



PTT Global Chemical Public Company Limited

Management Discussion and Analysis FY2022

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## 1. Executive Summary

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In Q4/2022, PTT Global Chemical Public Company Limited (“the Company”) had total sales revenue of Baht 124,780 million, decreased by 31% from Q3/2022 and decreased by 10% from Q4/2021. The total revenue has declined due to scheduled maintenance shutdown of Refinery for 49 days in this quarter and the petrochemicals demand remained weak, which caused the decrease in the product prices. The Company had Adjusted EBITDA of Baht 3,459 million in this quarter, decreased from Q3/2022 and Q4/2021 by 67% and 66%, respectively, as the prices and spreads weakened for all major petroleum and petrochemical products due to the slowdown of demand caused by China's zero-COVID policy. Additionally, the market continued to be under pressure from new supplies in the market and the concerns over a recession. The Company had Net Operating Loss Recurring (excluding Stock Loss Net NRV, Foreign Exchange Gain and Loss from financial derivative, Gain from commodity hedging, and Extraordinary items) of Baht 1,769 million. The aforementioned factors also resulted to fluctuations in oil price fluctuations. Consequently, the Company recorded extraordinary items from Stock Loss Net NRV of Baht 3,518 million, Gain from commodity hedging of Baht 356 million, Net gain from Foreign Exchange Gain and financial derivatives of Baht 3,990 million. The Company had Share of Loss from Investments at Baht 381 million, mainly due to a slowdown in Petrochemical business. As a result, The Company recorded Net loss in Q4/2022 at Baht 968 million (Baht -0.21/share). Additionally, in Q4/2022 the Company had recorded Extraordinary items totaling to Baht 1,744 million.

In Q4/2022, Upstream Business performance slowed down compared to previous quarter due to scheduled maintenance shutdown for 49 days. The Market GRM was stable at 9.7 USD per barrel, supported by spread of Diesel which remained at high level. Olefins performance improved as the price of ethylene dropped less than the drop in feedstock prices.

Intermediates Business performance slowed down compared to previous quarter due to Phenol market was weak especially Bis-Phenol A (BPA) products which continue to be impacted by the weak downstream demand and oversupply. Moreover, Phenol unit 2 had the scheduled maintenance shutdown in this quarter. PTA products and Monoethylene Glycol products were under pressure from weak downstream demand in fiber and textile industry. For Polymers & Chemicals Business in Q4/2022, the performance decreased from the previous quarter due to the decrease in plastic resins prices, in line with a decline in feedstock costs, low demand caused by China's zero-COVID policy and concerns on economic recession.

Bio & Circularity Business performance declined compared to previous quarter due to weak margins of Fatty alcohols, as demand weakened. Performance Chemicals Business can still maintain effective cost and price management. Even though, total sale volume slightly declined from previous quarter due to sluggish downstream demand and seasonality impact.

Table 1 : Performance Summary

(Unit: Million Baht)	Q4/2021	Q3/2022	Q4/2022	YoY % +/-	QoQ % +/-	2021	2022	YoY % +/-
Sales Revenue	139,298	181,536	124,780	-10%	-31%	465,128	678,267	46%
EBITDA	12,675	155	297	-98%	92%	61,141	22,420	-63%
EBITDA Margin (%)	9%	0.1%	0.2%	-9%	0.1%	13%	3%	-10%
Share of profit /(loss) of investments in JV and Associates	1,472	306	(381)	-126%	<-200%	6,993	2,908	-58%
Net Profit/(Loss)	3,248	(13,384)	(968)	-130%	93%	44,982	(8,752)	-119%
EPS (Baht/Share)	0.72	(2.97)	(0.21)	-130%	93%	10.01	(1.94)	-119%
Adjusted EBITDA*	10,173	10,374	3,459	-66%	-67%	56,627	49,134	-13%
Adjusted EBITDA Margin (%)	7%	6%	3%	-4%	-3%	12%	7%	-5%

Note: \* Adjusted EBITDA refers to EBITDA excluding Stock gain/(loss),NRV, Gain/(loss) from commodity hedging, and Extra item

In 2022, the Company had total sales revenue of Baht 678,267 million, increased by 46% from previous year due to several factors such as the global economic recovery with the economy now re-opened and demand increased. Another factor was the Russia-Ukraine conflict has triggered a global energy crisis. This led to a surge in both Petroleum products price and Petrochemical products, in line with the rise in oil price. In 2022, the Company also started the consolidation of allnex's financial performance. In 2022, the Company had Adjusted EBITDA of Baht 49,134 million, decreased by 13% from previous year. Overall performance of Upstream Business remained strong, however the spreads weakened for all major petrochemical products, especially in Intermediate and Polymers & Chemicals businesses. The main reasons were the higher production costs, China's zero-COVID policy's adverse impacts on the demand, the oversupply situation, and the concerns over a global recession. The Company had Net Operating Profit Recurring (excluding Stock Loss Net NRV, Foreign Exchange Loss and Gain from financial derivative, Loss from commodity hedging, and Extraordinary items) of Baht 18,984 million. However, the Russia-Ukraine war caused a surge in oil price and push up the spread of Petroleum products, especially in Q2/2022. As a result, the Company had Loss from commodity hedging of Baht 23,057 million as the market product spreads were higher than the hedged price especially during the first half of 2022 when Russia-Ukraine tension started. The Company recorded Stock Loss Net NRV of Baht 3,657 million, Net loss from Foreign Exchange and financial derivatives of Baht 313 million. Additionally, the Company had Share of Profit from Investments at Baht 2,908 million, decreased from previous year due to a slowdown in Petrochemical business. The Company had extraordinary items totaling to Baht 893 million. Consequently, the Company recorded Net loss in 2022 at Baht 8,752 million (Baht -1.94/share).

In 2022, Upstream Business performance remain stable compared to the previous year. This was mainly from the improvement in the Refining business's performance from the increase in GRM, which offset with the decline in the Olefins & Aromatics business's performance due to lower product spread from the higher production cost and the weaker downstream demand. Moreover, this year the Company has planned maintenance shutdowns at Upstream business including Refinery, Aromatics plant 1 and Olefins plant 3.

Intermediates Business performance decreased from previous year. The end use markets of Intermediate business, which includes automotive industry, construction industry, electrical industry, and electronics industry, mainly in China, were impacted by weak demand followed China's zero-COVID policy and the concerns over a global recession. On the supply side, the oversupply situation continued to persist. Additionally, the Company has planned maintenance shutdowns at Intermediates Business including, Phenol plant 2, BPA Plant, Monoethylene Glycol plant, and Propylene Oxide plant.

Polymers & Chemicals Business performance decreased from previous year. Plastic resins prices increased with the upward feedstock trend. However, product spreads were still under pressure from China's zero-COVID policy, concerns over a recession, along with the oversupply situation.

Bio & Circularity Business performance increased compared to previous year due to the increased in sales and fatty alcohols spread, in line with the upward demand trend as the economy has recovered. In addition, Performance Chemicals Business performance increased from previous year mainly due to the start of the consolidation of Allnex Holding GmbH (Allnex) in 2022.

