



Management discussion and analysis

1 Q2020

MEMBER OF
**Dow Jones
Sustainability Indices**
In Collaboration with RobecoSAM



Member of DJSI for 8th consecutive year

Management's Discussion and Analysis (MD&A) and operating results for the first quarter of 2020 ended March 31, 2020

Executive Summary

Unit : Million Baht	1Q2019	4Q2019	1Q2020	%Inc. (Dec.)	
				YoY	QoQ
Sales Revenue	550,874	560,106	483,567	(12.2%)	(13.7%)
EBITDA	80,523	66,948	32,385	(59.8%)	(51.6%)
Net Profit/(Loss)	29,312	17,446	(1,554)	<(100.0%)	<(100.0%)
Earnings per share (Baht/share)	1.02	0.59	(0.6)	<(100.0%)	<(100.0%)

In the First quarter of 2020 (1Q2020), PTT and its subsidiaries reported Earnings before Interest, Tax, Depreciation and Amortization (EBITDA) in an amount of Baht 32,385 million, drop 51.6% or by Baht 34,563 million when compared to the fourth quarter of year 2019 (4Q2019). This resulted mainly from the lower performance of Petrochemical and Refining businesses' due to stock loss in 1Q2020 from the sharply dropped in crude oil price that at the end of 4Q2019 was recorded at US\$ 67.3 while 1Q2020 was recorded at US\$ 23.4 per barrel. This was due to oil price war and oversupply as OPEC and its allies failed to reach an agreement in oil production cut together with the drop on demand of Petroleum and Petrochemical products from economic slowdown according to the the coronavirus disease 2019 (COVID-19) pandemic leading to country and city lockdown. Consequently, petroleum product spreads and olefins spreads decreased, despite the increased aromatics spreads. The Exploration and Production (E&P) Business's performance softened from lower sales volume and selling prices. In addition, the Gas business group recorded a decrease in its performance mainly from PTT's Gas Separation Plant (GSP) due to the lower sales volume from the planned turnaround of both GSP#5 and petrochemical customer's plants as well as the Natural Gas Sales and Marketing (S&M) business from the lower fuel oil referenced selling prices for industrial customers. However, the Technology and Engineering (TEG) business had better performance due to the increase of revenue from availability payment of Independent Power Producer (IPP) owing to no turnaround in 1Q20 and lower natural gas cost of Small Power Producer (SPP). Performance of Coal business increased mainly from lower cost of sales and higher selling prices. Likewise, the performance of Oil business increased from lower operating expenses. In 1Q2020, there were loss from foreign exchange loans due to the baht depreciating against the US dollar and income tax expenses increased mainly from the impact of the Baht depreciation of the E&P business despite an increase in gain on derivatives. In this regard, Net loss in 1Q2020 was recorded at Baht 1,554 million, fell more than 100% or more than Baht 19,000 million from the net profit of Baht 17,446 million in 4Q2019.

In the First quarter of year 2020 (1Q2020), PTT and its subsidiaries reported EBITDA decrease by Baht 48,138 million or 59.8% when compared to the First quarter of year 2019 (1Q2019). This was mainly due to the Petrochemical and Refining businesses' stock loss in 1Q2020 from the significant drop in crude oil price as aforementioned. The Market GRM dropped due to lower spreads of jet, diesel and high sulfur fuel oil (HSFO) as well as the decrease in olefins and aromatics spreads. Likewise, the performance of Gas business group decreased mainly from the GSP's lower selling prices and sales volume as well as the S&M business's lower fuel oil referenced selling price. The performance of Oil business decreased from higher stock loss and lower sales volume during the COVID-19 pandemic. Nevertheless, the performance of TEG business improved particularly from GPSC's performance according to the acquisition of GLOW in March 2019. Moreover,

performance of E&P Business increased from higher revenues from Malaysia project and Partex. Therefore, Net Income dropped by Baht 30,866 million or more than 100% when compared to net profit of Baht 29,312 million in 1Q2019 in line with a decrease in EBITDA, an increase in depreciation and amortization expenses mainly from the E&P and TEG Businesses' acquisition as aforementioned, more loss from foreign exchange loans, and higher tax expenses from the depreciation of Thai Baht against US Dollar despite the increase in gain on derivatives.

As of 31 March 2020, PTT and its subsidiaries had the total assets amounting to Baht 2,499,666 million, increasing by Baht 15,227 million or 0.6% from 31 December 2019, mainly from the right of use assets increasing by Baht 70,404 million from the adoption of Thai Financial Reporting Standard – the Lease, effective from 1 January 2020 onwards. Whereas the total liabilities were recorded at Baht 1,222,702 million increased by Baht 39,303 million or 3.3% including an increase in the interest-bearing debt amounting to Baht 46,462 million mainly from the increase of lease liabilities from the adoption of Thai Financial Reporting Standard – the Lease. The total shareholders' equity was Baht 1,276,964 million, decreased by 1.9% or Baht 24,076 million, mainly from the dividend payment and reported net loss in 1Q2020.

The widespread of the COVID-19 pandemic as well as the the oil price war situations have severely affected the global economy in almost all industrial groups including the energy industry as well as PTT and its subsidiaries' performances. However, PTT group have closely monitored the situation and proceeded to manage and issue various measures by establishing the PTT Group Vital Center to plan and manage the overall responses in both short-term and long-term. PTT Group have implemented cost control measures "Decrease-Discard-Defer" policy which PTT Group has reduced the operating expenses by approximately Baht 3,600 million from 4Q2019 and collaborate to have PTT group value chain optimization in the management of demand, supply, and inventory to maximize benefits including managing liquidity and maintaining the financial strength of PTT Group.

Economic Overview in the First Quarter of 2020

The world economy in 1Q2020 contracted after expanding in 4Q2019, as the Coronavirus disease (COVID-19) lockdown and social distancing measures weighed on global economic activities. Specifically, China economic growth suffered its first contraction in 28 years, as Beijing's intense containment measures starting from the end of January 2020, heavily dragged down business activities, especially in retails, logistic and other consumer and tourism related service sectors. As of the US, economic growth contracted, due to spike in jobless numbers, particularly in March 2020, caused by COVID-19 containment measures implementing at the end of the first quarter of 2020, as well as a drop in private investment, especially in the oil-related sector. However, the Federal Reserves (the Fed) at its March 2020 made 2nd emergency rate cut to 0 – 0.25%, and launched unlimited amount of quantitative easing program (QE) to support liquidity of financial market and business sectors. Meanwhile, the Euro area's economic growth contracted, due to negative impacts of the COVID-19 spreading across the region, particularly in Italy and Spain. Nevertheless, the European Central Bank (ECB) announced a new pandemic emergency purchase program that will deploy more than \$800 billion to purchase securities to help and support the European economy.

According to the International Energy Agency (IEA) report of April 2020, global oil demand in 1Q2020 averaged at 93.4 million barrels per day (MMBD), decreasing from 4Q2019 at 100.9 MMBD and from 1Q2019 at 99.0 MMBD. In 2020, global oil demand is expected to average 90.7 MMBD, decreasing from 2019 at 100.0 MMBD, resulted from drastic decline in oil demand from COVID-19 outspread that requires each countries to enforce lockdown measure, shutdown airport and limit travel.

Unit :	1Q2019	4Q2019	1Q2020	%increase(decrease)	
				YoY	QoQ
US\$/barrel					
Average Dubai crude oil price	63.5	62.1	50.7	(20.2%)	(18.4%)
Gasoline Crack Spread	3.7	12.9	6.7	81.1%	(48.1%)
Diesel Crack Spread	12.8	14.3	11.0	(14.1%)	(23.1%)
FO Crack Spread (180 – 3.5%S)	0.6	(18.7)	(7.4)	<(100.0%)	(60.4%)

Dubai oil price in 1Q2020 averaged at US\$50.7 per barrel, decreasing from 4Q2019 at US\$62.1 per barrel and 1Q2019 at US\$63.5 per barrel resulted from the pandemic outbreak of COVID-19. In addition, OPEC+ failed to agree on an additional oil production cut of 1.5 MMBD from 1.7 MMBD in March 2020, resulted in oil price war between Saudi Arabia and Russia.

Petroleum product prices at Singapore spot market:

- Gasoline crack spread (Gasoline to Dubai) in 1Q2020 was averaged at US\$6.7 per barrel, decreasing from 4Q2019 at US\$12.9 per barrel due to lower demand from lockdown measure amid high refining supply from China and Europe. The average of gasoline crack spread increased from 1Q2019 at US\$3.7 per barrel due to lower supply in 1Q2020 from refineries turnaround while high refining supply in 1Q2019 from a consecutive increase in US light crude production.

- Diesel crack spread** (Diesel to Dubai) in 1Q2020 was averaged at US\$11.0 per barrel, decreasing from 4Q2019 at US\$14.3 per barrel and 1Q2019 at US\$12.8 per barrel. This resulted from lower demand according to lockdown measure amid additional supply from India and China's refineries due to their excess supply. However, diesel demand tends to recover after China resume their industrial production.
- High Sulfur fuel oil (HSFO) crack spread** (HSFO to Dubai) in 1Q2020 was averaged at US\$ -7.4 per barrel, increasing from 4Q2019 at US\$-18.7 per barrel. The supportive HSFO crack spread were the lower regional supply according to refineries' cut run in responding to lower demand from COVID-19 as well as lower level of HSFO inventory, though HSFO demand impacted shipping business after (International Maritime Organization (IMO) 2020 be effective starting from January 2020. The averaged of HSFO crack spread was decreased from US\$ 0.6 per barrel in 1Q2019 to US\$-7.4 per barrel in 1Q2020 due to sharp drop of HSFO demand due to stronger demand from Low Sulfur Fuel Oil (LSFO) according to IMO 2020.

Singapore Gross Refining Margin (GRM) in 1Q2020 was averaged at US\$1.2 per barrel, decreasing from 4Q2019 at US\$1.6 per barrel and from 1Q2019 at US\$3.2 per barrel. The decrease was due to lower demand resulted from COVID-19.

Unit : US\$/ton	1Q2019	4Q2019	1Q2020	%increase (decrease)	
				YoY	QoQ
HDPE: CFR SEA	1,093	841	839	(23.3%)	(0.2%)
PP: CFR SEA – Film	1,127	1,049	986	(12.5%)	(6.0%)
BZ: FOB Korea	590	671	614	4.1%	(8.5%)
BZ – Naphtha	71	131	174	>100.0%	32.8%
PX: CFR Taiwan	1,080	801	706	(34.6%)	(11.9%)
PX – Naphtha	561	261	267	(52.4%)	2.3%

Petrochemical prices of both the Olefins and Aromatics in 1Q2020 decreased from 4Q2019 according to markedly lower demand, especially from China, stemming from COVID-19 pandemic. The situation created a ripple effect leading to a higher inventory level across the petrochemical supply chain in China. Meanwhile, the effects from COVID-19 on logistic restrictions and lower margin in petrochemical industry, forced refineries and petrochemical plants to reduce production rate.

- Olefins:** High density polyethylene (HDPE) price was slightly lower than 4Q2019, while Polypropylene (PP) price was under more pressure than HDPE due to disruption in China's automobile industry. In China, the surge in medical product demand could not be replaced by the loss of PP demand in automotives due to less weight of PP used in medical products.
- Aromatics:** Benzene (BZ) price and Paraxylene (PX) prices in 1Q2020 decreased from 4Q2109 following the lower crude oil price according to COVID-19 and price war. However, BZ spread over naphtha as well as PX spread over naphtha increased due to much lower price of naphtha.

Comparing to 1Q2019, petrochemical prices of Olefins and Aromatics in 1Q2020 decreased due to lower demand from COVID-19, lower crude and naphtha prices as well as new and large capacity of China's PX supply. While BZ spread over naphtha improved significantly from 1Q2019, as BZ price in 1Q2019 had been heavily pressured from oversupply market in Asia.

