



# Supplementary of Form 56-1 One Report for Year 2021

Details of Businesses Invest  
through PTT Group

Details of Connected Transaction

POWERING LIFE  
WITH FUTURE  
**ENERGY**  
AND BEYOND



# Additional Information for 56-1 One Report 2021

## Nature of Business/ Procurement/Distribution of Businesses invested through PTT Group

*Details of businesses invested by PTT through PTT Group as listed below provide additional information to Item 1.2.2 Nature of Business/ Procurement/ Distribution of Businesses in the 56-1 One Report.*

### 1. Upstream Business invested through PTT Group

#### 1.1 Gas related Business

PTT has operated businesses related to national gas through its affiliates. For example, Liquefied Natural Gas business operates receiving services, Liquefied Natural Gas storage, and Liquefied Natural Gas regasification to support Liquefied Natural Gas import of country as well as an investment expansion and an integrated Liquefied Natural Gas business across the value chain. Its portfolio has even included the development and construction of gas transmission pipelines systems and natural gas transportation. To support PTT Group's status as the fully-integrated natural gas business operator, PTT has invested in the following companies:

- 1.1.1 [PTT Natural Gas Distribution Company Limited \(PTTNGD\)](#)
- 1.1.2 [Trans Thai-Malaysia \(Thailand\) Limited \(TTM\(T\)\) and Trans Thai-Malaysia \(Malaysia\) Sdn.Bhd. \(TTM\(M\)\)](#)
- 1.1.3 [PTT LNG Company Limited \(PTTLNG\)](#)
- 1.1.4 [Map Ta Phut Air Products Company Limited \(MAP\)](#)

#### 1.2 Petroleum Exploration and Production Business

PTT has conducted petroleum exploration and production business through [PTT Exploration and Production Public Company Limited \(PTTEP\)](#), which is PTT Group's flagship company in the exploration and production. PTTEP operates domestic and international petroleum E&P as well as invested in related businesses to explore petroleum sources of crude oil and natural gas to ensure Thailand's energy security and distribute petroleum outputs from domestic and regional projects, mostly natural gas, primarily to the domestic market. As of 31 December 2021, PTTEP had more than 40 petroleum exploration and production projects in 15 countries including Thailand and other countries globally.

#### 1.3 Overseas Businesses (Upstream)

PTT has operated energy businesses overseas to find new energy sources and alternative energy to secure Thailand's energy supply and extend its own existing businesses by leveraging the knowledge, expertise, and experiences of its human resources as well as collaborations within its group, PTT has expanded its businesses to international countries by investing in the following companies:

- 1.3.1 [PTT Energy Resources Company Limited \(PTTER\)](#)
- 1.3.2 [PTT Global Management Company Limited \(PTTGM\)](#)
- 1.3.3 [PTT Green Energy Company Limited \(PTTGE\)](#)
- 1.3.4 [PTT Global LNG Company Limited \(PTTGL\)](#)

## **2. Downstream Businesses invested through PTT Group**

### **2.1 International Trading Business**

PTT invested in international trading business to undertake full-fledged international trading transactions through 3 companies as follows:

- 2.1.1 [PTT International Trading Pte Ltd \(PTTT\)](#)
- 2.1.2 [PTT International Trading London Ltd \(PTTT LDN\)](#)
- 2.1.3 [PTT International Trading USA Inc. \(PTTT USA\)](#)

### **2.2 Petrochemical & Refinery, Oil and Retailing Businesses**

PTT has invested in the integrated refining with interests in three of Thailand's six refineries, total refining capacity is 770,000 barrels per day (BPD), or accounts for 62% of the country's total capacity (As of 31 December 2021). Moreover, PTT has operated integrated petrochemical business which covered from upstream to downstream. Its business cover the production and distribution of fuel, upstream, midstream and downstream petrochemical products in both olefins and aromatics, which focus on creating added value to its business, including receiving terminal and storage services. PTT is responsible for procuring crude oil and buying fuels and petrochemical products from PTT Group for distribution in domestic and overseas markets. The operating results of oil, petrochemical and refinery businesses mainly subject to economic situation, the spreads between crude oil/raw material and fuel/petrochemical products in global market which is related to demand and supply together with year-end inventories. For PTT Group, PTT Global Chemical Public Company Limited (GC) is the petrochemical flagship. Thai Oil Public Company Limited (TOP) is the refinery flagship. IRPC Public Company Limited (IRPC) is the integrated petrochemical and refinery flagship. PTT Oil and Retail Business Public Company Limited (OR) is the oil and retail business flagship that has distributed petroleum products, non-oil products and services both in domestic and overseas, including sales of petroleum products and other products in retail and commercial markets, coffee business, food and beverages, convenience stores, and space management. Additionally, PTT Tank Terminal Company Limited (PTT TANK) engages in petroleum and petrochemical product receiving, storing, and offtaking services to companies in the Group. PTT exercises direct and indirect governance of its affiliates through representatives that serve as directors and secondments.

PTT has invested in Petrochemical& Refining, Oil and Retailing Businesses through 5 companies as follows:

- 2.2.1 [PTT Global Chemical Public Company Limited \(GC\)](#)
- 2.2.2 [Thai Oil Public Company Limited \(TOP\)](#)
- 2.2.3 [IRPC Public Company Limited \(IRPC\)](#)
- 2.2.4 [PTT Oil and Retail Business Public Company Limited \(OR\)](#)
- 2.2.5 [PTT Tank Terminal Company Limited \(PTT TANK\)](#)

## **3. New Business and Infrastructure Operated through PTT Group**

PTT commanded the following affiliates under the supervision of the New Business and Infrastructure Group:

- 3.1 [Global Power Synergy Public Company Limited \(GPSC\)](#)
- 3.2 [District Cooling System and Power Plant Company Limited \(DCAP\)](#)
- 3.3 [Energy Complex Company Limited \(EnCo\)](#)
- 3.4 [PTT Energy Solutions Company Limited \(PTTES\)](#)
- 3.5 [PTT Digital Solution Company Limited \(PTT DIGITAL\)](#)

PTT Group engaged in power business through GPSC, a Power Flagship. GPSC conducts its business primarily in the production and distribution of electricity, steam, industrial water and other utilities which operates by itself and by invested in other companies. As of the year-end 2021, its total equity capacity were 7,122 megawatt (MW) of power generation, 2,946 tons per hour of steam, 7,372 cubic meters per hour of industrial water, 15,400 refrigerated tons of chilled water, and 141 megawatts hour of energy storage unit.

On 4 January 2021, PTTGM (a subsidiary of PTT) has acquired 50% shares of Global Renewable Power Company Limited (GRP)'s ordinary share, a wholly owned subsidiary of GPSC). This share acquisition is in accordance with PTT Group's strategic plan to become a leader in renewable energy or green energy sectors. In addition, this also supports PTT Group to expand and enhance its capability to invest in renewable energy, both inside and outside Thailand to achieve the group target of renewable power output of 12,000 MW by 2030. On 14 June 2021, GPSC established Global Renewable Synergy Company Limited (GRSC) which GPSC holds 100% with the objective to increase flexibility and competitiveness in investing in renewable energy in key target countries within Asia.

Furthermore, PTT has established a new subsidiaries to execute new businesses according to PTT's New S-Curve strategy. For the electric vehicle value chain business, ARUN PLUS Company Limited is set up to pursue opportunities across the EV value chain, creating the EV ecosystem in Thailand thru exploring EV manufacturing opportunity in Thailand through business partnership, distribution of EV chargers and expanding EV charging services located outside service stations. EVME PLUS Company Limited offers services via EV digital platforms such as EV rental, information of charging and maintenance service stations. Swap and Go Company Limited operates infrastructure platform and battery-swap network for electric motorcycles for instant swap. For the life science business, Innobic (Asia) Company Limited (Innobic (Asia)) is set up to be an investment vehicle to support businesses such as pharmaceutical, nutrition, medical equipment and diagnosis. The investment in this business will enhance PTT's capability in life sciences and to create added value for the country which including the purchase of Lotus Pharmaceutical Company Limited (LOTUS)'s ordinary shares, a listed company in Taiwan Stock Exchange whose core business is research and development (R&D), manufacturing, and distribution of Generic drugs that cover therapeutic areas especially oncology and central nervous system. AI, robotics and digitalization business, Alpha Com Company Limited serves as an investment vehicle in new businesses for PTT and the PTT Group, whereby new business models can be tested prior to actual investment decision. PTT Raise Company Limited supplies and installs robotics and automation system to industrial customers. PTT and TGES Optec Company Limited (OPTEC) operates one-stop total improving efficiency technology solutions/services that deploys technology to enhance efficiency of industrial equipment and machineries. ReAcc Company Limited functions as the trading platform for clean energy and climate neutrality through the digital platforms for Renewable Energy Certificates (RECs), Corporate Power Purchase Agreement (CPPA), and renewable energy for EV. Mekha Technology Company Limited is set up to invest in business of public cloud which provides various types of information system services including data storage, data processing, and data management for organizations as well as PTT group.

#### **4. Other Business Groups**

PTT Treasury Center Company Limited (PTT TCC) offers financial services to PTT and PTT Group. Not only that it prepares both short-term and long-term loans in foreign currencies as well as THB for PTT and PTT Group, but it also handles their debt management, liquidity management and financial management, in the interest of PTT and affiliates.

**Details of Businesses invested through  
PTT Group  
2021**

## 1. Upstream Businesses invested through PTT Group

### 1.1 Gas-related businesses

PTT has operated gas-related businesses via PTT Group in order to be the fully integrated natural gas business operator. Details are as follows:

#### 1.1.1 PTT Natural Gas Distribution Company Limited (PTTNGD)

PTT Natural Gas Distribution Company Limited (PTTNGD) was founded on 24 June 1996 to operate the development and constructions of gas distribution pipeline systems for natural gas transport and distribution. Its current shareholders are (1) PTT Public Company Limited; (2) Gulf Energy Development Public Company Limited; and (3) Gulf LNG Company Limited. PTTNGD has developed and constructed distribution pipeline systems for natural gas transmission and distribution to customers in industrial zones around Bangkok, its perimeter, and Rayong. As of 31 December 2021, PTTNGD has the registered and paid-up capital of THB 500 million. PTT has held 58 % of its registered and paid-up shares.

For its business operations, PTTNGD has invested in the constructions of distribution pipelines that are made of steel and High Density Polyethylene (HDPE) and linked to PTT's transmission pipelines. These distribution pipelines have delivered natural gas to customers in industrial zones around Bangkok, its perimeter, and Rayong. Additionally, PTT has assisted PTTNGD in finding land plots, getting the right to utilize land for the constructions of natural gas distribution pipelines. PTTNGD also expanded its business and investment in order to address customers' needs, which provided energy services, cogeneration business and alternative-energy businesses, and engaged in other various business activities such as providing additional services regarding to distribution pipeline systems.

#### 1) Procurement

PTT procured all natural gas to PTTNGD through sale/purchase agreements that are valid for 5- 10 years. Natural gas price structure includes the price of natural gas, pipeline tariff, and the return for the gas supply, marketing and distribution of natural gas.

#### 2) Distribution

On 31 December 2021, PTTNGD's distribution pipeline system has delivered natural gas to 13 industrial zones namely the Bangpoo Industrial Estate, the industrial zone in Bangpoo Mai, the Bang Plee Industrial Estate, the Lat Kra Bang Industrial Estate, the industrial zone in Rangsit, the Rojana Industrial Park, the Nava Nakorn Industrial Estate, the Theparak Industrial Town, the Bang Pa-In Industrial Estate, the Bangkok Industrial Park, the Eastern Seaboard Industrial Park (Rayong), the WHA Eastern Seaboard Industrial Estate 1, and the Bangpoo Industrial Estate (North). The gas sales agreements with customers have term ranging from five to seven years where gas price is set at a rate competitive with alternative fuels namely fuel oil or cooking gas. In 2021, PTTNGD has a total distributed volume of 56.96 MMSCFD– increased by 12.84% from 2020 with a total of 253 customers. Its natural-gas sales and number of customers between 2019 and 2021 are as follows:

Sales	2019	2020	2021
Volume (MMSCFD)	54.57	50.48	56.96
Number of customers	253	255	253

In addition, PTTNGD has increased its natural gas distribution channels by co-investing with 80% holding in Amata Natural Gas Distribution Company Limited (AMATA NGD) to construct distribution pipeline system that delivers natural gas to customers in the Amata City Chonburi Industrial Estate and the Amata City Rayong Industrial Estate.

### 3) Management

PTTNGD's board of directors as of 31 December 2021, is consisted of 12 members. 5 of them (including chairperson) are appointed by PTT. In addition, PTT has assigned its executives to serve as PTTNGD management, including the Managing Director.

### 4) Finance

The operating results of PTTNGD between 2019 and 2021 are as follows:

Unit : THB million

Separate financial statements	2019	2020	2021*
Revenue from sales and services	6,883	4,785	7,583
Total revenue	7,378	4,872	8,028
Total expenses (including taxes)	6,240	5,060	6,967
Net profit (loss)	1,138	(195)	1,061

Unit : THB million

Separate financial statements	2019	2020	2021*
Total assets	2,959	3,075	3,345
Total liabilities	808	1,119	1,277
Shareholders' equity	2,151	1,956	2,068

\* Data of 2021 are unaudited.

#### 1.1.2 Trans Thai – Malaysia (Thailand) Company Limited (TTM(T)) and Trans Thai-Malaysia (Malaysia) Sdn. Bhd. (TTM(M))

PTT and Petronas, Malaysia's National oil company, jointly established Trans Thai-Malaysia (Thailand) Company Limited (TTM(T)) in Thailand on 4 February 2000 and Trans Thai-Malaysia (Malaysia) Sdn. Bhd. (TTM(M)) in Malaysia on 21 March 2000. TTM(T) operates a gas transmission pipeline service from Malaysia-Thailand Joint Development Area (JDA) for utilization within Thailand and also to Thai – Malaysia border as well as providing gas separation services in Songkhla and transporting Liquefied Petroleum Gas via pipelines from Songkhla to Thai – Malaysia border. TTM(M), meanwhile, has transported natural gas and Liquefied Petroleum Gas via pipelines from Thai – Malaysia border to Malaysia for utilization within the country. As of 31 December 2021, TTM(T) had the registered and paid-up capital of THB 6,343.6 million while TTM(M) had the registered and paid-up capital of 52.8 million ringgit plus redeemable reference shares amounting to 15 million Ringgit. PTT and Petronas held 50 % of paid-up shares each in both companies.

This investment project is divided into three phases as follows:

#### Phase 1 : Its commercial operations started in 2006

- Its 34-inch undersea natural-gas pipeline from A18 Plot in JDA to Songkhla's Chana district stretches for 267 kilometers, with the capacity to transport up to 1,020 million cubic feet of natural gas per day;
- Its 36-inch land-based natural gas pipeline from Songkhla's Chana district to Thai – Malaysia border in Songkhla's Sadao district stretches for 89 kilometers. From there, a nine-km-long pipeline links the system to Petronas' pipeline in Malaysia's Kedah. They have the capacity to transport up to 750 million cubic feet of natural gas per day;



- Natural Gas Separation Plant 1 has capacity to separate gas which can handle up to 425 million cubic feet of natural gas, which is unloaded from ships in Songkhla. Also, it has the capacity to produce 166,800 tons of Liquefied Petroleum Gas and 43,000 tons of Liquefied Natural Gas per year;
- It installed an 8-inch Liquefied Petroleum Gas pipeline from Natural Gas Separation Plant 1 alongside with natural gas pipeline to Thai – Malaysian borders in Songkhla’s Sadao district, and also a further pipeline over a stretch of 89 kilometers from there to Prai in Malaysia’s Penang, totaling 150 kilometre. They have the capacity to transport up to 1,166 tons of Liquefied Petroleum Gas per day.

#### **Phase 2 : Its commercial operations started in 2008**

- It installed a 42-inch undersea pipeline from Block A18 to PTT’s natural gas pipeline No. 3 over a stretch of 61.5 kilometer. This pipeline started natural-gas transport services on 12 December 2008;
- Its natural gas pipeline from Block B17 in MTJDA connects to the aforementioned 42-inch undersea pipeline. With its construction completed on 25 September 2009, this pipeline has now transported gas from MTJDA-B17 to designated system. PTT has solely used the service of this pipeline.

#### **Phase 3 : Its commercial operations started in 2015**

- It installed a 24-inch undersea pipeline for the transport of natural gas from Block B17. This pipeline stretches for 60 kilometers in JDA Area and another 298 kilometers, connected between JDA and Malaysia’s Kerteh. Its transport of natural gas started on 1 May 2015, with Petronas being the sole user of its transport services.

#### **1) Services**

Trans Thai-Malaysia (Thailand) Company Limited Ltd., and Trans Thai-Malaysia (Malaysia) Sdn. Bhd. provide the transmission service of natural gas and Liquefied Petroleum Gas, including the gas separation services for only PTT and Petronas. Both are the shareholders of the companies under a mutual service agreement. The companies have been providing gas transmission services (onshore and offshore) since January 2006 where the natural gas has processed thru a carbon dioxide separation unit, as well as providing gas separation services and Liquefied Petroleum Gas transmission services since 14 April 2006. Additionally, it has expanded a commercial gas delivery for PTT to Chana Power Plant with a capacity of 131 MMSCFD since the third quarter of 2008 and subsequently increased by 7 MMSCFD, starting from June 2011, to deliver to NGV mother station in Thailand’s southern region. Since December 2006, the pipeline from the MTJDA-A18 gas field, connected to PTT’s third gas pipeline, has lay with a delivery capacity of 300 MMSCFD and began its gas transmission in late 2008. Consequently, the commercial service from MTJDA-B17, connected to PTT’s third gas pipeline on 1 June 2010, has started its service with expanding up to 300 MMSCFD. Besides, on 1 May 2015, the gas commercial transmission service, from the MTJDA-B17 field connected to Petronas’s pipeline at the edge of the JDA to Kerteh, Malaysia, has started. Such expansion generates additional revenue and also helped PTT to procure sufficient gas supply to meet its customers’ needs. This also strengthened stability and increased energy security for Thailand.

As of 31 December 2021, service details were as follows:

• Natural-gas production (Feed Gas) (Block A18)	869	MMSCFD
• Natural-gas production (Feed Gas) (Block B17)	275	MMSCFD
• Gas Delivery (Sales Gas)	345	MMSCFD
• LPG Delivery	140,331	metric tons per year
• NGL Delivery	44,113	metric tons per year



## 2) Management

The boards of directors of TTM(T) and TTM(M), as of 31 December 2021, comprise 6 members each. PTT appoints 3 of them while Petronas appoints three others. Currently, the directors appointed by PTT have served as the chairpersons of the boards. The tenure of the chairpersons lasts three years. The chairmanship has been rotated between directors appointed by PTT and directors appointed by Petronas.

## 3) Finance

The operating results of TTM(T)) between 2019 and 2021 are as follows:

Unit : THB million

Financial statements	2019	2020	2021*
Revenue from sales and services	2,786	2,874	3,054
Total revenue	3,083	3,122	3,281
Total expenses (including taxes)	2,054	2,731	2,104
Net profit (loss)	1,029	391	1,177

Unit : THB million

Financial statements	2019	2020	2021*
Total assets	16,119	13,221	13,637
Total liabilities	7,870	7,119	6,326
Shareholders' equity	8,249	6,102	7,311

\* 2021 data are unaudited.

The operating results of TTM(M) between 2019 and 2021 are as follows:

Unit : Ringgit million

Financial statements	2019	2020	2021*
Revenue from sales and services	74	72	68
Total revenue	90	84	79
Total expenses (including taxes)	60	55	49
Net profit (loss)	31	29	30

Unit : Ringgit million

Financial statements	2019	2020	2021*
Total assets	829	720	624
Total liabilities	560	477	387
Shareholders' equity	269	243	237

\* 2021 data are unaudited.

### 1.1.3 PTT LNG Company Limited (PTTLNG)

PTT established PTT LNG Company Limited (PTTLNG) on 30 August 2004 to operate Liquefied Natural Gas receiving terminal and provide Liquefied Natural Gas storage and regasification services. As of 31 December 2021, PTTLNG had the registered capital of THB 27,748 million and the paid-up capital of THB 26,290.5 million.

#### 1) Nature of Business

Its Liquefied Natural Gas Receiving Terminal 1 (LNG Map Ta Phut Terminal 1: LMPT1) Project is consisted of Liquefied Natural Gas receiving terminal, Liquefied Natural Gas storage tanks, and Liquefied Natural Gas regasification unit with the capacity to handle 11.5 million tons of Liquefied Natural Gas per year. Of the total capacity, five million tons per year will be

achieved in Phase 1 and ramp up to 10 million more tons per year in Phase 2, and there was an additional expansion of phase 2 by 1.5 million ton per year.

## 2) Progress

On 8 December 2016, the National Energy Policy Council passed a resolution to review natural gas demand in Natural Gas Management Plan 2015 – 2036. Also, it approved the expansion of the LNG Receiving Terminal 2 (LNG Map Ta Phut Terminal 2: LMPT2) construction project so as to raise the terminal's annual capacity from 5 million tons to 7.5 million tons per year. Constructions, which are now ongoing, are scheduled for completion in 2022. This terminal is expected to start transporting natural gas in 2022.

On 30 August 2019, the Committee on Energy Policy Administration passed a resolution to assign the Electricity Generating Authority of Thailand (EGAT) to import not exceeding 200,000 tons of spot Liquefied Natural Gas for the test of liberalization in Thailand's natural gas sector. In response to the resolution, EGAT imported two spot Liquefied Natural Gas cargoes. The first cargo shipment of 65,000 tons arrived in December 2019, while the second cargo shipment of 63,350 tons arrived in April 2020.

On 25 January 2020, Liquefied Natural Gas Reloading Facilities at Map Ta Phut LNG Terminal was tested to support Thailand's goal to become the Regional Liquefied Natural Gas Hub.

On 1 October 2021, the Air Separation Unit (ASU) Project started its commercial services that use cold energy from Liquefied Natural Gas regasification process for industrial-gas production process via Map Ta Phut Air Products Company Limited.

## 3) Services

PTTLNG has provided services via its Liquefied Natural Gas Receiving Terminal management. It has collected Liquefied Natural Gas regasification Terminal Tariff from customers who have procured and imported Liquefied Natural Gas themselves.

- Demand Charge : Ld Rate for Years 2018 to 2022 is THB 18.3506 per MMBTU.
- Commodity Charge : Lc Rate for Year 2021 is THB 0.5382 per MMBTU (January – March) and THB 0.5423 per million BTUs (April – December).
- Current customers: PTT and EGAT

## 4) Management

PTTLNG board of directors is consisted of 5 members. Of them, 4 are PTT's executives and one is the representative of the Ministry of Finance, who has been nominated as an expert by PTT.

## 5) Finance

The operating results of PTTLNG between 2019 and 2021 are as follows:

Unit : THB million

Financial statements	2019	2020	2021*
Revenue from sales and services	9,542	9,581	9,691
Total revenue	9,566	9,599	9,705
Total expenses (including taxes)	3,430	2,882	2,743
Net profit (loss)	6,136	6,717	6,942

Financial statements	2019	2020	2021*
Total assets	55,458	56,981	69,394
Total liabilities	17,367	13,344	18,155
Shareholders' equity	38,091	43,637	51,239

\* 2021 data are unaudited.

### 1.1.4 Map Ta Phut Air Products Company Limited (MAP)

PTT Board of Directors, at its meeting on 16 November 2018, issued a resolution for PTT to establish MAP with PTT holding 51% and Bangkok Industrial Gas Company Limited (BIG) holding 49% of MAP's shares. In response to the resolution, PTT registered MAP on 15 January 2019 to operate a business that utilizes excess cold energy from Liquefied Natural Gas and reduce operating cost in Air Separation Unit (ASU) Project for the production and distribution of industrial gases namely nitrogen, oxygen, liquid nitrogen, liquid oxygen, and liquid argon.

#### 1) Nature of Business

- Joint venture with BIG in ASU Project as a Production JVC to produce industrial gases with excess cold energy about 0.67 million tons per year from Liquefied Natural Gas.
- ASU Project utilizes excess cold energy from Liquefied Natural Gas. It has constructed cold air-duct system that links to PTT LNG Receiving Terminal so as to transport Liquefied Natural Gas to its facilities that will take cold energy out from Liquefied Natural Gas. After that, the ASU will send natural gas via ducts back to PTT LNG Receiving Terminal, which will forward it to natural gas users. PTT LNG has invested in the project's air-duct system.
- ASU facilities use manufacturing technologies from Air Products and Chemicals, Inc. (APC), the parent firm of BIG.
- ASU Project occupies about 9.5 rai of land in the Map Ta Phut Industrial Port in Rayong, which is operated by the Industrial Estate Authority of Thailand. Its location sits about one kilometer away from PTT LNG Receiving Terminal.