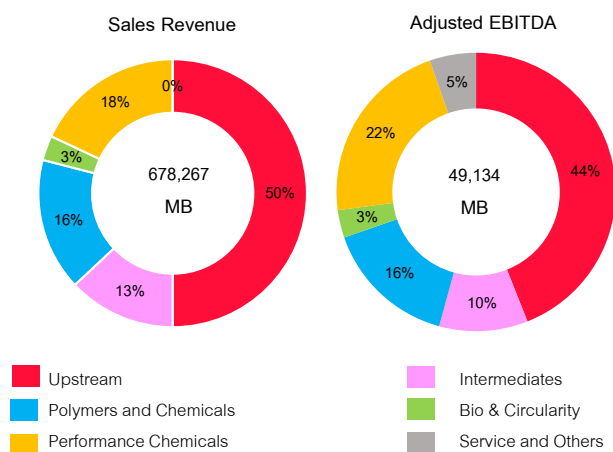
Table 2 : Adjusted EBITDA by Business Unit

Adjusted EBITDA Margin by Business Unit	Q4/2021	Q3/2022	Q4/2022	YoY	QoQ	2021	2022	YoY
				% +/-	% +/-			% +/-
<b>Adjusted EBITDA (Million Baht)</b>								
Upstream	4,115	3,559	1,658	-60%	-53%	22,826	21,616	-5%
Intermediates	3,851	707	96	-98%	-86%	19,029	5,049	-73%
Polymers & Chemicals	2,418	2,769	53	-98%	-98%	11,819	7,580	-36%
Bio & Circularity	580	238	4	-99%	-98%	1,497	1,579	5%
Performance Chemicals	422	2,330	465	10%	-80%	1,779	10,667	>200%
Service and Others	(1,213)	770	1,183	198%	54%	(323)	2,643	>200%
<b>total</b>	<b>10,173</b>	<b>10,374</b>	<b>3,459</b>	<b>-66%</b>	<b>-67%</b>	<b>56,627</b>	<b>49,134</b>	<b>-13%</b>
<b>Adjusted EBITDA margin (%)</b>								
Upstream	5	4	3	(2)	(1)	9	6	(3)
Intermediates	16	3	1	(15)	(2)	22	6	(16)
Polymers & Chemicals	9	10	0	(9)	(10)	11	7	(4)
Bio & Circularity	10	5	0	(10)	(5)	8	7	(1)
Performance Chemicals	11	8	2	(9)	(6)	13	9	(4)
<b>Average</b>	<b>7</b>	<b>6</b>	<b>3</b>	<b>(4)</b>	<b>(3)</b>	<b>12</b>	<b>7</b>	<b>(5)</b>

Note: 1) Adjusted EBITDA refers to EBITDA excluding Stock gain/(loss), NRV, Gain/(loss) from commodity hedging, and Extra item.

2) In Q3/2023, there was an adjustment of Adjusted EBITDA between segments due to company reorganization.

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## 2. Performance Analysis by Business Unit

### 2.1 Upstream

Table 3: Price, Product Spreads and performance of Upstream

	Q4/2021	Q3/2022	Q4/2022	YoY % +/-	QoQ % +/-	2021	2022	YoY % +/-
Dubai Crude Oil (\$/bbl)	78.3	96.9	84.8	8%	-12%	69.2	96.3	39%
Diesel-Dubai (\$/bbl)	11.4	35.2	39.3	>200%	12%	6.7	34.3	>200%
LSFO-Dubai (\$/bbl)	14.4	21.1	14.4	0%	-32%	12.6	22.5	78%
Gasoline-Dubai (\$/bbl)	15.5	13.2	9.4	-39%	-29%	11.0	18.8	72%
Jet-Dubai (\$/bbl)	10.2	32.4	33.5	>200%	3%	5.8	30.3	>200%
<b>Market GRM (\$/bbl)</b>	<b>6.3</b>	<b>9.8</b>	<b>9.7</b>	<b>53%</b>	<b>-1%</b>	<b>3.8</b>	<b>12.1</b>	<b>&gt;200%</b>
Condensate (\$/ton)	683	820	732	7%	-11%	596	830	39%
Paraxylene (FECP)-Condensate (\$/ton)	211	276	249	18%	-10%	259	275	6%
Benzene-Condensate (\$/ton)	262	158	92	-65%	-42%	318	198	-38%
<b>BTX P2F (\$/ton)</b>	<b>101</b>	<b>78</b>	<b>96</b>	<b>-5%</b>	<b>22%</b>	<b>153</b>	<b>85</b>	<b>-45%</b>
Naphtha (MOPJ) (\$/ton)	745	714	673	-10%	-6%	646	785	22%
Ethylene (SEA) (\$/ton)	1,094	942	905	-17%	-4%	1,008	1,054	5%
Propylene (SEA) (\$/ton)	938	895	880	-6%	-2%	966	1,008	4%
Hedging Gain/(Loss) (MB)	1,206	(2,111)	356	-71%	117%	(1,355)	(23,057)	<-200%
Stock Gain/(Loss) ๓๓๖ NRV (MB)	1,080	(8,025)	(3,455)	<-200%	57%	5,981	(3,197)	-153%
<b>Adjusted EBITDA* (MB)</b>	<b>4,115</b>	<b>3,559</b>	<b>1,658</b>	<b>-60%</b>	<b>-53%</b>	<b>22,826</b>	<b>21,616</b>	<b>-5%</b>
<b>Adjusted EBITDA (%)</b>	<b>5%</b>	<b>4%</b>	<b>3%</b>	<b>-2%</b>	<b>-1%</b>	<b>9%</b>	<b>6%</b>	<b>-3%</b>
Petroleum Product Sales Volume (million bbl)	15.82	15.26	7.72	-51%	-49%	53.35	50.84	-5%
Petrochemical Product Sales Volume (million ton)	1.40	1.30	1.21	-14%	-7%	5.55	5.11	-8%

Note: \* Adjusted EBITDA refers to EBITDA excluding Stock gain/(loss), NRV, Gain/(loss) from commodity hedging, and Extra item

For Upstream Business in Q4/2022, the Adjusted EBITDA was Baht 1,658 million, which decreased from the previous quarter by 53%, and the Adjusted EBITDA Margin was at 3%. The overall product sales volume decreased from Q3/2022 due to the planned maintenance shutdown of the Refinery. Also, the Company had petroleum product sales volume of 7.72 million barrels and petrochemical product sales volume at 1.21 million. The factors for the decrease in the performance are as follows:

1. For the Refinery business in Q4/2022, the performance decreased from the previous quarter resulting from the planned maintenance shutdown for 49 days. Diesel spreads increased due to increased travel during the holiday and winter season, and the sanctions on Russia, a major exporter of petroleum and crude oil, by the European Union. Low Sulfur Fuel Oil and Gasoline spread decreased as the market demand was pressure by economics recession, zero-COVID policy in China and a higher export from China. The Company's Market GRM was stable at 9.7 USD per barrel.

2. For the Aromatics business in Q4/2022, the performance decreased from the previous quarter resulting from a decline in the utilization rate from the production optimization and less feedstock available due to the planned maintenance shutdown of Refinery. Paraxylene and Benzene over Condensate spread declined due to lower demand of the Polyester and textile market, and the COVID-19 outbreak in China. While Benzene was pressured by a weak downstream market, especially Styrene monomer due to a decline of production from economics recession. However, with higher spread of By-product, these factors resulted to the increase in Market P2F to 96 USD per ton.
3. For the Olefins business in Q4/2022, the performance increased from the previous quarter resulting from a decline in feedstock price and effects from reduced operating rate by some producers. However, the demand for Ethylene remained pressured by the downside of the downstream market from the zero-COVID policy in China and global economic recession, which impacted consumer spending.

For Upstream Business in 2022, the Adjusted EBITDA was Baht 21,616 million, which decreased from the previous year by 5%, and the Adjusted EBITDA Margin was at 6%. The overall product sales volume decreased from 2021. The Company's petroleum product sales volume was lower at 50.84 million barrels due to the planned maintenance shutdown of Refinery in Q4/2022. The Company's petrochemical product sales volume of 5.11 million tons decreased from 2021 due to the planned maintenance shutdown of Aromatics 2 in Q2/2022 and the planned maintenance shutdown of Olefins 3 in Q2/2022. The performance decreased as follows:

1. For the Refinery business in 2022, the performance increased from 2021 resulting from an increase in main product spreads which included Diesel, Jet fuel, Low Sulfur Fuel Oil, and Gasoline spread mainly due to the conflict between Russia and Ukraine which led to a decline of market supply. While the market demand increased due to the lowering trend of COVID-19 infections and the re-opening of cities in many countries, even the market was pressured by economic recession and inflation. The Company had the planned maintenance shutdown of the Refinery in Q4/2022 for 49 days. The Company's Market GRM increased to 12.1 USD per barrel.
2. For the Aromatics business in 2022, the performance decreased from the previous year resulting from a decline in Paraxylene and Benzene over Condensate spread due to lower demand of the Polyester textile market from the COVID-19 infections throughout the year and zero-COVID policy in China which are the main pressure factors in the downstream market despite the reduced operating rate of some producers. While Benzene was pressured by a weak downstream market. In 2021, the market was supported by economic recovery even though the energy consumption control policy was implemented in China. The Market P2F decreased to 85 USD per ton.
3. For the Olefins business in 2022, the performance decreased from 2021 resulting from the feedstock price increased with the higher of Crude oil price while the downstream market was impacted by the zero-COVID policy in China and global economic recession even though some Ethylene producers reduced their operating rates. The Company completed the planned maintenance shutdown of Olefins 3 in 2022 resulting in lower sale volume compare with 2021.



