)	104,836	283,484	(19,846)	(179,348)	185,639
As at December 31, 2020									
Segment assets	66,100	71,592	186,823	13,671	76,391	95,398	62,213	(82,805)	489,383
Investment in joint ventures and associates	-	-	574	1,623	-	-	62,213	-	64,410
Change in non-current assets (excluding deferred tax assets and derivatives)	(1,625)	(2,066)	7,269	1,044	7,394	5,007	1,309	(7,001)	11,331

Geographical segments

In presenting information on the basis of geographical segments, segment revenue from sale of goods and rendering of services for the years ended December 31, 2021 and 2020 are based on the geographical location of customers. Segment non-current assets (exclude derivatives and deferred tax assets) as at December 31, 2021 and 2020 are based on the geographical location of the assets.

Geographical information

Unit: Million Baht

	Revenues	
	2021	**2020**
Thailand	288,545	209,335
The People's Republic of China	44,939	36,270
Singapore	8,946	8,480
Vietnam	20,415	15,094
Malaysia	11,918	9,858
Indonesia	10,236	6,294
India	11,432	4,196
Japan	5,055	3,344
United States of America	3,445	2,392
Other countries	64,022	34,028
Total	**468,953**	**329,291**

Unit: Million Baht

	Non-current assets (excluding deferred tax assets and derivatives)	
	2021	**2020**
Thailand	341,360	334,914
Netherlands	96,539	-
Germany	61,127	-
United States of America	19,545	11,274
France	7,120	7,238
Malaysia	486	4,406
Other countries	17,739	446
Total	**543,916**	**358,278**

Major customers

The Group's revenue from sale of goods and rendering of services for the years ended December 31, 2021 and 2020 mainly comprise revenue from one customer, which is the related party, of Refinery, Aromatics and Olefins and derivatives segment representing Baht 19,503 million *(2020: Baht 17,738 million)* and revenue from another customer, which is the related party, of Refinery and Green Chemicals segment representing Baht 123,579 million *(2020: Baht 99,346 million)*.

29. EXPENSES BY NATURE

The statements of income include an analysis of expenses by function. Expenses by nature disclosed in accordance with the requirements of various TFRS were as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Included in cost of sales of goods				
Changes in finished goods work in progress and goods in transit	(22,463)	2,003	(6,989)	1,956
Raw materials used	385,490	246,588	275,861	182,412
Personnel expense	10,800	9,246	5,765	4,921
Depreciation of property, plant and equipment	19,318	17,567	13,034	12,225
Depreciation of right-of-use assets	821	620	644	486
Amortisation of intangible assets	490	364	369	288
Included in selling and distribution and administrative expenses				
Personnel expense	6,445	5,484	4,162	3,566
Depreciation of property, plant and equipment	754	692	463	437
Depreciation of right-of-use assets	493	513	732	610
Amortisation of intangible assets	417	382	276	259
Minimum lease payments recognised as a lease expense	306	307	131	119

30. FINANCE COSTS

Finance costs for the years ended December 31, 2021 and 2020 consisted of:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Interest expense				
Parent	-	2	-	2
Subsidiaries	-	-	2,153	782
Other related parties	19	-	19	-
Debentures	3,986	2,984	2,192	2,325
Derivatives	-	2	-	2
Bank loans and overdrafts	1,417	1,043	617	291
Borrowings from other parties	6	7	-	-
Interest expense on lease liabilities	273	176	249	160
Total interest expense	**5,701**	**4,214**	**5,230**	**3,562**
Other finance costs	493	250	330	173
Less Capitalised as cost of assets under construction	(249)	(953)	(235)	(459)
Net	**5,945**	**3,511**	**5,325**	**3,276**

31. PROMOTIONAL PRIVILEGES

By virtue of the provisions of the Industrial Investment Promotion Act of B.E. 2520, the Company has been granted privileges by the Board of Investment relating to production of upstream, intermediate and downstream petrochemical, utilities and production support facilities, jetty for transportation and storage of liquid product and transportation by marine vessels, production of petroleum product, research and development of polymer products and chemical formula, lab testing services and refinery. The privileges granted include:

(a) exemption from payment of import duty on machinery approved by the Board;

(b) exemption from payment of income tax not over 100 percent of investment excluded land and working capital of certain operations for a period of 8 years from the date on which the income is first derived from such operations;

(c) a 50% reduction in the normal income tax rate on the net profit derived from certain operations for a period of five years, commencing from the expiry date in (b) above.

As promoted companies, the Company must comply with certain terms and conditions prescribed in the promotional certificates.

Summary of revenues from promoted and non-promoted businesses in separate financial statement for the years ended December 31, 2021 and 2020 were as follows:

Unit : Million Baht

	Separate financial statements					
	2021			2020		
	Promoted businesses	Non-promoted businesses	Total	Promoted businesses	Non-promoted businesses	Total
Export sales	32,592	2,086	34,678	20,443	5,331	25,774
Domestic sales	166,890	177,754	344,644	117,619	126,178	243,797
Services income	-	619	619	-	662	662
Total revenues	**199,482**	**180,459**	**379,941**	**138,062**	**132,171**	**270,233**

Certain subsidiaries in the Group have been granted promotional privileges as same as the Company.

32. INVESTMENT INCOME

Investment income for the years ended December 31, 2021 and 2020 were as follows:

Unit : Million Baht

		Consolidated financial statements		Separate financial statements	
	Note	2021	2020	2021	2020
Gain on remeasurement of fair value at the date of investment reclassification	11	10,565	-	10,997	-
Dividend income		152	17	12,953	3,202
Others		512	345	542	299
Total		**11,229**	**362**	**24,492**	**3,501**

33. NET DERIVATIVE GAIN (LOSS)

Net derivative gain (loss) for the years ended December 31, 2021 and 2020 were as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Gain (loss) from financial derivatives	(4,502)	693	(3,612)	153
Gain (loss) from commodity derivatives	(1,440)	476	(1,360)	476
Total	**(5,942)**	**1,169**	**(4,972)**	**629**

Foreign currency risk

The Group is exposed to foreign currency fluctuations risk in financial assets and liabilities and the gross profit (Product to Feed margin - P2F) of the Group that is referenced in foreign currency. Therefore, the Group has a policy in place to manage those risks by emphasizing the natural hedge on assets and liabilities held in foreign currency and the gross profit (P2F) of the Group that is referenced in foreign currency.

Moreover, the Group uses derivative hedges to mitigate the residual risk by entering into foreign currency forward contracts in accordance with the framework approved by the Risk Management Committee of the Group. The derivative financial instruments will result in gain (loss) from derivatives which will be offset against the gross profit (P2F), which is a hedged item, in order to maintain the Group's net profit at the exchange rate specified in the business plan as follows:

- In the event that the Thai Baht appreciates more than the exchange rate in the foreign currency forward contracts, there will be gain on derivative. Meanwhile, the gross profit (P2F) which the Group received in cash will decrease due to the appreciation of the Thai Baht.

- On the contrary, in the event that the Thai Baht depreciates more than the exchange rate in foreign currency forward contracts, there will be loss on derivative. Meanwhile, the gross profit (P2F) which the Group received in cash will increase due to the depreciation of the Thai Baht.

Overall, the derivative hedge can mitigate the impact from fluctuations in foreign currency to the Group's performance.

Commodity price risk

The Group is exposed to commodity price risk which may occur from purchases and sales. The Group mitigates risk by closely monitoring market situation, feedstock price and product price to appropriately adjust sales and production plans through our value chain amid fluctuating market situations. Moreover, the Group primarily applies derivative and forward contracts to hedge the commodity prices, in order to protect crude oil price and spread in accordance with the framework approved by the Risk Management Committee of the Group, which are not lower than the business plan levels. Those hedging transactions will cause in gain (loss) from derivatives which will be offset against crude oil and product prices, to maintain the Group's gross profit and net profit stability as the business plan are as follows:

- In the event that the crude oil price or spread is less than the forward contracts, there will be gain on derivative. Meanwhile, the gross profit which the Group received in cash will decrease due to the decrease in the crude oil price or spread.

- On the contrary, in the event that the crude oil price or spread is more than the forward contracts, there will be loss on derivative. Meanwhile, the gross profit which the Group received in cash will increase due to the increase in the crude oil price or spread.

Overall, the commodity price risk hedging by using the forward contracts and/or the derivative hedge can mitigate the impact of Group's performance from price and spread fluctuations.

34. BASIC EARNINGS (LOSS) PER SHARE

The calculation of basic earnings (loss) per share for the years ended December 31, 2021 and 2020 were based on the profit (loss) for the years attributable to ordinary shareholders of the parent company and the weighted average number of ordinary shares outstanding during the years as follows:

Unit : Million Baht / Million shares

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Profit (loss) attributable to ordinary shareholders of the parent company (basic)	44,982.39	199.61	37,128.70	(3,379.55)
Number of ordinary shares as at January 1,	4,508.85	4,508.85	4,508.85	4,508.85
Effect of treasury stock	(15.95)	(22.30)	(15.95)	(22.30)
Weighted average number of ordinary shares (basic)	4,492.90	4,486.55	4,492.90	4,486.55
Earnings (loss) per share (basic) *(in Baht)*	**10.01**	**0.04**	**8.26**	**(0.75)**

35. DIVIDENDS PAID

At the Annual General Meeting of the shareholders of the Company held on June 2, 2020, the shareholders acknowledged the appropriation of annual dividend from 2019 performance at Baht 2.00 per share, amounting to Baht 8,995 million. The Company had paid interim dividend of the first half year of 2019 at Baht 1.00 per share, amounting to Baht 4,508 million on September 13, 2019 and the payment of an interim dividend at Baht 1.00 per share, amounting to Baht 4,487 million by the Board of Directors at the Extraordinary Meeting No. 2/2020, held on April 1, 2020. Such dividend was paid to the shareholders on April 28, 2020.

At the Annual General Meeting of the shareholders of the Company held on April 5, 2021, the shareholders approved the appropriation of annual dividend from 2020 performance at Baht 1.00 per share, amounting to Baht 4,487 million. Such dividend was paid to the shareholders on April 23, 2021.

At the Board of Directors' Meeting of the Company held on August 23, 2021, the Board approved the appropriation of interim dividends from the earnings from January 1, 2021 to June 30, 2021 at Baht 2.00 per share. The dividend amounting to Baht 8,972 million was paid to the rightful shareholders on September 22, 2021.

36. FINANCIAL INSTRUMENTS

Financial risk management policies

The Group is exposed to normal business risks from changes in market interest rates, currency exchange rates and commodity prices and from non-performance of contractual obligations by counterparties. The Group does not hold or issue derivative financial instruments for speculative or trading purposes.

Risk management is integral to the whole business of the Group. The management continually monitors the Group's risk management process to ensure that an appropriate balance between risk and control is achieved.

Capital management

The Company's Board of Directors' policy is to maintain a strong capital base so as to maintain investor, creditor, partners and other stakeholders. In addition, the Board monitors the return on capital and the level of dividends to ensure business sustainability.

Interest rate risk

Interest rate risk is the risk that future movements in market interest rates will affect the results of the Group's operations and its cash flows because the Group's finances loans which have both floating and fixed interest rates for their operations. The Group has managed this risk to ensure the appropriateness to the business operation.

The effective interest rates of interest-bearing liabilities as at December 31, 2021 and 2020 and the periods in which those liabilities mature or re-price were disclosed in note 19 to the financial statement.

Interest rate sensitivity analysis

The sensitivity analyses below have been determined based on the exposure to interest rates for financial liabilities at the reporting date. For floating rate liabilities, the analysis is prepared assuming the amount of liability outstanding at the reporting date was outstanding for the whole year and using an increase or decrease rate by considering the reasonably possible change in interest rates.

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	Increase	**Decrease**	**Increase**	**Decrease**
As at December 31, 2021				
Interest rates change by 1%				
Finance costs	963	(323)	433	(192)
As at December 31, 2020				
Interest rates change by 1%				
Finance costs	625	(237)	330	(162)

Foreign currency risk

The Group is exposed to foreign currency risk. Therefore, the Group primarily utilises forward exchange contracts and foreign currency and interest rate swap contracts to hedge such financial assets and liabilities denominated in foreign currencies.

As at December 31, 2021 and 2020, the Group was exposed to foreign currency risk in respect of financial assets and liabilities denominated in the following currencies:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	**2020**	**2021**	**2020**
USD				
Financial assets	59,235	23,242	66,414	18,769
Financial liabilities	(24,154)	(19,846)	(79,804)	(33,503)
Gross statement of financial position exposure	**35,081**	**3,396**	**(13,390)**	**(14,734)**
Net Derivatives	**(1,279)**	**148**	**1,941**	**(634)**
EUR				
Financial assets	22	1,039	86,772	1,007
Financial liabilities	(19,936)	(85)	(10,236)	-
Gross statement of financial position exposure	**(19,914)**	**954**	**76,536**	**1,007**
Net Derivatives	**536**	**(528)**	**-**	**(1,021)**

Foreign currency sensitivity analysis

The following table details the Group's sensitivity to an increase and decrease in THB currency against USD currency and EUR currency. The sensitivity analysis includes only outstanding foreign currency denominated monetary items and foreign exchange forward contracts applied cash flow hedges accounting for USD currency and EUR currency at the reporting date and using an increase or decrease rate by considering the reasonably possible change in foreign exchange rates.

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	Strengthens	**Weakens**	**Strengthens**	**Weakens**
As at December 31, 2021				
USD Exchange rate change by 10%				
Net gain (loss) on foreign exchange rate	(3,261)	3,261	1,252	(1,252)
Other equity - gain (loss) on cash flow hedges	(119)	119	(107)	107
EUR Exchange rate change by 10%				
Net gain (loss) on foreign exchange rate	1,951	(1,951)	(7,654)	7,654
Other equity - gain (loss) on cash flow hedges	(13)	13	-	-
As at December 31, 2020				
USD Exchange rate change by 10%				
Net gain (loss) on foreign exchange rate	(237)	228	1,619	(1,619)
Other equity - gain (loss) on cash flow hedges	(117)	117	(83)	83
EUR Exchange rate change by 10%				
Net gain (loss) on foreign exchange rate	7	(7)	1	(1)
Other equity - gain (loss) on cash flow hedges	(49)	49	-	-

The Group performs foreign currency risk management on assets and liabilities held in USD. The Group has net assets and liabilities under USD currency. The Group manages net USD assets and liabilities by naturally hedged USD portion of net profit to minimise the impact from fluctuations in foreign currency to the Group's performance.

In addition to forward exchange contracts, the Group uses derivatives financial instruments, principally currency swaps and interest rate swap, to manage exposure to fluctuations in exchange rates and interest rates. As at December 31, 2021, the Group has entered into foreign currency and interest rate swap contracts, totalling Baht 2,887 million. *(2020: nil)*

The following tables detail the foreign currency forward contracts outstanding at the reporting date for their hedged items related to forecasted purchases. Foreign currency forward contract assets and liabilities are presented in the line "Derivatives" (either as asset or as liabilities) within the statement of financial position.

	Consolidated financial statements			
Hedging instruments - Outstanding contracts	**Average exchange rate**	**Notional value: Foreign currency**	**Notional value: Local currency**	**Carrying amount of the hedging instruments assets (liabilities)**
	[rate]	**Million [FC]**	**Million Baht**	**Million Baht**
As at December 31, 2021				
Cash flow hedges				
Buy [USD]	30.90	36	1,103	85
Buy [EUR]	38.77	3	129	(3)
As at December 31, 2020				
Cash flow hedges				
Buy [USD]	30.45	39	1,187	(16)
Buy [EUR]	35.54	13	472	19
Buy [SEK]	3.46	72	249	15

	Separate financial statements			
Hedging instruments - Outstanding contracts	**Average exchange rate**	**Notional value: Foreign currency**	**Notional value: Local currency**	**Carrying amount of the hedging instruments assets (liabilities)**
	[rate]	**Million [FC]**	**Million Baht**	**Million Baht**
As at December 31, 2021				
Cash flow hedges				
Buy [USD]	30.64	32	987	85
As at December 31, 2020				
Cash flow hedges				
Buy [USD]	30.65	27	843	(17)
Buy [SEK]	3.46	72	249	15

The Group assesses effectiveness by comparing the nominal amount of the net assets designated in the hedge relationship with the nominal amount of the hedging instruments. This is a simplified approach because the currency of the exposure and hedging instruments perfectly match and the company identified that there was no change in fair value for hedge ineffectiveness recognized in the income statement.

Commodity price risk

The Group is exposed to commodity price risk relating to purchases and sales. The Group mitigates risk by closely monitoring market situation, feedstock, and product prices to adjust sales and production plans for our value chain facing rapidly changing situations. Moreover, the Group primarily utilises derivatives and forward to hedge the commodity price and spread fluctuations.

Commodity price sensitivity analysis

The following table details the Group's sensitivity to an increase and decrease in commodity price. The sensitivity analysis includes only outstanding commodity derivative contracts at the reporting date and using an increase or decrease rate by considering the reasonably possible change in commodity price.

Unit : Million Baht

	Consolidated financial statements		**Separate financial statements**	
	Increase	**Decrease**	**Increase**	**Decrease**
As at December 31, 2021				
Net derivatives gain (loss)				
Petroleum Crack Spread hedging +/- 1 USD per BBL	(1,157)	1,157	(1,157)	1,157
Petrochemical Spread hedging +/- 1 USD per Ton	(18)	18	(18)	18
As at December 31, 2020				
Net derivatives gain (loss)				
Petroleum Crack Spread hedging +/- 1 USD per BBL	(96)	96	(96)	96
Petrochemical Spread hedging +/- 1 USD per Ton	(0.4)	0.4	(0.4)	0.4

Credit risk

Credit risk is risk of failure from a customer or a counterparty to settle its obligations to the Group as and when they fall due.

Management has a policy in place and the exposure to credit risk is monitored on an ongoing basis. Credit evaluations are performed on all customers requiring credit over a certain amount. At the reporting date, there were no significant credit risk and the concentration of credit risk. The maximum exposure to credit risk is represented by the carrying amount of each financial asset in the statement of financial position. However, the majority of the customers are on the long-term contracted commitment and parts of them are the Company's shareholders which the company has consistently collected from them. For the customers who do not have the long-term contracted commitments, the Group monitors the risk on an ongoing basis and would do the business only with the credible customers by limiting the credit lines and requesting the guarantee on some cases. For the export, the credit of counterparty will be considered. The Group will demand a payment on a case to case basis and also has commercial credit insurance. Management anticipates no material losses from its debt collection.

- For trade receivables, the Group apply simplified approach in accordance with TFRS 9 to measure lifetime expected credit loss. The Group consider expected credit loss by using trade receivables provision table which estimate historical credit loss. The overdue circumstance adjusted to reflect current situation of receivables and the future economic conditions were taken into account. Therefore, credit risk of these financial assets is presented by consideration of overdue status in provision by aging table set out in note 6.

- The Company has loans to related parties. In assessing credit risk, the Company considers that most of subsidiaries and joint ventures in which have borrowings from the Company have the affordability that payments will be made under the agreements. However, the Company continually monitors the possibility of payments from counterparties.

- The Group has deposits and investments in financial assets with financial institutions and companies which are rated at investment grade. The Group constantly assesses the financial status and stability of those financial institutions and companies to manage risks from deposit and investing.

Liquidity risk

The Group monitors its liquidity risk and maintains a level of cash and cash equivalents deemed adequate by management to finance the Group's operations and to mitigate the effects of fluctuations in cash flows.

The following tables detail the Group's remaining contractual maturity for its non-derivative financial liabilities with agreed repayment periods. The tables have been drawn up based on the undiscounted cash flows of financial liabilities based on the earliest date on which the Group can be required to pay.

Unit : Million Baht

	Consolidated financial statements				
	Less than 1 year	**1 - 2 years**	**2 - 5 years**	**Over 5 years**	**Total**
As at December 31, 2021					
Short-term borrowings from financial institutions	2,423	-	-	-	2,423
Trade payables	69,951	-	-	-	69,951
Other payables	21,913	-	-	-	21,913
Payables to contractors	2,693	-	-	-	2,693
Lease liabilities	1,964	1,272	2,490	8,113	13,839
Long-term borrowings from financial institutions	4,366	42,262	33,342	17,684	97,654
Long-term borrowings from other parties	46	43	116	51	256
Long-term borrowings from related parties	-	55,600	-	-	55,600
Debentures	32,211	-	18,500	58,275	108,986
Other non-current liabilities	-	479	-	32	511
As at December 31, 2020					
Short-term borrowings from financial institutions	19	-	-	-	19
Trade payables	20,114	-	-	-	20,114
Other payables	7,806	-	-	-	7,806
Payables to contractors	2,956	-	-	-	2,956
Lease liabilities	1,278	823	1,426	5,311	8,838
Long-term borrowings from financial institutions	2,008	4,853	38,206	18,232	63,299
Long-term borrowings from other parties	45	45	120	85	295
Debentures	20,000	30,534	11,500	23,500	85,534
Other non-current liabilities	-	126	196	23	345

Unit : Million Baht

	Separate financial statements				
	Less than 1 year	**1 - 2 years**	**2 - 5 years**	**Over 5 years**	**Total**
As at December 31, 2021					
Trade payables	50,695	-	-	-	50,695
Other payables	10,208	-	-	-	10,208
Payables to contractors	2,960	-	-	-	2,960
Lease liabilities	1,430	620	1,536	6,105	9,691
Short-term borrowings from related parties	10,089	-	-	-	10,089
Long-term borrowings from financial institutions	1,025	6,725	22,650	2,600	33,000
Long-term borrowings from related parties	16,473	65,897	-	38,143	120,513
Debentures	15,639	-	18,500	16,500	50,639
Other non-current liabilities	-	479	-	23	502
As at December 31, 2020					
Trade payables	14,813	-	-	-	14,813
Other payables	5,593	-	-	-	5,593
Payables to contractors	2,020	-	-	-	2,020
Lease liabilities	1,305	829	1,088	4,635	7,857
Short-term borrowings from related parties	5,608	-	-	-	5,608
Long-term borrowings from financial institutions	-	1,025	27,175	4,800	33,000
Long-term borrowings from a related party	-	16,473	-	-	16,473
Debentures	20,000	15,638	11,500	23,500	70,638
Other non-current liabilities	-	124	196	23	343

The following table details the Group's liquidity analysis for its derivative financial instruments based on contractual maturities. The table has been drawn up based on the undiscounted net cash inflows and outflows on derivative instruments.

