



MANAGEMENT DISCUSSION & ANALYSIS 3Q2021 & 9M2021



POWERING LIFE
with **FUTURE ENERGY** and **BEYOND**
ขับเคลื่อนทุกชีวิตด้วยพลังแห่งอนาคต

Management's Discussion and Analysis (MD&A) and operating result for the three-month and nine-month periods ended 30 September 2021

Executive Summary

Unit : Million Baht	3Q2020	2Q2021	3Q2021	%Inc. (Dec.)		9M2020	9M2021	% Inc. (Dec.)
				YoY	QoQ			
Sales Revenue	383,599	533,256	558,888	45.7%	4.8%	1,208,491	1,569,981	29.9%
EBITDA	67,465	113,166	110,522	63.8%	(2.3)%	154,058	326,685	>100.0%
Net Profit	14,120	24,578	23,653	67.5%	(3.8)%	24,619	80,819	>100.0%
Earnings per share (Baht/share)	0.50	0.86	0.82	64.0%	(4.7)%	0.86	2.82	>100.0%
Average Dubai Price	42.9	66.9	71.7	67.1%	7.2%	41.4	66.2	59.9%

In the third quarter of 2021 (3Q2021), PTT and its subsidiaries reported Earnings before Interest, Tax, Depreciation and Amortization or EBITDA in an amount of Baht 110,522 million, decreased by Baht 2,644 million or 2.3% from the second quarter of 2021 (2Q2021) of Baht 113,166 million mostly from the decrease in the performance of Petrochemical and Refining businesses due to lower sales volume affected from PTT group's refinery maintenance shutdown, higher crude premium and increased petrochemical feedstock as well as higher hedging loss. Oil Business's performance reduced mainly from lower sales volume. Additionally, PTT Group's stock gain decreased approximately by Baht 1,400 million because of the lower extent of the crude oil prices' increase compared to the previous quarter. However, Gas business and Exploration and Production business increased mainly from the increase of average selling prices. In 3Q2021, there was the recognition of non-recurring items (PTT's portion) mainly from the write-off on obsolete materials and supplies approximately by Baht 900 million from PTT net off gain on fair value measurement of Ubon Ethanol Public Company Limited (UBE) approximately by Baht 290 million from Thai Oil Public Company Limited (TOP). Whereas, in 2Q2021, there was PTT Global Chemical Public Company Limited (GC)'s impairment loss on investment in joint venture approximately by Baht 1,500 million. As a result, net income of PTT and its subsidiaries in 3Q2021 was reported at Baht 23,653 million, decreased by Baht 925 million or 3.8% from Baht 24,578 million in 2Q2021.

In the third quarter of 2021 (3Q2021), PTT and its subsidiaries reported EBITDA increased by Baht 43,057 million or 63.8% from the third quarter of 2020 (3Q2020) of Baht 67,465 million. This was mainly from Petrochemical and Refining businesses that the Petrochemical business's performance increased from the higher of overall petrochemical product spreads both of Olefins and Aromatics as well as the increased sales volume offset with the decline in the Refining business's performance due to lower sales volume and increased hedging loss in this quarter. However, PTT Group's stock gain increased approximately by Baht 2,000 million following crude oil prices increased in higher extent compared to 3Q2020. Exploration and Production business's performance improved due to higher sales volume mainly from the acquisition of Oman Block 61 in March 2021 as well as higher average selling prices. The performance of Gas business enhanced from Gas Separation Plant business (GSP) and Supply and Marketing business (S&M) due to the higher average referenced selling prices as aforementioned. Net income of PTT and subsidiaries in 3Q2021 was Baht 23,653

million, increased by Baht 9,533 million or 67.5% from Baht 14,120 million in 3Q2020. This resulted from the improved EBITDA despite higher losses on derivatives, foreign exchange rate, and income tax expense in this quarter. In 3Q2021, there was the recognition of non-recurring items as aforementioned. While in 3Q2020, there was PTT Global Management Company Limited (PTTGM)'s impairment loss of coal assets approximately by Baht 1,000 million.

For nine month period ended 30 September 2021 (9M2021), PTT and its subsidiaries reported EBITDA of Baht 326,685 million, increased by Baht 172,627 million or more than 100.0% from Baht 154,058 million from the first nine-month of 2020 (9M2020). This was primarily from Petrochemical and Refining businesses which significantly improved from the increased Accounting GRM, from loss US\$ 1.8 per barrel in 9M2020 to gain US\$ 4.9 per barrel in 9M2021. In addition, petrochemical product spreads both of Olefins and Aromatics increased. Besides, PTT Group had stock gain approximately by Baht 39,000 million in 9M2021 following the crude oil prices increased from the end of 2020 while there was the stock loss approximately by Baht 27,000 million in 9M2020. Furthermore, Exploration and Production business's performance enhanced mainly due to higher sales volume and average selling prices. Moreover, Gas business's performance increased mainly from GSP and S&M businesses. The performance of GSP rose due to higher average selling prices and sales volume. Additionally, S&M business's performance increased from the higher of both sales volume and the fuel oil referenced selling prices for industrial customers as well as the lower gas cost. Net income of PTT and its subsidiaries in 9M2021 was Baht 80,819 million, increased by Baht 56,200 million or more than 100.0% from Baht 24,619 million in 9M2020 in line with the improved EBITDA. In addition, there was the recognition of non-recurring items (PTT's portion) mainly from PTT Exploration and Production Public Company Limited (PTTEP)'s gain on bargain purchase in Oman Block 61 approximately by Baht 7,000 million and TOP's gain on fair value measurement of UBE approximately by Baht 290 million. Meanwhile, there were PTTEP's partial write-off of exploration and evaluation assets of the exploration project in Brazil approximately by Baht 2,900 million, GC's impairment loss on investment in joint venture approximately by Baht 1,500 million, and PTT's write-off on obsolete materials and supplies approximately by Baht 900 million. In 9M2020, there were impairment loss on assets approximately by Baht 2,000 million mainly from Mariana Oil Sands Project of PTTEP and Coal Mining of PTTGM. Moreover, loss on derivatives, foreign exchange rate, and income tax expense increased in 9M2021 compared to 9M2020.

As of 30 September 2021, PTT and its subsidiaries had the total assets amounting to Baht 2,970,002 million, increased by Baht 425,819 million or 16.7% from 31 December 2020, mainly from the increase in property, plant, and equipment by Baht 117,515 million due to PTTEP's business acquisition of Oman Block 61 and the increase in trade accounts receivable and inventories from the higher product prices. In addition, the long-term investments increased mainly from the investment in PT Chandra Asri Petrochemical Tbk (CAP) of TOP. Whereas, the total liabilities were recorded at Baht 1,535,242 million, increased by Baht 276,904 million or 22.0% primarily from an increase in the short-term and long-term loans amounting to Baht 140,157 million mainly from long-term loan and bond issuances of PTT, GC,

and TOP together with the increase in accounts payable as a result of the increase in the purchased prices. The total shareholders' equity was Baht 1,434,760 million, increased by Baht 148,915 million or 11.6%, mainly from PTT Oil and Retail Business Public Company Limited (OR)'s capital increase and PTT and its subsidiaries' net income of 9M2021 offset with dividend payment from the operating results of the second half of 2020 and the first half of 2021.



Economic Overview in the Third Quarter of 2021

The **world economy** in 3Q2021 recovered at a slower rate from 2Q2021, due to the spread of the Delta COVID-19 variant which has forced many Emerging and Developing countries to reimpose lockdown measures. In addition, the shortages of key inputs and global supply chain disruptions, coupled with the release of pent-up demand in Advanced Economies, and the rise in commodity prices, resulted in an accelerated inflation rate in several countries. As a result, many central banks have shifted their monetary policies. Especially, the Federal Reserves (the Fed) and the European Central Bank (ECB) in late September 2021 signaled the potential tightening of monetary policies. The International Monetary Fund (IMF) in October 2021 has slightly revised down its global growth forecast for 2021 to 5.9% from its previous forecast of 6.0% in July 2021.

Thai economy in 3Q2021 contracted from 2Q2021, mainly due to the contraction in private consumption and private investment which had been affected by a new prolonged and severe outbreak of the Delta COVID-19 variant, forcing the government to impose harsher lockdown restrictions in many areas for almost 2 months (12 July – 30 August 2021). Also, the tourism sector had been pressured by the high level of domestic COVID-19 cases, despite the government approved quarantine free travel to foreign tourists in some pilot destinations, including “Phuket Sandbox” and “Samui Plus”. Meanwhile, the merchandise exports continued to expand, albeit at a slower pace due to the highly contagious of the Delta COVID-19 variant that slowed economic activities in many countries and prompted supply chain disruption which resulted from the closure of factories in Thailand as well as the production stoppage in trading-partner countries in the same supply chain. While, government spending continued to expand, supported by additional relief measures, including subsidies for social welfare card holders (Round 3), "Khon La Khrueng" phase 3, “Ying Chai Ying Dai” scheme, utility subsidy, and financial assistance for people and businesses affected by the government's partial COVID-19 lockdown in 29 provinces. The Bank of Thailand, in September 2021, kept its Thai economic forecast for 2021 at 0.7%, similar to the previous forecast in June 2021.

According to IHS Markit (IHS) report of October 2021, global oil demand in 3Q2021 was averaged at 98.3 million barrels per day (MMBD), increasing from 2Q2021 at 96.2 MMBD and from 3Q2020 at 92.4 MMBD. It was resulted from easing lockdown measures and wide spread vaccines rollout as well as economic stimulus packages which lead to the increasing of oil demand, especially in Europe and Middle East. However, the new variance of Delta COVID-19, especially in Asia, still pressures the oil demand throughout the remaining of the year. In 2021, global oil demand is expected to be averaged at 96.7 MMBD, increasing from 2020 at 91.1 MMBD following economic recovery and stimulus packages in each countries.

Unit : US\$/barrel	3Q2020	2Q2021	3Q2021	% Inc. (Dec.)		9M2020	9M2021	% Inc. (Dec.)
				YoY	QoQ			
Average Dubai crude oil price	42.9	66.9	71.7	67.1%	7.2%	41.4	66.2	59.9%
Gasoline Crack Spread	4.4	9.9	11.8	>100.0%	19.2%	4.5	9.6	>100.0%
Diesel Crack Spread	4.2	5.3	5.4	28.6%	1.9%	7.0	5.1	(27.1%)
HSFO Crack Spread (180 – 3.5%S)	(2.5)	(5.8)	(3.4)	(36.0%)	41.4%	(3.8)	(4.2)	(10.5%)
GRM-Singapore Crack	0.05	2.1	3.8	>100.0%	90.0%	0.12	2.5	>100.0%

Dubai crude oil price in 3Q2021 was averaged at US\$71.7 per barrel, increasing from 2Q2021 at US\$66.9 per barrel, and from 3Q2020 at US\$42.9 per barrel following supply disruption from the impact of Hurricane Ida on the Gulf of Mexico from the end of August through mid of September 2021, resulting in the decreasing of US crude oil supply around 1.74 MMBD. In addition, OPEC and its allies (OPEC+) agreed at the meeting on 1 September 2021 to affirm the increase of oil production quota at 0.4 MMBD per month from August 2021 to April 2022, together with some of OPEC+ members such as Nigeria, Angola, and Kazakhstan produced oil well below the agreed level amid countries' investment limitation. As a result, the oil supply did not increase as much as the increase in oil demand which was nearly back to the pre-COVID-19 level, resulted from easing lockdown policy and economic stimulus packages. Also, Northern Hemisphere cold weather and high gas price drove higher refined product demand such as diesel and fuel oil, leading global crude oil inventory to stay below 5 year average. Also, fund flow to commodities help drive higher oil price. However, the new variance of Delta COVID-19 still put pressure on the oil demand.

Petroleum product prices at Singapore spot market

- Gasoline crack spread** in 3Q2021 was averaged at US\$11.8 per barrel, increasing from 2Q2021 at US\$9.9 per barrel and from 3Q2020 at US\$4.4 per barrel, due to the increase of demand from easing lockdown policy especially in US, Europe, and other Asia countries. The crack spread was also supported by the outage of US refineries, resulted from the impact of Hurricane Ida, and lower inventories. However, the resurgence of COVID-19 in China pressured on the crack spread.
- Diesel crack spread** in 3Q2021 was averaged at US\$5.4 per barrel, slightly increasing from 2Q2021 at US\$5.3 per barrel and 3Q2020 at US\$ 4.2 per barrel, due to higher demand from economic recovery and the higher Liquefied Natural Gas (LNG) price which help pushing diesel demand for electricity generation as well as lower supply from refineries' turnaround. However, the rise of Delta variant of COVID-19 cases in Asia and Monsoon season in China, India, and Japan put pressure on the crack spread.
- Higher Sulfur fuel oil 3.5% crack spread (HSFO)** in 3Q2021 was averaged at US\$ -3.4 per barrel, increasing from 2Q2021 at US\$ -5.8 per barrel, due to the increase in demand of power generation in South Asia and Middle East regions as well as the higher gas and coal prices which resulted in low level of fuel oil inventory.

However, High Sulfur fuel oil 3.5% crack spread in 3Q2021 decreased from 3Q2020 at US\$ -2.5 per barrel due to higher HSFO supply from the gradually increasing of OPEC+ sour crude production and increasing refinery run which put pressure on fuel oil crack spread.

Singapore Gross Refining margin (GRM) in 3Q2021 was averaged at US\$3.8 per barrel, increasing from 2Q2021 at US\$2.1 per barrel, and from 3Q2020 at US\$0.05 per barrel from increasing products' demand in US, Asia, and Europe as well as high LNG price led to increasing petroleum product demand, especially diesel and fuel oil for power generation. However, the new variance of COVID-19 and increasing refineries run will put pressure on Singapore GRM through the end of this year.

