

Management's Discussion and Analysis (MD&A) and operating results for the fourth quarter of 2018 and year ended December 31, 2018

Executive Summary

Unit : Million Baht	4Q2017	3Q2018	4Q2018	%Inc. (Dec.)		2017	2018	%Inc (Dec.)
				YoY	QoQ			
Sales Revenue	531,959	606,979	617,417	16.1%	1.7%	1,995,722	2,336,155	17.1%
EBITDA	94,213	96,138	64,443	(31.6%)	(33.0%)	345,395	351,396	1.7%
Net income	35,364	30,329	19,538	(44.8%)	(35.6%)	135,180	119,684	(11.5%)
Earnings per share (Baht/share)	1.22	1.05	0.67	(45.1%)	(36.2%)	4.67	4.15	(11.1%)

In the Fourth quarter of 2018 (4Q2018), PTT and its subsidiaries reported net income of Baht 19,538 million, 35.6% declined or by Baht 10,791 million from the third quarter of 2018 (3Q2018) of Baht 30,329 million. This resulted mainly in net stock loss of the Petrochemical and Refining businesses' Accounting Gross Integrated Margin (Accounting GIM). The sharply drop of crude oil price led to the net stock loss. (Crude oil prices at the end of 3Q2018 and 4Q2018 were recorded at US\$ 80.0 and 52.9 per barrel, respectively). Moreover, the lower spread of Petrochemical products regarding the producers' put off their orders as Chinese yuan depreciation and keep their low level of inventories at the end of year. Likewise, oil business had a drop in gross profit according to higher stock loss in this quarter. The gas business group recorded the decrease in its performance following the lower petrochemical prices of PTT's Gas Separation Plant (GSP) business. Whereas, the higher of average selling prices as well as sales volume, the performance of exploration and production business rose during this quarter. In 4Q2018, PTT group had higher gain on derivatives versus lower unrealized gain on foreign exchange from foreign currency loan decreased.

In 2018, PTT and its subsidiaries had net income of Baht 119,684 million, 11.5% drop or Baht 15,496 million from 2017 net income of Baht 135,180 million. This resulted from the performance increase of exploration and production business from the rise in both average selling prices and sales volume while there was a recognition of an impairment loss on assets of the Mariana Oil Sand Project amounting to Baht 18,505 million in 2017. Moreover, performance of gas business group, both operating by PTT's and its affiliates also increased except NGV business. However, Petrochemical and Refining businesses' performance decreased mainly from stock loss following the sharp drop of crude oil prices in the fourth quarter of 2018 while there was stock gain in 2017. The olefins and aromatics petrochemical business performance also decreased from the lower petrochemical spreads especially during the end of 2018 due to the concern on the slowdown in world economy and unresolved of United States and China trade war, despite the increasing in sales volume. Likewise, the performance of oil business decreased with regard to stock loss in 2018 versus stock gain in 2017. PTT and its subsidiaries recorded higher depreciation and amortization expenses according to PTTEP's acquisition of participating interest in Bongkot gas field and the increase in income tax expenses due to better performance

*of exploration and production business, higher income tax from the restructuring of oil business unit and lower BOI tax privilege. Moreover, there was loss on derivatives and the decrease in foreign exchange gain from lower appreciation of Thai Baht against US Dollar in year 2018 when compared with 2017.*

*As of the year-end of 2018, PTT and its subsidiaries had the total assets amounting to Baht 2,355,484 million of which Baht 1,114,174 million was the property plant and equipment. Whereas the total liabilities were recorded at Baht 1,036,989 million including the interest-bearing debt amounting to Baht 543,634 million and the total shareholders' equity of Baht 1,318,495 million.*

*Economic Overview in the fourth Quarter of 2018*

The world economy in 4Q2018 expanded at a slower pace than in 3Q2018. Specifically, US economic growth slowed on the back of tighter financial conditions, a potent mix of heightened concerns about the pace of US rate hikes and a strong US dollar, despite benefiting from the still strong labor market, and the 90-day trade truce with China (beginning on December 1, 2018) being a welcome development. Accordingly, the Federal Reserve (the Fed) at its December 2018 meeting raised its policy rate for the fourth time in 2018, but lowered its projections for future rate hikes to 2 increases in 2019 from 3 increases. Meanwhile, the euro area’s economic recovery continued amid record-low policy rates, despite the European Central Bank (ECB) since October 2018 further tapering its quantitative easing (QE) program before ending it completely at the end of December 2018. Among factors weighing on growth in the euro area in 4Q2018 were a severe drought disrupting Germany’s inland waterway, Italy budget standoff with the European Union (EU), and yellow-vest protests in France. As for China, economic growth slightly slowed in 4Q2018 amid Beijing’s softer tone on debt crackdown to mitigate threats to growth from the trade conflict with the US. The International Monetary Fund (IMF) in January 2019 estimated global growth for 2018 at 3.7%.

Thai economy in 4Q2018 continued to grow at a healthy pace, following continuous expansion in private consumption for all spending categories, specifically in durable goods, supported by rising household incomes from non-agricultural sector. Public spending expanded on the back of state-enterprise investment. Meanwhile, private investment gradually expanded, particularly from investment in machinery and equipment, in line with an increase in capacity utilization. Merchandise exports returned to growth as temporary factors in major trading partners dissipated. Still, the momentum was softer amid global economic slowdown and high base effect. As for tourism, growth moderately rebounded on the back of Asian tourists’ expansion, in particular, Malaysian tourists, despite slowing Chinese tourists. The Office of National Economic and Social Development Council has reported the Thai economic growth for 2018 at 4.1%, increasing from 4.0% in 2017.

According to the International Energy Agency (IEA) in January 2019, global oil demand in 4Q2018 averaged 100.1 million barrels per day (MMBD), increasing from 99.8 MMBD in 3Q2018 and 98.7 MMBD in the fourth quarter of 2017 (4Q2017). For the whole of 2018, global oil demand is expected to average 99.2 MMBD.

Unit :	4Q2560	3Q2561	4Q2561	%increase(decrease)		2560	2561	%increase (decrease)
				YoY	QoQ			
US\$/barrel								
Average Dubai crude oil price	59.3	74.3	67.4	13.7%	(9.3%)	53.2	69.4	30.5%
Gasoline Crack Spread	14.4	11.6	4.7	(67.4%)	(59.5%)	14.9	10.5	(29.5%)
Diesel Crack Spread	13.0	14.4	14.8	13.8%	2.8%	12.5	14.6	16.8%
FO Crack Spread (180 – 3.5%S)	(3.1)	(2.5)	1.4	>100%	>100%	(2.3)	(2.6)	(13.0)%

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Dubai oil price in 4Q2018 averaged at US\$67.4 per barrel, decreasing from US\$74.3 per barrel in 3Q2018 due to the US in early November 2018 granted exemption allowance to temporarily buy the Iranian oil, the rise of US shale oil production, as well as lower forecast of oil demand according to the slowdown of world economy. Dubai oil price in 2018 averaged at US\$69.4 per barrel, up from US\$53.2 per barrel in 2017. This resulted from OPEC and non- OPEC members agreed to the compliance to output cut in order to balance global oil demand and supply. Moreover, the economic downturn of Venezuela also impacted oil exports while global oil demand remained healthy in 2018.

**Petroleum product prices** in the Singapore spot market recorded various changes in 4Q2018 relative to 3Q2018. **Gasoline** crack spreads in 4Q2018 averaged US\$4.7 per barrel, a significant decrease from US\$11.6 per barrel in 3Q2018, amid stable demand and supply surplus from rising exports from China, US and Japan that caused high inventories level. Likewise, the averaged gasoline crack spreads in 2018 was US\$ 10.5 per barrel, down from US\$14.9 per barrel in 2017 due to supply surplus from high global inventories. For **Diesel** crack spreads in 4Q2018 averaged US\$14.8 per barrel, an increase from US\$14.4 per barrel in 3Q2018, amid higher demand in winter and lower supply from refineries and China's export. Moreover, diesel crack spreads in 2018 averaged US\$14.6 per barrel, increasing from US\$12.5 per barrel in 2017 due to substantially low inventory from prolonged winter in Western countries and the recovery of manufacturing sector. For **Fuel Oil** crack spreads in 4Q2018 averaged US\$1.4 per barrel, an increase from US\$ -2.5 per barrel in 3Q2018, due to higher bunker demand and lower supply from Iran and Venezuela. However, fuel oil crack spreads in 2018 averaged US\$ -2.6 per barrel, slightly lower from US\$ -2.3 per barrel in 2017 due to soften demand in Asia.

**Dubai crude cracking margin** in Singapore in 4Q2018 averaged US\$4.2 per barrel, a decrease from US\$6.1 per barrel in 3Q2018, amid oversupply of gasoline. For the whole of 2018, Dubai crude cracking margin in Singapore averaged US\$5.8 per barrel. (2017: US\$7.1 per barrel)

**Petrochemical prices** of Olefins and Aromatics in 4Q2018 decreased from 3Q2018, from lower demand due to its seasonal slowdown and concern over economic growth, amid lower prices of crude oil and naphtha. Meanwhile, **high density polyethylene (HDPE)** price was under pressure from higher plastic's supply from the Middle East, US and India. **Polypropylene (PP)** price was under less pressure relative to HDPE, due to some unexpected outages in the Middle East, following a major fire of a producer which staying shut through the quarter. For Aromatics, the **benzene (BZ)** price decreased, due to lower price of **styrene monomer (SM)**, sluggish demand during SM plant turnarounds in the US and China, high BZ and SM inventories, uneconomical arbitrage from Asia to US. While Asia was still oversupplied from steady production in all processes and few ongoing maintenance. **Paraxylene (PX)** price decreased due to lower demand for polyester leading to lower production of purified Terephthalic acid (PTA), while the market was well supplied as plants operation was high, and there were resumption of idle plants in Indonesia and in China and the resumed production of the China plants from the fire since 2015.

Overall, petrochemical prices in 2018 were in the high range for the first 9 months of 2018 in line with firm crude and naphtha prices. Also, higher import demand in China, boosted by the ban on recycle plastic imports

before falling towards the end of 2018 following lower crude oil price and market sentiment over the US and China trade war, resulting in higher HDPE price. Moreover, PP price increased as the amount of additional supply was less than additional demand due to lower use of scrap & waste plastics in China to comply with tighter environmental rules, as well as lower supply from unplanned shutdown in the Middle East. PX price continued to rise as demand was marked up by expanding polyester market, also supported by delay startup in Vietnam and Saudi Arabia.