## 2.2 Intermediates

Table 4: Price, Product Spreads and and performance of Intermediates

(Unit : USD per ton)	Q4/2021	Q3/2022	Q4/2022	YoY % +/-	QoQ % +/-	2021	2022	YoY % +/-
Mono-ethylene glycol (MEG -ACP)	937	897	837	-11%	-7%	846	903	7%
MEG - 0.65 Ethylene	226	284	249	10%	-13%	191	218	14%
Phenol	1,278	1,211	1,094	-14%	-10%	1,178	1,309	11%
Phenol spread*	465	301	355	-24%	18%	448	357	-20%
Bisphenol A (BPA)	2,476	1,580	1,462	-41%	-7%	2,889	1,860	-36%
BPA spread*	1,182	381	351	-70%	-8%	1,649	553	-66%
Propylene Oxide (PO)	1,988	1,098	1,054	-47%	-4%	2,086	1,230	-41%
Purified Terephthalic Acid (PTA)	704	845	758	8%	-10%	669	845	26%
PTA - 0.67PX	105	111	101	-4%	-9%	96	105	10%
Acrylonitrile (AN)	2,194	1,539	1,561	-29%	1%	2,239	1,706	-24%
AN - Propylene	1,255	644	681	-46%	6%	1,273	697	-45%
Methyl Methacrylate (MMA)	1,976	1,814	1,593	-19%	-12%	1,985	1,874	-6%
MMA - Naphtha	1,231	1,100	920	-25%	-16%	1,339	1,089	-19%
<b>Adjusted EBITDA (MB)</b>	<b>3,851</b>	<b>707</b>	<b>96</b>	<b>-98%</b>	<b>-86%</b>	<b>19,029</b>	<b>5,049</b>	<b>-73%</b>
<b>Adjusted EBITDA (%)</b>	<b>16%</b>	<b>3%</b>	<b>1%</b>	<b>-15%</b>	<b>-2%</b>	<b>22%</b>	<b>6%</b>	<b>-16%</b>
Sales Volume (Kton )	794	709	672	-15%	-5%	2,961	2,874	-3%
Share of gain/(loss) from investment (MB)	342	(214)	(337)	-198%	-57%	1,352	(592)	-144%

Note : Phenol spread derives from Phenol-0.878 BZ-0.474Propylene+0.616 Acetone and BPA spread derives from BPA-0.853 Phenol-0.273 Acetone

For Intermediates Business in Q4/2022, the Adjusted EBITDA was Baht 96 million, which decreased from the previous quarter by 86%, and the Adjusted EBITDA Margin was at 1%. The overall product sales volume was approximately 672,000 ton which decreased from Q3/2022 by 5% due to the planned maintenance shutdown of Phenol plant unit 2 and Propylene Oxide plant in this quarter.

In this quarter, Intermediates products spread were lower compared to previous quarter. The global economic recession, the COVID-19 outbreak, and inflationary concern impacted the downstream demand, especially the textile industry (Filament and Staple Fiber), construction industry, and electronic industry in China, which is the major market. In term of supply, there were Phenol producers in China which started commercial operation in Q4/2022 impacted the further drop in product prices from the previous quarter, while the supply of BPA remained surplus in China.

For Intermediates Business in 2022, the Adjusted EBITDA was Baht 5,049 million, which decreased from the previous quarter by 73%, and the Adjusted EBITDA Margin was at 6%. The overall product sales volume was approximately 2,874,000 ton which decreased from 2021 by 3% due to the planned maintenance shutdown of Monoethylene Glycol plant, Phenol plant unit 2, and Propylene Oxide plant in this quarter.

The overall market of Intermediates product in 2022 was weak compared to the market in 2021 due to the dampening demand impacted by the global economic slowdown, the COVID-19 outbreak, and the new supply of Phenol and Propylene Oxide segment that entered the market this year. Besides, the market situation of Phenol in 2021 was under-supply because of the Polar-Vortex disruption and the implementation of energy consumption control policy in China that led to production cut or curtailed of some Phenol producers.

## 2.3 Polymers & Chemicals

Table 5: Price, Product Spreads and and performance of Polymers & Chemicals

(Unit : USD per ton)	Q4/2021	Q3/2022	Q4/2022	YoY % +/-	QoQ % +/-	2021	2022	YoY % +/-
Average Polyethylene(PE)	1,376	1,168	1,047	-24%	-10%	1,299	1,280	-1%
High-Density Polyethylene (HDPE)	1,252	1,104	1,033	-17%	-6%	1,181	1,203	2%
HDPE-Ethylene	159	162	128	-19%	-21%	172	148	-14%
Linear Low-Density Polyethylene (LLDPE)	1,285	1,100	999	-22%	-9%	1,200	1,208	1%
LLDPE-Ethylene	192	158	94	-51%	-41%	192	154	-20%
Low-Density Polyethylen (LDPE)	1,592	1,300	1,110	-30%	-15%	1,516	1,428	-6%
LDPE-Ethylene	498	358	205	-59%	-43%	507	373	-26%
Polyethylene Terephthalate (PET)	1,084	1,096	913	-16%	-17%	975	1,097	12%
Polypropylene (PP)	1,335	1,088	995	-25%	-8%	1,321	1,206	-9%
PP- Naphtha	590	374	323	-45%	-14%	675	421	-38%
Polyvinyl chloride (PVC)	1,565	918	773	-51%	-16%	1,419	1,103	-22%
PVC-0.5Ethylene	1,018	447	320	-69%	-29%	915	576	-37%
Polyols	2,415	1,407	1,404	-42%	0%	2,465	1,656	-33%
Polyols-0.92PO	586	397	434	-26%	9%	546	525	-4%
<b>Adjusted EBITDA (MB)</b>	<b>2,418</b>	<b>2,769</b>	<b>53</b>	<b>-98%</b>	<b>-98%</b>	<b>11,819</b>	<b>7,580</b>	<b>-36%</b>
<b>Adjusted EBITDA (%)</b>	<b>9%</b>	<b>10%</b>	<b>0%</b>	<b>-9%</b>	<b>-10%</b>	<b>11%</b>	<b>7%</b>	<b>-4%</b>
Sales Volume ( Kton )	590	515	541	-8%	5%	2,353	2,199	-7%
Share of gain/(loss) from investment (MB)	605	203	(154)	-125%	-176%	3,036	1,598	-47%

For Polymers and Chemicals Business in Q4/2022, the Adjusted EBITDA was Baht 53 million, which decreased from the previous quarter by 98%, and the Adjusted EBITDA Margin was at 0%. The overall product sales volume was approximately 541,000 ton which increased from Q3/2022 by 5%.

The Polymers market demand was under pressure mainly due to the zero-COVID policy in China, which led to lockdowns in many cities and impacted the slowdown in demand. Also, the concerns about global economic recession led to a slowdown in global economic growth. In addition, the inventory of buyers remains in a wait-and-see mode while the supply was adequate and increased from higher production in China, and imports from North America and the Middle East to Asia, despite some producers reducing their operating rates in this quarter. According to the situation and lower crude oil prices, Polyethylene (PE) prices decreased from Q3/2022.