Unit : Million Baht

	Consolidated financial statements				
	Less than 1 year	**1 - 2 years**	**2 - 5 years**	**Over 5 years**	**Total**
As at December 31, 2021					
Cash inflows from					
Foreign exchange forward contracts	5,443	986	-	-	6,429
Foreign currency and interest rate swap contracts	156	239	819	1,655	2,869
Commodity forward contracts	1,777	-	-	-	1,777
Cash outflows from					
Foreign exchange forward contracts	(5,452)	(919)	-	-	(6,371)
Foreign currency and interest rate swap contracts	(164)	(251)	(848)	(1,659)	(2,922)
Commodity forward contracts	(2,978)	-	-	-	(2,978)
As at December 31, 2020					
Cash inflows from					
Foreign exchange forward contracts	8,357	-	-	-	8,357
Commodity forward contracts	57	-	-	-	57

Unit : Million Baht

	Consolidated financial statements				
	Less than 1 year	**1 - 2 years**	**2 - 5 years**	**Over 5 years**	**Total**
Cash outflows from					
Foreign exchange forward contracts	(8,351)	-	-	-	(8,351)
Commodity forward contracts	(40)	-	-	-	(40)

Unit : Million Baht

	Separate financial statements				
	Less than 1 year	**1 - 2 years**	**2 - 5 years**	**Over 5 years**	**Total**
As at December 31, 2021					
Cash inflows from					
Foreign exchange forward contracts	1,132	814	-	-	1,946
Commodity forward contracts	1,777	-	-	-	1,777
Cash outflows from					
Foreign exchange forward contracts	(1,102)	(747)	-	-	(1,849)
Commodity forward contracts	(2,978)	-	-	-	(2,978)

Unit : Million Baht

	Separate financial statements				
	Less than 1 year	**1 - 2 years**	**2 - 5 years**	**Over 5 years**	**Total**
As at December 31, 2020					
Cash inflows from					
Foreign exchange forward contracts	6,639	-	-	-	6,639
Commodity forward contracts	57	-	-	-	57
Cash outflows from					
Foreign exchange forward contracts	(6,649)	-	-	-	(6,649)
Commodity forward contracts	(40)	-	-	-	(40)

Levels and categories of financial instruments and their fair values

Fair values of financial instruments approximate their carrying values presented in the statement of financial position as at December 31, 2021 and 2020 were as follows:

The carrying values of cash and cash equivalents, current investments in financial assets, trade receivables, other receivables, short-term loans to related parties, short-term borrowings from financial institutions, trade payables, other payables, payables to contractors and short-term borrowings from related parties that measured at amortised cost approximate their fair values due to the short maturity period.

The carrying values of long-term loans to related parties, other non-current assets, long-term borrowings from financial institutions with floating interest rate, long-term borrowings from other party, long-term borrowings from related parties with floating interest rate, lease liabilities and other non-current liability that measured at amortised cost approximate their fair values.

The following table details information as at December 31, 2021 and 2020 of:

- classes of financial instruments based on their nature and characteristics;
- the carrying amounts of financial instruments;
- fair values of financial instruments (except fair values of financial instruments when carrying amount approximates their fair value); and
- fair value hierarchy levels of financial assets and financial liabilities for which fair value was disclosed.

Unit : Million Baht

	Consolidated financial statements													
	Carrying value										Fair value			
	Financial assets					Financial liabilities					Level			
	FVTOCI - Derivatives designated in cash flow hedge relationships	FVTPL - mandatorily measured	FVTOCI - mandatorily measured	FVTOCI - designated	Amortised cost	FVTOCI - Derivatives designated in cash flow hedge relationships	FVTPL - mandatorily measured	Amortised cost	Non-financial assets and non-financial liabilities	Total	1	2	3	Total
As at December 31, 2021														
Cash and cash equivalents	-	-	42	-	55,571	-	-	-	-	55,613	-	42	-	42
Current investments in financial assets	-	-	996	-	18,385	-	-	-	-	19,381	-	996	-	996
Trade receivables	-	-	-	-	50,540	-	-	-	-	50,540	-	-	-	-
Other receivables	-	-	-	-	2,420	-	-	-	3,605	6,025	-	-	-	-
Current derivatives assets	29	1,279	-	-	-	-	-	-	-	1,308	-	1,308	-	1,308
Non-current investments in financial assets	-	598	1,969	26,590	-	-	-	-	-	29,157	25,879	1,969	1,309	29,157
Long-term loans to related parties	-	-	-	-	762	-	-	-	-	762	-	-	-	-
Non-current derivatives assets	63	-	-	-	-	-	-	-	-	63	-	63	-	63
Other non-current assets	-	-	-	-	264	-	-	-	861	1,125	-	-	-	-
Short-term borrowings from financial institutions	-	-	-	-	-	-	-	2,423	-	2,423	-	-	-	-
Trade payables	-	-	-	-	-	-	-	69,951	-	69,951	-	-	-	-
Other payables	-	-	-	-	-	-	-	21,913	5,592	27,505	-	-	-	-
Payables to contractors	-	-	-	-	-	-	-	2,693	-	2,693	-	-	-	-
Current derivatives liabilities	-	-	-	-	-	5	1,857	-	-	1,862	-	1,392	470	1,862
Long-term borrowings from financial institutions	-	-	-	-	-	-	-	97,238	-	97,238	-	1,455 *	-	1,455
Long-term borrowings from other parties	-	-	-	-	-	-	-	256	-	256	-	-	-	-
Long-term borrowings from related parties	-	-	-	-	-	-	-	55,600	-	55,600	-	55,600	-	55,600
Debentures	-	-	-	-	-	-	-	109,501	-	109,501	-	113,687	-	113,687
Lease liabilities	-	-	-	-	-	-	-	10,356	-	10,356	-	-	-	-
Non-current derivatives liabilities	-	-	-	-	-	-	18	-	-	18	-	18	-	18
Other non-current liabilities	-	-	-	-	-	-	-	511	388	899	-	-	-	-

** Fair value of long-term borrowings from financial institutions with fixed interest rate only.*

Unit : Million Baht

	Consolidated financial statements													
	Carrying value										Fair value			
	Financial assets					Financial liabilities					Level			
	FVTOCI - Derivatives designated in cash flow hedge relationships	FVTPL - mandatorily measured	FVTOCI - mandatorily measured	FVTOCI - designated	Amortised cost	FVTOCI - Derivatives designated in cash flow hedge relationships	FVTPL - mandatorily measured	Amortised cost	Non-financial assets and non-financial liabilities	Total	1	2	3	Total
As at December 31, 2020														
Cash and cash equivalents	-	-	1	-	44,312	-	-	-	-	44,313	-	1	-	1
Current investments in financial assets	-	-	70	-	16,275	-	-	-	-	16,345	-	70	-	70
Trade receivables	-	-	-	-	29,277	-	-	-	-	29,277	-	-	-	-
Other receivables	-	-	-	-	1,744	-	-	-	1,982	3,726	-	-	-	-
Current derivatives assets	37	89	-	-	-	-	-	-	-	126	-	126	-	126
Non-current investments in financial assets	-	382	36	670	-	-	-	-	-	1,088	352	36	700	1,088
Long-term loans to related parties	-	-	-	-	714	-	-	-	-	714	-	-	-	-
Other non-current assets	-	-	-	-	247	-	-	-	558	805	-	-	-	-
Short-term borrowings from financial institutions	-	-	-	-	-	-	-	19	-	19	-	-	-	-
Trade payables	-	-	-	-	-	-	-	20,114	-	20,114	-	-	-	-
Other payables	-	-	-	-	-	-	-	7,806	4,699	12,505	-	-	-	-
Payables to contractors	-	-	-	-	-	-	-	2,956	-	2,956	-	-	-	-
Current derivatives liabilities	-	-	-	-	-	20	81	-	-	101	-	101	-	101
Long-term borrowings from financial institutions	-	-	-	-	-	-	-	62,951	-	62,951	-	818 *	-	818
Long-term borrowings from other parties	-	-	-	-	-	-	-	294	-	294	-	-	-	-
Debentures	-	-	-	-	-	-	-	85,032	-	85,032	-	87,942	-	87,942
Lease liabilities	-	-	-	-	-	-	-	6,787	-	6,787	-	-	-	-
Non-current derivatives liabilities	-	-	-	-	-	-	95	-	-	95	-	-	95	95
Other non-current liabilities	-	-	-	-	-	-	-	345	138	483	-	-	-	-

* *Fair value of long-term borrowings from financial institutions with fixed interest rate only.*

Unit : Million Baht

Separate financial statements

	Carrying value										Fair value			
	Financial assets					Financial liabilities					Level			
	FVTOCI - Derivatives designated in cash flow hedge relationships	FVTPL - mandatorily measured	FVTOCI - mandatorily measured	FVTOCI - designated	Amortised cost	FVTOCI - Derivatives designated in cash flow hedge relationships	FVTPL - mandatorily measured	Amortised cost	Non-financial assets and non-financial liabilities	Total	1	2	3	Total
As at December 31, 2021														
Cash and cash equivalents	-	-	42	-	33,262	-	-	-	-	33,304	-	42	-	42
Current investments in financial assets	-	-	996	-	18,058	-	-	-	-	19,054	-	996	-	996
Trade receivables	-	-	-	-	32,344	-	-	-	-	32,344	-	-	-	-
Other receivables	-	-	-	-	4,635	-	-	-	1,716	6,351	-	-	-	-
Short-term loans to related parties	-	-	-	-	2,829	-	-	-	-	2,829	-	-	-	-
Current derivatives assets	29	1,269	-	-	-	-	-	-	-	1,298	-	1,298	-	1,298
Non-current investments in financial assets	-	374	1,969	25,029	-	-	-	-	-	27,372	25,399	1,969	4	27,372
Long-term loans to related parties	-	-	-	-	103,850	-	-	-	-	103,850	-	-	-	-
Non-current derivatives assets	63	-	-	-	-	-	-	-	-	63	-	63	-	63
Other non-current assets	-	-	-	-	175	-	-	-	107	282	-	-	-	-
Trade payables	-	-	-	-	-	-	-	50,695	-	50,695	-	-	-	-
Other payables	-	-	-	-	-	-	-	10,208	462	10,670	-	-	-	-
Payables to contractors	-	-	-	-	-	-	-	2,960	-	2,960	-	-	-	-
Short-term borrowings from related parties	-	-	-	-	-	-	-	10,089	-	10,089	-	-	-	-
Current derivatives liabilities	-	-	-	-	-	2	1,329	-	-	1,331	-	1,331	-	1,331
Long-term borrowings from financial institutions	-	-	-	-	-	-	-	32,874	-	32,874	-	-	-	-
Long-term borrowings from related parties	-	-	-	-	-	-	-	123,642	-	123,642	-	119,119 *	-	119,119
Debentures	-	-	-	-	-	-	-	51,894	-	51,894	-	52,995	-	52,995
Lease liabilities	-	-	-	-	-	-	-	7,512	-	7,512	-	-	-	-
Other non-current liabilities	-	-	-	-	-	-	-	502	159	661	-	-	-	-

* *Fair value of long-term borrowings from related parties with fixed interest rate only.*

Unit : Million Baht

	Separate financial statements													
	Carrying value										Fair value			
	Financial assets					Financial liabilities					Level			
	FVTOCI - Derivatives designated in cash flow hedge relationships	FVTPL - mandatorily measured	FVTOCI - mandatorily measured	FVTOCI - designated	Amortised cost	FVTOCI - Derivatives designated in cash flow hedge relationships	FVTPL - mandatorily measured	Amortised cost	Non-financial assets and non-financial liabilities	Total	1	2	3	Total
As at December 31, 2020														
Cash and cash equivalents	-	-	1	-	31,534	-	-	-	-	31,535	-	1	-	1
Current investments in financial assets	-	-	70	-	15,875	-	-	-	-	15,945	-	70	-	70
Trade receivables	-	-	-	-	22,592	-	-	-	-	22,592	-	-	-	-
Other receivables	-	-	-	-	1,004	-	-	-	1,009	2,013	-	-	-	-
Short-term loans to related parties	-	-	-	-	2,401	-	-	-	-	2,401	-	-	-	-
Current derivatives assets	15	88	-	-	-	-	-	-	-	103	-	103	-	103
Non-current investments in financial assets	-	352	36	4	-	-	-	-	-	392	352	36	4	392
Long-term loans to related parties	-	-	-	-	714	-	-	-	-	714	-	-	-	-
Other non-current assets	-	-	-	-	218	-	-	-	19	237	-	-	-	-
Trade payables	-	-	-	-	-	-	-	14,813	-	14,813	-	-	-	-
Other payables	-	-	-	-	-	-	-	5,593	644	6,237	-	-	-	-
Payables to contractors	-	-	-	-	-	-	-	2,020	-	2,020	-	-	-	-
Short-term borrowings from related parties	-	-	-	-	-	-	-	5,608	-	5,608	-	-	-	-
Current derivatives liabilities	-	-	-	-	-	18	81	-	-	99	-	99	-	99
Long-term borrowings from financial institutions	-	-	-	-	-	-	-	32,831	-	32,831	-	-	-	-
Long-term borrowings from a related party	-	-	-	-	-	-	-	14,948	-	14,948	-	15,808	-	15,808
Debentures	-	-	-	-	-	-	-	70,164	-	70,164	-	72,329	-	72,329
Lease liabilities	-	-	-	-	-	-	-	6,064	-	6,064	-	-	-	-
Other non-current liabilities	-	-	-	-	-	-	-	344	53	397	-	-	-	-

Measurement of fair values

Level 1 of fair values for debt instruments measured at fair value through profit or loss are based on quoted bid price as at the end of reporting period by references from the Stock Exchange of Thailand. For equity instruments measured at fair value through other comprehensive income are based on closing price as at the end of reporting period in the Stock Exchange of Thailand or New York Stock Exchange.

Level 2 of fair values for debt instruments measured at fair value through other comprehensive income are based on the yield rate quoted by the Thai Bond Market Association or other markets and for simple over-the-counter financial derivative and commodity derivative instruments are based on broker quotes. Those quotes are tested for reasonableness by discounting expected future cash flows using market interest rate for a similar instrument at the measurement date. Fair values reflect the credit risk of the instrument and include adjustments to take account of the credit risk of the Group and counterparty when appropriate. For fixed-rate long-term borrowings are based on discounted future cash flows for the remaining periods using market interest rate for a similar instrument at the measurement date. For debentures are based on the last closing price on the Thai Bond Market Association at the measurement date.

Level 3 of fair value for debt instrument measured at fair value through profit or loss are as follows;

- For investment in a startup company, is based on valuation of the latest fundraising round.
- For investments in non-marketable securities, the fair values are based on the discounted present value of the future cash flows estimated based on available performance indicators at an appropriate interest rate.

Fair values for equity instruments measured at fair value through other comprehensive income are as follows;

- For investments in startup companies, the fair values are based on valuation of the latest fundraising round.
- For investments in non-marketable securities, the fair values are based on cost which considered as estimated fair values, except there are significant changes in their operations.
- For investments in funds, the fair values are referred to the net asset value of the funds.

Fair values for derivative liability, which is the put option over non-controlling interest, is based on present value of expected payments which is determined by considering the forecast earnings before financial costs, income taxes, depreciation and amortisation and discounted using discount rate.

Reconciliation of Level 3 fair value measurements of financial instruments

The following table includes the financial assets and the financial liability that are measured subsequently at fair value on Level 3.

Unit : Million Baht

	Consolidated financial statements	**Separate financial statements**
Investments in non-current financial assets		
Balance as at January 1, 2021	700	4
Total gains or (losses):		
in profit or loss	-	-
in other comprehensive income	174	-
Business acquisition (see Note 4)	191	-
Purchases/ issues	242	-
Disposals/ settlements	-	-
Change in fair value measurement level	(64)	-
Effect of change in foreign exchange rates	66	-
Balance as at December 31, 2021	**1,309**	**4**

Unit : Million Baht

	Consolidated financial statements	Separate financial statements
Derivative liability in put option over non-controlling interest		
Balance as at January 1, 2021	95	-
Total (gains) or losses:		
in profit or loss	371	-
in other comprehensive income	-	-
Purchases/ issues	-	-
Disposals/ settlements	-	-
Effect of change in foreign exchange rates	4	-
Balance as at December 31, 2021	**470**	**-**

Unit : Million Baht

	Consolidated financial statements	Separate financial statements
Investments in non-current financial assets		
Balance as at January 1, 2020	574	4
Effect from first-time adoption of new accounting policy	(4)	-
Total gains or (losses):		
in profit or loss	-	-
in other comprehensive income	(10)	-
Purchases/ issues	123	-
Disposals/ settlements	-	-
Effect of change in foreign exchange rates	17	-
Balance as at December 31, 2020	**700**	**4**

Unit : Million Baht

	Consolidated financial statements	Separate financial statements
Derivative liability in put option over non-controlling interest		
Balance as at January 1, 2020	-	-
Effect from first-time adoption of new accounting policy	573	-
Total (gains) or losses:		
in profit or loss	(514)	-
in other comprehensive income	-	-
Purchases/ issues	-	-
Disposals/ settlements	-	-
Effect of change in foreign exchange rates	36	-
Balance as at December 31, 2020	**95**	**-**

37. COMMITMENTS WITH NON-RELATED PARTIES

As at December 31, 2021 and 2020, the Company and its subsidiaries had commitments with non-related parties as follows:

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Capital commitments contracted but not provided for				
Land	6	-	1	-
Plant, machinery and equipment	6,584	6,387	4,753	3,624
Buildings and furniture, fixtures and equipment	904	116	20	111
Others	280	141	103	136
Total	**7,774**	**6,644**	**4,877**	**3,871**

Unit : Million Baht

	Consolidated financial statements		Separate financial statements	
	2021	2020	2021	2020
Non-cancellable lease commitments				
Within one year	28	40	20	35
After one year but within five years	28	56	20	52
Total	**56**	**96**	**40**	**87**
Other commitments				
Letters of credits	181	327	-	100
Bank guarantees	4,147	3,609	2,082	1,944
Guarantees to subsidiaries and joint ventures for credit facilities, debentures and bank guarantees	501	631	96,115	21,284
Other agreements	11,021	10,094	7,882	7,805
Total	**15,850**	**14,661**	**106,079**	**31,133**

Under the Equity Contribution and Shareholders Support Agreement between the Company and a subsidiary, the Company will provide financial support in case of occurrence of cash deficiency to a subsidiary according to its shareholding interest not exceeding Baht 410.50 million.

Under the Guarantee Agreement between the Company and a financial institution, the Company guaranteed the loan agreement with a subsidiary with credit facility not exceeding USD 120 million. As at December 31, 2021, the subsidiary had unutilised such credit facility.

Utilities and Other Services Agreements with minimum purchase quantity

The Group has 28 utilities and other services agreements which have minimum purchase quantity with other parties. These agreements are for the periods from 1 years to 30 years, commencing from the date as specified in each agreement and expiring in March 2022 to March 2036. The minimum purchase quantity, the selling price of products and the renewal of the contract will be subject as specified in the agreements.

38. LITIGATIONS

a) Purchase and sales of raw materials agreement legal case

On December 3, 2009, a company filed for arbitration against PTT Plc. ("PTT") and the Company as a producer to perform according to purchase and sales of raw materials agreement, of which the said company has been committed by PTT, or to compensate for damages of approximately Baht 13,805 million. On March 8, 2010, the dispute was struck out of the case-list by the arbitration ruling that the Company was not a party to the contract.

On August 27, 2010, the said company filed a civil suit to the Civil Court against PTT and the Company as a producer to perform according to purchase and sales of raw materials agreement, of which the said company has been committed by PTT, or to compensate for damages of approximately Baht 9,380 million. In this regards, the Company filed an objection against the indictment with the Civil Court on the basis that the Company was not a party to the contract.

On May 21, 2013, the Civil Court considered that the arbitration process between such company and PTT has not yet been finalised; therefore, the Court has temporarily struck the case out of the case-list until the final decision has been reached under arbitration process. Then, both parties or either party can resubmit the case to the Civil Court for the further trial.

Subsequently, on March 25, 2016, the arbitration has reached a conclusion for PTT to compensate the damages in some amount. On June 30, 2016, PTT submitted a motion for setting aside the arbitral award to the Civil Court. Thereafter, on September 19, 2019, the Civil Court rendered the judgement for enforcement of the arbitral award. PTT has appealed against the Civil Court's judgement to the Supreme Court and the Supreme Court rendered the judgement for enforcement of the arbitral award. This case has become final and the Company has no any liability to compensate for any damage.

b) Oil spill incident legal case

During the third quarter of 2014, the number of people in Rayong filed several lawsuits with the Civil Court and the Rayong Provincial Court against the Company to claim the extra compensation from oil spill incident and to perform the rehabilitation of the sea and natural environmental recovery. Some cases have been dismissed and some cases have been passed a judgement by the Civil Court on August 25, 2016 by ordered the Company to compensate for damages including interest and rehabilitation of approximately Baht 11.26 million. The Company has appealed on February 17, 2017. Subsequently, on May 11, 2018, the Company made compromise agreements with majority plaintiffs at the Civil Court. On December 20, 2018, the Court of Appeal has passed the judgement according to the compromise agreements which the Company has already paid compensation in full amount. For the remaining plaintiffs, the Court of Appeal ordered the Company to pay compensation with its interest according to the judgement of the Court of First Instance and reduced the amount of interest. The Company has paid the compensation to all plaintiffs completely and no petition is submitted to Supreme Court by any plaintiffs. This case has become final.