#### 2) Progress

The construction of ASU facilities was completed on 1 September 2021. Its commercial operation date was 1 October 2021.

#### 3) Distribution

MAP sells industrial gases to BIG, PTT Group, and other users in various industries. Its gases are priced based on Cost Plus formula, which all change in response to production cost. BIG is responsible for retailing. Its customers are in various industries such as freezing industry, electronic industry, metal-welding industry, and hospitals. Retailing operations are done with the transport of gases via both pipelines and trucks.

#### 4) Management

MAP board of directors is consisted of four members. Of them, 2 are PTT's executives and 2 others are BIG's executives.

## 5) Finance

The operating results of MAP between 2019 and 2021 are as follows:

Unit : THB million

Financial statements	2019	2020	2021*
Revenue from sales and services	-	-	195
Total revenue	-	13	200
Total expenses (including taxes)	7	13	170
Net profit (loss)	(7)	-	30

MAP has started its commercial operation since 1 October 2021

Unit : THB million

Financial statements	2019	2020	2021*
Total assets	170	960	1,604
Total liabilities	106	741	1,230
Shareholders' equity	63	219	374

\* 2021 data are unaudited.

### 1.2 Petroleum Exploration and Production

PTT has operated petroleum exploration and production business through its subsidiary which is PTTEP. PTTEP was established on 20 June 1985 with the initial registered capital of THB 400,000 as the E&P Flagship Company of PTT. On 10 June 1993, PTTEP listed on Thai stock market. As of 31 December 2021, PTTEP had the registered capital of THB 3,969,985,400 with PTT has held 63.79 % of PTTEP's registered and paid-up capital.

To operate its petroleum exploration and production business in Thailand and overseas, PTTEP must comply with conditions and laws of relevant countries, which could be in form of (1) Production Sharing Contracts (PSC) (2) Concessions, or (3) Services Agreements. In Thailand, PTTEP also has to adhere to Petroleum Act B.E. 2514 (and amendments).

PTTEP Group has mainly operated in Southeast Asia namely Thailand, Myanmar, Malaysia, Vietnam, and Indonesia. PTTEP has also invested in other regions including Oman, the United Arab Emirates, Algeria, Mozambique, Angola, Kazakhstan, Australia, Canada, Brazil, and Mexico. As of 31 December 2021, PTTEP has conducted more than 40 petroleum exploration and production projects in 15 countries with proved reserves of 1,350 million barrel of oil equivalent consisting of crude oil, condensate and Liquefied Petroleum Gas which were at 357 million barrel and the volume of natural gas which was at 5,973 billion cubic feet. Moreover, the Probable Reserves had the volume of 773 million barrel of oil equivalent. The total proven reserves of PTTEP and its subsidiaries at the year-end of 31 December 2019 - 2021 were as follows:

Unit : million barrel of oil equivalent

Proved reserves	2019	2020	2021
Indigenous Thailand	566	534	605
International	574	540	745
Total	1,140	1,074	1,350

PTTEP, moreover, has invested in new business outside petroleum exploration and production field in pursuit of long-term growth. These investments focus on the development of its current technologies and R&D capabilities that support its current business. PTTEP has urgently expanded its artificial intelligence (AI) and robotics businesses, its renewable energy business, and

new energy business. For example, it has invested in AI & Robotics Ventures Company Limited (ARV) to develop a platform of AI and robotic innovations. Not only that ARV aims to become a tech leader in AI and robotics field, but it also intends to provide forums where young talents are able to apply their concepts and technologies for the commercial market in a systematic manner and make positive changes to the world.

PTTEP has also entered into joint ventures for its investments outside petroleum exploration and production field. For instance, it has co-invested in gas pipeline projects in Myanmar namely the Zawtika Project, the Yadana Project, and the Yetagun Project. PTTEP has also formed joint ventures with PTT Group. For example, PTT and PTTEP jointly invested in Energy Complex Company Limited, which handles office-building constructions, and PTT Global LNG Company Limited for fully-integrated Liquefied Natural Gas business. PTTEP and PTT each held 50% of shares of both companies.

The operating results of PTTEP mainly depend on global crude oil prices, the success of its petroleum exploration and production projects, continued enhancement of operational performance and cost management, and investment opportunities. In summary, its operating results are as follows:

### 1) Production

As of 31 December 2021, the total production capacity of PTTEP and its subsidiaries was 494,877 BOED. The total annual production for 2019 - 2021 is summarized as follows:

Unit : BOED

Production volume	2019	2020	2021
All projects	413,640	422,278	494,877

### 2) Distribution

PTTEP and its subsidiaries have produced four types of products namely crude oil, natural gas, Liquefied Natural Gas, and condensate with most products sold to PTT (Sales to PTT accounted for 68 % of PTTEP's 2021 sales). Regarding natural gas sales and purchases, PTT and PTTEP have signed long-term contracts that are valid for 25 to 30 years. There is also minimum purchase requirement in each year. For crude oil and condensate, the prices under sales agreements between PTT and PTTEP are made in reference to the global crude oil prices, which have similar qualification in order to reflect the value of its product to be as close as the market price.

As of 31 December 2021, the total sales volume of all four types of products by PTTEP and its subsidiaries was approximately 416,141 BOED, increased by 18% when compared to 2020 which is at 354,052 BOED. The sales increased from the acquisition of Oman Block 61 Project in March 2021 and Malaysia Block H Project first gas production in February 2021. Sales of PTTEP and its subsidiaries by product type between 2019 and 2021 are as follows:

Products	2019	2020	2021
Crude oil (thousand barrel per day)	61.16	79.32	70.56
Natural gas (MMSCFD)	1,536.57	1,469	1,828.78
Liquefied Petroleum Gas (metric tons per day)	199.95	182	185.58
Condensate (thousand barrel per day)	38.49	34.95	44.99
All products (BOED)	350,651	354,052	416,141
Average selling prices (USD per barrel of oil equivalent)	47.24	38.92	43.49

### 3) Management

PTT governs PTTEP through its executives nominated as members of the board of directors with authority to define and supervise policies and business activities under good governance. PTTEP board of directors, as of 31 December 2021, consisted of 15 members, 2 of whom were nominated by PTT

### 4) Finance

The operating results of PTTEP between 2019 and 2021 are as follows:

Unit : THB million

Financial statements *	2019	2020	2021
Revenue from sales and services	191,053	160,401	219,068
Total revenue	198,822	167,418	234,631
Total expenses (including taxes)	150,400	146,061	196,256
Net profit (loss)	48,803	22,664	38,864

Unit : THB million

Financial statements *	2019	2020	2021
Total assets	669,464	675,637	783,536
Total liabilities	312,405	321,226	368,186
Shareholders' equity	357,059	354,411	415,350

\* From 1 January 2011, PTTEP has chosen USD as functional currency. Any figure in THB in financial statements therefore is converted from USD.

### 5) Progress of significant projects and projects under development

PTTEP's primary operational base is in Southeast Asia namely Thailand, Myanmar, Malaysia, Vietnam, and Indonesia. In 2021, the average sales volume from projects in Thailand was about 264,382 BOED, which accounted for 64% of total sales volume. In other Southeast Asian nations, the average sales volume was approximately 95,766 BOED, which accounted for 23% of total sales volume.

The key projects progress including: Projects in the Gulf of Thailand such as Bongkot Project, Arthit Project, and Contract 4 Project which were delivered higher production in accordance with higher nomination from the buyer resulted from easing of COVID-19 control measures in 2021. Malaysia Project began first gas production from Malaysia Block H Project in the first quarter of 2021. PTTEP has made gas discovery in Sarawak SK410B which is larger reservoir than the initial estimate as well as discovered new petroleum resources from drilling exploration wells in 3 projects, off the coast of Sarawak. In addition, the company has expanded the investment by acquiring a stake in the Oman Block 61 Project, a large Oman natural gas field. Regarding the transition of the rights of Block G1/61 (Erawan Field) in Thailand, PTTEP has made various preparations so that the installation of subsea production platforms and pipelines can be expedited when the site is accessible and the project can be produced according to the contract as quickly as possible. In December 2021, PTTEP signed an agreement with the existing concessionaire to access to the operating area. Moreover, the company has continued to operate in the area under the existing contract since the beginning of 2022.

For more information, visit PTTEP website: [pttep.com/en/Investorrelations/Regulatorfilings/Annualfiling.aspx](https://pttep.com/en/Investorrelations/Regulatorfilings/Annualfiling.aspx)

### 1.3 Overseas Businesses (Upstream)

#### 1.3.1 PTT Energy Resources Company Limited (PTTER)

PTTER (a wholly owned subsidiary of PTT) was established in October 2007. PTTER has operated the natural gas pipeline system in Arab Republic of Egypt. As of 31 December 2021, PTTER had the registered capital of THB 36,045 million (3,604,500,000 ordinary shares that have the value of THB 10 each). Its paid-up capital was THB 33,703 million.

##### 1) Business Operations

PTT, via PTTER, invested in East Mediterranean Gas S.A.E. (EMG) by acquiring 25% of its shares in December 2007 with the investment budget of THB 16,479 million. PTT supported this investment by granting loans to PTTER.

EMG is the legitimate and sole exporter of natural gas from Egypt to the state of Israel under a bilateral memorandum of understanding (MOU). EMG has also inked agreements to sell/buy natural gas with the Egyptian General Petroleum Corporation (EGPC) and Egyptian Natural Gas Holding Company (EGAS) – both being state enterprises of Egypt – in the volume of 677 MMSCFD for 20 years. Natural gas sold has been delivered through undersea pipelines from Egypt's Al-Arish to Ashkelon in Southern Israel. EMG project started its operations in the first quarter of 2008.

The operation was, however, interrupted and finally suspended due to EGPC/EGAS pipeline explosion, following the ongoing political chaos in Egypt since February 2011, leading to zero natural gas delivery to EMG and significantly affecting EMG's business.

PTT Board of Directors of the meeting No. 1/2564 on 21 January 2021, passed a resolution for PTTER to dispose its investment in EMG – whose 25% of shares were in the hand of PTTER – as well as all related obligations by handing them to Snam S.p.A (Snam) (a firm listed in the Italian stock market) or any of Snam's wholly-owned subsidiaries for the payment of about USD 50 million. PTTER signed sales and purchase agreement with Snam on 29 January 2021. Both parties have already completed the sales and purchase of EMG shares along with related obligations. As a result, the transaction was fully effective on 2 December 2021.

##### 2) Management

As of December 31, 2021, there were 4 directors on the PTTER board of directors, 3 of whom were from PTT and the remaining person was an external independent director.

##### 3) Finance

The operating results of PTTER between 2019 and 2021 are as follows:

Unit : THB million

Financial statements	2019	2020*	2021
Revenue from sales and services	-	-	-
Other revenues	127	114	1,460
Total expenses (including taxes)	158	(409)	136
Net profit (loss)	(31)	523	1,324



Financial statements	2019	2020*	2021
Total assets	1,051	1,564	3,134
Total liabilities	36	50	67
Shareholders' equity	1,016	1,514	3,067

\* In 2020, reversal of doubtful debts of THB 513 million due to the restructuring of coal business investments.

### 1.3.2 PTT Global Management Company Limited (PTTGM)

PTTGM was established as a holding company to facilitate PTT's investments in both Thailand and overseas. PTT has held all registered and paid-up shares of PTTGM. As of 31 December 2021, PTTGM had the registered capital of THB 57,735 million, of which THB 55,343 million was fully paid.

#### 1) Business Operations

Investment in a coal business details are as follows:

PTT Mining Limited (PTTML) is a wholly owned subsidiary of PTTGM (directly and indirectly), incorporated in Hong Kong, China. Currently, PTTML has the registered capital of USD 497,680,942.05, of which USD 497,680,942.05 was fully paid. Its investment details are as follows:

- It has held 95.82% of shares in Sakari Resources Limited (SAR), a Singapore based company. SAR has operated coal mines in Indonesia including Sebuken Mine and Jembayan Mine. Moreover, SAR has conducted coal trade in Singapore via Tiger Energy Trading Pte Limited (TET).
- It has held, via a subsidiary, 80.00% of shares in Madagascar Consolidated Mining SA (MCM) that is a joint venture with the nominating entity of Government of Madagascar. MCM has explored and developed coal mines in Madagascar's Sakoa Coal Field, located in the southwestern part of the country, this field has solid potential for the production of coal that can be exported and fuel used for coal-fired power plants and various industrial applications especially in India and Western Europe. Currently, MCM has already obtained a license to produce coal from the Government of Madagascar. However, because historical coal prices have fallen lately, its project development has been postponed.
- It has held, via a subsidiary, 35% of shares in Fee (Bru) Pte Ltd. This joint venture used to win the right to explore coal fields in Brunei.
- As of 31 December 2021, PTT was in the process of divesting its coal business in line with its strategies.

Regarding SAR's operating results, it sold 6 million tons of coals in 2021 and recorded the net loss of USD 96 million.

To accommodate PTT's and PTT Group's investments in New S-Curve, PTTGM has set up the subsidiary companies in response to PTT's objectives for agility purposes. Its New S-Curve investments cover EV value chain businesses and Life Science businesses such as pharmaceutical business, nutrition business, and medical-device and diagnosis business. In addition, investments have extended to a wide range of information services including AI, Robotics and Digitalization. However, as New S-Curve businesses are still in their infancy, they have not yet generated a significant amount of revenue for PTTGM.

## 2) Management

PTTGM Board of Directors, as of 31 December 2021, is consisted of 3 members. 2 of them are PTT executives and one is a representative of the Ministry of Finance.

## 3) Finance

The overall operating results of PTTGM between 2019 and 2021 are as follows:

Unit : THB million

Financial statements	2019	2020	2021
Revenue from sales and services	15,380	11,057	16,984
Other revenues	206	470	814
Total expenses (including taxes)	13,657	18,606	14,285
Net profit (loss)	1,929	(7,079)	3,513

Unit : THB million

Financial statements	2019	2020	2021
Total assets	28,247	39,519	62,227
Total liabilities	7,619	19,706	27,504
Shareholders' equity	20,628	19,813	34,723

### 1.3.3 PTT Green Energy Company Limited (PTTGE)

PTT Green Energy Company Limited (PTTGE) was registered as a wholly owned subsidiary of PTT on 14 September 2007, with an initial capital of THB 833 million, with a primary business objective to invest in palm plantation and crude palm oil production. Currently, PTTGE's registered capital has risen to THB 12,403 million. However, the assets under PTTGE is not appropriate for palm plantation at the international standard level. The performance failed to meet the business targets and the investment plans could not provide a positive yield as higher cost and operating expenses. As a result, in 2014, the PTT Board of Directors decided at Board Meeting No. 5/2557 to resolve and liquidate the projects under PTTGE.

## 1) Business Progress

PTTGE fully completed the liquidation of its subsidiaries PTT Green Energy (Hong Kong) Limited, Kalimantan Thailand Palm Pte. Ltd., and Sabran Brothers Pte. Ltd., on 6 April 2018, 4 July 2018, and 14 November 2019, respectively. Currently, PTTGE has 2 active entities: PTT Green Energy Pte. Ltd. (a Singaporean registered company) and PTT Green Energy (Thailand) Co., Ltd. (a Thai registered company).

## 2) Management

As of 31 December 2021, PTTGE had 4 directors on its board of directors, 3 of whom were executives from PTT and the other was an independent director.

## 3) Finance

The operating results of PTTGE between 2019 and 2021 are as follows:

Unit : USD million

Financial statements	2019	2020	2021*
Total revenue	1	0	2
Total expenses (including taxes)	10	(1)	(1)
Net profit (loss)	(9)	(1)	1

Unit : USD million

Financial statements	2019	2020	2021*
Total assets	18	18	18
Total liabilities	0.2	1	0.4
Shareholders' equity	17.8	17	17.6

\* 2021 data are unaudited.

### 1.3.4 PTT Global LNG Company Limited (PTTGL)

PTTGL was registered on 23 June 2017, which was a 50:50 joint venture between PTT and PTTEP. PTTGL's registered capital stood at THB 10,421 million, calculated from 10,421,446 common shares with a par value of THB 1,000 per share; THB 10,421 million was fully paid.

#### 1) Business Operations

Presently, PTTGL has invested in Liquefied Natural Gas Value Chain businesses overseas. PTTGL has set up PTTGL Investment Limited (PTTGLI) in Hong Kong, China, with the registered capital of USD 25,000 and has held all of its shares. PTTGLI has acquired 10% of the shares of PETRONAS LNG 9 Sdn Bhd (PL9SB), which has operated an Liquefied Natural Gas liquefaction plant or Liquefaction Train 9 Project and facilities around PETRONAS LNG Complex in Malaysia's Sarawak. Its annual production capacity totals 3.6 million tons. Its Liquefied Natural Gas has been distributed to customers across Asia. This investment marks PTTGL's first step into the Liquefied Natural Gas Value Chain sector. In 2021, PTTGL invested in B. Grimm Power LNG JV Company Limited by held 50% of the company's shares with B. Grimm Power Public Company Limited equally. This company has the objectives to operate businesses related to Liquefied Natural Gas procurement and distribution and also to explore other opportunities in Liquefied Natural Gas value chain both in Thailand and overseas. Such investments are in line with PTT's strategies to shift towards transition fuel and to achieve strategic partnerships in search of greater business opportunities.

#### 1) Management

PTTGL Board of Directors, as of 31 December 2021, is consisted of 4 members. 2 of them are PTT executives while 2 others are PTTEP executives.

#### 2) Finance

The operations results of PTTGL between 2019 and 2021 are as follows:

Unit : USD million

Financial statements	2019	2020	2021*
Total revenue	6.5	5.5	2.1
Total expenses (including taxes)	11	7.3	5.3
Net profit (loss)	(4.5)	(1.8)	(3.2)

Financial statements	2019	2020	2021*
Total assets	438	379	339
Total liabilities	134	120	84
Shareholders' equity	304	259	255

\*2021 data are unaudited.

## **2. Downstream Businesses Invested through PTT Group**

### **2.1 International Trading**

#### **2.1.1 PTT International Trading Pte. Ltd. (PTTT)**

PTTT registered in Singapore as a company on 1 December 2000, wholly-owned subsidiary of PTT. PTTT has a registered and paid-up capital of SGD 6.1 million. The objective is to undertake full-fledged international trading transactions through commodity storage, blending, administration, chartering service and price risk management for crude oil, petroleum products, petrochemicals, products related to energy, and other commodities to generate revenue, create value added, and represent a platform for transaction expansion in the Eastern together with energy security.

PTTT has a subsidiary, PTT MEA LTD. (PTTMEA), located in Abu Dhabi of the United Arab Emirates, PTT MEA was established on 21 February 2021 to engage in ICE Futures Abu Dhabi (IFAD) trading and expand trade network in the Middle East. PTTT also has a representative office which is PTT International Trading Shanghai Representative Office. This bureau has coordinated for trading activities and provided market data related to China and nearby regions.

#### **1) Trading and Services**

Its full-scale international-trading activities are conducted via storage, blending, management, and distribution through the sales and purchase of commodities, chartering service and price risk management through derivatives. PTTT also focuses on Asia market and intercontinental market associated with other subsidiaries of the International Trading Business unit and PTT Group.

#### **2) Management**

PTTT Board of Directors is consisted of 6 members. 5 of them are PTT executives and one is a representative of the Ministry of Finance.

#### **3) Finance**

The operating results of PTTT and its subsidiary between 2019 and 2021 are as follows:

Unit : USD million

Financial statements	2019	2020	2021
Revenue from sales and services	13,255	8,553	15,316
Total revenue	13,281	8,565	15,320
Total expenses (including taxes)	13,265	8,524	15,302
Net profit (loss)	16	41	18

Unit : USD million

Financial statements	2019	2020	2021
Total assets	1,737	1,084	1,614
Total liabilities	1,628	936	1,451
Shareholders' equity	109	148	163

### 2.1.2 PTT International Trading London Ltd. (PTTT LDN)

PTT International Trading London Ltd. (PTTT LDN) was established on 24 October 2016 in London, Britain, with the registered capital of USD 26.5 million and the paid up capital of USD 10.5 million. PTT holds all of PTTT LDN's shares. PTTT LDN has the business objectives to conduct full-scale international-trading activities and seek value-generation opportunities from new transactions that could arise by connecting the Western World with the Eastern World. Its trading transactions cover crude oils and petroleum products, together with chartering service and efficient price-risk management services.

PTTT LDN has played a key role in seeking trade data and price movements in the Western World which enabled PTT to get the products' updated data from around-the-clock. PTTT LDN is located in a strategic derivative zone in Britain. It therefore enjoys advantages and achieves better trading activities and more efficient price-risk management.

#### 1) Trading and Services

PTTT LDN has conducted trading activities outside Thailand. Its businesses are engaged in the purchases and sales of commodities, the provision of chartering service, and price-risk management services via derivatives. While PTTT LDN treats Europe and Africa as its major markets as well as intercontinental market associated with other subsidiaries of the International Trading Business unit and PTT Group.

#### 2) Management

PTTT LDN Board of Directors is consisted of 6 members. 5 are PTT executives while the other represents the Ministry of Finance.

#### 3) Finance

The operating results of PTTT LDN between 2019 and 2021 are as follows:

Unit : USD million

Financial statements	2019	2020	2021
Revenue from sales and services	2,344	1,141	2,046
Total revenue	2,357	1,159	2,053
Total expenses (including taxes)	2,346	1,145	2,044
Net profit (loss)	11	14	9

Unit : USD million

Financial statements	2019	2020	2021
Total assets	460	149	357
Total liabilities	435	111	311
Shareholders' equity	25	38	46

### 2.1.3 PTT International Trading USA Inc. (PTTT USA)

PTTT USA was registered on 2 April 2020 in Houston, the United States, with the registered capital of USD 15 million and the paid-up capital of USD 5 million which is a wholly owned subsidiary of PTT. PTTT USA's objective is to conduct full-scale international trading activities with a focus on America (North America, Central America, and Latin America), including pursuing opportunities to upgrade transactions within America and between the continent and others, and to procure feedstock for PTT Group's refineries and/or petrochemical plants which reduce dependence on Middle East whereby political risks are relatively high. Its transactions cover crude oils, petroleum products, petrochemical products, chartering service, and price risk management.

Moreover, PTTT USA's key role is to pursue data on product trading and price movement in the Americas and the world's foremost derivative market in the US, contributing to PTT's efficiency of trading and hedging, thanks to around-the-clock product data availability.

#### 1) Trading and Services

PTTT USA engages in full-fledged international trading by purchasing and selling commodities and providing chartering and hedging services through derivatives. PTTT USA focuses on the primary markets in North America and South America, including intercontinental trading associated with other subsidiaries under PTT's International Trading Business unit and PTT Group.

#### 2) Management

PTTT USA Board of Directors has 3 members who are all PTT executives.

#### 3) Finance

PTTT USA's operating results in 2020 - 2021 are as follows:

Unit: USD million

Financial statements	2020	2021
Revenue from sales and services	-	234
Total revenue	-	234
Total expenses (including taxes)	-	232
Net profit (loss)	-	2

Unit: USD million

Financial statements	2020	2021
Total assets	5	8
Total liabilities	0	1
Shareholders' equity	5	7

## 2.2 Petrochemicals and Refinery, Oil and Retail business

### 2.2.1 PTT Global Chemical Public Company Limited (GC)

PTT Global Chemical Public Company Limited (GC) is involved in integrated petrochemicals and refining with a total production capacity 13.95 million tons per year of petrochemical and chemical products and a total refining capacity for crude oil and condensate of about 280,000 barrels per day (BPD). GC is PTT Group's petrochemical flagship. PTT holds 45.18% of shares in the company, as of 31 December 2021.

GC has 3 core business groups, as follows:

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

In addition to the 3 major business groups mentioned above, GC also offers the service of providing utilities and others such as storage and transport of products for GC factories located in the Map Ta Phut Industrial Estate, Rayong province.

As of 31 December 2021, GC's installed nameplate capacity for its products is as follows:

Product	Installed production capacity	
	)Ton per year, except otherwise stated(	
Refinery) <sup>1</sup> .....	280,000	
Aromatics factory .....	2,419,000	
Olefins plant .....	3,738,000	
Polymer) <sup>2</sup> .....	3,667,000	
Ethylene oxide .....	473,000	
Green chemicals) <sup>2</sup> .....	793,000	
Phenol.....	954,000	
Performance materials and chemicals) <sup>2</sup>	1,903,000	

Remarks:

- (1) Raw materials entering the crude distillation unit (CDU) are measured in barrels per day, including 145,000 barrels per day for crude distillation and 135,000 barrels per day for condensate distillation.
- (2) Polymer products, Green chemicals, and Performance materials and chemicals from companies in which GC holds at least 25% of shares.