Unit : US\$/ton	4Q2560	3Q2561	4Q2561	%increase (decrease)		2560	2561	%increase (decrease)
				YoY	QoQ			
				HDPE: CFR SEA	1,226			
PP: CFR SEA – Film	1,196	1,288	1,215	1.6%	(5.7%)	1,155	1,273	10.2%
BZ: FOB Korea	839	856	694	(17.3%)	(18.9%)	823	826	0.4%
PX: CFR Taiwan	887	1,180	1,141	28.6%	(3.3%)	854	1,073	25.6%

## Non-recurring items in the fourth Quarter of 2018 until present

Summary of non-recurring items in 2018 are as follows:

<p>January 2018</p>	<ul style="list-style-type: none"> <li>On January 23, 2018 PTT Global Chemical Public Company Limited (PTTGC) has signed Engineering, Procurement and Construction Agreement for the new Olefins Reconfiguration Project (ORP) at Map Ta Phut Industrial Estate in Rayong Province with capacity of 750,000 TPA. The new olefins plant has been planned to commercially operate within 2020. The total investment of this project is approximately Baht 36,000 million or about \$985 million.</li> <li>On January 29, 2018, the Board of Directors of PTTGC America LLC ("PTTGCA"), a subsidiary of PTTGC, approved the execution of Heads of Agreement (HOA) between PTTGCA and a subsidiary of Daelim Industrial Co., Ltd., construction and petrochemical company of Republic of Korea, to conduct a feasibility study of the Petrochemical Complex project in the State of Ohio, United States of America which will produce and distribute ethylene and its derivatives 1.5 MTPA.</li> <li>On 31 January 2018, PTTEP Mexico E&amp;P Limited, S. de R.L. de C.V. (PTTEP MEP), a wholly-owned subsidiary of PTT Exploration and Production Public Company Limited (PTTEP), and its consortium have been selected as the successful bidders of 2 exploration blocks in the gulf of Mexico in Mexico.</li> </ul>
<p>February 2018</p>	<ul style="list-style-type: none"> <li>On 6 February 2018, the Ministry of Environment and Forestry of the Republic of Indonesia had filed a request to the court for withdrawal of a lawsuit, regarding to 8 May 2017 the legal action commenced in Indonesia relating to the Montara incident, with the reason to amend the Claim. Therefore, the court had granted the request and ordered to strike the case out of the case-list.</li> <li>On 20 February 2018, the Board of Directors Meeting of PTT approved the acquisition of ordinary shares in IRPC Public Company Limited ("IRPC") from the Government Savings Bank in the number of 1,950 million shares with a par value of THB 1 per share, equivalent to approximately 9.54 percent of the total issued and sold shares of IRPC, at the price of THB 7.10 per share, totaling THB 13,845 million Baht, through the Stock Exchange of Thailand (the "Share Acquisition Transaction"). As a result, PTT is currently holding 48.05% of IRPC's share capital.</li> <li>On 20 February 2018, the Board of Directors Meeting of PTT approved the establishment of PTT Treasury Center Company Limited (PTT TCC), a wholly owned subsidiary of PTT with a registered capital of Baht 20 million in order to conduct the business in the area of International Headquarters (IHQ) and Treasury Center (TC) for the purpose of financial and treasury management of PTT Group.</li> </ul>

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<p>March 2018</p>	<ul style="list-style-type: none"> <li>On 21 March 2018, GC Estate Company Limited, PTTGC's wholly owned subsidiaries, signed Land's Sales and Purchase Agreement with PTT with the total value approximately Baht 7,200 million. On 30 March 2018, the consortium consists of PTTEP HK Offshore Limited (Malaysian Branch) or PTTEP HKO (the Operator), a wholly-owned subsidiary of PTTEP, and PETRONAS Carigali Sdn. Bhd. (PCSB) with participating interests of 80% and 20% respectively, signed Production Sharing Contracts with Petroleum Nasional Berhad (PETRONAS) for exploration and production rights of 2 blocks located in Malaysia.</li> </ul>
<p>April 2018</p>	<ul style="list-style-type: none"> <li>On 12 April 2018, the Annual General Meeting of Shareholders of PTT has passed the resolution as follows; <ul style="list-style-type: none"> <li>The change in the par value of PTT from 10 Baht per share to 1 Baht per share and the amendment to clause 4 of PTT's Memorandum of Association to reflect such change in the par value. The new par value in Stock Exchange of Thailand was effective on 24 April 2018.</li> <li>Approved dividend payment for year 2017 at Baht 20.00 per share, approximately Baht 57,108 million or 42.8% of 2017 consolidated net income. On September 15, 2017, PTT paid an interim dividend for the operating results of the first half of 2017 at Baht 8.00 per share. The remaining dividend for the second half of 2017 was at 12.00 Baht per share which paid on April 27, 2018.</li> </ul> </li> <li>On 25 April 2018, the Board of Directors Meeting of PTT passed a resolution to establish a new company to carry out the "Cafe Amazon" coffee business in Singapore. This is the stepping stone for Cafe Amazon to be as a Global brand. The new company in Singapore has established in September 2018, with registered capital not more than 6.5 million Singapore dollar, consisting of ordinary share at 1 Singapore dollar per share, with shareholding 100% by PTT Oil and Retail Business Public Company Limited (PTTOR).</li> </ul>
<p>May 2018</p>	<ul style="list-style-type: none"> <li>Sapthip Company Limited ("SAPTHIP") (50% owned by Thai Oil Ethanol Company Limited ("TET") established Sapthip Green Energy Company Limited to conduct power plant business from biogas with an initial registered share capital of Baht 1 million and 100% owned by SAPTHIP.</li> <li>Nava Nakorn Electricity Generating Company Limited (Subsidiary of Global Power Synergy Public Company Limited ("GPSC")) will invest in an expansion for an addition of 60 megawatts of electricity generation capacity and 10 tons per hour of steam generation capacity, with the project cost of approximately Baht 3,105 million. The commercial operation will commence in the third quarter of 2020. After the operation, Nava Nakorn Electricity Generating Company Limited will have the total electricity</li> </ul>

	<p>generation capacity of approximately 185 megawatts and the net steam generation capacity of approximately 40 tons per hour.</p>
<p>June 2018</p>	<ul style="list-style-type: none"> <li>On June 18, 2018, the Board of Directors Meeting of PTTGC has approved to establish Kuraray GC Advanced Materials Co., Ltd as a joint venture company. The purpose of the joint venture company is to invest in production of High-Heat Resistant Polyamide-9T (PA9T) 13,000 tons/year and Hydrogenated Styrenic Block Co-Polymer (HSBC) 16,000 tons/year. PTTGC will hold 33.4% share while Kuraray Co., Ltd (KRR) and Sumitomo Corporation (SC) will indirectly hold share Affiliate Companies by 53.3% and 13.3%, respectively. The initial register capital was Baht 10 million.</li> <li>On June 21, 2018, PTTEP has completed the acquisition of the 22.22% stake in the Bongkot Project from Shell Integrated Gas Thailand Pte. Limited (Shell) and Thai Energy Company Limited ( a wholly-owned subsidiary of Shell), with the transaction value before tax of approximately USD 750 million. As a result, PTTEP's stake in the Bongkot Project has effectively increased from 44.4445% to 66.6667% with incremental petroleum sales volume of approximately 35,000 barrels of oil equivalent per day.</li> <li>On June 29, 2018, the Board of Directors Meeting of Thai Oil Public Company Limited (TOP) has approved on the investment in the Clean Fuel Project (CFP) for enhancing the competitiveness of the company by improving its production efficiency, adding value to the products that is environmental friendly, and to increase its oil refining capacity from 275,000 to 400,000 barrel per day to allow the refineries to handle more types and greater quantities of crude oils, with the investment value of approximately USD 4,825 million or approximately THB 160,279 million. The construction time for this project is approximately 5 years.</li> </ul>
<p>July 2018</p>	<ul style="list-style-type: none"> <li>On 18 June 2018, PTT and PTTOR had successfully executed the Business Transfer Agreement and PTT had commenced the process of transferring various assets and liabilities, and shares of related companies to PTTOR since 1 July 2018.</li> <li>On 15 July 2018, PTTEP Australasia (Ashmore Cartier) Pty Ltd, a subsidiary of PTTEP, signed a Sale and Purchase Agreement (SPA) to sell a 100% stake in the Montara field and its related assets in the Commonwealth of Australia, to Jadestone Energy (Eagle) Pty Ltd with the asset purchase price of USD 195 million with completion in September 2018.</li> <li>On 23 July 2018, the Board of Directors Meeting of PTTGC has approved to divest all of the remaining shares in Alliance Petrochemical Investment (Singapore) Pte. Ltd. which PTTGC owns 15.34% stake with the total value from the sale of shares equal to Baht 663 million</li> </ul>



<p>August 2018</p>	<ul style="list-style-type: none"> <li>On 3 August 2018, PTTOR CHINA has been registered to establish to carry out lubricants business in China with a registered capital of not more than Baht 80 million (around 2.26 Million USD), where PTTOR will hold 100% of PTTOR CHINA shares.</li> <li>On 8 August 2018, PTTGC together with an affiliated company signed SPA to acquired 74% shares of Siam Mitsui PTA Company Limited (SMPC), a Purified Terephthalic Acid (PTA) producer, and 74% shares of Thai PET Resin Company Limited ("TPRC"), a Polyethylene Terephthalate (PET) resin producer, from SCG Chemicals Co., Ltd. and Mitsui Chemicals, Inc. total investment around \$125 million or equivalent to approximately 4,148 million baht, which the transfer of shares had completed in late 2018. The investment was to expand the downstream investment and increase market potential in polymer business.</li> </ul>
<p>October 2018</p>	<ul style="list-style-type: none"> <li>On 28 September 2018, the Board of Directors of PTT has approved a resolution for the payment of interim dividend for the first half of 2018 (1H/2018) performance to PTT's shareholders at the rate of Baht 0.80 per share, totaling approximately Baht 22,850 million, or 32.9 % of the 1H/2018 consolidated net income. The payment of the dividend was on October 26, 2018.</li> <li>On 16 October 2018, the Board of Directors of IRPC had approved the Company to invest in Guangzhao Saiju Performance Polymer Ltd. (GZSJ) in China. The investment will be the subscription of capital increased shares equivalent to 15% of total registered capital, in an amount of RMB 135 million (approximately THB 650 million). Currently, GZSJ is the major operator of plastic product e-commerce business in China. And, the Board approved IRPC to incorporate the private company under the laws of Thailand with the registered capital amounting to THB 120 million, by which the Company and GZSJ will hold the shares equivalent to 55% and 45% of total shares, respectively, to develop the e-commerce platform focusing in plastic products in Thailand.</li> <li>On 30 October 2018, PTTGC has signed the Share Sale and Subscription Agreement to acquire 49% shares of Revolve Group Limited (RGL) from an original shareholder and by subscription of newly issues shares from RGL. The total investment was 6.4 million pound sterling or equivalent to approximately 281 million baht. RGL is a major producer of Rotomolding Compound with a significant market share in Europe and Oceania, which the major feedstock used is LLDPE plastic resin.</li> </ul>
<p>November 2018</p>	<ul style="list-style-type: none"> <li>On 16 November 2018, the Board of Directors of PTT approved an establishment of a new joint venture company between PTT, PTT's affiliate and Bangkok Industrial Gas Company Limited ("BIG") under the name of Map Ta Phut Air Products Company Limited ("MAP"). PTT and PTT's affiliate aggregately will hold 51% in MAP shares, and BIG will hold 49% in MAP's shares. MAP will engage in the business of the production</li> </ul>

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	<p>and distribution of industrial gas by applying technology of air separation processing utilizing waste cold energy from liquified natural gas (“LNG”) with the total investment approximately THB 1,500 million. The establishment was completed in early of 2019.</p>
<p>December 2018</p>	<ul style="list-style-type: none"> <li>● On 7 December 2018, GPSC has entered into share purchase agreement to acquire directly and indirectly, through subsidiaries company, in N.P.S. Stargroup Co., Ltd., World X Change Asia Co., Ltd., and P.P. Solar Co., Ltd., a solar power producer in Thailand and have the total power generation capacity of 39.5 Megawatts, includes TerraForm Global Operating Co., Ltd., that provide operation and maintenance service for solar power plants. The total value of the transaction is approximately Baht 3,070 million to be solar power producer in Thailand.</li> <li>● On 13 December 2018, PTTEP Energy Development Company Limited, a subsidiary of PTTEP, has been awarded the rights of petroleum exploration and production and as the operator for Exploration Block No. G1/61 (Erawan field) and G2/61 (Bongkot field) with holding interest of 60% and 100% respectively. The Production Sharing Contracts (PSC) are expected to be signed within the first quarter of 2019.</li> <li>● On December 21, 2018 Board of Directors Meeting of PTT has approved the five-year (Year 2019-2023) investment plan of PTT and wholly owned subsidiaries in an aggregate amount of Baht 167,114 million. The major investments will be in gas business group and JV and wholly owned subsidiaries such as natural gas transmission pipeline system, expanding import capacity of LNG receiving terminal as well as expanding oil and non-oil business in Thailand and international. In addition, PTT has prepared provisional investment budget amounting to Baht 187,616 million, mainly to expand its core business i.e. LNG Value Chain and to invest in new s-curve businesses which in the process of undergoing feasibility studies.</li> <li>● On 26 December 2018, the Office of the Energy Regulatory Commission (ERC) approved the proposed merger of GPSC and GLOW. The approval of the ERC was granted subject to a condition precedent that GLOW must sell Glow SPP 1 Co., Ltd. (“SPP1”) after GPSC has appealed the order disapproving such application on 12 November 2018 and that the sale of SPP1 should be completed by during the first quarter of 2019.</li> </ul>
<p>January 2019</p>	<ul style="list-style-type: none"> <li>● On 3 January 2019, PTTEP has temporarily shutdown of the Bongkot’s operation around 4-7 days due to the Tropical Storm “PABUK” entering the Gulf of Thailand. According to aforementioned situation, average sales volume during the period is estimated to reduce by 96,700 barrels of oil equivalent per day or accounted less than 1% of the average sales volume per day in 2019.</li> </ul>