For the case at Rayong Provincial Court, on September 28, 2018, the Court has made the judgement ordering the Company to pay damage cost with its interest of approximately Bath 38 million by deducting the remedy payment paid to the plaintiffs of Baht 24 million. The Company deposited the remaining damage cost with its interest to the Rayong Provincial Court on February 25, 2019. Some plaintiffs filed an appeal with the Rayong Provincial Court and the Company has filed an answer to the appeal with the Rayong Provincial Court on October 2, 2019. Subsequently, on January 22, 2020, the Rayong Provincial Court sent an appointment to hear the judgment of the Court of Appeal Region 2 on March 19, 2020 and the Court of Appeal Region 2 has postponed the date of hearing the judgment. On September 1, 2020, the Court of Appeal Region 2 has made the judgement ordering the Company to pay damage cost with its interest to the plaintiffs. The Company deposited the amount of Baht 25 million to the Rayong Provincial Court on September 30, 2020. Afterwards, on October 14, 2020, the Rayong Provincial Court sent an appointment to hear the judgement or the order of the Court of Appeal Region 2 on November 26, 2020. Then, the plaintiffs have filed the Dika appeal period on March 1, 2021, and the case is currently under the consideration to receive the plaintiffs' Dika appeal of the Supreme Court. The Company is following up on the progress of the case.

c) Transfer of right for the payment of raw materials legal case of the subsidiary

c.1) On August 18, 2017, Anatta Green Company Limited ("Anatta"), later changed its name to Thai Bio Innovation Company Limited, the subsidiary and Asia Capital Group Public Company Limited ("ACAP") entered a tripartite MOU where Anatta agreed to responsible for supplying crude palm oil to the subsidiary and ACAP agreed to provide financial support to Anatta for payment to its suppliers. On the same day, Anatta entered into a loan agreement with ACAP and transferred its right to receive payment for raw materials to ACAP, along with notifying the transfer of such claim to the subsidiary and the subsidiary has given consent to such transfer.

During the 2nd quarter of 2018, the subsidiary disclosed the material event of inventory issue to the Stock Exchange of Thailand. At the same time, ACAP has demanded that the subsidiary pay for the raw materials purchased from Anatta under the transfer of claim, a total of 11 items. The subsidiary considered the documents received and clarified to ACAP that such documents were not in the subsidiary's system and did not find evidence of the delivery of the raw materials from Anatta as specified.

Subsequently, on August 20, 2018, ACAP filed a lawsuit in the Civil Court, claiming Anatta and the subsidiary jointly to pay damages totaling Baht 324.65 million and 15% interest per annum. The subsidiary's legal advisor had considered the relevant facts and evidences and provided opinion that the subsidiary is not liable for allegation. The subsidiary therefore appointed a lawyer and submitted a statement to defend.

The Court of First Instance issued its judgement on June 10, 2020, requiring the subsidiary to compensate ACAP in the amount of Baht 289.56 million plus interest of 15% per annum from the date of default until the payment is complete. If the subsidiary does not pay the said debt in full, Anatta shall pay the remaining balance. The subsidiary filed a legal appeal on November 25, 2020.

On January 20, 2022, the Appeal Court upheld the judgment of the Court of First Instance. However, the subsidiary did not agree with the Appeal Court's decision and will submit a request for a petition to the Supreme Court. The subsidiary believes that its defenses in facts, laws, and the exercising rights in court in good faith, in the end, the Supreme Court will consider evidences in the case and adjudicate the subsidiary not to be liable for payment of debts according to the judgments of the Court of First Instance and the Court of Appeal. The subsidiary also believes that evidences that the subsidiary has submitted additionally in the Court of Appeal as important evidences, directly related to the issue of the case, and is new evidence that the inquiry official in criminal cases has gathered and prepared from the investigation after the Court of First Instance decided the case, are solid evidences that will make the Supreme Court hear that the transaction documents prepared by Anatta, assisted by former employees of the subsidiary, and used by ACAP as evidences for filing against the subsidiary, are dishonest and unlawful acts. This is consistent with the fact that the SEC has found fraudulent acts related to inventory issue and unlawful exploitation which caused the subsidiary to be damaged. It is considered as an offense under the Securities and Exchange Act B.E. 2535. The inquiry official has made recommendation to pursue prosecution in some criminal cases and submitted the investigation documents to the public prosecutor already, therefore, the subsidiary believes that the subsidiary has no debts to be liable to ACAP under the contracts arising from dishonest and unlawful acts. However, the subsidiary has considered to record a reserve for damages from the said case in the amount of Baht 444 million.

c.2) On September 8, 2020, the subsidiary received a summons and a copy of a Civil Court plaint from a company, a former supplier of the subsidiary, to filed a civil lawsuit against the subsidiary regarding the breach of an agreement concerning the reclaiming of purchase price on raw materials and claiming damages on the principal of Baht 470.03 million with interest at the rate of 7.5% per annum, amounting to Baht 595.10 million, starting from the date of the lawsuit until the date of completion of payment. The witness hearing will be held in June 2022.

On November 8, 2020, the subsidiary received a summons and a copy of a Civil Court plaint from the aforementioned company to filed a civil lawsuit against the subsidiary as the first defendant and two other companies as joint defendants regarding the breach of principal-agent agreements and claiming damages on the principal of Baht 92.29 million with interest at the rate of 7.5% per annum, amounting to Baht 109.42 million, starting from the date of the lawsuit until the date of completion of payment. The witness hearing will be held in June and July 2022.

On December 25, 2020, the subsidiary received a summons and a copy of a Civil Court plaint from the aforementioned company to filed a civil lawsuit against a supplier and the subsidiary as second defendants regarding the breach of agreements concerning the reclaiming of purchase price on raw materials and claiming damages on the principal of Baht 305.26 million with interest at the rate of 7.5% per annum, amounting to Baht 364.71 million, starting from the date of the lawsuit until the date of completion of payment. The witness hearing will be held in July and August 2022.

The subsidiary and legal advisor of the subsidiary have considered relevant facts and evidences in all three cases and provided the opinion that the subsidiary has not breached the agreement and has no obligation to pay as claimed. Therefore, the subsidiary has appointed a lawyer and filed testimony with its defense in accordance with the applicable law. In addition, the subsidiary is in the process of filing a counterclaim amounting to Baht 551 million. Therefore, the subsidiary has not recorded any provision against any losses from such case.

d) Civil Court plaint regarding tort, breach of agreements, breach of promise and claiming damages occurred in year 2021 of the subsidiary

On June 28, 2021, the subsidiary received a summons and a copy of the Civil Court plaint in which a company filed a lawsuit against the subsidiary in the Civil Court regarding tort, breach of agreements, breach of promise and claiming damages in the total amount of Baht 449.77 million, together with interest at the rate of 7.5% per annum. The subsidiary and legal advisor of the subsidiary considered relevant facts and evidences and provided the opinion that the issue of this lawsuit is the same as the case that the subsidiary had filed against such company and the subsidiary has not committed a wrongful act and has not breached the agreements against the plaintiff as claimed. The subsidiary appointed a lawyer and submitted a file testimony with its defense. The witness hearing will be held on March 1 - 4, 2022. Therefore, the subsidiary has not recorded any provision against any losses from such case.

39. EVENT AFTER THE REPORTING PERIOD

39.1 On January 25, 2021, the Company has issued and offered Senior Unsecured Debentures. The debentures have an issued 30 million units and the issue price per unit is Baht 1,000, totalling Baht 30,000 million which were offered to institutional investors and high net worth investors and can be separated into 4 tranches,

- A 5-year tenor, Baht 14,000 million, carrying a 2.13% coupon rate per annum with interest payable on semi-annual basis.

- A 7-year tenor, Baht 2,000 million, carrying a 2.65% coupon rate per annum with interest payable on semi-annual basis.

- A 10-year tenor, Baht 2,000 million, carrying a 3.05% coupon rate per annum with interest payable on semi-annual basis.

- A 12-year tenor, Baht 12,000 million, carrying a 3.29% coupon rate per annum with interest payable on semi-annual basis.

The use of proceeds is for debt repayment, repayment of US dollar debentures with the maturity date in September 2022, debt prepayment, or working capital for operating working capital.

39.2 At the Board of Directors' meeting held on February 14, 2022, the Board approved to submit for approval at the Annual General Meeting of the Shareholders, a full year 2021 dividend payment at the rate of Baht 1.75 per share to the shareholders entitled to receive dividends, amounting to Baht 7,890 million. Such dividend is subject to the approval of the Shareholders at the Annual General Meeting to be held on April 4, 2022.

40. APPROVAL OF THE FINANCIAL STATEMENTS

These financial statements have been approved for issue by the Board of Directors on February 14, 2022.

04

APPENDIX

TECHNICAL TERMS & ABBREVIATIONS

Technical Terms & Abbreviations	
Acrylonitrile (AN)	AN, an intermediate product, is used for many applications such as acrylic fiber, automotive parts, and electric appliance parts.
Aromatics	A group of cyclic hydrocarbons containing one or more benzene rings of six carbon atoms characterized by single and double bonds, such as benzene, toluene, and xylene.
Bio-based Polybutylene Succinate (Bio-PBS)	Bio-PBS, a natural material made from bio-succinic acid and 1,4-butanediol, used in applications such as paper coating, compound injection, and packaging.
Bisphenol A (BPA)	BPA, an intermediate product produced from acetone and phenol, is used to produce polycarbonate or epoxy resins.
Butadiene	Butadiene, derived from the extraction of mixed-C4, is used in making synthetic rubber.
Butene-1	Butene-1, a byproduct of the cracking of petroleum (kerosene or gasoil) and naphtha distillation, or extraction of mixed-C4, is used as polymer feedstock.
Carotenoid	Carotenoid, a natural substance found in plants, vegetables, fruits, and microbes, consists of the carotene group and xantho group. Carotene, such as beta carotene and lycopene, is fats-soluble, whereas xantho, such as lutein and astaxanthin, is less fats-soluble.
Crosslinkers (XLR)	Crosslinkers are molecules that connect polymers chains at specific reactive sites, thereby enhancing the performance of coatings by increasing the chemical and scratch resistance. When paired with catalysts they can accelerate the reactivity of formulations.
EO-Based Performance Product	EO-based performance products refers to ethylene oxide derivatives such as ethylene oxide, ethylene glycol, ethanolamine products, and ethoxylate.
Ethanolamine (EA)	EA, obtained from the reaction between ethylene oxide and ammonia, is used in hair conditioner, fabric softener, cosmetics, and pharmaceuticals.
Ethoxylate	Ethoxylate, produced from ethylene oxide, is used as a surfactant in soap and detergent.
Ethylene	Ethylene, obtained from ethane, LPG, or naphtha, is feedstock for polyethylene, vinyl chloride monomer, styrene monomer, and ethylene oxide.
Ethylene Glycol (EG)	EG is synthesized from ethylene oxide reacting with water, producing mono ethylene glycol, diethylene glycol, triethylene glycol, and polyethylene glycol.
Ethylene Oxide (EO)	EO, obtained from the reaction between ethylene and oxygen, is a chemical intermediate of ethylene glycol, ethanolamine, and ethoxylate, and others.

Technical Terms & Abbreviations	
Fatty Alcohol	Fatty alcohol, produced from methyl ester and hydrogen through hydrogenation, is used in personal care products.
Glycerin	Glycerin, a byproduct of methyl ester production, is used in pharmaceuticals, food, and personal care products.
Hexamethylene Diisocyanate (HDI)	HDI, obtained from the reaction between hexamethylenediamine and phosgene, is used in polyurethane production.
Hexene-1	An organic compound primary is used as a comonomer in production of polyethylene.
High Density Polyethylene (HDPE)	Produced from ethylene monomers, HDPE is a very dense and crystallized thermoplastic used for containers, including plastic bags, bottles, fuel containers, tanks, and cartons.
Hydrocracking	Hydrocracking is a process of breaking up hydrocarbon molecules by breaking up carbon-carbon bonds with the use of hydrogen and catalysts.
Linear Low Density Polyethylene (LLDPE)	LLDPE, a branched thermoplastic with 65-80% crystallization and a byproduct produced from chemical reaction between ethylene and butene-1, is found in film and containers.
Liquid Resins and Additives (LRA)	Liquid Resins comprise of functional polymers that are carried in either water or a solvent. Liquid resins form an essential part of many coating formulations with the function of forming a protective film that enhances the appearance and surface protection of coatings applied in automotive, marine, industrial and wood applications. Additives are polymer products used in small amounts in coating formulations but have a significant impact on coating properties such as drying speed and reducing surface defects.
Low Density Polyethylene (LDPE)	LDPE is a branched type of thermoplastic with 65-75% crystallization. Obtained from chemical reaction of ethylene monomer coalescing, it is found in film and containers.
Methylamines	Methylamine, derived from methanol and ammonia, is found in shampoo, hair conditioner, fabric softener, cosmetics, and pharmaceuticals.
Methyl Ester	Methyl ester, derived from the reaction between crude plant/vegetable oil or animal fats and alcohols under esterification, is used for biodiesel production.
Methyl Methacrylate (MMA)	MMA is an intermediate product for polymethyl methacrylate (PMMA) used for LCD screen light guide panels, automotive parts, and billboards.
Mixed C4	Mixed C4, the byproducts produced from naphtha crackers for olefins production, can be isolated into butadiene, butane-1, and isobutene, and others.
Mixed Xylenes	Aromatics derived from naphtha undergoing a chemical reaction aided by catalysts. They consist of paraxylene, orthoxylene, and metaxylene, all capable of serving as reactants for higher-value aromatics and as industry solvents.
Mono Ethylene Glycol (MEG)	MEG, derived from the oxidation of ethylene produced by the reaction of ethylene oxide and water, can serve as an automobile antifreeze agent or a reactant with pure terephthalic acid to produce polyester, clear drinking-water bottles, film, and fiber.

Technical Terms & Abbreviations	
Naphtha	Naphtha is a general term for low-boiling hydrocarbon fractions that is a product of crude oil refining or a condensate splitter. It serves as petrochemical feedstock and as a solvent.
Olefins	Olefins are unsaturated hydrocarbons with at least one carbon-carbon bond. The main olefins include ethylene, propylene, and butadiene.
Oleochemicals	Oleochemicals are natural chemicals derived from plant fats and animal fats, such as fatty alcohols, methyl ester, and glycerin.
O-xylene or Orthoxylene (OX)	This aromatic compound with two methyl groups in the 1- and 2-positions of the benzene ring is used to produce phthalic anhydride, feedstock for plasticizers.
Polymers	Chemicals with molecular weights of 5,000 or more, derived when certain individual monomers come together and link up. Examples are polyethylene, rubber, and cellulose.
Polypropylene	Polypropylene, a thermoplastic polymer derived from the reaction between propylene and catalysts, is used in containers, textiles, and injected plastics.
Polyethylene Terephthalate (PET)	PET is made by combining mono ethylene glycol and pure terephthalic acid. PET and mono ethylene glycol serve as feedstock for synthetic fiber, water bottles, audiotapes, adhesive tapes, film, food packaging, and others.
Polyols	Polyols is an intermediate petrochemical product, used as main feedstock to produce polyurethane.
Polystyrene	A thermoplastic made from styrene monomer.
Polyurethane (PU)	PU, a thermoplastic resulting from glycol and diisocyanate condensation, can be stiff, soft, or flexible, depending on the additives used. When blended with rubber, it provides shoe soles, heat insulators, windshield wipers, and others.
Polyvinyl Chloride (PVC)	PVC is a thermoplastic polymer produced from vinyl chloride monomers (VCM), and consists of unplasticized and plasticized PVC. It is used in water pipes, electric wire conduits, artificial leather, among others.
Powder Coating Resins	Powder coating resins are 100% solids (not carried in water or solvent) which upon oven-baking forms a protective film that provides superior durability and weathering resistance to the coated object. They are commonly used to coat metals in applications ranging from agricultural and construction equipment, aluminum frames and household electrical appliances.
PP Compound	A polypropylene with additives added to reinforcing substances to enhance special features.
Premix Polyols	A mixture of various polyols and additives co-developed with customers to achieve desired properties.
Propylene	Propylene is an unsaturated hydrocarbon derived from propane, LPG, or naphtha. This feedstock of polypropylene is of three grades: refinery, chemical, and polymer, depending on the proportions of propylene and propane.

Technical Terms & Abbreviations	
Propylene Oxide (PO)	PO is an intermediate petrochemical product derived from propylene, used as feedstock to produce polyols and propylene glycol.
Purified Terephthalic Acid (PTA)	PTA is a hydrocarbon compound resulting from paraxylene and is feedstock for polyester production.
P-xylene or Paraxylene (PX)	PX, feedstock for PTA, is an aromatic hydrocarbon with two methyl groups in the 1- and 4-positions of the benzene ring.
Pyrolysis Gasoline	Pyrolysis gasoline, a byproduct of naphtha distillation, can be blended with gasoline or used as feedstock for aromatics.
Radcure (RAD)	Radiation-Curable Resins, or Radcure, is made up of polymers that contain special functional groups that enable them to react and form a protective film upon the application of Ultra-Violet or Electron Beam radiation. They are commonly used in applications such as wood, plastic, electronic and packaging coatings.
Rotomolding Compound	Rotomolding Compound, a byproduct produced from low-density polyethylene (LLDPE), is plastic powders which are processed through rotational moulding machine at suitable temperature. It is used to manufacture some products such as water tanks, chemical storage tanks, playground, kayaks and other common products.
Toluene	Toluene, an aromatic hydrocarbon with one methyl group connected to the benzene ring, is feedstock for higher-valued aromatics, including benzene and xylene. It is used as a solvent in paints, adhesives, lacquer, thinner, and others.
Toluene Diisocyanate	This chemical derived from the reaction between toluene diamine and phosgene is used for polyurethane production.
Vinyl Chloride Monomer (VCM)	VCM is a hydrocarbon compound used as feedstock for PVC production. It is a colorless, sweet-smelling gas.

ATTACHMENT 1

DETAILS OF DIRECTORS, EXECUTIVES, CONTROLLERS AND COMPANY SECRETARY

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED

Mr. Piyasvasti Amranand

Chairman and Chairman of the Independent Director (Non-executive Director)
Age : 68 Years
Appointed : April 9th, 2018, April 5th 2021 (1st re-elected)

Education/Training
- Doctor of Philosophy (Ph.D.) in Economics, London School of Economics and Political Science, University of London, U.K.
- Master of Science (Economics), London School of Economics and Political Science, University of London, U.K.
- Bachelor of Arts (Mathematics) (First-class Honors), University of Oxford, U.K.
- The Executive Program in Energy Literacy for a Sustainable Future, Class 6, Thailand Energy Academy (TEA)

Director Training
- Director Accreditation Program (DAP) Class 35/2005, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 4
- Independent Director and Chairman of Plan Administrator, Thai Airways International Public Company Limited
- Chairman and Chairman of the Independent Director, PTT Global Chemical Public Company Limited
- Independent Director and Chairman of the Audit Committee, Pruksa Holding Public Company Limited
- Independent Director and Chairperson of the Risk Oversight Committee, Kasikornbank Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 1
- Director, Kiroro Resort Holdings Company Limited

Position in Other Organizations/Institutions : 3
- Member, the National Energy Reform Committee
- Council Member, the Heart Foundation of Thailand under the Royal Patronage
- Chairman, Energy for Environment Foundation

Work Experiences (5-years Past Experiences)

25 May 2020 - 14 Jun 2021	Independent Director and Planner, Thai Airways International Public Company Limited
2015 - May 2020	Chairman of the Audit Committee, Kasikornbank Public Company Limited
1 Jul 2014 - 11 Jul 2018	Independent Director and Chairman, PTT Public Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Apisak Tantivorawong

Independent Director (Non-executive Director) **and Chairman of the Audit Committee**
Age : 68 Years
Appointed : January 24th, 2020

Education/Training
- Master of Business Administration (M.B.A.) (Industrial Management), University of Tennessee, U.S.A.
- Bachelor of Engineering (Chemical Engineering), Chulalongkorn University
- Diploma, National Defence College, The Joint State-Private Sector Course, Class 16, National Defence College of Thailand (NDC)

Director Training
- Director Certification Program (DCP) Class 18/2002, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 2
- Chairman of the Board of Directors and Independent Director, S Hotels and Resorts Public Company Limited
- Independent Director and Chairman of the Audit Committee, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Position in Other Organizations/Institutions : 2
- Honorable Committee Members, Chulabhorn Royal Academy Council
- Director of the Rehabilitation Committee, Thai Airways International Public Company Limited

Work Experiences (5-years Past Experiences)

19 Aug 2015 - 16 Jul 2019	Minister, Ministry of Finance

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Don Wasantapruek

Independent Director (Non-executive Director) **and Chairman of the Nomination and Remuneration Committee**

Age : 63 Years

Appointed : November 1st, 2015, April 5th, 2016 (1st re-elected), April 5th, 2019 (2nd re-elected)

Education/Training

- Master of Engineering (Industrial Engineering), University of New South Wales, Sydney, Australia
- Bachelor of Engineering (Industrial Engineering), University of New South Wales, Sydney, Australia
- Seminar "Incorporation of State Investment Corporation" (July 13, 2015)
- The Executive Program in Energy Literacy for a Sustainable Future, Class 6/2015, Thailand Energy Academy (TEA)
- Thailand's 5th National Conference on Collective Action Against Corruption Tackling Corruption through Public - Private Collaboration (October 16th, 2014)

Director Training

- Briefing on International Anti-Corruption International Cases and Practices (October 14, 2015), Seminar Anti-Corruption : Leadership Role of the Board in Driven the Organization toward the Draft of the Development of Corporate Governance and Enterprise Management Act And Good Corporate Governance, Director Accreditation Program (DAP) Class 117/2015 and Role of the Nomination and Governance Committee (RNG) Class 7/2015, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 2

- Independent Director and Chairman of the Nomination and Remuneration Committee, PTT Global Chemical Public Company Limited
- Independent Director and Chairman of the Nomination Committee, PTT Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Position in Other Organizations/Institutions : 1

- Self-employed

Work Experiences (5-years Past Experiences)

Apr 2018 - Nov 2019	Director to the Nomination and Remuneration Committee, PTT Global Chemical Public Company Limited
4 Feb 2014 - 23 Dec 2018	Member of the Corporate Governance Committee, PTT Public Company Limited
Nov 2015 - Apr 2018	Director to the Corporate Governance Committee, PTT Global Chemical Public Company Limited

Shareholding : Spouse 3,000 Shares (0.000067%) as of 31 December 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Professor Somkit Lertpaithoon

Independent Director (Non-executive Director) **and Chairman of the Corporate Governance and Sustainability Committee**

Age : 62 Years

Appointed : April 9th, 2018, April 5th, 2021 (1st re-elected)