The following is GC's production capacity and utilization rate of its refinery, olefins plant and aromatics plant over the recent years:

	Production capacity	2019 <sup>1</sup>	2020 <sup>2</sup>	2021 <sup>3</sup>
		Utilization rate (%)	Utilization rate (%)	Utilization rate (%)
Refinery	280 thousand barrels per day	87	97	95
Olefins plant	3,738 thousand tons per year	102	97	91
Aromatics plant	2,419 thousand tons per year	88	96	99

<sup>1</sup> In 2019, there were planned maintenance shutdown of main production; Aromatics Plant 1 in May and June for 49 days and refinery in October and November for 52 days.

<sup>2</sup> In 2020, there were planned maintenance shutdown of main production; Olefins Plants 2/1 and 2/2 from January to March for 74 days and the Oleflex Production Unit between March and April for 37 days.

<sup>3</sup> In 2021, oleflex production units was closed for maintenance from October to November for 37 days.

## 1) Procurement

Raw materials used in the production of petroleum and aromatics products include: 1) Imported crude oil, and 2) condensate obtained from both domestic and international sources. PTT is responsible for procuring crude oil and other raw materials including condensate under a feedstock supply agreement which the price structure based on the market prices.

Raw materials used in the production of olefins products are ethane, propane, Liquefied Petroleum Gas, NGL, and light naphtha. Most of the raw materials are acquired from domestical sources, and PTT is responsible for procuring natural gas from its gas separation plants under a long-term supply agreement.



## 2) Distribution

Refined products are purchased by PTT Oil and Retail Business Plc.(OR) under a product offtake agreement from GC based on market prices.

Most of GC's aromatics products are sold under long-terms agreements to domestic customers, including PTT, as well as overseas and the United States of America at prices based on the market prices.

GC's olefins products are sold under long-terms agreements to related petrochemical plants, most of them belong to the company's shareholders or their affiliates.

Regarding plastic pellet products, GC enters into an agreement with a domestic agent and international trader for the distribution of polyethylene plastic pellets under the trademark "InnoPlus" and "Plasmate" and polystyrene plastic pellets under the trademark "Diarex". GC sells all its products through GC Marketing Solutions Company Limited (GCM), which is established for marketing and distributing polymer products both domestically and internationally to GC Group. Also, GC sells other plastic pellet products through its subsidiary and joint venture.

## 3) Management

GC's Board of Directors, as of 31 December 2021, consists of 15 members, 4 of whom were appointed by PTT. PTT also delegate its executives to GC management, including the CEO

## 4) Finance

GC's comparative performance results between 2019 and 2021 are as follows:

Unit: THB million

Consolidated financial statements	2019	2020	2021
Revenue from sales and services	412,810	329,291	468,953
Total revenue	422,974	335,716	492,126
Total expenses (including taxes)	410,625	335,064	446,576
Net profit (loss) *	12,349	652	45,550
Net profit (loss) of the major shareholder	11,682	200	44,982

Unit: THB million

Consolidated financial statements	2019	2020	2021
Total assets	452,514	489,383	754,115
Total liabilities	158,919	200,389	426,512
Shareholders' equity	293,595	288,994	327,603

\* Profit (loss) of the major shareholder after deducting the portion of non-controlling interests. The profit (loss) of the non-controlling interests totals THB 667 million in 2019, THB 452 million in 2020, and THB 452 million in 2021.

## 5) Projects

### 5.1.1 High Value Business: HVB

According to GC's strategy to further build its position in HVB business, the company acquired Allnex Holding GmbH (Allnex) for EUR 4,100 million. The company fund from operation cash, loan from banks, and inter-company loan from PTT to support this acquisition which was completed on 29 December 2021. The acquisition of Allnex highly fits to the company group's growth strategy with aim to fulfill customer's need under global megatrend. The company expects to collaborate with

Allnex to enhance its competitive edge and to preserve Allnex's strength while creating more opportunities and synergies in business, growth, innovation, and operation excellence.

#### **5.1.2 Olefins Reconfiguration Project**

GC invests in a new olefins reconfiguration project (ORP) using naphtha and liquefied petroleum gas (LPG) as the major feedstock. The plant is capable of producing 500,000 tons of ethylene and 250,000 tons of propylene per year. As a result, GC's installed olefins capacity will be increased from 2,988,000 tons per year to 3,738,000 tons per year. This project started commercial operation since June 2021.

#### **5.1.3 High-quality recycled plastics project**

GC has invested through a joint venture, Envicco Company Limited with the objective to produce and sell recycled plastic products of the rPET and rHDPE, with a total capacity of 45,000 tons per year which consists of 30,000 tons per year for rPET and 15,000 tons per year for rHPDE. Commercial operation is expected to start in the first quarter of 2022.

#### **5.1.4 High-engineered plastics project**

GC sets up a joint venture, Kuraray GC Advanced Materials Company Limited for the production and distribution of high-engineered plastics, such as High Heat Resistant Polyamide-9T (PA9T), with the production capacity of 13,000 tons per year, and Hydrogenated Styrenic Block Copolymer (HSBC), with the capacity of 16,000 tons per year. The plant is expected to start commercial operation in 2022.

#### **5.1.5 Olefins 2 modification project**

GC has obtained the approval to implement the olefins 2 modification project, with the use of propane as an additional feedstock. Commercial operation is expected to start in the first quarter of 2023.

#### **5.1.6 Other projects**

The PTA1 plant, with the total capacity of 470,000 tons per year, underwent an improvement of efficiency and resumed its operation in early April 2021, with an increased capacity of 1,440,000 tons per year. The project of expanding the production capacity of the PET plant, from 147,000 tons per year to 200,000 tons per year, was completed in June 2021 as planned.

*For additional details, visit the company's website, at: [pttgcgroup.com/en/investor-relations/document/annual-filings](https://pttgcgroup.com/en/investor-relations/document/annual-filings)*

### **2.2.2 Thai Oil Public Company Limited (TOP)**

Thai Oil Public Company Limited, or Thairoil, is Thailand's largest business operator in refinery and petroleum distribution. Its refinery is among the ones with highest efficiency in the Asia-Pacific region. The company's main business focuses on petroleum oil refinery, with the present nameplate capacity of 275,000 barrels per day, or 22.1% of the country's overall refinery nameplate capacity. Domestic distribution accounts for 80% of the total capacity. The company also expands its investment into the business of producing aromatics, with the current production capacity of 838,000 tons per year, surface-active agent (LAB), olefins, electricity generation, alternative energy, and solvent. As of 31 December 2021, PTT holds 45.03% of shares in the company.

The following is TOP's production capacity and utilization rate of its refinery and aromatics plant for the periods indicated:

	Production capacity	2019 <sup>/1</sup>	2020 <sup>/2</sup>	2021
		Utilization rate (%)	Utilization rate (%)	Utilization rate (%)
Refinery	275,000 barrels per day	107	101	100
Aromatics plant	838,000 tons per year	70	71	87

<sup>/1</sup> In 2019, there were major maintenance shutdown at Crude Distillation Unit 3 (CDU-3) and related production units, and a tie-in activity under the Clean Fuel Project (CFP) project including aromatics production unit, between mid-June and late July 2019.

<sup>/2</sup> In 2020, a major maintenance shutdown was carried out at LAB production unit from mid-July to late August 2020.

### 1) Procurement

TOP's production uses crude oil obtained from both domestic and international sources. Most of the imported crude oil is shipped from the Middle East, transported by sea freight. For domestic crude oil is transported by train and sea freight. The selection of crude oil is based on the price and the expected returns. PTT is responsible for procuring crude oil under a crude supply agreement in line with a price structure based on the market prices.

### 2) Distribution

In 2021, TOP distributed 80% of its products in the domestic market while exporting the remaining 20%. OR, the main distributor of PTT Group's refined products, is responsible for purchasing TOP's oil products under a product offtake agreement based on the market prices.

2019	2020	2021
Proportion of domestic/international sale (%)	Proportion of domestic/international sale (%)	Proportion of domestic/international sale (%)
88/12	87/13	80/20

### 3) Management

As of 31 December 2021, TOP's Board of Directors is consisted of 15 members, 5 of whom are PTT executives. PTT also delegate its executives to TOP management, including the Presiden & CEO.

### 4) Finance

TOP's performance results between 2019 and 2021 are as follows:

Unit: THB million

Consolidated financial statements	2019 <sup>(1)</sup>	2020	2021
Revenue from sales and services	361,768	242,840	335,827
Total revenue *	369,056	259,104	348,308
Total expenses **	362,540	261,986	335,305
Net profit (loss) ***	6,516	(2,882)	13,003
Net profit (loss) of the major shareholder	6,277	(3,301)	12,578

Consolidated financial statements	2019	2020	2021
Total assets	283,445	306,188	362,144
Total liabilities	159,521	186,069	239,050
Shareholders' equity	123,924	120,119	123,094

(1) Adjusted to impact on financial statements under Financial Reporting Standards No. 5 regarding non-current assets held for sale and discontinued operations.

\* Includes share of profit from investments in joint ventures and associates: THB 1,276 million in 2019, THB 2,492 million in 2020, and THB 1,675 million in 2021.

\*\* Includes income tax items (income tax credit) of THB 1,240 million in 2019, THB (647) million in 2020, and THB 2,034 million in 2021, as well as the financial costs of THB 3,224 million in 2019, THB 4,292 million in 2020, and THB 3,595 million in 2021.

\*\*\* Profits belonging to major shareholders after deducting that of minority shareholders; the profit (loss) shares of non-controlling interests amounted to THB 239 million in 2019, THB (419) million in 2020, and THB 425 million in 2021.

## 5) Projects

### 5.1 Clean Fuel Project (CFP)

CFP is a project aimed at increasing the competitiveness of refineries by expanding the refinery capacity from 275,000 barrels per day to 400,000 barrels per day. This can bring about economies of scale, with reduced production cost and enhanced flexibility in receiving crude oil. As a result, the refinery can increase its heavy crude processing by 40-50 %, add value to products by turning fuel oil into aviation fuel and diesel, which have higher value. Also, the refinery is capable of producing gasoline and diesel oil that meet the Euro 5 standard for improved environment and quality of life. This project requires an investment of about USD 4,825 million. CFP began in 2018, the project has progressed by 81% as of 31 December 2021. In addition to its construction, currently, the project also involves different activities, including the preparation for procuring crude oil and selling products, review of the possibility to receive different types of crude oil beyond the original design, in case of price fluctuation, as well as preparations for public utilities, infrastructures and the workforce. Commercial operation is expected to start in 2023.

### 5.2 Olefins business co-investment project

TOP has invested in PT Chandra Asri Petrochemical Tbk (CAP), which is Indonesia's largest producer of integrated chemical products, with years of experience and expertise in the petrochemical sector. TOP investment is made through a new subsidiary set up in the Republic of Indonesia, "PT TOP Investment Indonesia (TII)". On 29 July 2021, TII entered into agreements with the original major shareholders and taking 15% of CAP's shares, at the total price of no more than USD 914 million, or about THB 30,222 million. This project is consistent with TOP's long-term strategy of diversifying investments into growing petrochemical markets. Business expansion into the petrochemical sector is executed through extension of its existing hydrocarbon business's downstream supply chain.

For additional details, visit the company's website, at: [investor.thaioilgroup.com/form\\_561\\_one\\_report.html](http://investor.thaioilgroup.com/form_561_one_report.html)

### 2.2.3 IRPC Public Company Limited (IRPC)

IRPC Public Company Limited (IRPC) is involved in an integrated petrochemical business. Its refinery has the production capacity of 215,000 barrels per day, accounting for 17.31% of the country's total refinery capacity. As of 31 December 2021, PTT holds 45.05 % of the company's shares.

IRPC's refinery is capable of producing various petroleum products, including naphtha and liquefied petroleum gas (LPG). The company is able to produce 320,000 tons of lubricant oils per year and 600,000 tons of asphalt per year. Also, IRPC is a producer of petrochemical products such as olefins and aromatics, with the production capacity of 1,221,000 and 367,000 tons

per year, respectively. These upstream petrochemical products are feedstocks in the production of different plastic pellets, including HDPE and PP, with the production capacity of 915,000 tons per year, as well as styrenics (ABS, SAN, PS, and EPS), with the production capacity of 352,000 tons per year. These products are sold to producers to use as raw materials in the production of numerous plastic wares, and purchase orders are from both domestic and overseas customers. Moreover, IRPC has public utilities to support its operation, including deep-sea port, oil storage and power plant, which gives the company an edge in management and the economy of scale such as cost of transporting raw materials.

The following is IRPC's production capacity and utilization rate of its refinery, olefins plant, and aromatics and styrenics plant for the periods indicated:

	Production capacity	2019 <sup>1</sup>	2020 <sup>2</sup>	2021 <sup>3</sup>
		Utilization rate (%)	Utilization rate (%)	Utilization rate (%)
Refinery	215,000 barrels per day	92	89	89
Olefins plant	1,611,000 tons per year	95	93	95
Aromatics and styrenics plants	1,194,000 tons per year	93	98	99

<sup>1</sup> In 2019, there were planned shutdown of its main production units: RDCC plant (28 days) and ADU 1 refinery (18 days).

<sup>2</sup> In 2020, there were planned shutdown of its main production units: RDCC plant (27 days).

<sup>3</sup> In 2021, there were planned shutdown of its main production units: RDCC plant (45 days).

### 1) Procurement

The company's principle feedstock is crude oil, accounting for 83%. Most of the crude oil used in the production process is imported from Middle East sources by sea freight. The company has a policy of acquiring the feedstocks from sources that generate maximum returns. PTT is responsible for procuring most of the crude oil under the crude oil supply agreement, with the price structure based on the market prices.

### 2) Distribution

In 2021, IRPC sold 59% of its products in the domestic market and exported 41% of the net revenue from sales of total petroleum products.

Petrochemical products: In 2021, IRPC sold 56% of its products in the domestic market and exported the remaining 44% of the net revenue from sales of total petrochemical products. Distribution of petrochemical products is executed through distributors and direct sale while overseas sale is made through trade representatives based out of the country.

### 3) Management

IRPC's Board of Directors is consisted of 14 members as of 31 December 2021. 4 of them are PTT executives appointed to serve in managerial posts at IRPC, including the company's president and chief executive officer.

### 4) Finance

The performance results of IRPC between 2019 and 2021 are as follows:

Unit: THB million

Consolidated financial statements	2019	2020	2021
Revenue from sales and services	239,315	174,463	255,115
Total revenue	243,632	175,802	255,393
Total expenses (including taxes) *	244,778	181,932	240,860
Net profit (loss)**	(1,146)	(6,130)	14,533
Net profit (loss) of the major shareholder	(1,174)	(6,152)	14,505

Unit: THB million

Consolidated financial statements	2019	2020	2021
Total assets	177,850	173,491	190,492
Total liabilities	94,448	97,825	102,780
Shareholders' equity	83,402	75,666	87,712

\*Includes income taxes: THB 779 million in 2019, THB 1,554 million in 2020, and THB 2,351 million in 2021.

\*\* Net profit (loss) of the major shareholder after deducting those of minority shareholders; the profit (loss) shares of non-controlling interests amounted to THB 28 million in 2019, THB 22 million in 2020, and THB 28 million in 2021

## 5) Projects

### 5.1 Ultra Clean Fuel (UCF) project

The objective of the UCF Project is to increase refinery plant's efficiency and upgrade diesel quality to meet the Euro 5 (Euro V) standard in accordance with the Ministry of Energy's policy determining that starting from 1 January 2024, diesel distribution must meet Euro V standards. Under the Euro V standard, the permitted sulfur level will decline to 10 parts per million (PPM) from 50 PPM under Euro 4. The project will increase the Company's competitiveness through the rising demand for low sulfur diesel in domestic market and ASEAN Economic Community (AEC). The UCF project is able to reinforce competitiveness of the company involving diesel as a main product; besides, the project is environmentally friendly and in line with the company's Eco Factory policy. Meanwhile, the Board of Directors approved the Final Investment Decision (FID) in the third quarter of 2021. Currently, the project is under a construction process and has been planned to commercial operate within the first quarter of 2024. Once the project is completed, the company's capacity will be able to convert entire high-sulfur diesel to low-sulfur diesel following Euro V standards.

### 5.2 ABS powder expansion project

The project aims to upgrade the polymerization unit for improved quality of the ABS powder produced, in addition to reducing the production cost and boosting the production capacity by 6,000 tons per year. As a result, fewer volatile organic compounds will be released into the environment and instead are recycled in the production process. ABS powder products can be used for variety purpose, particularly improving recycled plastic pellets now in high demand continuously. Commercial operation of the project began in April 2021.

For more details, visit the company's website: [irpc.co.th/en/annualreport\\_post/annual-report/](http://irpc.co.th/en/annualreport_post/annual-report/)

#### 2.2.4 PTT Oil and Retail Business Public Company Limited (OR)

PTT Oil and Retail Business Public Company Limited (OR) is the PTT Group's flagship company involved in the oil and retail business. The company was listed on the Stock Exchange of Thailand in February 2021. As of 31 December 2021, PTT holds 75.00% of the company's shares.

OR carries out its business as a leading retailer both inside and outside of oil stations, responding to all customer needs. Its operation covers 3 major business groups including, Mobility, Lifestyle and Global.

## **1) Operations by business group**

### 1.1 Mobility group

OR is involved in the integrated energy business with seamless mobility, consistent with the future trend of energy use. The scope of business has been expanded beyond the oil ecosystem towards the energy solution ecosystem. OR conducts petroleum-products marketing through the retail and commercial market sectors. Regarding the retail market, OR sells petroleum products and lubricants mainly to motorists and other retail customers through its service stations under the brand PTT Station. In the commercial market, OR sells petroleum products and other products to commercial customers, including industrial factories, airlines and gas filling plants, as well as lubricants and FIT Auto service centers. Moreover, OR has installed charging stations for the electric vehicles, with an expansion plan to cover major routes throughout the country in the future.

### 1.2 Lifestyle group

OR engages in businesses that respond to all lifestyles of the customers, expanding beyond the F&B ecosystem into the one-stop solution ecosystem. These include: (1) Food and beverage, such as coffee business under the brand Café Amazon selling coffee and other drinks, bakeries and snacks, as well as fried chicken business under the brand Texas Chicken, of which OR is the only licensee in Thailand. Also, the company has diversified its products by investing in potential SMEs, such as “Ohkajhu” healthy-food restaurant, “Pacamara” specialty coffee, “Kamu Tea” tea shop, and “Kouen Premium Buffet” and “Ono Sushi” Japanese-food restaurants, (2) Other businesses, including convenience stores that sell foods, drinks and various basic necessities under the brand “Jiffy”, and “7-Eleven. under the collaboration agreement with CP ALL. Moreover, OR offers the service of space management by providing rental space and other services to the various Thai and foreign brands.

### 1.3 Global group

OR has expanded its business base for success and acceptance in the global market. The overseas expansion is executed through building on the existing Mobility business involving petroleum products, such as diesel, gasoline, aviation fuel, fuel oil, lubricants and other petroleum products. Also, the overseas expansion is executed through the Lifestyle business involving coffee shops under the brand “Café Amazon” and “Jiffy” convenience store. At present, OR has businesses in 10 countries, including Philippines, Cambodia, Laos, China, Myanmar and Vietnam.

## **2) Product procurement and preparation**

Procurement of petroleum products is executed through procurement or offtaking contracts with refineries owned by the PTT Group or an outsider. Certain petroleum products including gasoline are procured from importers, in addition to the purchases from refineries in Thailand, for a variety of sources. The purchased petroleum products are transported through transmission pipelines, or by ship, truck and train to OR’s storage network.

Liquefied petroleum gas is procured mainly by PTT, which OR purchases directly from PTT’s gas separation plants. Condensate and methanol are procured for a particular group of customers. Ethanol, biodiesel (B100), and fuel additives are purchased from selected distributors, as ingredients for gasohol and diesel before they are made available for the customers.

Base oils for lubricants are procured from Thai Lube Base Public Company Limited, IRPC and other domestic and overseas distributors. Additives for lubricants are acquired from domestic and overseas distributors.

Coffee beans for Café Amazon shops are procured from local producers in Thailand, including the Royal Project Foundation, Sarn Palung Social Enterprise Company Limited, community enterprises and cooperatives. This is aimed at encouraging local communities and farmers to grow coffee. For the Café Amazon business based overseas, coffee beans are



procured from local sources in countries that are major producers while, in other countries, roasted coffee beans are sent from Thailand. Other related raw materials for Café Amazon, such as condensed milk, evaporated milk, powdered drink mixes, cups and drinking straws, are procured from local potential producers and leading producers in their respective industries.

For other food and beverage shops under the brand “Texas Chicken”, raw materials are mainly procured from wholesalers.

Regarding 7-Eleven convenience stores, CP ALL is responsible for procuring goods, as it owns all goods available at 7-Eleven outlets located within the OR network. For Jiffy convenience stores, trade agreements are reached with producers and/or distributors with no timeframe for procurement of goods, in order to make the procurement as needed.

### 3) Distribution and marketing

Distribution channels cover all regions of Thailand and areas in the Philippines, Cambodia, Laos, as well as Japan, Oman, Singapore, Myanmar, Malaysia and China. These include oil stations, Liquefied Petroleum Gas stations, cooking gas shops, FIT Auto service centers, Café Amazon outlets, other food and drink shops, and convenience stores.

### 4) Projects

**Mobility business:** A major plan for expanding the network of oil stations under the brand “PTT Station” calls for construction of new oil stations, renovation of existing oil stations, as improvement of the oil products’ quality, in order to raise competitiveness and customer confidence. Also, there is a marketing plan for storage terminal and distribution centers, as well as the use of clean energy. OR has an investment plan to expand the EV Station network at PTT service stations, along with promoting various types of clean energy. Moreover, the company offers solutions for efficient energy consumption.

**Lifestyle business:** A major plan calls for a continued expansion of the network of retail outlets to meet the growing demand in the market. There is a plan to open new Café Amazon and Texas Chicken outlets, as well as expanding the existing network of convenience stores and the space management business. The company seeks opportunities for joint ventures (JV) or mergers and acquisitions (M&A) to meet the rapidly changing customer needs. In addition to the food and beverage business, OR is also looking for other growing sectors, including tourism and health & wellness.

**Global business:** The company has a plan to expand the network of oil stations and seeks opportunities of M&A and/or JV in overseas. For instance, OR set up a JV in Vietnam to expand the Café Amazon business there.

### 5) Management

OR’s Board of Directors has 15 members as of 31 December 2021. 4 of them are PTT executives appointed by PTT to assume managerial posts at OR, including the president and chief executive officer.

### 6) Finance

The performance results of OR between 2019 and 2021 are as follows:

Unit: THB million

Consolidated financial statements	2019	2020	2021
Revenue from sales and services	577,134	428,804	511,799
Total revenue	584,137	432,957	516,422
Total expenses (including taxes)	573,241	424,166	504,952
Net profit (loss)	10,896	8,791	11,470
Net profit (loss) of the major shareholder	10,896	8,791	11,474

Unit: THB million

Consolidated financial statements	2019	2020	2021
Total assets	152,176	144,979	207,659
Total liabilities	113,468	107,063	107,787
Shareholders' equity	38,708	37,916	99,872

For additional details, visit the company's website: [investor.pttor.com/en/downloads/one-report](http://investor.pttor.com/en/downloads/one-report)

### 2.2.5 PTT Tank Terminal Company Limited (PTT TANK)

PTT Tank Terminal Company Limited (PTT TANK) was established on 6 March 2009, which is a wholly owned subsidiary of PTT with a paid-in registered capital of THB 3,887.50 million (at THB 100 per share). The company is involved in the business of providing services of storing and transporting liquid chemical products, oil and gas for PTT and its affiliates. As of 31 December 2021, PTT owns 100% of the company's shares.

On 30 June 2009, PTT TANK was handed over 2 contracts that PTT signed with the Industrial Estate Authority, namely an agreement on permission for the use of a 57.8-rai land plot for construction of a liquid storage warehouse at the Map Ta Phut Industrial Estate 1 extension zone, and an agreement on joint development of the Map Ta Phut Industrial Port.

PTT TANK offers the terminal service and the service of receiving, storing and distributing products for PTT Group and its subsidiaries. Commercial services began on 21 April 2011, with 2 terminals for the maximum cargo size of 60,000 DWT, capable for the maximum cargo volume of 2,000,000 tons per year. The throughput rate is about 800,000 tons per year (with 40 % utilization) and there are 10 storage tanks for liquid products available. Services are available for sulfuric acid, propylene, methyl methacrylate, acrylonitrile, ammonia, Liquefied Petroleum Gas, solvent and nitrogen.

#### 1) Management

PTT TANK's Board of Directors is consisted of 5 members. 4 of them are PTT executives appointed to assume managerial positions at PTT TANK, including the chief executive officer.