For Polymers and Chemicals Business in 2022, the Adjusted EBITDA was Baht 7,580 million, which decreased from 2021 by 36%, and the Adjusted EBITDA Margin was at 7%. The overall product sales volume was approximately 2,199,000 ton which decreased from 2021 by 7%.

The Polymers market in 2022 was under pressure mainly due to lower PE spread, which decreased from 2021 by 1% even though crude oil prices was higher this year. Although the lowering trend of COVID-19 infections and the re-opening of cities in many countries, PE price was pressured by a new supply, zero-COVID policy in China, and concerns about global economic recession. For the Polyols market in 2022, the oversupply and slowdown of market demand led to a decline in Polyols price compared with the previous year.

## 2.4 Bio & Circularity

Table 6: Price, Product Spreads and and performance of Bio & Circularity

(Unit : USD per ton)	Q4/2021	Q3/2022	Q4/2022	YoY % +/-	QoQ % +/-	2021	2022	YoY % +/-
Methyl Ester (ME) P2F (THB per Kilogram)	3.1	3.1	4.2	35%	35%	3.1	3.4	10%
Fatty Alcohol (FA) P2F	247	641	595	141%	-7%	275	514	87%
<b>Adjusted EBITDA (MB)</b>	<b>580</b>	<b>238</b>	<b>4</b>	<b>-99%</b>	<b>-98%</b>	<b>1,497</b>	<b>1,579</b>	<b>5%</b>
<b>Adjusted EBITDA (%)</b>	<b>10%</b>	<b>5%</b>	<b>0%</b>	<b>-10%</b>	<b>-5%</b>	<b>8%</b>	<b>7%</b>	<b>-1%</b>
ME Sales Volume ( Kton )	81	74	76	-6%	3%	323	293	-9%
FA Sales Volume ( Kton )	22	28	21	-2%	-23%	86	97	13%
Share of gain/(loss) from investment (MB)	480	206	39	-92%	-81%	1,523	1,326	-13%

For Bio and Circularity Business in Q4/2022, the Adjusted EBITDA was Baht 4 million, which decreased from the previous quarter by 98%, and the Adjusted EBITDA Margin was at 0% driven by the decrease in Fatty Alcohol sales volume and P2F. The demand of Fatty Alcohol dropped from previous quarter since main customers in China had shutdown during China's national holidays. In addition, the prolonged Russia-Ukraine conflict, the global economic recession, US dollar appreciation, and the downward trend of feedstock price put pressure on customers to be more cautious in their purchases and restocking. On the contrary, Methyl Ester demand increased because the adjustment of biodiesel mandatory stipulated by the Ministry of Energy changed from B5 to B7 from October 10, 2022 to March 31, 2023 to support the domestic palm oil price that tend to decline following international palm oil price.

For Bio and Circularity Business in FY2022, the Adjusted EBITDA was Baht 1,579 million, which increased from the previous year by 5%, and the Adjusted EBITDA Margin was at 7%. This was supported by Fatty Alcohol P2F improved significantly and the increase in sales volume of Fatty Alcohol due to the longer shutdown period to change Catalyst in 2021 (Q1/2021 and Q2/2021). In addition, to accelerate the sales volume, the Company shift sales destination to other countries apart from China where COVID-19 pandemic was severe, led to the higher sales volume of FA compared with previous year. However, Methyl Ester sales volume decreased by 9% from previous year as the B5 biodiesel mandatory was implemented since February 5, 2022 to October 9, 2022 and changed to B7 afterwards, while the B10 biodiesel mandatory was stipulated for basic biodiesel blending and B6, B7, or B20 for alternative biodiesel blending.

## 2.5 Performance Chemicals

Table 7: Price, Product Spreads and and performance of Performance Chemicals

(Unit : USD per ton)	Q4/2021	Q3/2022	Q4/2022	YoY % +/-	QoQ % +/-	2021	2022	YoY % +/-
Adjusted EBITDA (MB)	422	2,330	465	10%	-80%	1,779	10,667	>200%
Adjusted EBITDA (%)	11%	8%	2%	-9%	-6%	13%	9%	-4%
Sales Volume (million ton )	12	205	183	>200%	-11%	49	837	>200%
Share of gain/(loss) from investment (MB)	(20)	(2)	(16)	23%	<-200%	(36)	(20)	44%

Note : the Company realized allnex performance since January 2022.

For Performance Chemicals Business in Q4/2022, the Adjusted EBITDA was Baht 465 million, which decreased from the previous quarter by 80%, and the Adjusted EBITDA Margin was at 2% due to the lower demand resulting in the drop in sales volume from the previous quarter. This was attributable to the lower demand in China due to global economic recession, direct and indirect impact from the Russia and Ukraine conflict, and holiday season in Q4/2022, especially in Europe and the United States. In Q4/2022, the Company completed the purchase price allocation of allnex. Hence, the Company recorded one-time expenses from assigning fair value to Inventories amounting to Baht 1,779 million. If excluding such amount, the Adjusted EBITDA and the Adjusted EBITDA Margin of Performance Chemicals in Q4/2022 would be Baht 2,244 million and 9% respectively.

For Performance Chemicals Business in 2022, the Adjusted EBITDA was Baht 10,667 million, which increased from the previous year by over 200%, and the Adjusted EBITDA Margin was at 9% due to the consolidation of allnex's performance since January 2022, attributed to higher performance of Performance Chemicals compared with last year. In term of demand in 2022, it was impacted by the global economic recession and inflationary factors, direct and indirect impact from the Russia and Ukraine war, COVID-19 lockdown in China and lower Automotives OEM volumes impacted by micro-chips shortages in the first half of 2022. These impacts led to the lower sales volume in 2022. However, allnex is able to contribute stable margin per unit, leading to the Adjusted EBITDA Margin of Performance Chemicals at 11% in 2022, excluding one-time expense from the purchase price allocation to inventories.

### 3. Operating Performance

Unit : MB		Q4/2021	Q3/2022	Q4/2022	YoY % + /(-)	QoQ % + /(-)	20221	2022	YoY % + /(-)
1	Sales Revenue	139,298	181,536	124,780	-10%	-31%	465,128	678,267	46%
2	Feedstock cost	(106,681)	(143,018)	(92,801)	-13%	-35%	(341,893)	(521,512)	53%
3	Product to Feed Margin	32,617	38,518	31,979	-2%	-17%	123,235	156,755	27%
4	Variable Cost	(10,614)	(13,854)	(13,053)	23%	-6%	(34,107)	(51,148)	50%
5	Fixed OH	(6,320)	(8,341)	(9,949)	57%	19%	(18,556)	(32,542)	75%
6	Stock Gain/(Loss) and NRV	1,040	(8,108)	(3,518)	<-200%	57%	5,955	(3,657)	-161%
7	Gain/(Loss) on Commodity Hedging	1,462	(2,111)	356	-76%	117%	(1,440)	(23,057)	<-200%
8	Other Revenue	1,465	1,875	2,535	73%	35%	4,932	7,527	53%
9	SG&A Expenses	(6,975)	(7,824)	(8,053)	15%	3%	(18,878)	(31,458)	67%
10	EBITDA	12,675	155	297	-98%	92%	61,141	22,420	-63%
11	Depreciation & Amortization	(6,408)	(7,123)	(6,235)	-3%	-12%	(23,593)	(26,646)	13%
12	Loss from impairment of assets	(1,886)	-	-	-100%	-	(1,886)	-	-100%
13	Provision of contingent liabilities-Subsidiary	(444)	-	-	-100%	-	(444)	-	-100%
14	Gain on shares purchase	-	-	939	100%	100%	-	939	100%
15	Gain on sale of investment	1,388	-	-	-100%	-	10,201	-	-100%
16	Gain from investment reclassification	-	-	848	100%	100%	10,565	848	-92%
17	Technical incident in the warehouse construction project	-	(851)	(43)	-	-95%	-	(894)	100%
18	EBIT	5,325	(7,819)	(4,194)	-179%	46%	55,984	(3,333)	-106%
19	Net financial expense	(1,400)	(2,474)	(2,405)	72%	-3%	(5,434)	(9,171)	69%
20	FX Gain(Loss)	(1,899)	(3,298)	3,990	>200%	>200%	(4,765)	(313)	93%
21	Share of gain/(loss) from investment	1,472	306	(381)	-126%	<-200%	6,993	2,908	-58%
22	Corporate Income Tax	(190)	101	2,031	<-200%	>200%	(7,228)	2,273	-131%
23	Net Profit/(Loss) after Tax	3,308	(13,184)	(959)	-129%	93%	45,550	(7,636)	-117%
	Profit/(loss) attributable to:								
24	Non-controlling interests	60	200	9	-85%	-96%	568	1,116	96%
25	Owners of the Company	3,248	(13,384)	(968)	-130%	93%	44,982	(8,752)	-119%
26	Adjusted EBITDA*	10,173	10,374	3,459	-66%	-67%	56,627	49,134	-13%