Unit : US\$/Ton	3Q2020	2Q2021	3Q2021	% Inc. (Dec.)		9M2020	9M2021	% Inc. (Dec.)
				YoY	QoQ			
HDPE: CFR SEA	919	1,191	1,138	23.8%	(4.5%)	839	1,158	38.0%
PP: CFR SEA - Film	968	1,338	1,250	29.1%	(6.6%)	943	1,318	39.8%
BZ: FOB Korea	427	966	993	>100.0%	2.8%	471	904	91.9%
BZ - Naphtha	30	360	318	>100.0%	(11.7%)	101	291	>100.0%
PX: CFR Taiwan	546	859	919	68.3%	7.0%	583	848	45.5%
PX - Naphtha	149	253	243	63.1%	(4.0%)	213	235	10.3%
Naphtha (MOPJ)	397	606	676	70.3%	11.6%	370	613	65.7%

Petrochemical prices of Olefins in 3Q2021 softened from 2Q2021, due to sluggish demand, amid slow economic recovery, a surge in COVID-19 cases in many countries, and strengthen enforcement of China's dual control policy. The policy, which limits domestic energy consumption and reduce energy intensity to achieve its climate goal, mainly in Guangdong, Zhejiang, and Jiangsu, has curtailed downstream demand in both olefins and aromatics due to power shortage which effects to the production in many industries including downstream sector. Meanwhile, the petrochemical prices have remained high following the increasing of the feedstock prices including, crude oil, naphtha, LPG, and coal.

- Olefins:** High density polyethylene (HDPE) and polypropylene (PP) prices decreased from 2Q2021, due to weak demand caused by a surge in COVID-19 cases particularly in ASEAN, a monsoon season, and China's dual control policy. Additionally, new plants starting up in China and Vietnam also pressured the price. However, Olefins prices remained firm from higher production costs due to higher feedstock and freight costs. In addition, some Coal-to-Olefin (CTO) and Methanol-to-Olefin (MTO) plants decided to cut their production due to higher coal price and the implementation of stringent dual control policy.
- Aromatics:** Benzene (BZ) price increased from 2Q2021. However, higher crude oil and naphtha prices caused BZ spread over naphtha to decrease. Moreover, BZ downstream demand in China was impacted by the strict dual control policy. Besides, styrene monomer (SM) manufacturers' demand also declined due to planned maintenance shutdowns in China and unplanned shutdowns in US from the impact of hurricane Ida. Meanwhile, BZ supply in Asia increased due to steady production by operable plants outside of China,

an increase in the use of naphtha as the feedstock for production, and no arbitrage window from Asia to US. Paraxylene (PX) price also increased from 2Q2021. However, PX spread over naphtha decreased due to the increase in crude oil and naphtha prices which were unable to passthrough to the end products' price. In addition, PX demand decreased following a slowdown in the downstream demand for both Purified terephthalic acid (PTA) and Polyester in China, due to the strict dual control policy, high inventory level, and problems of products' distribution and export in China.

Comparing to the same period last year, petrochemical prices of Olefins and Aromatics in 3Q2021 increased, following higher demand boosted by a gradual global economic recovery after the easing of COVID-19 restriction measures, the widespread of COVID-19 vaccination globally, especially in major economies, coupled with a sharp rise in crude oil and naphtha prices.



Non-recurring items in the third quarter of 2021 until present

Summary of non-recurring items in the third quarter of 2021 until present are as follows:

July 2021

- **IRPC:** On 2 July 2021, IRPC's Board of Directors has approved the investment in the Refinery Efficiency and Diesel Quality Improvement Project (Ultra Clean Fuel Project: UCF) for EURO V Standards Compliance which Ministry of Energy determines to start the policy since 1 January 2024. The investment cost is approximately Baht 13,300 million and has been planned to commercial operate within January 2024.
- **GC:** On 10 July 2021, PTTGC International (Netherlands) B.V. ("GC Inter B.V."), the wholly owned subsidiary of GC has signed Shares Purchase Agreement to acquire the ordinary shares in Allnex Holding GmbH (a global leader in specialty coating resins and crosslinkers business) from Allnex Holdings S.à.r.l equivalent to 100 percent of the total shares, Shareholder Loan and the preferred shares. The total consideration of the transactions is EURO 4,002.2 million or equivalent to approximately Baht 148,417 million. This acquisition highly fits to the Company Group's growth strategy that aims to diversify the Company Group's business toward specialties arena, specifically to increase profit contribution from and capture growth opportunities in High Value Business ("HVB"). The transaction is anticipated to complete by 31 December 2021. GC and PTT Treasury Center Company Limited ("PTT TCC") also signed the loan agreement in the amount of not exceeding Baht 73,920 million, contract period of 24 months and at the comparable to the market interest rate of not exceeding 2.5% per year on 7 July 2021. The objective is to support for investment in High Value Business ("HVB") Project.
- **GPSC:** On 13 July 2021, Global Renewable Synergy Company Limited ("GRSC") (a wholly-owned subsidiary of GPSC) has completed the acquisition of the shares in Avaada Energy Private Limited ("Avaada") in the Republic of India. GRSC has invested by way of subscription of new shares approximately 41.6% of total equity interest in Avaada with total investment of approximately Baht 14,825 million. Avaada has developed and is operating a large portfolio of solar power plants in India, with a total committed capacity of approximately 4,560 megawatts, of which approximately 1,500 megawatts are in operations and approximately 3,060 megawatts are under construction with expected commercial operations by 2021 – 2022.
- **GPSC:** On 14 July 2021, GRSC (a wholly-owned subsidiary of GPSC) has entered into Share Purchase Agreements to acquire a 25% interest in CI Changfang Limited and CI Xidao Limited ("Target Companies") with Copenhagen Infrastructure II K/S ("CI-II") and Copenhagen Infrastructure III K/S ("CI-III"), with the total investment (until the project completion) of approximately USD 500 million. The Target Companies are developing and constructing an offshore wind power project in Taiwan with a total capacity of 595 megawatts, comprising the Changfang Project and the Xidao Project with capacity of 547 megawatts and 48 megawatts, respectively. The project is expected to start full commercial operation date in the first quarter

of 2024. GPSC expects that the conditions precedent will be satisfied, and that the transfer of shares will be completed by the end of the second quarter of 2022.

- **OR:** On 20 July 2021, OR's Management Committee has approved Modulus Venture Company Limited ("Modulus") (a 100% owned subsidiary of OR) to establish a new wholly owned subsidiary to operate business related to online automotive service with the initial registered capital not exceeding Baht 106 million.
- **PTT:** On 22 July 2021, ON-I ON SOLUTIONS Co., Ltd. (a wholly owned subsidiary of PTT) has registered to change the company name to ARUN PLUS Co., Ltd. ("ARUN PLUS") and increased its registered capital to Baht 5,000 million (initial registered capital is Baht 30 million). ARUN PLUS will be responsible for operating in EV value chain business in accordance with New S-Curve strategy to support PTT's expansion plan in EV business. Moreover, ARUN PLUS has established EVME PLUS Co., Ltd. ("EVME PLUS") which is 100% owned by ARUN PLUS, with the registered capital of Baht 1,000 million and initial paid-up capital of Baht 340 million. The objective of the company establishment is to operate in the electric vehicle business through the digital platform in order to promote and to create an EV ecosystem for the widespread use of electric vehicles in Thailand which includes EV rental services, information services for the charging and maintenance stations.
- **PTT & GPSC:** On 27 July 2021, Global Renewable Power One Co., Ltd. ("GRP1") (a wholly owned subsidiary of Global Renewable Power Co., Ltd. ("GRP") which GRP is a subsidiary that PTT and GPSC equally hold at 50%) has met the conditions precedent under the share purchase agreement to acquire 90% stakes in Sheng Yang Energy Co., Ltd. ("Sheng Yang") from Tatung Forever Energy Co., Ltd. with the total value of approximately Baht 2,560 million. This transaction resulted that Sheng Yang will be a subsidiary of PTT. Currently, Sheng Yang operates a solar power generation business in Taiwan with a total installed generation capacity of 55.8 MW which all commenced commercial operation.
- **PTT & TOP:** On 29 July 2021, notification on the direct investment in PT Chandra Asri Petrochemical Tbk ("CAP") which will be made by PT TOP Investment Indonesia (TOP's subsidiary) up to 15.38 percent of CAP's total shares with the total value of the Share Acquisition Transaction will not exceed USD 1,183 million or approximately Baht 39,116 million. The investment proceeds will be exclusively used for the investment in the development and construction of a petrochemical plant by PT Chandra Asri Perkasa ("CAP2"). CAP is the premier petrochemical producer with an integrated plant incorporating world class, state-of-the-art technology and supporting facilities in the Republic of Indonesia. Moreover, TOP's Board of Director approved to enter into the Facilities Agreement with PTT with the bridging loan amount not exceed USD 670 million, duration not exceed 18 months and interest rate not exceed 2.5 percent per annum in line with market rate as well as approved the long-term recapitalization plan including sale of GPSC's share of not exceeding 10.8 percent of GPSC's paid up capital

and approximately Baht 10,000 million capital increase which is in consideration for the appropriate fund raising structure. PTT will support TOP's long-term recapitalization plan.

- **PTTEP:** On 30 July 2021, Participations and Explorations Corporation and Partex (Brazil) Corporation, subsidiaries of PTTEP, entered into a Sale and Purchase Agreement (SPA) to sell Partex Brasil Ltda. and Partex Brasil Operações Petrolíferas Ltda., which are registered in the Federative Republic of Brazil, altogether with all obligations to Ubuntu Engenharia e Serviços Ltda. The project has the average crude sales volume of 94 barrels per day (50% interest). The Completion of sale has been fulfilled on 29 October 2021.

August 2021

- **PTT:** On 6 August 2021, PTT has issued unsubordinated and unsecured debentures No. 1/2021 for the total amount of Baht 47,000 million at interest rate of compound THOR+0.18% to 2.37% per annum with a tenor of 1 year 6 months to 10 years to the institutional investors and/or high net worth investors (excluding individual). The debentures are issued under Medium -Term Note Program (MTN Program) Baht 130,000 million.
- **GC:** On 10 August 2021, Board of Directors of NatureWorks LLC ("NatureWorks"), which GC International Corporation (a wholly owned subsidiary of GC) holds 50 percent of shares and Cargill, Incorporated holds 50 percent of shares, has approved NatureWorks to invest in the Bioplastic Polylactic Acid ("PLA") Plant 2 located in Nakorn Sawan Biocomplex, Thailand. The plant will use sugar from sugar cane as the main feedstock for production of lactic acid, which is used for the production of PLA at the nameplate capacity of 75,000 metric tons per year. This investment will ensure growth of the green business strategy of GC. The project has been planned to commercial operate within 2024.
- **GC:** On 16 August 2021, GC Marketing Solutions Company Limited ("GCM") which is a wholly-owned subsidiary of GC, has established a subsidiary company called GC Marketing Solutions (Shanghai) Company Limited. GCM holds 100% in GC Marketing Solutions (Shanghai) Company Limited which has the registered capital USD 600,000 to support trading business on import and export and to do retail and wholesale distribution of Polymers products in the People's Republic of China.
- **GC:** On 17 August 2021, the Board of Directors of PTTGC International Private Limited ("GC Inter"), a wholly-owned subsidiary of PTTGC has approved GC Inter to enter into a Share Purchase Agreement ("SPA") to sell, together with Sime Darby Plantation Berhad ("SDP"), their collective 100% of ordinary shares in the Asia Pacific business of Emery Oleochemicals (M) Sdn. Bhd. ("EOM") and Emery Specialty Chemicals Sdn. Bhd. ("ESC") (Emery Group is a 50:50 joint venture between GC Inter and SDP) to Edenor Technology Sdn. Bhd. ("ETSB") for a total cash consideration of RM 38 million. The divestment is conditional upon the restructuring of Emery Group into separate standalone groups in respect of its Asia Pacific business and the

North America and Europe business. On 1 November 2021, GC Inter and SDP have completed the sale of their collective 100% of ordinary shares.

- PTT: On 23 August 2021, PTT Global LNG Company Limited (“PTTGL”) (a subsidiary of PTT which PTT and PTTEP equally hold at 50% shares) completely subscribed the 250,000 newly issued ordinary shares in B.Grimm Power LNG JV Limited (“BGP LNG JV”) with the subscription price at par value of Baht 100 per share, totaling Baht 25,000,000. As a result, PTTGL and B.Grimm Power Company Limited (“BGRIM”) equally hold 50% stakeholding in BGP LNG JV. The objective of BGP LNG JV is to procure and supply LNG and explore other business opportunities related to LNG value chain both domestically and internationally as well as creating business alliance with the potential partner to expand our business opportunities.

September 2021

- PTTEP: On 6 September 2021, PTTEP has established two subsidiaries to support future investments in renewable energy business, per the following details:
 - Asia Power and Transportation SG Holding Pte. Ltd. has been established with registered capital of USD 50,000 with 100% shareholding by EP-Tech Ventures Holding Company Limited, a subsidiary of PTTEP.
 - Delta Gas Transportation SG Holding Pte. Ltd. has been established with registered capital of USD 50,000 with 100% shareholding by Asia Power and Transportation SG Holding Pte. Ltd.
- PTT: On 14 September 2021, Arun Plus (PTT’s 100% owned subsidiary) has signed the joint venture agreement with Lin Yin International Investments Co., Ltd. (“Lin Yin”), the wholly owned affiliate of Hon Hai Precision Industry Company Limited (“Foxconn”) and established the joint venture company with the registered capital not in excess of Baht 3,220 million. Arun Plus and Lin Yin will hold 60% and 40% stakes respectively. The objective of the company establishment is to operate the electric vehicle manufacturing business in Thailand using Foxconn’s state-of-the-art technology in manufacturing and developing of MIH (Mobility-In-Harmony) platform collectively with PTT Group’s expertise in business operation within Thailand and the final investment decision shall reach within the second half of 2022. The joint venture company is expected to complete its registration by the fourth quarter of 2021.
- PTT: On 16 September 2021, PTT’s Board of Directors has approved a resolution of interim dividend payment for the first six-month performance of year 2021 to PTT’s shareholders at the rate of Baht 1.20 per share, totaling approximately Baht 34,276 million, or 60% of the consolidated net income. The Record Date to entitle rightful shareholders who may receive the interim dividend was on 30 September 2021. The payment of the interim dividend was made on 15 October 2021.
- GPSC: On 16 September 2021, the Glow Energy Phase 5 power plant had an unplanned outage from August 14, 2021. The Company is operating a reparation and inspecting the cause

with technical specialists from the manufacturer and insurance company. It is expected to resume normal operation in early 2022. The outage had no impact on the sale of electricity and steam to industrial customers.