#### 2) Finance

PTT TANK's performance results between 2019 and 2021 are as follows:

Unit: THB million

Financial statements	2019	2020	2021
Revenue from sales and services	959	920	934
Total revenue	992	984	1,010
Total expenses (including taxes)	680	707	739
Net profit (loss)	312	277	271

Unit: THB million

Financial statements	2019	2020	2021
Total assets	4,818	5,187	6,793
Total liabilities	192	385	423
Shareholders' equity	4,626	4,802	6,370

### **3) Projects**

#### **3.1 Map Ta Phut Industrial Port Phase 3 (Part 1)**

On 1 October 2019, PTT TANK and Gulf Energy Development (GULF) had registered to establish a new joint venture company under the name of Gulf MTP LNG Terminal Company Limited (GMTP) with the initial registered capital of THB 3,500 million. PTT TANK and GULF respectively hold 30% and 70% of shares in GMTP. The company's objective is to conduct business related to the Liquefied Natural Gas value chain and logistics to support other future investments consistent with PTT Group's strategy. On 1 October 2019, GMTP entered into a Public Private Partnership (PPP) contract with Industrial Estate Authority of Thailand for development of Map Ta Phut Seaport Phase III (Section 1) with joint investments including: 1) Design and construction of the infrastructure with an investment of THB 12,900 million, and 2) Design, construction and operation of a Liquefied Natural Gas superstructure on a reclaimed area covering about 200 rai, capable of at least 5 million tons of Liquefied Natural Gas cargoes per year (for the first section of gas port), and an extension that can deal with up to 10.8 million tons per year. This part requires an investment of about THB 28,000 million. The project's total investment is THB 40,900 million. The commercial operation is expected to be in 2027.

#### **3.2 Laem Chabang port phase III, Terminal F**

Laem Chabang port phase III, Terminal F is a project that the Port Authority of Thailand (PAT) allows the private sector to take part in the development of Terminal F1 and Terminal F2, under a Public Private Partnership (PPP) agreement with a 35-year concession.

PTT TANK established a new joint venture with Gulf Energy Development Public Company Limited (GULF) and CHEC OVERSEA INFRASTRUCTURE HOLDING PTE. LTD (CHEC OVERSEA) under the name of GPC International Terminal Company Limited (GPC) with the registered capital of THB 4,000 million. PTT Tank, CHEC OVERSEA, and GULF will hold 30%, 30%, and 40% stakeholding, respectively in this joint investment. The investment objectives are to operate a seaport and to provide services covering mooring, docking, loading, unloading of goods for container vessels as well as to conduct warehouse business with the capacity to handle containers of at least 4,000,000 TEU/year (TEU is equivalent to 20 Foot Unit of container) to meet the growing demand in container shipping and logistics of Laem Chabang port by using state-of-the-art logistic technology. This is in line with PTT's strategy in pursuing Logistics & Infrastructure business and supporting infrastructure growth in Thailand. Consequently, on 25 November 2021, GPC has entered into 35-year Public-Private Partnership (PPP) contract with the Port Authority of Thailand ("PAT") for the above project with the investment cost of THB 30,871 million. Terminal F1 is expected to start construction in 2023 and commercial operation in 2025, and Terminal F2 will then start its construction in 2027 with an expected commercial operation in 2029.

### **3. New business and infrastructure group**

#### **3.1 Global Power Synergy Public Company Limited (GPSC)**

GPSC registered from the consolidation of related partnership entities at the Department of Business Development, Ministry of Commerce, on 10 January 2013. The company was later transformed into a public company limited and registered on SET with the first trading date of 18 May 2015. The objective is to support future business growth under a prime mission to pursue power businesses expansion both in Thailand and overseas, and become a power flagship for PTT Group as a synergy force. Additionally, GPSC also focuses on the investment in renewable energy power plants and integrated energy storage systems, both domestically and internationally. As of 31 December 2021, GPSC has a registered capital of THB 28,197.29 million, all of which is paid-up capital.

In June 2021, PTT increased its shareholding in GPSC. PTT and Siam Management Holding Company Limited (SMH), a subsidiary of PTT, purchased 10.82% and 1.91% of GPSC shares from GC. As a result, GPSC shareholding structure changed from 31.72% PTT, 22.73% GC, 20.78% TOP, and 24.77% minor shareholders to 42.54% PTT, 10.00% GC, 20.78 TOP, 1.91% SMH, and 24.77% minor shareholders respectively.

At the end of 2021, GPSC's total equity capacities were 7,122 MW of power generation, 2,946 tons per hour (T/h) of steam, 7,372 cubic metres per hour (Cu.m/h) of industrial water, 15,400 refrigerated tons of chilled water, and 141 megawatts-hour (MWh) per year of energy storage unit.

### **1) Procurement**

GPSC's power and steam production uses natural gas as its main feed. PTT is the sole supplier of gas to GPSC under an agreement on 25 years long-term gas supply for its Sriracha Power Plant and a 15 years contract for its Rayong - Central Utility Plants (CUP-1, CUP-2, CUP-3, and CUP-4).

### **2) Distribution**

GPSC's distribution of products is as follows:

- Sriracha Power Plant is an independent power producer (IPP) with total electricity capacity of 700 MW. All the generated power is distributed to EGAT under 25-year power purchase agreement (PPA) starting from the first day of its commercial operation on 15 August 2000.

- Rayong Power Plants - distributes electricity to PTT group's petrochemical plants and other industrial customers under long term contract agreements ranging from 10 to 15 years and industrial water to industrial customers under 15 years contract. In order to secure a balance between the production of electricity and steam in case of high demand for steam from industrial customers, the Rayong - Central Utility Plant raises its power output. The surplus of the electricity will sell to EGAT under a non-firm small power producer (SPP) 5 years contracts which automatically renewed every 5 years, started from the date electricity is transmitted to EGAT's power grid. The total capacity of Rayong is 403 MW of electricity and 1,480 T/h of steam.

Distribution through affiliates – Power distribution to EGAT under executed IPP contracts, with the total capacity of 1,739 MW. Another 4,280 MW is delivered under SPPs and VSPPs (small power producer and very small power producer schemes) to EGAT, PEA (Provincial Electricity Authority), MEA (Metropolitan Electricity Authority), and other industrial users in Thailand and overseas. Moreover, they also distributed to industrial and other users with capacity of 1,466 T/h of steam.

### **3) Management**

As of 31 December 2021, GPSC's Board of Directors comprised 15 directors. 6 of them are PTT executives appointed to serve in managerial posts at GPSC, including the company's president and chief executive officer.

### **4) Finance**

The following is GPSC's financial performance for 2019-2021:

Unit: THB million

Financial statements	2019 **	2020	2021
Sales and services revenue *	65,789	68,757	74,137
Total revenue	68,635	71,908	74,874
Total expenses (including taxes)	62,634	63,418	67,033
Net profit (loss)	6,001	8,490	7,840
Net profit (loss) of the major shareholder	4,061	7,508	7,319

Unit: THB million

Financial statements	2019 **	2020	2021
Total assets	252,017	256,656	270,379
Total liabilities	141,841	144,789	152,632
Shareholders' equity	110,176	111,867	117,748

\* Excluding income from financial lease

\*\* The financial statement for 2019 includes GLOW's financial statement pursuant to its shareholding structure following the acquisition of GLOW on 13 March 2019.

## 5 ) Projects progress and projects under construction

In 2021, there were 2 projects completed and started their commercial operations as follows:

- Energy Storage Unit: Thailand's first battery factory that uses the Semi- solid technology from 2 4 M Technologies Inc. (24M), with the production capacity of 30 MWh. located on a 12-rai plot at the Map Ta Phut Industrial Estate in Muang district, Rayong province. The plant officially started the production line on 19 July 2021.
- Rayong Waste to Energy (WTE): There are 2 sub-projects located in Rayong province. Refused Derived Fuel (RDF) project has seen its construction completed and carried out waste disposal since 2018. The power plant from RDF project, with a capacity of 9.8 MW, started its commercial distribution of power in May 2021 after its construction was completed.

The under-investment or under-construction projects are as follows:

- SPP Replacement Glow Energy Phase 2, commenced with site preparation. The project is designed with a total generating capacity of 192 MW of power and 300 tons per hour of steam, with a scheduled COD in 2022.
- Energy Recovery Unit (ERU): Purchase the Energy Recovery Unit (ERU) which is part of TOP's Clean Fuel Project (CFP), designed to retrieve oil residue from TOP's distillation units under the CFP. The retrieved oil residue from ERU is set to generate 250 MW and 175 T/h of steam, which are sold directly to TOP under CFP. The scheduled COD is 2023.
- Avaada project: A solar power platform that Global Renewable Synergy Co Ltd ( a GPSC's subsidiary) purchased 41.6% of shares from Avaada Energy Private Limited, India's operator of a large renewable energy business. The project has total capacity of 4,608 MW consists of an operating capacity of 2,205 MW and under construction of 2,403 MW which expected to COD between 2022 and 2023. GPSC's equity capacity is 1,917 MW. In addition, Avaada's targeted growth is to reach 11,000 MW within 2025.
- CFXD project: An offshore wind power plant that GRSC TW invested 25% in CI Changfanc Limited and CI Xidao Limited which generates electricity from wind power off Taiwan's coast. The project has total power-

generating capacity of 595 MW which GPSC's equity capacity is 149 MW. The project is expected to COD in 2022-2023.

For more details, visit the company's website: [gpscgroup.com/en/investor-relations/downloads/one-reports](https://gpscgroup.com/en/investor-relations/downloads/one-reports)

### **3.2 District Cooling System and Power Plant Company Limited (DCAP)**

DCAP is a joint venture between PTT, EGAT, and the Metropolitan Electricity Authority (MEA), holding 35%, 35%, and 30% shares respectively. It was established on 2 April 2003 with a registered capital of THB 1,670 million to engage in the production and sale of power and chilled water for the Airports of Thailand Plc (AOT) and other customers in Suvarnabhumi Airport. The project detail are as follows:

The District Cooling System and Power Plant project for Suvarnabhumi Airport, was designed to supplement value to natural gas by using natural gas to generate electricity. The surplus heat generating steam which using for generate additional electricity; the surplus steam then produces chilled water for air-conditioning systems. This scheme represents highly cost-effective energy consumption and lowering air pollution.

- DCAP's utilities units are as follow:
  - A combined-cycle cogeneration power plant with a total capacity of about 95 MW
  - A Steam Absorption Chiller (SAC) unit with a total chilled-water capacity of about 13,100 RT
  - An electric chiller with a total chilled-water capacity of about 11,600 RT
  - An electric chiller for the Satellite Airport Terminal-1 (SAT-1) with a capacity of about 12,500 RT, which is operate commercially in April 2021.
- Installation of 8-inch gas transmission pipeline branching off PTT's transmission pipeline system at King Kaeo – Lat Krabang Road into the airport, 2 kilometers. The pipeline is capable of transporting natural gas up to 25 MMSCFD.

#### **1) Procurement**

DCAP fuels its power and chilled water production with natural gas supplied by PTT under a gas supply agreement containing a minimum of about 7 MMSCFD for 25 years contract.

#### **2) Distribution**

DCAP's product distribution consists of:

- Electricity sold to AOT Plc under a power purchase agreement (PPA) of 50 MW, the surplus electricity sold to EGAT under a non-firm PPA of up to 65 MW.
- Supplying chilled water for air-conditioning and steam systems of the following customers:
  - AOT passenger terminals, Airport Operation Building (AOB), Airport Information Management System (AIMS) building, for a total of 21,500 RT of chilled water.
  - Satellite Terminal 1 (SAT-1), 9,000 RT of chilled water
  - Catering building of Thai Airways International Plc under a purchase agreement for 6,600 RT of chilled water and 8.6 tons/hour of steam
  - Suvarnabhumi Airport Hotel Company Limited, 1,500 RT of chilled water and 2 tons/hr of steam
  - Electric Train station at the Suvarnabhumi Airport, 700 RT of chilled water

### 3) Management

As of 31 December 2021, DCAP Board of Directors is consisted of 7 members, 2 of whom are PTT executives.

### 4) Finance

DCAP's financial results between 2019 and 2021 are as follows:

Unit: THB million

Financial statements	2019	2020	2021
Total revenue	2,777	2,655	3,116
Total expenses	2,583	2,477	2,747
Net profit (loss)	194	178	368

Unit: THB million

Financial statements	2019	2020	2021
Total assets	3,288	3,839	3,904
Total liabilities	472	1,179	1,275
Shareholders' equity	2,816	2,660	2,629

### 3.3 Energy Complex Company Limited (EnCo)

PTT and PTTEP have jointly established EnCo on 11 August 2004, with a registered capital of THB 1,800 million. EnCo is responsible for the project the construction and operational management of the Energy Complex Project, with the aim to be the country's energy center by combining architectural and engineering innovations into the Energy Complex. These innovations have resulted in an Energy Complex that serves as the prototypical building for energy conservation, harmonious coexistence of industry and the environment and optimal utilization of resources. The concept is also efficiently use resources with better living for people, society, and the environment to sustainably grow. In 2018, EnCo extended its business scope to property development.

#### 1) Services

##### 1.1 Property management business

##### - Energy Complex Center provides office space services as detailed below:

Address: No. 555/1, 555/2 and 555/3 Vibhavadi-Rangsit Road, Chatuchak district, Bangkok 10900, in the Nikom Rotfai KM 11 area, adjacent to the back of PTT Group's headquarters, on a 28.93-rai plot, rented from the State Railway of Thailand. Construction period took 4 years from 2006 and 2009 and the exploitation period is 30 years, starting from 2010 to 2039.

- Building A, 36 floors, 88,266 sq.m. rentable space, used as PTT Group offices
- Building B, 26 floors, 42,428 sq.m. rentable space, used as PTT Group offices and the Ministry of Energy
- Building C, 8 floors, connecting between Building A and B, used as a business service area and recreation facilities such as banks, shops, canteens, conference rooms, and a fitness center for any offices and agencies located in the Energy Complex Center
- Parking Tower, 10 floors, Two buildings, with a total parking capacity of 2,500 cars
- Chilled-water production building, 3 floor-heights with the total capacity of 5,400 RT

##### - THE EnCony Residential Hotel as detailed below

- THE EnCony Phase 1: A 73-room serviced apartment building in Wangchan Valley, Rayong province, serving personnel from PTT's Vidyasirimedhi Institute of Science and Technology and general customers. Operational since 2018.



- THE EnCony Phase 2: A 38-room apartment building and a 38-room hotel in Wangchan Valley, Rayong province, serving personnel from PTT's Vidyasirimedhi Institute of Science and Technology, PTT Group's customers, and general customers.
- THE EnCony Phase 3: A 34-room serviced apartment building and a 34-room hotel in Wangchan Valley, Rayong province, serving PTTEP personnel, PTT Group's customers, and general customers.

- **EnCo Terminal (EnTer) project:** 2 office buildings with the total space of 28,216 square metres, on a land plot measuring 19 rai, 3 ngan and 26 square wa, or an equivalent of 7,926 square wa. Currently, the project is under the renovation and preparation to provide the services in the future.

1.2 Facility Management Business: Providing integrated services of facility management and supervision to the PTT Group covering 17 areas, including building operation, engineering and maintenance, energy management, cleaning, safety, occupational health and environment, and gardening and landscaping.

1.3 Property Development Business: Involving properties that are assets of EnCo and projects that the company is hired to construct and manage, covering the stages of pre-development and development, as follows:

- Pre-Development, covering Land Selection and Acquisition, Marketing survey, Design Concept and Feasibility Study
- Development, Covering Detail Design, Constructor Selection and Procurement, Authorized Construction and Commissioning, Decoration and Delivering

## 2) Management

As of 31 December 2021, EnCo's board of directors comprised 8 persons, 4 of whom were PTT's executives. PTT also appointed its executive as the managing director.

## 3) Finance

EnCo's operating results between 2019 and 2021 are as follows:

Unit: THB million

Financial statements	2019	2020	2021
Revenue from sales and services	2,044	1,985	1,999
Total expenses (including taxes)	1,539	1,307	1,373
Net profit (loss)	505	678	626

Unit: THB million

Financial statements	2019	2020	2021
Total assets	4,971	5,802	7,388
Total liabilities	1,779	2,074	3,174
Shareholders' equity	3,192	3,728	4,214

\* 2021 Financial statement is unaudited

### 3.4 PTT Energy Solutions Company Limited (PTTES)

PTT and subsidiaries established PTT Energy Solutions Company Limited (PTTES) on 10 June 2011, with a registered capital of THB 150 million to provide consultancy services on technical engineering and operation to PTT Group and other customers. PTTES is 40% held by PTT and the remaining 20% each by TOP, GC, and IRPC.

### 1) Services

PTTES engages in the business of offering technical engineering services to support work-related efficiency for PTT Group and other customers. The services include energy management, project development, risk management, process safety, equipment reliability improvement as well as technical competency and development of PTT Group for high caliber and global competitiveness.

### 2) Management

As of 31 December 2021, PTTES's board of directors comprised 5 persons, 2 of whom were PTT's executives. PTT also appointed its executive as the managing director.

### 3) Finance

The operating results of PTTES between 2019 and 2021 are as follows:

Unit: THB million

Financial statements	2019	2020	2021
Revenue from sales and services	448	438	350
Total revenue	454	440	355
Total expenses (including taxes)	479	435	395
Net profit (loss)	(25)	5	(40)

Unit: THB million

Financial statements	2019	2020	2021
Total assets	367	513	293.5
Total liabilities	157	289	109.4
Shareholders' equity	210	224	184.1

## 3.5 PTT Digital Solutions Company Limited (PTT DIGITAL)

PTT and subsidiaries established PTT DIGITAL on 7 July 2006, with a registered capital of THB 150 million. The objective of the company is to enhance value added to the companies in PTT Group through operating, executing and applying its information technology and communications services with excellence in the most professional manner. PTT DIGITAL is 40% held by GC and the remaining 20% each by PTT, TOP, and PTTEP.

### 1) Services

PTT DIGITAL engages in the business of offering integrated information technology and communication to PTT Group and other customers, with professionalism and international standard. The services include design, development, and maintenance that conform to each organization by experienced and proficient personnel who command a mastery of PTT Group's businesses. Moreover, the company is certified for industrial standards by international institutions, including ISO/ IEC 27001:2005 (regarding data center) and Level 3 of CMMI (Capability Maturity Model Integration), a standard involving work process development.

### 2) Management

PTT DIGITAL's Board of Directors, as of 31 December 2021, is consisted of 7 members. 3 of whom are PTT executives. PTT appointed its executives to assume managerial positions including managing director.

### 3) Finance

The operating performance of PTT DIGITAL between 2019 and 2021 is as follows:

Unit: THB million

Financial statements	2019	2020	2021*
Revenue from sales and services	4,710	5,103	5,408
Total revenue	4,719	5,110	5,415
Total expenses (taxes included)	4,341	4,587	4,907
Net profit (loss)	378	523	508

Unit: THB million

Financial statements	2019	2020	2021*
Total assets	4,008	4,980	5,646
Total liabilities	1,900	2,444	2,703
Shareholders' equity	2,108	2,536	2,943

\* 2021 Financial Statement is unaudited

## 4. Other business groups

### PTT Treasury Center Company Limited (PTT TCC)

PTT established PTT TCC on 11 May 2018, with a registered capital of THB 20 million. The company, wholly owned by PTT, serves as the treasury center for PTT and its subsidiaries. PTT TCC was authorized to operate as a treasury center on 31 July 2018.

#### 1) Service

The company operates as the treasury center for PTT and its subsidiaries, with the duty of procuring money in foreign currencies and Thai baht, both in long and short terms, for lending to PTT and/or its subsidiaries. The company also has the duty of managing debts, liquidity and money by taking into account the interest of PTT and its subsidiaries.

#### 2) Management

PTT TCC Board of Directors has 3 members as of 31 December 2021, and all of them are PTT executives. one of the board members is appointed to serve as the company's chief executive officer.

#### 3) Finance

The operating results of PTT TCC between 2019 and 2021 are as follows:

Unit: THB million

Financial statements	2019	2020	2021
Interest income	296.67	3,057.81	3,684.49
Total revenue	297.82	3,073.30	3,708.00
Total expenses	298.30	2,903.32	3,507.22
Net profit (loss)	(0.48)	169.98	200.78

Unit: THB million

Financial statements	2019	2020	2021
Total assets	52,199.90	99,189.08	185,784.99
Total liabilities	52,184.88	99,010.96	185,377.11
Shareholders' equity	15.02	178.12	407.88



## Connected Transactions

## 9.2 Connected Transactions

*The detailed connected transaction is an expansion of the Annual Registration Statement/Annual Report 2021 (Form 56-1 One Report) under 9.2 Connected transactions*

### 9.2.2 Connected Transactions between PTT and Parties with the Common Major Shareholder

#### 9.2.2.1 Transactions of product(s) /service(s) sold by PTT to entities with the same major shareholder and potential conflict of interest

Entities with the same major shareholder	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Electricity Generating Authority of Thailand	63,632.34	65,117.03	72,791.42	The Finance Ministry, which is PTT's major shareholder, has controlling power over Electricity Generating Authority of Thailand.	—
State Railway of Thailand	1,519.49	1,687.52	2,298.13	The Finance Ministry, which is PTT's major shareholder, has controlling power over State Railway of Thailand.	—
Bangkok Mass Transit Authority	1,395.03	1,306.27	1,538.19	The Finance Ministry, which is PTT's major shareholder, has controlling power over Bangkok Mass Transit Authority.	—
Port Authority of Thailand	851.60	626.11	754.72	The Finance Ministry, which is PTT's major shareholder, has controlling power over Port Authority of Thailand.	—
Transport Co., Ltd.	169.07	318.83	660.67	The Finance Ministry, which is PTT's major shareholder, has controlling power over Transport Co., Ltd.	—
Provincial Electricity Authority	222.60	269.58	386.10	The Finance Ministry, which is PTT's major shareholder, has controlling power over Provincial Electricity Authority.	- PTT's director (Mr. Danucha Pichayanan) is also a director of the Provincial Electricity Authority.
Dairy Farming Promotion Organization of Thailand	80.70	54.21	74.88	The Finance Ministry, which is PTT's major shareholder, has controlling power over Dairy Farming Promotion Organization of Thailand.	—
Metropolitan Electricity Authority	32.18	31.53	44.31	The Finance Ministry, which is PTT's major shareholder, has controlling power over Metropolitan Electricity Authority.	—
Liquor Distillery Organization	31.73	20.19	12.41	The Finance Ministry, which is PTT's major shareholder, has controlling power over Liquor Distillery Organization.	—



## 9.2.2.1 Transactions of product(s) /service(s) sold by PTT to entities with the same major shareholder and potential conflict of interest (continued)

Entities with the same major shareholder	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Government Pharmaceutical Organization	23.82	18.72	17.99	The Finance Ministry, which is PTT's major shareholder, has controlling power over Government Pharmaceutical Organization.	—
Civil Aviation Training Center	4.28	7.80	20.27	The Finance Ministry, which is PTT's major shareholder, has controlling power over Civil Aviation Training Center.	—
Tobacco Authority of Thailand	8.77	7.75	21.43	The Finance Ministry, which is PTT's major shareholder, has controlling power over Tobacco Authority of Thailand.	—
Rubber Authority of Thailand	6.74	7.04	3.93	The Finance Ministry, which is PTT's major shareholder, has controlling power over Rubber Authority of Thailand.	—
Airports of Thailand Plc.	1.13	0.37	0.81	The Finance Ministry, which is PTT's major shareholder, has controlling power over Airports of Thailand Plc.	—
Thailand Institute of Scientific and Technological Research	0.38	0.22	0.29	The Finance Ministry, which is PTT's major shareholder, has controlling power over Thailand Institute of Scientific and Technological Research.	—
Government Savings Bank	0.09	0.09	0.10	The Finance Ministry, which is PTT's major shareholder, has controlling power over Government Savings Bank.	—
Thailand Post Co., Ltd.	0.07	1.55	3.38	The Finance Ministry, which is PTT's major shareholder, has controlling power over Thailand Post Co., Ltd.	—
Thai Airways International Plc.	-	1.64	21.56	The Finance Ministry, which is PTT's major shareholder, holds more than 10.00% of Thai Airways International Plc.'s shares.	—
Aeronautical Radio of Thailand Co., Ltd.	-	0.38	4.20	The Finance Ministry, which is PTT's major shareholder, has controlling power over Aeronautical Radio of Thailand Co., Ltd.	—
National Telecom Plc.	-	0.29	0.35	The Finance Ministry, which is PTT's major shareholder, has controlling power over National Telecom Plc.	—
Tourism Authority of Thailand	-	0.03	-	The Finance Ministry, which is PTT's major shareholder, has controlling power over Tourism Authority of Thailand.	- PTT's director (Professor Dr. Thosaporn Sirisumphand) is the chairman of Tourism Authority of Thailand.