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- PTTEP MENA Limited, a wholly-owned subsidiary of PTTEP, and Eni Abu Dhabi B.V., a wholly owned subsidiary of Eni, Italian multinational oil and gas company, have been selected as the successful bidders of two offshore blocks named Offshore 1 and 2 which are located in the north-west of Abu Dhabi, United Arab Emirates for exploration and production rights. The consortium has signed Concession Agreement with the Abu Dhabi National Oil Company (ADNOC) on 12 January 2019, with the participation interest for PTTEP MENA Limited at 30% and Eni Abu Dhabi B.V. (the Operator) at 70%.
- TOP has planned the maintenance schedule for 2019 to have the shutdown schedule of Crude Distillation Unit 3 (CDU-3) and some major production units for major turnaround and tie-in new units of the CFP as planned since Mid-June to Mid-July 2019 for approximately 30 days. In the same period, Continuous Catalyst Regeneration Platformer Unit 1 (CCR-1) and Hydrocracking Unit 2 (HCU-2) will be shutdown for approximately 30 days and 36 days respectively. For Aromatics production units, Thai Paraxylene Company Limited (TPX) will be shutdown since Mid-June to end of July 2019 for approximately 45 days
- In January 2019, TOP has entered agreements with GPSC's wholly-owned subsidiary to transfer ownership in the Energy Recovery Unit (ERU) with the designed generating capacity of 250 megawatts and steam, to supply the production process of the CFP Project, utilizing by-products of the CFP Project as the main source of fuel, instead of owned investment. The total value is not exceeding USD 757 million (approximately THB 24,113 million), expecting that the construction of the ERU Project will be completed in the third quarter of 2023. The transaction will be proposed to the 2019 Annual General Meeting of Shareholders of TOP and GPSC for consideration and approval.

## Overall performance of PTT and its subsidiaries



Financial performance of 4Q2018 compared with 4Q2017 and 3Q2018 as well as Y2018 compared with Y2017 are summarized as follows:

Unit : Million Baht	4Q2017	3Q2018	4Q2018	% Inc. (Dec.)		2017	2018	% Inc. (Dec.)
				YoY	QoQ			
<b>Sales revenue</b>	<b>531,959</b>	<b>606,979</b>	<b>617,417</b>	<b>16.1%</b>	<b>1.7%</b>	<b>1,995,722</b>	<b>2,336,155</b>	<b>17.1%</b>
: Exploration & Production	40,325	45,087	47,263	17.2%	4.8%	147,725	171,809	16.3%
: Gas	111,915	127,787	131,584	17.6%	3.0%	443,740	489,549	10.3%
: Coal	6,074	5,342	4,867	(19.9%)	(8.9%)	19,575	20,527	4.9%
: Oil	141,111	146,083	151,599	7.4%	3.8%	547,296	601,064	9.8%
: International trading	266,963	335,458	331,492	24.2%	(1.2%)	935,616	1,239,121	32.4%
: Petrochemical & Refining	260,155	297,355	285,132	9.6%	(4.1%)	950,727	1,132,080	19.1%
: Others 1/	6,533	8,774	7,624	16.7%	(13.1%)	26,134	32,244	23.4%
<b>EBITDA</b>	<b>94,213</b>	<b>96,138</b>	<b>64,443</b>	<b>(31.6%)</b>	<b>(33.0%)</b>	<b>345,395</b>	<b>351,397</b>	<b>1.7%</b>
: Exploration & Production	27,428	33,039	34,653	26.3%	4.9%	105,468	126,843	20.3%
: Gas	23,028	24,831	21,373	(7.2%)	(13.9%)	83,792	94,084	12.3%
: Coal	1,839	1,878	2,221	20.8%	18.3%	6,114	7,445	21.8%
: Oil	4,513	4,103	907	(79.9%)	(77.9%)	19,598	15,271	(22.1%)
: International trading								
- Excluding effect of FX and derivatives	163	513	(975)	<(100%)	<(100%)	527	2,702	>100%
- Including effect of FX and derivatives	1,896	1,003	1,409	(25.7%)	40.5%	5,387	5,929	10.1%
: Petrochemical & Refining	35,695	30,593	3,837	(89.3%)	(87.5%)	123,835	97,821	(21.0%)
: Others	385	1,502	770	>100%	(48.7%)	4,538	5,653	24.5%
<b>Depreciation and amortization expenses</b>	<b>29,405</b>	<b>32,055</b>	<b>32,621</b>	<b>10.9%</b>	<b>1.8%</b>	<b>116,289</b>	<b>123,556</b>	<b>6.2%</b>
<b>Operating Income</b>	<b>64,808</b>	<b>64,082</b>	<b>31,762</b>	<b>(51.0%)</b>	<b>(50.4%)</b>	<b>229,106</b>	<b>227,840</b>	<b>(0.6%)</b>
: Exploration & Production	13,294	16,672	18,419	38.6%	10.5%	49,699	66,701	34.2%
: Gas	18,736	20,279	16,623	(11.3%)	(18.0%)	67,451	76,088	12.8%
: Coal	1,425	1,350	1,734	21.7%	28.4%	4,224	5,516	30.6%
: Oil	3,763	3,256	(102)	<(100%)	<(100%)	15,454	10,955	(29.1%)
: International trading								
- Excluding effect of FX and derivatives	153	505	(1,063)	<(100%)	<(100%)	494	2,591	>100%
- Including effect of FX and derivatives	1,886	995	1,321	(30.0%)	32.8%	5,354	5,818	8.7%
: Petrochemical & Refining	26,867	21,881	(5,184)	<(100%)	<(100%)	89,316	62,922	(29.6%)
: Others	(591)	459	(322)	(45.5%)	<(100%)	946	1,489	57.4%
<b>Share of net income from investments in joint ventures and associates</b>	<b>2,101</b>	<b>2,499</b>	<b>1,726</b>	<b>(17.8%)</b>	<b>(30.9%)</b>	<b>7,310</b>	<b>8,515</b>	<b>16.5%</b>
Loss on impairment of assets	6,390	-	17	(99.7%)	100.0%	24,848	17	(99.9%)
Gain on foreign exchange	2,948	2,452	1,626	(44.8%)	(33.7%)	13,650	6,354	(53.5%)
<b>EBIT</b>	<b>65,928</b>	<b>69,423</b>	<b>39,144</b>	<b>(40.6%)</b>	<b>(43.6%)</b>	<b>242,014</b>	<b>246,684</b>	<b>1.9%</b>
Finance costs	6,697	6,820	7,182	7.2%	5.3%	29,086	27,628	(5.0%)
Income taxes	8,615	17,495	9,551	10.9%	(45.4%)	28,306	53,647	89.5%
<b>Net income</b>	<b>35,364</b>	<b>30,329</b>	<b>19,538</b>	<b>(44.8%)</b>	<b>(35.6%)</b>	<b>135,180</b>	<b>119,684</b>	<b>(11.5%)</b>
<b>Earnings per share (Baht/share)</b>	<b>1.22</b>	<b>1.05</b>	<b>0.67</b>	<b>(45.1%)</b>	<b>(36.2%)</b>	<b>4.67</b>	<b>4.15</b>	<b>(11.1%)</b>

<sup>1/</sup> Including Technology and Engineering

Business

Executive Summary

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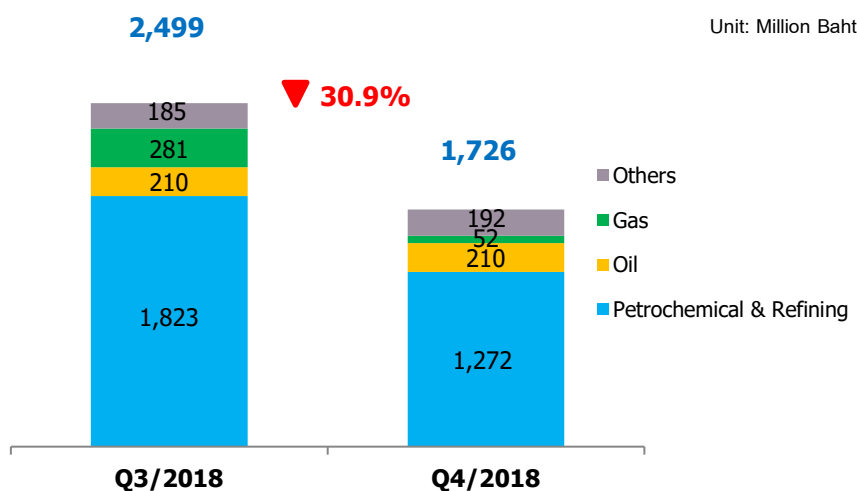
Major Project Plan

### Fourth quarter of 2018 compared with Third quarter of 2018

In 4Q18, sales revenue of PTT and its subsidiaries was Baht 617,417 million, increasing by Baht 10,438 million or 1.7% mainly from oil, gas and exploration and production business according to an increase in overall sales volume, while a decrease in average selling prices following the drop in average Dubai crude price from US\$ 74.3 per barrel to US\$ 67.4 per barrel in 4Q2018. Whereas, operating performance in this quarter dropped mainly from net stock loss of the Petrochemical and Refining businesses. Accounting GIM in 4Q2018 versus stock gain in 3Q2018. The sharply drop of crude oil price led to the net stock loss that crude oil prices at the end of 3Q2018 and 4Q2018 were recorded at US\$ 80.0 and 52.9 per barrel, respectively, according to the US granted exemption allowance temporarily buy the Iranian oil in early of November 2018. Moreover, the lower spread of Petrochemical products, both the Olefins and Aromatics, regarding the producers' put off their orders as Chinese yuan depreciation and keep their low level of inventories at the end of year. Likewise, oil business had a drop in gross margin according to higher stock loss in this quarter. In 4Q18, PTT and its subsidiaries had total net stock loss from Petroleum and Petrochemical businesses amounting to Baht 25,000 million. Besides, the gas business group recorded the decrease in its performance following the lower petrochemical prices of PTT's GSP business and the higher gas feed cost. Whereas, the higher of average selling prices as well as sales volume, the performance of exploration and production business rose during this quarter following the rise in both average selling prices and sales volume. Therefore, PTT and its subsidiaries recorded the earnings before interest, taxes, depreciation and amortization (EBITDA) of Baht 64,443 million, 33% decrease of by Baht 31,695 million.

The depreciation and amortization (DDA) expenses was Baht 32,621 million up by Baht 566 million or 1.8% from 3Q2018 of Baht 32,055 million. The increase in DDA was mainly from the higher depreciation of ready for use assets in petrochemical and refining business group as well as in gas business group.

Share of net income from investments in joint ventures and associates



In 4Q2018, the share of net income from investments in joint ventures and associates was Baht 1,726 million, decreasing by Baht 773 million 3Q2018 of Baht 2,499 million. It was primarily from lower performance of joint ventures in petrochemical and refining business group mainly the PTT Asahi Chemical Company Limited (PTTAC) (a joint venture of PTTGC) following the lower of AN and MMA product prices from the the previous quarter.

In addition, there was an increase of Baht 2,932 million in gain on derivatives mainly resulted from commodity hedging contract of PTT International Trading Pte. Ltd. (PTTT) and PTTEP.

In 4Q2018, PTT and its subsidiaries recorded non-recurring items, the gain on business acquisition of PTTGC amounting by Baht 1,355 million versus loss on Montara field divestment of PTTEP amounting to Baht 1,886 million versus Baht 1,208 million in 3Q2018) as well as the derecognition of deferred tax assets of Montara asset of Baht 1,754 million. These transactions be recognized Baht 950 million as profit attributable to owner of the parent.

Corporate income taxes in 4Q2018 decreased 45.4% or Baht 7,944 million from Baht 17,495 million in 3Q2018 to Baht 9,551 million in 4Q2018. This resulted mainly from net tax expense related to transferring of the oil business in 3Q2018 amounting to Baht 6,033 million and lower performance of PTT's affiliates in petrochemical and refining business. Although, tax expense of PTTEP increased following its better operating performance.

Therefore, PTT and its subsidiaries reported net income of Baht 19,538 million, 35.6% declined or by Baht 10,791 million from 3Q2018 of Baht 30,329 million.