- **PTT:** On 18 September 2021, PTT's Board of Directors has approved the dissolution of PTT Regional Treasury Center Pte. Ltd. ("PTT RTC"), PTT's wholly owned subsidiary. As of 18 September 2021, PTT RTC has been completely dissolved which aligned to PTT's policy to close down the dormant company that did not affect to PTT's business operation.
- **PTTEP:** On 21 September 2021, AI and Robotics Ventures Company Limited ("ARV"), a subsidiary of PTTEP, has established four subsidiaries namely Rovula (Thailand) Company Limited ("ROVULA"), Skyller Solutions Company Limited ("SKYLLER"), Varuna (Thailand) Company Limited ("VARUNA"), and Cariva (Thailand) Company Limited ("CARIVA"). Each has been incorporated with an initial registered capital of Baht 1,000,000. ARV has 100% shareholding in all four companies to support its business growth plans. ROVULA focuses on using advanced artificial intelligence ("AI") and robotics to provide end-to-end subsea and marine inspection, repair, and maintenance. SKYLLER provides integrated asset inspection and management services via its proprietary platform to industry asset owners by leveraging multiple fleets from drones to robotics and AI platform-as-a-service ("PAAS"). VARUNA leverages AI, satellite technology, and unmanned aerial vehicles ("UAV") to offer state-of-the-art smart-farming and smart-forestry solutions to farmers and agricultural businesses. CARIVA is a health data network which leverages AI, IoT, and robotics to empower and generate health insights to users, both individuals and businesses.

October 2021

- **PTT:** On 5 October 2021, PTT's Board of Directors has approved Siam Management Holding Co., Ltd. ("SMH") (PTT's 100% owned subsidiary) to establish PTT and TGES Optec Company Limited ("Optec"), a new joint investment with Tokyo Gas Engineering Solutions Corporation ("TGES") (a 100% owned subsidiary of Tokyo Gas Co., Ltd.) with the registered capital not in excess of Baht 60 million. SMH and TGES will hold 51% and 49% shareholdings, respectively in this joint investment. The Joint Venture Agreement has already been signed on 5 October 2021. The investment objective aims to provide One-stop Total Improving Efficiency Technology Solutions and Services for Machinery and Equipment including fuel supply to the customers in industrial, power, and utilities sectors. The company is expected to complete its registration by the fourth quarter of 2021 and to start operating within the first quarter of 2022.
- **OR:** On 5 October 2021, OR's Board of Directors has approved PTTOR International Holdings (Singapore) Pte. Ltd. ("SGHoldCO"), OR's wholly-owned subsidiary, together with companies in 500 Startups Group ("500 Startups"), to set up a Private Fund registered in Delaware, USA, in the form of Limited Partnership under the name ORZON VENTURES, L. P. ("ORZON VENTURES") with an initial investment value of USD 25 million, and the investment value can

be increased to USD 50 million thereafter, where SGHoldCO will have 99% stake and 1% stake will be held by the 500 Startups company and individual investors in 500 Startups Group. The investment objectives of a venture capital are to invest in high-potential startup companies in Thailand and Southeast Asia, to seek new opportunities to build new S-Curve, which is a strategy to strengthen and expand OR's business.

- **PTTEP:** On 27 October 2021, PTTEP has established three subsidiaries to support future investments in renewable energy business, per the following details:
 - FutureTech Energy Ventures Company Limited has been established with registered capital of Baht 5,000,000, with 100% shareholding by EP-Tech Ventures Holding Company Limited, a subsidiary of PTTEP.
 - FutureTech Solar (Thailand) Company Limited has been established with registered capital of Baht 1,000,000, with 100% shareholding by FutureTech Energy Ventures Company Limited.
 - Delta Gas Transportation Limited has been established with registered capital of USD 50,000, with 100% shareholding by Delta Gas Transportation SG Holding Pte. Ltd., a subsidiary of PTTEP.
 - **OR:** 27 October 2021, OR's Management Committee has approved Modulus, a wholly-owned subsidiary of OR, to invest by purchasing newly issued common shares of Imsub Global Cuisine Company Limited ("ISGC"), with a total investment amount not exceeding Baht 192 million. After such investment, Modulus will hold 25% and the ISGC's former shareholders will hold 75% of all common shares issued by ISGC. ISGC owns and operates KOUEN Brand, a Japanese restaurant, along with other brands. The investment objective is to strengthen OR's food and beverage business by increasing product diversification and creating opportunities for domestic and international growth.
 - **GPSC:** 29 October 2021, GRSC has been established Global Renewable Synergy Company Limited Taiwan ("GRSC TW"), new subsidiary of the Company in Taiwan on October 21, 2021. GRSC holds a 100 percent stake and has an initial paid-up capital of NTD 500,000. The objective is to invest in renewable energy in Taiwan.
- November 2021**
- **PTTEP:** 5 November 2021, PTTEP has completed the issuance of name-registered unsubordinated and unsecured digital debentures to general public for the total amount of Baht 6,000 million carrying a step-up interest rate of 2.00% - 2.75% p.a., averaging to 2.25% p.a., with the tenor of 5 years.

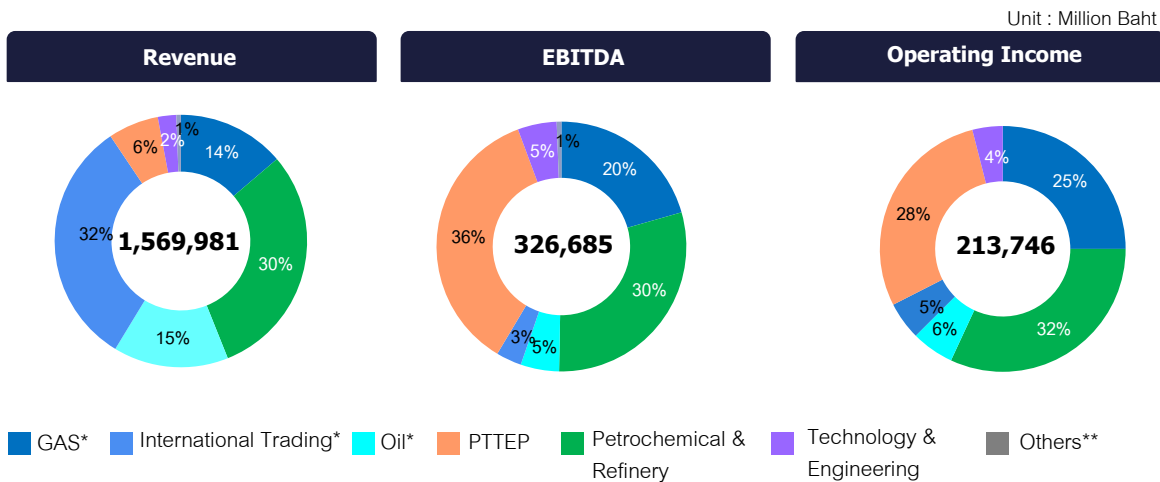
Financial Results of PTT Group by Business

Financial performance of 3Q2021 compared with 3Q2020 and 2Q2021 as well as 9M2021 compared with 9M2020 are summarized as follows:

Unit : Million Baht	3Q2020	2Q2021	3Q2021	% Inc. (Dec.)		9M2020	9M2021	% Inc. (Dec.)
				YoY	QoQ			
Sales revenue	383,599	533,256	558,888	45.7%	4.8%	1,208,491	1,569,981	29.9%
: Exploration & Production	39,263	54,830	58,295	48.5%	6.3%	120,277	155,879	29.6%
: Gas	98,514	112,927	115,933	17.7%	2.7%	312,026	331,574	6.3%
: Coal	1,810	3,137	4,947	>100.0%	57.7%	8,039	11,209	39.4%
: Oil	105,439	119,466	117,274	11.2%	(1.8%)	320,569	355,630	10.9%
: International trading	154,814	254,807	287,583	85.8%	12.9%	493,600	768,488	55.7%
: Petrochemical & Refining	173,616	247,825	254,978	46.9%	2.9%	537,497	727,232	35.3%
: Technology and Engineering Business	18,565	19,483	19,438	4.7%	(0.2%)	57,913	56,999	(1.6%)
: Others	864	862	938	8.6%	8.8%	2,548	2,669	4.7%
EBITDA	67,465	113,166	110,522	63.8%	(2.3%)	154,058	326,685	>100.0%
: Exploration & Production	28,038	42,161	42,961	53.2%	1.9%	84,385	116,946	38.6%
: Gas	13,279	22,134	23,388	76.1%	5.7%	38,740	67,297	73.7%
: Coal	380	934	2,051	>100.0%	>100.0%	2,275	4,215	85.3%
: Oil	5,958	5,605	4,158	(30.2%)	(25.8%)	12,837	16,294	26.9%
: International trading								
- Excluding effect of FX and derivatives	(446)	3,410	3,409	>100.0%	(0.0%)	(1,798)	10,794	>100.0%
- Including effect of FX and derivatives	601	907	1,942	>100.0%	>100.0%	2,759	3,987	44.5%
: Petrochemical & Refining	14,984	33,408	30,260	>100.0%	(9.4%)	1,895	97,160	>100.0%
: Technology and Engineering Business	5,429	5,881	5,178	(4.6%)	(12.0%)	17,132	16,495	(3.7%)
: Others	(666)	(706)	(868)	(30.3%)	(22.9%)	(1,875)	(2,224)	(18.6%)
Depreciation and amortization expenses	34,590	38,608	39,295	13.6%	1.8%	105,057	112,939	7.5%
Operating income (loss)	32,875	74,558	71,227	>100.0%	(4.5%)	49,001	213,746	>100.0%
: Exploration & Production	11,980	22,477	23,060	92.5%	2.6%	36,089	60,864	68.6%
: Gas	8,497	17,484	18,695	>100.0%	6.9%	24,296	53,357	>100.0%
: Coal	102	633	1,617	>100.0%	>100.0%	661	3,147	>100.0%
: Oil	4,593	4,160	2,673	(41.8%)	(35.7%)	8,886	11,960	34.6%
: International trading								
- Excluding effect of FX and derivatives	(519)	3,361	3,357	>100.0%	(0.1%)	(2,015)	10,644	>100.0%
- Including effect of FX and derivatives	528	858	1,890	>100.0%	>100.0%	2,542	3,837	50.9%
: Petrochemical & Refining	5,430	23,739	20,403	>100.0%	(14.1%)	(26,498)	68,126	>100.0%
: Technology and Engineering Business	3,047	3,183	2,420	(20.6%)	(24.0%)	9,258	8,500	(8.2%)
: Others	(764)	(818)	(983)	(28.7%)	(20.2%)	(2,143)	(2,560)	(19.5%)
Share of net income from investments in joint ventures and associates	1,206	2,893	2,233	85.2%	(22.8%)	2,501	7,073	>100.0%
Loss on impairment of assets (reversal)	1,396	3,165	876	(37.2%)	(72.3%)	2,879	4,036	40.2%
Gain (loss) on derivatives	1,961	(12,620)	(11,768)	<(100.0%)	6.8%	6,850	(31,786)	<(100.0%)
Gain (loss) on foreign exchange	(1,213)	(873)	(6,405)	<(100.0%)	<(100.0%)	459	(11,608)	<(100.0%)
EBIT	34,318	61,746	55,729	62.4%	(9.7%)	58,675	182,802	>100.0%
Finance costs	7,346	7,102	7,470	1.7%	5.2%	21,110	21,010	(0.5%)
Income taxes	7,852	20,851	15,408	96.2%	(26.1%)	16,824	47,942	>100.0%
Net income (loss)	14,120	24,578	23,653	67.5%	(3.8%)	24,619	80,819	>100.0%
Earnings per share (Baht/share)	0.50	0.86	0.82	64.0%	(4.7%)	0.86	2.82	>100.0%

Segmentation performance of PTT Group

The details of revenue, EBITDA and operating income by segmentation of 9M2021 are as follows;



* Including PTT own operation and PTT's affiliates **Including coal and others.

1. Upstream Petroleum and Gas Business Group

Petroleum Exploration and Production Business: PTT Exploration and Production Public Co., Ltd. (PTTEP)

	3Q2020	2Q2021	3Q2021	%Inc.(Dec.)		9M2020	9M2021	%Inc.(Dec.)
				YoY	QoQ			
Average selling price (US\$/BOE)	38.8	42.2	44.3	14.2%	5.0%	39.7	42.3	6.5%
Average sales volume (BOED)	344,317	443,126	417,167	21.2%	(5.9%)	344,909	414,516	20.2%

Third quarter of 2021 compared with Second quarter of 2021

In 3Q2021, sales revenue of PTTEP was Baht 58,295 million, increasing by Baht 3,465 million or 6.3% from 2Q2021. This was from the increase in the average selling price by 5.0% from US\$ 42.2 per BOE in 2Q2021 to US\$ 44.3 per BOE in 3Q2021. While the average sales volume decreased by 5.9% from 443,126 BOED in 2Q2021 to 417,167 BOED in 3Q2021 primarily from Bongkot Project, MTJDA Project, and Yadana Project due to lower gas nomination from buyer.

EBITDA in 3Q2021 was Baht 42,961 million, increasing by Baht 800 million or 1.9% from 2Q2021 mainly due to an increase in sales revenue. However, operating expenses increased primarily from exploration well write-off together with an increase in sales volume mainly from Malaysia Project. Moreover, there were more maintenance activities in Bongkot Project. As a result, operating income in 3Q2021 was Baht 23,060 million, increasing by Baht 583 million or 2.6% from 2Q2021.