Thai economy in 1Q2020 decelerated, compared to 4Q2019, following a sharp contraction in tourism, particularly Chinese tourists due to the announcement of Chinese government to shutdown many areas and ban on outbound group tours traveling abroad in order to contain the spread of the COVID-19. As for public consumption, it declined on the back of the delays in disbursement of Budget Act B.E. 2563. Meanwhile, private investment contracted following a fall in imports of capital goods from China because of the lockdown measure. Still, merchandise exports continue to expand, due to higher shipments of gold as a safe-heaven asset amid an intensifying COVID-19's effect on global economy. Besides, private consumption grew, as a result of the acceleration in purchases on necessary consumer goods as a result of concerns over the COVID-19 outbreak. The Bank of Thailand in March 2020 has revised down its Thai economic growth forecast in 2020 to -5.3% from its previous estimate of +2.8% in December 2019.

Non-recurring items in the First Quarter of 2020 until present

Summary of non-recurring items in the first quarter of 2020 are as follows:

January 2020

- **PTT Group:** On 1 January 2020, there were a significant change from the adoption of the new financial reporting standards effective in 2020 which are financial instruments (TFRS 9) and lease agreements (TFRS 16).
- **GC:** On 6 January 2020, GC Marketing Solution Company Limited (GCM), a wholly owned subsidiary of GC, established **PT GCM Marketing Solutions Indonesia** with a registered capital of Indonesian rupiah 10 million to support trading business on import and export and distribute Polymers products in Indonesia. GCM holds 67% stake PT GCM Marketing Solutions Indonesia which has a registered capital of Indonesian rupiah 10 million.
- **PTT:** On 16 January 2020, Board of Directors Meeting approved the **five-year (Year 2020-2024) investment plan** of PTT and its wholly owned subsidiaries in an aggregate amount of Baht 180,814 million. PTT's investment plan focus in core businesses mainly in Gas business group in both PTT own operation (Gas business and Gas Transmissions) and its wholly owned subsidiaries such as expansion of Liquefied Natural Gas (LNG) receiving terminal capacity as well as other investments in Joint Ventures and wholly owned subsidiaries such as investment plan in oil and non-oil businesses in Thailand and overseas.
Additionally, PTT has set provisional capital expenditure for the next 5 years amounting to Baht 203,583 million to enhance value added and synergy among PTT Group from core businesses' expertise including LNG Value Chain, Gas-to-Power project, as well as new investments in energy businesses in accordance with national development plan, technology disruption, consumer behaviors, and clean energy trends.
- **PTT:** Since 16 January 2020, the price of natural gas for public vehicles (NGV) was increased at one baht per kg. as the third uplift according to the Committee on Energy Policy Administration (CEPA) (the first and second uplift of 1 baht per kg. each was started from 16 May and 16 September 2019, respectively) This resulted in NGV price for public vehicles at 13.62 baht per kg.

February 2020

- **GC:** On 3 February 2020, GC established **ENVICCO Limited (ENVICCO)**, a joint venture company, to manufacture and distribute high-quality recycled plastic, rPET and rHDPE, with overall production capacity of 45,000 ton per year. GC and ALPLA-Werke Alwin Lehner GmbH & Co KG (ALPLA) hold 70.0% and 30% stake in ENVICCO respectively. The joint venture company has the objectives. The operation will be Commercial Operation Date within 4Q2021.
- **OR:** On 17 February 2020, Established Modulus Company Limited (Modulus) with initial registered capital not more than Baht 10 million. Modulus is a wholly owned subsidiary of

PTTOR Holdings Company Limited (OR HoldCo) which was changed the company name from PTTOR International Holdings (Thailand) Company Limited (TH HoldCo). The established objective of Modulus is the holding company in new potential growth businesses in Thailand to align with OR's strategies.

- **PTTEP:** On 19 February 2020, PTTEP MENA Limited, a wholly-owned subsidiary of PTTEP, and Total E&P Oman Block 12 B.V., a wholly-owned subsidiary of Total S.A. signed Exploration and Production Sharing Agreement (EPSA) with Oman's Ministry of Oil and Gas (MOG) for **exploration and production rights of Block12**, located onshore central part of the Sultanate of Oman, with the participation interest for PTTEP MENA Limited at 20% and Total E&P Oman Block 12 B.V. (the Operator) at 80%.
- **PTT:** On 27 February 2020, **Sakari Royal Limited**, a subsidiary of Sakari Resources Limited (SAR), was **completed its deregistration**. SAR is a subsidiary of PTT Global Management Limited (PTTGM) and PTTGM is a wholly-owned subsidiary of PTT. Sakari Royal Limited was established for investment in coal mining development project in Cambodia. However, the project was not feasible to further invest.

March 2020

- **PTT:** On 3 March 2020, PTT **established Alpha Com Co., Ltd.** with an initial registered capital of Baht 3 million. According to Board of Director's resolution, the establishment's objective is to support PTT and PTT Group future investments including investments under New S-Curve strategy with a registered capital not exceeding Baht 200 million. Alpha Com Co., Ltd is a subsidiary of Siam Management Holding Co., Ltd. (SMH) and SMH is a subsidiary of PTT Global Management Limited (PTTGM) (a wholly-owned subsidiary of PTT).
- **PTT:** On 19 March 2020, Committee on Energy Policy Administration (CEPA) reviewed the liquefied petroleum gas (LPG) price that the Ex-Refinery LPG prices has been revised down from 17.1795 baht per kg. to 14.3758 baht per kg.. Therefore the retail price of a standard 15 kg LPG cylinder will be reduced from 363 baht per cylinder to 318 baht per cylinder, decreasing by 45 baht per cylinder for 3 months during 24 March 2020 to 23 June 2020 in order to alleviate public suffering from the economic situation and from impact of COVID-19. However, the price adjustment has not any impact on PTT's performance due to LPG domestic selling prices of GSP be referenced to import parity. If the selling prices is higher or lower than GSP cost; PTT's GSP margin has been limited to USD 1 per ton more or less than GSP's cost. The difference of USD 1 per ton from GSP's cost will be subsidized from or consigned to LPG fund.
- **PTT:** On 25 March 2020, **Committee on Enrgy Policy Administration (CEPA)** has decided to I reduce the retail price of the natural gas vehicle (NGV) to alleviate public suffering from the economic situation and impact from COVID- 19. Therefore, NGV prices for public transportation will be reduced at 3 baht per kg.; from 13.62 baht per kg. to 10.62 baht per

kg., for 3 months during 1 April 2020 to 30 June 2020. Moreover, the NGV prices for private vehicles will be fixed at 15.31 baht per kg. for the next 5 months during 16 March 2020 to 15 August 2020.

- **GPSC:** On 27 March 2020, GPSC acquired the shares of **solar power plants** through Global Renewable Power Co., Ltd. (GRP), a subsidiary of the GPSC. The solar power plant acquisition consists of 9 projects in Thailand, with the total power generation capacity of 39.5 megawatts under the Power Purchase Agreement with Provincial Electricity Authority (“PEA”) for the period of 25 years with the remaining contract until the year 2039-2040.
- **PTT:** On 30 March 2020, PTT’s Board of Directors has approved a resolution for the interim dividend payment for the second half of 2019 (2H2019) performance instead of the dividend payment for year 2019, at the rate of Baht 1.10 per share, the dividend was paid on 24 April 2020. PTT paid interim dividend for the first half of 2019 (1H2019) performance at the rate of Baht 0.90 per share according to Board of directors’ resolution on 27 September 2019. Therefore the total dividend payment for 2019 performance is Baht 2.00 per share and the Board of Directors will not propose for further dividend payment from 2019 performance.
- **PTT Group:** In accordance with the current outbreak of the COVID-19 and the rising number of infections, PTT Group has enforced measures of **working from home** with the intention to lower the risk from the epidemic in the work place. PTT Group assure that activities and operations will be operated with normal efficiency and would not affect to any business operations.

April 2020

- **OR:** On 2 April 2020, PTT Oil and Retail Business Public Company Limited (“OR”), which is PTT’s wholly-owned subsidiary, **filed an application for the Initial Public Offering** of its newly issued ordinary shares (the “IPO”), including its registration statements and its draft prospectus (collectively, the “Prospectus”), to the Office of the Securities and Exchange Commission (the “SEC Office”) and concurrently filed its application for the listing of its common shares on the Stock Exchange of Thailand. OR will offer up to 2,700,000,000 newly issued ordinary shares, excluding any additional shares to be offered for the purposes of the over-allotment option. OR will allocate up to 300,000,000 of the newly issued ordinary shares exclusively to the group of existing shareholders of PTT who are entitled to such allocation, on a pro-rata basis according to their respecting shareholding in PTT, as a pre-emptive right. Where demand for newly issued ordinary shares exceeds the amount of newly issued ordinary shares being offered, up to an additional 300,000,000 newly issued ordinary shares may be issued to the over-allotment agent in order to return the OR shares it borrowed from PTT for the over-allotments, if any. After the offering of newly issued ordinary shares of OR pursuant to the IPO, PTT will hold not less than 75.0% of the total issued and offered shares of OR.

- PTT: On 7 April 2020, PTT established PTT International Trading USA Inc. (“PTTT USA”), a wholly owned subsidiary of PTT, in the U.S.A with an initial registered capital of USD 5,000. The objective of the PTTT USA’s establishment is to operate the international trading business, strengthen the national energy security as well as expand PTT trading network globally.
- PTT: On 10 April 2020, PTT notified the change of auditors, PTT’s Board of Directors appoint EY Office Limited to be PTT’s auditor for the year 2020. The audit fee for the quarters and for the year of 2020 of both separated and consolidated financial statements would be in an amount of THB 8,000,000. PTT will propose the appointment of PTT’s auditors and audit fee for the year 2020 as aforementioned to the upcoming 2020 AGM for approval.

Financial Results of PTT Group by Business

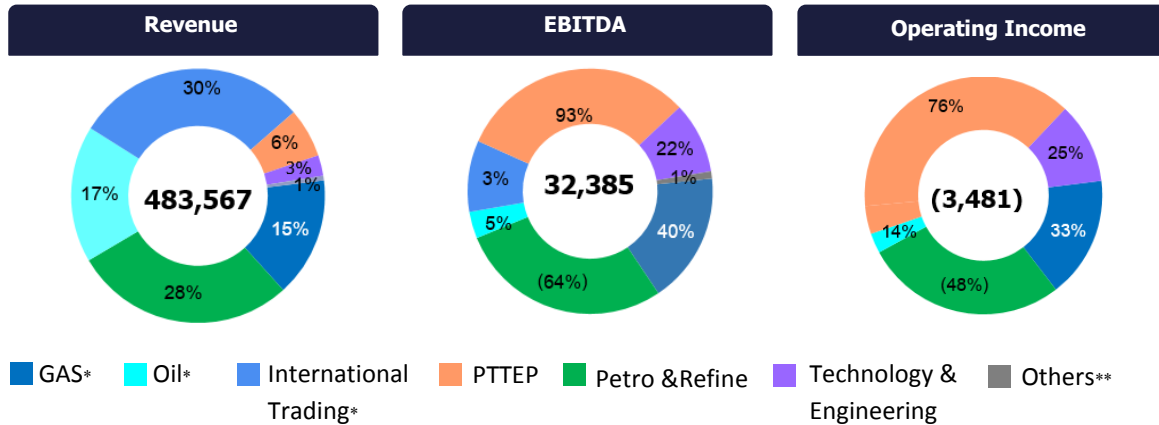
Financial performance of 1Q2020 compared with 1Q2019 and 4Q2019 are summarized as follows:

Unit : Million Baht	1Q/2019	4Q/2019	1Q2020	% Inc. (Dec.)	
				YoY	QoQ
Sales revenue	550,874	560,106	483,567	(12.2%)	(13.7%)
: Exploration & Production	42,860	53,893	46,986	9.6%	(12.8%)
: Gas	126,139	120,216	114,265	(9.4%)	(5.0%)
: Coal	4,216	3,354	3,526	(16.4%)	5.1%
: Oil	145,892	147,282	130,629	(10.5%)	(11.3%)
: International trading	269,208	279,204	222,684	(17.3%)	(20.2%)
: Petrochemical & Refining	254,679	231,688	212,052	(16.7%)	(8.5%)
: Technology and Engineering Business	10,439	19,837	19,705	88.8%	(0.7%)
: Others	752	897	860	14.4%	(4.1%)
EBITDA	80,523	66,948	32,385	(59.8%)	(51.6%)
: Exploration & Production	32,812	36,509	33,315	1.5%	(8.7%)
: Gas	17,948	15,509	14,433	(19.6%)	(6.9%)
: Coal	1,209	672	1,174	(2.9%)	74.7%
: Oil	5,954	3,364	3,755	(36.9%)	11.6%
: International trading					
- Excluding effect of FX and derivatives	829	245	(3,392)	<(100%)	<(100%)
- Including effect of FX and derivatives	613	508	907	48.0%	78.5%
: Petrochemical & Refining	20,920	7,181	(22,971)	<(100%)	<(100%)
: Technology and Engineering Business	2,708	4,671	5,668	>100%	21.3%
: Others	(599)	(942)	(532)	(11.2%)	(43.5%)
Depreciation and amortization expenses	31,195	35,814	35,865	15.0%	0.1%
Operating Income	49,328	31,134	(3,480)	<(100%)	<(100%)
: Exploration & Production	18,287	19,014	16,596	(9.2%)	(12.7%)
: Gas	13,333	10,618	9,601	(28.0%)	(9.6%)
: Coal	378	1	403	6.6%	>100%
: Oil	4,988	2,284	2,465	(50.6%)	7.9%
: International trading					
- Excluding effect of FX and derivatives	802	208	(3,463)	<(100%)	<(100%)
- Including effect of FX and derivatives	586	471	836	42.7%	77.5%
: Petrochemical & Refining	12,029	(1,641)	(32,331)	<(100%)	>100%
: Technology and Engineering Business	1,448	1,953	2,935	>100%	50.3%
: Others	(679)	(1,042)	(621)	(8.5%)	(40.4%)
Share of net income from investments in joint ventures and associates	1,536	1,435	643	(58.1%)	(55.2%)
Gain (loss) on derivatives	(3,780)	770	8,470	>100%	>100%
Gain (loss) on foreign exchange	3,875	3,673	(5,075)	<(100%)	<(100%)
EBIT	53,843	36,045	1,567	(97.1%)	(95.7%)
Finance costs	6,888	5,844	6,955	1.0%	19.0%
Income taxes	7,371	7,011	8,618	16.9%	22.9%
Net income (loss)	29,312	17,446	(1,554)	<(100%)	<(100%)
Earnings (loss) per share (Baht/share)	1.02	0.59	(0.60)	<(100%)	<(100%)

Segmentation performance of PTT Group

The details of revenue, EBITDA and operating income by segmentation of 1Q2020 are as follows;

Unit: Million Baht



* 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)

	1Q2019	4Q2019	1Q2020	%Inc.(Dec.)	
				YoY	QoQ
Average selling price (US\$/BOE)	46.2	48.3	44.8	(3.0)%	(7.2)%
Average sales volume (BOED)	319,230	395,028	363,411	13.8%	(8.0)%

First quarter of 2020 compared with Fourth quarter of 2019

In 1Q2020, sales revenue of PTTEP was Baht 46,986 million, decreasing by Baht 6,907 million or 12.8% from 4Q2019. This resulted mainly from the decrease in average sales volume from 395,028 barrels of oil equivalent per day (BOED) in 4Q2019 to 363,411 BOED in 1Q2020 or decreasing 8.0%. The decrease in sales volume mainly from a decrease in crude oil sales of Malaysia Project, and from Bongkot Project due to lower nomination from buyer. Moreover, average selling prices decreased by 7.2% from US\$ 48.3 per barrels of oil equivalent (BOE) in 4Q2019 to US\$ 44.8 per BOE in 1Q2020.

EBITDA in 1Q2020 was Baht 33,315 million, decreasing by Baht 3,194 million or 8.7% from 4Q2019 mainly due to lower sales revenue as aforementioned. However, total expenses were decreased primarily from the decrease in operating expenses of Baht 2,565 million from lower average sales volume and lower maintenance cost, mainly from Malaysia Project. Furthermore, depreciation and amortization expenses decreased by Baht 776 million. As a result, operating income in 1Q2020 was Baht 16,596 million, decreasing by Baht 2,418 million or 12.7%.

The overall performance of Petroleum Exploration and Production Business decreased by Baht 3,008 million mainly from higher income tax expenses relating to changes in foreign exchange rate of Baht 8,381 million from a depreciation of Baht against US Dollar at 2.50 baht per dollar in 1Q2020, while there was an appreciation of Baht against US Dollar at 0.44 baht per dollar in 4Q2019. However, there was a gain on financial derivatives of Baht 6,983 million in 1Q2020, while recognized loss from such transaction of Baht 1,242 million in 4Q2019, mainly from oil price hedging instruments and forward contracts.

First quarter of 2020 compared with First quarter of 2019

In 1Q2020, sales revenue of PTTEP was Baht 46,986 million, increasing by Baht 4,126 million or 9.6% from 1Q2019. This was resulted mainly from the increase in average sales volume from 319,230 BOED in 1Q2019 to 363,411 BOED in 1Q2020 or 13.8%. The average sales volume increased from Malaysia Project and Partex Group from business acquisition in the second half of 2019 and Bongkot Project from the decrease of shutdown days from maintenance activities. Whereas, the average selling prices decreased by 3.0% from US\$ 46.2 per BOE in 1Q2019 to US\$ 44.8 per BOE in 1Q2020.

EBITDA in 1Q2020 was Baht 33,315 million, increasing by Baht 503 million or 1.5% from 1Q2019 mainly due to higher sales revenue as aforementioned. However, operating expenses increased by Baht 1,891 million and petroleum exploration expenses also increased by Baht 941 million from the exploration well written-off of Zawtika Project. Furthermore, depreciation and amortization expenses increased by Baht 2,195 million due to an increase of sales volume from Malaysia Project and Partex Group from business acquisition in the second half of 2019. As a result, operating income in 1Q2020 was Baht 16,596 million, decreasing by Baht 1,691 million or 9.2% from 1Q2019.

As a result, the overall performance of Petroleum Exploration and Production Business decreased by Baht 3,866 million mainly from higher income tax expenses relating to changes in foreign exchange rate of Baht 10,729 million as a result of a depreciation of Baht against US Dollar at 2.50 baht per dollar in 1Q2020, while there was an appreciation of Baht against US Dollar at 0.63 baht per dollar in 4Q2019. However, there was a gain on financial derivatives of Baht 6,983 million in 1Q2020, while there was loss from such transaction of Baht 2,601 million in 1Q2019, mainly from oil price hedging instruments and forward contracts.

Gas Business Group

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

Unit : Ton	1Q2019	4Q2019	1Q2020	% Inc.(Dec.)	
				YoY	QoQ
LPG	831,793	922,975	769,339	(4.3%)	(13.7%)
Ethane	555,281	610,339	551,961	(0.6%)	(9.6%)
Propane	241,799	241,772	199,397	(17.5%)	(17.5%)
NGL	154,315	172,262	159,369	3.3%	(7.5%)
Pentane	12,295	14,312	12,749	3.7%	(10.9%)
Total	1,795,482	1,961,660	1,719,815	(4.2%)	(12.3%)

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

Unit : US\$ per Ton	1Q2019	4Q2019	1Q2020	% Inc.(Dec.)	
				YoY	QoQ
LPG ^{1/}	462	438	519	12.3%	18.5%
HDPE ^{2/,4/}	1,093	841	839	(23.2%)	(0.2%)
LDPE ^{2/,4/}	1,046	956	955	(8.7%)	(0.1%)
LLDPE ^{2/,4/}	1,037	838	847	(18.3%)	1.1%
PP ^{2/}	1,127	1,050	986	(12.5%)	(6.1%)
Naphtha ^{3/}	467	499	398	(14.8%)	(20.2%)

Note: ^{1/} LPG Cargo referenced from Platts that assesses the average of propane and butane cargoes (FOB Arab Gulf) two weeks prior by using 50:50 Propane and Butane.

^{2/} South East Asia - Spot Price

^{3/} MOP Singapore (MOP'S)

^{4/} GSP had agreed to new purchase and sale product agreements with GC: The Ethane selling prices was amended petrochemical referenced prices from HDPE in 2019 to HDPE, LDPE and LLDPE effective since January 1, 2020

First quarter of 2020 compared with Fourth quarter of 2019

In 1Q2020, gas business reported sales revenue of Baht 114,265 million, decreasing by Baht 5,951 million or 5.0% from 4Q2019 resulted mainly from PTT's GSP business due to lower sales volume (including NGL derived from Dew Point Control units) in all products, especially LPG, from 1,961,660 tons in 4Q2019 to 1,719,815 tons in 1Q2020 or decreased by 12.3% since PTT's GSP#5 planned maintenance shutdown (20 days) in line with planned turnaround of olefins customer (GC) in 1Q2020. In addition, average petrochemical referenced selling prices also decreased.

For S&M business units, fuel oil referenced selling prices for industrial customer declined due to the impact from IMO2020 regulation. Additionally, the average sales volume (calculated at heating value of 1,000 BTU per cubic feet) decreased by 81 million standard cubic feet per day (MMSCFD) or 1.7% from 4,704 MMSCFD in 4Q2019 to 4,623 MMSCFD in 1Q2020 mainly from GSPs' planned maintenance shutdown as aforementioned, together with slightly lower demand of

power customer following the restricted measures of COVID-19 epidemic resulting in the slowdown of economic activities though warmer weather. Nonetheless, industrial customers' sales volume rose from customers' planned turnaround in 4Q2019.

In 1Q2020, EBITDA of gas business was reported at Baht 14,433 million, decreasing by Baht 1,076 million or 6.9%. The operating income was reported at Baht 9,601 million, decreasing by Baht 1,017 million or 9.6%. This was mainly from lower gross profit of GSP due to lower sales volume according to GSP planned maintenance shutdown as aforementioned and S&M businesses' lower average selling prices as aforementioned. However, the NGV business unit had lower losses primarily from the decrease in sales volume by 326 tons per day or 6.3% from 5,067 tons per day in 4Q2019 to 4,741 tons per day in 1Q2020. This resulted from the switching of NGV's user to use gasoline and diesel, the lockdown measure from COVID-19, and the increase of average selling price from the 3rd uplift of NGV prices for taxi and public vehicles at Baht 1 per kilogram since 16 January 2020 (4Q2019: 12.62, 1Q2020: 13.62 Baht/Kg.).

First quarter of 2020 compared with First quarter of 2019

In 1Q2020, gas business reported sales revenue of Baht 114,265 million, decreasing by Baht 11,874 million or 9.4% from 1Q2019 resulted mainly from GSP business due to the lower petrochemical referenced selling prices following the lower demand from COVID-19 epidemic. Sales volume (including NGL derived from Dew Point Control units) decreased in most of products from 1,795,482 tons in 1Q2019 to 1,719,815 tons in 1Q2020 or decreased by 4.2% mainly from Propane and LPG products according to customers' planned turnaround and soften domestic demand.

S&M business units has lower average selling prices for industrial customers due to lower fuel oil referenced selling price. Additionally, the average sales volume (calculated at heating value of 1,000 BTU per cubic feet) decreased by 124 MMSCFD or 2.6% from 4,747 MMSCFD in 1Q2019 to 4,623 MMSCFD in 1Q2020 mainly from power plant customers owing to weaker domestic power demand from economic slowdown.

In 1Q2020, EBITDA of gas business was reported at Baht 14,433 million, decreasing by Baht 3,515 million or 19.6%. The operating income was reported at Baht 9,601 million, decreasing by Baht 3,732 million or 28.0%. This was mainly from lower gross profit from GSP according to the decrease of average selling prices and slightly increase in gas cost.

However, the NGV business unit had lower losses primarily from the increase in NGV selling prices in public vehicles from Baht 10.62 per kilogram to Baht 13.62 per kilogram in 1Q2020. Besides, NGV's sales volume decreased by 972 tons per day from 5,713 tons per day in 1Q2019 to 4,741 tons per day in 1Q2020 because of the decrease in crude price led to the switching of NGV's user to use diesel and gasoline instead, and also the lockdown measure to control the epidemic of COVID-19.