Education/Training

- Doctorate, (Droit Public Interne), The University Paris II, France
- Degree of Profound Studies, (Droit Public Interne), The University Paris II, France
- Bachelor of Law, Thammasat University
- Barrister-at-Law, Institute of Legal Education Thai Bar Association
- Certification in Local Government, Institut International d' Administration Publique (IIAP), France
- The Executive Program in Energy Literacy for a Sustainable Future, Class 10, Thailand Energy Academy (TEA)

Director Training

- Director Accreditation Program (DAP) Class 181/2021 and Corporate Governance for Executives (CGE) Class 17/2021, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 2

- Director, Sky ICT Public Company Limited
- Independent Director and Chairman of the Corporate Governance and Sustainability Committee, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Position in Other Organizations/Institutions : 7

- Independent Expert of Board Member, NSTDA Governing Board, National Science and Technology Development Agency (NSTDA)
- Chairperson of the Commissioner, Higher Education Commission
- Independent Expert of Board Member, Board of Governance, Thai Health Promotion Foundation (ThaiHealth)
- Member, The National Law Reform Committee
- Honorary Board Member, King Prajadhipok's Institute
- Member, 10th Council of State, Office of the Council of State
- Professor of Faculty of Law, Thammasat University

Work Experiences (5-years Past Experiences)

Feb 2017 - Apr 2018	Independent Director and Member of the Enterprise Risk Management Committee, PTT Public Company Limited
2017	Director, The Government Pharmaceutical Organization
2010 - 2017	Rector, Thammasat University

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Grisada Boonrach

Independent Director (Non-executive Director) **and Chairman of the Risk Management Committee**
Age : 64 Years
Appointed: June 2nd, 2020

Education/Training

- Master of Science (Political Science), Thammasat University
- Bachelor of Arts (Political Science), Ramkhamhaeng University
- Bachelor of Laws, Chiang Mai University
- Diploma, National Defence College, The National Defence Course, Class 53, National Defence College of Thailand (NDC)
- Intensive English Program (2019), English Language Center, Georgetown University
- The Management Development Participation, University Of Birmingham, U.K. (Scholarships offered by British Embassy, 2001)
- Senior Executives in State and Local Government, Kennedy School of Government, Harvard University, U.S.A. (Scholarships offered by Office of the Civil Service Commission, 2009)
- Stability Security Transition and Reconstruction, Asia Pacific Center for Security Studies (APCSS), U.S.A (Scholarships offered by US Embassy, 2007)

Director Training

- Director Certification Program (DCP) Class 298/2020, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Independent Director and Chairman of the Risk Management Committee, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Position in Other Organizations/Institutions : 3

- Assistant Secretary General, Thai Red Cross Society
- Director, Thai Red Cross Chapters Administration Office, Thai Red Cross Society
- Committee Member, Sai Jai Thai Foundation Under Royal Patronage

Work Experiences (5-years Past Experiences)

2017 - 2019	Minister, Ministry of Agriculture and Cooperative
2017 - 2019	Chairman of National Reform Committee for Public Administration, Office of the National Economic and Social Development Council
2015 - 2017	Permanent Secretary for Interior, Ministry of Interior

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Pakorn Nilprapunt

Independent Director (Non-executive Director), **Director to the Audit Committee and Director to the Nomination & Remuneration Committee**
Age : 53 Years
Appointed : April 9th, 2018, April 5th, 2021 (1st re-elected)

Education/Training

- Master of Laws (Trade Practices Laws), The University of Sydney, Australia
- Public Sector Management and Organization Change, The Australian National University, Australia
- Bachelor of Laws, Thammasat University
- High-Level Budget Management, 1st Edition, Bureau of the Budget
- Program for Chief Executive Training Course, Class 2, The Royal Thai Police
- Train the Trainers Program in Information Communication and Technology Law for the Justice Executive, Class 1, Office of the Secretary of the Electronic Transaction Commission
- Chief Executive Training Program : Leadership with Vision and Morality (AMP 64), The Office of the Civil Service Commission (List of Qualified Candidates for Training)
- East Asian Public Sector Leadership Challenges National Graduate Institute for Policy Study, Tokyo, Japan

Director Training

- Director Accreditation Program (DAP) Class 153/2018, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Independent Director, Director to the Audit Committee and Director to the Nomination & Remuneration Committee, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Position in Other Organizations/Institutions : 7

- Commissioner, Civil Service Commission, Office of the Civil Service Commission
- Committee Member, Public Sector Development Commission, Office of the Public Sector Development Commission (OPDC)
- Member, the National Law Reform Committee, The Prime Minister's Office
- Distinguished Member, Educational Innovation Area Policy, Ministry of Education
- Director, The Rehabilitation Committee, Thai Airways International Public Company Limited
- Committee Member, Bank of Thailand
- Secretary-General, Office of the Council of State, The Prime Minister's Office

Work Experiences (5-years Past Experiences)

Jun 2018 - Jan 2019	Secretary-General, Office of the Public Sector Development Commission (OPDC)
Jun 2018 - Jan 2019	Director, The Strategic Reform Office on the Promotion of the National Reform, Strategy and Cohesion
2017 - 2018	Deputy Director, Prime Minister's Delivery Unit (PMDU)
2015 - 2018	Deputy Secretary-General, Office of the Council of State
2016 - 2017	Deputy Secretary-General, The Secretariat of the Cabinet

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Lieutenant General Nithi Chungcharoen

Independent Director (Non-executive Director), **Director to the Nomination & Remuneration Committee and Director to the Corporate Governance and Sustainability Committee**

Age : 51 Years

Appointed : September 22nd ,2014, April 1st 2015 (1st re-elected), April 9th 2018 (2nd re-elected), April 5th 2021 (3rd re-elected)

Education/Training

- Bachelor of Science, Chulachomklao Royal Military Academy
- Master of Engineering (Mechanical), Stevens Institute of Technology, New Jersey, U.S.A.
- Command and General Staff College, Class 80, Command And General Staff College
- Peace Keeping Operation Course, Peace Operation Center, German Army
- Peace Mediation Course, Swiss Federal Department of Foreign Affairs

Director Training

- Director Certification Program (DCP) Class 200/2015, Driving Company Success with IT Governance (ITG) Class 5/2017, IOD Talk 2/2017 "Cyber Security: Risks, Liabilities, and Best Practices", Role of the Nomination and Governance Committee (RNG) Class 8/2016 and Board that Make a Different (BMD) Class 9/2019, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Independent Director, Director to the Nomination and Remuneration Committee and Director to the Corporate Governance and Sustainability Committee, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Position in Other Organizations/Institutions : 1

- Assistant Chief of Staff Officer to Minister of Defence, Ministry of Defense

Work Experiences (5-years Past Experiences)

1 Oct 2020 - 31 Mar 2021	Staff Officer, Ministry of Defence
Apr 2019 - Sep 2020	Expert, Royal Thai Army
4 Oct 2018 - 31 Mar 2019	Assistant General Director, 2nd Coordination Centre, Office of Internal Security Coordination, Royal Thai Army
2016 - 2018	Army Attache, Royal Thai Embassy, Canberra, Australia

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mrs. Watanan Petersik

Independent Director (Non-executive Director), **Director to the Audit Committee and Director to the Corporate Governance and Sustainability Committee**

Age : 61 Years

Appointed : September 22nd 2014, April 5th 2016 (1st re-elected), April 5th 2019 (2nd re-elected)

Education/Training

- A.B. degree, Bryn Mawr College, Pennsylvania, U.S.A.

Director Training

- Director Accreditation Program (DAP) English Program, Class 83/2010, Thai Institute of Directors Association (IOD)
- Mandatory Accreditation Programme (MAP) for Directors of Public Listed Companies (March 2010), Bursatra Sdn. Bhd.
- Role of Director, Singapore Institute of Directors Course

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Independent Director/Director to the Audit Committee and Director to the Corporate Governance and Sustainability Committee
  PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 1

- Non-Executive Director, Jetanin Institute for Assisted Reproduction, Jetanin Company Limited

Position in Other Organizations/Institutions : 5

- Multinational Standards Advisory Council, BCorp, U.S.A.
- Advisory Board, Nanyang Business School, Singapore
- Management Committee, Lien Centre for Social Innovation, Singapore Management University
- Advisor, TPG Capital Asia
- Advisor, TaejaiDotCom (taejai.com)

Work Experiences (5-years Past Experiences)

Apr 2007 - Jun 2020	Independent Director and Chairperson of Nomination, Remuneration, and Corporate Governance Committee, CIMB Thai Bank Public Company Limited
Jan 2010 - Jan 2019	Independent Director and Non-Executive Director, CIMB Group Sdn. Bhd.
Jan 2010 - Jan 2019	Independent Director and Non-Executive Director, CIMB Group Holdings Berhad, Malaysia
Jan 2016 - Nov 2017	Director, TPG Star SF Pte Ltd.
Jan 2016 - Nov 2017	Director, TPG Growth III Asia Internet Holdings Pte Ltd.
Jan 2016 - Nov 2017	Director, TPG Growth SF Pte Ltd.
Feb 2015 - Nov 2017	Director, TE Asia Healthcare Advisory Pte Ltd.
Sep 2014 - Nov 2017	Director, TE Asia Healthcare Partners Pte Ltd.

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Chansin Treenuchagron

Director (Non-executive Director)
and Director to the Corporate Governance and Sustainability Committee
Age : 61 Years
Appointed : September 21st, 2020

Education/Training

- Honorary Doctorate of Science (Technology Management), Thammasat University
- Master of Economics, Chulalongkorn University
- Bachelor of Economics, Thammasat University
- Law of Democracy Course, Class 8/2020, Office of The Constitutional Court
- Executive Development Relation, Class 1, Directorate of Civil Affairs
- The Executive Program in Energy Literacy for a Sustainable Future, Class 7/2015, Thailand Energy Academy (TEA)
- Diploma, National Defence College, The National Defence Course, Class 57/2014, Thailand National Defence College
- Leadership Development Program III (LDP III), Class 1/2014, PTT Leadership and Learning Institute (PLLI), PTT Public Company Limited
- Advance Senior Executive Program (ASEP-5), Class 5/2010, KELLOGG & SASIN, Chicago, USA
- Air War College, Class 35/2006
- Senior Executive Program (SEP), Class 20, Sasin Graduate Institute of Business Administration of Chulalongkorn University
- PTT Executive Leadership, General Electric, GE, New York, USA
- Advanced Certificate Course in Public Economics Management for Executives, Class 10, King Prajadhipok's Institute
- Leadership Excellence through Awareness and Practice (LEAP), INSEAD, Singapore and France

Director Training

- IT Governance and Cyber Resilience Program (ITG) Class 18/2021, The Role of the Board in IT Governance of 2020, Briefing on International Anti-Corruption International Cases and Practices (October 14, 2015), Charted Director Class (CDC) Class 10/2015, Director Accreditation Program (DAP) Class 93/2011, Financial Statements for Directors (FSD) Class 12/2011 and Director Certification Program (DCP) Class 85/2007, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 2

- Director and Member of Plan Administrator, Thai Airways International Public Company Limited
- Director and Director to the Corporate Governance Committee, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 1

- Chairman, Y.S.S. (THAILAND) Company Limited

Position in Other Organizations/Institutions : 3

- Honorary Member of the University Council, Thaksin University
- President, Thammasat Association
- Honorary Member of the University Council, Thammasat University

Work Experiences (5-years Past Experiences)

2 Jul 2020 - 1 Jul 2021	Acting President, Thai Airways International Public Company Limited
4 Jun 2020 - 15 Jun 2021	Director and Plan Administrator, Thai Airways International Public Company Limited
Aug 2018 - Dec 2020	Chairman, IRPC Public Company Limited
Sep 2018 - Aug 2020	Director, PTT Exploration and Production Public Company Limited
Aug 2018 - May 2020	President and Chief Executive Officer/Director/Secretary to the Board, PTT Public Company Limited
Jan 2018 - Aug 2018	Chief Technology and Engineering Officer, PTT Public Company Limited
Dec 2017 - Aug 2018	Chairman, PTT Digital Solutions Company Limited
Oct 2017 - Aug 2018	Director/Member of Risk Management Committee/ Member of Nomination and Remuneration Committee, Global Power Synergy Public Company Limited
Apr 2016 - Aug 2018	Member of the Risk Management Committee, IRPC Public Company Limited
Oct 2015 - Aug 2018	Director, IRPC Public Company Limited
Oct 2017 - Dec 2017	Chief Operating Officer, Infrastructure and Sustainability Management Business Group, PTT Public Company Limited
Apr 2017 - Dec 2017	Chairman, PTT Asahi Chemical Company Limited
Nov 2015 - Dec 2017	Chairman, PTT Polymer Marketing Company Limited
Jan 2016 - Sep 2017	Senior Executive Vice President, Downstream Business Group Alignment, PTT Public Company Limited
Nov 2015 - Mar 2017	Chairman, PTT Polymer Logistics Company Limited

Shareholding : 40,000 Shares (0.000887%) as of 31 December 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Sarawut Kaewtathip

Director (Non-executive Director)
and Director to the Risk Management Committee
Age : 47 Years
Appointed : July 20th, 2020

Education/Training

- Doctor of Philosophy (PhD) in Chemical Engineering, University of Southern California, U.S.A.
- Master of Science (Chemical Engineering), University of Southern California, U.S.A.
- Bachelor of Science (Chemical Engineering), California State Polytechnic University, U.S.A.
- The Executive Program in Energy Literacy for a Sustainable Future (Class 11), Thailand Energy Academy (TEA)
- Strategist Course, Strategic Studies Center, National Defence Studies Institute
- The Civil Service Executive Development Program (Class 83), Civil Service Training Institute, Office of the Civil Service Commission (OCSC)
- Top Level Energy Administration (Class 7), Ministry of Energy
- LPG - Supply, Economics, Markets and International Trading, Mennta Energy Solutions (formerly The Oxford Princeton Programme), Oxford, U.K.
- International Program for Development Evaluation Training, the World Bank and Carleton University, Ottawa, Canada
- International Training Program on Utility Regulation and Strategy, the World Bank and University of Florida, Florida, U.S.A
- International Energy Forum, Doha, Qatar

Director Training

- Director Certification Program (DCP) Class 267/2018, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Director and Director to the Risk Management Committee, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Position in Other Organizations/Institutions : 1

- Director General, Department of Mineral Fuels, Ministry of Energy

Work Experiences (5-years Past Experiences)

16 Dec 2019 - 3 Jul 2020	Director, PTT Public Company Limited
9 Mar 2018 - 16 Dec 2019	Director and Member of the Enterprise Risk Management Committee, PTT Oil and Retail Business Public Company Limited
6 Apr 2019 - 8 Nov 2019	Deputy Permanent Secretary, Office of the Permanent Secretary Ministry of Energy
7 Dec 2016 - 5 Apr 2019	Deputy Director-General, Department of Mineral Fuels

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mrs. Pantip Sripimol

Director (Non-executive Director)
and Director to the Risk Management Committee
Age : 59 Years
Appointed : November 22nd, 2021

Education/Training

- Master of Public Administration, Chulalongkorn University
- Bachelor of Laws, Ramkhamhaeng University
- Bachelor of Business Administration, Ramkhamhaeng University
- Anti-Corruption Strategic Management for Senior Executives (Class 12), Office of the National Anti-Corruption Commission
- Tourism Management Program for Executives (Class 2), TAT Academy, Tourism Authority of Thailand (TAT)
- Capital Market Leader Program (Class 25), Capital Market Academy
- The Executive Program in Energy Literacy for a Sustainable Future, Class 8, Thailand Energy Academy (TEA)
- Leadership Development Program (LDP 3), Class 2, PTT Leadership and Learning Institute, PTT Public Company Limited
- Private Sector Course Class 26 Diploma, National Defence College
- The Program of Senior Executives on Justice Administration (Class 14), Judicial Training Institute

Director Training

- Director Certification Program (DCP) Class 73/2006, Audit Committee Program (ACP) Class 40/2012 and Role of the Nomination and Governance Committee Program (RNG) Class 5/2013, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 3

- Director and Director to the Risk Management Committee, PTT Global Chemical Public Company Limited
- Director and Member of the Risk Oversight Committee, The Siam Commercial Bank Public Company Limited
- Director, Don Muang Tollway Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Position in Other Organizations/Institutions : 2

- Director, The Rehabilitation Committee, Thai Airways International Public Company Limited
- Director-General, The State Enterprise Policy Office, Ministry of Finance

Work Experiences (5-years Past Experiences)

27 Apr 2021 - 15 Nov 2021	Independent Director, Esso (Thailand) Public Company Limited
2020 - 2021	Director and Chairman of Subcommittee, Bank for Agriculture and Agricultural Cooperatives
2019 - 2021	Deputy Permanent Secretary Ministry of Finance, Chief of Revenue Group
2019 - 2021	Director and Chairman of Audit Committee, Tourism Authority of Thailand (TAT)
20 Apr 2012 - 29 Oct 2019	Independent Director, Member of Audit, Environmental, Social and Governance Committee, Krungthai Card Public Company Limited
6 Oct 2014 - 1 Oct 2019	Director, Chairman of Risk Management Committee, and Member of Remuneration Committee, MCOT Public Company Limited
2015 - 2019	State Enterprise Development Advisor (State Enterprise Analysis, Advisory Level), The State Enterprise Policy Office, Ministry of Finance

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Noppadol Pinsupa

Director (Non-executive Director) **and Director to the Corporate Governance and Sustainability Committee**
Age : 57 Years
Appointed : October 1st, 2021

Education/Training

- Master of Engineering (Electrical Engineering), Chulalongkorn University
- Bachelor of Engineering (Electrical Engineering), Chulalongkorn University
- The Executive Program in Energy Literacy for a Sustainable Future, Class 14/2019, Thailand Energy Academy (TEA)
- Diploma, National Defence College, The National Defence Course, Class 60, National Defence College of Thailand (NDC)
- TIJ Executive Program on the Rule of Law and Development (RoLD Program), 2017, Thailand Institute of Justice (TIJ)
- Capital Market Leader Program (Class 22/2016), Capital Market Academy
- G-20Y Summit 2015, France
- Mitsui-Harvard Business School Global Management Academy (Japan – U.S.A., 2015), MITSUI & CO.
- Program for Senior Executive on Justice Administration Batch, Class 19/2014, Judicial Training Institute
- Leadership Development Program III (LDP III), PTT Leadership and Learning Institute (PLLI), PTT Public Company Limited
- Breakthrough Program for Senior Executives International Leading Business School (IMD), Lausanne, Switzerland
- Assessor Training Program, Thailand Quality Award (TQA)

Director Training

- Briefing on International Anti-Corruption International Cases and Practices (October 14, 2015), Director Certification Program (DCP) Class 146/2011 and Financial Statements for Directors (FSD) Class 12/2011, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 3

- Director and Member of the Nomination and Remuneration Committee, Global Power Synergy Public Company Limited
- Chief New Business and Infrastructure Officer, PTT Public Company Limited
- Director and Director to the Nomination and Remuneration Committee, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 1

- Director, Arun Plus Company Limited

Position in Other Organizations/Institutions : None

Work Experiences (5-years Past Experiences)

1 Nov 2021 - 22 Nov 2021	Director to the Nomination & Remuneration Committee, PTT Global Chemical Public Company Limited
4 Jan 2021 - 18 Oct 2021	Chairman, Global Renewable Power Company Limited
4 Dec 2020 - 18 Oct 2021	Director, Alpha Com Company Limited
7 Apr 2021 - 1 Oct 2021	Director, and Member of Corporate Governance Committee, PTT Oil and Retail Business Public Company Limited
1 Dec 2020 - 1 Oct 2021	Director, and Member of the Nomination and Remuneration Committee, IRPC Public Company Limited
1 Dec 2020 - 30 Sep 2021	Senior Executive Vice President, Innovation and Digital, PTT Public Company Limited
2 Dec 2020 - 31 Mar 2021	Chairman, PTT Digital Solutions Company Limited
Apr 2019 - Jan 2021	Chairman, IRPC Polyol Company Limited
3 Jul 2020 - 30 Nov 2020	Senior Executive Vice President, PTT Public Company Limited, working on a secondment as President and Chief Executive Officer, IRPC Public Company Limited
1 Feb 2019 - 3 Jul 2020	Senior Executive Vice President, PTT Public Company Limited, working on a secondment as President, IRPC Public Company Limited
Feb 2019 - Aug 2019	Chairman, PTT Energy Solutions Company Limited
1 Oct 2015 - 31 Jan 2019	Senior Executive Vice President, Gas Business Unit, PTT Public Company Limited
1 Oct 2015 - 31 Jan 2019	Director, and Member of the Risk Management Committee, Thai Oil Public Company Limited
Oct 2017 - Jan 2019	Chairman, PTT Global LNG Company Limited
2017	Chairman, PTT LNG Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Disathat Panyarachun

Director (Non-executive Director)
and Director to the Risk Management Committee
Age : 57 Years
Appointed : October 22nd, 2018,
April 5th, 2021 (1st re-elected)

Education/Training

- Master of Political Science (M.P.A.), National University, San Diego, U.S.A.
- B.A. in Ed. (Social Science), Silpakorn University
- Diploma, National Defence College, The National Defence Course, Class 63, National Defence College of Thailand (NDC)
- Capital Market Leader Program (Class 30), Capital Market Academy
- Making the CEO's of Thailand, MCOT (Class 2), MCOT Public Company Limited
- The Executive Program in Energy Literacy for a Sustainable Future, Class 14, Thailand Energy Academy (TEA)
- Leadership Development Program III (LDP III), PTT Leadership and Learning Institute (PLLI), PTT Public Company Limited
- Certification of Oil Futures Program, The Oxford Princeton, U.K.

Director Training

- Ethical Leadership Program (ELP) Class 19/2020 and Director Certification Program (DCP) Class 206/2015, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 3

- Director and Director to the Corporate Governance Committee, PTT Oil and Retail Business Public Company Limited
- Director and Director to the Risk Management Committee, PTT Global Chemical Public Company Limited
- Senior Executive Vice President, International Trading Business Unit, PTT Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 1

- Chairman, PTT International Trading Pte Ltd.