## 9.2.2.1 Transactions of product(s) /service(s) sold by PTT to entities with the same major shareholder and potential conflict of interest (continued)

Entities with the same major shareholder	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Bangkok Dock Co., Ltd.	-	-	1.54	The Finance Ministry, which is PTT's major shareholder, has controlling power over the Bangkok Dock Co., Ltd.	—
<b>Total</b>	<b>67,980.02</b>	<b>69,477.15</b>	<b>78,656.68</b>		

## 9.2.2.2 Transactions of product(s) /service(s) purchased, including any expense paid, by PTT from entities with the same major shareholder and potential conflict of interest

Entities with the same major shareholder	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Provincial Electricity Authority	931.48	1,196.01	1,430.75	The Finance Ministry, which is PTT's major shareholder, has controlling power over Provincial Electricity Authority.	- PTT's director (Mr. Danucha Pichayanan) is also a director of the Provincial Electricity Authority.
Metropolitan Electricity Authority	261.92	368.89	497.02	The Finance Ministry, which is PTT's major shareholder, has controlling power over Metropolitan Electricity Authority.	—
Electricity Generating Authority of Thailand	319.32	44.21	73.45	The Finance Ministry, which is PTT's major shareholder, has controlling power over Electricity Generating Authority of Thailand.	—
Airports of Thailand Plc.	4.67	43.95	146.73	The Finance Ministry, which is PTT's major shareholder, has controlling power over Airports of Thailand Plc.	—
Export-Import Bank of Thailand	-	28.41	18.81	The Finance Ministry, which is PTT's major shareholder, has controlling power over Export-Import Bank of Thailand.	—
National Telecom Plc.	-	27.22	31.92	The Finance Ministry, which is PTT's major shareholder, has controlling power over National Telecom Plc.	—





## 9.2.2.2 Transactions of product(s) /service(s) purchased, including any expense paid, by PTT from entities with the same major shareholder and potential conflict of interest (continued)

Entities with the same major shareholder	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
State Railway of Thailand	2.91	26.33	61.95	The Finance Ministry, which is PTT's major shareholder, has controlling power over State Railway of Thailand.	—
Provincial Waterworks Authority	5.24	11.90	10.29	The Finance Ministry, which is PTT's major shareholder, has controlling power over Provincial Waterworks Authority.	—
Thailand Post Co., Ltd.	5.64	6.13	10.75	The Finance Ministry, which is PTT's major shareholder, has controlling power over Thailand Post Co., Ltd.	—
Metropolitan Waterworks Authority	2.37	4.42	8.03	The Finance Ministry, which is PTT's major shareholder, has controlling power over Provincial Electricity Authority.	—
Industrial Estate Authority of Thailand	3.54	2.91	48.76	The Finance Ministry, which is PTT's major shareholder, has controlling power over Industrial Estate Authority of Thailand.	—
Transport Co., Ltd.	0.16	0.30	0.50	The Finance Ministry, which is PTT's major shareholder, has controlling power over Transport Co., Ltd.	—
TMBThanachart Bank	-	1.37	1.12	The Finance Ministry, which is PTT's major shareholder, holds more than 10.00% of TMBThanachart Bank's shares.	- PTT's director (Mr.Chumpol Rimsakorn) is a director, the chair of Credit Committee, an executive director, and a member of the Nomination, Remuneration, and Corporate Governance Committee of TMBThanachart Bank.
Central Laboratory (Thailand) Co., Ltd.	-	0.07	0.10	The Finance Ministry, which is PTT's major shareholder, holds more than 10.00% of Central Laboratory (Thailand) Co., Ltd.'s shares.	—
Expressway Authority of Thailand	-	-	0.25	The Finance Ministry, which is PTT's major shareholder, has controlling power over Expressway Authority of Thailand.	—



## 9.2.2.2 Transactions of product(s) /service(s) purchased, including any expense paid, by PTT from entities with the same major shareholder and potential conflict of interest (continued)

Entities with the same major shareholder	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Don Muang Tollway Plc.	-	-	0.01	The Finance Ministry, which is PTT's major shareholder, holds more than 10.00% of Don Mueang Tollway Plc.'s shares.	- PTT's director (Mr.Chumpol Rimsakorn) is a director Don Muang Tollway Plc.
<b>Total</b>	<b>1,537.25</b>	<b>1,762.12</b>	<b>2,340.44</b>		

## 9.2.2.3 Interest income from entities with the same major shareholder and potential conflict of interest

Related Company	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
TMBThanachart Bank	23.57	1.82	17.90	The Finance Ministry, which is PTT's major shareholder, holds more than 10.00% of TMBThanachart Bank's shares.	- PTT's director (Mr.Chumpol Rimsakorn) is a director, the chair of Credit Committee, an executive director, and a member of the Nomination, Remuneration, and Corporate Governance Committee of TMBThanachart Bank.
<b>Total</b>	<b>23.57</b>	<b>1.82</b>	<b>17.90</b>		



## 9.2.2.4 Trade Accounts Receivable, Other Receivables, and Advance Payments involving entities with the same major shareholder and potential conflict of interest

## 9.2.2.4.1 Trade Accounts Receivable

Entities with the same major shareholder	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Electricity Generating Authority of Thailand	6,289.21	4,632.34	12,115.43	The Finance Ministry, which is PTT's major shareholder, has controlling power over Electricity Generating Authority of Thailand.	—
State Railway of Thailand	153.83	191.96	261.91	The Finance Ministry, which is PTT's major shareholder, has controlling power over State Railway of Thailand.	—
Bangkok Mass Transit Authority	178.69	171.18	203.06	The Finance Ministry, which is PTT's major shareholder, has controlling power over Bangkok Mass Transit Authority.	—
Port Authority of Thailand	73.72	51.11	62.74	The Finance Ministry, which is PTT's major shareholder, has controlling power over Port Authority of Thailand.	—
Transport Co., Ltd.	29.91	37.62	59.55	The Finance Ministry, which is PTT's major shareholder, has controlling power over Transport Co., Ltd.	—
Provincial Electricity Authority	19.11	22.27	26.82	The Finance Ministry, which is PTT's major shareholder, has controlling power over Provincial Electricity Authority.	- PTT's director (Mr. Danucha Pichayanan) is also a director of the Provincial Electricity Authority.
Dairy Farming Promotion Organization of Thailand	11.91	6.32	6.97	The Finance Ministry, which is PTT's major shareholder, has controlling power over the Dairy Farming Promotion Organization of Thailand.	—
Government Pharmaceutical Organization	2.27	3.34	3.33	The Finance Ministry, which is PTT's major shareholder, has controlling power over Government Pharmaceutical Organization.	—
Liquor Distillery Organization	2.75	2.56	0.97	The Finance Ministry, which is PTT's major shareholder, has controlling power over Liquor Distillery Organization.	—
Metropolitan Electricity Authority	2.76	2.76	6.69	The Finance Ministry, which is PTT's major shareholder, has controlling power over Metropolitan Electricity Authority.	—

## 9.2.2.4 Trade Accounts Receivable, Other Receivables, and Advance Payments involving entities with the same major shareholder and potential conflict of interest

## 9.2.2.4.1 Trade Accounts Receivable (continued)

Entities with the same major shareholder	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Thai Airways International Plc.	1.50	1.50	2.49	The Finance Ministry, which is PTT's major shareholder, holds more than 10.00% of Thai Airways International Plc.'s shares.	—
Civil Aviation Training Center	0.44	1.22	2.83	The Finance Ministry, which is PTT's major shareholder, has controlling power over Civil Aviation Training Center.	—
Thailand Post Co., Ltd.	-	0.64	0.77	The Finance Ministry, which is PTT's major shareholder, has controlling power over Thailand Post Co., Ltd.	—
Tobacco Authority of Thailand	0.03	0.04	0.52	The Finance Ministry, which is PTT's major shareholder, has controlling power over Tobacco Authority of Thailand.	—
Aeronautical Radio of Thailand Co., Ltd.	-	-	0.21	The Finance Ministry, which is PTT's major shareholder, has controlling power over Aeronautical Radio of Thailand Co., Ltd.	—
Thailand Institute of Scientific and Technological Research	0.10	-	0.09	The Finance Ministry, which is PTT's major shareholder, has controlling power over Thailand Institute of Scientific and Technological Research.	—
National Telecom Plc.	-	-	0.08	The Finance Ministry, which is PTT's major shareholder, has controlling power over National Telecom Plc.	—
Rubber Authority of Thailand	0.34	-	-	The Finance Ministry, which is PTT's major shareholder, has controlling power over Rubber Authority of Thailand.	—
<b>Total</b>	<b>6,766.57</b>	<b>5,124.86</b>	<b>12,754.46</b>		

## 9.2.2.4 Trade Accounts Receivable, Other Receivables, and Advance Payments involving entities with the same major shareholder and potential conflict of interest (continued)

## 9.2.2.4.2 Other Receivables

Entities with the same major shareholder	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Liquor Distillery Organization	-	0.04	0.07	The Finance Ministry, which is PTT's major shareholder, has controlling power over Liquor Distillery Organization.	—
Thailand Post Co., Ltd.	0.01	0.01	0.01	The Finance Ministry, which is PTT's major shareholder, has controlling power over Thailand Post Co., Ltd.	—
Electricity Generating Authority of Thailand	-	-	0.76	The Finance Ministry, which is PTT's major shareholder, has controlling power over Electricity Generating Authority of Thailand.	—
Thailand Institute of Scientific and Technological Research	-	-	0.06	The Finance Ministry, which is PTT's major shareholder, has controlling power over Thailand Institute of Scientific and Technological Research.	—
<b>Total</b>	<b>0.01</b>	<b>0.05</b>	<b>0.90</b>		

## 9.2.2.4.3 Advance Payments

Entities with the same major shareholder	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
State Railway of Thailand	-	-	38.21	The Finance Ministry, which is PTT's major shareholder, has controlling power over State Railway of Thailand.	—
Airports of Thailand Plc.	-	-	7.77	The Finance Ministry, which is PTT's major shareholder, has controlling power over Airports of Thailand Plc.	—
Industrial Estate Authority of Thailand	-	-	1.88	The Finance Ministry, which is PTT's major shareholder, has controlling power over Industrial Estate Authority of Thailand.	—



## 9.2.2.4 Trade Accounts Receivable, Other Receivables, and Advance Payments involving entities with the same major shareholder and potential conflict of interest (continued)

## 9.2.2.4.3 Advance Payments (continued)

Entities with the same major shareholder	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Expressway Authority of Thailand	0.32	0.30	-	The Finance Ministry, which is PTT's major shareholder, has controlling power over Expressway Authority of Thailand.	—
<b>Total</b>	<b>0.32</b>	<b>0.30</b>	<b>47.86</b>		

## 9.2.2.5 Trade Accounts Payable and Other Accounts Payable involving entities with the same major shareholder and potential conflict of interest

## 9.2.2.5.1 Trade Accounts Payable

Entities with the same major shareholder	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Industrial Estate Authority of Thailand	26.92	17.74	14.89	The Finance Ministry, which is PTT's major shareholder, has controlling power over Industrial Estate Authority of Thailand.	—
<b>Total</b>	<b>26.92</b>	<b>17.74</b>	<b>14.89</b>		



## 9.2.2.5 Trade Accounts Payable and Other Accounts Payable involving entities with the same major shareholder and potential conflict of interest (continued)

## 9.2.2.5.2 Trade Accounts Payable

Entities with the same major shareholder	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
State Railway of Thailand	44.21	44.18	44.18	The Finance Ministry, which is PTT's major shareholder, has controlling power over State Railway of Thailand.	—
MCOT Plc.	5.01	9.52	21.42	The Finance Ministry, which is PTT's major shareholder, has controlling power over MCOT Plc.	—
National Telecom Plc.	-	0.82	4.08	The Finance Ministry, which is PTT's major shareholder, has controlling power over National Telecom Plc.	—
Industrial Estate Authority of Thailand	5.93	0.73	-	The Finance Ministry, which is PTT's major shareholder, has controlling power over Industrial Estate Authority of Thailand.	—
Metropolitan Waterworks Authority	0.17	0.34	0.70	The Finance Ministry, which is PTT's major shareholder, has controlling power over Metropolitan Waterworks Authority.	—
Provincial Electricity Authority	0.75	0.19	0.61	The Finance Ministry, which is PTT's major shareholder, has controlling power over Provincial Electricity Authority.	- PTT's director (Mr. Danucha Pichayanan) is also a director of the Provincial Electricity Authority.
Aeronautical Radio of Thailand Co., Ltd.	18.52	0.08	7.19	The Finance Ministry, which is PTT's major shareholder, has controlling power over Aeronautical Radio of Thailand Co., Ltd.	—
Transport Co., Ltd.	-	0.08	0.04	The Finance Ministry, which is PTT's major shareholder, has controlling power over Transport Co., Ltd.	—
Electricity Generating Authority of Thailand	312.79	0.03	1.46	The Finance Ministry, which is PTT's major shareholder, has controlling power over Electricity Generating Authority of Thailand.	—



## 9.2.2.5 Trade Accounts Payable and Other Accounts Payable involving entities with the same major shareholder and potential conflict of interest (continued)

## 9.2.2.5.2 Trade Accounts Payable (continued)

Entities with the same major shareholder	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Government Pharmaceutical Organization	-	0.02	0.05	The Finance Ministry, which is PTT's major shareholder, has controlling power over Government Pharmaceutical Organization.	—
Expressway Authority of Thailand	0.04	0.02	-	The Finance Ministry, which is PTT's major shareholder, has controlling power over Expressway Authority of Thailand.	—
TMBThanachart Bank	0.02	0.02	0.09	The Finance Ministry, which is PTT's major shareholder, holds more than 10.00% of TMBThanachart Bank's shares.	- PTT's director (Mr.Chumpol Rimsakorn) is a director, the chair of Credit Committee, an executive director, and a member of the Nomination, Remuneration, and Corporate Governance Committee of TMBThanachart Bank.
Central Laboratory (Thailand) Co., Ltd.	-	0.01	-	The Finance Ministry, which is PTT's major shareholder, holds more than 10.00% of Central Laboratory (Thailand) Co., Ltd.'s shares.	—
Thailand Institute of Scientific and Technological Research	-	-	0.09	The Finance Ministry, which is PTT's major shareholder, has controlling power over Thailand Institute of Scientific and Technological Research.	—
Thai Airways International Plc.	-	-	1.85	The Finance Ministry, which is PTT's major shareholder, holds more than 10.00% of Thai Airways International Plc.'s shares.	—
Airports of Thailand Plc.	-	(0.11)	-	The Finance Ministry, which is PTT's major shareholder, has controlling power over Airports of Thailand Plc.	—
<b>Total</b>	<b>387.44</b>	<b>55.93</b>	<b>81.76</b>		



### 9.2.3 Connected Transactions Between PTT and Subsidiaries, Joint Ventures, Associates, and Related Companies

#### 9.2.3.1 Transactions of product(s) /service(s) sold by PTT to subsidiaries, joint operations, joint ventures, associates and other related companies

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries					
PTT Global Chemical Plc.	271,569.11	175,175.20	234,564.02	PTT Group owns 48.18%.  No shares held by PTT’s related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT’s director (Mr. Don. Wasantapruerk) is a director of PTT Global Chemical Plc.</li><li>- PTT’s executives (Mr. Noppadol Pinsupa, M.L. Peekthong Thongyai, and Mr. Disathat Panyarachun) are directors of PTT Global Chemical Plc.</li><li>- PTT’s executive (Mr. Kongkrapan Intarajang) is a director, the secretary and CEO of PTT Global Chemical Plc.</li></ul>
IRPC Plc.	164,665.06	100,329.47	152,995.77	PTT Group owns 48.05%.  No shares held by PTT’s related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT’s executive (Mr. Kris Imsang) is the chairman of IRPC Plc.</li><li>- PTT’s executives (Ms. Peangpanor Boonklum and Mr. Charnsak Cheunchom) are directors of IRPC Plc.</li><li>- PTT’s executive (Mr. Chawalit Tippawanich) is a director, executive, and CEO of IRPC Plc.</li></ul>



## 9.2.3.1 Transactions of product(s) /service(s) sold by PTT to subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Thai Oil Plc.	114,454.44	67,590.13	114,945.49	PTT Group owns 48.03%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's executives (Ms. Pannalin Mahawongtikul , Mr. Terdkiat Prommool, Mr.Suchat Ramarch and Mr. Buranin Rattanasombat) are directors of Thai Oil Plc.</li><li>- PTT's executive (Mr. Wirat Uanarumit.) is a director, the secretary, CEO and president of Thai Oil Plc.</li></ul>
PTT Oil and Retail Business Plc.	28,583.12	29,552.24	41,961.00	PTT Group owns 75.00 %.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's director / executive (Mr. Auttapol Rerkpiboon) is the chairman of PTT Oil and Retail Business Plc.</li><li>- PTT's executive (Mr. Kris Imsang, Mr. Disathat Panyarachun, and Mr. Buranin Rattanasombat) are directors of PTT Oil and Retail Business Plc.</li><li>- PTT's executive (Ms. Jiraphon Kawswat) is a director, the secretary, and acting CEO and president of PTT Oil and Retail Business Plc.</li></ul>



## 9.2.3.1 Transactions of product(s) /service(s) sold by PTT to subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTT International Trading Pte. Ltd.	24,051.61	22,596.81	31,150.06	PTT Group owns 100.00%.	- PTT’s executive (Mr. Disathat Panyarachun) is the chairman of PTT International Trading Pte. Ltd.  - PTT’s executive (Mrs. Chanamas Sasnanand) is a director of PTT International Trading Pte. Ltd.
PTT International Trading London Ltd.	12,948.15	-	7,357.53	PTT Group owns 100.00%.	—
Global Power Synergy Plc.	12,372.35	11,399.60	12,651.74	PTT Group owns 75.23%.  No shares held by PTT’s related parties with potential conflicts.	- PTT’s executive (Mr. Atikom Terbsiri, Mr. Noppadol Pinsupa, Mr. Wuttikom Stithit, Mr. Kongkapan Intarajang, and Mr. Wirat Uanarumit.) are directors of Global Power Synergy Plc.  - PTT’s executive (Mr. Worawat Pitayasiri) is a director, the secretary, CEO and president of Global Power Synergy Plc.
Glow Energy Plc.	9,288.46	8,443.54	9,204.66	PTT Group owns 99.83%.  No shares held by PTT’s related parties with potential conflicts.	- PTT’s executive (Mr. Worawat Pitayasiri) is a director of Glow Energy Plc.
PTT International Trading USA Inc.	7,025.29	-	-	PTT Group owns 100.00%.	—
PTT Natural Gas Distribution Co., Ltd.	5,624.96	4,431.60	5,543.64	PTT Group owns 58.00%.  No shares held by PTT’s related parties with potential conflicts.	- PTT’s executive (Mr. Wuttikom Stithit) is the chairman of PTT Natural Gas Distribution Co., Ltd.



## 9.2.3.1 Transactions of product(s) /service(s) sold by PTT to subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Glow SPP 2 Co., Ltd.	5,480.12	4,138.47	3,452.48	PTT Group owns 100.00%.	- PTT’s executive (Mr. Worawat Pitayasiri) is a director of Glow SPP 2 Co., Ltd.
Top SPP Co., Ltd.	4,635.50	4,157.44	4,651.49	PTT Group owns 99.99%. No shares held by PTT’s related parties with potential conflicts.	—
IRPC Clean Power Co., Ltd.	3,949.45	3,761.74	4,257.89	PTT Group owns 100.00%.	—
Glow SPP 11 Co., Ltd.	3,469.31	3,170.11	2,922.09	PTT Group owns 100.00%.	- PTT’s executive (Mr. Worawat Pitayasiri) is a director of Glow SPP 11 Co., Ltd.
Amata Natural Gas Distribution Co., Ltd.	3,062.24	2,329.08	2,975.52	PTT Group owns 80.00%. No shares held by PTT’s related parties with potential conflicts.	—
PTT MEA Ltd.	2,415.14	-	-	PTT Group owns 100.00%.	—
Glow IPP Co., Ltd.	1,752.99	913.38	730.19	PTT Group owns 95.00%. No shares held by PTT’s related parties with potential conflicts.	- PTT’s executive (Mr. Worawat Pitayasiri) is a director of Glow IPP Co., Ltd.
Labix Co., Ltd.	655.70	494.32	672.84	PTT Group owns 75.00%. No shares held by PTT’s related parties with potential conflicts.	- PTT’s executive (Mr. Wirat Uanarumit) is a director and chairman of Labix Co., Ltd.
GC-M PTA Co., Ltd.	435.25	217.36	284.18	PTT Group owns 74.00%. No shares held by PTT’s related parties with potential conflicts.	—
Thai Lube Base Plc.	301.09	212.89	494.92	PTT Group owns 99.99%. No shares held by PTT’s related parties with potential conflicts.	—
PTT LNG Co., Ltd.	274.02	256.87	89.14	PTT Group owns 100.00%.	- PTT’s executive (Mr. Atikom Terbsiri) is the chairman of PTT LNG Co., Ltd.



## 9.2.3.1 Transactions of product(s) /service(s) sold by PTT to subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
GC Oxirane Co., Ltd.	270.08	64.96	-	PTT Group owns 100.00%.	—
Global Green Chemicals Plc.	145.11	-	634.91	PTT Group owns 72.29%. No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Kongkrapan Intarajang) is the chairman of Global Green Chemicals Plc.
Thai PET Resin Co., Ltd.	114.62	89.36	113.14	PTT Group owns 84.40%. No shares held by PTT's related parties with potential conflicts.	—
Sak Chaisidhi Co., Ltd.	70.59	53.36	73.37	PTT Group owns 80.52%. No shares held by PTT's related parties with potential conflicts.	—
PTT Phenol Co., Ltd.	36.55	27.44	27.77	PTT Group owns 100.00%.	—
GC Glycol Co., Ltd.	18.17	11.45	12.43	PTT Group owns 100.00%.	—
GC Polyols Co., Ltd.	7.40	4.15	-	PTT Group owns 82.10%. No shares held by PTT's related parties with potential conflicts.	—
PTT Exploration and Production Plc.	4.29	6.66	4.77	PTT Group owns 65.29%. No shares held by PTT's related parties with potential conflicts.	- PTT's director / executive Mr. Auttapol Rerkpiboon) is a director of PTT Exploration and Production Plc.  - PTT's executive (Mr. Atikom Terbsiri) is a director of PTT Exploration and Production Plc.  - PTT's executive (Mr. Montri Rawanchaikul) is the CEO of PTT Exploration and Production Plc.