Coal Business

	1Q2019	4Q2019	1Q2020	%Inc. (Dec.)	
				YoY	QoQ
Newcastle index price (US\$ per ton)	95.9	67.2	67.6	(29.5%)	0.6%
Average selling price (US\$ per ton)	65.6	57.4	58.5	(10.8%)	1.9%
Cash cost (US\$ per ton)	54.8	53.3	48.0	(12.4%)	(10.0%)
Sales volume (million tons)	2.0	1.9	1.9	(5.0%)	-

First quarter of 2020 compared with Fourth quarter of 2019

In 1Q2020, sales revenue of coal business was Baht 3,526 million, increasing by Baht 172 million or 5.1% compared with 4Q2019 mainly due to the increase of average selling prices by US\$ 1.1 per ton or 1.9% from US\$ 57.4 per ton in 4Q2019 to US\$ 58.5 per ton in 1Q2020 according to the increase in Newcastle referenced prices from lower supply during the lockdown measures leading to an increase in selling prices. While, sales volume remained stable.

EBITDA in 1Q2020 was Baht 1,174 million, increasing by Baht 502 million or 74.7% from 4Q2019 mainly from lower mining cost following the decline in crude price and higher selling prices as aforementioned. Coal business reported operating income of Baht 403 million in 1Q2020, increasing by Baht 402 million according to the increase in EBITDA. In addition, there were payback of tax lawsuit case from the Indonesian Supreme Court in 1Q2020 following the settled of past tax lawsuits.

First quarter of 2020 compared with First quarter of 2019

In 1Q2020, sales revenue of coal business was Baht 3,526 million, decreasing by Baht 690 million or 16.4% compare with 1Q2019 mainly due to the decrease in the average selling prices by US\$ 7.1 per ton or 10.8% from US\$ 65.6 per ton in 1Q2019 to US\$ 58.5 per ton in 1Q2020 due to 29.5% decrease in Newcastle referenced prices according to soften demand from economic slowdown and shifting to alternative energy. As a result, sales volume decreased by 0.1 million tons or 5.0% from 2.0 million tons in 1Q2019 to 1.9 million tons in 1Q2020.

EBITDA in 1Q2020 was Baht 1,174 million, decreasing by Baht 35 million or 2.9% from 1Q2019 mainly from lower selling prices and sales volume as aforementioned. Coal business reported operating income of Baht 403 million in 1Q2020, increasing by Baht 25 million due to lower depreciation and amortization expenses from lower production volumes. Additionally, there were higher payback of past tax lawsuit case in 1Q2019 compared with 1Q2020, leading to the decrease in the overall performance.

2. Downstream Petroleum Business Group

Oil Business Group

	1Q2019	4Q2019	1Q2020	%Inc. (Dec.)	
				YoY	QoQ
Average sales volume* (Unit: Million Liter)	7,073	7,157	6,623	(6.4%)	(7.5%)
Average selling prices (Unit: US\$ per barrel)					
Gasoline	67.2	75.0	57.4	(14.6%)	(23.5%)
Aviation	76.5	76.0	59.3	(22.5%)	(21.7%)
Diesel	76.3	76.4	61.7	(19.1%)	(18.8%)
HSFO	64.1	43.4	43.4	(32.3%)	-

*Only the average sales volume of domestic oil segment of OR Group

First quarter of 2020 compared with Fourth quarter of 2019

In 1Q2020, sales revenue of oil business group was Baht 130,629 million, decreasing by Baht 16,653 million or 11.3% due to the decrease in selling prices of most products according to the slump in crude price after OPEC+ failed to reach an agreement in oil production cut. In addition, average sales volume decreased by 534 million liters or 7.5% from 7,157 million liters or equivalent to 489,316 barrels per day in 4Q2019 to 6,623 million liters or equivalent to 457,783 barrels per day in 1Q2020, mainly from Aviation fuel, LPG and Gasoline products due to lower demand from the COVID-19 pandemic lockdowns effecting to tourism and transportation sectors.

EBITDA in 1Q2020 recorded at Baht 3,755 million, increasing by Baht 391 million or 11.6% mainly from lower selling and administrative expenses from employee expense, external service expenses and advertising and sales promotion expenses. Besides, there was higher gross profit of aviation fuel from its selling price structure, which is reference to the product price in the previous month (M-1). However, there was higher stock loss in 1Q2020 when compared with 4Q2019. The operating income in 1Q2020 was Baht 2,465 million, increasing by Baht 181 million or 7.9% following higher EBITDA.

First quarter of 2020 compared with First quarter of 2019

In 1Q2020, sales revenue of oil business group was Baht 130,629 million, decreasing by Baht 15,263 million or 10.5% from the decrease in selling prices of almost products following global oil prices. In addition, average sales volume in 1Q2020 decreased by 450 million liters or 6.4% from 7,073 million liters or equivalent to 494,319 barrels per day in 1Q2019 to 6,623 million liters or equivalent to 489,316 barrels per day in 1Q2020 mainly due to Aviation fuel and LPG product from the impact of COVID-19 as aforementioned.

EBITDA in 1Q2020 recorded at Baht 3,755 million, decreasing from 1Q2019 by Baht 2,199 million or 36.9% mainly due to higher stock loss in 1Q2020 than in 1Q2019 due to the slump in petroleum price in March 2020. Despite, gross profit of aviation fuel increased from its selling price structure which is reference to the product price in the previous month (M-1). The operating income in 1Q2020 was Baht 2,465 million, decreasing by Baht 2,523 according to lower EBITDA and higher depreciation and amortization expenses by baht 324 million.

International Trading Business Group

Unit : Million Litre	1Q2019	4Q2019	1Q2020	%Inc. (Dec.)	
				YoY	QoQ
Average sales volume	20,372	22,110	20,015	(1.8%)	(9.5%)

First quarter of 2020 compared with Fourth quarter of 2019

Sales revenue of international trading business in 1Q2020 was Baht 222,684 million, decreasing by Baht 56,520 million or 20.2% from 4Q2019 due to the decrease in product selling prices in accordance with global oil prices caused by Oil Price War and lower oil demand from the COVID-19. Also, Sales volume decreased by 2,095 million liters from 22,110 million liters or equivalent to 1,511,637 barrels per day in 4Q2019 to 20,015 million liters or equivalent to 1,383,441 barrels per day in 1Q2020, or 9.5% from lower sales volume of out - out trading activities from JET A-1, Gasoline and Fuel oil.

EBITDA, adjusted by the effect of foreign exchange rate and derivatives, in 1Q2020 was Baht 907 million, increasing by Baht 399 million or 78.5% mainly due to higher gross margin from lower condensate discount and gain on derivatives. The operating income, adjusted by the effect of foreign exchange rate and derivatives in 1Q2020 was Baht 836 million, increasing by Baht 365 million or 77.5%

First quarter of 2020 compared with First quarter of 2019

Sales revenue of international trading business in 1Q2020 was Baht 222,684 million, decreasing by Baht 46,524 million or 17.3% from 1Q2019 due to the decrease in product selling prices as aforementioned. Also, sales volume decreased by 357 million liters from 20,372 million liters or equivalent to 1,423,763 barrels per day in 1Q2019 to 20,015 million liters or equivalent to 1,383,441 barrels per day in 1Q2020, or 1.8%, due to a declining trading of imported crude and condensate (Out-In) due to softened domestic demand from a sluggish economy and out - out trading activities from COVID-19 and global economic slowdown.

EBITDA, adjusted by the effect of foreign exchange rate and derivatives, in 1Q2020 was Baht 907 million, increasing by Baht 294 million or 48% mainly due to gain on derivatives. The operating income, adjusted by the effect of foreign exchange rate and derivatives, in 1Q2020 was Baht 836 million, increasing by Baht 250 million or 42.7%

Petrochemical and Refinery Business Group

Unit : US\$ per barrel	1Q2019	4Q2019	1Q2020	%Inc. (Dec.)	
				YoY	QoQ
Market GRM	2.44	2.19	0.84	(65.6%)	(61.6%)
Inventory gain (loss) excl. NRV	1.58	0.89	(9.02)	<(100.0%)	<(100.0%)
Hedging gain (loss)	(0.06)	0.44	0.79	>100.0%	79.5%
Accounting GRM	3.97	3.52	(7.39)	<(100.0%)	<(100.0%)
Refinery Utilization rate (%)	105.1%	90.0%	101.0%	(3.9%)	(12.2%)

*From 3 Refineries: TOP, GC and IRPC

Unit : US\$ per Ton	1Q2019	4Q2019	1Q2020	%Inc. (Dec.)	
				YoY	QoQ
Olefins					
Naphtha (MOPJ)	519	540	440	(15.2%)	(18.5%)
HDPE	1,093	841	839	(23.2%)	(0.2%)
HDPE - Naphtha	574	301	399	(30.5%)	32.6%
LLDPE	1,037	838	847	(18.3%)	1.1%
LLDPE - Naphtha	518	298	407	(21.4%)	36.6%
PP	1,127	1,049	986	(12.5%)	(6.0%)
PP - Naphtha	608	509	546	(10.2%)	7.3%
Aromatics					
Condensate	535	546	450	(15.9%)	(17.6%)
PX (TW)	1,080	801	706	(34.6%)	(11.9%)
PX (TW) – Condensate	545	255	256	(53.0%)	0.4%
BZ	590	671	614	4.1%	(8.5%)
BZ – Condensate	55	125	164	>100.0%	31.2%

First quarter of 2020 compared with Fourth quarter of 2019

In 1Q2020, sales revenue of petrochemical and refining business was Baht 212,052 million, decreasing by Baht 19,636 million or 8.5% primarily due to the decrease in sales revenue of refinery business because of lower selling prices and sales volume. This was mainly from the drop in oil prices and demand of refined product in all sectors such as industry, transportation and tourism sectors caused by the COVID-19 lockdown measure. However, the increase in sales volume from GC from its full capacity production after the planned major turnaround of refineries (Approximate 52 days) in 4Q2019. Therefore, PTT Group refineries' utilization rates increased from 90.0% in 4Q2019 to 101.0% in 1Q2020.

Overall sales revenue of petrochemical business also decreased mainly due to declining in sales revenue of olefins business resulted from GC's planned turnaround of Olefins plant 2/1 (39 days) Olefins plant 2/2 (35 days) and Oleflex (37 days) in 1Q2020 and lower sales volume according to the drop in petrochemical products demand driven by the COVID-19 lockdown measure resulted in the stagnation of consumption and manufacturing sectors. In addition, the product selling prices declined. Sales revenue of aromatics business decreased resulting from lower selling prices of PX

and BZ following oil price decrease and soften demand of downstream products. However, higher sales volume of PX and BZ after the resumption of GC's refinery, the production cut run of PX producer and regional BZ producers' planned maintenance shutdown.

EBITDA of petrochemical and refining business in 1Q2020 reported loss of Baht 22,971 million decreasing by Baht 30,152 million from 4Q2019. There was loss on operating income of Baht 32,331 million in 1Q2020, more loss amounting to Baht 30,690 million when compared to 4Q2019 operating income, mainly from;

- Refinery performance excluding stock gain/(loss) decreased from the drop in most of petroleum product spreads. As a result, Gross Refinery Margin excluding stock gain/(loss) (Market GRM) decreased from US\$ 2.19 per bbl in 4Q2019 to US\$ 0.84 per bbl in 1Q2020. Additionally, there was stock loss of US\$ 9.02 per bbl in 1Q2020, versus stock gain of US\$ 0.89 per bbl in 4Q2019 that resulted in the decrease in Accounting GRM from US\$ 3.52 per bbl in 4Q2019 to loss US\$ 7.39 per bbl in 1Q2020 together with sales volume decreased resulted in overall performance of Petrochemical and Refinery Business suppressed.
- Overall petrochemical performance also decreased mainly from lower performance of aromatics business from higher stock loss, despite the higher BZ and PX spread mainly due to sharp drop in feedstock price from crude oil prices. Olefins business also decreased mainly from lower sales volume from GC's planned maintenance turnaround of its olefins plants as aforementioned and lower selling prices because of COVID-19.