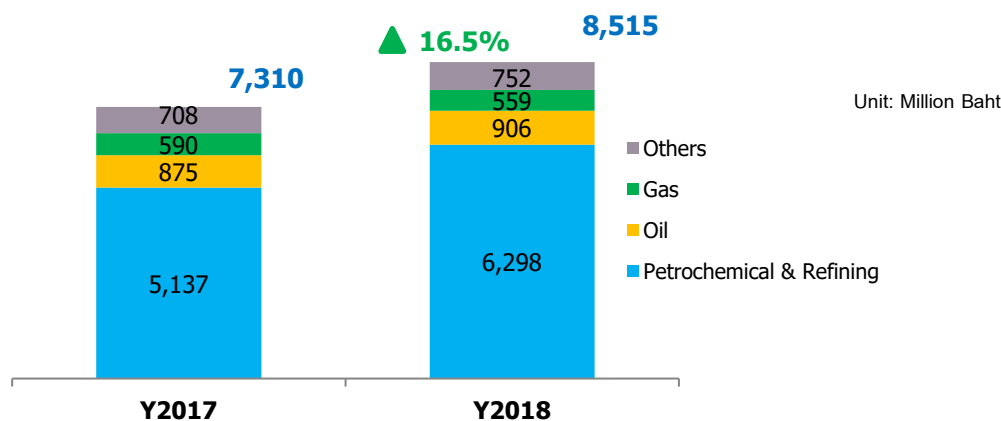
### Year 2018 compared with Year 2017

PTT and its subsidiaries recorded 2018 sales revenue of Baht 2,336,155 million, 17.1% increased or by Baht 340,433 million in all business groups compared with last year. It resulted in the increase in average product selling prices of most petroleum and petrochemical products following the rise of Dubai crude oil price. The average Dubai price increased 30.53% from US\$ 53.2 per barrel to US\$ 69.4 per barrel. PTT and its subsidiaries had EBITDA of Baht 351,396 million in 2018, an increase of Baht 6,001 million or 1.7% mainly from exploration and production business following higher average selling prices and sales volume. Moreover, better performance of gas business group in almost all business areas except NGV, especially GSP, Natural Gas Sales and Marketing (S&M) according to Small Power Producer (SPP) customers together with higher selling prices following crude oil price and Transmission Pipeline (TM) from power producer customers., Moreover, PTT's Gas affiliates also reported better performance, the PTT LNG from its revenue recognition of LNG Terminal 1 Phase 2 in 2018 and the PTTNGD according to higher average gas selling prices Whereas, overall performance of petrochemical and refining business decreased mainly from net stock loss in the accounting GIM following the sharp fall of crude oil

prices in 4Q18 versus stock gain in 2017. The olefins and aromatics petrochemical business performance was down from the lower petrochemical spreads during the period around the net of 2018 over the concern of the slowdown in world economy from the impact of unresolved United States and China trade war, products demand decreased on the back of fluctuations in raw material prices as well as inventories reduction during year end, despite the increasing in production and sales volume. The higher utilization rate in 2018 versus 2017 led to the volume increase; PTTGC' startup of LLDPE#2 in 2018 versus maintenance shutdown of both aromatics and olefins plants in 2017, IRPC major turnaround in 2017. Likewise, performance of oil business with regard to stock loss in 2018 versus 2017 stock gain.

PTT and its subsidiaries recorded depreciation and amortization expenses of Baht 123,495 million, an increase of Baht 7,206 million or 6.2% from Baht 116,289 million in 2017 according PTTEP's acquisition of participating interest in Bongkot gas field and IRPC project completion

Share of net income from investments in joint ventures and associates



In 2018, share of net income from investments in joint ventures and associates was Baht 8,515 million, increasing by Baht 1,205 million or 16.5% from Baht 7,310 million in 2017 mainly from the performance of PTTAC and NatureWorks LLC which are joint venture of PTTGC following the rise in average product selling prices.

In 2018, PTT and its affiliates had loss on derivatives of Baht 2,369 million, increasing by Baht 3,062 million from gain of Baht 693 million in 2017, mainly due to financial derivative contracts of PTT and TOP.

There was gain on foreign exchange, decreasing by Baht 7,296 million from Baht 13,650 million in 2017 to Baht 6,354 million in 2018. This resulted mainly from the decrease in unrealized gain on foreign exchange rate from foreign currency loans of PTT, TOP and PTTGC together with realized and unrealized gain on foreign exchange rate from account receivables of PTTEP due to an appreciation of Thai Baht against USD in 2018 lower than 2017.

In 2018, there was non-recurring item mainly are the loss on Montara field divestment of PTTEP amounting by Baht 1,886 million, inventory loss of GGC Baht 2,004 million and gain on business acquisition of PTTGC by Baht 1,355 million. The non-recurring items in 2017 are PTTEP recognized impairment loss on assets of the Mariana Oil Sand Project amounting to Baht 18,505 million, impairment loss on coal mining asset of PTTGM amounting to by Baht 4,229 million and impairment loss on petrochemical business of PTTGC amounting by Baht 2,296 million versus dividends income from investment in EPIF mutual fund of Baht 4,310 million and gain on selling investment in SPRC and mutual fund of PTT of Baht 2,780 million. (These transactions be recognized under PTT's stakeholding in net expense approximately Baht 2,300 million in 2018 and Baht 9,000 million in 2017.)

Finance cost decreased by Baht 1,458 million or 5.0% from Baht 29,086 million in 2017 to Baht 27,628 million in 2018 mainly from lower average long-term loan compared with 2017 following repayment of long-term loans and redemption of debentures during 2018.

Corporate income taxes increased by Baht 25,341 million or 89.5% from Baht 28,306 million in 2017 to Baht 53,647 million in 2018 mainly from PTT's income tax expenses related to restructuring of the oil business in 2018 amounting to Baht 6,033 million and the full redemption of BOI tax privilege since the fourth quarter of 2017 (4Q2017) of GSP business unit, including PTTEP's tax expenses from an increase in petroleum profit from an increase in sales revenues.

Therefore, PTT and its subsidiaries reported net income of Baht 119,684 million in 2018, a decrease of 11.5% or by Baht 15,496 million from 2017 of Baht 135,180 million.

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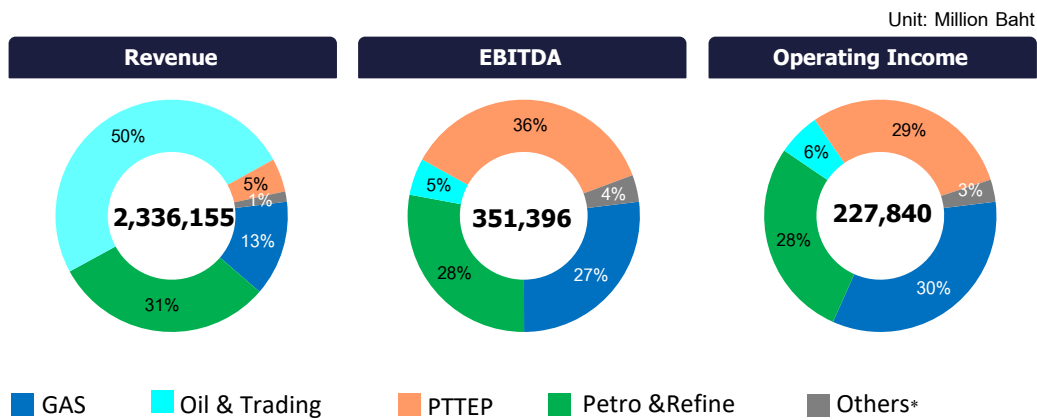
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## Segmentation performance of PTT and its subsidiaries

The details of revenue, EBITDA and operating income by segmentation of 2018 are as follows;



\* Including coal and others.

### 1. Upstream Petroleum and Gas Business Group

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

	4Q2017	3Q2018	4Q2018	%Inc. (Dec.)		2017	2018	%Inc (Dec.)
				YoY	QoQ			
Average selling price (US\$/BOE)	41.7	47.7	47.8	14.6%	0.2%	39.2	46.7	19.1%
Average sales volume (BOED)	313,054	304,940	320,905	2.5%	5.2%	299,206	305,522	2.1%

#### Fourth quarter of 2018 compared with Third quarter of 2018

In 4Q2018, sales revenue of PTTEP was Baht 47,263 million, increasing by Baht 2,176 million or 4.8% mainly from the increase in average sales volume by 5.2% from 304,940 barrel of oil equivalent per day (BOED) in 3Q2018 to 320,905 BOED in 4Q2018 primarily from higher nomination from buyers of the Bongkot and Sinphuhorm Projects and the increase in average selling prices by 0.2% from US\$ 47.7 per barrel of oil equivalent (BOE) in 3Q2018 to US\$ 47.8 per BOE in 4Q2018 according to the increase in gas price.

EBITDA in 4Q2018 was Baht 34,653 million, increasing by Baht 1,614 million or 4.9% mainly from the increase in gross profit by Baht 2,784 million from the higher sales revenue despite the increase in selling and administrative expenses. Furthermore, because of the decrease in depreciation and amortization expense by Baht 133 million, operating income in 4Q2018 was Baht 18,419 million, increasing by Baht 1,747 million or 10.5%.

Nonetheless, overall performance dropped by higher tax expenses owing to Thai Baht depreciation against US Dollar in 4Q2018. As well as, the derecognition of deferred tax assets of PTTEP Australasia by Baht 1,754 million and loss on the Montara field divestment of Baht 678 million.

## Year 2018 compared with Year 2017

In 2018, PTTEP reported its sales revenue of Baht 171,809 million in PTT and its subsidiaries' financial statements, increasing by Baht 24,084 million or 16.3% from 2017. This resulted mainly from 19.1% increase in average selling prices from US\$ 39.2 per BOE in 2017 to US\$ 46.7 per BOE in 2018 and 2.1% increase in average sales volume from 299,206 BOED in 2017 to 305,522 BOED in 2018 according to an additional participating interests of 22.22% in Bongkot Project since June 2018 as well as the higher nomination from buyers of the Contract 4 Project.

EBITDA in 2018 was recorded by Baht 126,843 million, increasing by Baht 21,375 million or 20.3%. The increase in EBITDA was mainly from the increase in gross profit by Baht 24,376 million from the higher sales revenue despite the increase in petroleum royalties and remuneration by Baht 2,733 million following the increase in domestic sales revenue. Whereas, there were higher depreciation and amortization expenses by Baht 4,373 million from the additional participating interests of the Bongkot Project as well as an increase in development wells and wellhead platforms in the Contract 4 and S1 Projects. As a result, 2018 operating income was reported by Baht 66,701 million, increasing by Baht 17,002 million or 34.2%.

In 2018, overall performance increased following the increase in operating profit. Though there were an increase in income tax expense regarding the less appreciation of Thai Baht against US Dollar in 2018 than in 2017 as well as the impairment loss on assets of the Mariana Oil Sand Project amounting to Baht 18,505 million recorded in 2017. Whereas, there were loss on the Montara field divestment of Baht 1,886 million and the derecognition of deferred tax assets of PTTEP Australasia by Baht 1,761 million in 2018.