The overall performance of Exploration and Production business increased according to an increase in EBITDA. Additionally, there was lower loss on financial instruments-primarily from oil price hedging instruments due to less upward trend of forward oil price than the previous quarter, offset with higher loss on foreign exchange from more depreciation of Thai Baht against US dollar than the previous quarter.

Third quarter of 2021 compared with Third quarter of 2020

In 3Q2021, sales revenue of PTTEP was Baht 58,295 million, increasing by Baht 19,032 million or 48.5% from 3Q2020. This was mainly from the increase in the average sales volume by 21.2% from 344,317 BOED in 3Q2020 to 417,167 BOED in 3Q2021 primarily from the acquisition of Oman Block 61 Project in March 2021, Malaysia Block H Project first gas production in February 2021, and Contract 4 Projects due to higher gas nomination from buyer. In addition, the average selling price increased by 14.2% from US\$ 38.8 per BOE in 3Q2020 to US\$ 44.3 per BOE in 3Q2021.

EBITDA in 3Q2021 was Baht 42,961 million, increasing by Baht 14,923 million or 53.2% from 3Q2020 mainly due to an increase in sales revenue. However, expenses increased primarily from exploration well write-off together with higher operating expenses from the acquisition of Oman Block 61 Project. As a result, operating income in 3Q2021 was Baht 23,060 million, increasing by Baht 11,080 million or 92.5% from 3Q2020 even though depreciation, depletion and amortization increased primarily from the acquisition of Oman Block 61 Project and S1 Project due to additional completed assets.

The overall performance of Exploration and Production business increased due to an increase in EBITDA. Whereas, income taxes increased mainly from higher profit from projects in Thailand and Oman Block 61 Project regarding a gradual recognition. Besides, there was a higher loss on foreign exchange due to the depreciation of Thai Baht against USD. Additionally, there was a higher loss on financial instruments mainly from loss on oil price hedging instruments due to an upward trend of forward oil price.

First nine month of 2021 compared with First nine month of 2020

In 9M2021, sales revenue of PTTEP was Baht 155,879 million, increasing by Baht 35,602 million or 29.6% from 9M2020. This was mainly from the increase in the average sales volume by 20.2% from 344,909 BOED in 9M2020 to 414,516 BOED in 9M2021 primarily from the acquisition of Oman Block 61 Project, Bongkot Project and Contract 4 Project due to higher gas nomination from buyer together with Malaysia Block H Project first gas production. As well as the average selling price increased by 6.5% from US\$ 39.7 per BOE in 9M2020 to US\$ 42.3 per BOE in 9M2021.

EBITDA in 9M2021 was Baht 116,946 million, increasing by Baht 32,561 million or 38.6% from 9M2020 mainly due to an increase in sales revenue. However, expenses increased. As a result, operating income in 9M2021 was Baht 60,864 million, increasing by Baht 24,775 million or 68.6% from 9M2020. Whereas, depreciation, depletion and amortization

increased primarily from the acquisition of Oman Block 61 Project and S1 Project due to additional completed assets, together with Bongkot Project and Contract 4 Project due to higher sales volume.

The overall performance of Exploration and Production business increased due to an increase in EBITDA. However, there was a higher loss on financial instruments mainly from oil price hedging instruments due to an upward trend of forward oil price while there was gain in 9M2020. Moreover, there was an increase in income taxes mainly from higher profit from projects in Thailand and Oman Block 61 Project regarding a gradual recognition. However, there was the recognition of non-recurring items which were gain from a bargain purchase of Oman Block 61 Project and exploration expenses from partial write-off of exploration and evaluation assets of the exploration project in Brazil.

Gas Business Group

The details of all product sales volume from GSPs are as follows:

Unit : Ton	3Q2020	2Q2021	3Q2021	% Inc.(Dec.)		9M2020	9M2021	% Inc.(Dec.)
				YoY	QoQ			
LPG	745,185	782,597	815,058	9.4%	4.1%	2,186,530	2,345,915	7.3%
Ethane	568,002	565,493	520,591	(8.3%)	(7.9%)	1,630,111	1,668,325	2.3%
Propane	214,822	275,908	205,175	(4.5%)	(25.6%)	613,833	751,576	22.4%
NGL	155,609	160,547	144,541	(7.1%)	(10.0%)	441,981	473,391	7.1%
Pentane	6,599	11,929	8,929	35.3%	(25.1%)	30,540	31,617	3.5%
Total	1,690,217	1,796,474	1,694,294	0.2%	(5.7%)	4,902,995	5,270,824	7.5%

The details of reference product prices of GSPs are as follows:

Unit : US\$ per Ton	3Q2020	2Q2021	3Q2021	% Inc.(Dec.)		9M2020	9M2021	% Inc.(Dec.)
				YoY	QoQ			
LPG ^{1/}	355	519	648	82.5%	24.9%	393	583	48.3%
LDPE ^{2/,3/}	979	1,540	1,398	42.8%	(9.2%)	933	1,490	59.7%
LLDPE ^{2/,3/}	884	1,185	1,185	34.0%	0.0%	828	1,172	41.5%
HDPE ^{2/,3/}	919	1,191	1,138	23.8%	(4.5%)	839	1,158	38.0%
Propane ^{4/}	363	528	648	78.5%	22.7%	390	590	51.3%

Note: ^{1/} Global LPG Price (Contract Price Saudi Aramco) as a reference for selling prices of petrochemical customers, calculated from the proportion of Propane and Butane by 50:50

^{2/} South East Asia - Spot Price

^{3/} GSP had agreed to new sale and purchase product agreements with GC: The petrochemical reference prices of Ethane selling prices is HDPE, LDPE and LLDPE effective since January 1, 2020

^{4/} GSP had agreed to new sale and purchase product agreements with GC: The petrochemical referenced prices of Propane selling prices is global Propane Price (Contract Price Saudi Aramco) effective since January 1, 2020

Third quarter of 2021 compared with Second quarter of 2021

In 3Q2021, gas business reported sales revenue of Baht 115,933 million, increasing by Baht 3,006 million or 2.7% from 2Q2021. This resulted mainly from S&M business due to the higher average selling prices because of the increase in Pool Gas as well as the average selling prices for industrial customers, which increased from the higher fuel oil referenced prices. However, the average sales volume (calculated at heating value of 1,000 BTU per cubic feet) decreased by 527 MMSCFD or 11.1% from 4,751 MMSCFD in 2Q2021 to 4,224 MMSCFD in 3Q2021 from all customer groups mainly due to the decreased in overall electricity demand in Thailand from the seasonal factor, the spread of COVID-19 delta variant and the higher dispatch from hydro power plant during rainy season together with the several emergency shutdown of domestic coal power plants during 2Q2021, causing lower gas demand for power sector in 3Q2021 compared to the previous quarter.

For GSP business, sales revenue increased from higher average selling prices almost all product following the higher petrochemical referenced prices, especially LPG and Propane supported by the rose in global natural gas prices. However, GSP's sales volume (including NGL derived from Dew Point Control units) decreased from 1,796,474 tons in 2Q2021 to 1,694,294 tons in 3Q2021 or 5.7% from almost all products resulting from major planned maintenance shutdown of GSP#6 for 26 days and planned shutdown of GSP#3 which affected on the reduction in ESP's production at the same period for 8 days. Even though, LPG sales volume increased due to the higher demand from petrochemical customers.

In 3Q2021, EBITDA of gas business was reported at Baht 23,388 million, increasing by Baht 1,254 million or 5.7%. The operating income was reported at Baht 18,695 million, increasing by Baht 1,211 million or 6.9%. This was mainly from the higher gross profit of GSP and S&M businesses according to the increase in average selling prices in line with higher referenced prices as aforementioned. Meanwhile, in 2Q2021, S&M business has the deduction of gain from LNG export transaction as a commercial pilot cargo of LNG reloading according to the resolution of National Energy Policy Council (NEPC). In addition, NGV's gross profit decreased from the lack in higher selling prices adjustment than the higher gas cost.

Third quarter of 2021 compared with Third quarter of 2020

In 3Q2021, gas business reported sales revenue of Baht 115,933 million, increasing by Baht 17,419 million or 17.7% from 3Q2020. This resulted mainly from S&M business following the increase in average selling prices as a result of the increase in Pool Gas as well as the average selling prices for industrial customers increased from the higher fuel oil referenced prices. However, the average sales volume (calculated at heating value of 1,000 BTU per cubic feet) decreased by 202 MMSCFD or 4.6% from 4,426 MMSCFD in 3Q2020 to 4,224 MMSCFD in 3Q2021 mainly from lower electricity demand as the spread of COVID-19 delta variant and the higher dispatch from hydro power plant due to drought situation in 3Q2020.

The sales revenue of GSP business increased following the higher average selling prices of all products in accordance with the higher petrochemical referenced prices. In addition, there was an increase in sales volume (including NGL derived from Dew Point Control units) from 1,690,217 tons in 3Q2020 to 1,694,294 tons in 3Q2021 or increased by 0.2%, mainly from higher demand of LPG from petrochemical customers. However, there was a decrease in sales volume of other products resulting from major planned maintenance shutdown of gas separation plant as aforementioned, while there was planned maintenance shutdown of GSP#1 and production turndown in order to optimized operation to cope with lower customers' demand during COVID-19 situation and drought situation of GSP#6 in 3Q2020.

In 3Q2021, EBITDA of gas business was reported at Baht 23,388 million, increasing by Baht 10,109 million or 76.1%. The operating income was reported at Baht 18,695 million, increasing by Baht 10,198 million or more than 100.0%. This was mainly from higher gross profit of GSP business according to the increase in average selling prices and the decrease in gulf gas cost. In addition, gross profit of S&M business increased following the higher average selling prices as aforementioned. However, NGV's gross profit decreased from the lack in increasing selling prices adjustment than the higher gas cost.

First nine months of 2021 compared with First nine months of 2020

In 9M2021, gas business reported sales revenue of Baht 331,574 million, increasing by Baht 19,548 million or 6.3% from 9M2020. This resulted mainly from GSP business due to the higher average selling prices of all products following the higher petrochemical referenced prices. In addition, there was an increase in sales volume (including NGL derived from Dew Point Control units) in all products from 4,902,995 tons in 9M2020 to 5,270,824 tons in 9M2021 or increased by 7.5%, mainly from LPG and Propane due to higher demand of petrochemical customers together with the lower planned maintenance shutdown days compared to previous year.

The sales revenue of S&M business decreased following the lower average selling prices in line with Pool Gas price, even though the average selling prices for industrial customers increased from the higher fuel oil referenced prices. Furthermore, average sales volume (calculated at heating value of 1,000 BTU per cubic feet) increased by 91 MMSCFD or 2.0% from 4,441 MMSCFD in 9M2020 to 4,532 MMSCFD in 9M2021 mainly due to industrial customers, GSP and power plant customers in accordance with the the economic activities recovered from last year.

In 9M2021, EBITDA of gas business was reported at Baht 67,297 million, increasing by Baht 28,557 million or 73.7%. The operating income was reported at Baht 53,357 million, increasing by Baht 29,061 million or more than 100.0%. This was mainly from the increase in GSP and S&M's gross profit due to the increase in average selling prices from the higher referenced prices as aforementioned together with lower gas cost. Besides, NGV's gross profit increased as the adjustment of the retail price of NGV for public transportation vehicles to be similar to retail price of private vehicles since 1 January 2021.

Coal Business

	3Q2020	2Q2021	3Q2021	%Inc. (Dec.)		9M2020	9M2021	%Inc. (Dec.)
				YoY	QoQ			
Newcastle index price (US\$ per ton)	51.5	109.0	167.5	>100.0%	53.7%	58.2	121.7	>100.0%
Average selling price (US\$ per ton)	51.8	75.9	88.6	71.0%	16.7%	54.5	78.0	43.1%
Cash cost (US\$ per ton)	40.5	49.5	51.1	26.2%	3.2%	45.0	48.8	8.4%
Sales volume (million tons)	1.1	1.3	1.6	45.5%	23.1%	4.7	4.4	(6.4%)

Third quarter of 2021 compared with Second quarter of 2021

In 3Q2021, sales revenue of coal business was Baht 4,947 million, increasing by Baht 1,810 million or 57.7% compared with 2Q2021 mainly due to the increase in average selling prices by US\$ 12.7 per ton or 16.7% from US\$ 75.9 per ton in 2Q2021 to US\$ 88.6 per ton in 3Q2021 according to the increase in Newcastle referenced prices. This was resulted from higher global coal demand, especially in China according to its energy controlled policy which led to higher coal import, as well as the coal restocking for upcoming winter. Additionally, the sales volume increased by 0.3 million tons or 23.1% from 1.3 million tons in 2Q2021 to 1.6 million tons in 3Q2021, primarily from higher demand in China and some postponed deliveries from 2Q2021 to 3Q2021.

In 3Q2021, EBITDA was Baht 2,051 million, increasing by Baht 1,117 million or more than 100.0% mainly from higher gross margin following higher average selling prices and sales volume. Operating income was Baht 1,617 million in 3Q2021, increasing by Baht 984 million or more than 100.0% according to the increase in EBITDA. However, coal business performance slightly decreased due to income tax and higher loss on derivatives mainly from commodities price hedging following the increase in Newcastle prices.

Third quarter of 2021 compared with Third quarter of 2020

In 3Q2021, sales revenue of coal business was Baht 4,947 million, increasing by Baht 3,137 million or more than 100.0% compared with 3Q2020 mainly due to the increase in average selling prices by US\$ 37.3 per ton or 71.0% from US\$ 51.3 per ton in 3Q2020 to US\$ 88.6 per ton in 3Q2021 following the increase in Newcastle referenced prices as aforementioned. In addition, sales volume increased by 0.5 million tons or 45.5% from 1.1 million tons in 3Q2020 to 1.6 million tons in 3Q2021, primarily from higher demand in China despite higher mining cost following higher coal and gasoil prices.

