

Bangchak Corporation Plc.

Management Discussion & Analysis of Business Operation

For the 4th quarter and
year ended December 31st, 2021





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Executive Summary



Summary of the company and its subsidiaries' operating result for the 4th quarter and for the year 2021

Unit: THB Million	Q4/2021	Q3/2021	QoQ	Q4/2020	YoY	2021	2020	YoY
Total Revenue	66,762	47,649	40%	33,134	101%	199,417	136,450	46%
Accounting EBITDA	9,281	7,531	23%	2,750	237%	25,818	4,104	529%
<i>Refinery and Trading Business</i> ^{1/}	3,084	1,891	63%	600	414%	9,363	(2,169)	N/A
<i>Marketing Business</i> ^{2/}	255	562	-55%	602	-58%	2,614	2,174	20%
<i>Power Plant Business</i> ^{3/}	1,038	1,179	-12%	868	20%	4,193	3,640	15%
<i>Bio-Based Products Business</i> ^{4/}	255	890	-71%	590	-57%	1,863	1,828	2%
<i>Natural Resources Business</i> ^{5/}	4,832	3,112	55%	221	>1,000%	8,251	(1,004)	N/A
<i>Others</i>	(184)	(102)	-80%	(131)	-40%	(466)	(365)	-28%
Profit attributable to owners of the company	1,756	1,820	-4%	251	598%	7,624	(6,967)	N/A
Earnings (Loss) per share (Baht)	1.20	1.25		0.09		5.25	(5.50)	

Note: 1/ EBITDA from Refinery Business of the company, BCP Trading Pte. Ltd. and share of profit from associated companies

2/ EBITDA from Marketing Business of the company, Bangchak Green Net Co.,Ltd., Bangchak Retail Co., Ltd., and share of profit from associated companies

3/ EBITDA from Power Plant Business of BCPG Plc., its subsidiaries, and share of profit from associated companies

4/ EBITDA from Bio-Based Products Business of BBGI Plc., its subsidiaries, and share of profit from associated companies

5/ EBITDA from Natural Resources Business of OKEA ASA, BCP Innovation Pte. Ltd., and NIDO Petroleum Pty. Ltd.

Performance in 2021, amid the COVID-19 pandemic which exacerbated and prolonged throughout the year, Bangchak Corporation Plc. ("the company") and its subsidiaries were able to generate a record-breaking performance, with revenue from sales and rendering of service in the amount of THB 199,417 million (+46% YoY), with EBITDA of THB 25,818 million (+529% YoY), and **net profit attributable to owners of the parent at THB 7,624 million** (THB +14,591 million YoY) or **earning per share of THB 5.25**. The company group's performance was supported by significant rises in crude oil and refined products prices in the global market as a result of economic recovery and growth in oil demand following the progress of COVID-19 vaccination around the world which improved COVID-19 situations in many countries. In addition, tighter oil supply amid energy crisis, which pushed up natural gas and coal prices to an elevated level, have made many industrial and power plants switched fuel from natural gas or coal to oil. In 2021, average Dubai crude oil price was 69.39 \$/BBL, an increase of 27.11 \$/BBL compared to the previous year. The company group recorded inventory gain approximately of THB 6,700 million in this year. Although domestic oil demand has declined, Bangchak refinery continuously increase crude run to support the expansion of unconverted oil (UCO) for export market where production volume of UCO increased to 2 times compared to the previous year. In addition, crack spreads for most finished products increased resulting in higher Operating GRM. Moreover, the Natural Resources Business was positively impacted by the sharp increase in energy prices, especially natural gas price. Resulting in OKEA recording the highest revenue from oil and gas sales, where revenue in Q4/2021 was similar to the full year revenues for 2020. However, the company group changed its recording method of investment in OKEA from share of profit (loss) to consolidated method from 1st July 2021 onward which resulted in OKEA's EBITDA in consolidated financial statement approximately of THB 7,800 million. In addition to market-related factors that contributed to improved performance from the previous year, the company group has also undertaken Business Process Redesign



(BPR) to improve work processes to increase efficiency and reduce costs. There are ongoing projects and new development projects this year which increased EBITDA for the company group by more than THB 1,600 million.