### Gas Business Group

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

Unit : Ton	4Q2017	3Q2018	4Q2018	% Inc.(Dec.)		2017	2018	%Inc (Dec.)
				YoY	QoQ			
LPG	739,842	900,314	838,498	13.3%	(6.9%)	2,919,062	3,203,338	9.7%
Ethane	613,494	597,005	595,823	(2.9%)	(0.2%)	2,333,234	2,389,118	2.4%
Propane	253,359	177,574	236,549	(6.6%)	33.2%	826,526	907,028	9.7%
NGL <sup>1/</sup>	198,974	167,112	171,968	(13.6%)	2.9%	732,192	692,853	(5.4%)
<b>Total</b>	<b>1,805,669</b>	<b>1,842,005</b>	<b>1,842,838</b>	<b>2.1%</b>	<b>0.05%</b>	<b>6,811,014</b>	<b>7,192,337</b>	<b>5.6%</b>

<sup>1/</sup>include Pentane

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

Unit : US\$ per Ton	4Q2017	3Q2018	4Q2018	% Inc.(Dec.)		2017	2018	%Inc (Dec.)
				YoY	QoQ			
LPG <sup>1,4/</sup>	578	589	531	(8.1%)	(9.8%)	485	539	11.1%
Ethylene <sup>2/</sup>	1,195	1,217	883	(26.1%)	(27.4%)	1,092	1,149	5.2%
Propylene <sup>2/</sup>	828	1,027	936	13.0%	(8.9%)	823	990	20.3%
HDPE <sup>2/</sup>	1,226	1,350	1,207	(1.5%)	(10.6%)	1,168	1,335	14.3%
PP <sup>2/</sup>	1,196	1,288	1,215	1.6%	(5.7%)	1,155	1,273	10.2%
Naphtha <sup>3/</sup>	519	608	583	12.3%	(4.1%)	449	576	28.3%

**Note:**

- <sup>1/</sup> Contract Price (CP) 50:50
- <sup>2/</sup> South East Asia - Spot Price
- <sup>3/</sup> MOP Singapore (MOP'S)
- <sup>4/</sup> NEPC acknowledged the progress of LPG liberalization based on the approval of CEPA on 2 December 2016 for government LPG liberalization roadmap that have 2 phases. Phase 1: Before complete the liberalization (Year 2017), liberalized only the LPG imports segment, while Refinery and Gas Separation Plant prices were still regulated through oil fund. Phase 2: LPG fully liberalization effective on 1 August 2017 with no selling price setting of LPG ex refinery and EPPO will only announce the reference price to regulate domestic LPG retail price. However, EPPO will have mechanism to monitor if LPG import price have material deviation from LPG ex GSP and will suggest CEPA to consider the case on a monthly basis.

#### Fourth quarter of 2018 compared with Third quarter of 2018

In 4Q2018, gas business reported its sales revenue of Baht 131,584 million, increasing by Baht 3,797 million or 3.0% from 3Q2018. This resulted mainly from an increase in sales revenue of PTT's GSM and NGR business units according to the higher average selling prices in 4Q2018 as well as an increase in the average natural gas sales volume (calculated at heating value of 1,000 BTU per cubic foot) by 37 standard cubic feet per day (MMSCFD) from 4,668 MMSCFD in 3Q2018 to 4,705 MMSCFD in 4Q2018 or 0.8% mainly from power producer customers.

The sales volume of PTT's gas separation plant (GSP) business unit decreased as a result of declining average selling prices following reference petrochemical prices as well as the increasing gas feed cost. Whereas, overall GSP's sales volume (including NGL derived from Dew Point Control units) slightly increased from 1,842,005 tons in 3Q2018 to 1,842,839 tons in 4Q2018.

In 4Q2018, EBITDA was reported by Baht 21,373 million, decreasing by Baht 3,458 million or 13.9%. The operating income was Baht 16,623 million, decreasing by Baht 3,656 million or 18.0% primarily from lower gross margin of GSP business unit following the decline in average selling prices and higher gas cost. The decline in selling prices following the crude price were pressured on the performance of PTT's GSM and NGR business units. Though, TM had better EBITDA due to the lower of selling and administrative expenses. NGV's EBITDA had lower loss performance from the lower adjusted gas price expenses following higher adjusted heating value.

## Year 2018 compared with Year 2017

In 2018, Gas business reported sales revenue of Baht 489,549 million, increasing by Baht 45,809 million or 10.3%. It is resulted mainly from the higher sales revenue of PTT's GSM and NGR business unit according to an increase in average selling prices following higher gas price despite a slight decrease in average natural gas sales volume (calculated at heating value of 1,000 BTU per cubic foot) from 4,716 MMSCFD in 2017 to 4,710 MMSCFD in 2018. The power producer customer volume in 2018 are closed to the 2017 versus NGV volume decreased

In addition, sales revenue of PTT's GSP business unit increased due to overall sales volume increased from 6,811,014 tons in 2017 to 7,192,337 tons in 2018 or 5.6%. This resulted primarily from an increase in LPG product volume sold to PTTOR and an increase in Propane product volume according to PTTGC and HMC Polymer Company Limited (HMC)' maintenance shutdown in 2017 as well as the lower shutdown day of PTT's GSP in 2018 when compared to 2017 together with the higher average selling prices according to the rise in the global referenced petrochemical prices.

EBITDA and operating income of gas business group in 2018 was reported by Baht 94,084 million and Baht 76,088 million, increasing by Baht 10,292 million and Baht 8,637 million respectively. Its better performance was mainly from PTT's GSP, GSM, NGR and TM as well as PTT's gas subsidiaries, the startup in PTTLNG revenue recognition of LNG terminal 1 Phase 2 with the capacity of 5 million ton per annum since March 2018 and the higher average selling prices of PTTNGD.

NGV reported loss increase from the higher natural gas cost despite sales volume decreased. Though the selling prices of taxi and public cars increased from Baht 10.00 per kg to Baht 10.62 per kg since 16 May 2018. And the selling prices to private cars increased from the adjustment of improving gas quality expense, an increase by Baht 0.4553 per kilogram (kg) from Baht 3.4367 per kg to Baht 3.8920 per kg, effective from 16 September 2017.

## Coal Business

	4Q2017	3Q2018	4Q2018	%Inc. (Dec.)		2017	2018	%Inc. (Dec.)
				YoY	QoQ			
Newcastle index price (US\$ per ton)	98.2	117.5	104.4	6.3%	(11.1%)	88.5	107.3	21.2%
Average selling price (US\$ per ton)	74.8	84.2	70.6	(5.6%)	(16.2%)	70.3	77.6	10.4%
Sales volume (million tons)	2.5	1.9	2.1	(16.0%)	10.5%	8.3	8.2	(1.2%)

#### Fourth quarter of 2018 compared with Third quarter of 2018

In 4Q2018, sales revenue of coal business was Baht 4,867 million, decreasing by Baht 475 million or 8.9% compare with 3Q2018 mainly due to the decrease of average selling prices by US\$ 13.6 per ton or 16.2% from US\$ 84.2 per ton to US\$ 70.6 per ton in 4Q2018. The reasons of average selling price decrease were 11.1% decrease of Newcastle reference price from China's import limitations reaching imposed quotas in 4Q2018 versus constant supply. The sales volume increased by 0.2 million tons from 1.9 million tons in 3Q2018 to 2.1 million tons in 4Q2018 or 10.5% following higher seasonal demand during winter season.

EBITDA in 4Q2018 was Baht 2,221 million, increasing by Baht 343 million or 18.3% mainly from the increase in gross profit due to a decline of mining cost following Newcastle and oil price, together with expenses from the winning of past tax lawsuit from Supreme Court Decision. Operating income in 4Q2018 was Baht 1,734 million, increasing by Baht 384 million following EBITDA, including the decrease of depreciation and amortization expense by Baht 41 million.

#### Year 2018 compared with Year 2017

Sales revenue in 2018 was Baht 20,527 million, increasing by Baht 952 million or 4.9% mainly due to the average selling prices which increased by US\$ 7.3 per ton or 10.4% from US\$ 70.3 per ton in 2017 to US\$ 77.6 per ton in 2018 following the increase of Newcastle reference price by 21.2%. Meanwhile, sales volume in 2018 slightly decreased by 0.1 million ton or 1.2% from 8.3 million ton in 2017 to 8.2 million ton in 2018 due to lower demand in the second half of 2018 resulting from the slowdown order due to higher coal price.

EBITDA in 2018 was Baht 7,445 million, increasing by Baht 1,331 million or 21.8% mainly from the increase in gross profit by 1,184 million following higher selling prices, despite higher cost and expenses the past tax lawsuit from Supreme Court Decision. Operating income in 2018 was Baht 5,516 million, increasing by Baht 1,292 million, compared with 2017 following higher EBITDA versus depreciation and amortization expenses increased by Baht 39 million.

## 2. Downstream Petroleum Business Group

### Oil Business Group

Unit : Million Liter	4Q2017	3Q2018	4Q2018	%Inc. (Dec.)		2017	2018	%Inc (Dec.)
				YoY	QoQ			
Average sales volume	6,644	6,301	6,542	(1.5%)	3.8%	26,006	26,351	1.3%

#### Fourth quarter of 2018 compared with Third quarter of 2018

In 4Q2018, sales revenue of oil business was Baht 151,599 million, increasing by Baht 5,516 million or 3.8% mainly from the increase in average sales volume by 241 million liters or 3.8% to 6,542 million liters or equivalent to 447,267 barrels per day in 4Q2018 from most products, particularly diesel and gasoline from stations' expansion and higher demand for diesel and fuel oil in manufacturing season.

EBITDA in 4Q2018 was Baht 907 million, decreasing from 3Q2018 by Baht 3,196 million or 77.9% , and operating income was Baht 102 million losses from gain of Baht 3,256 million in the previous quarter mainly due to significant increase in stock loss from a sharp drop of oil price in 4Q2018 as well as higher advertising expenses and sales promotion, amid higher profit of aviation fuel from its selling price which reference to the product price in the previous month (M-1), higher profit (that exclude stock loss) of diesel.

#### Year 2018 compared with Year 2017

Sales revenue of oil business in 2018 was Baht 601,064 million, increasing by Baht 53,768 million or 9.8% mainly from higher product selling prices following rising global oil price especially in the first 9 months of 2018. Also, sales volume increased by 345 million liters or 1.3% from 26,006 million liters or equivalent to 448,159 barrels per day in 2017 to 26,351 million liters or equivalent to 454,103 barrels per day in 2018 mainly from diesel and gasoline due to stations' expansion and aviation fuel after International Civil Aviation Organization (ICAO) lifted Thailand off significant safety concern list since the beginning of 2018, allowing several airlines to resume their operations.

EBITDA and operating income in 2018 was at Baht 15,271 million and Baht 10,955 million, decreasing by Baht 4,327 million and Baht 4,499 million respectively, mainly from stock loss in 2018 instead of a stock gain in the previous year, as well as higher advertising, sales promotion, and operating expenses which increased following the stations' expansion, amid non-oil performance which improved 7% following an expansion of Café Amazon, and higher profit (that exclude stock loss) of diesel and gasoline.

## International Trading Business Group

Unit : Million Liter	4Q2017	3Q2018	4Q2018	%Inc. (Dec.)		2017	2018	%Inc (Dec.)
				YoY	QoQ			
Average sales volume	19,531	20,980	21,024	7.6%	0.2%	75,638	80,481	6.4%

### Fourth quarter of 2018 compared with Third quarter of 2018

Sales revenue of international trading business in 4Q2018 was Baht 331,492 million, decreasing by Baht 3,966 million or 1.2% from 3Q2018 due to the decrease in product selling prices in accordance with global oil prices while sales volume increased by 44 million liters or 0.2% from 20,980 million liters or equivalent to 1,434,378 barrels per day in 3Q2018 to 21,024 million liters or equivalent to 1,437,391 barrels per day in 4Q2018 due to higher sales volume of diesel in North Asia and EU market (out - out Trading activities).

EBITDA, which adjusted the effect of foreign exchange rate and derivatives, in 4Q2018 was Baht 1,409 million, increasing by Baht 406 million or 40.5% mainly due to the margin of domestic condensate increased. Operating income, which adjusted the effect of foreign exchange rate and derivatives in this quarter, was Baht 1,321 million, increasing by Baht 326 million resulting from EBITDA increased as aforementioned.

### Year 2018 compared with Year 2017

In 2018, sales revenue of international trading business was Baht 1,239,121 million, increasing by Baht 303,505 million or 32.4% which resulted from the rise in product selling prices in accordance with global oil prices especially in the first 9 months of 2018. Moreover, the sales volume in this period increased by 4,843 million liters or 6.4% from 75,638 million liters or equivalent to 1,303,442 barrels per day in 2017 to 80,481 million liters or equivalent to 1,386,912 barrels per day in 2018 mainly due to higher sales volume of imported crude and condensate as IRPC refinery had major planned turnaround in 1Q2017, and higher sales volume of out-out Trading crude and condensate.

EBITDA, which adjusted the effect of foreign exchange rate and derivatives, in 2018 was Baht 5,929 million, increasing by Baht 542 million or 10.1%, mainly due to higher margin of imported crude and condensate together with higher margin of domestic condensate which resulted from the average oil prices in Crude Basket increased. Consequently, operating income which adjusted the effect of foreign exchange rate and derivatives of international trading business in 2018 increased to Baht 5,818 million from Baht 5,354 million in 2017 in line with the rise in EBITDA.