In 3Q2021, EBITDA was Baht 2,051 million, increasing by Baht 1,671 million or more than 100.0% from 3Q2020 mainly from higher gross profit due to higher sales revenue. The operating income was Baht 1,617 million in 3Q2021, increasing by Baht 1,515 million or over 100.0%. Consequently, the overall performance of coal business improved, although there was the recognized impairment loss on coal assets and tax lawsuit in 3Q2020.

First nine-month of 2021 compared with First nine-month of 2020

In 9M2021, sales revenue of coal business was Baht 11,209 million, increasing by Baht 3,170 million or 39.4% compared with 9M2020 mainly due to the increase in the average selling prices by US\$ 23.5 per ton or 43.1% from US\$ 54.5 per ton in 9M2020 to US\$ 78.0 per ton in 9M2021 following the increase in Newcastle referenced prices. Meanwhile, sales volume decreased by 0.3 million ton or 6.4% from 4.7 million ton in 9M2020 to 4.4 million ton in 9M2021 mainly from the decrease in Jembayan coal mine following lower production plan and cease operating of the Sebuk coal mine since early 2021.

EBITDA in 9M2021 was Baht 4,215 million, increasing by Baht 1,940 million or 85.3% from 9M2020 mainly due to the increase in gross profit following sharp increased average selling prices despite lower sales volume as aforementioned. The operating income in 9M2021 was Baht 3,147 million, increasing by Baht 2,486 million in line with the increase in EBITDA. While in 9M2020, there was an impairment loss on coal assets despite payback of past tax lawsuit case.

2. Downstream Petroleum Business Group

Oil Business Group

	3Q2020	2Q2021	3Q2021	%Inc. (Dec.)		9M2563	9M2564	%Inc. (Dec.)
				YoY	QoQ			
Average Sales Volume* (Unit: Million Liter)	6,062	5,542	5,217	(13.9%)	(5.9%)	18,118	16,669	(8.0%)
Average selling prices (Unit: US\$ per barrel)								
Gasoline	47.4	76.8	83.4	75.9%	8.6%	46.0	75.8	64.8%
Aviation	42.2	71.5	77.0	82.5%	7.7%	44.0	70.6	60.5%
Diesel	47.1	72.2	77.1	63.7%	6.8%	48.4	71.3	47.3%

*The average sales volume of domestic oil segment only

Third quarter of 2021 compared with Second quarter of 2021

In 3Q2021, sales revenue of oil business group was Baht 117,274 million, decreasing by Baht 2,192 million or 1.8% from previous quarter mainly due to the decrease of sales volume by 325 million liters or 5.9% from 5,542 million liters or equivalent to 383,064 barrels per day in 2Q2021 to 5,217 million liters or equivalent to 356,681 barrels per day in 3Q2021, mainly from diesel and gasoline, as more severe of the Delta COVID-19 variant in 3Q2021. However, average selling prices increased in accordance with higher global refined products prices. In addition, non-oil business revenue decreased in line with the decline in consumer purchasing power according to the economy and operating-hours limitation due to the Delta COVID-19 pandemic.

EBITDA in 3Q2021 was Baht 4,158 million, decreasing by Baht 1,447 million or 25.8% due to lower gross profit, which was mainly from the decrease of oil and non-oil business's sales revenue as aforementioned. The operating income in 3Q2021 was Baht 2,673 million, decreasing by Baht 1,487 million or 35.7% in line with lower EBITDA.

Third quarter of 2021 compared with Third quarter of 2020

In 3Q2021, sales revenue of oil business group was Baht 117,274 million, increasing by Baht 11,835 million or 11.2% from 3Q2020 due to higher average selling prices which were in line with higher global oil prices. While sales volume decrease by 845 million liters or 13.9% from 6,062 million liters or equivalent to 414,452 barrels per day in 3Q2020 to 5,217 million liters or equivalent to 356,681 barrels per day in 3Q2021, mainly from diesel and gasoline due to more stringent measures of the Delta COVID-19 pandemic than 3Q2020. Whereas non-oil business revenue decreased as aforementioned.

In 3Q2021, EBITDA was Baht 4,158 million, decreasing from 3Q2020 by Baht 1,800 million or 30.2%, mainly from oil business following lower gross margin of fuel oil, and non-oil business following lower sales revenue as aforementioned. The operating income in 3Q2021 was Baht 2,673 million, decreasing by Baht 1,920 million or 41.8% according to lower EBITDA.

First nine months of 2021 compared with First nine months of 2020

In 9M2021, sales revenue of oil business group was Baht 355,630 million, increasing by Baht 35,061 million or 10.9% from 9M2020, mainly from higher average selling prices of refined products following global oil prices. While sales volume decreased by 1,449 million liters or 8.0% from 18,118 million liters or equivalent to 417,438 barrels per day in 9M2020 to 16,669 million liters or equivalent to 384,055 barrels per day in 9M2021, mainly from sales volume of diesel and gasoline which was from the Delta COVID-19's variant, caused the government to issue more stringent lockdown measures than last year. Moreover, sales volume of aviation fuel which was waiting for the recovery of international tourism sector. However, non-oil business revenue slightly decreased due to the decrease in convenient stores' average sales revenue per store per day from operating-hours limitation in many areas and the decline in consumer purchasing power.

In 9M2021, EBITDA was Baht 16,294 million, increasing by Baht 3,457 million or 26.9% from 9M2020. Oil business increased mainly from the increase in average gross margin per liter of gasoline and diesel. In addition, net operating expenses decreased, mainly from the decrease in aviation fuel filling expense due to the impact of the Delta COVID-19 variant, while non-oil business's EBITDA slightly decreased following its decreasing sales revenue decrease. In 9M2021, the operating income was Baht 11,960 million, increasing by Baht 3,074 million or 34.6% in line with the increase in EBITDA.

International Trading Business Group

Unit : Million Litre	3Q2020	2Q2021	3Q2021	%Inc. (Dec.)		9M2020	9M2021	%Inc. (Dec.)
				YoY	QoQ			
Average sales volume	18,360	18,224	16,906	(7.9%)	(7.2%)	56,786	54,052	(4.8%)

Third quarter of 2021 compared with Second quarter of 2021

Sales revenue of International Trading business in 3Q2021 was Baht 287,583 million, increasing by Baht 32,776 million or 12.9% from 2Q2021 due to the increase in product selling prices following the rise in global oil prices, despite lower sales volume of International Trading business by 1,318 million liters or 7.2% from 18,224 million liters or equivalent to 1,259,647 barrels per day in 2Q2021 to 16,906 million liters or equivalent to 1,155,845 barrels per day in 3Q2021, mainly from lower volume of crude from Out-Out activity due to a widen Dubai/Brent spread resulted in the drop in demand of crude product referenced to Brent crude in the Asia region. While sales volume of crude and condensate from Out-In activity improved.

EBITDA, adjusted by the impact from foreign exchange rate and derivatives, in 3Q2021 was Baht 1,942 million, increasing by Baht 1,035 million or more than 100.0% mainly from cross-regional trade at the right moment with the use of excellent risks management together with the increase in spreads of domestic crude and condensate following oil referenced price. The operating income, adjusted by the impact from foreign exchange rate and derivatives, in 3Q2021 was Baht 1,890 million, increasing by Baht 1,032 million or more than 100.0%.

Third quarter of 2021 compared with Third quarter of 2020

Sales revenue of International Trading business in 3Q2021 was Baht 287,583 million, increasing by Baht 132,769 million or 85.8% from 3Q2020. This was due to the increase in product selling price following the rise in global oil price. However, sales volume of International Trading business decreased by 1,454 million liters or 7.9% from 18,360 million liters or equivalent to 1,255,253 barrels per day in 3Q2020 to 16,906 million liters or equivalent to 1,155,845 barrels per day in 3Q2021, mainly from lower sales volume of crude products from Out – Out activity due to a wider Dubai/Brent spread resulted in the drop in demand of crude product referenced to Brent crude in Asian region as aforementioned.

EBITDA, adjusted by the impact from foreign exchange rate and derivatives, in 3Q2021 was Baht 1,942 million, increasing by Baht 1,341 million or more than 100.0% mainly from cross-regional trade at the right moment with the use of excellent risks management together with the increase in spreads of domestic crude and condensate following oil referenced price. The operating income, adjusted by the impact from foreign exchange rate and derivatives, in 3Q2021 was Baht 1,890 million, increasing by Baht 1,362 million or more than 100.0%.

First nine months of 2021 compared with First nine months of 2020

In 9M2021, sales revenue of International Trading business was Baht 768,488 million, increasing by Baht 274,888 million or 55.7% from 9M2020 following the increase in product selling prices as aforementioned. Meanwhile, sales volume of International Trading business decreased by 2,734 million liters or 4.8% from 56,786 million liters or equivalent to 1,303,579 barrels per day in 9M2020 to 54,052 million liters or equivalent to 1,245,362 barrels per day in 9M2021 due to lower sales volume of crude products from Out – Out activity and the lower imported crude and condensate from Out – In activity for domestic refineries. This is due to new wave of COVID-19 pandemic resulting to lower oil and petroleum demand in 9M2021 compared to 9M20 which affected by the first wave of COVID-19 pandemic since March 2020.

EBITDA, adjusted by the effect of foreign exchange rate and derivatives, in 9M2021 was Baht 3,987 million, increasing by Baht 1,228 million or 44.5% mainly due to higher sales revenue as aforementioned. In addition, margin per unit of LNG, LPG, and aromatics products from Out-Out activity increased from cross-regional trade at the right moment with the use of excellent risks management together with higher spreads of domestic crude and condensate increased

following oil referenced price. The operating income, adjusted by the effect of foreign exchange rate and derivatives in this quarter was Baht 3,837 million, increasing by 1,295 million or 50.9%.

Petrochemical and Refinery Business Group

Unit : US\$ per barrel	3Q2020	2Q2021	3Q2021	%Inc. (Dec.)		9M2020	9M2021	% Inc.(Dec.)
				YoY	QoQ			
Market GRM	0.2	1.6	2.1	>100.0%	31.3%	0.9	1.8	100.0%
Inventory gain (loss) excl. NRV	3.4	3.2	3.3	(2.9%)	3.1%	(3.2)	3.9	>100.0%
Hedging gain (loss)	0.6	(0.6)	(2.2)	<(100.0%)	<(100.0%)	0.5	(0.8)	<(100.0%)
Accounting GRM	4.2	4.2	3.2	(23.8%)	(23.8%)	(1.8)	4.9	>100.0%
Refinery Utilization rate (%)	92.6%	96.1%	87.5%	(5.1%)	(8.6%)	96.5%	93.0%	(3.5%)

*From 3 Refineries: TOP, GC and IRPC

Unit : US\$ per Ton	3Q2020	2Q2021	3Q2021	%Inc. (Dec.)		9M2020	9M2021	% Inc.(Dec.)
				YoY	QoQ			
Olefins								
Naphtha (MOPJ)	397	606	676	70.3%	11.6%	370	613	65.7%
HDPE	919	1,191	1,138	23.8%	(4.5%)	839	1,158	38.0%
LDPE	979	1,540	1,398	42.8%	(9.2%)	933	1,490	59.7%
LLDPE	884	1,185	1,185	(34.0%)	0.0%	828	1,172	41.5%
PP	968	1,338	1,250	29.1%	(6.6%)	943	1,318	39.8%
Aromatics								
Condensate	357	572	616	72.5%	7.7%	344	567	64.8%
PX (TW)	546	859	919	68.3%	7.0%	583	848	45.5%
PX (TW) – Condensate	189	287	303	60.3%	5.6%	239	281	17.6%
BZ	427	966	993	>100.0%	2.8%	471	904	91.9%
BZ – Condensate	71	393	377	>100.0%	(4.1%)	127	337	>100.0%

Third quarter of 2021 compared with Second quarter of 2021

In 3Q2021, sales revenue of petrochemical and refining business was Baht 254,978 million, increasing by Baht 7,153 million or 2.9% primarily from the increase in sales revenue of petrochemical business due to olefins business from higher sales volume compared to previous quarter despite the decrease in selling prices of PE following the Delta variant of COVID-19 situation in Asia. Sales revenue of aromatics business also increased from higher both sales volume and selling prices following the increase in crude oil price as well as the decrease in supply as Chinese producers' maintenance shutdown.

Overall sales revenue of refinery business decreased mainly due to PTT Group refineries' utilization rates decreased from 96.1% in 2Q2021 to 87.5% in 3Q2021 due to GC's planned refinery maintenance shutdown in 3Q2021 for

25 days, IRPC's HYVAHL unit of RDCC plant maintenance shutdown for 45 days, and TOP's plant optimization as a result of domestic market situation despite the increase in selling price following the improved referenced price in global market.

EBITDA of petrochemical and refining business in 3Q2021 were Baht 30,260 million decreasing by Baht 3,148 million from Baht 33,408 million in 2Q2021. There was operating income of Baht 20,403 million in 3Q2021, decreasing by Baht 3,336 million when compared to Baht 23,739 million in 2Q2021, details as follows:

- **Refinery performance** decreased, according to the lower Accounting GRM from US\$ 4.2 per bbl in 2Q2021 to US\$ 3.2 per bbl in 3Q2021 due to higher hedging loss from US\$ 0.6 per bbl in 2Q2021 to loss US\$ 2.2 per bbl in 3Q2021. Conversely, Market GRM increased from US\$ 1.6 per bbl in 2Q2021 to US\$ 2.1 per bbl in 3Q2021 mainly from the increase in most of all petroleum product spreads due to the better COVID-19 situation and the alleviation of Lockdown in Europe and US. Moreover, there was slightly increased stock gain (There was stock gain of US\$ 3.3 per bbl in 3Q2021 versus US\$ 3.2 per bbl in 2Q2021) while crude premium increased.
- **Petrochemical performance** also decreased mainly from olefins business due to the decrease in selling prices mainly from selling price of PE following the Delta variant of COVID-19 situation in Asia and the increase in Naphtha price from 2Q2021 as the increase in crude oil price as well as GC obtained less natural gas resulted in the increased Naphtha portion for its production in 3Q2021. However, the performance of aromatics business increased from higher PX spread due to the decrease in supply as Chinese producers' maintenance shutdown.

