



PTT Global Chemical Public Company Limited

Management Discussion and Analysis FY2021

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1. Executive Summary

In Q4/2021, PTT Global Chemical Public Company Limited (“the Company”) had total sales revenue of Baht 139,298 million, increased by 24% from Q3/2021 and increased by 59% from Q4/2020. The revenue has grown continuously supported by the rise of petroleum products tracking with crude oil price and the demand recovery from lockdown restriction of COVID-19 ease. Moreover, petrochemical products price increased due to the demand persists and tightening supply from maintenance shutdown and the slowdown in production of some producers in the region. In term of sales volume, in this quarter the Company’s sales volume increased from petroleum products after the completion of maintenance shutdown in the previous quarter, even there was a decrease in sale volume of petrochemical products from maintenance shutdown in Polymer business and Phenol business. However, the increasing of crude oil price has direct impact on raw material cost. As a result, in Q4/2021, The Company had Net Operating Profit Recurring (excluding Stock Gain Net NRV, Foreign Exchange loss, Gain from commodity hedging, and Extraordinary items) of Baht 3,462 million, decreased from Q3/2021 and Q4/2020 by 60% and 17%, respectively. The Company had Adjusted EBITDA of Baht 11,635 million in this quarter, decreased by 17% from Q3/2021, but increased by 22% from Q4/2020. After considering the results of Stock Gain Net NRV of Baht 1,040 million, Gain from commodity hedging of Baht 1,462 million, Foreign Exchange loss of Baht 1,899 million, the Company reported Net Profit in Q4/2021 of Baht 3,248 million (Baht 0.72/share), decreased by 54% from Q3/2021. In Q4/2021, the Company had recorded extraordinary items from loss on impairment of assets of Baht 1,886 million, provisions by a subsidiary for legal obligations of Baht 444 million and gain from sale of investment in joint ventures totaling Baht 1,388 million.

In Q4/2021, Olefins and Derivatives Business Unit’s performance was slightly decreased due to the increase in Naphtha and LPG prices, following an increasing of crude oil price, which increased at higher proportion to the increase in average price of Polyethylene (PE). This resulted to Adjusted EBITDA Margin of Olefins and Derivative Business Unit in this quarter at 12%, declined from the previous quarter and Q4/2020. For the Aromatics business, the BTX P2F was at 101 USD per ton, decreased from the previous quarter and Q4/2020, due to the increase in condensate price following the increase in crude oil price. While there was a decrease in the Aromatics product prices due to the pressure from China’s energy consumption policies, which directly pressured to the operating rate of the end products. Performance Materials & Chemicals Business Unit’s performance slightly decreased due to planned maintenance shutdown of Phenol plant for 26 days and the decrease in Bisphenol-A price due to increasing supply in the market. For Refinery Business Unit, in Q4/2021, the Market GRM was at 6.35 USD per barrel, increased from the previous quarter and Q4/2020, followed the increase in products spread and demand recovery from lockdown restriction of COVID-19 ease. Moreover, some power generation plants in Asia switched from Liquefied Natural Gas (LNG) to Low Sulphur Fuel Oil (LSFO) as LNG prices significantly increased. The Company had Share of Profit from Investments in JV and associates of Baht 1,472 million, increased from Q3/2021, mainly driven by the completion of planned maintenance shutdown of petrochemical businesses in Q3/2021.

Table 1: Performance Summary

(Unit: Million Baht)	Q4/2020	Q3/2021	Q4/2021	YoY	QoQ	2020	2021	YoY
				% +/-	% +/-			
Sales Revenue	87,555	112,173	139,298	59%	24%	326,270	465,128	43%
EBITDA	10,539	15,251	12,675	20%	-17%	20,291	61,141	>200%
EBITDA Margin (%)	12%	14%	9%	-3%	-5%	6%	13%	7%
Share of profit of investments in JV and Associates	1,073	1,295	1,472	37%	14%	3,340	6,993	109%
Net Profit	6,405	7,005	3,248	-49%	-54%	200	44,982	>200%
EPS (Baht/Share)	1.43	1.56	0.72	-50%	-54%	0.04	10.01	>200%
Adjusted EBITDA*	9,514	14,080	11,635	22%	-17%	28,579	55,186	93%
Adjusted EBITDA Margin (%)	11%	13%	8%	-3%	-5%	9%	12%	3%

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

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

In 2021, Olefins and Derivatives Business Unit's performance was continuously increased due to the increase in average price of Polyethylene (PE) tracking with crude oil price direction. In addition, PE market was supported by the easing of the lockdown restriction for COVID-19, the progress on vaccination, and Polyethylene products themselves are usually necessary for daily usage especially for packaging industry including the demand on Hygiene products. These resulted to increase in sale volume comparing with the previous year, even there was planned maintenance shutdown during the year. As a result, Adjusted EBITDA Margin of Olefins and Derivatives was at 20%, increased from the previous year. For Refinery Business Unit, the performance was improved due to the economic recovery after the easing of the lockdown restriction which led to the fuel consumption recovering and tightening supply