## Petrochemical and Refinery Business Group

Unit : US\$ per barrel	4Q2017	3Q2018	4Q2018	%Inc. (Dec.)		2017	2018	%Inc (Dec.)
				YoY	QoQ			
Market GRM	5.55	4.74	4.47	(19.5%)	(5.7%)	5.74	4.69	(18.3%)
Inventory gain (loss)	3.04	1.06	(6.17)	<(100%)	<(100%)	1.04	(0.28)	<(100%)
Accounting GRM	7.72	5.79	(1.85)	<(100%)	<(100%)	6.40	4.36	(31.9%)
Refinery Utilization rate (%)	104.2%	104.6%	105.3%	1.1%	0.7%	100.0%	104.4%	4.4%

Unit : US\$ per Ton	4Q2017	3Q2018	4Q2018	%Inc. (Dec.)		2017	2018	%Inc (Dec.)
				YoY	QoQ			
<b>Olefins</b>								
Naphtha (MOPJ)	570	667	568	(0.4%)	(14.8%)	496	614	23.8%
HDPE	1,226	1,350	1,207	(1.5%)	(10.6%)	1,168	1,330	13.9%
HDPE - Naphtha	656	683	639	(2.6%)	(6.4%)	672	716	6.5%
LLDPE	1,194	1,170	1,098	(8.0%)	(6.2%)	1,178	1,181	0.3%
LLDPE - Naphtha	624	503	530	(15.1%)	5.4%	682	567	(16.9%)
LDPE	1,273	1,200	1,102	(13.4%)	(8.2%)	1,277	1,207	(5.5%)
LDPE - Naphtha	703	533	534	(24.0%)	0.2%	781	593	(24.1%)
PP	1,196	1,288	1,215	1.6%	(5.7%)	1,155	1,269	9.9%
PP - Naphtha	626	621	647	3.4%	4.2%	659	655	(0.6%)
<b>Aromatics</b>								
Condensate	528	642	579	10%	-10%	467	606	30%
BZ	839	856	694	(17.3%)	(18.9%)	823	821	(0.2%)
BZ - Cond	311	214	115	(63.0%)	(46.3%)	357	215	(39.8%)
PX	886	1,143	1,148	29.6%	0.4%	847	1,057	24.8%
PX - Cond	358	501	569	58.9%	13.6%	380	451	18.7%

## Fourth quarter of 2018 compared with Third quarter of 2018

In 4Q2018, sales revenue of petrochemical and refining business was Baht 285,132 million, decreasing by Baht 12,223 million or 4.1% mainly due to the decrease in sales revenue of refining business that average petroleum product prices of all products dropped following crude oil price compared with the previous quarter. However, refineries' sales volume increased due to higher utilization rates of PTT group which increased to 105.3% in 4Q2018 from 104.6% in 3Q2018 that had planned turnaround of IRPC's Hyvahl and RDCC unit in 3Q2018.

Sales revenue of Olefins decreased from lower in most petrochemical product prices following a declining demand from the concern over the U.S. – China trade war and the U.S. exporting volume to other regions to replace China, despite the increase in sales volume from PTTGC's planned turnaround in previous quarter. Sales revenue of Aromatics also decreased mainly from the drop in BZ prices due to the soften downstream demand of SM and Phenol from planned turnaround of refinery and aromatics plants in Asia, as well as a continuously rising BZ inventories in China. Meanwhile, PX price increased from higher demand of downstream



product such as PTA and Polyester, despite an increase aromatics supply from the start operation of new capacities such as Petro Rabigh plant in Saudi Arabia and Nghi Son plant in Vietnam.

EBITDA of petrochemical and refinery business in 4Q2018 was Baht 3,837 million, decreasing by Baht 26,756 million from 3Q2018, and operating income was losses by Baht 5,184 million, decreasing by Baht 27,065 million, mainly due to

- Refinery performance decreased as Accounting GRM dropped from US\$ 5.79 per bbl to US\$ (1.85) per bbl following the drop in Gross Refining Margin excluding stock gain/(loss) (Market GRM) due to the substantially decreased in gasoline spread from over supply. Moreover, stock gain decreased from US\$ 1.06 per bbl in Q3/2017 to stock loss US\$ 6.17 per bbl following a sharp decrease of crude price in 4Q2018 approximately Baht 16,700 million.
- Olefins petrochemical performance decreased mainly from lower product prices and higher feed cost compared with the previous quarter, despite the slightly increased in sales volume. Aromatics petrochemical performance decreased mainly due to BZ spread over condensate as planned maintenance shutdown of refinery and aromatics plants in Asia during 4Q2018, as well as continuously increase of BZ inventories in China. Also, there were stock loss approximately 3,000 million Baht following a downward trend of crude price in 4Q2018. However, PX prices increased from a favorable demand in downstream.

### Year 2018 compared with Year 2017

In 2018, sales revenue of petrochemical and refining business was Baht 1,132,080 million, increasing by Baht 181,353 million or 19.1% mainly from the rise in average selling price of most petroleum and petrochemical products in both aromatics and olefins following the rise in crude oil prices and the increase in demand of downstream products.

Sales volume of refining business rose following the increasing of refinery utilization rates from 100.0% in 2017 to 104.4% in 2018 together with sales volume and operating rate of petrochemical business both olefins and aromatics increased due to PTTGC's LLDPE II had started its commercial operation in 2018. Whereas, in 2017 PTTGC had efficiency improvement and planned maintenance shutdown of both olefins and aromatics plants, and IRPC had major planned turnaround.

In 2018, EBITDA of petrochemical and refining business was Baht 97,821 million, dropping by Baht 26,014 million, and operating income was Baht 62,922 million, decreasing by Baht 26,394 million, mainly from

- Overall refinery performance decreased following lower Accounting GRM from US\$ 6.40 per bbl in 2017 to US\$ 4.36 per bbl in 2018 as a result of decreasing in Market GRM from higher crude premium

and lower gasoline and fuel oil crack spread over crude oil. In addition, stock gain decreased from US\$ 1.04 per bbl to stock loss US\$ 0.28 per bbl following a significant drop in crude price.

- Overall olefins petrochemical performance decreased from lower product price especially in 4Q2018 and higher feed cost, despite the increased in sales volume mainly from PTTGC that had increasing capacities from LLDPE II. Aromatics petrochemical performance decreased due to lower BZ spread following higher supply especially in China from an unusually high inventory level. However, PX spread rose in 2018 due to improved demand from growing downstream business of Polyester and PTA for PET production to substitute diminishing recycled PET in China.

### Other businesses

Other businesses include Technology and Engineering Business, which mainly come from GPSC.

#### Fourth quarter of 2018 compared with Third quarter of 2018

Sales revenue of GPSC in 4Q2018 was Baht 5,863 million, decreasing by Baht 825 million or 12.3% due to lower sales volume of electricity from major planned maintenance shutdown of Sriracha and IRPC Clean Power Company Limited (IRPC-CP) plants in 4Q2018 while the Ft rate remained unchanged.

EBITDA in 4Q2018 was Baht 985 million, decreasing by Baht 388 million or 28.3% due to lower gross profit following rising natural gas cost and higher selling and administrative expenses.

Overall performance of GPSC in 4Q2018 was soften following lower EBITDA while in the previous quarter, there was a dividend income from Ratchaburi Power Company Limited (RPCL) of Baht 135 million.

#### Year 2018 compared with Year 2017

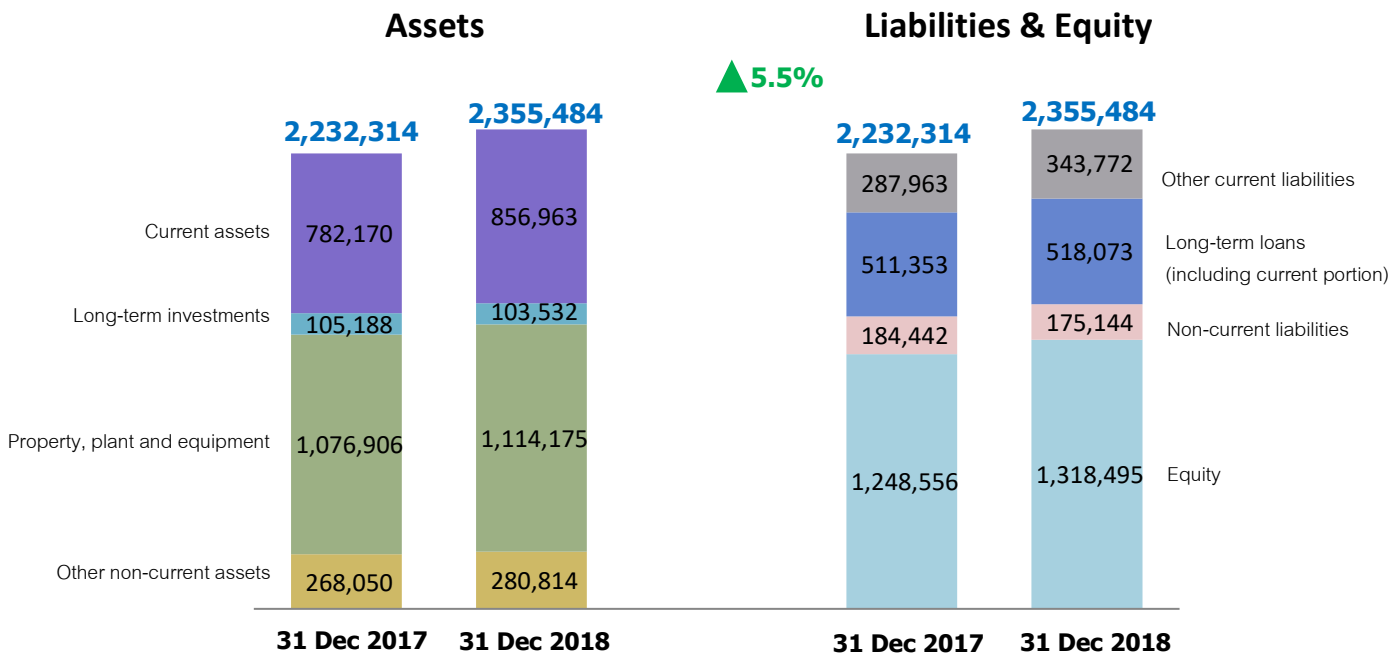
Sales revenue of GPSC in 2018 was Baht 24,880 million, increasing by Baht 4,855 million or 24.2% from higher sales volume as IRPC-CP with the capacity of 240 megawatts started Commercial Operation Date (COD) of two phases and Ichinoseki Solar Power 1 GK (ISP1) with the capacity of 20.8 megawatts started COD since 4Q2017, as well as higher sales volume of Rayong Central Utility from higher demand of industrial users as they expanded production capacities. Additionally, the Ft rate also increased slightly.

EBITDA in 2018 was Baht 5,490 million, increasing by Baht 1,076 million or 24.4% due to higher gross profit despite rising natural gas cost and higher selling and administrative expenses.

Overall performance of GPSC in 2018 improved, following higher EBITDA despite higher depreciation and amortization expenses from full phase operations of IRPC-CP and ISP1, as well as lower dividend income from RPCL when compared to 2017.

The analysis of PTT and its subsidiaries' consolidated financial position  
as of December 31, 2018 compared with December 31, 2017

Unit: Million Baht



Assets

As of December 31, 2018, total assets of PTT and its subsidiaries were Baht 2,355,484 million, increasing by Baht 123,170 million or 5.5% compared with December 31, 2017. The increase was mainly from the net effect of the followings:

- : An increase of Baht 74,793 million or 9.6% in current assets was mainly from the followings:
  - Net increase of Baht 38,765 million in cash and cash equivalents and current investment mainly from the rise in operating cash flow from PTT and affiliates.
  - An increase of Baht 3,408 million in inventory mainly due to the rise in inventory volume from both oil and gas products.
  - An increase of Baht 32,931 million in other current assets mainly from other accounts receivable which from input vat refund from the payment for business acquisition of PTTOR and PTTEP's advance payment of the acquisition of additional stakes in the Bongkot Project.

: A decrease of Baht 1,656 million or 1.6% of long-term investment mainly from the reclassification of available for sales of TOP and PTTGC to current investment.