Third quarter of 2021 compared with Third quarter of 2020

In 3Q2021, sales revenue of petrochemical and refining business was Baht 254,978 million, increasing by Baht 81,362 million or 46.9% primarily due to the increase in sales revenue of petrochemical business mainly due to olefins business from higher selling prices of PE following the increase in the global market price and the increase in sales volume of PP. Moreover, sales revenue of aromatics business also increased due to both higher sales volume from the increase in utilization rate when compared to 3Q2020 and higher selling prices of BZ and PX due to the increase in crude oil price as well as the decrease in supply as Chinese producers' maintenance shutdown.

Overall sales revenue of refinery business also increased mainly from the increase in selling price due to the better COVID-19 situation. However, PTT Group refineries' utilization rates decreased from 92.6% in 3Q2020 to 87.5% in 3Q2021 due to GC and IRPC had planned refinery maintenance shutdown, including TOP's plant optimization as aforementioned.

EBITDA of petrochemical and refining business in 3Q2021 were Baht 30,260 million increasing by Baht 15,276 million from Baht 14,984 million in 3Q2020. There was operating income of Baht 20,403 million in 3Q2021, increasing by

Baht 14,973 million when compared to Baht 5,430 million in 3Q2020 primarily from petrochemical business, details as follows:

- **Petrochemical performance** increased from aromatics business due to both higher BZ and PX spread following the increase in crude oil price and naphtha from lower supply as Chinese producers' maintenance shutdown as well as the higher sales volume from the increase in utilization rate when compared to 3Q2020 due to GC's planned maintenance shutdown of Aromatics plant 2 for 19 days. Olefins business's performance also increased as the increase of selling prices of PE and sales volume.
- **Refinery performance** decreased, according to the lower Accounting GRM from US\$ 4.2 per bbl in 3Q2020 to US\$ 3.2 per bbl in 3Q2021 due to higher hedging loss from gain of US\$ 0.6 per bbl in 3Q2020 to loss of US\$ 2.2 per bbl in 3Q2021, as well as lower stock gain (There was stock gain of US\$ 3.3 per bbl in 3Q2021 versus US\$ 3.4 per bbl in 3Q2020). However, Market GRM increased from US\$ 0.2 per bbl in 3Q2020 to US\$ 2.1 per bbl in 3Q2021 mainly from the increase in most of all petroleum product spreads due to the better COVID-19 situation as aforementioned.

First nine months of 2021 compared with First nine months of 2020

In 9M2021, sales revenue of petrochemical and refining business was Baht 727,232 million, increasing by Baht 189,735 million or 35.3% primarily due to the increase in sales revenue of refinery business mainly from the recovery of oil price as aforementioned. PTT Group refineries' utilization rates decreased from 96.5% in 9M2020 to 93.0% in 9M2021 because GC and IRPC had refinery maintenance shutdown in 3Q2021 as mentioned, including TOP's plant optimization as a result of lower jet demand caused by COVID-19.

Overall sales revenue of petrochemical business also increased mainly due to olefins business from higher selling prices of PE as the increase in feed cost and the increase in sales volume of PP. Moreover, sales revenue of aromatics business increased because higher selling prices of PX and BZ due to the increase in crude oil price.

EBITDA of petrochemical and refining business in 9M2021 were Baht 97,160 million increasing by Baht 95,265 million from Baht 1,895 million in 9M2020. There was operating income of Baht 68,126 million in 9M2021, increasing by Baht 94,624 million when compared to loss of Baht 26,498 million in 9M2020, details as follows:

- **Refinery performance** increased, according to the higher Accounting GRM from loss of US\$ 1.8 per bbl in 9M2020 to gain of US\$ 4.9 per bbl in 9M2021 due to higher stock gain (There was stock gain of US\$ 3.9 per bbl in 9M2021 versus stock loss of US\$ 3.2 per bbl in 9M2020). Moreover, Market GRM increased from US\$ 0.9 per bbl in 9M2020 to US\$ 1.8 per bbl in 9M2021 mainly due to the increase in gasoline product spreads.
- **Petrochemical performance** increased from both olefins and aromatics business due to the increase in overall product spreads as aforementioned and the higher overall sales volume regarding the economic recovery.

3. Technology and Engineering Business Group

	3Q2020	2Q2021	3Q2021	%Inc. (Dec.)		9M2020	9M2021	%Inc. (Dec.)
				YoY	QoQ			
Power sales volume (GWh)	4,564	5,251	4,653	1.9%	(11.4%)	14,682	14,845	1.1%
Steam sales volume (Thousand tons)	3,440	3,779	3,866	12.4%	2.3%	10,131	11,349	12.0%

Third quarter of 2021 compared with Second quarter of 2021

In 3Q2021, sales revenue of Technology and Engineering business group was Baht 19,438 million, decreased by Baht 45 million or 0.2% mainly from GPSC. This was due to the lower electricity sales volume of Independent Power Producer (IPP) and the lower Availability Payment (AP) from GHECO-One Power Plant as a result of higher unplanned shutdown days in this quarter.

EBITDA in 3Q2021 was Baht 5,178 million, decreased by Baht 703 million or 12.0% mainly from the lower gross profit of GPSC following lower sales revenue as aforementioned and higher gas and coal cost. Furthermore, there was the lower recognition of other income mainly from the partial insurance claim of Glow Energy Phase 5 power plant in 2Q2021. Therefore, the operating income in 3Q2021 was Baht 2,420 million, decreasing by Baht 763 million or 24.0% from previous quarter. As a result, the overall performance of Technology and Engineering business group decreased mainly from lower GPSC's performance following lower EBITDA, despite higher share profit from Xayaburi Power Plant due to higher water level during the rainy season.

Third quarter of 2021 compared with Third quarter of 2020

In 3Q2021, sales revenue of Technology and Engineering business group was Baht 19,438 million, increasing by Baht 873 million or 4.7% mainly from the higher sales revenue of GPSC. This was due to higher Small Power Producer (SPP)'s electricity sales volume to Electricity Generating Authority of Thailand (EGAT) and industrial customers, together with higher stream sales volume.

EBITDA in 3Q2021 was Baht 5,178 million, decreasing by Baht 251 million or 4.6% mainly due to the lower gross profit of GPSC from higher gas and coal cost, together with maintenance cost of GHECO-One Power Plant. In this regard, operating income in 3Q2021 was Baht 2,420 million, decreasing by Baht 627 million or 20.6% owing to the decrease in EBITDA, as mentioned. The overall performance of Technology and Engineering business group decreased mainly from lower GPSC's performance following the lower EBITDA and dividend income from Ratchaburi Power Company Limited (RPCL), despite higher share profit from Xayaburi Power Plant as a result of higher water level than last year which facing drought situation.

First nine months of 2021 compared with First nine months of 2020

In 9M2021, sales revenue of Technology and Engineering Business was Baht 56,999 million, decreasing by Baht 914 million or 1.6% mainly from GPSC. This was due to the decrease in revenue of GHECO-One Power Plant from higher maintenance shutdown days compared to the same period last year resulting in lower Availability Payment (AP) and Energy Payment (EP), despite increases in overall electricity and steam sales volume of SPP.

EBITDA in 9M2021 was Baht 16,495 million, decreasing by Baht 637 million or 3.7% mainly from GPSC's lower gross profit according to lower sales revenue as mentioned with higher coal cost, despite the lower gas cost. In this regard, in 9M2021, operating income was Baht 8,500 million, decreasing by Baht 758 million or 8.2% in accordance with lower EBITDA. However, GPSC's performance increased primarily from higher share profit from Xayaburi Power Plant due to higher water level compared to the same period last year which facing drought situation. Consequently, the overall performance of Technology and Engineering Business group increased.

Overall performance of PTT and its subsidiaries

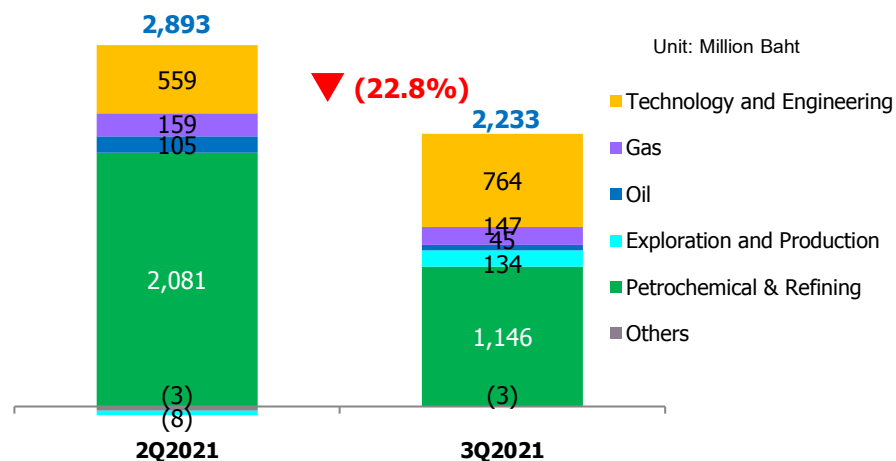
Third quarter of 2021 compared with Second quarter of 2021

In 3Q2021, PTT and its subsidiaries' sales revenue was reported at Baht 558,888 million, increased by Baht 25,632 million or 4.8% from 2Q2021 primarily from increased in revenues of International Trading business, Petrochemical and Refining businesses and Exploration and Production business due to higher average selling prices according to increasing global oil price despite lower sales volume from Delta COVID-19 pandemic. Moreover, Gas business's revenue increased mainly from the higher fuel oil referenced selling prices for industrial customers of S&M as well as the increase in the average selling prices reference to the higher petrochemical prices of GSP.

EBITDA in 3Q2021 was Baht 110,552 million, decreased by Baht 2,644 million or 2.3% mostly from the decrease in the performance of Petrochemical and Refining businesses due to lower sales volume from PTT group's refinery maintenance shutdown, higher crude premium and increased petrochemical feedstock as well as higher hedging loss. The performance of Oil business decreased mainly from lower sales volume. Additionally, PTT Group's stock gain decreased approximately by Baht 1,400 million because of the lower extent of the crude oil prices' increase compared to the previous quarter. Meanwhile, the performances of Gas business and Exploration and Production business improved due to the increase in average selling prices.

The depreciation and amortization expenses of 3Q2021 were Baht 39,295 million which was close to 2Q2021.

Share of profit from investments in joint ventures and associates



In 3Q2021, the share of profit from investments in joint ventures and associates was Baht 2,233 million, decreased by Baht 660 million or 22.8% mainly from the lower performance of joint venture in Petrochemical and Refining businesses mainly due to lower petrochemical product spreads. Despite, overall performance of associates in Technology

and Engineering increased due to Xayaburi Power Plant as a result of higher electricity generation from the rise of water volume in the rainy season.

In 3Q2021, there was loss on derivatives amounting to Baht 1,176 million, decreased by Baht 852 million or 6.8% mainly due to loss on oil price hedging instruments from PTTEP.

In 3Q2021, loss on foreign exchange was Baht 6,405 million, increased by Baht 5,532 million or more than 100.0% mainly due to higher unrealized loss on foreign currency loan (US Dollar loan) as a result of more Baht depreciation at the end of this quarter compared to the previous quarter (Thai Baht depreciation in 3Q2021 of Baht 1.87 per US Dollar, Thai Baht depreciation in 2Q2021 of Baht 0.71 per US Dollar)

Finance costs was Baht 7,470 million in 3Q2021 which was close to 2Q2021.

In 3Q2021, there was the recognition of non-recurring items (PTT's portion) mainly from the write-off on obsolete materials and supplies approximately by Baht 900 million from PTT net off gain on fair value measurement of UBE approximately Baht 290 million from TOP. While, in 2Q2021, there was GC's impairment loss from JV approximately by Baht 1,500 million.

The corporate income taxes in 3Q2021 was Baht 15,408 million, decreased by Baht 5,443 million or 26.1% resulted primarily from GC's income tax from gain on sale of the investment in GPSC transaction in 2Q2021.

As previously mentioned, this was resulted in PTT and its subsidiaries' net profit in 3Q2021 amounting to Baht 23,653 million, which decreased by Baht 925 million or 3.8% from net profit of Baht 24,578 million in 2Q2021.

Third quarter of 2021 compared with Third quarter of 2020

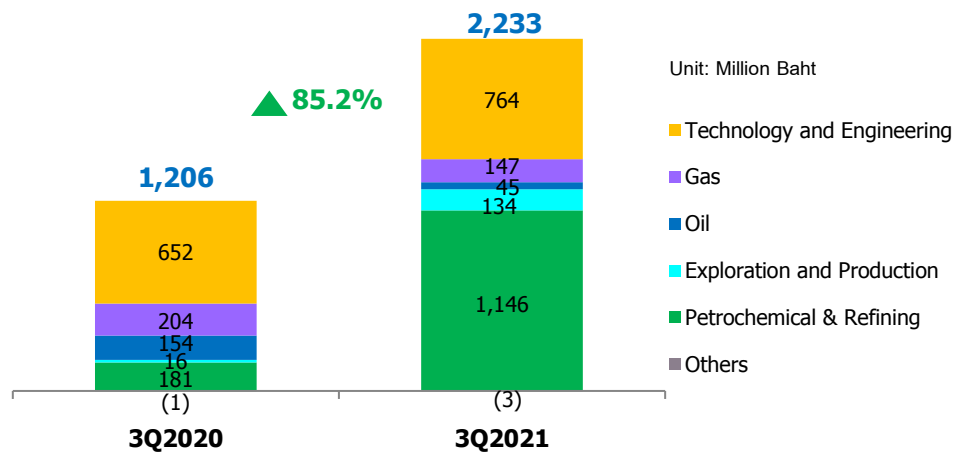
In 3Q2021, sales revenue of PTT and its subsidiaries was reported at Baht 558,888 million, increased from 3Q2020 by Baht 175,289 million or 45.7% from all businesses. Sales revenue of International Trading business, Petrochemical and Refining businesses, Gas business and Oil business increased due to higher average selling prices following the rise in global petroleum and petrochemical product prices. In addition, Exploration and Production business's revenue increased mainly from the rise of both average selling prices and sales volume.