The COVID-19 pandemic situation deteriorated due to the spread of the Delta variant which affected total sales volume of the Marketing Business to decline compare to the previous year. However, after the improvement in COVID-19 outbreak during Q4/2021, economic activities and domestic travel recovered. This led to sales through the retail market in December 2021 to reach an all-time high at 432 million liter per month, making it the first year where sales exceeded Bangchak's refining capacity. In addition, the Marketing Business continues to increase sales of lubricants, resulting in an increase in market share of domestic lubricant market to 9.9% from 9.4% in the previous year. Furthermore, Inthanin coffee business also recorded new high for the number of cups sold per day in December.

As for performance in Q4/2021, the company and its subsidiaries recorded revenue from sales and rendering of service in the amount of THB 66,762 million (+40% QoQ), with EBITDA of THB 9,281 million (+23% QoQ). This quarter the Refinery and Trading Business Group's performance increased from the increase in crack spreads of most finished products in line with global markets. As a result, Operating GRM for Q4/2021 was 6.79 \$/BBL, an increase of 3.72 \$/BBL from the previous quarter. In addition, the Natural Resources Business has a better performance from OKEA's increase in revenue due to higher crude oil and gas prices compare to last quarter. However, revenue from the Marketing Business declined from Q3/2021 due to the government's price control measures of retail domestic diesel to below 30 baht per liter, even though sales volume increased after the easing of COVID-19 outbreaks. For Bio-Based Product Business, excluding the effect of recording a gain from fair value adjustments of investments in Q3/2021, the performance remained close to the previous quarter. This quarter, the company group recorded **net profit attributable to owners of the parent THB 1,756 million** (-4% QoQ) or **earning per share of THB 1.20**. The company group's performance of each business group in 2021 are as follow:

The Refinery and Oil Trading Business performance increase THB 11,532 million from 2020, mainly from an Inventory Gain of THB 5,966 million in 2021 while there was an Inventory Loss in 2020. In addition, Operating GRM rose to 4.52 \$/BBL, mainly due to higher crack spreads of most finished products and crude premium declined. In 2021, Bangchak refinery continue to increase production capacity to support the expansion of UCO export which help to support GRM and reduce impacts from lower domestic demand. Due to the scheduled refinery maintenance in Q1/2021, the refinery average crude run was 99.0 KBD or 83% utilization rate where production of UCO increase to 2 times compared to the previous year. For the Oil Trading Business, BCPT recorded an increase in gross profit, mainly from transactions of low sulfur fuel oil and diesel products group due to increase in demand from global economic recovery and the easing of lockdown restrictions in many countries. In addition, the company group has expanded into fuel pipeline transportation and logistics businesses through Bangkok Fuel Pipeline and Logistics Company Limited ("BFPL"), a wholly-owned subsidiary of the company. BFPL granted the right to manage the fuel pipeline systems (Bangkok - Bang Pa-in) from Fuel Pipeline Transportation Limited ("FPT"), and will start an operation in 2022. The expansion into logistics business will create many opportunities with potential to not only reduce costs and losses from oil transportation but also increase revenue as well as reduce carbon emissions from vehicular transport and road accidents, supporting Bangchak's sustainable growth in harmony with the environment and society.



The Marketing Business performance increase 20% from 2020, mainly due to Inventory Gain in 2021 as a result of oil price increase. While total sales volume declined 6% YoY from the impacts of worsening and prolonged COVID-19 outbreak compared to the previous year. In addition, tourism and airline industries have not recovered yet resulting in the continue decline in jet fuel sales. Moreover, net marketing margin per unit decreased 14% YoY due the increase in the cost of finished product, biodiesel (B100), and ethanol. In addition, during Q4/2021 the government implemented price control measures on retail diesel. As a result, the company was unable to adjust retail price in line with cost of finished products. The company's cumulative retail market share in 2021 was 16.2%, maintaining the 2nd place position in market share (data from the Department of Energy Business). At the end of 2021, Bangchak has 1,277 service stations. The company plans to develop service stations into "Greenovative Destination" that can fulfill customers' desires but still respond to changing lifestyles. The company developed "Bangchak Food Truck" business which is currently in its 9 service stations. In addition, Bangchak currently offers EV charging service in 70 service stations, covering 37 provinces across the country. The Marketing Business continues to focus on expanding non-oil business. There were 817 Inthanin Coffee branches and 15 DAKASI bubble tea branches at the end 2021. Due to the COVID-19 situation, Bangchak Retail Co.,Ltd ("BCR") continually promote inthanin's sales through online platforms which include 7 major online delivery players to be in line with changing consumer behavior. As a result, in 2021, BCR's revenue from Inthanin coffee shop increase 18% YoY, in line with the increase in number of cups sold per day of 20% YoY. While online sales increased to 3 times compared to the previous year. In addition, Inthanin Coffee received the Superbrands Award for the first time in 2021.