: An increase of Baht 37,269 million or 3.5% in property, plant and equipment was mainly from the additional construction in progress assets of PTT Group, for instance, PTTGC's projects; Olefins Reconfiguration, Propylene Oxide and Polyols, the 5<sup>th</sup> transmission pipeline project of PTT, TOP's projects; Thaioil Sriracha Building project, New Crude Tanks Construction project, New Jetty 7&8, and Catalyst Cooler project of IRPC. Moreover,

there were the acquisition of additional stakes 22.22% of the Bongkot Project as well as additional investment in exploration and production assets in Zawtika and S1 projects of PTTEP. However, depreciation, amortization and depletion in this period was baht 117,703 million.

: An increase of Baht 12,764 million or 4.8% in other non-current assets was mainly from the increase in deferred tax asset (DTA) of PTTOR due to the transferring oil business unit from PTT. In addition, goodwill increased due to the acquisition of additional stakes of the Bongkot Project.

### Liabilities

As of December 31, 2018, PTT and its subsidiaries had total liabilities of Baht 1,036,989 million, increasing by Baht 53,231 million or 5.4% from December 31, 2017, mainly from the followings:

: An increase of Baht 55,809 million or 19.4% in other current liabilities primarily from higher other accounts payable which increased from PTTEP's deferred considerations acquired through business acquisition of additional stakes in the Bongkot Project and PTTGC's payable from additional construction of the Olefins Reconfiguration projects. Moreover, PTT's income tax payable increased in this period due to the transferring of oil business unit to PTTOR and the expiration of BOI privilege of GSP business unit in 2017.

: An increase of Baht 6,720 million or 1.3% in long-term loans (including the current portion within 1 year) mainly from the higher of long term loan by baht 6,832 million included by the additional loans of Baht 143,627 million in this period mainly from TOP, PTTOR, PTTGC, and IRPC. However, there were repayment of long-term loans and the redemption of debenture amounting to Baht 136,795 million mainly from PTTGC, PTTEP, PTT, TOP and IRPC. Moreover, the effect of foreign exchange and fee resulted in higher long-term loans by Baht 198 million.

: A decrease of Baht 9,298 million or 5.0% in non-current liabilities mainly from advance receivable of PTTT decreased and deferred tax liabilities of PTTEP decreased following the appreciation of Thai Baht against US Dollar.

### Equity

As of December 31, 2018, PTT and its subsidiaries had total shareholders' equity of Baht 1,318,495 million, increasing by Baht 69,939 million or 5.6% from the year ended 2017, mainly due to performance in 2018 of PTT and its subsidiaries which was Baht 119,684 million. Also, PTT had dividend payment from the performance of 2H/2017 by 12 Baht per share and from the performance of 1H/2018 by 0.8 Baht per share (After the change in par value of PTT's share from 10 Baht per share to 1 Baht per share) amounting to total Baht 57,108 million.

## Liquidity

For the year ended December 31, 2018, PTT and its subsidiaries had net increase in cash and cash equivalents amounting to Baht 125,995 million, and cash and cash equivalents at the beginning of the period was Baht 166,189 million. As a result, cash and cash equivalents at the end of the period was Baht 292,184 million. Details of cash flow by activities are as follows:

	Unit: Million Baht
Net cash provided by operating activities	267,801
Net cash used in investing activities	(34,148)
Net cash used in financing activities	(111,468)
Effects of exchange rates on cash and cash equivalents	637
Currency translation differences	3,173
Net decrease in cash and cash equivalents during the period	<u>125,995</u>
Cash and cash equivalents at the beginning of the period	<u>166,189</u>
Cash and cash equivalents at the end of the period	<u>292,184</u>

Net cash provided by operating activities of Baht 267,801 million was derived from Baht 119,684 million of net profit attributable to owners of the parent, adjusted by net profit to net cash provided (used in) by operating activities. The increase in net cash flow are from operating activities mainly resulted from Baht 123,556 million of depreciation and amortization expenses, Baht 53,647 million of income taxes, Baht 45,726 million of net profit attributable to non-controlling interests, Baht 27,627 million of finance costs, together with the decrease in net operating assets of Baht 44,043 million and income taxes paid of Baht 45,371 million.

Net cash used in investing activities was Baht 34,148 million mainly resulted from the followings:

: The cash inflow of current investments amounting to Baht 93,821 million, mainly from fixed deposits which has reached maturity of PTTEP and PTT amounting to Baht 68,901 million and Baht 49,530 million, respectively.

: The cash outflow of investments in property, plant and equipment, investment property, intangible assets, and exploration and evaluation assets amounting to Baht 106,958 million, mainly due to the additional investments of PTTEP in exploration and production assets mainly from Zawtika and S1 projects, Furthermore, there were investments in Olefins reconfiguration, Propylene Oxide and Polyols projects of PTTGC, PTT projects principally the 5th transmission pipeline, Thairoil Sriracha Building project, New Crude Tanks Construction project and New Jetty 7&8 of TOP as well as Polypropylene Compounding Project (PPC) and Catalyst Cooler of IRPC.

: The cash outflow of other long-term investments amounting to Baht 38,035 million, mainly from the acquisition of additional stake of the Bongkot Project of PTTEP and the acquisition of affiliates in petrochemical business of PTTGC.

Net cash used by financing activities was Baht 111,468 million, mainly from the followings:

: Cash paid for dividend amounting to Baht 85,035 million mainly from PTT, PTTGC, PTTEP, TOP and IRPC and finance costs paid amounting to Baht 28,148 million.

Financial ratios and earnings per share of PTT and its subsidiaries

Financial Ratio	Unit	2017	2018
<u>Liquidity Ratios</u>			
Current ratio	Times	2.21	2.11
Quick ratio	Times	1.61	1.50
Account receivable turnover	Times	12.28	13.13
Collection period	Days	29.32	27.42
Account payable turnover	Times	10.87	12.62
Payment period	Days	33.12	28.53
<u>Profitability Ratios from Continuing Operations</u>			
Gross profit margin	%	15.40%	13.40%
Net profit margin	%	9.25%	7.08%
Return on equity	%	17.09%	14.13%
<u>Activity Ratios</u>			
Total asset turnover	%	8.27%	7.21%
Fixed asset turnover	%	16.91%	15.10%
Working capital turnover	Times	0.89	1.02
<u>Solvency Ratios</u>			
Debt to equity	Times	0.42	0.41
Interest coverage	Times	11.01	11.13
<u>Earnings per share</u>			
Earnings per share	Baht/share	4.67	4.15

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Note:

Current ratio	=	Current assets divided by Current liabilities
Quick ratio	=	(Cash and cash equivalent + Current investments + Accounts receivable) divided by Current Liabilities
Account receivable turnover	=	Sales and service income divided by Average account receivable
Collection period	=	360 divided by Account receivable turnover
Account payable turnover	=	Cost of sales and services divided by Average account payable
Payment period	=	360 divided by Account payable turnover
Gross profit margin	=	Gross profit divided by Sales and service income
Net profit margin	=	Net profit divided by Sales and service income
Return on equity	=	Net profit divided by Average shareholders' equity
Total asset turnover	=	Net profit divided by Average total assets
Fixed asset turnover	=	Net profit divided by Average total fixed assets
Working capital turnover	=	Sales and service income divided by Average total assets
Debt to equity	=	Interest bearing debt divided by Total shareholder's equity
Interest coverage	=	(Net cash flow from operating activities + Taxes paid from operating activities) divided by Interest paid from financing activities
Dividend payout	=	Dividends paid divided by Net profit



## Economic Outlook for 2019

Global economic growth is projected to slow further in 2019 – with US growth expected to decline amid fading tax-cut boost and the uncertainty over the trade conflict with China, despite continuing to benefit from the strong labor market. Meanwhile, economic recovery is expected to slow slightly in the euro area on the back of less accommodative monetary policy and home-grown political difficulties. In China, growth is expected to meet the government's target of 6-6.5%, amid Beijing easing off its campaign against risk and more support measures being rolled out to mitigate threats to growth from the trade conflict with the US. Downside risks to the world economy include an escalating cycle of trade restrictions and retaliation, a surprise tightening of global financial conditions, and political uncertainty and geopolitical tensions and strife. The IMF in January 2019 forecasted global growth for 2019 at 3.5%.

According to the IEA's estimates in January 2019, global oil demand is expected to grow by 1.5 MMBD to average 100.7 MMBD in 2019, with emerging market and developing economies, especially Asian countries and China, being the key driver. Meanwhile, oil demand in advanced economies is expected to slightly increase from the previous year amid slower economic growth curbing oil demand. As for crude oil supply, smaller surplus is expected amid OPEC+ ongoing oil deal to curb output. While global oil demand is expected to decrease by 0.6 MMBD to average 99.5 MMBD in the first quarter of 2019 (Q1/2019) relative to Q4/2018. Anyhow, Dubai crude oil price is expected to average US\$60-70 per barrel in 2019.

Dubai crude cracking margin in Singapore in 2019 is expected to average US\$5-6 per barrel, down from 2018, amid oversupply of gasoline, particularly continuing to pressure in Q1/2019.

Both the Olefins and Aromatics prices in 2019 are expected to be stable-to-soft from 2018. HDPE price is forecasted at US\$1,120-1,130 per ton amid higher supply from the US. PP price tends to average at US\$1,160-1,170 per ton amid new supply from Malaysia. As for aromatics price, PX price tends to average at US\$940-950 per ton and BZ price is projected at US\$650-660 per ton amid BZ oversupply and new supply of aromatics products from China's startup.

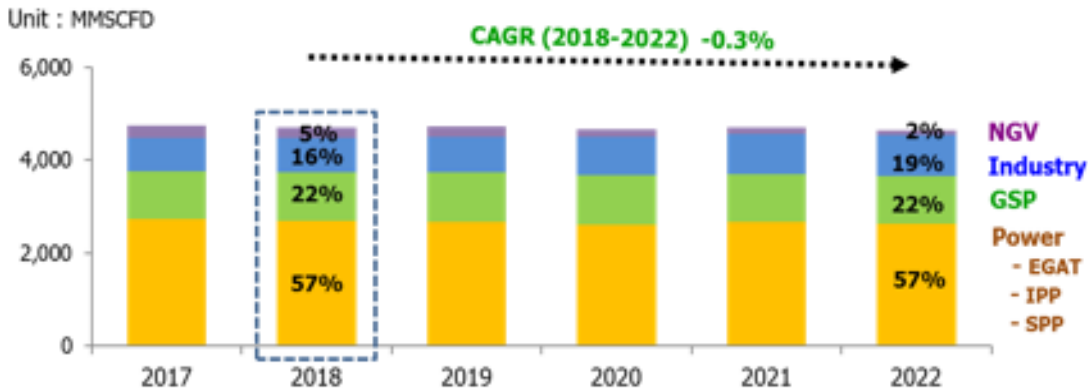
Thai economy in 2019 is expected to grow at a slightly slower pace than 2018, on the back of a slowdown in merchandise exports, in tandem with softer demand from key trading partners. Private investment is expected to grow at a softer pace, following further inventory destocking after an unusual spike in the previous year; while gross fixed capital formation is likely to expand, in line with public investment, in particular, infrastructure projects to enter execution phase in 2019. As for tourism, gradual improvement in growth is expected amid ongoing tourism stimulus measures. Private consumption is likely to continuously rise, in part due to government measures supporting low-income group. Still, high household debt will continue to constrain domestic demand. Meanwhile,

Thai economy still faces with some downside risks from a greater-than-envisaged slowdown of major trading partners, delays in the recovery of tourism sector and political transition and accompanying uncertainties.

Major Project Plan

Gas Business

**Country: Projected Gas Volume**



Assumption for country gas demand in year 2018-2022 has declined growth rate at -0.3% based on the recent situation of domestic power generators, from Electricity Generating Authority of Thailand (EGAT), Metropolitan Electricity Authority (MEA) and Provincial Electricity Authority (PEA), that tend to slightly decrease as private sector generates power for themselves. In addition, gas demand in long term is expected to increase according to new PDP 2018 which will have additional power plants comparing with PDP 2015. The new gas power plants will gradually deliver power into the system since 2014 onwards. As a result, the overall gas country demand will increase from 37% in 2036 (PDP 2015) to 53% in 2037 as coal fire power plant can't establish as planned.