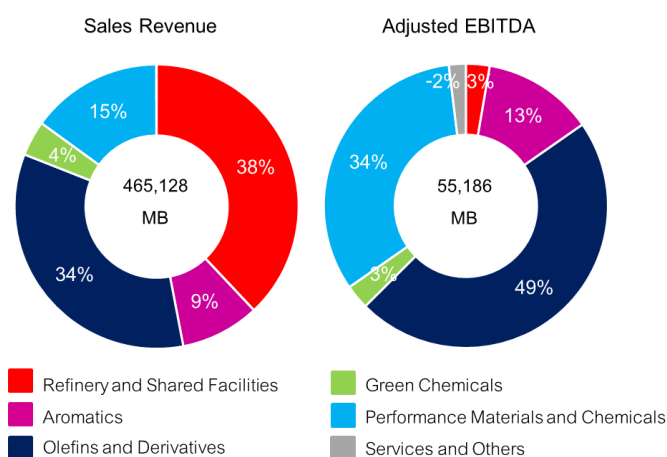
during the year, while the Company has continued to adjust production by reducing Jet Fuel production and producing more Diesel, resulted to the market GRM for the year at 3.80 USD per barrel. For Aromatics Business Unit, Market P2F per ton BTX increased to 153 USD per ton supported by global economic recovery after the easing of the lockdown restriction, the continue of healthy downstream demand, and the low inventory levels in this year. Furthermore, Performance Materials & Chemicals Business Unit's performance was also improved, supported by tightening supply of Phenol and Bis-Phenol A along the year, while Propylene Oxide and Polyols prices have been increasing through the year. The Company had Share of profit of investment in JV and Associates of Baht 6,993 million, increased by 109%, mainly due to the recovery in petrochemical business, which overall products spread are significantly increased.

Table 2: Adjusted EBITDA Margin

% Adj. EBITDA Margin				2020	2021
	Q4/2020	Q3/2021	Q4/2021		
Business Unit:					
Refinery and Shared Facilities	-1	-7	6	2	1
Aromatics	3	24	2	11	11
Olefins and Derivatives*	23	18	12	16	20
Green Chemicals	16	10	11	7	8
Performance Materials and Chemicals	26	30	22	18	27
Average	11	13	8	9	12

Note: *If included PTA, PET %Adj. EBITDA in Q4/20, Q3/21, Q4/21, 2020, and 2021 are 20,15,10 ,14 and 17 respectively.

FY 2021



2. Performance Analysis by Business Unit

2.1 Refinery & Shared Facilities Business Unit

Table 3: Crude Price & Petroleum Product Spreads

(Unit: USD per bbl)	Q4/2020	Q3/2021	Q4/2021	YoY	QoQ	2020	2021	YoY
				% +/-	% +/-			
Dubai Crude Oil	44.62	71.67	78.35	76%	9%	42.21	69.24	64%
Gasoline-Dubai	4.10	11.59	15.45	>200%	33%	4.43	11.01	148%
Jet-Dubai	2.42	5.31	10.21	>200%	92%	2.52	5.83	131%
Diesel-Dubai	3.69	5.35	11.44	>200%	114%	6.14	6.70	9%
HSFO-Dubai	-0.58	-3.33	-6.88	<-200%	-107%	-3.04	-4.87	-60%
LSFO-Dubai	9.86	11.42	14.39	46%	26%	11.21	12.62	13%

For Crude oil market situation in Q4/2021, Dubai crude oil price was higher compared with the previous quarter and the same period of last year. Crude oil price was supported by high LNG and coal prices due to winter, while OPEC alliances agreed to follow the existing policy of incrementally increasing production at 400,000 barrel per day, which is nevertheless less than the increasing demand in the market. Also, crude oil market was supported by the re-opening of cities in Europe and the United States due to the speed-up of the progress on vaccination against COVID-19, and the winter's impact on increasing demand in the market. In addition, the COVID-19 infection in Asia was positive direction due to Live with COVID policy. However, many countries issued new restrictions policy to reduce the impact from the Omicron variant at the end of quarter, which led to a decline of market demand resulting in the average Dubai crude oil price in Q4/2021 stood at 78.35 USD per barrel and closed at 76.96 USD per barrel at the end of the period.

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

For petroleum products spread over Dubai crude oil price in Q4/2021, petroleum products were supported by the back of a brighter demand outlook from the re-opening of cities in the US and European countries. The average Diesel over Dubai crude oil spread increased from Q3/2021 and Q4/2020 to 11.44 USD per barrel due to decreased in the export from China which maintenance shutdown of producers and demand growth from the COVID-19 infection in Southeast Asia was positive direction. While Average Jet over Dubai crude oil spread increased from Q3/2021 and Q4/2020 to 10.21 USD per barrel due to the implementation of Travel Bubbles and Live with COVID policy issuance even the Omicron variant outbreak at the end of Q4/2021. Average Low Sulfur Fuel oil (LSFO) over Dubai crude oil

spread increased from Q3/2021 and Q4/2020 to 14.39 USD per barrel supported by winter demand in North Asia and rising LNG price result in some consumers purchased LSFO for substitute.

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

Table 4: Gross Refinery Margin

(Unit: USD per bbl)	Q4/2020	Q3/2021	Q4/2021	YoY % +/-	QoQ % +/-	2020	2021	YoY % +/-
Market GRM	1.78	3.20	6.35	>200%	98%	2.24	3.80	70%
CDU GRM	0.53	2.52	6.02	>200%	139%	1.58	3.26	106%
CRS GRM	7.23	6.84	7.72	9%	13%	5.54	6.66	20%
Hedging Gain/(Loss)	-1.19	-7.55	1.81	>200%	124%	0.17	-1.53	<-200%
Stock Gain/(Loss) net NRV	1.41	1.29	1.66	18%	29%	-3.20	1.72	154%
Accounting GRM	2.00	-3.06	9.82	>200%	>200%	-0.80	3.99	>200%
Adjusted EBITDA (MB)	-434	-2,523	3,592	>200%	>200%	2,184	1,540	-30%
Adjusted EBITDA (%)	-1%	-7%	6%	7%	13%	2%	1%	-1%
Utilization Rate	91%	77%	101%	10%	24%	97%	95%	-2%