Position in Other Organizations/Institutions : None

Work Experiences (5-years Past Experiences)

24 Oct 2016 - 8 Oct 2021	Chairman, PTT International Trading London Ltd.
22 Oct 2018 - 22 Jun 2020	Director to the Corporate Governance Committee, PTT Global Chemical Public Company Limited
1 Nov 2011 - 19 Oct 2018	Chairman, PTT International Trading DMCC
1 Feb 2016 - 30 Sep 2018	Executive Vice President, International Trading, PTT Public Company Limited

Shareholding : Spouse 80 Shares (0.000002%) as of 31 December 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mom Luang Peekthong Thongyai

Director (Non-executive Director)
and Director to the Risk Management Committee
Age : 54 Years
Appointed : October 1st, 2021

Education/Training

- Master of Business Administration (Finance), Sasin Graduate Institute of Business Administration of Chulalongkorn University
- Bachelor of Science (Petroleum Engineering), The University of Texas at Austin

Director Training

- Director Certification Program (DCP) Class 15/2002, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 2

- Director and Director to the Risk Management Committee, PTT Global Chemical Public Company Limited
- Senior Executive Vice President, Downstream Business Group Alignment, PTT Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 2

- Director, GPC International Terminal Company Limited
- Director, PTT Tank Terminal Company Limited

Position in Other Organizations/Institutions : None

Work Experiences (5-years Past Experiences)

1 Oct 2019 - 30 Sep 2021	Director, Gulf MTP LNG Terminal Company Limited
1 Nov 2016 - 30 Sep 2021	Executive Vice President, PTT Public Company Limited, working on a secondment as Acting Managing Director, PTT Tank Terminal Company Limited
28 Jan 2016 - 26 Apr 2019	Director, PTT Energy Resources Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Kongkrapan Intarajang

Director (Executive Director)
and Secretary to the Board of Directors,
Director to the Risk Management Committee
and Chief Executive Officer and President
Age : 54 Years
Appointed : October 1st, 2019

Education/Training

- Doctor of Philosophy (Ph.D.) in Chemical Engineering, University of Houston, U.S.A.
- Bachelor of Engineering (Chemical Engineering) (Second-class Honors), Chulalongkorn University
- Executive Development Training Program, The Royal Thai Police
- Capital Market Leader Program (Class 30), Capital Market Academy
- Leadership Development Program (LDP 3), Class 4, PTT Leadership and Learning Institute (PLLI), PTT Public Company Limited
- The Executive Program in Energy Literacy for a Sustainable Future, Class 14, Thailand Energy Academy (TEA)
- Diploma, National Defence College, The National Defence Course, Class 60, National Defence College of Thailand (NDC)
- Breakthrough Program for Senior Executives, IMD Business School

Director Training

- Role of the Chairman Program (RCP) Class 21/2009 and Director Certification Program (DCP) Class 119/2009, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 4

- Chairman, Global Green Chemicals Public Company Limited
- Senior Executive Vice President reporting to Chief Operating Officer, Downstream Petroleum Business Group, PTT Public Company Limited
- Director and Secretary to the Board of Directors, Director to the Risk Management Committee and Chief Executive Officer & President, PTT Global Chemical Public Company Limited
- Director and Member of the Risk Management Committee, Global Power Synergy Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 5

- Chairman and Chairperson of Advisory Committee in relation to its investment in allnex, PTTGC International (Netherlands) B.V.
- Chairman, PTTGC International Private Limited
- Chairman, GC International Corporation
- Chairman, PTTGC America LLC
- Chairman, PTTGC America Corporation

Position in Other Organizations/Institutions : 10

- Director and Member of The Nomination Committee and Remunerating Committee, Thai Institute of Directors Association (IOD)
- Director, Association of Capital Market Academy Alumni
- Advisor of the Member Relations, The Federation of Thai Industries
- Director, The Federation of Thai Industries
- Vice President (Supporting), Thailand Swimming Association
- Member of Vidyasirimedhi Institute Council, Vidyasirimedhi Institute of Science and Technology (VISTEC)
- Member of Trustee, The Petroleum Institute of Thailand (PTIT)
- Council of Trustee, Thailand Business Council of Sustainable Development (TBCSD)
- Executive Director, Thailand Energy Academy
- Director, Kamnoetvidya Science Academy (KVIS)
- Co-Chairman, France – Thailand Business Forum

Work Experiences (5-years Past Experiences)

24 Aug 2020 - 25 Mar 2021	Committee Member, Sustainable Energy Foundation
6 Nov 2019 - 20 Oct 2020	Director, Global Green Chemicals Public Company Limited
Nov 2019 - Sep 2020	Director, Power of Innovation Foundation
Oct 2019 - Sep 2020	Director, Power of Learning Foundation
31 Oct 2019 - 31 Aug 2020	Director, GC International Corporation
9 Sep 2008 - 31 Aug 2020	Director, PTTGC International Private Limited
May 2017 - Jan 2020	Director, Thai Tank Terminal Limited
Apr 2017 - 30 Sep 2019	Chief Operating Officer – Upstream Petrochemical Business, PTT Global Chemical Public Company Limited
Jul 2015 - Sep 2019	Director and President & CEO, PTTGC America Corporation
Apr 2015 - Sep 2019	Director, PTTGC Innovation America Corporation
Feb 2015 - Sep 2019	Director, PTTGC International (Netherlands) B.V.
Jan 2015 - Sep 2019	Director, Vencorex Holding
Nov 2008 - Sep 2019	Director, Emery Oleochemicals (M) Sdn. Bhd.
Nov 2008 - Sep 2019	Director, Emery Specialty Chemicals Sdn. Bhd.
Sep 2014 - Dec 2018	Director, NatureWorks LLC
Sep 2014 - Dec 2018	Director/Vice President, GC International Corporation (Formerly, PTTGC International (USA) Inc.)
Oct 2014 - Mar 2017	Executive Vice President – International Business Operations, PTT Global Chemical Public Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

PROFILE OF GC EXECUTIVE PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED

Mr. Kongkrapan Intarajang

Chief Executive Officer and President
Age : 54 Years
Appointed : October 1st, 2019

Education/Training

- Doctor of Philosophy (Ph.D.) in Chemical Engineering, University of Houston, U.S.A.
- Bachelor of Engineering (Chemical Engineering) (Second-class Honors), Chulalongkorn University
- Executive Development Training Program, The Royal Thai Police
- Capital Market Leader Program (Class 30), Capital Market Academy
- Leadership Development Program (LDP 3), Class 4, PTT Leadership and Learning Institute (PLLI), PTT Public Company Limited
- The Executive Program in Energy Literacy for a Sustainable Future, Class 14, Thailand Energy Academy (TEA)
- Diploma, National Defence College, The National Defence Course, Class 60, National Defence College of Thailand (NDC)
- Breakthrough Program for Senior Executives, IMD Business School

Director Training

- Role of the Chairman Program (RCP) Class 21/2009 and Director Certification Program (DCP) Class 119/2009, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 4

- Chairman, Global Green Chemicals Public Company Limited
- Senior Executive Vice President reporting to Chief Operating Officer, Downstream Petroleum Business Group, PTT Public Company Limited
- Director and Secretary to the Board of Directors, Director to the Risk Management Committee and Chief Executive Officer & President, PTT Global Chemical Public Company Limited
- Director and Member of the Risk Management Committee, Global Power Synergy Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 5

- Chairman and Chairperson of Advisory Committee in relation to its investment in allnex, PTTGC International (Netherlands) B.V.
- Chairman, PTTGC International Private Limited
- Chairman, GC International Corporation
- Chairman, PTTGC America LLC
- Chairman, PTTGC America Corporation

Position in Other Organizations/Institutions : 10

- Director and Member of The Nomination Committee and Remunerating Committee, Thai Institute of Directors Association (IOD)
- Director, Association of Capital Market Academy Alumni
- Advisor of the Member Relations, The Federation of Thai Industries
- Director, The Federation of Thai Industries
- Vice President (Supporting), Thailand Swimming Association
- Member of Vidyasirimedhi Institute Council, Vidyasirimedhi Institute of Science and Technology (VISTEC)
- Member of Trustee, The Petroleum Institute of Thailand (PTIT)
- Council of Trustee, Thailand Business Council of Sustainable Development (TBCSD)
- Executive Director, Thailand Energy Academy
- Director, Kamnoetvidya Science Academy (KVIS)
- Co-Chairman, France – Thailand Business Forum

Work Experiences (5-years Past Experiences)

24 Aug 2020 - 25 Mar 2021	Committee Member, Sustainable Energy Foundation
6 Nov 2019 - 20 Oct 2020	Director, Global Green Chemicals Public Company Limited
Nov 2019 - Sep 2020	Director, Power of Innovation Foundation
Oct 2019 - Sep 2020	Director, Power of Learning Foundation
31 Oct 2019 - 31 Aug 2020	Director, GC International Corporation
9 Sep 2008 - 31 Aug 2020	Director, PTTGC International Private Limited
May 2017 - Jan 2020	Director, Thai Tank Terminal Limited
Apr 2017 - 30 Sep 2019	Chief Operating Officer – Upstream Petrochemical Business, PTT Global Chemical Public Company Limited
Jul 2015 - Sep 2019	Director and President & CEO, PTTGC America Corporation
Apr 2015 - Sep 2019	Director, PTTGC Innovation America Corporation
Feb 2015 - Sep 2019	Director, PTTGC International (Netherlands) B.V.
Jan 2015 - Sep 2019	Director, Vencorex Holding
Nov 2008 - Sep 2019	Director, Emery Oleochemicals (M) Sdn. Bhd.
Nov 2008 - Sep 2019	Director, Emery Specialty Chemicals Sdn. Bhd.
Sep 2014 - Dec 2018	Director, NatureWorks LLC
Sep 2014 - Dec 2018	Director/Vice President, GC International Corporation (Formerly, PTTGC International (USA) Inc.)
Oct 2014 - Mar 2017	Executive Vice President – International Business Operations, PTT Global Chemical Public Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Varit Namwong

Chief Operating Officer – Value Added Products and Acting Senior Vice President, Green Chemicals Business Unit

Age : 58

Appointed : February 1st, 2022

Education/Training

- Master of Business Administration (International Program), Ramkhamhaeng University
- Bachelor of Business Administration, Assumption Business Administration College
- Diploma, National Defence College, The National Defence Course Class 61 – 2018, National Defence College of Thailand (NDC)
- The Executive Program in Energy Literacy for a Sustainable Future, Class 10 – 2017, Thailand Energy Academy (TEA)
- Advanced Human Resource Executive Program 2014, The Stephen M. Ross School of Business, University of Michigan
- Leadership Development Program (LDP 3 - 2014), PTT Leadership and Learning Institute
- Senior Executive Program (SEP), Sasin Graduate Institute of Business Administration of Chulalongkorn University
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC)
  Role of the Chairman Program (RCP) Class 47/2021
  Director Certification Program (DCP) Class 160/2012 and Director Accreditation Program (DAP) Class 91/2011, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 2

- Chief Operating Officer - Value Added Products and Acting Senior Vice President, Green Chemicals Business Unit, PTT Global Chemical Public Company Limited
- Director, Director to Nomination and Remuneration Committee and Director to Risk Management Committee, Global Green Chemicals Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 4

- Chairman, GC Maintenance and Engineering Company Limited
- Chairman, NPC Safety and Environmental Service Company Limited
- Chairman, HMC Polymers Company Limited
- Director, GC Marketing Solutions Company Limited

Work Experiences (5-years past experiences)

1 Oct 2016 - 31 Jan 2022	Chief Operating Officer - Center of Excellence PTT Global Chemical Public Company Limited
20 Aug 2015 - 31 Jan 2022	Director, PTTGC America Corporation
20 Aug 2015 - 31 Jan 2022	Director, PTTGC America LLC
Dec 2015 - 30 Sep 2019	Director, PTT Energy Solutions Company Limited
Apr 2012 - Jan 2019	Director, Sport Services Alliance Limited

Shareholding : 108,939 Shares (0.002416%) As of 31 December, 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Toasaporn Boonyapipat

Chief Operating Officer – Base and Intermediate Chemicals

Age : 56

Appointed : February 1st, 2022

Education/Training

- Master of Business Administration, Burapha University
- Bachelor of Engineering (Mechanical) (Second-Class Honors), Chiang Mai University
- ASEAN Executive Program (AEP), General Electric, Crotonville, U.S.A
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC)
  Role of the Chairman Program (RCP) Class 47/2021 and Director Certification Program (DCP) Class 197/2014, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Chief Operating Officer - Base and Intermediate Chemicals, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 3

- Chairman, GC Estate Company Limited
- Director, GC Maintenance and Engineering Company Limited
- Director, Thai Tank Terminal Limited

Position in Other Organizations/Institutions : 1

- Association Vice President of Community Partnership Association (CPA) or Puenchumchon

Work Experiences (5-years past experiences)

1 Jan 2021 - 31 Jan 2022	Senior Executive Vice President - Upstream Petrochemical Business, PTT Global Chemical Public Company Limited
1 Jan 2021 - 1 Aug 2021	Director, Global Power Synergy Public Company Limited
2019 - 2020	Executive Vice President reporting to Chief Executive Officer, PTT Global Chemical Public Company Limited appointed as Secondment to PTTGC America LLC
2017 - 2020	Director, PTTGC America LLC
2016 - 2020	Director, Emery Specialty Chemicals Sdn. Bhd.
2016 - 2020	Director, Emery Oleochemicals (M) Sdn. Bhd.
2016 - 2020	President and CEO, PTTGC America LLC
2017 - 2020	Director, PTTGC International (Netherlands) B.V.
2014 - 2020	Director, Vencorex Holding
2018 - 2019	Director, GC Ventures Company Limited
2017 - 2019	Director and Chief Executive Office, PTTGC International Private Limited
2017 - 2019	Executive Vice President – International Business Operations, PTT Global Chemical Public Company Limited appointed as Secondment to PTTGC America LLC
2014 - 2017	Senior Vice President reporting to Executive Vice President - International Business Operations, PTT Global Chemical Public Company Limited appointed as Secondment to PTTGC America LLC

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Wiboon Chuchepchunkamon

Chief Operating Officer – Center of Excellence
Age : 59
Appointed : February 1st, 2022

Education/Training

- Master of Management, Sasin Graduate Institute of Business Administration of Chulalongkorn University
- Master of Science (Petroleum and Petrochemical), Petroleum and Petrochemical College, Chulalongkorn University
- Bachelor of Engineering (Electrical Engineering), Chulalongkorn University
- The Executive Program in Energy Literacy for a Sustainable Future, Class 13, 2019, Thailand Energy Academy (TEA)
- Stanford - NUS Executive Program in International Management, The Republic of Singapore
- Harvard - Leadership Development, Shanghai, The People's Republic of China
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC) Role of the Chairman Program (RCP) Class 47/2019 and Director Certification Program (DCP) Class 219/2016, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 2

- Chief Operating Officer - Center of Excellence, PTT Global Chemical Public Company Limited
- Director, Vice Chairman of the Board of Directors and Member of the Nomination and Remuneration Committee, Vinythai Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 10

- Chairman, PTT Phenol Company Limited
- Chairman, Solution Creation Company Limited
- Chairman, GC Glycol Company Limited
- Chairman, GC Oxirane Company Limited
- Chairman, Revolve Group Limited
- Director, GC-M PTA Company Limited
- Director, GC Marketing Solutions Company Limited
- Director, HMC Polymers Company Limited
- Director, Kuraray GC Advanced Materials Company Limited
- Director, Thai PET Resin Company Limited

Work Experiences (5-years past experiences)

1 Oct 2020 - 31 Jan 2022	Senior Executive Vice President - Downstream Petrochemical Business and Acting Senior Vice President - Green Chemicals Business Unit, PTT Global Chemical Public Company Limited
1 Oct 2019 - 30 Sep 2020	Acting Senior Executive Vice President - Downstream Petrochemical Business, PTT Global Chemical Public Company Limited
May 2019 - Nov 2019	Chairman, GC Styrenics Company Limited
Jan 2018 - Oct 2019	Chairman, GC Logistics Solutions Company Limited
Jan 2018 - Oct 2019	Chairman, PL Global Transport Company Limited
Jan 2018 - Sep 2019	Senior Vice President - Polymers Business Unit, PTT Global Chemical Public Company Limited
Jan 2018 - May 2019	Director, GC Styrenics Company Limited
Jul 2017 - Dec 2017	Senior Vice President - Down stream Petrochemical Business, PTT Global Chemical Public Company Limited
Jan 2016 - Jul 2017	Director and Managing Director, GC Glycol Company Limited
Jan 2016 - Jun 2017	Senior Vice President - EO-Based Performance Business Unit, PTT Global Chemical Public Company Limited

Shareholding : Spouse 198 Shares (0.000004%)
As of 31 December, 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Narongsak Jivakanun

Chief Operating Officer – International Business

Age : 53

Appointed : February 1st, 2022

Education/Training

- Master of Science (Chemical Engineering), Oregon State University, Oregon, U.S.A.
- Bachelor of Engineering (Chemical Engineering), Chulalongkorn University
- IMD - TLCA Leadership Development Program (LDP) Class 1, 2013 organized by Thai Listed Companies Association (TLCA) and IMD Business School, Switzerland)
- The Executive Program in Energy Literacy for a Sustainable Future, Class 8, Thailand Energy Academy (TEA)
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC)
  Director Certification Program (DCP) Class 165/2012, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Chief Operating Officer - International Business, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 11

- Chairman, GC Ventures Company Limited
- Chairman, GC Ventures America Corporation
- Chairman, Vencorex Holding
- Chairman, PTTGC Innovation America Corporation
- Director and President, PTTGC International (Netherlands) B.V.
- Director, NatureWorks LLC
- Director and Managing Director, PTTGC International Private Limited
- Director and Managing Director, PTTGC America Corporation
- Director and President & CEO, PTTGC America LLC
- Director and Managing Director, GC International Corporation
- Director, Chairman of Risk and Audit Committee and Chairman of Executive Committee, Emery Oleochemicals UK Limited

Work Experiences (5-years past experiences)

1 Oct 2019 - 1 Jan 2022	Executive Vice President - International Business Operations, PTT Global Chemical Public Company Limited
1 Oct 2019 - 1 Nov 2021	Director and Executive Committee, Emery Oleochemicals (M) Sdn. Bhd.
1 Oct 2019 - 1 Nov 2021	Director and Executive Committee, Emery Specialty Chemicals Sdn. Bhd.
21 Sep 2017 - 21 Nov 2019	Director, Vice Chairman and Director to the Nomination and Remuneration Committee, Vinythai Public Company Limited
23 Jan 2018 - 14 Oct 2019	Chairman, GC Estate Company Limited
2 Jun 2017 - 9 Nov 2019	Director, GC Polyols Company Limited
18 Feb 2016 - 14 Oct 2019	Director and Director to the Risk Management Committee, Global Green Chemicals Public Company Limited
11 Apr 2016 - 30 Sep 2019	Director, PTT Phenol Company Limited
1 Jan 2017 - 30 Sep 2019	Executive Vice President - Corporate Strategy, PTT Global Chemical Public Company Limited
3 Sep 2017 - 31 Jan 2018	Chairman, PTT MCC Biochem Company Limited
25 Nov 2016 - 26 Jul 2017	Director, PTT Digital Solutions Company Limited
13 Jan 2011 - 14 Jul 2017	Director, Myriant Corporation
1 Feb 2016 - 28 Feb 2017	Director, PTTGC International Private Limited
1 Feb 2016 - 28 Feb 2017	Director, PTT Chemical International (Asia Pacific ROH) Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Miss Pattaralada Sa-Ngasang

Executive Vice President - Finance and Accounting

Age : 56

Appointed : January 1st, 2021

Education/Training

- Master of Business Administration, Thammasat University
- Mini Master of Business Administration, National Institute of Development Administration
- Bachelor of Accounting, Thammasat University
- Diploma, National Defence College, The National Defence Course Class 61, National Defence College of Thailand (NDC)
- Capital Market Leader Program (Class 22), Capital Market Academy
- PTT - HBS Leadership Development Program, Class 2, Harvard Business School, U.S.A.
- IMD - TLCA Leadership Development Program (LDP) Class 1, organized by Thai Listed Companies Association (TLCA) and IMD Business School, Switzerland
- Treasury Management Program, Class 2, Fiscal Policy Research Institute Foundation, Ministry of Finance
- Executive Development Program (EDP) Class 5, Thai Listed Companies Association (TLCA)
- Global Leadership Business, Class 2, Cornell University, U.S.A
- Leadership Succession Program, Class 11, Institute of Research and Development for Public Enterprises (IRDP)
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC) Strategic Board Master Class (SBM) Class 1/2017
  Role of the Chairman Program (RCP) Class 38/2016 and Director Certification Program (DCP) Class 151/2011, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 2

- Executive Vice President reporting to Chief Financial Officer, PTT Public Company Limited
- Executive Vice President – Finance and Accounting, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 9

- Chairman, GC Treasury Center Company Limited
- Director, GC Polyols Company Limited
- Director, GC Oxirane Company Limited
- Director, PTTGC International Private Limited
- Director, PTTGC America Corporation
- Director, PTTGC America LLC
- Director, GC International Corporation
- Director, Vencorex Holding
- Director, Emery Oleochemicals UK Limited

Work Experiences (5-years past experiences)

1 Jan 2021 - 31 Jan 2022	Director, PTTGC Innovation America Corporation
15 Jan - 1 Nov 2022	Director, Emery Oleochemicals (M) Sdn. Bhd.
15 Jan - 1 Nov 2022	Director, Emery Specialty Chemicals Sdn. Bhd.
Oct 2015 - Dec 2020	Executive Vice President – Finance and Accounting, Thai Oil Public Company Limited
May 2017 - Dec 2020	Chairperson, Thaioil Treasury Center Company Limited
Jan 2010 - Dec 2020	Director, Ubon Bio Ethanol Public Company Limited
Apr 2016 - Dec 2020	Director, Thaioil Ethanol Company Limited
Mar 2017 - Dec 2020	Director, Thaioil Energy Services Company Limited
Dec 2015 - Dec 2020	Director, Sapthip Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mrs. Warawan Tippawanich

Executive Vice President - Corporate Strategy

Age : 58

Appointed : October 1st, 2019

Education/Training

- Master of Business Administration, Chulalongkorn University
- Bachelor of Science (Chemical Engineering), Chulalongkorn University
- Leadership Development Program (LDP 2) and (LDP 3), PTT Leadership and Learning Institute
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC) Board Matters and Trends (BMT) Class 2/2017
  Company Secretary Program (CSP) Class 57/2014
  Board Reporting Program (BRP) Class 15/2014
  Company Reporting Program (CRP) Class 10/2014
  Director Certification Program (DCP) Class 190/2014, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 2