Pipelines transmission Projects

- Nakorn Ratchasima Pipeline (Completion Year 2018)

Phase 1: Gas Pipeline transmission from Saraburi to Nakhon Ratchasima has already completed construction and started of regular operation since 5 March 2017. The pipeline length is 112 km.

Phase 2 : Gas Pipeline transmission from Nakhon Ratchasima to Suranaree Industrial Zone has already completed construction and had function test commissioning system since October 2018. On November 2018, the pipeline has started normal operation and delivered gas since 14 December 2018.

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- 5<sup>th</sup> Transmission Pipeline (Rayong – South Bangkok power plant) (Total Project Progress as of December 2018: 56%)

Phase 1: Gas pipeline transmission from Rayong to Chachoengsao has been constructed 60 km of 208 km.

Phase 2: Gas pipeline transmission from Chachoengsao to Ratchaburi is under construction and land adjustment to build Block valve station.

**RA#6 – Ratchaburi Pipeline Project** (Project progress as of December 2018: 63%)

- Gas transmission pipeline from Midline Block valve Ratchaburi – Wangnoi 6 to Ratchaburi has been constructed 32 km. Another 24 of 120 km of gas transmission pipeline were under construction.
- Commence piling and foundation of Valve stations and under construction of stations on gas pipeline
- **Wang-noi Compressor Station on Wangnoi - Kaeng Khoi** (Project progress of December 2018: 100%)
  - Completion of function test commissioning system and station system on December 2018.
  - Receiving Performance Acceptance Certificate (PAC) on 21 December 2018

#### LNG Project:

PTT has growth plan for LNG Terminal to support country gas demand with current capacity of LNG Terminal at 10 MTA finished in 2017, and will have capacity expansion to 11.5 MTA expected to be COD in year 2019. Also, there will be investment of new LNG Terminal by 7.5 MTA for future gas demand. The total LNG regasification capacity to be 19 MTA. PTT currently have long term LNG contracts with Qatargas, Shell, BP, and Petronas around 5.2 MTA and has plan to have additional LNG long term contract in order to support country gas demand growth in the future.

- **LNG Receiving Terminal 1 Phase 2 Extension:**
  - Construction completed 100% (as of September 2018)
  - Capacities expansion from 10 MTA to 11.5 MTA (Expansion capacity 1.5 MTA) approved by Cabinet on 12 July 2016
  - COD: 2019

- LNG Receiving Terminal 2:
  - Capacity 7.5 MTA approved by the Cabinet meeting on 11 April 2017
  - COD: 2022
- Other LNG Projects:
  - On 31 July 2017, National Energy Policy Council (NEPC) acknowledged on the study result of additional LNG projects: domestic FSRU in the south of Thailand (Jana District, Songkhla) (F-2), and FSRU in Myanmar (F-3) that technically be able to operate.

### NGV Plan

PTT has policy to further focus on wholesale gas selling and encourage private sector to invest in NGV stations

### Planned Shutdown for Gas Separation Plants in Y2019

- GSP 1
  - Turn down 15% during January – March 2019 (45 days)
- GSP 6
  - Turndown 50% to replace spare part on May 2019 (10 days)
  - Turndown 20% to replace spare part on May 2019 (10 days)
  - Maintenance S/D on June 2019 (6 days)
- Ethan separation plants
  - Maintenance S/D on September 2019 (15 days)

### Actual planned Shutdown for Gas Separation Plants in Y2018

- Erawan Complex maintenance shutdown during January 2018 (14 days) resulting to GSP 1 – 3 and ESP plants turndown 50 – 86%
- GSP 2
  - GSP 2 Planned shutdown for maintenance during March 2018 (Shutdown 16 days)
  - Ethane separation plants (ESP) turn down 43% (16 days due to GSP2 shutdown)
- GSP 3
  - GSP 3 Planned shutdown for maintenance from September – Beginning of October (Shutdown 18 days)
  - Ethane separation plants (ESP) turn down 60%(18 days due to GSP3 shutdown)
- GSP 6
  - Turndown 40% to replace spare part at the beginning of September (10 days)

Five-year (Year 2019 - 2023) investment plan

PTT has the five-year (Year 2019-2023) investment plan in an aggregate amount of Baht 167,114 million details of which are as follows:

Unit: MMTHB

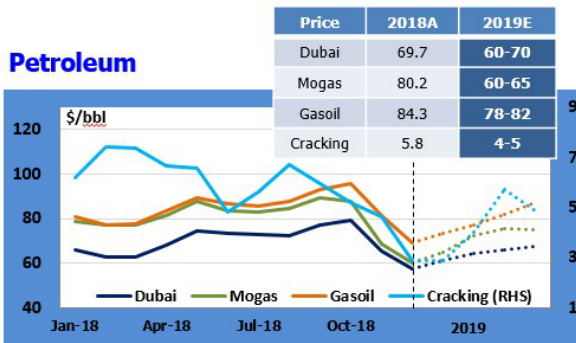
Business	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	Total	%
Gas	3,920	3,786	2,543	203	456	10,908	7
Transmissions	18,702	6,567	2,113	118	27	27,527	16
Downstream	4,395	2,653	2,553	2,175	3	11,779	7
Head Office and Others	6,384	4,402	2,063	1,927	919	15,695	9
JV and Wholly Owned Subsidiaries	37,100	28,773	14,526	12,761	8,045	101,205	61
<b>Total</b>	<b>70,501</b>	<b>46,181</b>	<b>23,798</b>	<b>17,184</b>	<b>9,450</b>	<b>167,114</b>	<b>100</b>

PTT Board of Directors Meeting has approved five-year (Year 2019-2023) investment plan. The major investments will be in gas business group and JV and wholly owned subsidiaries such as natural gas transmission pipeline system, expanding import capacity of Liquefied Natural Gas (LNG) receiving terminal as well as expanding oil and non-oil business in Thailand and international.

The major source of funding for above investment plan will be from PTT's cash flow operation, together with short term and long term financing. However, the investment plan is for PTT and the wholly-owned subsidiaries, not including other subsidiaries' investment plan.

Petroleum and Petrochemical Outlook

**Petroleum**



**Dubai:**

- ▲ **OPEC+ cut supply** 1.2 MMBD to balance market
- ▲ **Political Risks**; Iran sanction, Venezuela, unrest in Libya
- ▼ **Surging Non-OPEC output**; especially U.S.
- ▼ **Lower demand** due to expectation on econ. slowdown

**Mogas:**

- ▼ **High global inventory** due to high refinery intake YoY and more light crude availability
- ▼ **Soft demand** from higher oil prices last year
- ▲ **Improving demand** during CNY and beginning of driving season
- ▲ **Lower supply from shifting refinery yield** to maximize middle distillate ahead of IMO implementation in 2020

**Gasoil:**

- ▲ **Low global inventory** vs last few years
- ▲ **Stock buildup** ahead of IMO in 2020
- ▼ **Higher China exports** after govt. granted more export quota
- ▼ **Soft demand** after winter ends

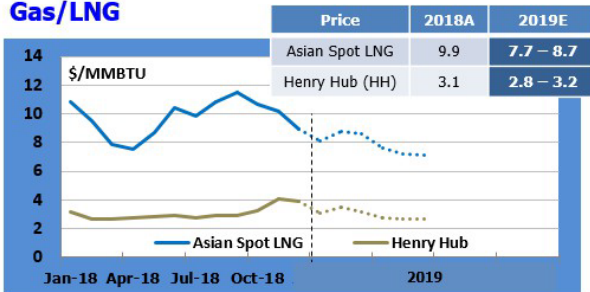
**GRM:**

- ▼ **Asian refining margins** to range between **\$4.0 – 6.0/BBL** in 2019
- ▼ **Lower gasoline & FO crack margins** in 4Q19 before IMO in 2020

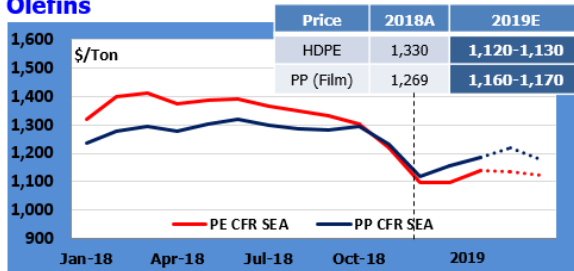
**Gas/LNG:**

- ▼ **Asian Spot LNG: Strong supply growth** continued while demand growth slows.
- ⚡ **Henry Hub: Cold temperature and low inventory levels** contributed to the increase in price as well as the **upcoming LNG projects** in the US.

**Gas/LNG**



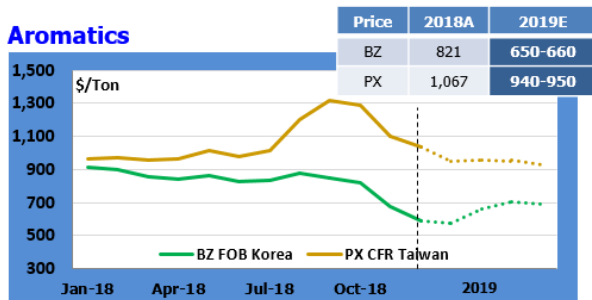
**Olefins**



**Olefins:**

- ▼ **More U.S. PE cargoes to divert to SE. Asia** after start-up of new units (approx. 4 MTA) and ongoing US-China trade war
- ⚡ **PP demand maintain** mostly from automotive and household appliances
- ▼ **RAPID Project** in Malaysia will **start-up PP unit** in 2H19, pressuring market

**Aromatics**

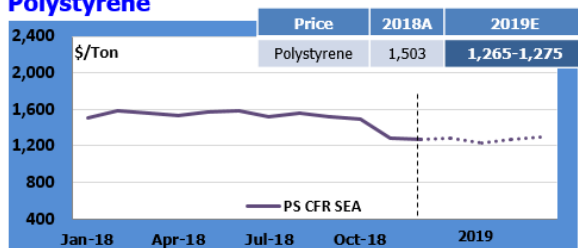


**Aromatics**

- ⚡ **PX price to drop then to maintain at high level** due to affirmed downstream demand and seasonal plant T/A in 1H19
- ▼ **China to lower PX import** due to start-up of Zhejiang Petrochemical (4 MTA) and Hengli Group (4 MTA)
- ▼ **Ample BZ supply**, high inventory in China while demand remains at low level

Note: Dampened Aromatics Prices during Q42018 due to supply from 1) Nghi Son (Vietnam) 2) Petro Rabigh (Saudi Arabia) 3) TPPI (Indonesia)

**Polystyrene**



**Polystyrene (PS)**

- ▼ PS price in 1Q19 will be **supported by high demand** from electronics manufacturing in China to export End-product to U.S. **In long term**, packaging PS demand continues to face **competition from alternate materials** and will face **risks of bans** and negative consumer perception, thereby limiting growth

## Appendix

**Exploration and Production Business** consists of PTT Exploration and Production Public Co., Ltd. (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 Company Limited (PTTGL)

**Oil Business** consists of PTT oil business unit, PTT (Cambodia) Co., Ltd. (PTTCL), PTT Oil and Retail Business Public Co., Ltd. (PTTOR), consolidating Thai Lube Blending Company Limited (TLBC) (a 100% shareholding by PTTOR and PTT), and PTT Oil Myanmar Co., Ltd. (PTTOM).

**International Trading Business** consists of PTT international business unit and PTT International Trading Pte Ltd (PTTT) and PTT International Trading London Ltd (PTTT LDN)

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

**Coal Business** consists of PTT Energy Resources Company Limited (PTTER), PTT Global Management Company Limited (PTTGM), Sakari Resources Ltd. (SAR), Straits (Brunei) Pte Ltd (Straits (Brunei)), and Yoxford Holdings (95.49% shareholding in SAR and 100% shareholdings in the others, held by PTT Mining Limited (PTTML), a 100% shareholding subsidiary of PTTGM)

**Other Business** consists of Technology and Engineering Business, Global Power Synergy Public Company Limited (GPSC), PTT Energy Solution Co., Ltd. (PTTES), Energy Complex Co., Ltd. (EnCo), PTT Digital Solutions Co., Ltd. (PTT DIGITAL), Business Services Alliance Co., Ltd. (BSA), PTT Green Energy Pte. Ltd. (PTTGE), PTT Regional Treasury Center Pte. Ltd. (PTTRTC) and PTT Treasury Center Company Limited (PTT TCC)