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

In Q4/2021, the Company had utilization rate at 101%, increased from the previous quarter at 77% caused by the maintenance shutdown for 25 days. The overall Petroleum products spread over Dubai crude oil price increased from Q3/2021 and Q4/2020 which impact on Market GRM increased to 6.35 USD per barrel compared with 3.20 USD per barrel in the previous quarter. Also, the Company realized Stock Gain at 1.66 USD per barrel resulting from the increase in Dubai crude oil price. The Company realized Gain from commodity hedging of 1.81 USD per barrel, as there was a direction of crude oil price and products spread to lower prices compared to the hedged prices of the commodity hedging. The Company had the Refinery Business Unit's Accounting GRM at 9.82 USD per barrel, increased from Q3/2021 and Q4/2020. The Adjusted EBITDA of Refinery Business Unit in Q4/2021 was Baht 3,592 million, while Adjusted EBITDA Margin was at 6% (Adjusted EBITDA and Adjusted EBITDA Margin excluding Gain from commodity hedging were 2,586 million Baht and 4%, increased from 529 million Baht and 2% in Q3/2021 respectively).

For Refinery Business Unit in 2021, Market GRM was 3.80 USD per barrel with CDU utilization rate at 95%, decreased by 2% from the previous year due to there was planned maintenance shutdown in Q3/2021 for 25 days. The Company realized Stock Gain at 1.72 USD per barrel due to the increased crude oil price which compared with

2020. The Company recorded Loss from commodity hedging of 1.53 USD per barrel. These resulted to the Refinery Business Unit's accounting GRM at 3.99 USD per barrel, increased from 2020. The Adjusted EBITDA of Refinery Business Unit in 2021 was Baht 1,540 million, 30% decreased from 2020 while Adjusted EBITDA Margin was at 1% (Adjusted EBITDA and Adjusted EBITDA Margin excluding Loss from commodity hedging were 4,468 million Baht and 3%, increased from 1,853 million Baht and 1% in 2020 respectively).

2.2 Aromatics Business Unit

Table 5: Aromatics Product Prices and Spreads over Condensate

(Unit: USD per ton)	Q4/2020	Q3/2021	Q4/2021	YoY		2020		2021		YoY
				% +/-	% +/-				% +/-	
Condensate	368	616	683	86%	11%	350	596	70%		
Paraxylene (TW)	561	919	893	59%	-3%	577	859	49%		
Paraxylene (TW)-Condensate	192	303	210	9%	-31%	227	263	16%		
Paraxylene (FECP)	560	920	894	60%	-3%	578	856	48%		
Paraxylene (FECP)-Condensate	191	304	211	10%	-31%	229	259	13%		
Benzene (Spot Korea)	529	993	945	79%	-5%	485	914	88%		
Benzene-Condensate	161	377	262	63%	-31%	136	318	134%		
Naphtha-Condensate	40	60	62	54%	3%	30	50	65%		

Paraxylene

In Q4/2021, Paraxylene (FECP) over Condensate spread averaged at 211 USD per ton, decreased by 31% from Q3/2021 but increased by 10% from Q4/2020 respectively due to the condensate price in Q4/21 moved up higher while Paraxylene price went down compared with last period. That was because the continual effect from energy consumption control policy implemented in China had an impact on Paraxylene downstream plants, especially Polyester production, led to a decrease in polyester operating rates in several regions. In addition, the resurgence of COVID-19 pressured textile demand amid high Paraxylene inventory. However, Paraxylene demand was supported by strong consumption of PET Resin product; especially packaging product during COVID-19 situation.

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

Benzene

In Q4/2021, Benzene over Condensate spread averaged at 262 USD per ton, decreased by 31% from Q3/2021 but increased by 63% from Q4/2020. A slight decrease in Benzene spread was due to a drop in operating rates of a large scale of Styrene Monomer plants from maintenance shutdown in China and South-Korea and the implementation of energy consumption control policy in China that affected Benzene downstream plants. In addition, concerning about new Styrene Monomer emerged in Q4/2021 and upcoming in 2022 with low seasonal consumption of Styrene Monomer led to weak Benzene demand in this quarter. However, export sale activities from Asia to the U.S. supported the Benzene prices.

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

Table 6: Aromatics market P2F

(Unit: USD per ton)	Q4/2020	Q3/2021	Q4/2021	YoY % + /(-)	QoQ % + /(-)	2020	2021	YoY % + /(-)
Market P2F	102	188	101	-1%	-46%	130	153	17%
Hedging Gain/(Loss)	1.5	76.9	12.1	>200%	-84%	2.5	18.5	>200%
Stock Gain/(Loss) net NRV	18.1	30.0	16.0	-12%	-47%	-28.6	35.4	>200%
Accounting P2F	122	295	129	6%	-56%	104	206	99%
Adjusted EBITDA (MB)	287	4,064	398	39%	-90%	3,635	7,206	98%
Adjusted EBITDA (%)	3%	24%	2%	-1%	-22%	11%	11%	0%
Utilization Rate (%)	98%	100%	97%	-1%	-3%	96%	99%	4%

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

For Aromatics Business Unit in Q4/2021, BTX utilization rate was 97%, decreased from Q3/2021. Market P2F per ton BTX decreased from previous quarter to 101 USD per ton mainly due to a drop in both Paraxylene over Condensate spread and Benzene over Condensate spread. Adjusted EBITDA for Q4/2021 was Baht 398 million and Adjusted EBITDA Margin was 2% (Adjusted EBITDA and Adjusted EBITDA Margin excluding hedging gain was Baht 133 million and 1% respectively, decreased from Baht 2,449 million and 14%). The Company realized Gain from commodity hedging of 12.1 USD per ton or Baht 265 million as the hedging gain resulted from the Company's hedging to protect against the fluctuation of Aromatics products spread. In the quarter, the Company had hedging gain since average Aromatics products spread was lower than the hedged spread. Besides, The Company had Stock Gain at 16.0 USD per ton, resulted to Accounting P2F of 129 USD per ton.