- Executive Vice President – Corporate Strategy, PTT Global Chemical Public Company Limited
- Director, Vinythai Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 7

- Director, Solution Creation Company Limited
- Director, GC Polyols Company Limited
- Director, GC Ventures Company Limited
- Director, GC Ventures America Corporation
- Director, PTTGC America Corporation
- Director, PTTGC America LLC
- Director, PTTGC International Private Limited

Work Experiences (5-years past experiences)

1 Sep 2019 - 31 Jan 2022	Director, GC International Corporation
24 Dec 2019 - Nov 2020	Director, GC-M PTA Company Limited
24 Dec 2019 - Nov 2020	Director, Thai PET Resin Company Limited
Sep 2017 - 14 Sep 2019	Director, Sarn Palung Social Enterprise Company Limited
Jan 2015 - 11 Nov 2019	Director, GC Glycol Company Limited
1 Jan 2015 - 30 Sep 2019	Senior Vice President - Corporate Affairs and Corporate Secretary, PTT Global Chemical Public Company Limited

Shareholding : Spouse 25,000 Shares (0.000554%), As of 31 December, 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Saroj Putthammawong

Executive Vice President - Marketing, Commercial and Supply Chain

Age : 53

Appointed : October 1st, 2019

Education/Training

- Master of Business Administration, Thammasat University
- Bachelor of Engineering (Chemical Engineering), Chulalongkorn University
- The Executive Program in Energy Literacy for a Sustainable Future, Class 11/2018, Thailand Energy Academy (TEA)
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC)
  Director Certification Program (DCP) Class 220/2016, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Executive Vice President - Marketing, Commercial and Supply Chain, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 6

- Director, PTT Phenol Company Limited
- Director, GC Treasury Center Company Limited
- Director, GC Oxirane Company Limited
- Director, GC Glycol Company Limited
- Director, GC Marketing Solutions Company Limited
- Director and Executive Committee Member, HMC Polymers Company Limited

Position in Other Organizations/Institutions : 1

- Committee Member of Industry Standards (ISC), The Federation of Thai Industries

Work Experiences (5-years past experiences)

27 Jun 2018 - 2020	Committee Member of Industrial Excellence Center (IEC), The Federation of Thai Industries
Oct 2015 - Sep 2019	Senior Vice President - Marketing, Commercial and Supply, PTT Global Chemical Public Company Limited
2017 - 2019	Director, GC Logistics Solutions Company Limited
18 Nov 2015 - 8 Apr 2018	Director, Solution Creation Company Limited
21 Dec 2015 - 2 Mar 2018	Director, Thai Tank Terminal Limited

Shareholding : 4,900 Shares (0.000109%) As of 31 December, 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Pirun Krimwongrut

Executive Vice President – Organizational Effectiveness

Age : 53

Appointed : October 1st, 2020

Education/Training

- Master of Engineering Science (Electrical Engineering), University of New South Wales, Australia
- Bachelor of Engineering (Electrical Engineering), (Second-Class Honors), Khon Kaen University
- Leadership Development Program (LDP 1), PTT Leadership and Learning Institute
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC) Director Certification Program (DCP) Class 257/2018, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Executive Vice President - Organizational Effectiveness, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 4

- Director, GC Estate Company Limited
- Director, PTT Digital Solutions Company Limited
- Director, Sport Services Alliance Company Limited
- Director, PTT Asahi Chemical Company Limited

Work Experiences (5-years past experiences)

1 Oct 2019 - 30 Sep 2020	Acting Executive Vice President - Organizational Effectiveness, PTT Global Chemical Public Company Limited
Nov 2019 - Nov 2020	Director, GC Styrenics Company Limited
Mar 2018 - Dec 2019	Director, Thai Tank Terminal Limited
Mar 2018 - Oct 2019	Director, Eastern Fluid Transport Company Limited
Apr 2018 - Sep 2019	Senior Vice President - Group Performance Center - Utilities, PTT Global Chemical Public Company Limited
Sep 2017 - Mar 2018	Acting Senior Vice President- Group Performance Center - Utilities, PTT Global Chemical Public Company Limited
2015 - 2017	Vice President - GPC Strategy & Business Development, Upstream Petrochemical Business, PTT Global Chemical Public Company Limited

Shareholding : 27,033 Shares (0.0006%) As of 31 December, 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Pornsak Mongkoltrirat

Executive Vice President – Polymers Business Unit

Age : 55

Appointed : April 1st, 2020

Education/Training

- Master of Business Administration (Management), Kasetsart University
- Bachelor of Engineering (Mechanical Engineering), Kasetsart University
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC) Role of the Chairman Program (RCP) Class 48/2021
  Director Certification Program (DCP) Class 263/2017, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Executive Vice President - Polymers Business Unit, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 11

- Chairman, GC Styrenics Company Limited
- Chairman, GC Logistics Solutions Company Limited
- Chairman, ENVICCO Limited
- Chairman, PL Global Transport Company Limited
- Director, Solution Creation Company Limited
- Director, GC Marketing Solutions Company Limited
- Director, GC Maintenance and Engineering Company Limited
- Director, Dynachisso Thai Co. Ltd
- Director, Revolve Group Limited
- Executive Committee Member, HMC Polymers Company Limited
- Executive Committee Member, PTT Asahi Chemical Company Limited

Work Experiences (5-years past experiences)

1 Oct 2019 - 30 Mar 2020	Acting Executive Vice President - Polymers Business Unit, PTT Global Chemical Public Company Limited
27 Dec 2018 - 12 Nov 2019	Director, GC-M PTA Company Limited
27 Dec 2018 - 12 Nov 2019	Director, Thai PET Resin Company Limited
16 Jul 2017 - 1 Oct 2019	Director and Managing Director, GC Glycol Company Limited
1 Jan 2017 - Sep 2019	Senior Vice President EO-Based Performance Business Unit, PTT Global Chemical Public Company Limited
Jul 2017 - Dec 2017	Acting Senior Vice President EO-Based Performance Business Unit, PTT Global Chemical Public Company Limited
Nov 2014 - Jun 2017	Acting Vice President - Strategy and Business Development, Polymers Business Unit, PTT Global Chemical Public Company Limited
Feb 2013 - Jun 2017	Vice President - LDPE Plant 1, Polymers Business Unit, PTT Global Chemical Public Company Limited

Shareholding : 9,558 Shares ; Spouse 12,958 Shares (0.000499%) As of 31 December, 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Pukpong Wungrattanasopon

Executive Vice President - Olefins

Age : 51

Appointed : April 1st, 2020

Education/Training

- Master of Science (Petrochemical Technology), The Petroleum and Petrochemical College, Chulalongkorn University
- Bachelor of Science (Chemical Technology), Chulalongkorn University
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC) Director Certification Program (DCP) Class 236/2017, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Executive Vice President - Olefins, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 4

- Director, HMC Polymers Company Limited
- Director, PTT Phenol Company Limited
- Director and Executive Committee Member, Thai Tank Terminal Limited
- Director, GC Glycol Company Limited

Work Experiences (5-years past experiences)

1 Oct 2019 - 30 Mar 2020	Acting Executive Vice President – Group Performance Center – Olefins, PTT Global Chemical Public Company Limited
1 Aug 2016 - 30 Sep 2019	Senior Vice President - Group Performance Center, Aromatics, PTT Global Chemical Public Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Chaya Chandavasu

Executive Vice President - Sustainability

Age : 48

Appointed : February 1st, 2022

Education/Training

- Doctor of Chemical Engineering, New Jersey Institute of Technology, U.S.A
- Master of Chemical Engineering, New Jersey Institute of Technology, U.S.A.
- Bachelor of Science (Chemistry), (First-class Honors), Mahidol University
- Advanced Senior Executive Program, Sasin & Kellogg School of Management, 2008
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC) Director Certification Program (DCP) Class 152/2011, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Executive Vice President - Sustainability, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 4

- Director, GC Ventures Company Limited
- Director, GC Ventures America Corporation
- Director, Sarn Palung Social Enterprise Company Limited
- Director, Emery Oleochemicals UK Limited

Work Experiences (5-years past experiences)

1 Oct 2019 - 31 Jan 2022	Senior Vice President - Sustainability and Corporate Branding, PTT Global Chemical Public Company Limited
22 Oct 2020 - 1 Nov 2021	Director, Emery Oleochemicals (M) Sdn. Bhd.
22 Oct 2020 - 1 Nov 2021	Director, Emery Specialty Chemicals Sdn. Bhd.
23 May 2018 - 30 Oct 2019	Managing Director, GC Ventures Company Limited
2016 - 2019	Director, PTTGC Innovation America Corporation
27 Jan 2016 - 30 Sep 2019	Director, Solution Creation Company Limited
1 Nov 2015 - 30 Sep 2019	Senior Vice President - Science and Innovation, PTT Global Chemical Public Company Limited
2013 - 2019	Chairman, Auria BioChemicals Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : Spouse : Mrs. Rattiya Chandavasu, Senior Vice President - Specialty Business

Mrs. Jeeranee Pimthanothai

Senior Vice President – Technical, Engineering and Maintenance

Age : 57

Appointed : September 1st, 2015

Education/Training

- Master of Engineering (Petrochemical Technology), Chulalongkorn University
- Bachelor of Science (Chemical Technology), Chulalongkorn University
- Leadership Innovation & Strategy, GE Crotonville, U.S.A.
- Leadership Development Program (LDP 1), PTT Leadership and Learning Institute
- NIDA-Wharton Executive Leadership Program, U.S.A.
- The Columbia Senior Executive Program, U.S.A.
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC) Director Certification Program (DCP) Class 249/2017, and Certificate of Corporate Governance: The Role of Manager in Supporting Directors, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President - Technical, Engineering and Maintenance, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 2

- Director, GC Maintenance and Engineering Company Limited
- Director, PTT Energy Solutions Company Limited

Work Experiences (5-years past experiences)

2017 - 2019 Director, PTT Asahi Chemical Company Limited

Shareholding : 15,543 Shares (0.000345%) As of 31 December, 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Amorn Putiphrawan

Senior Vice President – Internal Audit

Age : 58

Appointed : January 1st, 2018

Education/Training

- Master of Engineering (Chemical Engineering), Chulalongkorn University
- Bachelor of Science (Fuel Technology), Chulalongkorn University
- Leadership Development Program (LDP 1) and (LDP 2), PTT Leadership and Learning Institute
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC), Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President - Internal Audit, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Work Experiences (5-years past experiences)

1 Oct 2017 - 31 Dec 2017 Vice President reporting to Chief Executive Officer and President, PTT Global Chemical Public Company Limited

16 Jun 2014 - 30 Sep 2017 Vice President - Corporate Risk Management and Internal Control System, PTT Global Chemical Public Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mrs. Pilasphan Udomjarumanee

Senior Vice President – Corporate Secretary and Legal and Company Secretary

Age : 56

Appointed : October 1st, 2019

Education/Training

- Master Degree of Business Administration (Finance), Royal Melbourne Institute of Technology, Melbourne, Australia
- Post Graduate Diploma Degree in Business Administration, Victoria University, Melbourne, Australia
- Bachelor of Arts (English), Silpakorn University
- Leadership Development Program (LDP) 2 PLLI, INSEAD
- Supply Chain and Supply Sourcing, McKinsey
- Strategy Management Program - 2018, Fiscal Policy Research Institute Foundation, Ministry of Finance
- M&A Training for Senior Leadership - 2018, Institute for Merger, Acquisition & Alliance
- Leadership Development Program (LDP) 2 - 2015, Sasin Graduate Institute of Business Administration of Chulalongkorn University
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC) Company Secretary Refreshment Training Program (RFP) Class 4/2021 Board Reporting Program (BRP) Class 35/2020 Company Reporting Program (CRP) Class 26/2020 Company Secretary Program (CSP) Class 107/2020 Corporate Governance for Executives (CGE) Class 16/2020 Director Certification Program (DCP) Class 287/2019, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President – Corporate Secretary and Legal and Company Secretary, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Position in Other Organizations/Institutions : 1

- Committee Member of Thai Company Secretary Club, Thai Listed Companies Association

Work Experiences (5-years past experiences)

1 Sep 2016 - 30 Sep 2019 Vice President - Strategy and Planning Department, PTT Global Chemical Public Company Limited

1 Sep 2014 - 31 Aug 2016 Vice President - Portfolio and Subsidiary Department, PTT Global Chemical Public Company Limited

Shareholding : 18,400 Shares (0.000408%) As of 31 December 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Ratchada Sawasdirak

Senior Vice President – Refinery

Age : 53

Appointed : October 1st, 2019

Education/Training

- Master of Public Administration, Chulalongkorn University
- Bachelor of Engineering (Mechanical Engineering), Mahanakorn University of Technology
- Ethical Leadership 2020 : Ethical Challenges in New Normal, PTT Global Chemical Public Company Limited
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC) Director Certification Program (DCP) Class 287/2019, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President - Refinery, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 1

- Director, Thai Tank Terminal Limited

Work Experiences (5-years past experiences)

2008 - Sep 2019 Vice President - Refinery, PTT Global Chemical Public Company Limited

Shareholding : 21,500 Shares (0.000477%) As of 31 December, 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Anutin Chuaypen

Senior Vice President - Aromatics

Age : 56

Appointed : October 1st, 2019

Education/Training

- Master of Science (Computer & Engineering Management), Assumption University
- Bachelor of Science (Chemical Engineering), Chulalongkorn University
- Leadership Development Program (LDP 2), PTT Leadership and Learning Institute
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC), Director Certification Program (DCP) Class 200/2015, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President - Aromatics, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 2

- Director, GC Styrenics Company Limited
- Director, NPC Safety and Environmental Service Company Limited

Work Experiences (5-years past experiences)

27 Apr 2015 - 1 Jan 2020 Director, Thai Tank Terminal Limited

10 Jul 2014 - 30 Oct 2019 Director, GC Maintenance and Engineering Company Limited

1 Jan 2014 - 30 Sep 2019 Senior Vice President - Group Performance Center, Refinery and Shared Facilities, PTT Global Chemical Public Company Limited

16 Nov 2015 - 15 Mar 2018 Director, Eastern Fluid Transport Company Limited

Shareholding : 36,591 Shares (0.000812%)
As of 31 December, 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Supasit Tongsupachok

Senior Vice President - Utilities

Age : 59

Appointed : October 1st, 2019

Education/Training

- Master of Business Administration, Burapha University
- Bachelor of Engineering (Electronic Engineering), Rajmongkol Institute of Technology
- Executive Development Program, Class 11/2015, Fiscal Policy Research Institute Foundation
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC)
  Director Certification Program (DCP) Class 287/2019, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President - Utilities, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 6

- Director, GC Estate Company Limited
- Director, Thai Tank Terminal Limited
- Director, Eastern Fluid Transport Company Limited
- Director, GC Logistics Solutions Company Limited
- Director, PL Global Transport Company Limited
- Director, ISA Machining Service Company Limited

Work Experiences (5-years past experiences)

23 Nov 2011 - 30 Sep 2019 Vice President – Aromatics Plant 1, PTT Global Chemical Public Company Limited

Shareholding : 28,620 Shares (0.000635%)
As of 31 December, 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Vitaya Pinmuangngarm

Senior Vice President - EO-Based Performance Business Unit

Age : 59

Appointed : January 1st, 2021

Education/Training

- Master of Business Administration (M.B.A.) (Finance and International Business), Sasin Graduate Institution of Business Administration of Chulalongkorn University
- Bachelor of Accounting, Thammasat University
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC)
  Director Certification Program (DCP) Class 109/2008 Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President - EO-Based Performance Business Unit,
  PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 3

- Director, GC Styrenics Company Limited
- Director, GC Oxirane Company Limited
- Director and Managing Director, GC Glycol Company Limited

Work Experiences (5-years past experiences)

Jan 2018 - Dec 2020	Director and President, PTT Asahi Chemical Company Limited
Sep 2016 - Dec 2017	Director and Managing Director, Thai Tank Terminal Limited

Shareholding : 8,755 Shares; Spouse 10,000 Shares (0.000416%) As of December 31, 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Paisarn Sarapee

Senior Vice President - Phenol Business Unit

Age : 58

Appointed : October 1st, 2019

Education/Training

- Master of Business Administration, Graduate School of Commerce, Burapha University
- Bachelor of Science (Industrial Chemistry), Chiang Mai University
- Head of Company Program, INSEAD University
- Senior Executive Program (SEP) 2005, Sasin Graduate Institute of Business Administration of Chulalongkorn University
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC)
  Financial Statements for Directors (FSD) Class 41/2020 and Director Certification Program (DCP) Class 286/2019, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President – Phenol Business Unit,
  PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 1

- Director and Managing Director,
  PTT Phenol Company Limited

Work Experiences (5-years past experiences)

Jan 2015 - Sep 2019	Vice President - Phenol Operation Department, PTT Phenol Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mrs. Chananchida Wiboonkanarak

Senior Vice President, Downstream Strategy and Business Development

Age : 48

Appointed : April 1st, 2018

Education/Training

- Master of Engineering (Chemical Engineering), Chulalongkorn University
- Bachelor of Science (Chemical Engineering), Chulalongkorn University
- Leadership Development Program 2, 2015, Sasin Graduate Institute of Business Administration of Chulalongkorn University
- Leadership Development Program (LDP 2), General Electric, GE, U.S.A.
- PTT-HBS Leadership Development Program (LDP 1), Harvard Business School Campus, Shanghai, The People's Republic of China
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC)
  Director Certification Program (DCP) Class 267/2018, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President - Downstream Strategy and Business Development, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 11

- Director and Chairperson of Executive Committee, PTT MCC Biochem Company Limited
- Director, PTT Phenol Company Limited
- Director, GC Glycol Company Limited
- Director, Solution Creation Company Limited
- Director, Kuraray GC Advanced Materials Company Limited
- Director, PTT Asahi Chemical Company Limited
- Director, PTTGC International (Netherlands) B.V.
- Director, NatureWorks LLC
- Director, Vencorex Holding
- Director, Emery Oleochemicals UK Limited
- Executive Committee Member, HMC Polymers Company Limited

Work Experiences (5-years past experiences)

27 Dec 2018 - 22 Dec 2019	Director, GC-M PTA Company Limited
27 Dec 2018 - 22 Dec 2019	Director, Thai PET Resin Company Limited
26 Feb 2016 - 5 Nov 2018	Director, Thai Fatty Alcohols Company Limited
1 Oct 2017 - 31 Mar 2018	Acting Senior Vice President-Downstream Strategy and Business Development, PTT Global Chemical Public Company Limited
1 Apr 2014 - 30 Sep 2017	Vice President - Strategy and Business Development, High-Volume Specialties Business Unit, PTT Global Chemical Public Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Khomson Piyawattanaviroj

Senior Vice President - CAPEX Excellence

Age : 59

Appointed : January 1st, 2018

Education/Training

- Bachelor of Engineering (Mechanical Engineering), Chulalongkorn University
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC)
  Director Certification Program (DCP) Class 259/2018, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President - CAPEX Excellence, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 3

- Director, NPC Safety and Environmental Service Company Limited
- Director, GC-M PTA Company Limited
- Director, Thai PET Resin Company Limited

Work Experiences (5-years past experiences)

Jan - Dec 2017	Vice President - Center of Excellence, PTT Global Chemical Public Company Limited
Jul 2013 - Dec 2016	Project Director, PTT Phenol Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mrs. Chatsuda Kanjanarat

Senior Vice President – Transformation Excellence

Age : 53

Appointed : July 1st, 2017

Education/Training

- Bachelor of Engineering (Electrical-Electronics) (Second-class Honors), King Mongkut's Institute of Technology Ladkrabang
- PTT-HBS Leadership Development Program (LDP 1) PTT Leadership and Learning Institute
- Leading Digital Business Transformation (LDBT) 2017, Institute for Management Development (IMD)
- Executive Education Certificate Program in Cybersecurity (Executive CISO) Class 1, National Cyber Security Agency (NCSA)
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC) Director Certification Program (DCP) Class 249/2017, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President - Transformation Excellence PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 1

- Director, PTT Digital Solutions Company Limited

Work Experiences (5-years past experiences)

13 Jun 2016 - 30 Jun 2017	Vice President - PTTGC Business Performance Improvement - Project MAX, PTT Global Chemical Public Company Limited
1 Jan 2014 - 12 Jun 2016	Vice President - Strategy and Planning, PTT Global Chemical Public Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Paranai Waitayasewee

Senior Vice President – Procurement

Age : 58

Appointed : February 16th, 2021

Education/Training

- Master of Public Administration (Political Science), Thammasat University
- Bachelor of Engineering (Industrial Engineering), King Mongkut's University of Technology Thonburi
- Extraordinary Leader 2016 (Inhouse training by GC)
- Leadership Development Strategy Engagement Centric Engagement Creating an innovation, Leadership Engagement & Change Engagement, Thammasat Business Consulting Center
- Leadership Development Program (LDP 2 - 2015), PTT Leadership and Learning Institute
- Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC) Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President - Procurement, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 1

- Director, GC Estate Company Limited

Work Experiences (5-years past experiences)

1 - 15 Feb 2021	Vice President - Procurement, PTT Global Chemical Public Company Limited
Jun 2019 - Jan 2021	Vice President – Marketing, Commercial and Supply, PTT Phenol Company Limited
Feb 2013 - May 2019	Vice President – Marketing, Commercial and Supply – EO-Based, PTT Global Chemical Public Company Limited

Shareholding : 88,966 Shares (0.001973%), As of 31 December, 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Sakesiri Piyavej

Senior Vice President - Quality, Safety, Occupational Health and Environment

Age : 55

Appointed : January 1st, 2022

Education/Training

- Master of Public Administration (Honor Class), The National Institute of Development Administration (NIDA)
- Bachelor of Engineering (Electrical Engineering), Chulalongkorn University
- Bachelor of Safety Science, Rajabhat Rajanagarindra University

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President - Quality, Safety, Occupational Health and Environment, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Work Experiences (5-years past experiences)

Oct 2018 - Dec 2021 Vice President – Technical Safety and PSM, PTT Global Chemical Public Company Limited

Jan 2016 - Sep 2018 Vice President – Technical and Enhance SHE, PTT Global Chemical Public Company Limited

Shareholding : 10,000 Shares; Spouse 1,000 Shares (0.000244%) As of 31 December, 2021

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mr. Kamel Ramdani

Senior Vice President - Science and Innovation and Acting Senior Vice President of Long Term Innovation and Corporate Venture Capital

Age : 50

Appointed : December 1st, 2021

Education/Training

- Doctor of Philosophy (Ph.D.) in Chemical Engineering, French Institute of Petroleum & French National Research Center, Lyon, France
- Master of Business Administration (Wharton School Philadelphia), U.S.A.
- Master of Science (Chemistry and Catalysis), University Pierre & Marie Curie, Paris VI, France
- Bachelor of Engineering (Chemical Engineering), University Claude Bernard, Lyon, France

Board member/Management in Listed Company - The Stock Exchange of Thailand : 1

- Senior Vice President – Science and Innovation and Acting Senior Vice President of Long Term Innovation and Corporate Venture Capital, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company - The Stock Exchange of Thailand : 3

- Director, GC Ventures Company Limited
- Director, GC Ventures America Corporation
- Director, Vencorex Holding

Work Experiences (5-years Past Experiences)

2013 - 2021 Senior Vice President, Research & Innovation – Global Technology VP Solvay Group, Global Business Unit Novecare, Princeton, New Jersey, U.S.A.