## 9.2.3.1 Transactions of product(s) /service(s) sold by PTT to subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (Continued)					
Thai Oil Power Co., Ltd.	-	2,418.53	2,711.81	The company has been completely dissolved on 17 September 2021.	—
Joint Operation					
Carigali - PTTEPI Operating Company Sdn. Bhd.	-	-	9.48	PTT Group owns 50.00%. No shares held by PTT’s related parties with potential conflicts.	—
Joint Ventures					
HMC Polymers Co., Ltd.	6,768.33	4,414.26	4,621.65	PTT Group owns 41.44%. No shares held by PTT’s related parties with potential conflicts.	—
PTT Asahi Chemical Co., Ltd.	4,846.83	3,335.89	4,342.62	PTT Group owns 50.00%. No shares held by PTT’s related parties with potential conflicts.	—
Nava Nakorn Electricity Generating Co., Ltd.	2,512.42	1,788.30	1,787.74	PTT Group owns 30.00%. No shares held by PTT’s related parties with potential conflicts.	—
District Cooling System and Power Plant Co., Ltd.	1,776.48	1,622.39	1,827.56	PTT Group owns 35.00%. No shares held by PTT’s related parties with potential conflicts.	—
OGP Energy Solutions Co., Ltd.	62.39	34.04	13.31	PTT Group owns 40.00%. No shares held by PTT’s related parties with potential conflicts.	—
PTT MMC Biochem Co., Ltd.	40.16	28.76	37.74	PTT Group owns 50.00%. No shares held by PTT’s related parties with potential conflicts.	—



## 9.2.3.1 Transactions of product(s) /service(s) sold by PTT to subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Associates					
Bangpa-In Cogeneration Co., Ltd.	3,222.00	2,948.42	3,334.15	PTT Group owns 25.00%. No shares held by PTT’s related parties with potential conflicts.	——
Vinythai Plc.	270.01	236.82	261.84	PTT Group owns 24.98%. No shares held by PTT’s related parties with potential conflicts.	——
Other related company					
Ratchaburi Power Plc.	6,783.78	6,027.89	11,868.71	PTT Group owns 15.00%. No shares held by PTT’s related parties with potential conflicts.	- PTT’s executive (Mr. Worawat Pitayasiri) is a director of Ratchaburi Power Plc.
Total	703,962.57	462,282.93	662,587.65		



## 9.2.3.2 Transactions of product(s) /service(s) purchased by PTT from subsidiaries, joint operations, joint ventures, associates and other related companies

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries					
PTT Exploration and Production Plc.	99,568.62	81,263.85	101,665.86	PTT Group owns 65.29%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's director / executive (Mr. Auttapol Rerkpiboon) is a director of PTT Exploration and Production Plc.</li><li>- PTT's executive (Mr. Atikom Terbsiri) is a director of PTT Exploration and Production Plc.</li><li>- PTT executive ( Mr. Montri Rawanchaikul ) is CEO of PTT Exploration and Production Plc.</li></ul>
PTT International Trading Pte. Ltd.	77,740.23	28,593.84	15,105.26	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT's executive (Mr. Disathat Panyarachun) is the chairman of PTT International Trading Pte. Ltd.</li><li>- PTT's executive (Mrs. Chanamas Sasnanand) is a director of PTT International Trading Pte.Ltd.</li></ul>
PTT International Trading London Ltd.	19,682.23	7,482.27	19,756.65	PTT Group owns 100.00%.	—





## 9.2.3.2 Transactions of product(s) /service(s) purchased by PTT from subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTT Global Chemical Plc.	19,591.30	17,415.36	28,755.73	PTT Group owns 48.18%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's executive. (Mr. Don. Wasantapruek) is a director of PTT Global Chemical Plc.</li><li>- PTT's executives (Mr. Noppadol Pinsupa, M.L. Peekthong Thongyai and Mr. Disathat Panyarachun) are directors of PTT Global Chemical Plc.</li><li>- PTT's executive (Mr. Kongkrapan Intarajang) is a director, the secretary and CEO of PTT Global Chemical Plc.</li></ul>
PTTEP Siam Co., Ltd.	16,806.86	11,465.11	17,347.07	PTT Group owns 100.00%.	—
PTT Oil and Retail Business Plc.	16,304.74	18,139.65	26,640.43	PTT Group owns 75.00% .  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's director / executive (Mr. Auttapol Rerkpiboon) is the chairman of PTT Oil and Retail Business Plc.</li><li>- PTT's executives (Mr. Kris Imsang, Mr. Disathat Panyarachun, and Mr. Buranin Rattanasombat) are directors of PTT Oil and Retail Business Plc.</li><li>- PTT's executive (Ms. Jiraphon Kawswat) is a director, the secretary, and acting CEO and president of PTT Oil and Retail Business Plc.</li></ul>



## 9.2.3.2 Transactions of product(s) /service(s) purchased by PTT from subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTTEP International Co., Ltd.	15,572.54	14,535.77	18,692.72	PTT Group owns 100.00%.	—
PTT LNG Co., Ltd.	9,402.53	9,517.40	9,481.46	PTT Group owns 100.00%.	- PTT’s executive (Mr. Atikom Terbsiri) is the chairman of PTT LNG Co., Ltd.
PTTEP SP Ltd.	7,538.48	5,839.77	7,645.62	PTT Group owns 100.00%.	—
PTTEP MENA Ltd.	2,847.15	-	-	PTT Group owns 100.00%.	—
Glow Energy Plc.	575.67	-	-	PTT Group owns 99.83%.  No shares held by PTT’s related parties with potential conflicts.	- PTT’s executive (Mr. Worawat Pitayasiri) is the chairman of Glow Energy Plc.
Business Service Alliance Co., Ltd.	198.50	197.09	187.95	PTT Group owns 100.00%.	- PTT’s executive (Mr. Terdkiat Prommool) is the chairman of Business Service Alliance Co., Ltd.  - PTT’s executive (Mr. Suchat Ramarch) is a director of Business Service Alliance Co., Ltd.



## 9.2.3.2 Transactions of product(s) /service(s) purchased by PTT from subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
IRPC Plc.	177.36	592.40	5.96	PTT Group owns 48.05%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's executive (Mr. Kris Imsang) is the chairman of IRPC Plc.</li><li>- PTT's executives (Ms. Peangpanor Boonklum and Mr. Chansak Chuenchom) are directors of IRPC Plc.</li><li>- PTT's executive (Mr. Chawalit Tippawanich.) is a director, the secretary, CEO and president of IRPC Plc.</li></ul>
PTT Tank Terminal Co., Ltd.	118.60	156.21	191.18	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT's executive (Mr. Kris Imsang) is the chairman of PTT Tank Terminal Co., Ltd.</li><li>- PTT's executive (M.L. Peekthong Thongyai) is a director of PTT Tank Terminal Co., Ltd.</li></ul>
Thai Oil Plc.	65.09	56.74	1,098.48	PTT Group owns 48.03%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's executives (Ms. Pannalin Mahawongtikul, Mr. Terdkiat Prommool, Mr. Suchat Ramarch, and Mr. Buranin Rattanasombat) are directors of Thai Oil Plc.</li><li>- PTT's executive (Mr. Wirat Uanarumit) is a director, the secretary, CEO and president of Thai Oil Plc.</li></ul>



## 9.2.3.2 Transactions of product(s) /service(s) purchased by PTT from subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTT Digital Solutions Co., Ltd.	38.56	33.41	66.29	PTT Group owns 100.00%.	- PTT's executive (Mr. Terdkiat Prommool) is the chairman of PTT Digital Solutions Co., Ltd..
GC Maintenance and Engineering Co., Ltd.	12.69	10.12	11.32	PTT Group owns 100.00%.	—
PTT Natural Gas Distribution Co., Ltd.	9.00	18.73	27.43	PTT Group owns 58.00%.  No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Wuttikorn Stithit) is the chairman of PTT Natural Gas Distribution Co., Ltd.
Alpha Com Co., Ltd.	4.90	-	-	PTT Group owns 100.00%.	- PTT's executive (Mr. Terdkiat Prommool) is the chairman of Alpha Com Co., Ltd.  - PTT's executive (Mrs. Chanamas Sasnanand) is a director of Alpha Com Co., Ltd.  - PTT's executive (Mr. Worawat Pitayasiri) is an advisor to Alpha Com Co., Ltd.'s board of directors.
TOP Solvent Co., Ltd.	4.76	4.38	8.89	PTT Group owns 99.99%.  No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Wirat Uanarumit) is a director and the chairman of TOP Solven Co., Ltd.
PTT Energy Solutions Co., Ltd.	2.89	-	7.27	PTT Group owns 100.00%.	- PTT's executive (Mr. Chawalit Tippawanich) is the chairman of PTT Energy Solutions Co., Ltd.
GC Glycol Co., Ltd.	2.72	2.32	2.31	PTT Group owns 100.00%.	—
NPC Safety and Environmental Service Co., Ltd.	1.81	1.46	1.23	PTT Group owns 100.00%.	—



## 9.2.3.2 Transactions of product(s) /service(s) purchased by PTT from subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (Continued)					
GC Logistics Solutions Co., Ltd.	1.43	2.79	6.87	PTT Group owns 100.00%.	—
Business Professional Solutions Recruitment Co., Ltd.	0.85	-	-	PTT Group owns 100.00%.	- PTT’s executive (Mr. Suchat Ramarch) is the chairman of Business Professional Solutions Recruitment Co., Ltd.
PTT Retail Management Co., Ltd.	0.61	0.31	0.30	PTT Group owns 100.00%.	—
Energy Complex Co., Ltd.	0.03	-	-	PTT Group owns 100.00%.	- PTT’s executive (Mr. Chansak Chuenchom) is the chairman of Energy Complex Co., Ltd. - PTT’s executive (Ms. Peangpanor Boonklum) is a director of Energy Complex Co., Ltd.
Joint Operations					
Moattama Gas Transportation Company	14,185.08	13,917.36	17,602.33	PTT Group owns 25.50%. No shares held by PTT’s related parties with potential conflicts.	—
Andaman Transporation Ltd.	9,213.54	9,250.09	10,574.59	PTT Group owns 80.00%. No shares held by PTT’s related parties with potential conflicts.	—
Orange Energy Co., Ltd.	3,872.14	2,873.75	5,011.05	PTT Group owns 53.95%. No shares held by PTT’s related parties with potential conflicts.	—
B 8/32 Partners Co., Ltd.	3,872.14	2,873.75	5,011.05	PTT Group owns 25.00%. No shares held by PTT’s related parties with potential conflicts.	—



## 9.2.3.2 Transactions of product(s) /service(s) purchased by PTT from subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Joint Operations (Continued)					
Taninthayi Pipeline Company LLC	402.16	1,571.04	3,579.89	PTT Group owns 19.32%.  No shares held by PTT's related parties with potential conflicts.	—
Joint Ventures					
Trans Thai-Malaysia (Thailand) Co., Ltd.	1,442.64	1,402.70	1,406.76	PTT Group owns 50.00%.  No shares held by PTT's related parties with potential conflicts.	—
Map Ta Phut Air Products Co., Ltd.	22.90	-	-	PTT Group owns 51.00%.  No shares held by PTT's related parties with potential conflicts.	—
IRPC Polyol Co., Ltd.	0.05	-	-	PTT Group owns 50.00%.  No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Chawalit Tippawanich) is the chairman of IRPC Polyol Co., Ltd.
Associates					
Thai Petroleum Pipeline Co., Ltd.	5.44	4.72	-	PTT Group owns 49.21%.  No shares held by PTT's related parties with potential conflicts.	—
Eastern Fluid Transport Co., Ltd.	0.32	0.31	0.31	PTT Group owns 37.65%.  No shares held by PTT's related parties with potential conflicts.	—



## 9.2.3.2 Transactions of product(s) /service(s) purchased by PTT from subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Other Related Companies					
Dhipaya Insurance Plc.	82.87	287.77	257.36	As of 31 December 2021, PTT Group has not held any share of Dhipaya Insurance Plc.	—
Total	319,369.43	227,510.47	290,149.62		



## 9.2.3.3 Interest received from subsidiaries, joint operations, joint ventures, associates, and other related companies

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries					
PTT Treasury Center Co., Ltd.	1,271.80	1,195.00	83.27	PTT Group owns 100.00%.	- PTT's executive (Mrs. Chanamas Sasnanand) is a director of PTT Treasury Center Co., Ltd.
Energy Complex Co., Ltd.	6.20	15.25	19.43	PTT Group owns 100.00%.	- PTT's executive (Mr. Chansak Chuenchom) is the chairman of Energy Complex Co., Ltd.  - PTT's executive (Ms. Peangpanor Boonklum) is a director of Energy Complex Co., Ltd.
Thai Oil Plc.	0.12	-	-	PTT Group owns 48.03%.  No shares held by PTT's related parties with potential conflicts.	- PTT's executives (Ms. Pannalin Mahawongtikul , Mr. Terdkiat Prommool, Mr.Suchat Ramarch, and Mr. Buranin Rattanasombat) are directors of Thai Oil Plc.  - PTT's executive (Mr. Wirat Uanarumit) is a director, the secretary, CEO and president of Thai Oil Plc.
PTT LNG Co., Ltd.	-	19.59	577.28	PTT Group owns 100.00%.	- PTT's executive (Mr. Atikom Terbsiri) is the chairman of PTT LNG Co., Ltd.





## 9.2.3.3 Interest received from subsidiaries, joint operations, joint ventures, associates, and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Global Power Synergy Plc.	-	14.31	550.57	PTT Group owns 75.23%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's executives (Mr. Atikom Terbsiri , Mr. Noppadol Pinsupa, Mr. Wuttikom Stithit, Mr. Kongkrapan Intarajang, and Mr. Wirat Unanarumit) are directors of Global Power Synergy Plc.</li><li>- PTT's executive (Mr. Worawat Pitayasiri) is a director, the secretary, CEO and president of Global Power Synergy Plc.</li></ul>
IRPC Plc.	-	2.90	30.96	PTT Group holds 48.05%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's executive (Mr. Kris Imsang) is the chairman of IRPC Plc.</li><li>- PTT's executives (Ms. Peangpanor Boonklum and Mr. Chansak Chuenchom) are directors of IRPC Plc.</li><li>- PTT's executive (Mr. Chawalit Tippawanich) is a director, the secretary, CEO and president of IRPC Plc.</li></ul>



## 9.2.3.3 Interest received from subsidiaries, joint operations, joint ventures, associates, and other related companies

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTT Global Chemical Plc.	-	1.57	-	PTT Group owns 48.18%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's director (Mr. Don. Wasantapruet) is a director of PTT Global Chemical Plc.</li><li>- PTT's executives (Mr. Noppadol Pinsupa, M.L. Peekthong Thongyai and Mr. Disathat Panyarachun) are directors of PTT Global Chemical Plc.</li><li>- PTT's executive (Mr. Kongkrapan Intarajang) is a director, the secretary and CEO of PTT Global Chemical Plc.</li></ul>
PTT Oil and Retail Business Plc.	-	-	451.88	PTT Group holds 75.00%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's director / executive (Mr. Auttapol Rerkpiboon) is the chairman of PTT Oil and Retail Business Plc.</li><li>- PTT's executives (Mr. Kris Imsang, Mr. Disathat Panyarachun, and Mr. Buranin Rattanasombat) are directors of PTT Oil and Retail Business Plc.</li><li>- PTT's executive (Ms. Jiraphon Kawswat) is a director, the secretary and acting CEO and president of PTT Oil and Retail Business Plc.</li></ul>

## 9.2.3.3 Interest received from subsidiaries, joint operations, joint ventures, associates, and other related companies

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Siam Management Holding Co., Ltd.	-	-	27.87	PTT Group owns 100.00%.	—
PTT Regional Treasury Center Pte. Ltd.	-	-	93.51	The company had been completely dissolved on 24 May 2021.	—
Total	1,278.12	1,248.62	1,834.77		

## 9.2.3.4 Interest expenses paid to subsidiaries, joint operations, joint ventures, associates and other related companies

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries					
PTT Treasury Center Co., Ltd.	2,015.90	1,474.77	193.00	PTT Group owns 100.00%.	- PTT’s executive (Mrs. Chanamas Sasnanand) is director of PTT Treasury Center Co., Ltd.
PTT Tank Terminal Co., Ltd.	5.78	4.55	8.18	PTT Group owns 100.00%.	- PTT’s executive (Mr. Kris Imsang) is the chairman of PTT Tank Terminal Co., Ltd. - PTT’s executive (M.L. Peekthong Thongyai) is director of PTT Tank Terminal Co., Ltd.



## 9.2.3.4 Interest expenses paid to subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Arun Plus Co., Ltd.	4.95	-	-	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT's director (Professor Dr. Thosapom Sirisumphand) is the chairman of Arun Plus Co., Ltd.</li><li>- PTT's directors (Mr. Danucha Pichayanan and M.L. Chayotid Kridakon) are directors of Arun Plus Co., Ltd.</li><li>- PTT's director / executive (Mr. Auttapol Rerkpiboon) is a director of Arun Plus Co., Ltd.</li><li>- PTT's executive (Mr. Noppadol Pinsupa) is a director of Arun Plus Co., Ltd.</li></ul>
PTT LNG Co., Ltd.	2.97	7.18	19.60	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT's executive (Mr. Atikom Terbsiri) is the chairman of PTT LNG Co., Ltd.</li></ul>
PTT Global Management Co., Ltd.	2.66	0.40	0.80	PTT Group owns 100.00%.	—
Siam Management Holding Co., Ltd.	1.80	0.34	-	PTT Group owns 100.00%.	—
Innobic (Asia) Co., Ltd.	1.71	-	-	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT's executives (Mr. Buranin Rattanasombat and Mrs. Chanamas Sasnanand) are directors of Innobic (Asia) Co., Ltd.</li></ul>
Alpha Com Co., Ltd.	0.42	0.21	-	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT's executive (Mr. Noppadol Pinsupa) is a director of Alpha Com Co., Ltd.</li><li>- PTT executive (Mr. Worawat Pitayasiri) is an advisor to Alpha Com Co., Ltd.'s board of directors.</li></ul>



## 9.2.3.4 Interest expenses paid to subsidiaries, joint operations, joint ventures, associates and other related companies (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTT Energy Resources Co., Ltd.	0.33	0.76	2.48	PTT Group owns 100.00%.	—
Business Services Alliance Co., Ltd.	0.22	0.29	0.26	PTT Group owns 100.00%.	- PTT's executive (Mr. Terdkiat Prommool) is the chairman of Business Services Alliance Co., Ltd. - PTT's executive (Mr. Suchat Ramarch) is a director of Business Services Alliance Co., Ltd.
PTT Green Energy (Thailand) Co., Ltd.	0.17	-	-	PTT Group owns 100.00%.	—
Global Management Holding Co., Ltd.	0.01	-	-	PTT Group owns 100.00%.	—
Innobic LL Holding Co., Ltd.	0.01	-	-	PTT Group owns 100.00%.	—
Joint Venture					
Trans Thai-Malaysia (Thailand) Co., Ltd.	43.00	48.11	53.12	PTT Group owns 50.00%. No shares held by PTT's related parties with potential conflicts.	—
Total	2,079.93	1,536.61	277.44		



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties

9.2.3.5.1 Trade Accounts Receivable

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries					
PTT Global Chemical Plc.	19,532.22	12,261.18	17,202.17	PTT Group holds 48.18%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's director (Mr. Don. Wasantapruet) is a director of PTT Global Chemical Plc.</li><li>- PTT's executives (Mr. Noppadol Pinsupa, M.L. Peekthong Thongyai and Mr. Disathat Panyarachun) are directors of PTT Global Chemical Plc.</li><li>- PTT's executive (Mr. Kongkrapan Intarajang) is a director, the secretry and CEO of PTT Global Chemical Plc.</li></ul>
Thai Oil Plc.	12,844.72	4,184.76	11,614.64	PTT Group holds 48.03%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's executives (Ms. Pannalin Mahawongtikul, Mr. Terdkiat Prommool, Mr.Suchat Ramarch, and Mr. Buranin Rattanasombat) are directors of Thai Oil Plc.</li><li>- PTT's executive (Mr. Wirat Uanarumit.) is a director, secretary, CEO and president of Thai Oil Plc.</li></ul>



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.1 Trade Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
IRPC Plc.	10,200.87	13,569.37	15,432.36	PTT Group holds 48.05%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's executive (Mr. Kris Imsang) is the chairman of IRPC Plc.</li><li>- PTT's executives (Ms. Peangpanor Boonklum and Mr. Chansak Chuenchom) are directors of IRPC Plc.</li><li>- PTT's executive (Mr. Chawalit Tippawanich) is a director, the secretary, CEO and president of IRPC Plc.</li></ul>
PTT Oil and Retail Business Plc.	3,114.38	1,721.36	2,752.57	PTT Group holds 75.00%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's director / executive (Mr. Auttapol Rerkpiboon) is the chairman of PTT Oil and Retail Business Plc.</li><li>- PTT's executives (Mr. Kris Imsang, Mr. Disathat Panyarachun and Mr. Buranin Rattanasombat) are directors of PTT Oil and Retail Business Plc.</li><li>- PTT's executive (Ms. Jiraphon Kawswat) is a director, the secretary, and acting CEO and president of PTT Oil and Retail Business Plc.</li></ul>

9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.1 Trade Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTT International Trading Pte. Ltd.	2,806.92	3,010.97	3,794.04	PTT Group owns 100.00%.	- PTT’s executive (Mr. Disathat Panyarachun) is the chairman of PTT International Trading Pte. Ltd. - PTT’s executive (Mrs. Chanamas Sasnanand) is a director of PTT International Trading Pte. Ltd.
PTT MEA Ltd.	1,376.09	-	-	PTT Group owns 100.00%.	—
Global Power Synergy Plc.	1,373.02	1,352.48	1,326.15	PTT Group holds 75.23%. No shares held by PTT’s related parties with potential conflicts.	- PTT’s executives (Mr. Atikom Terbsiri, Mr. Noppadol Pinsupa, Mr. Wuttikorn Stithit, Mr. Kongkrapan Intarajang and Mr. Wirat Uanarumit) are directors of Global Power Synergy Plc. - PTT’s executive (Mr. Worawat Pitayasiri) is a director, the secretary, CEO and president of Global Power Synergy Plc.
PTT Natural Gas Distribution Co., Ltd.	1,357.77	744.09	447.81	PTT Group holds 58.00%. No shares held by PTT’s related parties with potential conflicts.	- PTT’s executive (Mr. Wuttikorn Stithit) is the chairman of PTT Natural Gas Distribution Co., Ltd.





9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.1 Trade Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Glow Energy Plc.	961.05	601.68	854.77	PTT Group owns 99.83%.  No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Worawat Pitayasiri) is a director of Glow Energy Plc.
PTT International Trading London Ltd.	770.17	-	7.50	PTT Group owns 100.00%.	—
Amata Natural Gas Distribution Co., Ltd.	699.46	398.59	241.04	PTT Group owns 80.00%.  No shares held by PTT's related parties with potential conflicts.	—
Glow SPP 2 Co., Ltd.	686.73	429.26	436.53	PTT Group owns 100.00%.	- PTT's executive (Mr. Worawat Pitayasiri) is a director of Glow SPP 2 Co., Ltd.
Top SPP Co., Ltd.	546.49	337.06	424.62	PTT Group owns 99.99%.  No shares held by PTT's related parties with potential conflicts.	—
IRPC Clean Power Co., Ltd.	474.81	286.11	354.59	PTT Group owns 100.00%.	—
Glow SPP 11 Co., Ltd.	322.69	238.45	308.98	PTT Group owns 100.00%.	- PTT's executive (Mr. Worawat Pitayasiri) is a director of Glow SPP 11 Co., Ltd.
Glow IPP Co., Ltd.	162.62	162.60	162.31	PTT Group owns 95.00%.  No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Worawat Pitayasiri) is a director of Glow IPP Co., Ltd.