In 2021, Aromatics Business Unit had BTX utilization rate at 99%, increased from the previous year following the rise in demand and no major maintenance shutdown of Aromatics plant in this period, while there was planned maintenance shutdown of Aromatics plant 2 for 19 days in 2020. Market P2F per ton BTX increased to 153 USD per ton this period mainly due to both Paraxylene over Condensate spread, and Benzene over Condensate spread.

Adjusted EBITDA for 2021 was Baht 7,206 million and Adjusted EBITDA Margin was 11% (Adjusted EBITDA and Adjusted EBITDA Margin excluding hedging gain was Baht 5,707 million and 9% respectively, increased from Baht 3,442 million and 10% last year). In this period, the Company had Stock Gain at 35.4 USD per ton and Gain from commodity hedging at 18.5 USD per ton, resulted to Accounting P2F of 206 USD per ton, decreased by 99% from the previous year.

2.3 Olefins and Derivatives Business Unit

Table 7: Prices and Spreads of Olefins and Derivatives

(Unit: USD per ton)	Q4/2020	Q3/2021	Q4/2021	YoY		2020	2021	YoY
				% +/-	% +/-			
Naphtha (MOPJ)	408	676	745	83%	10%	380	646	70%
Ethylene (SEA)	867	992	1,094	26%	10%	713	1,008	41%
Propylene (SEA)	887	930	938	6%	1%	775	966	25%
Avg. PE	1,074	1,240	1,376	28%	11%	919	1,299	41%
HDPE	1,000	1,138	1,252	25%	10%	880	1,181	34%
HDPE-Naphtha	592	462	507	-14%	10%	500	536	7%
LLDPE	983	1,185	1,285	31%	8%	867	1,200	38%
LLDPE- Naphtha	575	509	540	-6%	6%	487	554	14%
LDPE	1,238	1,398	1,592	29%	14%	1,010	1,516	50%
LDPE- Naphtha	830	722	847	2%	17%	630	870	38%
PP	1,142	1,250	1,335	17%	7%	992	1,321	33%
PP-Naphtha	734	574	590	-20%	3%	612	675	10%
MEG (ACP)	635	845	937	48%	11%	627	846	35%
MEG-0.65 Ethylene	71	200	226	217%	13%	164	191	16%

For Ethylene (SEA) market in Q4/2021, the average Ethylene price was 1,094 USD per ton, increased from Q3/2021 and Q4/2020 by 10% and 26% respectively, as following the higher of Crude oil price and the market was supported by less supply due to China's power crisis led to Coal-based and methanol-based producers reducing their production capacity. Additionally, the market was supported by the delay of a new capacity in China and India from Q4/2021 to 2022.

For Polyethylene (PE) market in Q4/2021, the average PE price was 1,376 USD per ton, increased from Q3/2021 by 11%, and increased from Q4/2020 by 28%. The increase in Polyethylene price supported by the increased in Crude oil price and easing lockdown due to the curbing of the spread of Delta in Southeast Asia and the speed-up of the progress on vaccination resulted in growth demand for the festival in the end of the year. Also, the market was supported by the delay of a new capacity in China and India from Q4/2021 to 2022. However, Polyethylene market was pressured by the resurgence of COVID-19 during the end of the quarter as following the lower of Crude oil price.

For MEG (ACP) market in Q4/2021, the price was 937 USD per ton, increased from the previous quarter by 11% and increased from Q4/2020 by 48% as following the higher of Ethylene price. However, the market was pressured

by a new capacity in the market and the sluggish textile industry due to lower demand and dual control policy in China which impacted the slowdown in production of producers.

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

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

(Unit: Million Baht)	Q4/2020	Q3/2021	Q4/2021	YoY % + /(-)	QoQ % + /(-)	2020	2021	YoY % + /(-)
Adjusted EBITDA	6,088	6,626	4,480	-26%	-32%	14,795	27,350	85%
Adjusted EBITDA (%)*	23%	18%	12%	-11%	-5%	16%	20%	4%
Utilization Rate Olefins (%)	104%	91%	80%	-24%	-11%	97%	91%	-6%
Utilization Rate Polymer (%)	110%	104%	98%	-12%	-6%	101%	103%	2%

Note: *If included PTA, PET %Adj. EBITDA in Q4/20, Q3/21, Q4/21,2020, and 2021 are 20,15,10 ,14 and 17 respectively.

In Q4/2021, Olefins plants had average utilization rate of 80%, decreased from Q3/2021. The Company managed production for efficiency and costs optimization even though there was an increase in Naphtha price tracking with crude oil prices. The Polymer plant utilization rate was 98%, decreased from the previous quarter due to the planned maintenance shutdown of HDPE plant for 14 days in November, LDPE plant for 15 days in October and LLDPE plant for 20 days in December. PE price was supported by easing lockdown and demand growth for the festival in the end of the year. MEG utilization rate was 99%. MEG price was pressured by the sluggish textile industry. These resulted to Adjusted EBITDA of Olefins and Derivatives Business Unit of Baht 4,480 million, or Adjusted EBITDA Margin of 12%. In term of feedstock, the portion of feedstock used of Gas and Naphtha were 76% and 24% respectively.