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

Mrs. Rattiya Chandavasu

Senior Vice President - Specialty Business and Acting Senior Vice President - Merger and Acquisition

Age : 44

Appointed : February 1st, 2022

Education/Training

- Master of Science (Petrochemical Technology), The Petroleum and Petrochemical College, Chulalongkorn University
- Bachelor of Science (Chemical Technology), Chulalongkorn University
- Leadership Development Program (LDP 2) 2019, PTT Leadership and Learning Institute
- Leadership Management Program, 2015, PacRim Group
- Management Development Program, 2013, Chulalongkorn University
- Effective Communications and Human Relation, Dale Carnegie
- Beyond Deal Making, Melanie Billing, Yun
- Project Management, Kepner Tregoe
- Performance Management and Coaching Skills, Achieve Global
- Integrated Marketing Communication (IMC)
- Professional Negotiation Skills, Achieve Global
- Management Interpersonal Relationship, Achieve Global
- Problem Solving and Decision Making, Kepner Tregoe

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President - Specialty Business and Acting Senior Vice President – Merger and Acquisition, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : 1

- Managing Director, GC Ventures Company Limited

Work Experiences (5-years past experiences)

1 Oct 2017 - 31 Jan 2022	Vice President, International Strategy and Business Development, PTT Global Chemical Public Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : Spouse : Mr. Chaya Chandavasu Executive Vice President – Sustainability

Mr. Panod Awaiwanond

Senior Vice President - US Second Home

Age : 53

Appointed : February 1st, 2022

Education/Training

- Master of Business Administration (Finance), University of Akron, Ohio, U.S.A.
- Bachelor of Arts (Economic), Southern Illinois University at Carbondale, Illinois, U.S.A.

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Senior Vice President - US Second Home, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Work Experiences (5-years past experiences)

1 Dec 2019 - 30 Sep 2021	Vice President Reporting to Senior Vice President - International Business Operations, PTT Global Chemical Public Company Limited
1 Jun 2017 - 30 Nov 2019	Vice President, US Business Development, PTT Global Chemical Public Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

PROFILE OF THE PERSON SUPERVISING ACCOUNTING (CHIEF ACCOUNTANT) OF PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED

Ms. Sutha Suwanrath

Vice President – Financial Accounting 1

Age : 59

Date of Appointment : August 1st, 2020

Education/Training

- Master of Business Administration, Burapha University
- Thai Financial Reporting Standards Workshop, 2020
- Inventory Accounting, 2020
- Process Business Overview, 2019
- Career Plan #3, 2019
- Roles of Executives and Internal Control #4, 2019
- Corporate Income Tax Planning, 2019
- IFRS15-16, 2019
  2021 TFRS Update Session 1
  2021 TFRS Update Session 2

Board Member/Management in Listed Company – The Stock Exchange of Thailand : 1

- Vice President, Financial Accounting 1, Finance and Accounting, PTT Global Chemical Public Company Limited

Board Member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Work Experiences (5-Year Past Experiences)

1 Aug - Present	Vice President - Financial Accounting 1, Finance and Accounting, PTT Global Chemical Public Company Limited
1 Sep 2018 - Jul 31, 2020	Vice President - Financial Accounting, PTT Global Chemical Public Company Limited
1 Jan 2017 - 31 Aug 2018	Vice President - Financial Accounting 1, Finance and Accounting, PTT Global Chemical Public Company Limited

Shareholding : 30,000 Shares (Information as of the latest book closing date, September 6, 2021)

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

ATTACHMENT 2

DETAILS OF DIRECTORS OF SUBSIDIARIES

List of the Board of Directors in Subsidiaries/Joint Ventures/Affiliates (As of 31 December 2021)

No.	Name - Surname	GC	Subsidiaries						Joint Ventures/Affiliates				
			GGC	GCA Corp.	GC Inter	GCA	GCI	GC BV	GPSC	PTT	OR	PTTT	PTT Tank
1	Mr. Piyasvasti Amranand	▲											
2	Mr. Apisak Tantivorawong	■											
3	Mr. Don Wasantapruek	■								■			
4	Professor Somkit Lertpaithoon	■											
5	Mr. Grisada Boonrach	■											
6	Mrs. Watanan Petersik	■											
7	Mr. Pakorn Nilprapunt	■											
8	Lieutenant General Nithi Chungcharoen	■											
9	Mr. Chansin Treenuchagron	■											
10	Mr. Noppadol Pinsupa	■							■	●			
11	Mr. Disathat Panyarachun	■								●	■	▲	
12	Mr. Sarawut Kaewtathip	■											
13	M.L. Peekthong Thongyai	■								●			■
14	Mrs. Pantip Sripimol	■											
15	Mr. Kongkrapan Intarajang	■ ●	▲		▲			▲	■	●			

Remarks: ▲ = Chairman ■ = Director ● = Executive

Subsidiaries

GGC = Global Green Chemicals Public Company Limited
GCA Corp. = PTTGC America Corporation
GC Inter = PTTGC International Private Limited
GCA = PTTGC America LLC
GCI = GC International Corporation
GC BV = PTTGC International (Netherlands) B.V.

Joint Ventures/Affiliates

GPSC = Global Power Synergy Public Company Limited)
PTT = PTT Public Company Limited
OR = PTT Oil and Retail Business Public Company Limited
PTTT = PTT International Trading Pte Ltd.
PTT Tank = PTT Tank Terminal Company Limited

List of GC'S Executives in Subsidiaries/Joint Ventures/Affiliates (As of 1 February 2022)

No.	Name-Surname	GC	Subsidiaries																							Joint Ventures/Affiliates								
			Glycol	PPCL	GGC	SUN	GCEC	GCTC	GCO	GCP	GCM	TTT	NPC S&E	GCME	GC-M PTA	TPRC	Vencorex	GC Inter	GCV	GCVA	GCI	GCIA	GCA Corp.	GCA	GC BV	PTT	GPSC	EOUK	HMC	NatureWorks	VNT	PTTAC	RGL	KGC
1	Mr. Kongkrapan Intarajang	■ ●			▲													▲							▲	●	■							
2	Mr. Wiboon Chuchepchunkamon	●	▲	▲		▲			▲		■				■	■													■		■		▲	■
3	Mr. Varit Namwong	●			■						■		▲	▲															▲					
4	Mr. Toasaporn Boonyapipat	●					▲					■		■																				
5	Mr. Narongsak Jivakanun	●															▲	■ ●	▲	▲	■ ●	▲	■ ●	■ ●	■ ●			■		■				
6	Miss Pattaralada Sa-ngasang	●						▲	■	■							■	■			■		■	■				■						

Remarks: ▲ = Chairman ■ = Director ● = Executive

Subsidiaries

Glycol = GC Glycol Company Limited
PPCL = PTT Phenol Company Limited
GGC = Global Green Chemicals Public Company Limited
SUN = Solution Creation Company Limited
NPC S&E = NPC Safety and Environmental Service Company Limited
TTT = Thai Tank Terminal Limited
GCEC = GC Estate Company Limited
GCTC = GC Treasury Center Company Limited
GCO = GC Oxirane Company Limited
GCP = GC Polyols Company Limited
GCME = GC Maintenance and Engineering Company Limited
GCM = GC Marketing Solutions Company Limited
GC-M PTA = GC-M PTA Company Limited
TPRC = Thai PET Resin Company Limited
GC Inter = PTTGC International Private Limited
GCV = GC Ventures Company Limited
GCVA = GC Ventures America Corporation
GCI = GC International Corporation
GCA Corp. = PTTGC America Corporation
GCA = PTTGC America LLC
GC BV = PTTGC International (Netherlands) B.V.
GCIA = PTTGC Innovation America Corporation
Vencorex = Vencorex Holding

Joint Ventures

GPSC = Global Power Synergy Public Company Limited
VNT = Vinythai Public Company Limited
PTTAC = PTT Asahi Chemical Company Limited
HMC = HMC Polymers Company Limited
NatureWorks = NatureWorks LLC
RGL = Revolve Group Limited
KGC = Kuraray GC Advanced Materials Company Limited
EOUK = Emery Oleochemicals UK Limited

Affiliate

PTT = PTT Public Company Limited

List of Directors in Subsidiaries wholly 100% owned by GC (As of 1 February 2022)

1. GC Glycol Company Limited

List of Directors	Position
1. Mr. Wiboon Chuchepchunkamon	Chairman
2. Mr. Saroj Putthammawong	Director
3. Mr. Pukpong Wungrattanasopon	Director
4. Mrs. Chananchida Wiboonkanarak	Director
5. Mr. Vitaya Pinmuangngarm	Director/ Managing Director

2. PTT Phenol Company Limited

List of Directors	Position
1. Mr. Wiboon Chuchepchunkamon	Chairman
2. Mr. Saroj Putthammawong	Director
3. Mr. Pukpong Wungrattanasopon	Director
4. Mrs. Chananchida Wiboonkanarak	Director
5. Mr. Paisarn Sarapee	Director/ Managing Director

3. GC Styrenics Company Limited

List of Directors	Position
1. Mr. Pornsak Mongkoltrirat	Chairman
2. Mr. Anutin Chuaypen	Director
3. Mr. Vitaya Pinmuangngarm	Director
4. Mr. Panchoak Auetanapa	Director/ Managing Director

4. Solution Creation Company Limited

List of Directors	Position
1. Mr. Wiboon Chuchepchunkamon	Chairman
2. Mr. Pornsak Mongkoltrirat	Director
3. Mrs. Warawan Tippawanich	Director
4. Mrs. Chananchida Wiboonkanarak	Director
5. Mr. Weerayuth Lorsathian	Director/ Managing Director

5. NPC Safety and Environmental Service Company Limited

List of Directors	Position
1. Mr. Varit Namwong	Chairman
2. Mr. Khomson Piyawattanaviroj	Director
3. Mr. Anutin Chuaypen	Director
4. Mr. Kridsada Prasertsuko	Director/ Managing Director

6. PTTGC International Private Limited

List of Directors	Position
1. Mr. Kongkrapan Intarajang	Chairman
2. Miss Pattaralad Sa-ngasang	Director
3. Mrs. Warawan Tippawanich	Director
4. Mr. Narongsak Jivakanun	Director/ Managing Director

7. PTTGC America Corporation

List of Directors	Position
1. Mr. Kongkrapan Intarajang	Chairman
2. Mr. Varit Namwong	Director
3. Miss Pattaralada Sa-ngasang	Director
4. Mrs. Warawan Tippawanich	Director
5. Mr. Narongsak Jivakanun	Director/ Managing Director

8. GC Marketing Solutions Company Limited

List of Directors	Position
1. Mr. Varit Namwong	Director
2. Mr. Wiboon Chuchepchunkamon	Director
3. Mr. Pornsak Mongkoltrirat	Director
4. Mr. Saroj Putthammawong	Director
5. Mr. Thitipol Artsanchorn	Director/ Managing Director

9. GC Logistics Solutions Company Limited

List of Directors	Position
1. Mr. Pornsak Mongkoltrirat	Chairman
2. Mr. Supasit Tongsupachok	Director
3. Mrs. Wilawan Songjaroen	Director
4. Mr. Thitipol Artsanchorn	Director
5. Mr. Amnuai Phrom-Anant	Director/ Managing Director

10. GC Maintenance and Engineering Company Limited

List of Directors	Position
1. Mr. Varit Namwong	Chairman
2. Mr. Toasaporn Boonyapipat	Director
3. Mr. Pornsak Mongkoltrirat	Director
4. Mrs. Jeeranee Pimthanothai	Director
5. Mrs. Wilawan Songjaroen	Director/ Managing Director

11. GC Oxirane Company Limited

List of Directors	Position
1. Mr. Wiboon Chuchepchunkamon	Chairman
2. Miss Pattaralada Sa-ngasang	Director
3. Mr. Saroj Putthammawong	Director
4. Mr. Vitaya Pinmuangngarm	Director
5. Mr. Monton Rochvatanaboon	Director/ Managing Director

12. GC Treasury Center Company Limited

List of Directors	Position
1. Miss Pattaralada Sa-ngasang	Chairman
2. Mr. Saroj Putthammawong	Director
3. Miss Kanoknun Buranapunsri	Director
4. Miss Pornsook Limsathit	Director/ Managing Director

13. GC Estate Company Limited

List of Directors	Position
1. Mr. Toasaporn Boonyapipat	Chairman
2. Mr. Pirun Krimwongrut	Director
3. Mr. Supasit Tongsupachok	Director
4. Mr. Paranai Waitayasewee	Director
5. Mrs. Wacharee Hanwongpaiboon	Director/ Managing Director

14. GC Ventures Company Limited

List of Directors	Position
1. Mr. Narongsak Jivakanun	Chairman
2. Mrs. Warawan Tippawanich	Director
3. Mr. Chaya Chandavasu	Director
4. Mr. Kamel Ramdani	Director

ATTACHMENT 3

DETAILS OF THE HEADS OF THE INTERNAL AUDIT AND COMPLIANCE UNITS

HEAD OF INTERNAL AUDIT and HEAD OF CORPORATE COMPLIANCE

(1) HEAD OF INTERNAL AUDIT

The Audit Committee Meeting No. 8/2017 convened on September 18, 2017 resolved to approve the appointment of Mr. Amorn Putiphrawan as Senior Vice President, Internal Audit, responsible for evaluating and enhancing the internal control effectiveness, supervising the operations of the internal audit function to be in accordance with the objectives and the international standards, including objectivity and independent consulting on the company's subsidiaries and report directly to the Audit Committee

Name - Surname : **Mr. Amorn Putiphrawan**
Senior Vice President – Internal Audit

Age : 58
Appointed : January 1st, 2018
Education/Training : Master of Engineering (Chemical Engineering), Chulalongkorn University
: Bachelor of Science (Fuel Technology), Chulalongkorn University
: Leadership Development Program (LDP 1) and (LDP 2), PTT Leadership and Learning Institute
: Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC), Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1
: Senior Vice President - Internal Audit, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Work Experiences (5 years past experiences)

1 Oct 2017 – 31 Dec 2017	Vice President reporting to Chief Executive Officer and President, PTT Global Chemical Public Company Limited
16 Jun 2014 – 30 Sep 2017	Vice President - Corporate Risk Management and Internal Control System, PTT Global Chemical Public Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

(2) HEAD OF CORPORATE COMPLIANCE

Mrs. Rattana Nakasiri as Vice President, Corporate Governance, has been assigned as Head of Corporate Compliance on October 15, 2015. The responsibilities include overseeing corporate compliance, promoting corporate governance in business practices, and ensuring that the Executives and employees of GC Group comply with laws, rules, and regulations in countries where GC operates.

Name - Surname : **Mrs. Rattana Nakasiri**
Vice President - Corporate Governance

Age : 58
Appointed : October 15th, 2015
Education / Training : Master of Business Administration, National Institute of Development Administration
: Bachelor of Economics, Ramkhamhaeng University
: PTTGC Group VP: Leadership Development Program (LDP2) 2015
: Business Simulation for VP: CELEMI Decision Base, KNOWLEDGE CO., LTD
: Corporate Compliance Overview - Executive, Hunton & Williams
: Director's Legal Liabilities, Ethical Leadership for new Era and High Performing Board & Board Effectiveness 2021 (In-house Programs by GC), Director Certification Program (DCP) Class 290/2020, Ethical Leadership Program (ELP) Class 15/2019, Risk Management Program for Corporate Leaders (RCL) Class 11/2018, IT Governance and Cyber Resilience Program (ITG) Class 8/2018, Company Reporting Program (CRP) Class 17/2017, Roles of Company Secretaries in Corporate Governance Promotion Seminar, IOD Open House 1/2017, Company Secretary Program (CSP) Class 69/2016, Board Reporting Program (BRP) Class 20/2016, Effective Minute Taking (EMT) Class 35/2016, Anti-Corruption: The Practical Guide (ACPG) Class 29/2016, and Corporate Governance for Executive (CGE) Class 7/2016, Thai Institute of Directors Association (IOD)

Board member/Management in Listed Company – The Stock Exchange of Thailand : 1
: Vice President - Corporate Governance, PTT Global Chemical Public Company Limited

Board member/Management in Non-Listed Company – The Stock Exchange of Thailand : None

Work Experiences (5 years past experiences)

29 Oct 2019 – 30 Sep 2021 Director, GC Estate Company Limited

Shareholding : None

Relation among Family with other Directors, Management, Major Shareholders of the Company or Subsidiaries : None

ATTACHMENT 4

ASSETS USED IN BUSINESS OPERATIONS AND DETAILS OF ASSET VALUATIONS

PROPERTY, PLANT, AND EQUIPMENT

As at December 31, 2021 the net book value of GC's and subsidiaries' operating fixed assets less accumulated depreciation and allowance for impairment was Bath 289,579 million, The total fixed assets shown in the consolidated financial statements are GC's and subsidiaries' owned assets.

(Unit: Million Baht)

No.	Item	Ownership	Book Value	Obligation
			Dec 31, 2021	
1	Land and land improvement	GC and subsidiaries	14,218	603
2	Plant, machinery, equipment, and factory tools	GC and subsidiaries	238,769	33,195
3	Buildings and buildings improvement	GC and subsidiaries	14,822	2,741
4	Furniture, fixtures, and equipment	GC and subsidiaries	1,358	-
5	Vehicles	GC and subsidiaries	217	-
6	Assets under construction	GC and subsidiaries	20,195	-
Total			**289,579**	**36,539**

INVESTMENT PROPERTIES

(Unit: Million Baht)

No.	Item	Ownership	Book Value
			Dec 31, 2021
1	Land	GC and subsidiaries	6,035
2	Buildings	GC and subsidiaries	27
3	Investment property under construction	GC and subsidiaries	12
Total			**6,074**

RIGHTS OF USE

As at December 31, 2021, GC and its subsidiaries' right-of-use assets less accumulated depreciation and allowance for impairment was Baht 10,412 million in net value, as detailed below.

(Unit: Million Baht)

No.	Item	Ownership	Book Value	Remaining Lease Period
			Dec 31, 2021	
1	Land and land improvement	Long-term lease	6,447	1-89 years
2	Plant, machinery, equipment, and factory tools	Long-term lease	1,851	1-19 years
3	Buildings and buildings improvement	Long-term lease	1,163	1-76 years
4	Furniture, fixtures, and equipment	Long-term lease	207	1-4 years
5	Vehicles	Long-term lease	744	1-7 years
Total			**10,412**	

DETAILS OF SIGNIFICANT RIGHTS OF USE

OTHER LAND LEASEHOLD RIGHTS

LAND LEASE AGREEMENTS WITH PTT

A land lease agreement for the construction of a jetty and a seaside tank farm for liquid chemicals in Tambon Map Ta Phut, Rayong, with a term of 22 years and 4 days from December 28, 2014 to December 31, 2037, consisting of:

- The rental rate of a 8-2-70.90 rai land parcel to which PTT has gained the right through expropriation by the Treasury Department
- The rental rate of a 67-2-52.90 rai land parcel owned by PTT

A portion of land in PTT Gas Separation Plant with a total area of 1 rai 1 ngan 24.5 square wah with a term of 3 years from January 1, 2019 to December 31, 2021.

For the establishment of water production from sea water unit located at a seashore in Tambon Map Ta Phut, Rayong, with a total area of 5 rai 3 ngan 56.73 square wah with a term of 16 years and 66 days from October 27, 2021 to December 31 2037.

LEASE AGREEMENT AND SERVICE AGREEMENT WITH ENERGY COMPLEX COMPANY LIMITED

555/1 Energy Complex Building A

- A lease agreement for a 14,227 sq.m. office space in Lobby A, on Floors 14-18 in Building A, storage and pantry for a term of 3 years from October 1, 2021 to September 30, 2024, consisting of:
  (1) 302 sq.m. office space in Lobby A;
  (2) 13,675 sq.m. office space on Floors 14-18;
  (3) 135 sq.m. storage space on Floors 14, 16-17;
  (4) 65 sq.m. storage space on M Floor in Building F; and
  (5) 50 sq.m. pantry

As of October 1, 2021, the rental of the 462 sq.m. office space on Floor 10 was discontinued.

LEASE AGREEMENT WITH THE STATE RAILWAY OF THAILAND

An area in the Map Ta Phut train station with a total area of 15,900 square meters with a term of 3 years from June 16, 2019 to June 15, 2022.

INTANGIBLE ASSETS

The intangible assets of GC and its subsidiaries as at December 31, 2021 consist of:

(Unit: Million Baht)

Intangible Asset	Net book value after accumulated amortization and allowance for impairment	Obligation	Useful Life
Production license fees	5,352	-	10-30 years
Computer software	3,972	-	3-10 years
Customer contracts and the related customer relationships	34,298	-	11-23 years
Right to use others	42,395	251	8-50 years
Intangible assets under development	484	-	
Total	**86,501**	**251**	

DETAILS OF SIGNIFICANT INTANGIBLE ASSETS

PTT GLOBAL CHEMICAL PUBLIC COMPANY LIMITED

RIGHTS TO USE PIPE RACKS

GC has been granted the right to charge right-of-use fees from users making a request to lay pipes on its pipe racks at the rate specified in the piperack agreement. The amount of the right-of-use fee charged to each user will depend on the value of GC's investment and the location where the user is laying pipes.