First quarter of 2020 compared with First quarter of 2019

In 1Q2020, sales revenue of petrochemical and refining business was Baht 212,052 million, decreasing by Baht 42,627 million or 16.7% primarily due to the decrease in average selling prices of refining business in almost products. This resulted from lower demand as aforementioned. Overall, sales volume in 1Q2020 was closed to the 1Q2019. PTT Group refineries' business utilization rates decreased from 105.1% in 1Q2019 to 101.0% in Q12020.

Overall sales revenue of petrochemical business also decreased mainly due to declining in sales revenue of olefins business resulted from lower sales volume and product selling prices from drop in demand. Moreover, there were GC's planned major turnaround of olefins plant in 1Q2020. Additionally, sales revenue of aromatics business decreased resulting from sharp drop of PX selling prices from new supply from the commercial operation startup of new regionally aromatics plants

EBITDA of petrochemical and refining business in 1Q2020 were loss Baht 22,971million decreasing by Baht 43,891 million from 1Q2019. Therefore, there was loss in operating income of Baht 32,331 million in 1Q2020, more loss amounting to Baht 44,360 million from 1Q2019, mainly from;

- Refinery performance excluding stock gain/(loss) decrease from the drop in most of petroleum product spreads. As a result, Market GRM decreased from US\$ 2.44 per bbl in 1Q2019 to US\$ 0.84 per bbl in 1Q2020. Additionally,

there was stock loss of US\$ 9.02 per bbl in 1Q2020, versus stock gain of US\$ 1.58 per bbl in 1Q2019 that resulted in the decrease in Accounting GRM from US\$ 3.97 per bbl in 1Q2019 to loss US\$ 7.39 per bbl in 1Q2020.

- Overall petrochemical performance decreased from the performance of the olefins business dropped due to lower product spreads and lower sales volume from planned major turnaround in 1Q2020. In addition, the performance of the aromatics business decreased following a sharp decline in PX spread following weaker product selling prices, despite the increase in BZ spread because of the lower supply and feedstock price.

3. Technology and Engineering Business Group

Unit: GWh	1Q2019	4Q2019	1Q2020	%Inc. (Dec.)	
				YoY	QoQ
Power Sales Volume	2,057	4,920	5,093	>100%	3.5%
Steam Sales Volume	1,961	3,608	3,254	66.0%	(9.8%)

First quarter of Year 2020 compared with Fourth quarter of Year 2019

In 1Q2020, sales revenue of Technology and Engineering Business group was Baht 19,705 million, decreasing by Baht 132 million or 0.7% from lower sales revenue of some companies in the business group. However, sales revenue of GPSC slightly increased due to no planned maintenance shutdown of Sriracha Power Plant and GHECO-One Power Plant in 1Q2020. In addition, the Availability Payment (AP) was increased corresponding to the depreciation of Thai Baht against the US Dollar together with higher dispatch volume from EGAT. Despite, the amount of electricity and steam sales volume to industrial customers decreased from the maintenance shutdown of the customers.

EBITDA in 1Q2020 was Baht 5,668 million, rose by Baht 997 million or 21.3% mainly from GPSC due to the increase in gross profit from higher sales revenue as aforementioned, together with lower natural gas cost of SPP and maintenance cost. In this regard, 1Q2020 operating income was Baht 2,935 million, increasing by Baht 982 million or 50.3% from 4Q2019 following the increase in EBITDA. As a result, the overall performance of Technology and Engineering Business increased mainly from GPSC which performance was Baht 1,580 million in 1Q2020, increasing by Baht 435 million.

First quarter of Year 2020 compared with First quarter of Year 2019

In 1Q2020, sales revenue of Technology and Engineering Business group was Baht 19,705 million, increasing by Baht 9,266 million or 88.8% mainly from GPSC due to the full quarter recognition of sales revenue from the acquisition of GLOW in 1Q2020 as well as higher sales revenue of Sriracha Power Plant from higher Availability Payment (AP) corresponding to the depreciation of Thai Baht against the US Dollar as well as higher dispatch volume from EGAT.

EBITDA in 1Q2020 was Baht 5,668 million, increasing by Baht 2,960 million or more than 100% due to the rise in gross profit following higher sales revenue as aforementioned, despite higher maintenance cost as well as higher selling and

administrative expenses from employee expense. In this regard, in 1Q2020, operating income was Baht 2,935 million, increasing by Baht 1,487 million or more than 100% owing to the increase in EBITDA, while depreciation and amortization expenses increased Baht 1,473 million according to GPSC's acquisition of GLOW and CUP-4 which has commenced the Commercial Operation Date (COD) in 4Q2019. As a result, the overall performance of Technology and Engineering Business increased mainly from GPSC which performance reported at Baht 1,580 million in 1Q2020, increasing by Baht 638 million mainly from recognition of GLOW's performance.



Overall performance of PTT Group

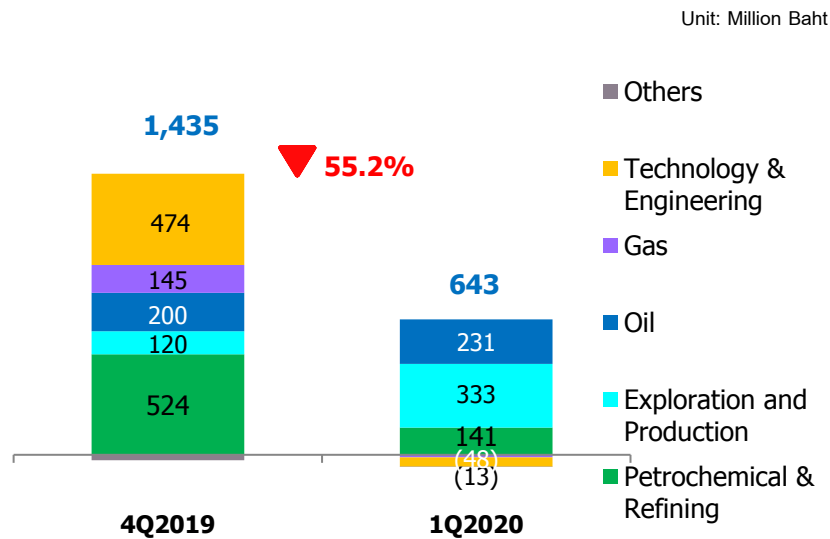
First quarter of 2020 compared with Fourth quarter of 2019

In 1Q2020, Sales Revenue of PTT Group was reported at Baht 483,567 million, decreasing by Baht 76,539 million or 13.7% from 4Q2019 mainly from lower sales revenue in almost business groups from lower selling prices and sales volume.

EBITDA in 1Q2020 was Baht 32,385 million, drop 51.6% or by Baht 34,563 million when compared to 4Q2019. This resulted mainly from the lower performance in the **Petrochemical and Refining** Businesses due mainly to stock loss approximately amounting to Baht 32,000 million in 1Q2020 versus the stock gain in 4Q2019 approximately amounting to Baht 1,300 million, from lower petroleum and petrochemical prices following the sharply drop in crude oil price. At the end of 4Q2019 was recorded at US\$ 67.3 while 1Q2020 was recorded at US\$ 23.4 per barrel. This was due to Oil Price War and the oversupply as OPEC and its allies failed to reach an agreement in oil production cut together with the drop on demand of Petroleum and Petrochemical products from economic slowdown according to the COVID-19 pandemic leading to the lockdown during. In addition, market GRM decreased from lower petroleum product spreads and olefins spreads, despite the higher of aromatics spreads, together with lower sales volume. The **Exploration and Production** Business's performance softened driven by the decrease in sales volume and lower average selling prices despite lower operating expenses according to lower sales volume. Moreover, **Gas business group's** performance decreased mostly from GSP's lower sales volume due to planned turnaround of GSP#5's aligned with customers' planned turnaround and S&M's lower fuel oil referenced selling prices to industrial customers. The **Technology and Engineering business's** performance increased due to higher revenue from availability payment of IPP and lower natural gas cost of SPP. Performance of **Coal business** increased mainly from lower cost of sales and higher selling prices. Likewise, the performance of **Oil business** increased from lower operating expense.

The depreciation and amortization expenses in 1Q2020 amounting to Baht 35,865 million, was closed to the previous period.

Share of net income from investments in joint ventures and associates



In 1Q2020, the share of net income from investments in joint ventures and associates was Baht 643 million, decreasing by Baht 792 million or 55.2% from lower performance of joint ventures in Petrochemical and Refining business mainly from lower product spread of Acrylonitrile (AN) and PP businesses as well as lower performance of associates in Technology and Engineering Business according to the decrease in electricity production from Xayaburi Power Point due to drought situation in this quarter. Nevertheless, performance of joint ventures in Petroleum Exploration and Production Business increased from business acquisitions of the Partex.

Gain on derivatives increased by Baht 7,700 million from Baht 770 million in 4Q2019 to Baht 8,470 million in 1Q2020, mainly due to unrealized gain on oil price hedging instruments from PTTEP and PTTT.

Loss on foreign exchange rate increased by Baht 8,748 million from gain on foreign exchange rate of Baht 3,673 million in 4Q2019 to loss on foreign exchange of Baht 5,075 million in 1Q2020, mainly due to unrealized loss from foreign exchange rate of US Dollar loan as a result of Baht depreciation compared with the previous quarter. (Baht depreciation 2.50 baht per dollar in 1Q2020, Baht appreciation 0.44 baht per dollar in 4Q2019)

In 1Q2020, there was no non-recurring items, while in 4Q2019 there were PTT's recognition expenses in accordance with the Civil Court's judgment to pay damage in the dispute on the pipeline Construction Contract of Sai Noi-North/South Bangkok Power Plants amounting to Baht 2,105 million, the allowance for impairment of the gas pipelines transmission to deliver the construction area of High-Speed Train project connected 3 Airport amounting to Baht 498 million together with IRPC's recognition on reversal of assets impairment amounting to Baht 770 million.

Finance costs was Baht 6,955 million in 1Q2020, increased by Baht 1,111 million from Baht 5,844 million in 4Q2019 mainly due to TOP's capitalization of finance costs as a part of assets in 4Q2019.

The corporate income taxes in 1Q2020 was Baht 8,618 million, increasing by Baht 1,607 million from Baht 7,011 million in 4Q2019, or 22.9%, mainly from PTTEP's higher tax expense due to Baht depreciation, despite lower tax expense in almost businesses according to lower performance.

Therefore, PTT Group reported net loss in 1Q2020 amounting to of Baht 1,554 million, decreasing by Baht 19,000 million or more than 100% from net profit in 4Q2019 of Baht 17,446 million.

First quarter of 2020 compared with First quarter of 2019

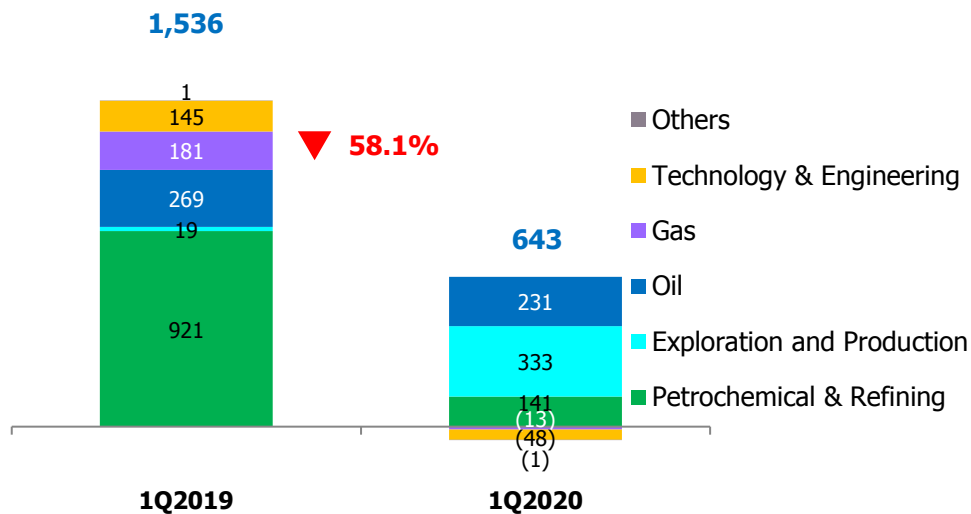
In 1Q2020, sales revenue of PTT Group was Baht 483,567 million, decreasing by Baht 67,307 million or 12.2% from 1Q2019 mainly from most business groups due to lower selling prices and sales volume besides the sales revenue from Technology and Engineering business and Exploration and Production Business. The sales revenue of the Technology and Engineering business increased owing to GPSC's acquisition of GLOW by the end of 1Q2019 and increased due to higher sales volume from the PTTEP's acquisition of the Malaysia project and Partex in the second half of 2019 (2H2019) together with the increase in Bongkot project sales volume from fewer maintenance shutdown days in 1Q2020 than 4Q2019 while the average selling price decreased.