In 2021, Olefins plants had average utilization rate of 91%, declined from 97% in 2020 due to some of utilities support providers was affected by the lighting strike incident in April 2021, which resulted to the slowdown in production. In addition, the Company has started commercial operation for the Olefins Reconfiguration Project (ORP) since June 2021. Polymer plant utilization rate of 103%, increased from 101% in 2020, as following the direction of market price, which was slightly increased, although there was planned maintenance shutdown in Q4/2021. In term of the price situation, overall products prices were supported by easing lockdown in many countries and the speed-up of the progress on vaccination, as following the Crude oil price. The Adjusted EBITDA of Olefins and Derivatives Business Unit was Baht 27,350 million, or Adjusted EBITDA Margin of 20%. In term of feedstock, the portion of feedstock used of Gas and Naphtha were 80% and 20% respectively.

2.4 Performance Materials and Chemicals Business Unit

Table 9: Prices Market P2F and Adjusted EBITDA of Performance Materials and Chemicals

(Unit: USD per ton)	Q4/2020	Q3/2021	Q4/2021	YoY % +/-	QoQ % +/-	2020	2021	YoY % +/-
Phenol	762	1,248	1,278	68%	2%	749	1,178	57%
BPA	1,920	3,322	2,476	29%	-25%	1,388	2,889	108%
Propylene Oxide (PO)	2,026	2,037	1,988	-2%	-2%	1,358	2,086	54%
Polyols	2,423	2,308	2,415	0%	5%	1,669	2,465	48%
Phenol P2F	454	399	465	2%	16%	447	448	0%
BPA P2F	1,015	2,052	1,182	16%	-42%	532	1,649	>200%
Adjusted EBITDA (MB)	2,730	5,439	3,899	43%	-28%	6,020	18,578	>200%
Adjusted EBITDA margin (%)	26%	30%	22%	-4%	-7%	18%	27%	9%
Utilization Rate Phenol (%)	119%	118%	101%	-18%	-17%	109%	113%	4%
Utilization Rate BPA (%)	114%	121%	107%	-8%	-14%	108%	111%	3%
Utilization Rate PO (%)	N/A	102%	89%	N/A	-13%	N/A	95%	95%

Phenol

In Q4/2021, Phenol price averaged at 1,278 USD per ton, increased by 2% from Q3/2021 and by 68% from Q4/2020 respectively due to a rise in demand of Phenol derivatives; BPA, Nylon and Phenolic resin, mainly in China. Furthermore, supply of Phenol went down in this period due to scheduled maintenance shutdown of some Phenol plants in Japan, Taiwan, and Thailand. In addition, the dual control policy stipulated in China caused several plants reduced or curtailed their operating rates in the region as well.

In Q4/2021, BPA price averaged at 2,476 USD per ton, decreased by 25% from Q3/2021 but increased by 29% from Q4/2020 respectively. This was due to new BPA supply emerging in this quarter, while the downstream demand was lower as the production of Epoxy resin was reduced due to China's dual control policy.

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

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

Propylene Oxide (PO)

In Q4/2021, Propylene Oxide (PO) price averaged at 1,988 USD per ton, decreased by 2% from Q3/2021 and by 2% from Q4/2020. In the beginning of this quarter, Dual control policy enforced in China led to a drop in Propylene

Oxide operation rates and there was a maintenance shutdown of Chinese producers. However, in December 2021, Propylene Oxide price significantly decreased as a result of the resumption of operations from the shutdown plants in China. In addition, there was also new capacity started in December led to more Propylene Oxide supply in the market, while demand from Polyols plant and Propylene glycol declined as they minimized inventory level at the end of the year.

In Q4/2021, Polyols price averaged at 2,415 USD per ton, increased by 5% from Q3/2021 and steady with Q4/2020 as a result of lower Polyols supply from Dual control policy enforcement and a drop in demand in South-East Asia during the COVID-19 resurgence.

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

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

For Performance Materials and Chemicals Unit in Q4/2021, the business continued generating strong performance aligned with the utilization rate of Phenol and BPA that was 101% and 107% respectively, which decreased from Q3/2021 due to a planned maintenance shutdown of Phenol plant 1. Market P2F per ton of Phenol slightly increased from Q3/2021 to 465 USD per ton. Market P2F per ton of BPA decreased from Q3/2021 to 1,182 USD per ton due to the new BPA capacity started in Q4/2021. For Propylene Oxide and Polyols, the utilization rate of Propylene Oxide was 89%, decreased from planned maintenance. These resulted to Adjusted EBITDA of Performance Materials and Chemicals Unit in Q4/2021 of Baht 3,899 million or Adjusted EBITDA Margin of 22%.

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

Table 10: Adjusted EBITDA by Business Unit

Adjusted EBITDA (MB)	Q4/2020	Q3/2021	Q4/2021	YoY % +/-	QoQ % +/-	2020	2021	YoY % +/-
Business Unit :								
Refinery and Shared Facilities	(434)	(2,523)	3,592	>200%	>200%	2,184	1,540	-30%
Aromatics	287	4,064	398	39%	-90%	3,635	7,206	98%
Olefins and Derivatives	6,088	6,626	4,480	-26%	-32%	14,795	27,350	85%
Green Chemicals	763	440	599	-21%	36%	1,228	1,609	31%
Performance Materials and Chemicals	2,730	5,439	3,899	43%	-28%	6,020	18,578	>200%
Services and Others	80	34	(1,333)	<-200%	<-200%	717	(1,097)	<-200%
*Adjusted EBITDA (MB)	9,514	14,080	11,635	22%	-17%	28,579	55,186	93%