Power Plant Business performance increase 15% from 2020, due to the share of profit from the Geothermal Power Plant business in Indonesia of THB 577 million, an increase of THB 344 million, due to increased tariff rate and lower financial costs. In addition, performance from Solar Power Plant Projects in Japan increased due to the commencement of commercial operation of Chiba 1 Solar Power Plant (PPA 20 MW) in Q4/2021. Hydro Power Plant in Lao PDR recorded increased performance from higher rainfalls. While performance from Solar Power Plants in Thailand increased due to the recognition of full year performance from the 4 new Solar Power Plant projects (PPA 20 MW) and efficiency improvements of electricity generation. As a result, the Power Plant Business total electricity sales in 2021 increased 13% YoY. In 2021, BCPG expanded investment into utility-scale energy storage system or vanadium redox flow battery through the purchase of convertible bonds of VRB Energy Inc. The investment is in line with BCPG's strategy to become a leader in the renewable energy and large-scale energy storage business as well as to mitigate limitations from the fluctuation of electricity generation by renewables. Moreover, Impact Energy Asia Development Limited ("IEAD"), an associate company of BCPG, has signed a power purchase agreement with Vietnam Electricity with a contracted capacity of 600 MW at the Lao PDR-Vietnam border with a contract term of 25 years. In addition, BCPG has successfully issued green bonds worth THB 12,000 million, which is the first financing through the bond market.

Bio-Based Product Business In 2021, the Business was impacted from COVID-19 outbreak with was worse and longer than the previous year. The **Biodiesel Business** recorded a decline in gross profit of 17% YoY even though average sale price for B100 product increased throughout the year but sales volume decreased due to COVID-19



outbreaks and lower blending mandate for B100 to control domestic retail diesel price. In addition, competition in the market was high. However, revenue from sales of refined glycerin increased which helped to lessen the aforementioned impacts. The **Ethanol Business** saw increased in average sale price of ethanol products in line with the price of main raw material; however, demand for ethanol declined. As a result, the Ethanol Business's gross profit declined 78% YoY. However, the Bio-Based Product Business recognized gains from fair value adjustment of investments in 2021, resulting in comparable performance from the previous year. The **High Value Products (HVP) Business**, BBGI has a strategic plan to integrally invest in the entire value chain from upstream to downstream. Currently, BBGI has a Memorandum of Understanding (MOU) with Bio-Om Co., Ltd, a biotechnology research and development company, to jointly develop high value bio-based enzyme and to co-develop the technology to commercial scale. In addition, BBGI has begun selling products under the "B Nature Plus" brand including ASTA-IMMU dietary supplement, ASTA-VIS dietary supplement, and pharmaceutical grade hand sanitizer. BBGI is preparing to raise funds through an initial public offering (IPO) totaling no more than 433.20 million shares at par value of 2.50 baht per share, representing no more than 30% of the number of all issued and sold ordinary shares. In late January 2022, the Securities and Exchange Commission (SEC) has started counting 1 on the application for an offer for sale of securities and a registration statement for the offer for sale of securities.

The Natural Resources Business saw its performance increase THB 9,254 million from 2020, mainly from the change recording of investment status in OKEA from investment in an associated company to subsidiary which resulted in the change in recording method of investment from share of profit (loss) to consolidated method from 1st July 2021 onward which resulted in a significant increase in Natural Resources Business Group's EBITDA. OKEA's operating results showed 241% YoY with record crude oil and gas sales revenues of THB 14,201 million, an increase of 158% YoY. The improved performance was mainly attributed to the significant increase in average selling price of crude oil and natural gas due to economic recovery in many countries around the world which pushed up demand for energy coupled with record high prices of coal and natural gas which caused the industrial sector and power plants to switch to using oil as fuel instead. The Yme field started production in October 2021 and it is expected that OKEA will have production capacity of 18,500 - 20,000 barrels per day in 2022. In addition, in January 2022, OKEA awarded 4 petroleum production licenses, three of which as operator. The awards strengthen OKEA's portfolio of near-field exploration opportunities around its Draugen and Gjøa production sites. In addition, the company saw an opportunity to enter the Liquefied Natural Gas (LNG) business by co-investing with Thai Special Gas Company Limited ("TSG"), a gas distributor for international standard industries and provider of a full range of gas equipment services, to establish a joint venture company under the name BTSG Company Limited ("BTSG") to engage in LNG procurement and distribution business.