EBITDA in 3Q2021 was Baht 110,522 million, increased by Baht 43,057 million or 63.8%. This was mainly from the Petrochemical and Refining businesses especially, the Petrochemical business's performance increased the higher of overall petrochemical product spreads both of olefins and aromatics as well as sales volume offset with the decline in Refining business's performance due to lower sales volume and increased hedging loss in 3Q2021. However, PTT Group's stock gain increased approximately by Baht 2,000 million following crude oil price increased in higher extent compared to 3Q2020. Exploration and Production business's performance increased due to higher sales volume mainly from the acquisition of Oman Block 61 in March 2021 as well as the higher average selling prices. Moreover, Gas business's

performance also improved primarily due to the GSP and S&M businesses due to the higher average referenced selling prices as aforementioned.

The depreciation and amortization expenses of 3Q2021 were Baht 39,295 million, increased by Baht 4,705 million or 13.6% mainly from Exploration and Production business due to Oman Block 61 Project acquisition along with additional completed assets from S1 Project.

Share of profit from investments in joint ventures and associates



In 3Q2021, the share of profit from investments in joint ventures and associates was Baht 2,233 million, increasing by Baht 1,027 million or 85.2%. This was primarily from higher performance of joint venture in Petrochemical and Refining businesses due to the rise in petrochemical prices and product spreads together with higher performance of associates in Technology and Engineering Business from Xayaburi Power Plant as a result of higher electricity generation from the rise of water volume.

In 3Q2021, loss on derivatives was Baht 11,768 million, increasing by Baht 13,729 million from gain on derivative of Baht 1,961 million in 3Q2020 mainly due to higher loss on oil price hedging transactions from PTTT, TOP, PTTEP and GC.

There was loss on foreign exchange rate in 3Q2021 by Baht 6,405 million, increased by Baht 5,192 million or more than 100.0% mainly due to higher unrealized losses of US currency loans as a result of the higher depreciation of Thai Baht against US Dollar in 3Q2021 compared to the 3Q2020. (Thai Baht depreciation in 3Q2021 of Baht 1.87 per US Dollar, Thai Baht depreciation in 3Q2020 of Baht 0.76 per US Dollar).

Finance costs was Baht 7,470 million in 3Q2021 which was close to 3Q2020.

In 3Q2021, there was the recognition of non-recurring items (PTT's portion) mainly from the write-off on obsolete materials and supplies approximately by Baht 900 million from PTT net off gain on fair value measurement of UBE approximately Baht 290 million from TOP. While, in 3Q2020, there was PTTGM's impairment loss from coal assets approximately by Baht 1,000 million.

The corporate income taxes in 3Q2021 was Baht 15,408 million, increased by Baht 7,556 million or 96.2% mainly from the increase in operating income taxes following the higher performance of PTT Group in 3Q2021 and a gradual recognition of tax expense of PTTEP's Oman Block 61 Project.

As aforementioned, this was resulted in PTT Group's net profit in 3Q2021 amounting to Baht 23,653 million, which increased by Baht 9,533 million or 67.5% from the net profit amounting to Baht 14,120 million in 3Q2020.

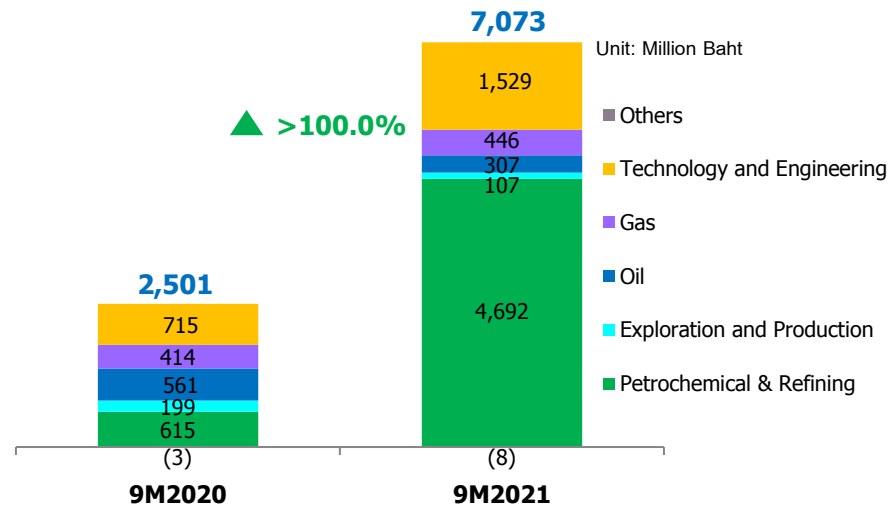
First nine months of 2021 compared with First nine months of 2020

In 9M2021, sales revenue of PTT and its subsidiaries' was reported at Baht 1,569,981 million, increased from 9M2020 by Baht 361,490 million or 29.9% from most of all businesses mainly from International Trading business and Petrochemical and Refining businesses due to higher average selling prices following the economic activities recovered from last year.

EBITDA in 9M2021 was Baht 326,685 million, increased by Baht 172,627 million or over 100.0%. This was mainly from the Petrochemical and Refining businesses which significantly improved from the increased Accounting GRM, from loss US\$ 1.8 per barrel in 9M2020 to gain US\$ 4.9 per barrel in 9M2021. In addition, petrochemical product spreads both of the olefins and aromatics were increased. Besides, PTT Group had stock gain approximately by Baht 39,000 million in 9M2021 following the higher crude oil price compared with at the end of 2020 compared to stock loss approximately by Baht 27,000 million in 9M2020. Furthermore, Exploration and Production business's performance enhanced according to the higher sales volume and average selling prices. Moreover, Gas business's performance increased mainly from GSP and S&M businesses. The performance of GSP rose due to the higher average selling prices and sales volume. Additionally, S&M business's performance also increased from higher sales volume and the fuel oil referenced selling prices for industrial customers as well as the lower gas cost.

The depreciation and amortization expenses of 9M2021 were Baht 112,939 million, increased by Baht 7,882 million or 7.5% mainly from Exploration and Production business due to the acquisition of Oman Block 61 Project, additional completed assets from S1 Project and higher sales volume of Bongkot Project and Contract 4 Project.

Share of profit from investments in joint ventures and associates



In 9M2021, the share of profit from investments in joint ventures and associates was Baht 7,073 million, increasing by Baht 4,572 million or over 100.0%. This was primarily from higher performance of joint venture in Petrochemical and Refining businesses due to higher petrochemical prices and product spreads together with higher performance of associates in Technology and Engineering Business from Xayaburi Power regarding drought situation 9M2020.

In 9M2021, loss on derivatives increased Baht 38,636 million, from gain on derivatives of Baht 6,850 million in 9M2020 to loss on derivatives of Baht 31,786 million in 9M2021 mainly due to loss on oil price hedging transactions from PTTEP, PTTT, GC, PTT, and TOP.

Loss on foreign exchange rate increased by Baht 12,067 million from gain on foreign exchange rate Baht 459 million in 9M2020 to loss on foreign exchange rate Baht 11,608 million in 9M2021 mainly due to unrealized loss of US currency loans as a result of higher Baht depreciation compared to the same period of last year (Thai Baht depreciation in 9M2021 of Baht 3.88 per US Dollar, while Thai Baht depreciation in 9M2020 of Baht 1.50 per US Dollar).

In 9M2021, there were the recognition of non-recurring items (PTT's portion) mainly from PTTEP's gain on bargain purchase in Oman Block 61 approximately by Baht 7,000 million and TOP's gain on fair value measurement of UBE approximately by Baht 290 million. Meanwhile, there were PTTEP's partial write-off of exploration and evaluation assets of the exploration project in Brazil approximately by Baht 2,900 million, GC's impairment loss on investment in joint venture approximately by Baht 1,500 million, and PTT's write-off on obsolete materials and supplies approximately by Baht 900 million. In 9M2020, there were impairment loss on assets approximately Baht 2,000 million mainly from Mariana Oil Sands Project of PTTEP and Coal Mining of PTTGM.

Finance costs was Baht 21,010 million in 9M2021 which was close to 9M2020

The corporate income taxes in 9M2021 was Baht 47,942 million, increased by Baht 31,118 million or over 100.0% mainly from the better performance of PTT Group in 9M2021 and GC's income tax from gain on sale of the investment in GPSC transaction.

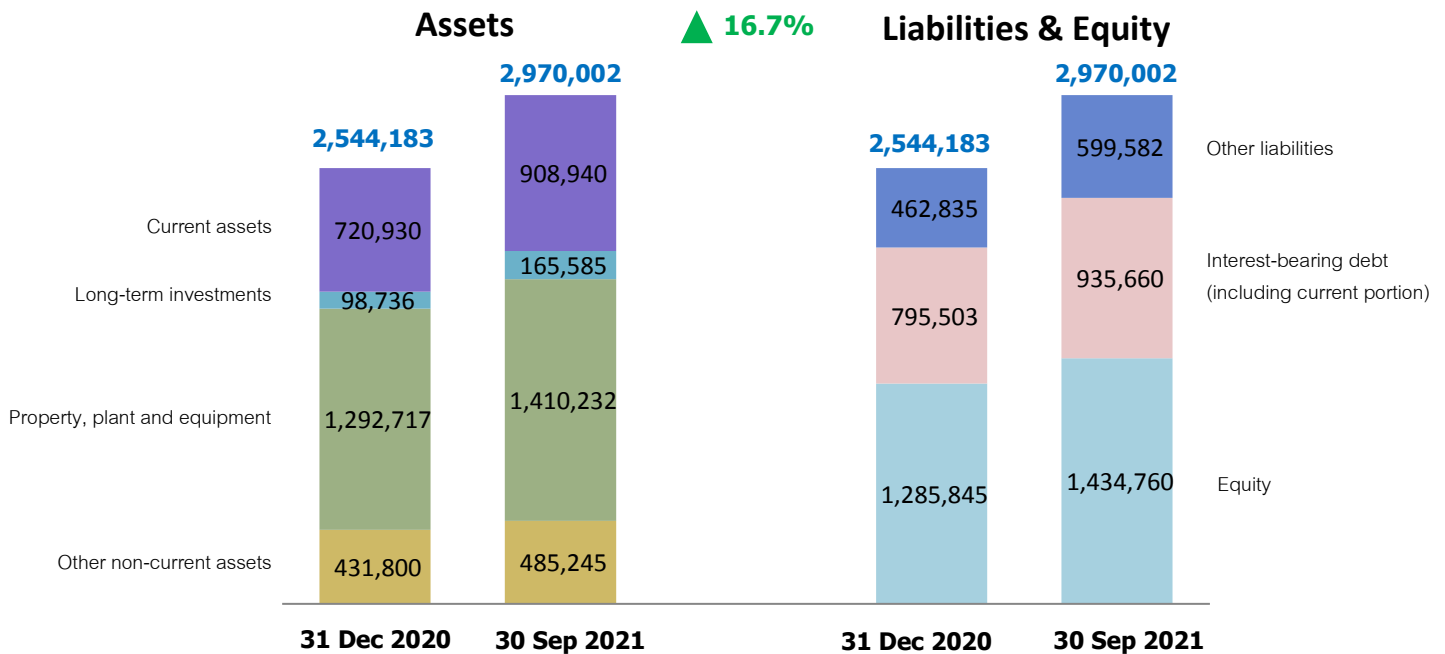
As aforementioned, this was resulted in PTT Group's net profit in 9M2021 amounting to Baht 80,819 million, which increased by Baht 56,200 million or over 100.0% from the net profit amounting to Baht 24,619 million in 9M2020.



The analysis of PTT Group consolidated financial position

As of 30 September 2021 compared with 31 December 2020

Unit: Million Baht



Assets

As of 30 September 2021, total assets of PTT Group were Baht 2,970,002 million, increasing by Baht 425,819 million or 16.7% compared with 31 December 2020 mainly from the net effect as follows:

: Current assets increased by 188,010 million or 26.1% mainly from the following:

- Cash and cash equivalents and current investments increased by Baht 40,042 million mainly from bond issuance and maturity of fixed deposits of PTT, including the issued ordinary shares of OR, despite cash declined from the purchases of business in the Oman Project Block 61 of PTTEP.
- Trade accounts receivables increased by Baht 49,161 million mainly from higher average selling prices of PTT, GC, TOP, PTTT, IRPC, and PTTEP.
- Inventories increased by Baht 69,258 million due to higher prices of crude oil and refined products of GC, TOP, IRPC, PTT, and PTTT.

: Long-term investments increased by Baht 66,849 million or 67.7% mainly from TOP's investment in CAP and GPSC's investment in Avaada.

: Property, plant and equipment (PPE) increased by Baht 117,515 million or 9.1% mainly from PTTEP's business acquisition of Oman Block 61 and TOP's additional construction in progress of Clean Fuel Project (CFP).

: Other non-current assets increased by Baht 53,445 million or 12.4% mainly from the increase in exploration and evaluation assets and deferred tax assets from PTTEP's business acquisition of Oman Block 61.

Liabilities

As of 30 September 2021, PTT Group had total liabilities of Baht 1,535,242 million, increasing by Baht 276,904 million or 22.0% from 31 December 2020, mainly from the following:

: Other liabilities increased by Baht 136,747 million or 29.5% mainly from the increase in trade accounts payables from the increase in overall purchase prices of PTT, PTTT, GC, and PTTEP.

: Interest-bearing debt increased by Baht 140,157 million or 17.6% primarily due to the increase in long-term loans and bonds amounting to Baht 113,691 million mainly from PTT, GC, TOP, and PTTEP. Additionally, there was the increase in short-term loans amounting to Baht 15,756 million from PTTT and GC.