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

3. Operating Performance

Unit: MB		Q4/2020	Q3/2021	Q4/2021	YoY % + /(-)	QoQ % + /(-)	2020	2021	YoY % + /(-)
1	Sales Revenue	87,555	112,173	139,298	59%	24%	326,270	465,128	43%
2	Feedstock cost	(64,327)	(80,121)	(106,681)	66%	33%	(248,737)	(341,893)	37%
3	Product to Feed Margin	23,228	32,052	32,617	40%	2%	77,533	123,235	59%
4	Variable Cost	(6,581)	(8,322)	(10,614)	61%	28%	(26,395)	(34,107)	29%
5	Fixed OH	(4,148)	(4,705)	(6,320)	52%	34%	(14,866)	(18,556)	25%
6	Stock Gain/(Loss) and NRV	1,025	1,171	1,040	1%	-19%	(8,288)	5,955	172%
7	Gain/(Loss) on Commodity Hedging	(542)	(1,676)	1,462	>200%	187%	476	(1,440)	<-200%
8	Other Revenue	1,605	1,279	1,465	-9%	15%	4,942	4,932	0%
9	SG&A Expenses	(4,048)	(4,548)	(6,975)	72%	53%	(13,111)	(18,878)	44%
10	EBITDA	10,539	15,251	12,675	20%	-17%	20,291	61,141	>200%
11	Depreciation & Amortization	(5,323)	(5,893)	(6,408)	20%	9%	(20,578)	(23,593)	15%
12	Loss from impairment of assets	313	-	(1,886)	<-200%	100%	313	(1,886)	<-200%
13	Provision of contingent liabilities-subsiary	-	-	(444)	100%	100%	-	(444)	100%
14	Gain on sale of investment	-	-	1,388	100%	100%	-	10,201	100%
15	Gain from remaining investment reclassification	-	-	-	-	-	-	10,565	100%
16	EBIT	5,529	9,358	5,325	-4%	-43%	26	55,984	>200%
17	Net financial expense	(797)	(1,540)	(1,400)	76%	-9%	(3,166)	(5,434)	72%
18	FX Gain/(Loss)	1,461	(1,147)	(1,899)	<-200%	-66%	343	(4,765)	<-200%
19	Share of gain/(loss) from investment	1,073	1,295	1,472	37%	14%	3,340	6,993	109%
20	Corporate Income Tax	(546)	(727)	(190)	-65%	-74%	109	(7,228)	<-200%
21	Net Profit after Tax	6,720	7,239	3,308	-51%	-54%	652	45,550	>200%
Profit/(loss) attributable to:									
22	Non-controlling interests	315	234	60	-81%	-74%	452	568	26%
23	Owners of the Company	6,405	7,005	3,248	-49%	-54%	200	44,982	>200%
24	Adjusted EBITDA*	9,514	14,080	11,635	22%	-17%	28,579	55,186	93%

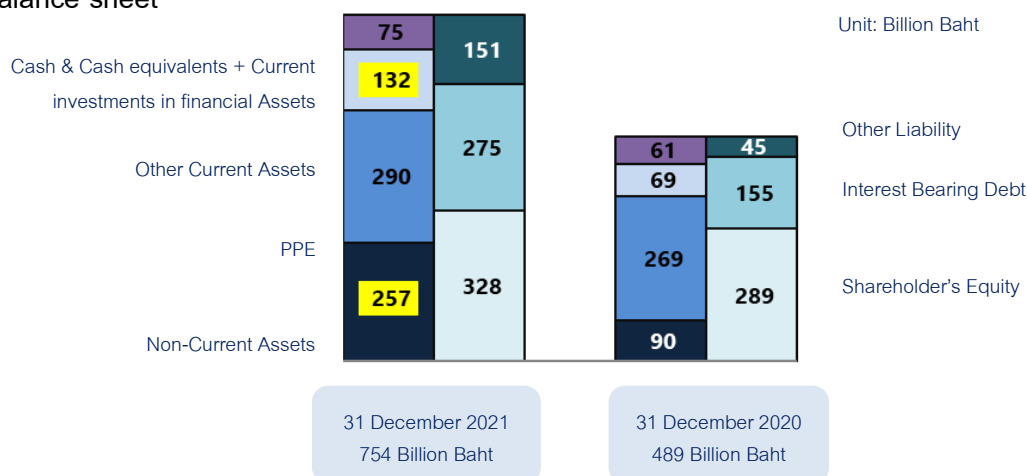
Note: *Adjusted EBITDA refers EBITDA excluding Stock gain/loss, net NRV and Extra item

In Q4/2021, the Company had higher sales revenue than the previous quarter and Q4/2020 as the overall products price increased, particularly in Refinery business due to the re-opening of cities in Europe and the United States. Fixed overhead and SG&A expenses went up from the previous quarter and Q4/2020 because of the Acquisition of Shares of Allnex Holding GmbH, and maintenance cost from Polymer and Phenol plants. In Q4/2021, the Company had Extraordinary Items Net from Tax which included the gain from the restructuring of investments in Emery of Baht 1,388 million, Loss from impairment of assets related the US Petrochemical complex project which are no longer applicable for the on-going project study of Baht 1,886 million, and provisions by a subsidiary for legal obligations of Baht 444 million.

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

4. Statements of Financial Position

4.1 Balance sheet



Assets

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

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

Liabilities

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

- Interest-bearing debt increased by Baht 120,291 million due to Bonds issuance by USD 1,250 million in March and a rise in borrowings from a related company by Baht 55,600 million.
- Other liabilities increased by Baht 105,832 million due to Account payable increased by Baht 49,836 million due to higher in both raw material price. Other current liabilities increased by Baht 19,344 million resulting from the investment in Allnex Holding GmbH, which impact to increased Others Payable by Baht 8,568 million, and the increase in the Company's liabilities of derivatives related to financial and commodity hedging. Other non-current liabilities increased by Baht 36,652 million due to the investment in Allnex Holding GmbH in 2021 resulting in increased Deferred tax liabilities by Baht 26,635 million.