In 1Q2020, EBITDA was Baht 32,385 million, decreased by Baht 48,138 million or 59.8% when compared to 1Q2019. This was mainly due to the **Petrochemical and Refining businesses's** significant stock loss in 1Q2020 versus the stock gain in 1Q2019 approximately amounting to Baht 6,000 million as the increase in crude oil prices at the end of 1Q2020 compared to the end of 4Q2018. The Market GRM also dropped regarding to lower spreads of jet, diesel and high sulfur fuel oil (HSFO) as well as the decrease in olefins and aromatics spread. In addition, the performance of the **Gas business group** decreased mainly from the GSP's lower selling prices and sales volumes, and the S&M's lower fuel oil referenced selling price. Also, the performance of **Oil business** decreased from higher stock loss and lower sales volume during the COVID-19 pandemic. Nevertheless, the performance of **Technology and Engineering businesses** improved particularly from GPSC's performance according to the full quarter recognition of GLOW in 1Q2020. Moreover, performance of **Petroleum Exploration and Production Business** increased from higher revenue from Malaysia and Partex project.

The depreciation and amortization expenses of Baht 35,865 million in 1Q2020 rose by Baht 4,670 million or 15.0%, from 1Q2019 of Baht 31,195 million mainly from the depreciation and amortization expenses from the business acquisitions of Malaysia project and the Partex as well as the increase in production volume from Bongkot project and GPSC's acquisition of GLOW at the end of 1Q2019

Share of net income from investments in joint ventures and associates

Unit: Million Baht



In 1Q2020, the share of net income from investments in joint ventures and associates was Baht 643 million, decreasing by Baht 893 million or 58.1% from Baht 1,536 million in 1Q2019. This was primarily from lower performance of joint ventures in Petrochemical and Refining business due to lower product spreads as aforementioned as well as lower performance of associates in Technology and Engineering Business according to the decrease in electricity production of Xayaburi power plant as the drought situation in this quarter. Nevertheless, performance of joint ventures in Petroleum Exploration and Production Business increased from business acquisitions of the Partex.

Gain on derivatives increased by Baht 12,250 million from loss on derivatives of Baht 3,780 million in 1Q2019 to gain on derivatives of Baht 8,470 million in 1Q2020, mainly due to unrealized gain on oil price hedging instruments of PTTEP and PTTT.

Loss on foreign exchange rate increased by Baht 8,950 million from gain on foreign exchange rate of Baht 3,875 million in 1Q2019 to loss on foreign exchange rate of Baht 5,075 million in 1Q2020, mainly due to unrealized loss of US Dollar loan as a result of Baht depreciation compared with 1Q2019. (Baht depreciation 2.50 baht per dollar in 1Q2020, Baht appreciation 0.63 baht per dollar in 1Q2019)

In 1Q2020 and 1Q2019, there was no non-recurring items.

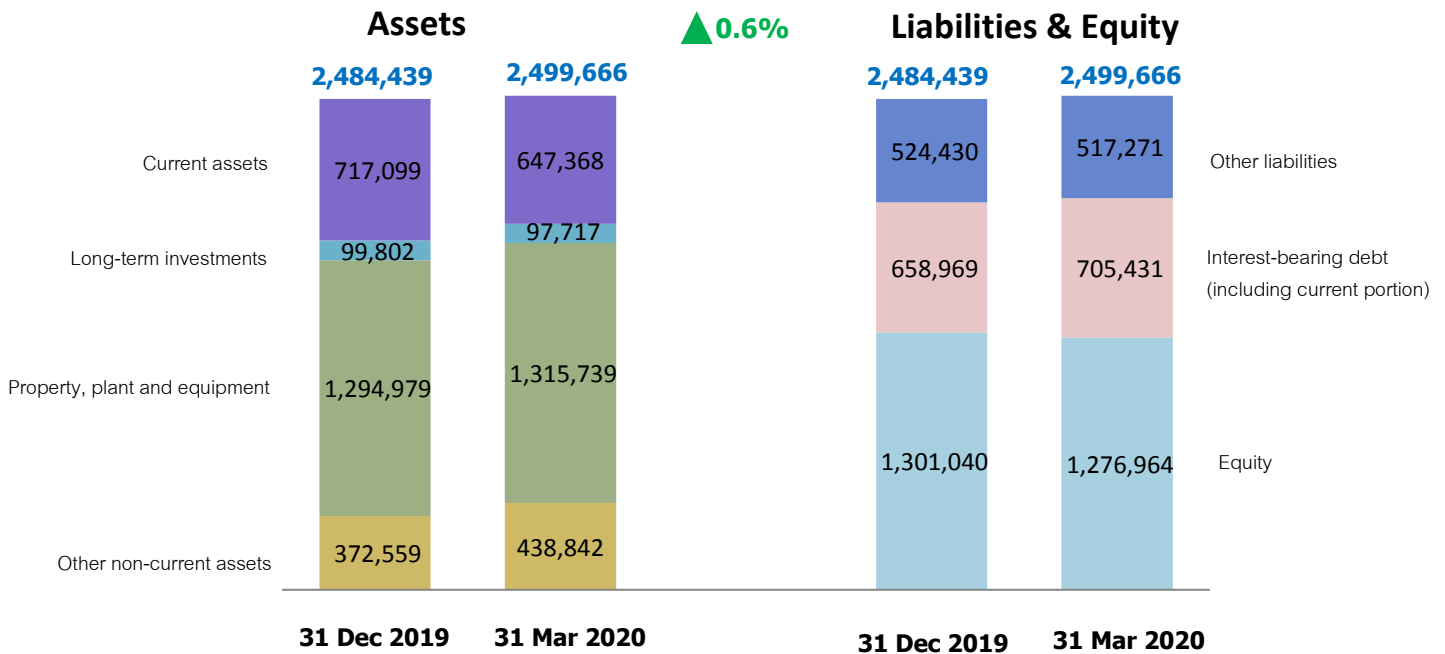
Finance costs was Baht 6,955 million in 1Q2020, which was closed to the same period last year.

The corporate income taxes in 1Q2020 was Baht 8,618 million increasing by Baht 1,247 million or 16.9% from Baht 7,371 million in 1Q2019 mainly from PTTEP's higher tax expense due to Baht depreciation, despite lower tax expense from Petrochemical and Refining business due to the softer performance.

Therefore, PTT Group reported net loss in 1Q2020 amounting to Baht 1,554 million, decreasing by Baht 30,866 million or more than 100.0% from the net profit in 1Q2019 amounting to Baht 29,312 million.

The analysis of PTT Group consolidated financial position
as of March 31, 2020 compared with December 31, 2019

Unit: Million Baht



Assets

As of March 31, 2020, total assets of PTT Group were Baht 2,499,666 million, increasing by Baht 15,227 million or 0.6% compared with December 31, 2019 mainly from the net effect of the followings:

: Current assets decreased by Baht 69,731 million or 9.7% mainly from the followings:

- Trade accounts receivable decreased by Baht 51,876 million mainly from the decrease in overall trade volume and selling price of PTT, PTTT, PTTT LDN, OR, PTTEP and TOP.
- Inventories decreased by Baht 29,622 million primarily due to crude oil as a result of the decrease in volume and price from TOP, PTTT, IRPC and GC.

: Property, plant and equipment increased by Baht 20,760 million or 1.6% mainly from PTTEP due to currency translation differences from Thai Baht depreciation. Additionally, there were the additional construction in progress of PTT Group, for instance, TOP's Clean Fuel Project, GC's Olefins Reconfiguration and Propylene Oxide Projects, and PTT's the 5th transmission pipeline project.

: Other non-current assets increased by Baht 66,283 million or 17.8% mainly from the increase in right of use by Baht 70,404 million according to the adoption of Thai Financial Reporting Standard – Leases in 2020.

Liabilities

As of March 31, 2020, PTT Group had total liabilities of Baht 1,222,702 million, increasing by Baht 39,303 million or 3.3% from March 31, 2019, mainly from

: Other liabilities decreased by Baht 7,159 million or 1.4% mainly from the decrease in trade accounts receivable due to the decrease in overall trade volume and purchase price of PTT, PTTT, PTTT LDN, TOP and OR.

: Interest-bearing debt increased by Baht 46,462 million or 7.1% primarily from the increase in lease liabilities according to the adoption of Thai Financial Reporting Standard – Leases in 2020 as well as the increase in long-term loans of Baht 19,678 million due to currency translation difference from Thai Baht depreciation. On the other hand, short-term loans decreased by Baht 15,956 million from GPSC's short-term loan repayment.

Equity

As of March 31, 2020, PTT Group had total shareholders' equity of Baht 1,276,964 million, decreasing by Baht 24,076 million or 1.9% from the year ended 2019. PTT Group reported 1Q2020 net loss amounting to Baht 1,554 million. Additionally, PTT's dividend payment from the performance of the second half of year 2019 at Baht 1.1 totalling of Baht 31,418 million. There were the increases in other components of equity by Baht 21,787 million due to currency translation differences mainly from PTTEP and non-controlling interests decreased by Baht 12,241 million from losses of subsidiaries.

Liquidity

For the 3-month ended March 31, 2020, PTT Group had net decrease in cash and cash equivalents amounting to Baht 38,197 million, cash and cash equivalents at the beginning of the period was Baht 292,542 million. As a result, cash and cash equivalents at the end of the period was Baht 254,345 million. Details of cash flow by activities are as follows:

	Unit: Million Baht
	PTT Group
Net cash provided by operating activities	61,243
Net cash used in investing activities	(69,218)
Net cash used in financing activities	(27,056)
Effects of exchange rates on cash and cash equivalents	3,860
Currency translation differences	(7,026)
Net decrease in cash and cash equivalents during the period	(38,197)
Cash and cash equivalents at the beginning of the period	292,542
Cash and cash equivalents at the end of the period	254,345

Net cash provided by operating activities of Baht 61,243 million was derived from Baht 5,388 million of loss before income taxes, adjusted loss before income taxes to net cash provided by (used in) operating activities. The increase in net cash flow from operating activities mainly resulted from Baht 35,865 million of depreciation and amortization expenses, Baht 12,619 million of allowance for loss on decline in value of inventories, Baht 7,100 of loss on exchange rates, Baht 6,955 million of finance costs. The decrease in net cash flow from operating activities mainly resulted from Baht 8,835 million of unrealized gain on derivatives, Baht 1,250 million of interest income together with the increase in net operating assets of Baht 15,618 million and income taxes paid of Baht 3,869 million.

Net cash used in investing activities was Baht 69,218 million mainly resulted from the followings:

: The cash outflow of investments in property, plant and equipment, investment property, intangible assets, and exploration and evaluation assets amounting to Baht 43,623 million, mainly due to additional investment of TOP's Clean Fuel Project, additional investment in exploration and production assets in Mozambique Area 1 and S1 of PTTEP, additional investment of GC's projects; Olefins Reconfiguration and Propylene Oxide, and PTT's the 5th transmission pipeline project, and the extension of 1st transmission pipeline project.

: The cash outflow from short-term investment in financial assets amounting to Baht 27,515 million, from TOP and PTT amounting to Baht 18,599 million and Baht 8,132 million respectively mainly from the investment in fixed deposits.