Note: \* Adjusted EBITDA refers to EBITDA excluding Stock gain/(loss), NRV, Gain/(loss) from commodity hedging, and Extra item

The Company started the consolidation of allnex's financial performance since January 2022, which led to higher revenue and expense compared with 2021. The performance of Q4/2022 is described as follows:

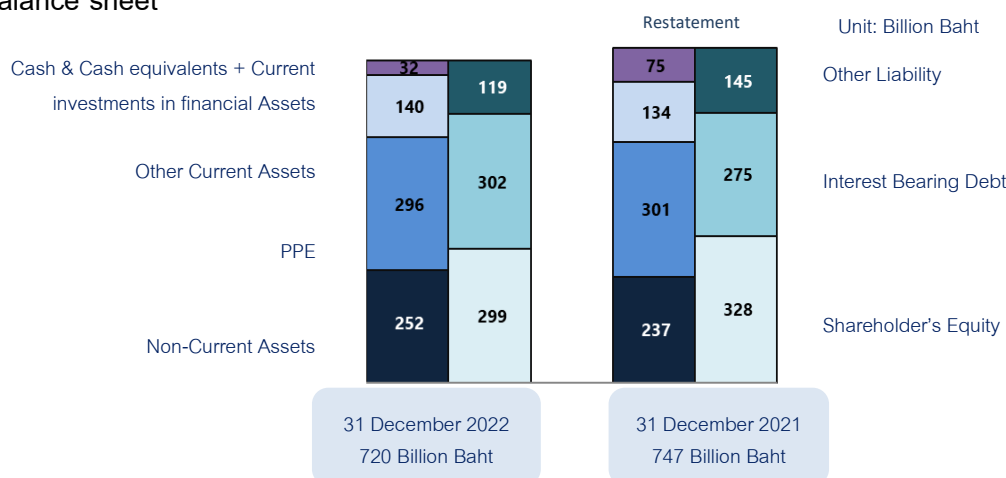
- In Q4/2022, the Company had sales revenue of Baht 124,780 million, which is less than Q3/2022 as the product prices and the sales volume of the Refinery decreased due to the planned maintenance shutdown for 49 days.
- The Company had lower Variable costs than Q3/2022 due to the planned maintenance shutdown of the Refinery, even the costs of product was higher due to higher fuel costs from Q3/2022 and Q4/2021.
- Fixed overhead and SG&A expenses went up from the previous quarter because of the completion of the purchase price allocation of allnex's acquisition costs in Q4/2022, which allocated the fair value measurements on the investment to inventory of Baht 1,779 million.
- Depreciation and Amortization decreased from previous quarter due to asset light management of assets related to the production process.

- Extraordinary items in Q4/2022 include 1) Gain of Baht 939 million from the acquisition of shares of AGC Vinithai Public Company Limited (AVT) by private placement which increased the Company's holdings in AVT to 32.72% from 27.32% 2) Gain of Baht 848 million from the reclassification of investment in Thai Tank Terminal Company (TTT), which the Company's holdings in TTT decreased to 36.43% from 51%. The Company reclassified the investment in TTT from subsidiary to Joint Venture company resulted to the reassessment of its fair value on the date of this reclassification.
- The Company had a decrease in Financial Expenses from Q3/2022 due to bond redemption in September 2022 for USD 1,000 million.
- The Company had Foreign Exchange gain in Q4/2022 by Baht 3,990 million due to the appreciation in Baht currency from Q3/2022.
- In Q4/2022, the Company's share of profit from investment decreased from the previous quarter mainly driven by the decreased performance from the global economic recession, which impacted to decline in the product spread.

In 2022, the Company had higher sales revenue of Baht 678,267 million than in 2021 mainly due to the increase in petroleum products price in the Upstream business, and the Performance Chemicals business increased from the consolidation of allnex's financial performance in 2022, which led to higher revenue of the Performance Chemicals in 2022. Fixed overhead and SG&A expenses went up from 2021 due to the consolidation of allnex's expenses and maintenance expenses from the planned maintenance shutdown. Also, the Company had Stock Loss Net NRV for 3,657 million Baht and Loss from commodity hedging of Baht 23,057 million due to fluctuation of Dubai crude oil prices. For extraordinary items in 2022 were mainly the transactions occurred in Q4/2022 as abovementioned. For 2021, the Company had extraordinary items from Gain of Baht 20,766 million from the sales of ordinary shares of 12.73% in Global Power Synergy Public Company Limited (GPSC), and the reclassification of the remaining investment shares of 10%.

## 4. Statements of Financial Position

### 4.1 Balance sheet



#### Assets

As of December 31, 2022, the Company had total asset of Baht 719,965 million, decreased by 4% or Baht 27,515 million from December 31, 2021 and variance of the assets were described as follows:

- Total Current asset decreased by Baht 37,083 million mainly due to 1) a decrease in Cash and Cash Equivalents and Current Investments in financial assets by Baht 43,032 million due to USD bond redemption by USD 1,000 million in September 2022 (refer to cash flows analysis) 2) a decrease in Account Receivable by Baht 5,287 million due to the overall products price decreased 3) Inventories was increased by Baht 5,066 million due to higher crude oil prices.
- Property plant and equipment decreased by Baht 4,721 million mainly due to depreciation for the year of Baht 10,382 million, while the projects in progress that were completed during the period was Baht 5,446 million.
- Non-current asset increased by Baht 14,289 million from 1) Right-of-use assets increased by Baht 14,235 million due to the allnex's assignment from Intangible assets to Right-of-use assets and the extension of the long-term service agreement with TTT, 2) Other non-current financial assets decreased by Baht 4,695 million due to the fair value measurements on the investment in Global Power Synergy Public Company Limited (GPSC), 3) the currency conversion of allnex, which led to a decrease in intangible assets by Baht 4,899 million and goodwill by Baht 1,975 million due to the appreciation in Baht currency against Euro from the end of 2021, 4) there was an increase in investments in subsidiary, associate, and other companies by Baht 11,731 million from purchase of ordinary shares in AGC Vinythai Public Company Limited (AVT).

#### Liabilities

As of December 31, 2022, the Company had total liabilities of Baht 421,138 million, increased by Baht 1,260 million from December 31, 2021 and movements of liabilities were as follows:

- Interest-bearing debt increased by Baht 26,497 million (including Lease liabilities) due to 1) Bonds issuance and Debt financing increased from 2021 by Baht 12,530 million, which increased from Bond issuance by 100,957 million Baht included Baht Bond issuance of Baht 30,000 million in January 2022, and USD Bond by USD 1,300 million in March 2022. The Company had prepayment of long-term loan to PTT

Treasury Center Co., Ltd. (PTT TCC) by Baht 55,600 million and repayment to financial institutes by Baht 15,240 million. Also, the Company had Bonds issuance by Baht 25,000 million in June 2022, and repayment of USD 1,000 million bonds in September 2022, and 2) Lease liabilities increased by Baht 13,949 million Baht from the extension of the long-term service agreement with TTT.