Shareholder's Equity

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

4.2 Cashflow statement

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

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

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



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

4.3 Key Financial Ratios

Financial Ratios	Q4/2020	Q3/2021	Q4/2021
Current Ratio (Times)	2.20	2.18	1.41
EBITDA to Sales Revenue (%)	6.22%	14.27%	13.14%
Net Profits to Sales Revenues (%)	0.06%	11.65%	9.67%
Return on Total Assets (%)	0.86%	11.96%	9.45%
Return on Equity (%)	0.07%	16.38%	15.01%
Interest Bearing Debt to Equity (Times)	0.54	0.58	0.84
Net Interest Bearing Debt to Equity (Times)	0.33	0.20	0.61
Interest Bearing Debt to EBITDA (Times)	7.64	3.15	4.50
Net Interest Bearing Debt to EBITDA (Times)	4.65	1.07	3.28

Remarks:

Current Ratio	=	Current Assets divided by Current Liabilities
EBITDA to Sales Revenue	=	EBITDA divided by Sales Revenue
Net Profit to Sales Revenue	=	Profits attributable to Owners of the Company to Sales Revenue
Return on Total Assets	=	Earnings before Interest and Tax divided by Average Total Assets
Return on Equity	=	Profits attributable to Owners of the Company divided by Average Equity attributable to Owners of the Company
Interest Bearing Debt to Equity	=	Interest Bearing Debt divided by Shareholder's Equity
Net Interest Bearing Debt to Equity	=	Interest Bearing Debt net Cash and Cash Equivalent and Current Investments in financial assets divided by Shareholder's Equity
Interest Bearing Debt to EBITA	=	Interest Bearing Debt net Cash and Cash Equivalent and Current Investments in financial assets divided by EBITDA
Net Interest Bearing Debt to EBITDA	=	Interest Bearing Debt net Cash and Cash Equivalent and Current Investments in financial assets divided by EBITDA

5. Projects Progress

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

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

2. The Company has important projects in the pipeline:

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

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

Estimated Annual CAPEX of PTTGC Group for the next 5 years

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

Notes: 1. Group annual maintenance ~ 310-360 M.USD (including allnex Holding GmbH)

2. Other projects such as IT & digital, new office facility, etc.

3. Excludes the proposed delisting of securities of Vinythai Public Company Limited and the tender offer for securities for the purpose of delisting which the company submitted tender offer on 21 December 21.

6. Environment Social Governance

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



Climate Management

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



Circular Economy

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



society and community

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

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



Awards for the seventh consecutive year from the Stock Exchange of Thailand. These examples of success in sustainability leadership undoubtedly reflect GC's commitment to grow with ESG as our foundation.

7. Market and Business Outlook in 2022

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

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

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

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

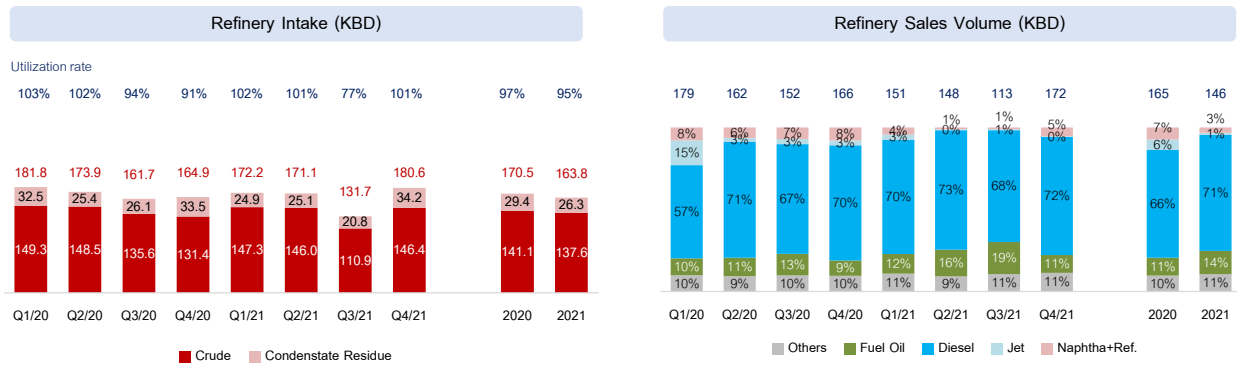
The outlook for Olefins and Derivatives product is expected to remain steady from this year, due to the recovery in demand during economic recovery. While Olefins and Polymer supply continue to increase by new productions and the recovery in refinery Business. The average HDPE price is expected to be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

preparation for the commercial operation of Olefins plant 2/2 modification project in Q4/2022. The Company expects that Polymers plants utilization rate will be around 103%.