Equity

As of 30 September 2021, PTT Group had total shareholders' equity of Baht 1,434,760 million, increasing by Baht 148,915 million or 11.6% from 31 December 2020 as PTT Group reported 9M2021 net income amounting to Baht 80,819 million. Additionally, non-controlling interests increased by Baht 52,327 million mainly from issued ordinary shares of OR and gain of subsidiaries.

Liquidity

For the nine-month ended 30 September 2021, PTT Group had net increase in cash and cash equivalents amounting to Baht 40,042 million. There was cash and cash equivalents at the beginning of the period of Baht 332,032 million. As a result, cash and cash equivalents at the end of the period was Baht 372,074 million. Details of cash flow by activities are as follows:

	Unit: Million Baht
	PTT Group
Net cash provided by operating activities	216,728
Net cash used in investing activities	(235,480)
Net cash provided by financing activities	71,738
Effects of exchange rates on cash and cash equivalents	2,350
Exchange differences on translation	(15,294)
Net increase in cash and cash equivalents during the period	40,042
Cash and cash equivalents at the beginning of the period	332,032
Cash and cash equivalents at the end of the period	372,074

Net cash provided by operating activities of Baht 216,728 million was derived from Baht 161,792 million of profit before income taxes, adjusted to net cash provided by (used in) operating activities. The increase in net cash flow from operating activities mainly resulted from Baht 112,939 million of depreciation and amortization expenses, Baht 21,010 million of finance costs, Baht 19,135 million of loss on foreign exchange rate. The decrease in net cash flow from operating activities mainly resulted from Baht 10,772 million of gain on bargain purchase, Baht 7,073 million of share of profit from investments in joint ventures and associates, the change in net operating assets resulting in the decrease in cash flow of Baht 57,314 million and income taxes paid of Baht 44,358 million.

Net cash used in investing activities was Baht 235,480 million mainly resulted from the following:

: The cash outflow of business acquisition and other long-term investments amounting to Baht 127,206 million, mainly from the acquisition of Oman Block 61 project by PTTEP and the investment in associates of TOP and GPSC.

: The cash outflow of investments in property, plant and equipment, investment property, intangible assets, and exploration and evaluation assets amounting to Baht 101,023 million, mainly due to additional investment in exploration and production assets in S1 Project, Mozambique Area 1 Project, and Arthit Project of PTTEP, additional investment of TOP's CFP and expand the capacity of electricity and steam of TOP SPP Company Limited (TOP SPP), GC's Olefins Reconfiguration project, LNG receiving terminal at Nong Fab of PTT LNG Company Limited (PTTLNG), PTT's the 5th transmission pipeline project, and investment in expansion of service stations, food and beverage outlets, warehouses, and investment in LPG cylinders and related equipment.

: The cash outflow from short-term investment in financial assets totaling Baht 12,521 million, mainly from the investment in fixed deposits, debt and equity instruments of GC and OR which were amounting to Baht 46,586 million, Baht 20,942 million, respectively, despite the maturities of fixed deposits, treasury bills and government bonds of PTT amounting to Baht 31,068 million.

Net cash provided by financing activities was Baht 71,738 million, mainly from the following:

: The net cash inflow of issuance of ordinary shares of subsidiaries amounting to Baht 53,798 million mainly from OR.

: The net cash inflow of long-term loans amounting to Baht 75,190 million mainly from PTT, GC, and TOP.

: The net cash inflow of short-term loans amounting to Baht 13,462 million mainly from PTTT.

: Dividend payment amounting to Baht 43,406 million mainly from PTT, GC, and PTTEP.

: Finance costs paid amounting to Baht 22,050 million mainly from GC, TOP, PTT, GPSC and PTTEP.

Financial ratios and earnings per share of PTT and its subsidiaries

Financial Ratio	Unit	9M2020	9M2021
<u>Profitability Ratios</u>			
Gross profit margin	%	8.97	17.81
Net profit margin	%	1.72	7.25
<u>Solvency Ratios</u>			
Interest coverage	Times	10.29	11.84
<u>Earnings per share</u>			
Earnings per share	Baht/Share	0.86	2.82

Financial Ratio	Unit	31 Dec 2020	30 Sep 2021
<u>Liquidity Ratios</u>			
Current ratio	Times	2.42	2.03
Quick ratio	Times	1.77	1.41
<u>Solvency Ratios</u>			
Debt to equity	Times	0.62	0.65

Note:

Gross profit margin	=	Gross profit divided by Sales and service income
Net profit margin	=	Net profit divided by Sales and service income
Interest coverage	=	(Net cash flow from operating activities + Taxes paid from operating activities) divided by Finance costs paid
Earnings per share	=	Net income attributable to ordinary shareholders divided by the weighted average number of ordinary shares which are held by third parties during the periods
Current ratio	=	Current assets divided by Current liabilities
Quick ratio	=	(Cash and cash equivalent + Current investments + Accounts receivable) divided by Current Liabilities
Debt to equity	=	Interest bearing debt divided by Total shareholder's equity

Economic Outlook in the Fourth Quarter of 2021 and Year 2022

The world economy in 4Q2021 is expected to continue its recovery from 3Q2021 due to the improvement in the Delta variant of COVID-19 situation in many countries, and also the containment measures are expected to be more relaxed, amid the widespread vaccinations. Although, the recovery is being dragged down by global supply chain disruption, and the high level of commodity prices, especially a skyrocketing energy prices in early October 2021. Downside risks to the world economy include the COVID-19 variants that could be more severe and contagious, the premature withdrawal of government economic support measures, and extreme weather-related events. **Consequently, IMF in October 2021 projected 2022 global growth at 4.9%.**

Thai economy in 4Q2021 is expected to recover from 3Q2021, as the COVID-19 crisis is likely to ease. Private consumption, and private investment are likely to recover, due to easing lockdown restrictions since the beginning of September, and higher numbers of Thai population getting fully vaccination. Besides, government spending will be partially supported by the 500-billion-baht emergency loan and disbursement of the remaining 1-trillion-baht loan, which allow the government to continue financing existing relief measures, including subsidies for social welfare card holders (Round 3), "Khon La Khrueng" phase 3, "Ying Chai Ying Dai" scheme. Meanwhile, merchandise export is expected to rise in line with global economic recovery, amid greater access to vaccines, particularly in developing countries, though momentum moderating due to global supply chain disruptions. According to tourism sector, although the government introduced quarantine free entry to fully vaccinated visitors from low risk countries, and expand pilot sandbox projects to other areas, including Bangkok, Chonburi, and Chiang Mai, started since 1 November 2021, some countries are still likely to strictly restrict their citizens to travel aboard, such as China, Japan, and Australia. However, Thai economic recovery would remain highly uncertain and could face downside risks due to potential risk of the COVID-19 resurgence in Thailand and some trading partners following the easing of lockdown, the impact of new virus variants which lower the effectiveness of COVID-19 vaccines, uncertainty of re-opening plan to foreign tourists, and increasing likelihood of business and household debt defaults. **The Bank of Thailand in September 2021 expected Thai economic to grow 3.9% in 2022 as the COVID-19 crisis is likely to ease.**

According to the IHS's report of October 2021, global oil demand in 4Q2021 is expected to increase 1.3 MMBD from 3Q2021 to 99.6 MMBD from faster vaccination in many countries and global economic recovery especially in China, US, and Europe. The crude oil price in 4Q2021 is expected to average at US\$82 per barrel, increasing from 3Q2021 at US\$71.7 per barrel due to increase in oil demand from economic stimulus packages and gradual increase of OPEC+ oil production which may result in oil supply deficit. However, the resurgence of new COVID-19 variants in many countries still pressure in the rising of oil demand. **Dubai crude oil price is expected to average at US\$68-73 per barrel in 2021;** whereas, Singapore Gross Refining margin is expected to average at US\$3.1-4.1 per barrel in 2021. For 2022, global oil

demand is expected to increase 4.2 MMBD from 2021 to 100.9 MMBD and Dubai crude oil price is expected to average at US\$71-76 per barrel in 2022 and Singapore GRM is expected to average at US\$4.0.-5.0 per barrel.

Petrochemical prices of Olefins and Aromatics in 4Q2021 are likely to increase from 3Q2021 following the increase of crude oil and naphtha prices, widespread COVID-19 vaccination globally, and the easing of COVID-19 restriction measures, particularly in ASEAN. In 2022, the market is likely to remain under pressure due to new capacities, and the uncertainty of China's dual control policy on petrochemical supply chains.

- **Olefins prices** in 4Q2021 is expected to increase from 3Q2021, with average price of US\$1,230 – 1,250 per ton for HDPE, and US\$1,360 - 1,380 per ton for PP, due to seasonal festival demand at the end of the year. For 2022, HDPE and PP prices are projected to average at US\$1,120 – 1,170 per ton and US\$1,275 - 1,325 per ton, respectively. In 2022, new supply in Asia is expected to increase significantly. Moreover, the further impact of dual control policy to other provinces, and severe shortage of containers for delivery is likely to continuously affect the market.
- **Aromatics prices** in 4Q2021, PX price is expected to be higher comparing with 3Q2021 at US\$945-965 per ton while BZ prices is projected to average US\$975-995 per ton, decreasing compared to 3Q2021. Aromatics spread over naphtha tends to decrease as crude oil and naphtha prices are expected to increase. Besides, the strict dual control policy of China will pressure the downstream demand. In addition, there will be the upcoming new large-scale capacities in China and Saudi Arabia. For 2022, PX and BZ prices are projected to average at US\$870-920 per ton and US\$850-900 per ton, respectively. New supply for Aromatics is expected to continue increasing faster than the recovery in demand, and the strict dual control policy in China is also likely to impact to downstream demand.

Major Project Plan

Gas Business Group: The progress of major projects

Pipelines Transmission Projects

- The 5th Transmission Pipeline (Rayong - Sai Noi – North/South Bangkok power plants)
 - Total Project Progress as of September 2021: 86.72% (Including 3 phases construction)
 - COD: Year 2022
- The Ratchaburi Transmission Pipeline Project
 - Total Project Progress as of September 2021: 99.95%
 - COD: Year 2021

LNG Project:

Currently, PTT have long term LNG contracts with Qatargas, Shell, BP, and Petronas at 5.2 MTA and has a capability to procure LNG in order to fulfill the country demand growth in the future.

- **LNG Receiving Terminal #2:**

Total Project progress as of September 2021: 83.43%

 - Total Capacity of 7.5 MTA be approved by the Cabinet meeting on 11 April 2017
 - COD: Year 2022
- **Other LNG Receiving Terminal Project (LNG Receiving Terminal 3):**
 - On 24 September 2019, the Cabinet approved the private entity selection, negotiations and the draft of the contract between Public Private Partnership (PPP) and the Industrial Estate Authority of Thailand (“IEAT”) on the development of Map Ta Phut seaport phase III (Section 1) as proposed by the Eastern Economic Corridor Office. Gulf MTP LNG Terminal Company Limited, a new joint venture company between PTT Tank Terminal Company Limited (“PTT Tank”) and Gulf Energy Development Public Company Limited (“GULF”) with shareholding of 30%, and 70%, respectively, is to proceed land reclamation with the investment cost of approximately Baht 12,900 million which is expected to be completed by 2023, as well as having the right to construct LNG terminal 3 phase 1 with the capacity not less than 5 million tons per annum. The LNG terminal 3 phase 1 has an investment cost approximately Baht 28,000 million which is expected to be completed by the year 2027.

[Summary Planned Shutdown for Gas Separation Plants in 2021](#)

Plant	1Q2021	2Q2021	3Q2021	4Q2021
GSP #2	SD (1 -2 Jan : 2 days)			
GSP #3		TD 70% (12 Apr : 1 day)	SD (23 - 30 Sep : 8 days)	SD (1 - 6 Oct : 6 days)
GSP #5	TD 27-50% (1 - 9 Jan : 9 days)	TD 50% (17 - 27 Apr : 11 days)		
GSP #6		TD 20% (13 Apr : 1 day)	Major SD (1 - 26 Jul : 26 days)	SD (7 -15 Oct : 9 days)
ESP	TD 40% (1 - 2 Jan : 2 days)		TD 60% (23 - 30 Sep : 8 days)	TD 60% (1 - 6 Oct : 6 days)

[Summary Planned Shutdown for Gas Separation Plants in 2022](#)

Plant	1Q2022	2Q2022	3Q2022	4Q2022
GSP #2		TD (1-23 May : 23 วัน)		
GSP #3		TD (1-23 May : 23 วัน)		
GSP #5				Minor SD (Dec 15 วัน)
ESP		Major SD (23 วัน)		

*TD: Turndown

**SD: Shutdown

Appendix



Exploration and Production Business consists of PTT Exploration and Production Public Company Limited (PTTEP)

Natural Gas Business consists of PTT natural gas business unit, PTT Natural Gas Distribution Co., Ltd. (PTTNGD), PTT LNG Co., Ltd (PTTLNG), and PTT Global LNG Co., Ltd (PTTGL)

Coal Business consists of PTT Energy Resources Co., Ltd (PTTER), PTT Global Management Co., Ltd (PTTGM)

Oil Business consists of PTT Oil and Retail Business Public Company Limited (OR)

International Trading Business consists of PTT international business unit and PTT International Trading Pte. Ltd. (PTTT), PTT International Trading London Limited (PTTT LDN) and PTT International Trading USA Incorporated (PTTT USA)

Petrochemical and Refinery Business consists of PTT Global Chemical Public Company Limited (GC), Thai Oil Public Company Limited (TOP), IRPC Public Company Limited (IRPC), and PTT Tank Terminal Co., Ltd. (PTT TANK)

Technology and Engineering Business consists of PTT Technology and Engineering Business business unit, Global Power Synergy Public Company Limited (GPSC), PTT Energy Solution Co., Ltd. (PTTES), Energy Complex Co., Ltd. (EnCo) and PTT Digital Solutions Co., Ltd. (PTT DIGITAL)

Other Business consists of Business Services Alliance Co., Ltd. (BSA), PTT Green Energy Pte. Ltd. (PTTGE), PTT and PTT Treasury Center Co., Ltd. (PTT TCC)