- Other liabilities decreased by Baht 25,219 million due to 1) Account payable decreased by Baht 12,497 million due to lower crude sourcing from the planned maintenance shutdown of Refinery in Q4/2022, 2) Other current liabilities decreased by Baht 4,265 million resulting from the tax transaction related to allnex acquisition at the end of 2021, 3) Other non-current liabilities decreased by Baht 8,457 million due to decreased Deferred tax liabilities.

### Shareholder's Equity

As of December 31, 2022, the Company had total Shareholder's Equity of Baht 298,828 million, which decreased by Baht 28,755 million from December 31, 2021, as a result from Net loss for the year ended December 31, 2022, of Baht 8,752 million. The Company had dividend payment for 2021 and interim dividend payment for 2022 of Baht 11,272 million. Additionally, the Company had lower Other components of equity by Baht 7,345 million, which included the loss from fair value measurements in financial assets of Baht 3,853 million from the fair value measurements of GPSC and Foreign Exchange loss of Baht 4,208 million.

## 4.2 Cashflow statement

Cashflow (Unit: Million Baht)	For the year Ended 31 Dec 2022
Net cash flows provided by operating activities	(3,426)
Net cash flows used in investing activities	(12,213)
Net cash flows provided by financing activities	(14,164)
<b>Net increase (decrease) in cash and cash equivalents, before effect from foreign exchange rate</b>	<b>(29,803)</b>
Effects of exchange rates on cash and cash equivalents	130
<b>Net decrease in cash and cash equivalents during the period</b>	<b>(29,673)</b>
Cash and cash equivalents at the beginning of the period	55,613
<b>Cash and cash equivalents at the end of the period</b>	<b>25,940</b>
Current investments in financial assets at the end of the period	6,023
<b>Net cash and cash equivalent and investment at the end of the period</b>	<b>31,963</b>

For the period ended December 31, 2022, the company had cash flow activities as follows:

- Cash flows used by operating activities of Baht 3,426 million due to Net Loss for 2022 (included Non-controlling profit) of Baht 7,636 million, and add back Non-cash items of Baht 36,459 million. The



Company had Share of Profit from Investments in JV and associates of Baht 2,557 million, and Changes in operating assets and liabilities of Baht 32,249 million.

- Cash flow used in investing activities of Baht 12,213 million. The Company had cash paid for property, plant, and equipment, and intangible assets amounting to Baht 20,093 million, for example, Olefins 2 Modification Project (OMP) and planned maintenance shutdown of Olefins Plant 3. The Company had cash paid for investment subsidiaries, associates, and joint ventures of Baht 8,224 million, which was mainly from the purchase of AVT shares by Baht 8,077 million. The Company had proceed from investment in financial assets of Baht 13,458 million and dividend received of Baht 2,901 million.
- Cash flow provided by financing activities of Baht 14,164 million mainly due to the proceeds from Bonds issuance by Baht 100,587 million, cash provided by from borrowings from financial institutions by Baht 1,435 million. The Company had outflows from PTT TCC long-term loan prepayment by Baht 55,600 million, cash paid for bond repayment by Baht 36,134 million, cash paid for financial costs by Baht 9,494 million, Dividend payment by Baht 11,746 million, and cash paid for finance lease liabilities by Baht 2,494 million.
- As a result, as of December 31, 2022, the Company had total Cash and Cash Equivalents of Baht 25,940 million, along with Current investments in financial assets of Baht 6,023 million. Hence, the Company had total cash and cash equivalent and investment of Baht 31,963 million. The Company had Net interest-bearing debt to equity at 0.90 times and Net interest-bearing debt to EBITDA at 12.04 times.

### 4.3 Key Financial Ratios

Financial Ratios	Q4/2021 (Restatement)	Q3/2022	Q4/2022
Current Ratio (Times)	1.42	1.60	1.65
EBITDA to Sales Revenue (%)	13.14%	5.02%	3.31%
Net Profits to Sales Revenues (%)	9.67%	-0.65%	-1.29%
Return on Total Assets (%)	9.50%	0.81%	-0.01%
Return on Equity (%)	15.01%	-1.50%	-2.87%
Interest Bearing Debt to Equity (Times)	0.84	0.95	1.01
Net Interest Bearing Debt to Equity (Times)	0.61	0.83	0.90
Interest Bearing Debt to EBITDA (Times)	4.50	8.28	13.46
Net Interest Bearing Debt to EBITDA (Times)	3.28	7.22	12.04

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

The Company has important projects in the pipeline:

- 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 Q1/2023.
- 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 Q2/2023.

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	Estimated Annual CAPEX (M.USD)				
	2023-2027	2023	2024	2025	2026	2027
1) Olefin 2 Modification Project	33	33	-	-	-	-
2) Other projects	269	225	27	16	-	-
<b>total</b>	<b>302</b>	<b>258</b>	<b>27</b>	<b>16</b>	<b>-</b>	<b>-</b>
3) allnex expansion & growth Capex	491	80	111	114	95	91
<b>GC group Grand total</b>	<b>793</b>	<b>338</b>	<b>139</b>	<b>130</b>	<b>95</b>	<b>91</b>

Notes: 1. Group annual maintenance ~ 400 M.USD (including allnex Holding GmbH)

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

## 6. Market and Business Outlook in 2023

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The global economic outlook in 2023 continues to be impacted by multiple factors. A prolonged period of the Russia-Ukraine conflict, which in response to Russia's invasion of Ukraine, sanctions were imposed on Russian economy and energy, which have caused direct impacts on economies around the globe. These resulted in an impact on the global energy supply and prices, and global inflationary. However, there was a positive sign shown in China by an orderly easing of mobility restrictions. The IMF has revised down the expected world economy growth to 2.9% in 2023 (As of January 2023). The global economy is expected to continue to recover in line with the increase in demand for Petroleum and Petrochemical products, however, there are heightened uncertainties over the economic outlook and monetary policy in each country.

### Upstream business unit

The Company anticipates that the average price of Dubai crude oil in 2023 will be within the range of 85-90 USD per barrel. The International Energy Agency (IEA) had estimated the crude oil demand (as of October 2022) in 2023 at 101.3 million barrels per day, increased by 1.7 million barrels per day from the 2022 demand. However, downside risk exists. The energy crisis continues to be a major concern, along with a recovery in demand, especially in China after the re-opening, the increase in OPEC supply, and global economic trends and prospects.

For Petroleum products, the Company anticipates that products price and products spread will be softened in 2023 comparing with 2022 which products spread has stood at high level due to tight supply in the market impacted from the consequence of the conflicts in Europe. As a result, Diesel over Dubai crude oil spread is expected to be 24-27 USD per barrel while Low Sulfur Fuel Oil (LSFO) over Dubai crude oil spread to be 14-18 USD per barrel. The expected Gasoline over Dubai crude oil spread is 15-17 USD per barrel. 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. The Company expects that the Refinery utilization rate of 2023 will be operated at around 101%.

For Aromatics products, Paraxylene over Naphtha spread is expected to be stable at 300-340 USD per ton. As more producers enter the market, 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 supported by food and beverage industry, e-commerce industry and the recovery in global economy by easing lockdown in China. Benzene over Naphtha spread is expected to be 220-250 USD per ton, supported by the new capacity of downstream products such as Phenol. The Company expects that the Aromatics utilization rate of 2023 will be 90% due to the planned maintenance shutdown of Aromatics plant in Q3/2023.

The outlook for Olefins products, the Company anticipates that Ethylene products price will be at 960-990 USD per ton. Propylene is expected to be 960-990 USD per ton, however, the supply will be pressured by new capacity in China. The Company expects Olefins utilization rate to be around 85% due to the planned maintenance for the preparation for the commercial operation of Olefins plant 2/2 modification project in Q1/2023 and the planned maintenance shutdown of Olefins plant 1 in Q3/2023.

### Intermediates business unit

For Phenol market trend in 2023, the Company anticipates that Phenol P2F spread will be at 260-300 USD per ton, as new supply is predicted to enter the market, along with new capacity from Bisphenol A (BPA). The demand for end products recovery is continuing from policies launching in China to stimulate vehicle and construction markets.