Net cash used in financing activities was Baht 27,056 million, mainly from the followings:

: The net cash outflow of long-term loans repayment of Baht 1,562 million mainly from PTTEP, GC, GPSC, IRPC and TOP

: The cash outflow of short-term loans repayment of Baht 16,840 million principally from the repayment of loans of GPSC

: Finance costs paid amounting to Baht 7,257 million mainly from GC, PTTEP, TOP, PTT, GPSC and IRPC.

: The cash outflow for redemption of PTTEP's subordinated capital debentures amounting to Baht 965 million.

Financial ratios and earnings per share of PTT Group

Financial Ratio	Unit	1Q2019	1Q2020
<u>Profitability Ratios</u>			
Gross profit margin	%	12.59	3.59
Net profit margin	%	7.19	(2.90)
<u>Solvency Ratios</u>			
Interest coverage	Times	11.99	8.97
<u>Earnings per share</u>			
Earnings per share	Baht/share	1.02	(0.06)

Financial Ratio	Unit	Dec 31, 2019	Mar 31, 2020
<u>Liquidity Ratios</u>			
Current ratio	Times	1.89	1.84
Quick ratio	Times	1.31	1.26
<u>Solvency Ratios</u>			
Debt to equity	Times	0.51	0.55

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 for the Rest of 2020

The world economy in 2Q2020 is expected to contract, following 1Q2020. Specifically, US economic growth is projected to experience a sharp contraction, due to weak labor market and downturn in business investment, amid rapid spread of COVID-19, despite benefit from fiscal stimulus, including a historic \$2 trillion coronavirus relief package, voted to pass the legislation on 27 March 2020. In Euro area, economic growth is expected to continue to plunge, due to severe disruption in economic activities and weak labor market, amid COVID-19 outbreak. However, Both US and Euro area economy will see a gradual recovery from late 2Q2020 onwards. Meanwhile, China economic growth is projected to slowly rebound, due to relatively successful containment of the virus, amid major constraints from external headwinds.

The world economy in the second half of 2020 (2H2020) is expected to recover from gradual lifting of containment measures after effectively preventing the spread of COVID-19, and further monetary and fiscal policies taken around the world. The International Monetary Fund (IMF) in April 2020 revised down its global growth forecast for 2020 to -3.0% from its January 2020 forecast of +3.3%. Downside risks to the world economy include longer outbreak, intensity and efficiency of containment efforts, repercussion of tightening financial market, and rising geopolitical tensions.

According to the IEA's report of April 2020, global oil demand in 2Q2020 is expected to shrink 17.2 MMBD from demand in 1Q2020 to the level of 76.2 MMBD in 2Q2020 amid lower demand resulted from COVID-19 outspread. The global oil demand is expected to shrink by 9.3 MMBD from demand in 2019 to the level of 90.7 MMBD in 2020. However, Oil demand is expected to recover during 2H2020 amid containment of COVID-19. In addition, in April 2020,, OPEC+ agreed to cut oil production at 9.7 MMBD in May-June 2020 and 7.7 MMBD afterwards until the end of 2020 as well as the decrease of oil supply from Non-OPEC producer who shut-in oil production and investment resulted from lower oil price. This results that Oil price could be gradually increase, and Dubai crude oil price is expected to average US\$30-40 per barrel in 2020. Meanwhile, the Singapore GRM in 2020 is expected to average US\$2.0-3.5 per barrel, decreasing from 2019 from COVID-19 outspread.

Petrochemical prices of Olefins and Aromatics in 2Q2020 tend to be lower comparing to 1Q2020 because of subdue demand as a result of COVID-19 outbreak, which distributed worldwide. Meanwhile, the supply is ample. Many products still have high inventory level. Therefore, HDPE price is forecasted to average at 710-730 USD/ton. PP price is expected to be around 790-810 USD/ton. For Aromatics, average BZ tends to be lower at 320-340 USD/ton and PX is projected to be lower at 480-500 USD/ton.

In 2020, Petrochemical prices of Olefins and Aromatics tends to decrease from 2019 due to COVID-19 pandemic effected to economics and spending on luxury goods such as automobiles, appliances, and textiles. Furthermore, significant inventory build-up is expected to further keep the pressure on prices. The market is mostly oversupplied from new production. Average HDPE price is anticipated at 770-790 USD/ton, with constraint from new petrochemical plants in China. PP price is expected to be around 860-880 USD/ton, pressured by new capacity in China and Malaysia. For

Aromatics, there are several new large capacity start up in China and Brunei. Therefore, PX and BZ is projected to average at 590-610 USD/ton and 450-470 USD/ton respectively.

Thai economy in 2Q2020 is expected to contract, compared to 1Q2020, following a fall in merchandise exports, driven by an economic slowdown of key trading partners, and supply chain disruption, amid the spread of COVID-19. Furthermore, tourism is also expected to drop in almost all nationalities as a result of travel restriction measure to contain the spread of COVID-19. In the meantime, private consumption is expected to decelerate on the back of the Emergency Decree on Public Administration in Emergency Situation since 26 March 2020, as well as, a decline in household income and the effects from the drought and still-high household debt constraining domestic demand, while private investment is likely to fall, in consistent with a drop in imports of capital goods. Nonetheless, public consumption remained a growth driver, specifically from the headways of the investment in mega-infrastructure projects. Meanwhile, Thai economy still faces with some downside risks from the more-severe and prolonged than envisaged of the spread of COVID-19 weighing the global economy, a slower-than-expected recovery in tourism sector, and an uncertainty from public consumption, particularly from the stimulus measures.

Thai Economy in 2020 is expected to drop, compared to 2019, following the contraction of merchandise exports, amid the economic slowdown of key trading partners, as well as, the fall in tourism due to the spread of COVID-19. Meanwhile, private consumption is expected to decrease following the decline in household income, amid the decline in business confidence. As for private investment, it is likely to decline, in line with capacity utilization rate. However, government consumption is still remained a growth driver, specifically from the headways of the investment in mega-infrastructure projects and the government stimulus measures. In addition, the Bank of Thailand in March 2020 revised down Thai economic growth forecast for 2020 to -5.3% from its December 2019 forecast of +2.8%.

Impacts and Mitigation plan of the COVID-19 pandemic situations and the oil price war

The widespread of the COVID-19 pandemic situations in many countries around the world has significantly slowed down global energy demand, the consumer demand, and the economy as a whole coupled with the uncertainty of the crude oil price war which is causing the great fluctuation of the petroleum and petrochemical products prices, those uncontrollable situations will affect the performance of PTT Group in 2020.

Therefore, PTT Group has average Dubai crude oil price assumption in 2020 ranges from US\$30-40 per barrel, and anticipates the impact from the above situations and assumptions as follows:

Exploration and Production business: The product sales volume of exploration and production businesses in both natural gas and crude oil, depends on demand in the electricity and petrochemical sectors that are related to the rate of economic growth. Therefore, it is expected that the average sales volume in 2020 will be about 7% lower than projected business plan.

Gas Business: The overall demand for natural gas in 2020 is expected to decrease by 5-10% from 2019, which will directly affect the natural gas Sales & Marketing business (S&M), the Natural Gas Separation Plant business (GSP) and the Natural Gas for Vehicles business (NGV) especially in the industrial and transportation sectors while the natural gas transmission business (TM), and the LNG Receiving Terminal business through PTT LNG Company Limited (PTT LNG) will not be affected by the above situation since the sales volumes are committed and the tariff prices were agreed by government.

International Trading: Restriction and lockdown measures in many countries have caused economic activities to be interrupted or slowed down including production cuts run in domestic refineries and the reduced global demand, leading to a decrease in sales volume of the trading business, especially in imported (out-in) activities and international (out-out) trading activities. It is estimated that the sales volume of the trading business will decrease by 5% from the year 2019. In this regard, the margin may be reduced according to the reduced sales volume due to the current oversupply market condition.

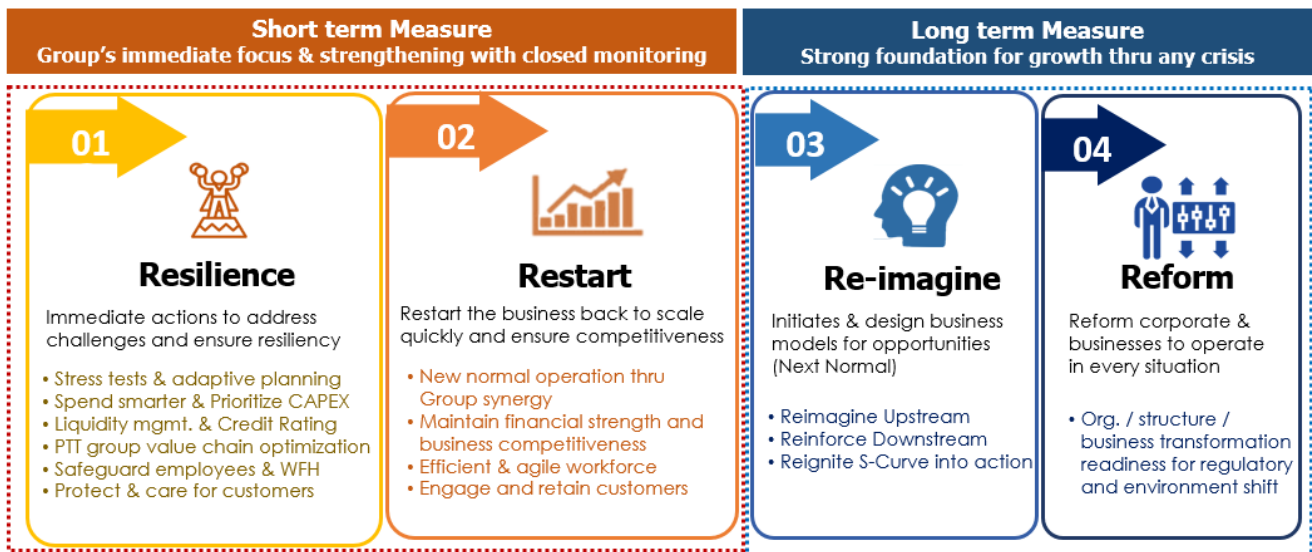
Oil business: The impact from lower domestic demand affects the sales volume of both oil and retails business, thus will vary in accordance with Thailand gross domestic product (GDP). Thailand's GDP is primary affected by tourism and exports declined, thus lowering the demand for refined products such as Jet fuel, diesel, and gasoline.

Petrochemical and Refining business: The refinery business is mostly affected in the product of jet fuel from the government worldwide restrictions and lockdown policy such as the shutdown of the airlines' operations. Nevertheless, the refining companies in PTT Group have the mitigation plan to counter the situation by configuring the production plan to reduce the amount of jet fuel production and turn to produce diesel fuel instead because the demand of diesel in the market has not decreased as much. Therefore, PTT Group refineries and petrochemical forecasts the Utilization Rate in 2020 at 90% - 100%.

Power business: The Ministry of Energy expects the country's electricity usage in 2020 to decrease by 0.7% from the previous predicted growth of 3%. However, the power business of PTT Group which sells to EGAT is not expected to be much impacted while Industrial Users (IUs), most of which are petrochemicals, would be affected according to the economic slowdown.

Mitigation Plan and Measures:

PTT group will closely monitor the situation and proceeded to manage and issue various measures by establishing the PTT Group Vital Center to plan and manage the overall responses in both short-term and long-term crisis situations followed by the 4R's guidelines: Resilience, Restart, Re-imagination, and Reform.



PTT Group places importance on urgent actions in accordance with the 2R's Resilience and Restart guidelines to maintain PTT's competitiveness and strength and be ready when the situation returns to normal while maintaining competitive advantage by accelerating important projects as follows:

Spend Smarter & Prioritize CAPEX manages expenses management through measures "Decrease-Discard-Defer" by "Decrease" expenses and outsourcing by focusing on self-operation as much as possible, "Discard" travel and unnecessary activities, "Defer" investment that is not accelerated by prioritizing investment projects. It is expected that the entire PTT group will be able to reduce operating costs (OPEX) and review the reduction of investment plans (CAPEX) in 2020 by 10-15%. However, investment projects that are currently under construction, such as PTT's Gas Pipeline #5 and TOP's Clean Energy Projects still proceed as in the original investment plan. PTT Group also emphasizes on creating a corporate culture of cost consciousness.