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.1 Trade Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Labix Co., Ltd.	72.57	47.47	52.52	PTT Group owns 75.00%.  No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Wirat Uanarumit) is director / chairman of Labix Co., Ltd.
GC-M PTA Co., Ltd.	53.77	20.69	23.04	PTT Group owns 74.00%.  No shares held by PTT's related parties with potential conflicts.	—
GC Oxirane Co., Ltd.	48.14	-	-	PTT Group owns 100.00%.	—
PTT LNG Co., Ltd.	30.89	17.84	23.41	PTT Group owns 100.00%.	PTT's executive (Mr. Atikom Terbsiri) is the chairman of PTT LNG Co., Ltd.
Thai Lube Base Plc.	28.88	18.97	24.73	PTT Group owns 99.99%.  No shares held by PTT's related parties with potential conflicts.	—
Thai PET Resin Co., Ltd.	16.00	8.37	8.90	PTT Group owns 84.40%.  No shares held by PTT's related parties with potential conflicts.	—
Sak Chaisidhi Co., Ltd.	6.40	3.44	6.53	PTT Group owns 80.52%.  No shares held by PTT's related parties with potential conflicts.	—
PTT Phenol Co., Ltd.	3.80	2.64	2.05	PTT Group owns 100.00%.	—



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.1 Trade Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Allnex (Thailand) Co., Ltd.	1.71	-	-	PTT Group owns 95.00%.  No shares held by PTT's related parties with potential conflicts.	—
GC Glycol Co., Ltd.	1.28	1.38	0.98	PTT Group owns 100.00%.	—
PTT Exploration and Production Plc.	0.78	0.50	-	PTT Group owns 65.29%.  No shares held by PTT's related parties with potential conflicts.	- PTT's director / executive (Mr. Auttapol Rerkpiboon) is a director of PTT Exploration and Production Plc.  - PTT's executive (Mr. Atikom Terbsiri) is a director of PTT Exploration and Production Plc.  - PTT's executive (Mr. Montri Rawanchaikul) is CEO of PTT Exploration and Production Plc.
Thai Oil Power Co., Ltd.	-	189.77	236.41	The company has been completely dissolved on 17 September 2021.	—
Joint Ventures					
HMC Polymers Co., Ltd.	765.04	442.79	363.46	PTT Group owns 41.44%.  No shares held by PTT's related parties with potential conflicts.	—



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.1 Trade Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Joint Ventures (continued)					
PTT Asahi Chemical Co., Ltd.	396.86	410.93	326.95	PTT Group owns 50.00%. No shares held by PTT's related parties with potential conflicts.	——
Nava Nakorn Electricity Generating Co., Ltd.	279.91	158.94	156.00	PTT Group owns 30.00%. No shares held by PTT's related parties with potential conflicts.	——
District Cooling System and Power Plant Co., Ltd.	217.74	133.79	151.66	PTT Group owns 35.00%. No shares held by PTT's related parties with potential conflicts.	——
OGP Energy Solutions Co., Ltd.	5.52	4.06	0.72	PTT Group owns 40.00%. No shares held by PTT's related parties with potential conflicts.	——
PTT MMC Biochem Co., Ltd.	2.87	0.12	1.69	PTT Group owns 50.00%. No shares held by PTT's related parties with potential conflicts.	——



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.1 Trade Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
<b>Associates</b>					
Bangpa-In Cogeneration Co., Ltd.	367.14	230.48	262.60	PTT Group owns 25.00%. No shares held by PTT's related parties with potential conflicts.	—
Vinythai Public Co., Ltd.	44.10	19.29	24.28	PTT Group owns 24.98%. No shares held by PTT's related parties with potential conflicts.	—
<b>Other Related Company</b>					
Ratchaburi Power Co., Ltd.	1,259.39	954.17	955.51	PTT Group owns 15.00%. No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Worawat Pitayasiri) is a director of Ratchaburi Power Co., Ltd.
<b>Total</b>	<b>60,832.80</b>	<b>41,963.60</b>	<b>57,981.52</b>		
<b>Less: Allowance for expected credit loss/Allowance for doubtful accounts</b>	<b>-</b>	<b>-</b>	<b>-</b>		
<b>Total Trade accounts receivables</b>	<b>60,832.80</b>	<b>41,963.60</b>	<b>57,981.52</b>		

9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.2 Other Accounts Receivable

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries					
PTT Oil and Retail Business Plc.	736.08	615.92	518.24	PTT Group owns 75.00 %.  No shares held by PTT’s related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT’s director / executive (Mr. Auttapol Rerkpiboon) is the chairman of PTT Oil and Retail Business Plc.</li><li>- PTT’s executives (Mr. Kris Imsang, Mr. Disathat Panyarachun and Mr. Buranin Rattanasombat) are directors of PTT Oil and Retail Business Plc.</li><li>- PTT’s executive (Ms. Jiraphon Kawswat) is a director, the secretary, acting CEO and president of PTT Oil and Retail Business Plc.</li></ul>
PTT International Trading London Ltd.	360.39	4.23	4.06	PTT Group owns 100.00%.	—
PTT Treasury Center Co., Ltd.	255.22	282.49	58.21	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT’s executive (Mrs. Chanamas Sasnanand) is a director of PTT Treasury Center Co., Ltd.</li></ul>
PTT International Trading Pte. Ltd.	138.68	11.34	23.67	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT’s excutive (Mr. Disathat Panyarachun) is a director of PTT International Trading Pte. Ltd.</li><li>- PTT’s executive (Mrs. Chanamas Sasnanand) is a director of PTT International Trading Pte. Ltd.</li></ul>



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.2 Other Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
IRPC Plc.	108.30	13.69	172.03	PTT Group holds 48.05%.  No shares held by PTT’s related parties with potential conflicts.	- PTT’s executive (Mr. Kris Imsang) is the chairman of IRPC Plc.  - PTT’s executives (Ms. Peangpanor Boonklum and Mr. Chansak Chuenchom) are directors of IRPC Plc.  - PTT’s executive (Mr. Chawalit Tippawanich) is a director, the secretary, CEO and president of IRPC Plc.
Thai Oil Plc.	61.10	13.93	14.01	PTT Group holds 48.03%.  No shares held by PTT’s related parties with potential conflicts.	- PTT’s executives (Ms. Pannalin Mahawongtikul, Mr. Terdkiat Prommool, Mr. Suchat Ramarch, and Mr. Buranin Rattanasombat) are directors of Thai Oil Plc.  - PTT’s executive (Mr. Wirat Uanarumit) is a director, the secretary, CEO and the president of Thai Oil Plc.
PTT Digital Solutions Co., Ltd.	51.41	47.89	60.99	PTT Group owns 100.00%.	- PTT’s executive (Mr. Terdkiat Prommool) is the chairman of PTT Digital Solutions Co., Ltd.



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.2 Other Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Global Power Synergy Plc.	32.01	31.03	28.08	PTT Group holds 75.23%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's executives (Mr. Atikom Terbsiri, Mr. Noppadol Pinsupa, Mr. Wuttikorn Stithit, Mr. Kongkrapan Intarajang and Mr. Wirat Uanarumit) are directors of Global Power Synergy Plc.</li><li>- PTT's executive (Mr. Worawat Pitayasiri) is a director, the secretary, CEO and president of Global Power Synergy Plc.</li></ul>
PTT Exploration and Production Plc.	24.95	46.48	31.44	PTT Group owns 65.29%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's director / executive (Mr. Auttapol Rerkpiboon) is a director of PTT Exploration and Production Plc.</li><li>- PTT's executive (Mr. Atikom Terbsiri) is a director of PTT Exploration and Production Plc.</li><li>- PTT's executive (Mr. Montri Rawanchaikul) is CEO of PTT Exploration and Production Plc.</li></ul>
PTT LNG Co., Ltd.	19.61	19.95	23.98	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT executive (Mr. Atikom Terbsiri) is the chairman of PTT LNG Co., Ltd.</li></ul>





9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.2 Other Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Energy Complex Co., Ltd.	18.05	18.25	20.04	PTT Group owns 100.00%.	- PTT’s executive (Mr. Chansak Chuenchom) is the chairman of Energy Complex Co., Ltd. - PTT’s executive (Ms. Peangpanor Boonklum) is a director of Energy Complex Co., Ltd.
PTT Tank Terminal Co., Ltd.	15.56	15.41	14.43	PTT Group owns 100.00%.	- PTT’s executive (Mr. Kris Imsang) is the chairman of PTT Tank Terminal Co., Ltd. - PTT’s executive (M.L. Peekthong Thongyai) is a director of PTT Tank Terminal Co., Ltd.
Business Services Alliance Co., Ltd.	10.29	10.51	8.61	PTT Group owns 100.00%.	- PTT’s executive (Mr. Terdkiat Prommool) is the chairman of Business Services Alliance Co., Ltd. - PTT’s executive (Mr. Suchat Ramarch) is a director of Business Services Alliance Co., Ltd.
PTT Energy Solutions Co., Ltd.	9.80	7.17	4.37	PTT Group owns 100.00%.	- PTT’s executive (Mr. Chawalit Tippawanich) is the chairman of PTT Energy Solutions Co., Ltd.
PTT Global LNG Co., Ltd.	9.35	10.35	2.52	PTT Group owns 100.00%.	- PTT’s executive (Mr. Wuttikorn Stithit) is the chairman of PTT Global LNG Co., Ltd.



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.2 Other Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTT Global Chemical Plc.	8.89	23.06	36.96	PTT Group owns 48.18%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's executive (Mr. Don. Wasantapruerk) is a director of PTT Global Chemical Plc.</li><li>- PTT's executives (Mr. Noppadol Pinsupa, M.L. Peekthong Thongyai and Mr. Disathat Panyarachun) are directors of PTT Global Chemical Plc.</li><li>- PTT's executive (Mr. Kongkrapan Intarajang) is a director, the secretary and CEO of PTT Global Chemical Plc.</li></ul>
PTT Natural Gas Distribution Co., Ltd.	8.69	5.94	6.52	PTT Group owns 58.00%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's executive (Mr. Wuttikorn Stithit) is the chairman of PTT Natural Gas Distribution Co., Ltd.</li></ul>
PTT International Trading USA Inc.	5.77	-	-	PTT Group owns 100.00%.	—
Arun Plus Co., Ltd.	4.71	-	-	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT's executive (Professor Dr. Thosaporn Sirisumphand) is the chairman of Arun Plus Co., Ltd.</li><li>- PTT's executives (Mr. Auttapol Rerkpiboon, Mr. Danucha Pichayanan, M.L. Chayotid Kridakon, and Mr. Noppadol Pinsupa) are directors of Arun Plus Co., Ltd.</li></ul>

9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.2 Other Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Innobic (Asia) Co., Ltd.	2.64	-	-	PTT Group owns 100.00%.	- PTT’s executive (Mr. Buranin Rattanasombat) is the chairman of Innobic (Asia) Co., Ltd. - PTT’s executive (Mrs. Chanamas Sasnanand) is a director of Innobic (Asia) Co., Ltd.
PTT Energy Resources Co., Ltd.	2.49	2.46	3.21	PTT Group owns 100.00%.	—
PTTOR Singapore Pte. Ltd.	2.17	1.56	1.38	PTT Group owns 100.00%.	—
PTT Philippines Trading Corporation	2.09	0.52	0.87	PTT Group owns 100.00%.	—
Combined Heat and Power Producing Co., Ltd.	1.46	0.32	-	PTT Group owns 100.00%.	—
PTT Global Management Co., Ltd.	1.27	0.29	0.26	PTT Group owns 100.00%.	—
Global Renewable Power Co., Ltd.	1.11	-	-	PTT Group owns 100.00%.	- PTT’s executive (Ms. Peangpanor Boonklum) is the chairwoman of Global Renewable Power Co., Ltd.
EV ME Plus Co., Ltd.	1.01	-	-	PTT Group owns 100.00%.	—
Mekha Technology Co., Ltd.	0.95	-	-	PTT Group owns 100.00%.	—
Business Professional Solutions Recruit Co., Ltd.	0.87	0.85	1.10	PTT Group owns 100.00%.	- PTT’s executive (Mr. Suchat Ramarch) is the chairman of Business Professional Solutions Recruit Co., Ltd.
Tiger Energy Trading Pte. Ltd.	0.84	0.84	0.85	PTT Group owns 100.00%.	—
PTT MEA Ltd.	0.84	-	-	PTT Group owns 100.00%.	—

9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.2 Other Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
GC Polyols Co., Ltd.	0.78	0.61	-	PTT Group owns 82.10%. No shares held by PTT's related parties with potential conflicts.	—
Sakari Resources Ltd.	0.78	-	-	PTT Group owns 95.82%. No shares held by PTT's related parties with potential conflicts.	—
Global Green Chemicals Plc.	0.73	2.85	1.55	PTT Group owns 72.29%. No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Kongkrapan Intarajang) is the chairman of Global Green Chemicals Plc.
Sport Services Alliance Co., Ltd.	0.44	0.75	5.63	PTT Group owns 100.00%.	—
Amata Natural Gas Distribution Co., Ltd.	0.27	-	-	PTT Group owns 80.00%. No shares held by PTT's related parties with potential conflicts.	—
GC Marketing Solutions Co., Ltd.	0.14	1.05	1.33	PTT Group owns 100.00%.	—
Top SPP Co., Ltd.	0.13	-	-	PTT Group owns 99.99%. No shares held by PTT's related parties with potential conflicts.	—
PTTEP Siam Co., Ltd.	0.12	0.60	1.66	PTT Group owns 100.00%.	—
Siam Management Holding Co., Ltd.	0.09	0.19	0.11	PTT Group owns 100.00%.	—
Global Management Holding Co., Ltd.	0.09	0.09	0.09	PTT Group owns 100.00%.	—
Swap & Go Co., Ltd.	0.09	0.02	-	PTT Group owns 100.00%.	—
IRPC Clean Power Co., Ltd.	0.08	-	0.08	PTT Group owns 100.00%.	—
Glow Energy Plc.	0.08	-	-	PTT Group owns 99.83%. No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Worawat Pitayasiri) is a director of Glow Energy Plc.

9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.2 Other Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Glow IPP Co., Ltd.	0.08	-	-	PTT Group owns 95.00%. No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Worawat Pitayasiri) is a director of Glow IPP Co., Ltd.
Thai Green Energy (Thailand) Co., Ltd.	0.06	0.39	1.48	PTT Group owns 100.00%.	—
PTTEP Services Co., Ltd.	0.05	0.11	0.19	PTT Group owns 100.00%.	—
GC Logistics Solutions Co., Ltd.	0.04	0.40	1.31	PTT Group owns 100.00%.	—
Thai Lube Blending Co., Ltd.	0.04	0.14	0.14	PTT Group owns 100.00%.	—
PTT International Holding Ltd.	0.04	0.04	-	PTT Group owns 100.00%.	—
PTT International Investment Ltd.	0.04	0.04	-	PTT Group owns 100.00%.	—
PTT Mining Ltd.	0.04	0.03	-	PTT Group owns 100.00%.	—
Alpha Com Co., Ltd.	0.03	0.02	-	PTT Group owns 100.00%.	- PTT's executive (Mr. Terdkiat Prommool) is the chairman of Alpha Com Co., Ltd. - PTTEP's executive (Mrs. Chanamas Sasnanand) is a director of Alpha Com Co., Ltd. - PTT's executive (Mr. Worawat Pitayasiri) is an advisor to Alpha Com Co.,Ltd.'s board of directors.
IRPC Oil Co., Ltd.	0.02	-	0.02	PTT Group owns 99.99%. No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Chawalit Tippawanich) is the chairman of IRPC Oil Co., Ltd.
Innobic LL Holding Co., Ltd.	0.02	-	-	PTT Group owns 100.00%.	—



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties (continued)

9.2.3.5.2 Other Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
GC-M PTA Co., Ltd.	0.01	0.56	0.03	PTT Group owns 74.00%. No shares held by PTT's related parties with potential conflicts.	—
TOP Solvent Co., Ltd.	0.01	-	0.02	PTT Group owns 99.99%. No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Wirat Uanarumit) is a director and the chairman of TOP Solvent Co., Ltd.
Global Renewable Power 1 Co., Ltd.	0.01	-	-	PTT Group owns 100.00%.	—
GC Oxirane Co., Ltd.	-	26.18	-	PTT Group owns 100.00%.	—
PTT Retail Management Co., Ltd.	-	2.18	2.56	PTT Group owns 100.00%.	—
PT Bahari Cakrawala Sebuku	-	1.33	1.29	PTT Group owns 100.00%.	—
PTTOR China (Shanghai) Co., Ltd.	-	0.51	0.51	PTT Group owns 100.00%.	—
PTT Philippines Corporation	-	0.45	0.45	PTT Group owns 100.00%.	—
GC Glycol Co., Ltd.	-	0.22	-	PTT Group owns 100.00%.	—
Thai Paraxylene Co., Ltd.	-	0.13	-	PTT Group owns 99.99%. No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Wirat Uanarumit) is a director and the chairman of Thai Paraxylene Co., Ltd.
Thai Lube Base Plc.	-	0.13	-	PTT Group owns 99.99%. No shares held by PTT's related parties with potential conflicts.	—
PTTEP International Co., Ltd.	-	0.11	-	PTT Group owns 100.00%.	—

9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.2 Other Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship
<b>Subsidiaries (continued)</b>				
Thaioil Energy Services Co., Ltd.	-	0.07	0.04	PTT Group owns 99.99%. No shares held by PTT's related parties with potential conflicts.
PTT International (Singapore) Co., Pte. Ltd.	-	0.04	-	PTT Group owns 100.00%.
PTTEP SP Ltd.	-	0.03	-	PTT Group owns 100.00%.
PTT (Lao) Co., Ltd.	-	0.02	0.01	PTT Group owns 100.00%.
PTT Regional Treasury Center Pte. Ltd.	-	0.01	0.07	The company had been completely dissolved on 24 May 2021.
Thai PET Resin Co., Ltd.	-	0.01	0.02	PTT Group owns 84.40%. No shares held by PTT's related parties with potential conflicts.
GC Maintenance and Engineering Co., Ltd.	-	-	3.32	PTT Group owns 100.00%.
Thaioil Marine Co., Ltd.	-	-	0.87	As of 31 December 2021, PTT Group has not held any share of Thaioil Marine Co., Ltd.
PTT Oil Myanmar Co., Ltd.	-	-	0.70	PTT Group owns 100.00%.
Sapthip Co., Ltd.	-	-	0.13	PTT Group owns 50.00%. No shares held by PTT's related parties with potential conflicts.
PTT GL Investment Ltd.	-	-	0.03	PTT Group owns 100.00%.
PTT Phenol Co., Ltd.	-	-	0.01	PTT Group owns 100.00%.
Solution Creation Co., Ltd.	-	-	0.01	PTT Group owns 100.00%.
PTT (Cambodia) Ltd.	(0.04)	0.45	2.49	PTT Group owns 100.00%.



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.2 Other Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship
<b>Joint Ventures</b>				
Trans Thai - Malaysia (Malaysia) Sdn. Bhd.	18.06	38.74	0.88	PTT Group owns 50.00%. No shares held by PTT's related parties with potential conflicts.
Map Ta Phut Air Products Co., Ltd.	13.63	13.45	13.45	PTT Group owns 51.00%. No shares held by PTT's related parties with potential conflicts.
HMC Polymers Co., Ltd.	5.25	0.26	0.24	PTT Group owns 41.44%. No shares held by PTT's related parties with potential conflicts.
Suez Environmental Services Co., Ltd.	3.94	5.46	-	PTT Group owns 40.00%. No shares held by PTT's related parties with potential conflicts.
Trans Thai-Malaysia (Thailand) Co., Ltd.	3.80	5.87	5.69	PTT Group owns 50.00%. No shares held by PTT's related parties with potential conflicts.
PTT MMC Biochem Co., Ltd.	3.21	0.75	3.75	PTT Group owns 50.00%. No shares held by PTT's related parties with potential conflicts.
PTT Raise Co., Ltd.	1.61	-	-	PTT Group owns 50.00%. No shares held by PTT's related parties with potential conflicts.
District Cooling System and Power Plant Co., Ltd.	1.55	3.15	4.29	PTT Group owns 35.00%. No shares held by PTT's related parties with potential conflicts.
OGP Energy Solutions Co., Ltd.	0.41	7.75	0.67	PTT Group owns 40.00%. No shares held by PTT's related parties with potential conflicts.
PTT and TGES Optec Co., Ltd.	0.40	-	-	PTT Group owns 51.00%. No shares held by PTT's related parties with potential conflicts.



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties (continued)

9.2.3.5.2 Other Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Joint Ventures (continued)					
Thai Ethoxylate Co., Ltd.	0.01	-	0.01	PTT Group owns 50.00%.  No shares held by PTT's related parties with potential conflicts.	—
PTT Asahi Chemical Co., Ltd.	-	0.01	0.11	PTT Group owns 50.00%.  No shares held by PTT's related parties with potential conflicts.	—
Associates					
Eastern Fluid Transport Co., Ltd.	6.61	5.53	5.44	PTT Group owns 37.65%.  No shares held by PTT's related parties with potential conflicts.	—
Vinythai Public Co., Ltd.	-	0.02	0.01	PTT Group owns 24.98%.  No shares held by PTT's related parties with potential conflicts.	—
Thai Petroleum Pipeline Co., Ltd.	(1.15)	1.02	0.61	PTT Group owns 49.21%.  No shares held by PTT's related parties with potential conflicts.	—
Other Related Companies					
Sam Palung Social Enterprise Co., Ltd.	0.21	0.34	2.00	PTT Group owns 100.00%.	—



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.2 Other Accounts Receivable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Other Related Companies (continued)					
Ratchaburi Power Co., Ltd.	-	-	0.21	PTT Group owns 15.00%.  No shares held by PTT’s related parties with potential conflicts.	- PTT’s executive (Mr. Worawat Pitayasiri is a director of Ratchaburi Power Co., Ltd.
Total	1,958.41	1,306.59	1,099.34		
Less: Allowance for expected credit loss/Allowance for doubtful accounts	-	-	-		
Total Other Accounts Receivables – Net	1,958.41	1,306.59	1,099.34		



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.3 Advance Payments

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiary					
PTT Digital Solutions Co., Ltd.	10.25	12.90	6.38	PTT Group owns 100.00%.	- PTT’s executive (Mr. Terdkiat Prommool) is the chairman of PTT Digital Solutions Co., Ltd.
Other Related Company					
Dhipaya Insurance Plc.	-	324.75	239.96	As of 31 December 2021, PTT Group has not held any share of Dhipaya Insurance Plc.	—
Total	10.25	337.65	246.34		

9.2.3.5.4 Short-Term Loans

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries					
PTT Treasury Center Co., Ltd.	4,278.92	4,986.74	3,142.20	PTT Group owns 100.00%.	- PTT’s executive (Mrs. Chanamas Sasnanand) is a director of PTT Treasury Center Co., Ltd.
PTT LNG Co., Ltd.	-	-	13,857.00	PTT Group owns 100.00%.	- PTT’s executive (Mr. Atikom Terbsiri) is the chairman of PTT LNG Co., Ltd.
Energy Complex Co., Ltd.	-	150.00	580.00	PTT Group owns 100.00%.	- PTT’s executive (Mr. Chansak Chuenchom) is the chairman of Energy Co., Ltd.  - PTT’s executive (Ms. Peangpanor Boonklum) is a director of Energy Co., Ltd.



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.4 Short-Term Loans (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Global Power Synergy Plc.	-	-	3,790.07	PTT Group owns 75.23%.  No shares held by PTT’s related parties with potential conflicts.	- PTT’s executives (Mr. Atikom Terbsiri, Mr. Noppadol Pinsupa, Mr. Wuttikorn Stithit, Mr. Kongkrapan Intarajang and Mr. Wirat Uanarumit.) are directors of Global Power Synergy Plc.  - PTT’s executive (Mr. Worawat Pitayasiri) is a director, the secretary, CEO and president of Global Power Synergy Plc.
Total	4,278.92	5,136.74	21,369.27		
Less: Allowance for expected credit loss/Allowance for doubtful accounts	-	-	-		
Total Short-term loans	4,278.92	5,136.74	21,369.27		



9.2.3.5 Trade accounts receivable, other accounts receivable, advance payments, short-term loans, and long-term loans to subsidiaries, joint ventures, associates, and other related parties  
(continued)

9.2.3.5.5 Long-term loans

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries					
PTT Treasury Center Co., Ltd.	119,596.25	44,345.77	24,594.89	PTT Group owns 100.00%	- PTT’s executive (Mrs. Chanamas Sasnanand) is a director of PTT Treasury Center Co., Ltd.
Energy Complex Co., Ltd.	-	317.50	-	PTT Group owns 100.00%	- PTT’s executive (Mr. Chansak Chuenchom) is the chairman of Energy Complex Co., Ltd.  - PTT’s executive (Ms. Peangpanor Boonklum) is a director of Energy Complex Co., Ltd.
PTT LNG Co., Ltd.	-	-	387.00	PTT Group owns 100.00%	- PTT’s executive (Mr. Atikom Terbsiri) is the chairman of PTT LNG Co., Ltd.
Total	119,596.25	44,663.27	24,981.89		
Less: Allowance for expected credit loss/Allowance for doubtful accounts	-	-	-		
Total Long-term loans	119,596.25	44,663.27	24,981.89		



9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties.