For MEG and PTA market, the Company expects that the average MEG price will be 570-600 USD per ton which higher than the average market price in 2022. PTA price is expected to be stable. The expected demand from downstream business is expected to gradually recover same as Paraxylene product.

#### Polymers & Chemicals Business unit

The Company anticipates that the average Polyethylene price in 2023 is expected to be 1,150-1,200 USD per ton. This is supported by the stronger demand for packaging, along with the re-opening of China and the decrease of new capacity, even though there are concerns about economic uncertainty. The Company expects that the Polyethylene plants utilization rate will be around 98% in 2023. The expected market outlook of Polyethylene Terephthalate (PET) is as abovementioned.

#### Performance Chemicals Business unit

The end markets industry such as automotive industry, and construction industry are expected to be recovered in 2023 as the launches policies to expand and stimulate both industries in China. For packaging industry is expected to grow follow an upward economic growth trend.

## 7. Sustainability Management (Environment Social Governance)

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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):

### Sustainability Management in the Environmental Dimension

GC reaffirms our stance to partake in the Paris Agreement under the United Nations Framework Convention on Climate Change. We have, thereby, set the target to reduce greenhouse gas emissions (scope 1 & 2) by 20 percent within 2030 and achieve the Net Zero Target as well as halving scope 3 emissions by 2050. The company has assessed and disclosed information on risks and opportunities relating to climate change in line with the guidelines of the Task Force on Climate-related Financial Disclosures (TCFD). Furthermore, we have clearly defined short-term, medium-term, and long-term policies and strategies pertaining to energy and climate change management. In doing so, the Sustainable Development Committee (SDC) has been appointed to drive these strategies and determine business directions to correspond with the Low Carbon Transition Framework:

**Efficiency-driven:** highlights the implementation of diverse greenhouse gas reduction and energy enhancement projects, such as Energy Conservation, Maptaphut Integration (MTPi), Greenhouse Gas Reduction through Alternative Energy, etc. We stress on energy and utilities management for maximum efficiency, loss reduction during transportation, greenhouse gas emissions reduction, and integrated waste management.

**Portfolio-driven:** features investment in the high value business (HVB) group and businesses that correspond to the Circular Economy principles. GC also explores opportunities to leverage synergy in order to yield maximum value from current businesses, markets and technologies, such as the acquisition of "allnex" which has high profitability and can respond to consumer needs based on megatrends. Additionally, ENVICCO, a joint venture between GC and ALPLA, has commenced the full commercial operation of its high-quality recycled plastic resin production plant in 2022. The plant's operations promote the concept of product circularity by reintroducing used plastic into an end-to-end waste management process. This is carried out in tandem with the development of the "YOUTURN Platform" as well as the collaboration with networks and third parties in order to achieve the Net Zero Target while preserving competitiveness and enabling continuous growth.

**Compensation-driven:** covers the continuous implementation of projects to restore and reinforce the balance of forest ecosystems in collaboration with the government, the private sector, the society and communities since 2013, spanning across a total area of 2,500 rai. These projects include the 80-rai Eco-Forest Rayong Wanarom which follows the Eco Forest principle and has been registered in the Thailand Voluntary Emission Reduction Program (T-VER), and the Khao Huai Mahat Forest Restoration and Water Conservation Project. Additionally, GC has also built cooperation with our partner network and made corporate venture capital (CVC) investments in order to gain access to Carbon Capture Utilization and Storage (CCUS) technology and innovation.

### Sustainability Management in the Social Dimension

GC is committed to conducting business with responsibility in adherence to the principle of Social Enterprise (SE) by implementing the organization's innovations and expertise as well as optimizing the utilization of current resources according to Circular Economy (CE). Concurrently, GC focuses on generating and returning income to the communities and the society, improving the quality of life, solving environmental problems, and managing plastic waste, which will lead to a sustainable and low-carbon society. GC also places importance in building relationships and engagement with all sectors. Our CSR projects are prioritized based on three key components, namely Better Living such as Community Waste Model under YOUtern Platform, sharing such as Rayong Organic Living project, and Ecology such as underground water bank covering the economic, social and environmental dimensions.

### Sustainability Management in the Economic Dimension

GC emphasizes on innovation investment and development to strengthen our competitiveness and support the achievement of our Net Zero Target under the Innovation Management Strategy which comprises 1) New Technology Uplift, 2) Market-focused Innovation, and 3) Technology Integration.

Furthermore, GC also enhances employee capacity and capabilities in support of our innovation development endeavors. Accordingly, we encourage cooperation in innovation research and development with networks and third-party agencies or experts as well as direct and indirect investment in innovation. This year, GC has signed a Memorandum of Understanding to conduct a feasibility study on the application of Carbon Capture and Storage (CCS), or CCS Hub Model, with PTT Group in an effort to achieve the Carbon Neutrality Target and the Net Zero Target. In addition, we have made investments in the form of corporate venture capital (CVC).

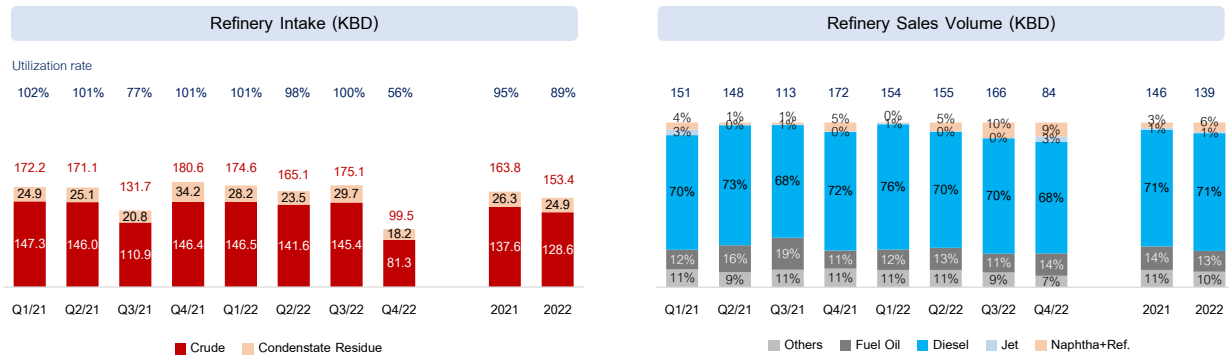
Highlight examples of GC's innovations in 2022 include the upcycling of used plastic from the YOUTURN Platform to create eco-designs in collaboration with 8 "Experts of Style" in Fashion & Lifestyle, Adventure & Traveling, and Home & Living; Bioplastics Toothbrush which are bio-based products under the brand Venture; and Post-Consumer Recycled Resin (PCR Resin) which features transforming plastic waste into plastic resins and delivering them to customers for further production under the concept of Circular Economy. They can replace ordinary plastic resins in the molding of packaging. Besides supporting Circular Economy, the PCR resins also contribute to decreasing resource and energy consumption as well as waste generation. The packaging of "Mistine" body lotion is the first product in Thailand to be manufactured from the PCR resins.

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 and Water Management at 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 fifth consecutive year and the Thailand Sustainability Investment (THSI) Awards for the eighth -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.