Cash Flow Preservation manages liquidity and maintains financial strength of PTT Group by providing liquidity from bank loans or intercompany borrowing and lending among between PTT Group. Prefunding would be in readiness according to the appropriate market conditions including reviewing the use of funds for short-term investments by focusing on investments tools with low risk and high liquidity in order to have adequate liquidity level while having account

receivables' risk management, appropriate measures to help debtors' and account receivables' liquidity as well as tax administration from various tax assistance measures as announced by the government.

Maintain continuity of business operations PTT Group has cooperated the PTT Group value chain optimization to manage the demand, supply, and inventory to maximize the benefits. Each of the business group has its mitigation plans in place to maintain the competitiveness and strength of PTT Group in the midst of various uncertainties as follows:

Exploration and production business: The Company has entered into oil price hedging contracts in limited amount to manage the fluctuation of crude oil and factors which impacted to product prices. At the end of 1Q2020, there is outstanding volume of oil price hedging in an approximate amount of 10 million barrels for flexibility in hedging plan as appropriate.

Gas business: manage the gas demand according to the situation of the domestic demand for natural gas by managing gas procurement thru the existing contracts according to minimum required terms and conditions to have the lowest cost level. Additionally, the plan to procure spot LNG at a low price to reduce gas costs and to alleviate the cost of living during the COVID-19 situation, as well as planning to optimise the operation of GSP to match the needs of domestic fuel and petrochemical customers, for the highest efficiency of PTT and for the highest benefit of the country.

Oil business: have inventory management measures by reducing operational inventories to an appropriate level Demand Accuracy management, and oil transportation management from the sourced oil terminal to regional warehouses in order to control costs appropriately.

Petrochemical and Refining Business: PTT Group considers overall business performance in the form of Group optimization through collaboration in the overall operation of the PTT group for maximum benefit and does not affect normal business operations.

Inventory management measures: every company tries to reduce the amount of inventory to an appropriate level to meet the needs of the market including risk management such as hedging and crude management to reduce market fluctuations, increase product distribution channels, and create synergy within PTT Group. Refining and Petrochemical business groups has planed to sell products that were originally bought from or sent to countries that have announced the lock down measures to other countries, as well as maintaining the domestic market share. However, the trade partners' financial position must be closely monitored.

Production plan measures: monitor and adjust the production plan in accordance with the highly volatile market situation, in order to minimize the impact to the production.

As for the long-term management, PTT Group will operate concurrently with 2R's (short-term) by using the opportunity to create new businesses and change the organization structure for sustainability, using the opportunity to develop & improve the operation model to be more efficient, countering all types of future crisis conditions by business

design (Re-imagination) to support the change to 'Next normal' and Reform the organization in terms of businesses structure, and operating style to be ready for the future.

Human Resources

PTT Group places great importance on the safety and health care of its employees and their families. PTT has put preventive and surveillance measures in accordance with government measures to reduce the risk of the spread of COVID-19, such as measures for employees to work from home during the COVID-19 pandemic to reduce the number of employees working in the office space. The performance of all employees is based on corporate values (SPIRIT + D): Values "to build confidence" TRUST (T) & Respect with supervisors considering the plan of working in the office area on a daily basis as appropriate or if the employees are at risk from being infected with COVID-19, they must work from home according to the infectious disease prevention and control measures by setting a surveillance period of 14 days after returning from the country or area with an outbreak and must report the progress to the PTT's Palungjai Center.

In addition, the operations of each business units have preventive measures for the safety of their operating personnels and for business continuity management such as Natural gas business unit has measures regarding Critical person and Social Distancing as follows:

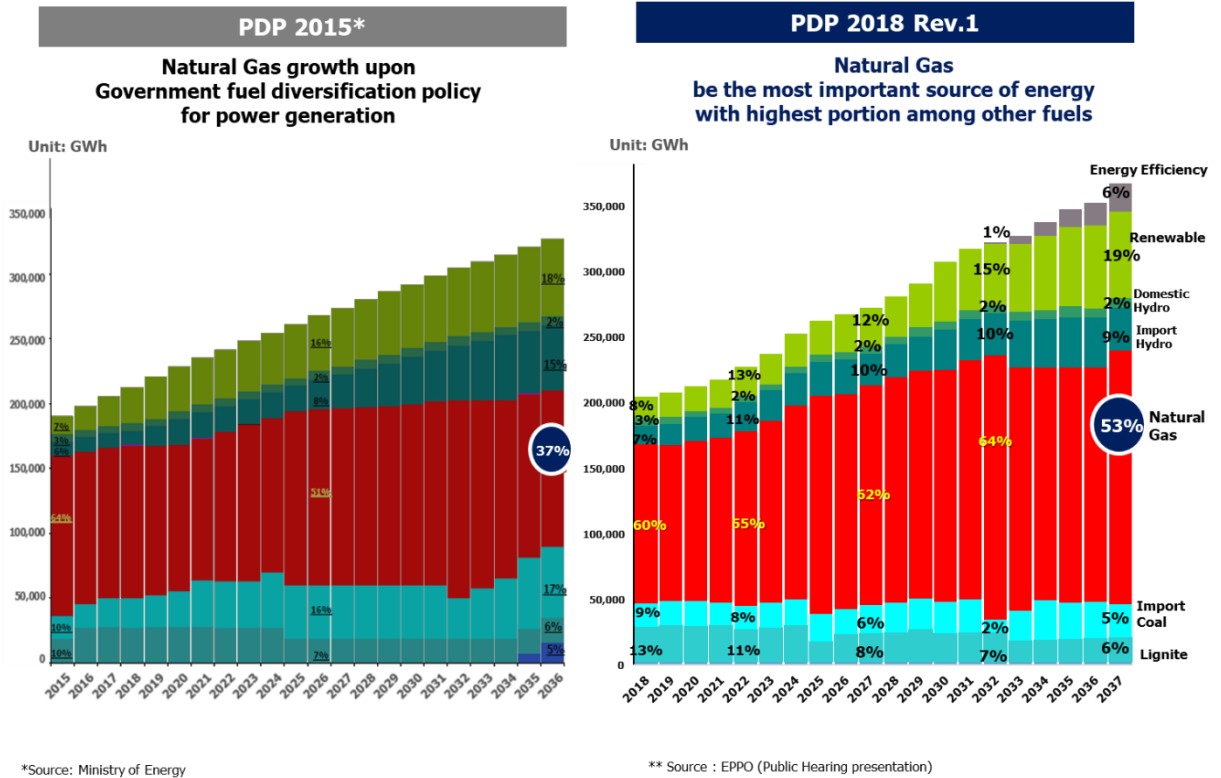
- Plan and define the necessary operational team and critical person by rearranging work schedule and assigning additional reserve teams (Staff be divided into 3 teams, 7 working days and 14 days off) and setting up the second site of the main control room in the production process.
- Strictly screening employees, contractors, and external parties before entering into the operating area and detain group of employees or contractors at risk for at least 14 days, impose measures for social distancing and reduce congestion area, such as limiting access to operating area by allowing only important personnel to enter into the area. Specifying measures to prevent employees from travelling outside the province of work.

PTT Group is confident that we would be able to bring the business back to normal as soon as possible while being able to adjust the operation model to support the current economic climate including new business model so that PTT Group is ready to handle all situations that may occur in the future. In the stress case, PTT Group are still able to invest according to the committed capital expenditure plan for the next 5 years in accordance with "Decrease-Discard-Defer" measures, maintaining a credit rating at the investment grade level and/or higher. Thus, PTT is able to maintain its credit rating at the BBB+ level, which is the same as sovereign rating together with maintaining the high level of liquidity and strong financial position.

Major Project Plan

Gas Business Group

Newly Thailand Power Development Plan



The assumption of Thailand’s gas demand growth during the year 2020 – 2024 is increasing at the rate of 4.9% following the growth of natural gas for power demand according to Power Development Plan (PDP) 2018 Rev.1 with additional gas power plants from 37% in 2036 (PDP 2015) to 53% in 2037 (PDP2018 Rev.1) to roll in more natural gas as the major fuel for power into the system starting from 2024 onwards. Gas power plants will replace coal-fired power plant that inability to feed in the system as planned in PDP2015. Consequently, the gas demand in the power sector increased.

On March 19, 2020, PDP 2018 Rev.1 had agreed by the National Energy Policy Council (NEPC) following principles and assumptions according to PDP 2018 by maintaining the electricity production target throughout the plan up to 2037 at 56,431 megawatts. Therefore, the total power generation capacity remains at 77,211 MW at the end of the PDP plan, but there is the amendment of the electricity distribution plan of a renewable and fossils power plant align with government policy and the fluctuating situation. For example, (1) Adjusting the target to buy electricity from renewable energy (new) in some types of fuels with the target at 18,696 megawatts, by reducing solar electricity production and increasing the target of the small power plant of EGAT of 69 MW and increasing the target of biogas electricity (energy crops) (2) Increasing community power plant policy for the local economy (biomass), biogas (wastewater and energy crops), and Solar hybrid into the system from 2020 to 2024 with a total capacity of 1,933 MW (3) Slowing down southern

biomass power plants 60 MW per year from 2021-2022 to 2022-2023 (4) Accelerating the purchase of electricity from wind power from 2034 to 2022. (5) Using the same assumption as in PDP2018 for the purchase of renewable energy power plants (exclude community power plants) after 2024, with a similar proportion of fuel power generation compared to previous plan; natural gas 53%, renewable 21% (previous 20%), coal and lignite 11% (previous 12%), import hydropower 9%, and 6% energy efficiency.

The Progress: PTT and its' Subsidiaries' Project

Pipelines transmission Projects

- The 5th Transmission Pipeline (Rayong - Sai Noi – North/South Bangkok power plants)
 - Total Project Progress as of March 2020: 85.62%
 - COD 2021
- RA#6 – Ratchaburi Pipeline Project
 - Total Project Progress as of March 2020: 95.06%
 - COD 2021

LNG Project:

Currently, PTT have long term LNG contracts with Qatar gas, 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 March 2020: 41.72%

- Total Capacity 7.5 MTA approved by the Cabinet meeting on 11 April 2017
- COD: Year 2022

- **Other LNG Receiving Terminal Project:**

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 70% and 30%, respectively) is to proceed land reclamation with the investment cost of approximately Baht 12,900 million which is expected to be completed by Year 2023 as well as having the right to construct LNG terminal phase 1 with the capacity not less than 5 million tons per annum. The LNG terminal phase 1 has an investment cost not exceeding Baht 28,000 million which is expected to be completed by the year 2025.

NGV Plan

Currently, PTT is in the process of coordinating the Ministry of Energy to review NGV's retail price structure to reflect actual cost according to the study of Khon Kaen University. Additionally, there is also a study on floating retail prices by referencing to the diesel retail price.

In term of NGV price for public vehicles, on 25 March 2020, the CEPA approved to uplift the price for NGV for public vehicles of Baht 3 per kilogram to Baht 13.62 per kilogram for 3 months since 1 April – 30 June 2020.

Summary Planned Shutdown for Gas Separation Plants in 2020

Plant	1Q2020	2Q2020	3Q2020	4Q2020
GSP #1	T/A (1 -2 Jan : 2 days)	Major T/A (6 – 30 Jun : 25 days)		
GSP #2				
GSP #3				
GSP #4				
GSP #5	Major T/A (20 Jan – 8 Feb : 20 days) TD 50% (9 Jan – 17 Feb : 27 days)		TD 12% (Aug - Sep : 28 days)	TD 12% (Oct - Nov : 28 days)
GSP #6				TD 12.5% (Dec : 28 days)
ESP				

*TD: Plant Turn down

**SD : Shut down

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)

Coal Business consists of PTT Energy Resources Company Limited (PTTER), PTT Global Management Company Limited (PTTGM)

Oil Business consists of PTT Oil and Retail Business Public Co., Ltd. (OR)

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

Petrochemical and Refinery Business consists of PTT Global Chemical Public Company Limited (GC), 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)

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 Regional Treasury Center Pte. Ltd. (PTTRTC) and PTT Treasury Center Company Limited (PTT TCC)