ELECTRICITY GENERATION LICENSES

(1) GC (Branch 2) was granted a license to operate an electricity generation business with a capacity of over 150 megawatts from the Energy Regulatory Commission.

- Installed power generation capacity at 357.230 megawatts (expansion of power generation capacity of 35.300 megawatts on June 2, 2021).
- The license is valid for 15 years from December 3, 2009 until December 2, 2024.

(2) GC (Branch 2) was granted a license to operate the electricity sale business from the Energy Regulatory Commission. The license is valid for 15 years from December 3, 2009 until December 2, 2024.

(3) GC (Branch 2) was granted a license to operate the electricity distribution system business from the Energy Regulatory Commission. The license is valid for 15 years from December 3, 2009 until December 2, 2024.

(4) GC (Branch 6) was granted a license to operate an electricity generation business with an installed capacity of over 10 megawatts but not exceeding 150 megawatts from the Energy Regulatory Commission.

- Installed power generation capacity at 89.752 megawatts.
- The license is valid for 10 years from February 14, 2011 until February 13, 2021.
- The 5-years renewal (first time) from February 14, 2021 until February 13, 2026. The renewal was issued on January 27, 2021.
- There are 4 specific conditions to operate electricity business (as set out in the licence).

THAI TANK TERMINAL COMPANY LIMITED (GC'S SUBSIDIARY)

Thai Tank Terminal Company Limited has been granted a concession from the Industrial Estate Authority of Thailand to manage and operate a liquid product handling and storage business in Map Ta Phut Industrial Estate in Tambon Map Ta Phut, Amphoe Muang, Rayong. The concession period is 30 years from October 1, 1992 to September 30, 2022 and grants the rights to design, construct, develop, operate, manage, and maintain a jetty for liquid products.

BOI INVESTMENT PROMOTION CERTIFICATES

GC and its subsidiaries have been granted investment promotion certificates from the Thailand Board of Investment (BOI), which offer tax privileges such as exemption from import duty on machinery and business taxes on imported machinery and equipment as well as exemption from corporate income taxes on net profit derived from business operation from the date on which income is first generated.

The details of the investment promotion certificates that BOI approved and awarded to GC and its subsidiaries and that were in effect as of December 31, 2020 as given below.

No.	Promoted Project	Date of Issuance	Product and Capacity	Expiration of Corporate Income Tax Privilege	Remark
1	Manufacture of petrochemicals Certificate No. 2264(2)/Or./2554	October 19, 2011	Production of approximately 97,937 tons of ethylene per year and 6,307 tons of pyrolysis gas per year	January 30, 2022	Transferred from PTTCH on October 19, 2011
2	Scientific laboratories Certificate No. 2265(4)/Or./2554	October 19, 2011	Provision of scientifc laboratory services related to petrochemicals, petroleum, chemicals, polymers, water, and the environment; approximately 60,000 assignments per year	January 18, 2023	Transferred from PTTCH on October 19, 2011
3	Manufacture of petrochemicals Certificate No. 2266(2)/Or./2554	October 19, 2011	Production of approximately 75,000 tons of butadiene per year, approximately 40,000 tons of butene-1 per year, and approximately 95,000 tons of by-products, namely isobutene, isobutylene, n-butane, raffinate, C4 acetylene, and C5+	April 29, 2027	Transferred from PTTCH on October 19, 2011
4	Production of electricity and steam Certificate No. 2267(2)/Or./2554	October 19, 2011	Electricity production capacity of 112.5 megawatts and steam production capacity of 560 tons/hour	February 28, 2025	Transferred from PTTCH on October 19, 2011
5	Manufacture of petrochemicals Certificate No. 2272(2)/Or/2554	October 19, 2011	Products from Reformer Complex - Reformate: approximately 649,400 tons per year - Naphtha: approximately 1,387,066 tons per year - LPG: approximately 253,037 tons per year - Condensate residue: approximately 1,273,298 tons per year Products from Aromatic Complex - Paraxylene: approximately 681,300 tons per year - Benzene: approximately 371,938 tons per year - Heavy aromatics: approximately 93,978 tons per year	August 22, 2021	Transferred from PTTCH on October 19, 2011

No.	Promoted Project	Date of Issuance	Product and Capacity	Expiration of Corporate Income Tax Privilege	Remark
6	Manufacture of upstream petrochemicals Certificate No. 1936(2)/Or/2556	July 1, 2013	Production of approximately 1,124,450 tons of ethylene per year Approximately 31,700 tons of propylene per year Approximately 863,600 tons of polyethylene (PE) per year	November 25, 2022	Transferred from PTTPE on July 1, 2013
7	Manufacture of downstream petrochemicals Certificate No. 1937(2)/Or/2556	July 1, 2013	Production of approximately 300,600 tons of HDPE per year and transportation of approximately 138,528,000 liters of petroleum and petrochemicals via pipeline	December 3, 2022	Transferred from BPE on July 1, 2013
8	Manufacture of downstream petrochemicals Certificate No. 1938(2)/Or/2556	July 1, 2013	Production of approximately 16,000 tons of compound plastics	June 3, 2023	Transferred from BPE on July 1, 2013
9	Manufacture of petrochemic Certificate No. 1616(2)/2556	May 8, 2013	Production of approximately 137,760 tons of paraxylene per year, approximately 73,800 tons of benzene per year, approximately 46,700 tons of toluene per year, and approximately 21,900 tons of othoxylene per year	December 22, 2028	
10	Manufacture of chemicals Certificate No. 1623(2)/2556	May 10, 2013	Production of approximately 154,176,000 cubic meters of purified hydrogen per year	January 30, 2030	
11	Manufacture of petrochemicals Certificate No. 1715(2)/2557	June 9, 2014	Production of approximately 55,000 tons of hexene-1 per year and approximately 4,000 tons of heavy polymers per year	May 29, 2031	
12	Manufacture of petrochemicals Certificate No. 2215(2)/2557	September 30, 2014	Production of approximately 400,000 tons of polyethylene (PE) per year	January 7, 2031	
13	Manufacture of petrochemicals Certificate No. 60-1300-0-00-1-0	November 20, 2017	Approximately 521,430 tons of ethylene per year Approximately 272,140 tons of propylene per year	March 1, 2034	ORP Project
14	Production of electricity or electricity and steam from other energy Certificate No. 61-0182-1-04-1-0	February 15, 2018	Production efficiency enhancement to reduce environmental impact	February 15, 2020	
15	Utilities and basic services Certificate No. 61-0929-0-00-1-0	August 8, 2018	Capacity of electricity production from natural gas of 56 megawatts and steam production capacity of 140 tons/hour	13 years after income recognition	GTG-J Project
16	Utilities and basic services Certificate No. 61-1336-0-00-1-0	November 15, 2018	Goods handling and marine vessels; oil and petroleum product handling capacity of approximately 3,000,000 tons per year	13 years after income recognition	Jetty 4 Project

No.	Promoted Project	Date of Issuance	Product and Capacity	Expiration of Corporate Income Tax Privilege	Remark
17	Manufacture of petroleum Certificate No. 62-1427-1-04-1-0	December 23, 2019	Efficiency improvement for energy saving. Petroleum production of 150,000 barels per day.	December 23, 2022	Pinch Project
18	Research and development Certificate No. 64-0228-1-00-2-0	March 3, 2021	Pilot research and development for the manufacturing of catalysts for various types of polymerization	8 years after income recognition	
19	Research and development Certificate No. 64-0264-1-00-2-0	March 12, 2021	Pilot research and development for the manufacturing of Polyethylene products	8 years after income recognition	
20	Manufacture of petrochemicals Certificate No. 64-1078-1-04-1-0	October 14, 2021	Efficiency improvement for energy saving. Production of Ethylene, propylene, mixed C4 and pyrolysis gas products	3 years after income recognition	OMP
GC Glycol					
21	Manufacture of petrochemicals Certificate No. 1761(2)/2550	August 3, 2007	Production of approximately 108,186 tons of MEG per year, approximately 10,337 tons of DEG per year, and approximately 438 tons of TEG per year	December 31, 2021	
22	Manufacture of other chemicals Certificate No. 2535(2)/Or/2555	October 12, 2012	Production of approximately 27,500 tons of MEA per year, approximately 27,500 tons of DEA per year, approximately 18,650 tons of TEA per year, and by-products, consisting of approximately 2,009 tons of amine per year and approximately 182 tons of crude DEA per year	August 25, 2022	Transferred from EA on October 12, 2012
23	Manufacture of other chemicals Certificate No. 2384(2)/Or/2557	October 31, 2014	Production of approximately 60,000 tons of purified ethylene oxide per year	December 4, 2028	
24	Manufacture of petrochemicals Certificate No. 61-0448-1-18-1-0	April 23, 2018	Approximately 3,1000 tons of TEG per year Approximately 1,600 tons of by-products, namely PEG, per year	October 21, 2030	New TEG Project
PPCL					
25	Manufacture of petrochemicals Certificate No. 1938 (2)/2547	November 4, 2004	Production of approximately 273,000 tons of phenol per year, approximately 170,133 tons of acetone per year, approximately 368,550 tons of cumene per year, and by-products, consisting of approximately 864 tons of benzene & dips drag per year, approximately 1,675 tons of heavy aromatics per year, and approximately 14,969 tons of heavy residue per year	November 8, 2021	

No.	Promoted Project	Date of Issuance	Product and Capacity	Expiration of Corporate Income Tax Privilege	Remark
26	Manufacture of petrochemicals Certificate No. 1609(2)/2551	June 16, 2008	Production of approximately 179,580 tons of bisphenol-A (BPA) per year and by-products, consisitng approximately 7,008 tons of TAR per year and approximately 350 tons of purge light oil per year	January 7, 2024	
27	Manufacture of petrochemicals Certificate No. 1126(2)/2556	January 30, 2013	Production of approximately 301,125 tons of phenol per year, approximately 186,700 tons of acetone per year, and by-products, consisting of approximately 2,285 tons of benzene & dips drag per year, approximately 2,520 tons of aromatics per year, approximately 13,190 tons of heavy residue per year, and approximately 11,620 tons of alpha –methylstyrene (AMS) per year	April 24, 2029	
VENCOREX					
28	Manufacture of chemical products for industries Certificate No. 1403(2)/2557	March 28, 2014	Production of approximately 18,000 tons of hexamethylene diisocyanate derivatives (HDI Derivatives) per year	April 6, 2029	
GC Oxirane					
29	Manufacture of petrochemicals Certificate No. 60-0769-0-00-1-0	July 13, 2017	Approximately 228,000 tons of propylene oxide per year By-products consist of: Approximately 3,420 tons of fuel gas per year Approximately 33,288 tons of fuel oil per year	November 13, 2033	
GC Polyols					
30	Manufacture of petrochemicals Certificate No. 60-0770-0-00-1-0	July 13, 2017	Approximately 198,000 tons of polyols per year, consisting of polyether polyols (PPG), polymer polyols (POP), and formulated polyols (PREMIX)	September 28, 2033	
Envicco					
31	Manufacture of recycled plastic: rPET(FOOD GRADE) and rHDPE Certificate No. 63-1102-1-00-1-0	June 17, 2020	Production of approximately 35,040 tons of rPET (FOOD GRADE) per year, approximately 16,650 tons of rHDPE, and by-products, consisting of metal scraps, plastic scraps (excluding PET and HDPE), and scraps and waste from manufacturing	8 years after income recognition	

POLICY ON INVESTMENTS IN SUBSIDIARIES, JOINT VENTURES, AFFILIATES, AND OTHERS

As a policy, GC invests in subsidiaries, joint ventures, affiliates, and others to support and promote business growth and ensures governance by appointing its Executives to the board of subsidiaries and assigning its representiatives to serve as Directors in subsidiaries, ventures, affiliates, and others.

The presence of GC's representatives as Directors or Executives in subsidiaries, ventures, affiliates, and others enables it to participate in policymaking, stay informed, and periodically monitor performance. Any activity that may have a significant impact on GC must be approved by the Board of Directors first.

As of December 31, 2021, GC's investments in subsidiaries, joint ventures, affiliates, and others were as follows:

Company		Abbreviation	Business Type	Registered Capital (Million Baht)	Paid-up Capital (Million Baht)	Ownership Interest (%)
SUBSIDIARIES						
1	allnex Holding GmbH	allnex[9]	Manufacturing and distribution coating resins & additives	275,000 euros	275,000 euros	100 (via GC BV)
2	ENVICCO Co., Ltd.	ENVICCO	Manufacturing, distribution, and development of recycled polyethylene terepthalate and recycled high-density polyethylene	1,080	1,026[4]	70
3	PTTGC International Private Limited	GC Inter	Investing in overseas petrochemical business	SGD 304.2 million/ USD 461[8] million/ EUR 249[8] million	SGD 304 million/ USD 461[8] million/ EUR 249[8] million	100
4	GC Estate Co., Ltd.	GCEC	Land and property management	7,200	7,200	100
5	GC International Corporation	GCI	Investing in overseas petrochemical business	USD 1	USD 1	100 (via GC Inter)
6	PTTGC Innovation America Corporation	GCIA	Open innovation and technology scouting services	USD 200	USD 200	100 (via GC Inter)
7	GC Logistics Solutions Co., Ltd.	GCL	Integrated logistics services	1,200	1,200	100 (99% direct interest held, 1% via SUN)
8	GC Marketing Solutions Co., Ltd.	GCM	Distribution of GC Group's polymer products	40	40	100 (99% direct interest held, 1% via SUN)

	Company	Abbreviation	Business Type	Registered Capital (Million Baht)	Paid-up Capital (Million Baht)	Ownership Interest (%)
9	GC Maintenance and Engineeting Co., Ltd.	GCME	Plant maintenance and engineering services	200	137	100
10	GC Oxirane Co., Ltd.	GCO	Manufacturing and distribution of petrochemical products	7,761	7,538[2)]	100
11	GC Polyols Co., Ltd.	GCP	Manufacturing and distribution of petrochemical products	4,002	4,002[1)]	82.1
12	GC Styrenics Co., Ltd.	GCS	Manufacturing and distribution of petrochemical products	190	190	100
13	GC Treasury Center Co., Ltd.	GCTC	Financial management services	10	10	100
14	GC Ventures Co., Ltd.	GCV	Investment in the form of corporate venture capital (CVC) domestically and overseas	1,010[7)]	781[7)]	100
15	GC Ventures America Corporation	GCVA	Investment in the form of CVC in the United States	USD 1	USD 1	100 (via GCV)
16	GC-M PTA Co., Ltd.	GC-M PTA	Manufacturing and distribution of petrochemical products	4,800	4,800	74 (49% direct interest held, 25% via Glycol)
17	Global Green Chemicals PLC	GGC	Manufacturing and distribution of oleochemical products	9,725	9,725	72.29
18	GC Glycol Co., Ltd.	Glycol	Manufacturing and distribution of petrochemical products	5,395	5,395	100
19	NPC Safety and Environmental Service Co., Ltd.	NPC S&E	Safety and environmental management and consulting services	165	165	100
20	NPC S&E Security Guard Co., Ltd.	NPCSG	Security services and consultancy	5	5	100 (via NPC S&E)
21	PTT Phenol Co., Ltd.	PPCL	Manufacturing and distribution of petrochemical products	11,851	11,851	100
22	PTTGC America Corporation	GCA Corp	Investment in overseas petrochemicals business	USD 1	USD 1	100

	Company	Abbreviation	Business Type	Registered Capital (Million Baht)	Paid-up Capital (Million Baht)	Ownership Interest (%)
23	PTTGC America LLC	GCA	Manufacturing and distribution of petrochemical products	USD 138 million	USD 138 million	100 (via GCA Corp)
24	PTTGC International (Netherlands) B.V.	GC BV	Investment in overseas petrochemicals business	EUR 18,000	EUR 18,000	100 (via GC Inter)
25	Solution Creation Co., Ltd.	SUN	Manufacturing and distribution of petrochemical products	850	826	100
26	Thai PET Resin Co., Ltd.	TPRC	Manufacturing and distribution of petrochemical products	900	900	74 (via Glycol 44.4%, via GC-M PTA 40%)
27	Thai Tank Terminal Co., Ltd.	TTT	Services for the storage and handling of liquid chemicals, oil, and gas	900	900	51
28	Vencorex Holding	Vencorex	Manufacturing and distribution of petrochemical products	EUR 232 million	EUR 232 million	90.82 (via GC BV)
			JOINT VENTURES			
29	Emery Oleochemicals UK Limited[6]	EOUK	Manufacturing and distribution of oleochemical products	-	GBP 4 million	50 (via GC Inter)
30	HMC Polymers Co., Ltd.	HMC	Manufacturing and distribution of plastic resins and primary plastic	3,790	3,790	41.44
31	NatureWorks LLC	NatureWorks	Manufacturing and distribution of bioplastic products	USD 1,351 million	USD 1,351 million	50 (via GCI)
32	PTT Asahi Chemical Co., Ltd.	PTTAC	Manufacturing and distribution of petrochemical products	13,819	13,819	50
33	PTT MCC Blochem Co., Ltd.	PTTMCC	Manufacturing and distribution of bioplastic products	1,860	1,860	50
34	Revolve Group Limited	RGL	Manufacturing and distribution of rotomolding compounds	GBP 63,839	GBP 63,839	49 (via SUN)
			AFFILIATES			
35	Eastern Fluid Transport Co., Ltd.	EFT	Oversight of petrochemical product transportation pipeline systems	10	10	22.65 (15% direct interest, via TTT 7.65%)

	Company	Abbreviation	Business Type	Registered Capital (Million Baht)	Paid-up Capital (Million Baht)	Ownership Interest (%)
36	Kuraray GC Advanced Materials Co. Ltd.	KGC	Manufacturing and distribution of advnaced engineering plastic products	5,600	5,321[5)]	33.4
37	PTT Digital Solutions Co., Ltd.	PTT Digital	Information technology and communication services	150	150	40
38	PTT Energy Solutions Co., Ltd.	PTTES	Technical engineering consulting services	150	150	20
39	S.P. Petpack Inter Group Co., Ltd.	SPIG	Development of plastic packaging markets in the Republic of the Union of Myanmar	200	200	25 (via SUN)
40	Vinythai PLC.	VNT	Manufacturing and distribution of petrochemical products	7,111	7,111	24.98
41	Dynachisso Thai Co. Ltd.	DYCT	Manufacturing and distribution of PP engineering plastic compound	120	120	41.5 (via SUN)
			OTHERS			
42	Business Services Alliance Co., Ltd.	BSA	Manpower and contractor services for PTT Group	2	2	25
43	Global Power Synergy PLC	GPSC	Maufacturing and distribution of shared facilities	28,197	28,197	10[3)]
44	Pracharath Rak Samakkee Rayong (Social Enterprise) Co., Ltd.	PRS RAYONG	Management consulting services	4	4	50
45	Sarn Palung Social Enterprise Co., Ltd.	SPSE	Operating businesses or producing, purchasing, and selling products and/ or services that benefit society, communities, and the environment	10	10	15
46	TPBI & Myanmar Star Company Limited	TPBIMS	Development of plastic packaging markets in the Republic of the Union of Myanmar	6,726 million Myanmar kyat	6,726 million Myanmar kyat	10 (via SUN)

Remarks:

1) As of January 12, 2021, GC paid for newly-issued shares in GCP
2) As of January 18, 2021, GC paid for newly-issued shares in GCO
3) As of June 8, 2021, GC disposed of 12.73% shares in GPSC and maintained its shareholding in GPSC at 10% resulting in a change from investment in affiliate to other investment
4) As of September 15, 2021 GC paid for newly-issued shares in ENVICCO
5) As of October 20, 2021, GC paid for newly-issued shares in KGC
6) As of November 1, 2021, GC has undertaken a shareholding restructuring in Emery Group whereby GC disposed of all of its shares in EOM and ESC and acquired 50% shares in Emery Oleochemicals UK Limited (EOUK)
7) As of November 18, 2021, GC increased the registered capital of GCV and paid for the newly-issued shares
8) As of December 28, 2021, GC Inter GC increased the registered capital of GC Inter and paid for the newly-issued shares
9) As of December 29, 2021, GC invested in the High Value Business (HVB) by holding 100% shares in allnex through GC BV

ATTACHMENT 5

GC POLICY AND PRACTICES OF CORPORATE GOVERNANCE AND BUSINESS CODE OF CONDUCT

PTT Global Chemical Public Company Limited operates its business responsibly, transparently, accountably, fairly, ethically and with due regard to all of its stakeholders by adhering to the principles of good corporate governance. The Company recognizes that its adherence to the principles of good corporate governance will contribute to the operational and management efficiency of the Company and a company under GC. The Company also bolsters its credibility and fosters sustainable growth, not only for the Company itself but also for the society and the nation as a whole in order to achieve its vision "To Be a Leading Chemical Company for Better Living."

In order to accomplish such goal, the Board of Directors has integrated the Corporate Governance Policy into the Company's Business Operations Policy and has made the Corporate Governance and Business Code of Conduct Handbook. This handbook has been distributed throughout the Company since its establishment in order for directors, executives and employees to adhere to code of conduct and all policies when performing their duties. To express intention to develop and improve our good corporate governance to be rated "Excellence" in accordance with international standard, the Company has reviewed and revised the handbook so as to keep them up-to-date, and to keep them abreast of any changes. This handbook must also be in line with business strategies and corporate governance principles, both domestically and internationally. This handbook has been comprehensively communicated to all Directors, Executives and Employees, who have acknowledged and understood it entirely, and are expected to stringently implement the handbook as a guideline for executing their duties. They are also required to inform individuals involved in GC Group's businesses, namely trading partners, customers and joint-operators, both local and overseas, of our ethical business strategies in order for all concerned parties to understand and comply with these important practices.

In this regard, the full details of the Company's policies and practices from the Corporate Governance and Business Code of Conduct Handbook can be found on the GC website: https://www.pttgcgroup.com/storage/document/cg-handbook/20210325-pttgc-cg-handbook-en.pdf

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