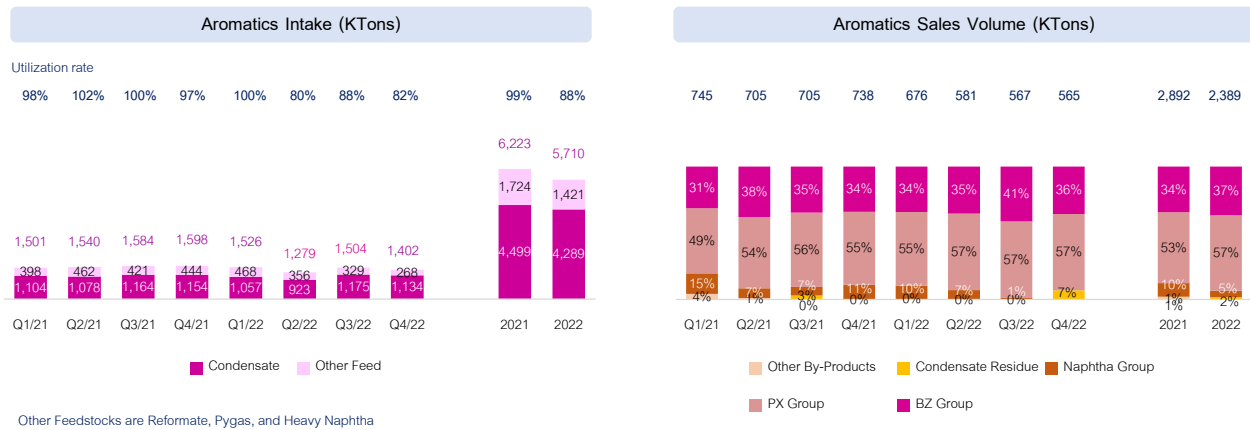
## 8. Appendix

### 8.1 Production and Sales

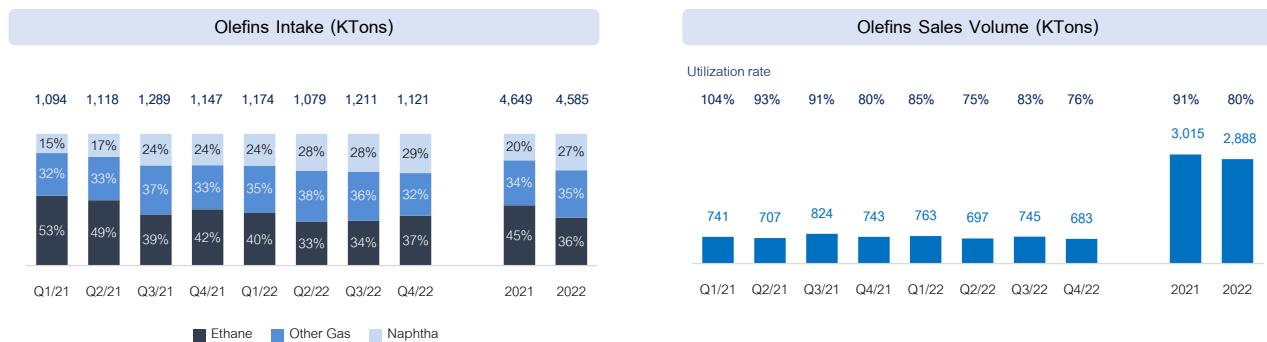
Graph 1: Refinery Intake and Sales Volume



Graph 2: Aromatics Intake and Sales Volume (BTX)

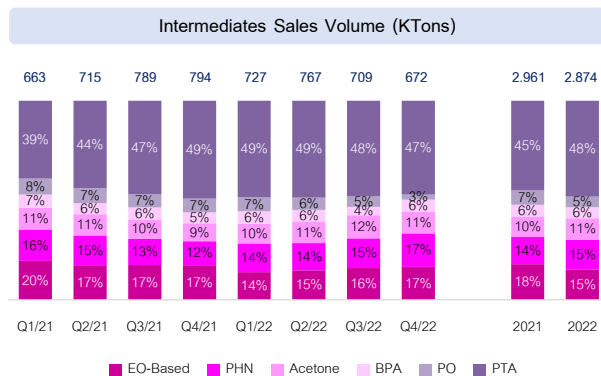


Graph 3: Olefins Intake and Olefins and Derivatives Sales Volume

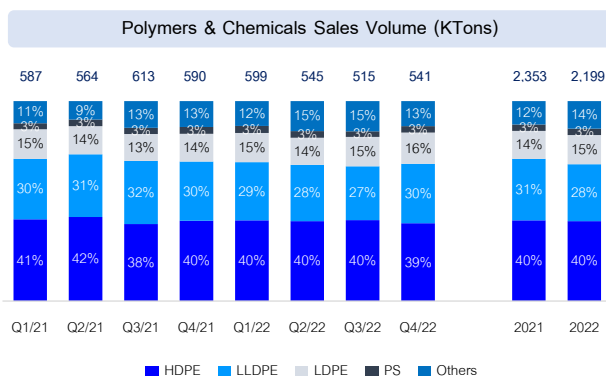




Graph 4: Intermediates products sales Volume



Graph 5: Polymers & Chemicals products sales Volume



Graph 6: Utilization rate

Utilization rate	Q1/21	Q2/21	Q3/21	Q4/21	Q1/22	Q2/22	Q3/22	Q4/22	2021	2022
<b>Upstream</b>										
- Refinery	102%	101%	77%	101%	101%	98%	100%	56%	95%	89%
- Aromatics	98%	102%	100%	97%	100%	80%	88%	82%	99%	88%
- Olefins	104%	93%	91%	80%	85%	75%	83%	76%	91%	80%
<b>Intermediates</b>										
- MEG	105%	104%	110%	99%	66%	88%	84%	79%	104%	79%
- Phenol	119%	115%	118%	101%	119%	118%	116%	107%	113%	115%
- BPA	114%	103%	121%	107%	119%	112%	71%	107%	111%	102%
- PO	89%	100%	99%	53%	104%	81%	69%	22%	85%	69%
<b>Polymers &amp; Chemicals</b>										
HDPE	107%	107%	104%	102%	111%	102%	95%	92%	105%	100%
LLDPE	96%	106%	95%	93%	92%	80%	97%	88%	98%	89%
LDPE	123%	100%	123%	100%	128%	85%	128%	121%	111%	115%
Total PE	105%	105%	104%	98%	106%	90%	101%	95%	103%	98%

## 8.2 Detail of Adjusted EBITDA by Business Unit

Adjusted EBITDA Margin by Business Unit	Q4/2021	Q3/2022	Q4/2022	YoY	QoQ	2021	2022	YoY
				% +/-	% +/-			% +/-
<b>Adjusted EBITDA (Million Baht)</b>								
Upstream	4,115	3,559	1,658	-60%	-53%	22,826	21,616	-5%
Refinery	2,586	4,958	2,449	-5%	-51%	4,468	21,046	>200%
Aromatics	133	(8)	(409)	<-200%	<-200%	5,707	(850)	-115%
Olefins	1,397	(1,391)	(382)	-127%	73%	12,651	1,421	-89%
Intermediates	3,851	707	96	-98%	-86%	19,029	5,049	-73%
Polymers & Chemicals	2,418	2,769	53	-98%	-98%	11,819	7,580	-36%
Bio & Circularity	580	238	4	-99%	-98%	1,497	1,579	5%
Performance Chemicals	422	2,330	465	10%	-80%	1,779	10,667	>200%
Service and Others	(1,213)	770	1,183	198%	54%	(323)	2,643	>200%
<b>total</b>	<b>10,173</b>	<b>10,374</b>	<b>3,459</b>	<b>-66%</b>	<b>-67%</b>	<b>56,627</b>	<b>49,134</b>	<b>-13%</b>
<b>Adjusted EBITDA margin (%)</b>								
Upstream	5	4	3	(2)	(1)	9	6	(3)
Intermediates	16	3	1	(15)	(2)	22	6	(16)
Polymers & Chemicals	9	10	0	(9)	(10)	11	7	(4)
Bio & Circularity	10	5	0	(10)	(5)	8	7	(1)
Performance Chemicals	11	8	2	(9)	(6)	13	9	(4)
<b>Average</b>	<b>7</b>	<b>6</b>	<b>3</b>	<b>(4)</b>	<b>(3)</b>	<b>12</b>	<b>7</b>	<b>(5)</b>

Note: 1) Adjusted EBITDA refers to EBITDA excluding Stock gain/(loss), NRV, Gain/(loss) from commodity hedging, and Extra item.

2) In Q3/2023, there was an adjustment of Adjusted EBITDA between segments due to company reorganization.

### 8.3 Planned Maintenance Shutdown Schedule 2023