9.2.3.6.1 Trade accounts payable

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries					
PTT Exploration and Production Plc.	10,269.00	8,333.29	10,710.49	PTT Group owns 65.29%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's director / executive (Mr. Auttapol Rerkpiboon) is a director of PTT Exploration and Production Plc.</li><li>- PTT's executive (Mr. Atikom Terbsiri) is a director of PTT Exploration and Production Plc.</li><li>- PTT's executive (Mr. Montri Rawanchaikul) is the president of PTT Exploration and Production Plc.</li></ul>
PTT International Trading Pte. Ltd.	5,355.62	1,745.14	707.95	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT's executive (Mr. Disathat Panyarachun) is the chairman of PTT International Trading Pte. Ltd.</li><li>- PTT's executive (Mrs. Chanamas Sasnanand) is a director of PTT International Trading Pte. Ltd.</li></ul>
PTT Oil and Retail Business Plc.	3,240.22	2,905.74	3,963.65	PTT Group owns 75.00%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's director / executive (Mr. Auttapol Rerkpiboon) is the chairman of PTT Oil and Retail Business Plc.</li><li>- PTT's executive (Mr. Kris Imsang, Mr. Disathat Panyarachun and Mr. Buranin Rattanasombat) are directors of PTT Oil and Retail Business Plc.</li><li>- PTT's executive (Ms. Jiraphon Kawswat) is a director, the secretary, acting CEO and president of PTT Oil and Retail Business Plc.</li></ul>



## 9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

## 9.2.3.6.1 Trade accounts payable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTT International Trading London Ltd.	2,788.76	274.42	2,137.90	PTT Group owns 100.00%.	——
PTTEP International Co., Ltd.	2,597.33	1,915.83	2,378.84	PTT Group owns 100.00%.	——
PTT Global Chemical Plc.	2,429.88	2,165.96	2,241.81	PTT Group owns 48.18%.  No shares held by PTT’s related parties with potential conflicts.	- PTT’s executive (Mr. Don. Wasantapruerk) is a director of PTT Global Chemical Plc.  - PTT’s executives (Mr. Noppadol Pinsupa, M.L. Peekthong Thongyai and Mr. Disathat Panyarachun) are directors of PTT Global Chemical Plc.  - PTT’s executive (Mr. Kongkrapan Intarajang) is a director, the secretary and CEO of PTT Global Chemical Plc.
PTTEP Siam Co., Ltd.	1,416.41	988.71	1,457.76	PTT Group owns 100.00%.	——
PTT LNG Co., Ltd.	836.86	866.97	798.09	PTT Group owns 100.00%.	- PTT’s executive (Mr. Atikom Terbsiri) is the chairman of PTT LNG Co., Ltd.
PTTEP MENA Ltd.	702.95	-	-	PTT Group owns 100.00%.	——
PTTEP SP Ltd.	652.25	625.54	715.59	PTT Group owns 100.00%.	——



## 9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

## 9.2.3.6.1 Trade accounts payable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
IRPC Plc.	18.88	508.93	1.72	PTT Group owns 48.05%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's executive (Mr. Kris Imsang) is the chairman of IRPC Plc.</li><li>- PTT's executives (Ms. Peangpanor Boonklum and Mr. Chansak Chuenchom) are directors of IRPC Plc.</li><li>- PTT's executive (Mr. Chawalit Tippawanich ) is a director, the secretary, CEO and president of IRPC Plc.</li></ul>
PTT Tank Terminal Co., Ltd.	6.03	10.93	14.48	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT's executive (Mr. Kris Imsang) is the chairman of PTT Tank Terminal Co., Ltd.</li><li>- PTT's executive (M.L. Peekthong Thongyai) is a director of PTT Tank Terminal Co., Ltd.</li></ul>
GC Logistics Solutions Co., Ltd.	0.73	-	0.34	PTT Group owns 100.00%.	—
Thai Oil Plc.	0.44	0.29	0.15	PTT Group owns 48.03%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's executives (Ms. Pannalin Mahawongtikul, Mr. Terdkiat Prommool, Mr. Suchat Ramarch and Mr. Buranin Rattanasombat) are directors of Thai Oil Plc.</li><li>- PTT's executive (Mr. Wirat Uanarumit) is a director, the secretary, CEO and president of Thai Oil Plc.</li></ul>





## 9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

## 9.2.3.6.1 Trade accounts payable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTT Natural Gas Distribution Co., Ltd.	-	1.17	1.91	PTT Group owns 58.00%.  No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Wuttikorn Stithit) is the chairman of PTT Natural Gas Distribution Co., Ltd.
PTT Retail Management Co., Ltd.	-	-	0.02	PTT Group owns 100.00%.	—
Joint Operations					
Moattama Gas Transportation Company	2,800.58	1,876.45	2,348.11	PTT Group owns 25.50%.  No shares held by PTT's related parties with potential conflicts.	—
Andaman Transporation Ltd.	1,712.63	1,190.13	1,384.61	PTT Group owns 80.00%.  No shares held by PTT's related parties with potential conflicts.	—
Orange Energy Co., Ltd.	249.52	295.61	379.42	PTT Group owns 53.95%.  No shares held by PTT's related parties with potential conflicts.	—
B 8/32 Partners Co., Ltd.	249.52	295.61	379.42	PTT Group owns 25.00%.  No shares held by PTT's related parties with potential conflicts.	—
Taninthayi Pipeline Company LLC	238.74	159.74	367.81	PTT Group owns 19.32%.  No shares held by PTT's related parties with potential conflicts.	—
Joint Ventures					
Trans Thai-Malaysia (Thailand) Co., Ltd.	273.34	236.90	245.62	PTT Group owns 50.00%.  No shares held by PTT's related parties with potential conflicts.	—
Total	35,839.69	24,397.36	30,235.69		

9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

9.2.3.6.2 Other accounts payable

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries					
IRPC Plc.	2,797.02	1.43	10.23	PTT Group owns 48.05%.  No shares held by PTT’s related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT’s executive (Mr. Kris Imsang) is the chairman of IRPC Plc.</li><li>- PTT executives (Ms. Peangpanor Boonklum and Mr. Chansak Chuenchom) are directors of IRPC Plc.</li><li>- PTT executive (Mr. Chawalit Tippawanich) is a director, the secretary, CEO and president of IRPC Plc.</li></ul>
PTT Oil and Retail Business Plc.	2,116.76	4,537.27	5,073.71	PTT Group owns 75.00%.  No shares held by PTT’s related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT’s director / executive (Mr. Auttapol Rerkpiboon) is the chairman of PTT Oil and Retail Business Plc.</li><li>- PTT’s executives (Mr. Kris Imsang, Mr. Disathat Panyarachun, and Mr. Buranin Rattanasombat) are directors of PTT Oil and Retail Business Plc.</li><li>- PTT’s executive (Ms. Jiraphon Kawswat) is a director, the secretary, acting CEO and president of PTT Oil and Retail Business Plc.</li></ul>
PTT Treasury Center Co., Ltd.	848.27	762.71	196.93	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT’s executive (Mrs. Chanamas Sasnanand) is a director of PTT Treasury Center Co., Ltd.</li></ul>



9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

9.2.3.6.2 Other accounts payable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTT Digital Solutions Co., Ltd.	831.56	694.87	681.65	PTT Group owns 100.00%.	- PTT’s executive (Mr. Terdkiat Prommool) is the chairman of PTT Digital Solutions Co., Ltd.
Business Services Alliance Co., Ltd.	285.94	172.74	232.44	PTT Group owns 100.00%.	- PTT’s executive (Mr. Terdkiat Prommool) is the chairman of Business Services Alliance Co., Ltd. - PTT’s executive (Mr. Suchat Ramarch) is a director of Business Services Alliance Co., Ltd.
Energy Complex Co., Ltd.	146.55	160.44	159.14	PTT Group owns 100.00%.	- PTT’s executive (Mr. Chansak Chuenchom) is the chairman of Energy Complex Co., Ltd. - PTT’s executive (Ms. Peangpanor Boonklum) is a director of Energy Complex Co., Ltd.
Glow Energy Public Co., Ltd.	64.47	0.53	0.51	PTT Group owns 99.83%. No shares held by PTT’s related parties with potential conflicts.	- PTT’s executive (Mr. Worawat Pitayasiri) is a director of Glow Energy Public Co., Ltd.



## 9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

## 9.2.3.6.2 Other accounts payable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTT Global Chemical Plc.	32.49	58.78	54.28	PTT Group owns 48.18%.  No shares held by PTT’s related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT’s executive (Mr. Don. Wasantapruerk) is a director of PTT Global Chemical Plc.</li><li>- PTT’s executives (Mr. Noppadol Pinsupa, M.L. Peekthong Thongyai and Mr. Disathat Panyarachun) are directors of PTT Global Chemical Plc.</li><li>- PTT’s executive (Mr. Kongkrapan Intarajang) is a director, the secretary and CEO of PTT Global Chemical Plc.</li></ul>
PTTEP International Co., Ltd.	31.63	17.11	24.57	PTT Group owns 100.00%.	—
IRPC Clean Power Co., Ltd.	22.52	22.52	22.52	PTT Group owns 100.00%.	—
PTT Exploration and Production Plc.	21.33	41.87	19.31	PTT Group owns 65.29%.  No shares held by PTT’s related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT’s director / executive (Mr. Auttapol Rerkpiboon) is a director of PTT Exploration and Production Plc.</li><li>- PTT’s executive (Mr. Atikom Terbsiri) is a director of PTT Exploration and Production Plc.</li><li>- PTT’s executive (Mr. Montri Rawanchaikul) is the president of PTT Exploration and Production Plc.</li></ul>
NPC S&E Security Guard Co., Ltd.	18.94	-	-	PTT Group owns 100.00%.	—



## 9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

## 9.2.3.6.2 Other accounts payable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTT Energy Solutions Co., Ltd.	18.42	20.15	68.07	PTT Group owns 100.00%.	- PTT’s executive (Mr. Chawalit Tippawanich is the chairman of PTT Energy Solutions Co., Ltd.
GC Maintenance and Engineering Co., Ltd.	17.41	16.47	6.38	PTT Group owns 100.00%.	—
Business Professional Solutions Recruit Co., Ltd.	11.74	9.03	8.28	PTT Group owns 100.00%.	- PTT’s executive (Mr. Suchat Ramarch) is the chairman of Business Professional Solutions Recruit Co., Ltd.
PTT Retail Management Co., Ltd.	8.68	1.41	3.58	PTT Group owns 100.00%.	—
NPC Safety and Environmental Service Co., Ltd.	7.35	7.25	6.50	PTT Group owns 100.00%.	—
PTT International Trading London Ltd.	5.96	96.09	1.74	PTT Group owns 100.00%.	—
Alpha Com Co., Ltd.	5.43	0.14	-	PTT Group owns 100.00%.	- PTT’s executive (Mr. Terdkiat Prommool) is the chairman of Alpha Com Co., Ltd. - PTT’s executive (Mrs. Chanamas Sasnanand) is a director of Alpha Com Co., Ltd. - PTT’s executive (Mr. Worawat Pitayasiri) is an advisor to Alpha Com Co., Ltd.’s board of directors.
PTT Natural Gas Distribution Co., Ltd.	4.76	4.27	7.23	PTT Group owns 58.00%.  No shares held by PTT’s related parties with potential conflicts.	- PTT’s executive (Mr. Wuttikom Stithit) is the chairman of PTT Natural Gas Distribution Co., Ltd.



9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

9.2.3.6.2 Other accounts payable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTT International Trading Pte. Ltd.	3.66	523.61	102.29	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT's executive (Mr. Disathat Panyarachun) is the chairman of PTT International Trading Pte. Ltd.</li><li>- PTT's executive (Mrs. Chanamas Sasnanand) is a director of PTT International Trading Pte. Ltd.</li></ul>
Thai Oil Plc.	2.62	1.08	1.08	PTT Group owns 45.03%.  No shares held by PTT's related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT's executives (Ms. Pannalin Mahawongtikul, Mr. Terdkia Prommool, Mr. Suchat Ramarch, and Mr. Buranin Rattanasombat) are directors of Thai Oil Plc.</li><li>- PTT's executive (Mr. Wirat Uanarumit) is a director, the secretary, CEO and president of Thai Oil Plc.</li></ul>
Innobic (Asia) Co., Ltd.	1.13	-	-	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT's executives (Mr. Buranin Rattanasombat and Mrs. Chanamas Sasnanand) are directors of Innobic (Asia) Co., Ltd.</li></ul>
Glow SPP 11 Co., Ltd.	0.95	3.61	0.95	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT's executive (Mr. Worawat Pitayasiri) is a director of Glow SPP 11 Co., Ltd.</li></ul>



## 9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

## 9.2.3.6.2 Other accounts payable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Arun Plus Co., Ltd.	0.94	-	-	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT’s director (Prof. Dr. Thosaporn Sirisumphand) is the chairman of Arun Plus Co., Ltd.</li><li>- PTT’s directors (Mr. Danucha Pichayanan and M.L. Chayotid Kridakon) are directors of Arun Plus Co., Ltd.</li><li>- PTT’s director / executive (Mr. Auttapol Rerkpiboon) is a director of Arun Plus Co., Ltd.</li><li>- PTT’s executive (Mr. Noppadol Pinsupa) is a director of Arun Plus Co., Ltd.</li></ul>
PTTOR Singapore Pte. Ltd.	0.77	0.54	0.40	PTT Group owns 100.00%.	—
Sak Chaisidhi Co., Ltd.	0.69	0.74	0.72	PTT Group owns 80.52%. No shares held by PTT’s related parties with potential conflicts.	—
Global Power Synergy Plc.	0.65	1.02	0.62	PTT Group owns 75.23%. No shares held by PTT’s related parties with potential conflicts.	<ul style="list-style-type: none"><li>- PTT’s executives (Mr. Atikom Terbsiri, Mr. Noppadol Pinsupa, Mr. Wuttikom Stithit, Mr. Kongkrapan Intarajang and Mr. Wirat Uanarumit) are directors of Global Power Synergy Plc.</li><li>- PTT’s executive (Mr. Worawat Pitayasiri) is a director, the secretary, CEO and president of Global Power Synergy Plc.</li></ul>



## 9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

## 9.2.3.6.2 Other accounts payable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
PTT Tank Terminal Co., Ltd.	0.62	0.87	1.05	PTT Group owns 100.00%.	- PTT’s executive (Mr. Kris Imsang) is the chairman of PTT Tank Terminal Co., Ltd. - PTT’s executive (M.L. Peekthong Thongyai) is a director of PTT Tank Terminal Co., Ltd.
PTT Phenol Co., Ltd.	0.60	0.58	0.58	PTT Group owns 100.00%.	—
PTT International Trading USA Inc.	0.54	-	-	PTT Group owns 100.00%.	—
GC Oxirane Co., Ltd.	0.46	0.45	0.44	PTT Group owns 100.00%.	—
Glow SPP 3 Co., Ltd.	0.46	0.44	0.47	PTT Group owns 100.00%.	- PTT’s executive (Mr. Worawat Pitayasiri) is a director of Glow SPP 3 Co., Ltd.
GC-M PTA Co., Ltd.	0.43	0.51	0.51	PTT Group owns 74.00%. No shares held by PTT’s related parties with potential conflicts.	—
Tiger Energy Trading Pte. Ltd.	0.43	0.35	0.28	PTT Group owns 100.00%.	—
PTTEP Services Co., Ltd.	0.35	0.65	0.28	PTT Group owns 100.00%.	—
PTT LNG Co., Ltd.	0.34	0.61	1.66	PTT Group owns 100.00%.	- PTT’s director (Mr. Atikom Terbsiri) is the chairman of PTT LNG Co., Ltd.
Siam Management Holding Co., Ltd.	0.31	0.06	-	PTT Group owns 100.00%.	—
PTT MEA Ltd.	0.23	-	-	PTT Group owns 100.00%.	—
GC Glycol Co., Ltd.	0.21	0.21	0.20	PTT Group owns 100.00%.	—
Solution Creation Co., Ltd.	0.21	-	0.06	PTT Group owns 100.00%.	—



## 9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

## 9.2.3.6.2 Other accounts payable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Sakari Resources Ltd.	0.16	-	-	PTT Group owns 95.82%. No shares held by PTT's related parties with potential conflicts.	—
GC Estate Co., Ltd.	0.14	-	-	PTT Group owns 100.00%.	—
EV ME Plus Co., Ltd.	0.11	-	-	PTT Group owns 100.00%.	—
PTT Philippines Trading Corporation	0.08	0.07	0.07	PTT Group owns 100.00%.	—
Global Green Chemicals Plc.	0.05	0.07	0.14	PTT Group owns 72.29%. No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Kongkrapan Intarajang) is the chairman of Global Green Chemicals Public Co., Ltd.
PTT Green Energy (Thailand) Co., Ltd.	0.03	-	-	PTT Group owns 100.00%.	
PTT Global Management Co., Ltd.	0.02	0.07	0.05	PTT Group owns 100.00%.	—
PTT Energy Resources Co., Ltd.	0.02	-	-	PTT Group owns 100.00%.	—
PTT (Cambodia) Ltd.	-	0.74	1.20	PTT Group owns 100.00%.	—
PTT Philippines Corporation	-	0.26	0.71	PTT Group owns 100.00%.	—
PTTEP Siam Co., Ltd.	-	-	1.09	PTT Group owns 100.00%.	—
Combined Heat and Power Producing Co., Ltd.	-	-	1.93	PTT Group owns 100.00%.	—
Glow SPP 2 Co., Ltd.	-	-	0.98	PTT Group owns 100.00%.	- PTT's executive (Mr. Worawat Pitayasiri) is a director of Glow SPP 2 Co., Ltd.
PTT Oil Myanmar Co., Ltd.	-	-	0.14	PTT Group owns 100.00%.	—



## 9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

## 9.2.3.6.2 Other accounts payable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
<b>Subsidiaries (continued)</b>					
PTT (Lao) Co., Ltd.	-	-	0.14	PTT Group owns 100.00%.	—
PTTOR CHINA (Shanghai) Co., Ltd.	-	-	0.03	PTT Group owns 100.00%.	—
<b>Joint Ventures</b>					
Map Ta Phut Air Products Co., Ltd.	5.51	2.27	3.00	PTT Group owns 51.00%. No shares held by PTT's related parties with potential conflicts.	—
Nava Nakorn Electricity Generating Co., Ltd.	3.13	3.13	3.13	PTT Group owns 30.00%. No shares held by PTT's related parties with potential conflicts.	—
Suez Environmental Services Co., Ltd.	2.48	5.02	-	PTT Group owns 40.00%. No shares held by PTT's related parties with potential conflicts.	—
PTT Asahi Chemical Co., Ltd.	2.42	2.48	2.39	PTT Group owns 50.00%. No shares held by PTT's related parties with potential conflicts.	—
PTT Raise Co., Ltd.	1.28	-	-	PTT Group owns 50.00%. No shares held by PTT's related parties with potential conflicts.	—
HMC Polymers Co., Ltd.	0.83	0.80	0.77	PTT Group owns 41.44%. No shares held by PTT's related parties with potential conflicts.	—
District Cooling System and Power Plant Co., Ltd.	0.72	0.72	0.72	PTT Group owns 35.00%. No shares held by PTT's related parties with potential conflicts.	—
OGP Energy Solutions Co., Ltd.	0.45	-	4.98	PTT Group owns 40.00%. No shares held by PTT's related parties with potential conflicts.	—



## 9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

## 9.2.3.6.2 Other accounts payable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Joint Ventures (continued)					
Trans Thai - Malaysia (Malaysia) Sdn. Bhd.	0.37	0.35	0.22	PTT Group owns 50.00%. No shares held by PTT's related parties with potential conflicts.	—
Trans Thai-Malaysia (Thailand) Co., Ltd.	-	-	0.27	PTT Group owns 50.00%. No shares held by PTT's related parties with potential conflicts.	—
Associates					
Bangpa-In Cogeneration Co., Ltd.	6.83	6.83	6.83	PTT Group owns 25.00%. No shares held by PTT's related parties with potential conflicts.	—
Thai Petroleum Pipeline Co., Ltd.	1.56	0.95	4.69	PTT Group owns 49.59%. No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Buranin Rattanasombat) is a director of Thai Petroleum Pipeline Co., Ltd.
Advanced Biochemical (Thailand) Co., Ltd.	0.32	0.31	0.30	PTT Group owns 49.59%. No shares held by PTT's related parties with potential conflicts.	—
Vinythai Public Co., Ltd.	0.32	0.31	0.30	PTT Group owns 24.98%. No shares held by PTT's related parties with potential conflicts.	—
Eastern Fluid Transport Co., Ltd.	-	3.42	-	PTT Group owns 37.65%. No shares held by PTT's related parties with potential conflicts.	—
Ubon Bio Ethanol Co., Ltd.	-	0.01	-	As of 31 December 2021, PTT Group has not held any share of Ubon Bio Ethanol Co., Ltd.	—



9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

9.2.3.6.2 Other accounts payable (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Other Related Companies					
Ratchaburi Power Co., Ltd.	31.80	31.80	31.80	PTT Group owns 15.00%.  No shares held by PTT's related parties with potential conflicts.	- PTT's executive (Mr. Worawat Pitayasiri) is a  director of Ratchaburi Power Co., Ltd.
Dhipaya Insurance Plc.	-	10.43	3.49	As of 31 December 2021, PTT Group has not held any share of Dhipaya Insurance Plc.	_____
Sam Palung Social Enterprise Co., Ltd.	-	-	0.14	PTT Group owns 100.00%.	_____
Total	7,372.46	7,230.45	6,758.17		



## 9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

## 9.2.3.6.3 Short-term loans

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries					
Arun Plus Co., Ltd.	2,729.19	-	-	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT’s director (Prof. Dr. Thosaporn Sirisumphand) is the chairman of Arun Plus Co., Ltd.</li><li>- PTT’s directors (Mr. Danucha Pichayanan and M.L. Chayotid Kridakon) are directors of Arun Plus Co., Ltd.</li><li>- PTT’s director / executive (Mr. Auttapol Rerkpiboon) is a director of Arun Plus Co., Ltd.</li><li>- PTT’s executive (Mr. Noppadol Pinsupa) is a director of Arun Plus Co., Ltd.</li></ul>
PTT LNG Co., Ltd.	1,615.32	816.04	2,632.23	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT’s executive (Mr. Atikom Terbsiri) is the chairman of PTT LNG Co., Ltd.</li></ul>
PTT Tank Terminal Co., Ltd.	990.22	1,114.69	619.05	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT’s executive (Mr. Kris Imsang) is the chairman of PTT Tank Terminal Co., Ltd.</li><li>- PTT’s executive (M.L. Peekthong Thongyai) is a director of PTT Tank Terminal Co., Ltd.</li></ul>
Siam Management Holding Co., Ltd.	892.60	131.36	-	PTT Group owns 100.00%.	—
Innobic (Asia) Co., Ltd.	635.07	-	-	PTT Group owns 100.00%.	<ul style="list-style-type: none"><li>- PTT’s executives (Mr. Buranin Rattanasombat and Mrs. Chanamas Sasnanand) are directors of Innobic (Asia) Co., Ltd.</li></ul>



9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

9.2.3.6.3 Short-term loans (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Alpha Com Co., Ltd.	161.25	83.73	-	PTT Group owns 100.00%.	- PTT’s executive (Mr. Noppadol Pinsupa) is a director of Alpha Com Co., Ltd. - PTT’s executive (Mr. Worawat Pitayasiri) is an advisor to Alpha Com Co., Ltd.’s board of directors.
PTT Green Energy (Thailand) Co., Ltd.	74.24	-	-	PTT Group owns 100.00%.	—
PTT Global Management Co., Ltd.	55.54	300.32	66.94	PTT Group owns 100.00%.	—
PTT Energy Resources Co., Ltd.	55.22	113.56	169.34	PTT Group owns 100.00%.	—
Innobic LL Holding Co., Ltd.	7.05	-	-	PTT Group owns 100.00%.	—
Global Management Holding Co., Ltd.	1.66	1.36	-	PTT Group owns 100.00%.	—
Total	7,217.36	2,561.06	3,487.56		

## 9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

## 9.2.3.6.4 Long-term loans

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiary					
PTT Treasury Center Co., Ltd.	49,489.92	45,181.01	23,872.73	PTT Group owns 100.00%.	- PTT's executive (Mrs. Chanamas Sasnanand) is a director of PTT Treasury Center Co., Ltd.
Total	49,489.92	45,181.01	23,872.73		

## 9.2.3.6.5 Liabilities under lease due within one year

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries					
PTT Digital Solutions Co., Ltd.	1.50	1.50	-	PTT Group owns 100.00%.	- PTT's executive (Mr. Terdkiat Prommool) is the chairman of PTT Digital Solutions Co., Ltd.
Business Services Alliance Co., Ltd.	0.91	0.84	0.77	PTT Group owns 100.00%.	- PTT's executive (Mr. Terdkiat Prommool) is the chairman of Business Services Alliance Co., Ltd.  - PTT's executive (Mr. Suchat Ramarch) is a director of Business Services Alliance Co., Ltd.
EV ME Plus Co., Ltd.	0.37	-	-	PTT Group owns 100.00%.	—



9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

9.2.3.6.5 Liabilities under lease due within one year (continued)

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries (continued)					
Energy Complex Co., Ltd.	0.10	35.70	-	PTT Group owns 100.00%.	- PTT’s executive (Mr. Chansak Chuenchom) is the chairman of Energy Complex Co., Ltd.  - PTT’s executive (Ms. Peangpanor Boonklum) is a director of Energy Complex Co., Ltd.
Joint Ventures					
Trans Thai-Malaysia (Thailand) Co., Ltd.	431.12	383.24	374.86	PTT Group owns 50.00%.  No shares held by PTT’s related parties with potential conflicts.	—
Total	434.00	421.28	375.63		





## 9.2.3.6 Trade accounts payable, other account payable, loans, and liabilities under leases from subsidiaries, joint operations, joint ventures, associates, and other related parties. (continued)

## 9.2.3.6.6 Liabilities under long-term lease

Related Companies	2021 (THB million)	2020 (THB million)	2019 (THB million)	Relationship	
Subsidiaries					
Business Services Alliance Co., Ltd.	1.24	2.15	2.98	PTT Group owns 100.00%.	- PTT’s executive (Mr. Terdkiat Prommool) is the chairman of Business Services Alliance Co., Ltd.  - PTT’s executive (Mr. Suchat Ramarch) is a director of Business Services Alliance Co., Ltd..
EV ME Plus Co., Ltd.	0.11	-	-	PTT Group owns 100.00%.	—
Joint Ventures					
Trans Thai-Malaysia (Thailand) Co., Ltd.	2,695.91	2,811.94	3,180.60	PTT Group owns 50.00%.  No shares held by PTT’s related parties with potential conflicts.	—
Total	2,697.26	2,814.09	3,183.58		





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PTT Public Company Limited  
555 Vibhavadi Rangsit Rd., Chatuchak,  
Bangkok 10900, Thailand  
Tel. 66 (0) 2537-2000  
[www.pttplc.com](http://www.pttplc.com)

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