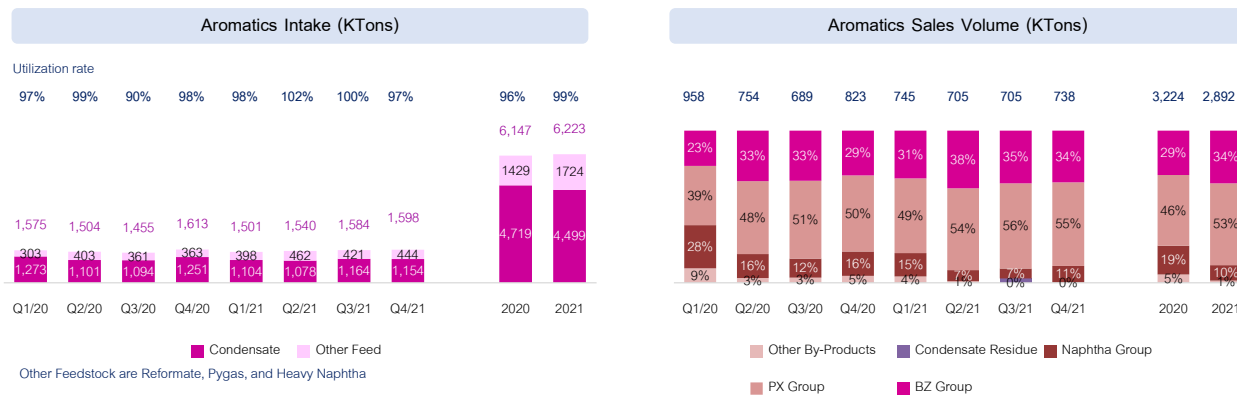
8. Appendix

8.1 Production and Sales

Graph 1: Refinery Intake and Sales Volume

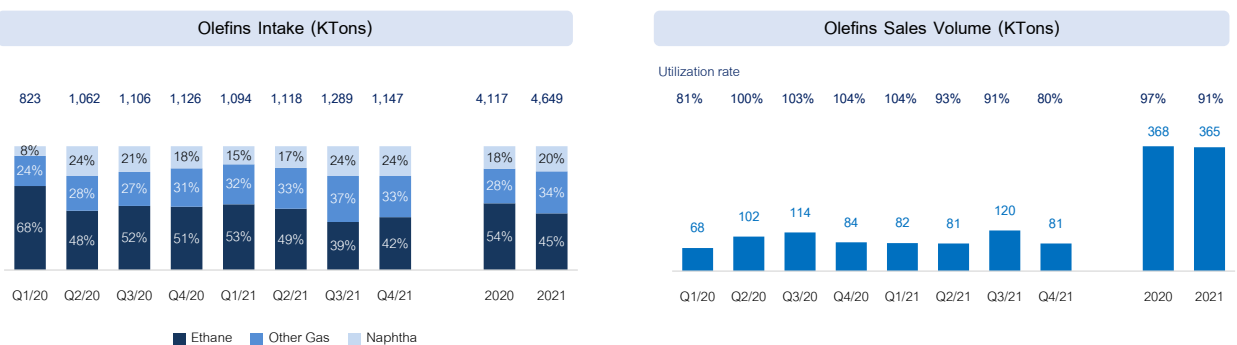


Graph 2: Aromatics Intake and Sales Volume (BTX)

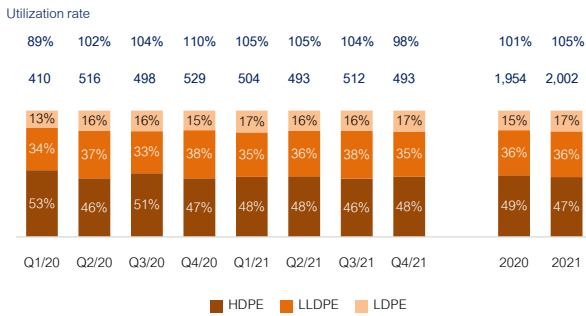


Other Feedstock refers to Reformate, Pygas, and Heavy Naphtha

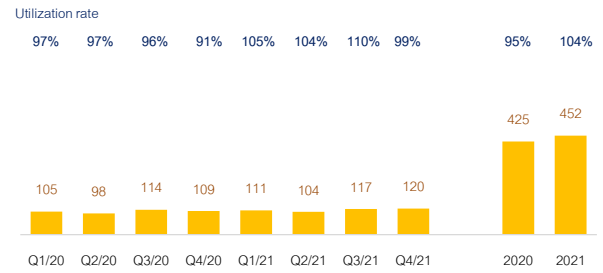
Graph 3: Olefins Intake and Olefins and Derivatives Sales Volume



PE Sales Volume (KTons)

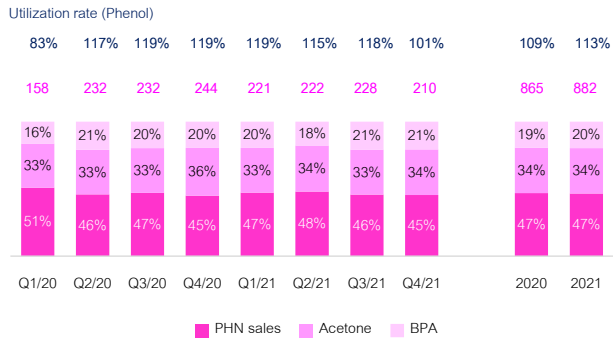


MEG Sales Volume (KTons)



Graph 4: Phenol chain Sales Volume

Phenol Sales Volume (KTons)



8.2 Planned Maintenance Shutdown Schedule 2022

Plant		2022											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
OLE	Cracker		19	OLE4		39	OLE3			16	OLE2/1 and OLE2/3		27
	Oleflex												OLE2/2
POL	HDPE									28	BPE1	38	HDPE
	LDPE					24							
	LLDPE I					7							
	LLDPE II					20							
	PS					15							
EOB	TOCGC		35										
	EA		35										
PHN	Phenol I												
	Phenol II												11
	BPA							30					
REF	Refinery											50	
ARO1	Aromatics I							30					
ARO2	Aromatics II												
GCO	PO										56		