The world has coped with COVID-19 pandemic for over 2 years with no sign of the crisis ending. As can be seen from new waves of outbreaks and new variant for each cycle. Toward the tail end of 2021, the Omicron variant unleashed another wave of outbreak which impacted global and Thai economy as well as daily lives that have to continue adjusting to the new normal to stay safe from infection. To bolster stakeholders' confidence in the company ability to operate business amidst the pandemic, the company has prepared a risk management plan and conducted drills

Executive Summary



according to the Business Continuity Management (BCM) plan, as well as managed working capital to ensure sufficient capital for business operations and investment according to plan. In addition, the company group has given great importance to the safety and health of employees and their families as well as our customers and partners. As a result of the company group's effort in procuring COVID-19 vaccines, over 90% of employees have received 2 doses. The company aims to have high percentage of employees who have received 3rd dose rapidly. The company has also changed the working arrangement to be a hybrid workplace, where employees can work at home and in the office according to changing situations. At the office, the company established measures to control office density and spraying disinfectants at the office regularly. In addition, COVID-19 screening via Antigen Test Kit (ATK) check point is set up for Bangchak Group's employees on a weekly basis. Moreover, ATKs are provided for employees who work at Bangchak service stations and Inthanin coffee shops. This enable employees to regularly test for COVID-19 themselves to ensure safety and build confidence for customers who come to use our services

Important Events in 2021



January

- The company notified the Stock Exchange of Thailand in regards to the change of the shareholding structure of the company's major shareholders. The Ministry of Finance has completed a sale and transfer the company's common shares to Vayupak Fund 1 managed by MFC Asset Management PLC and Vayupak Fund 1 managed by Krung Thai Asset Management PLC on 19th January 2021, totaling 71,899,000 shares, or 5.22% of the company's total issued and paid-up shares. After the completion of the transfer, the Ministry of Finance holds 65,543,767 shares, or 4.76%. Vayupak Fund 1 managed by MFC Asset Management PLC holds 136,886,300 shares, or 9.94%, and Vayupak Fund 1 managed by Krung Thai Asset Management PLC holds 136,886,300 shares, or 9.94%.

February

- The company notified the Stock Exchange of Thailand in regards to the scheduled Major Turnaround Maintenance of crude distillation unit and related units, duration of 39 days from the 15th February - 25th March 2021. The company has planned to cope with this shutdown by taking various measures to ensure sufficient reserves to serve customer demands and legal compliance. The maintenance was completed on time, and the units resume normal operation in March 2021.

March

- The company notified the Stock Exchange of Thailand in regards to the acquisition of WINNONIE Company Limited ("WINNONIE"). BCV Innovation Company Limited (a wholly owned subsidiary of the company) has acquired 99.8% common shares of WINNONIE, for a value of THB 50 million. Its objective is electric motorcycles rental and battery replacement services, including related business that align with the company's goal, leadership in green energy innovator. The acquisition was completed in April 2021.

April

- The 2021 Annual General Meeting of Shareholders approved the dividend payment for 2020 performance was THB 0.40 per share, for a value of THB 543 million. The dividend payment date is 22nd April 2021.

July

- The company group has considered to change the recording of investment status in OKEA ASA ("OKEA") from investment in an associated company to subsidiary since 1st July 2021. This is because there are events and supporting evidence to support the conclusion that the company group has significant control over operations of OKEA, which the company group previously had a significant influence but has no right to control.

- The company notified the Stock Exchange of Thailand in regards to the founding of Carbon Markets Club. Bangchak Group, comprising the company, BCPG Plc. and BBGI Plc., invited leading organizations in Thailand to jointly establish the Carbon Markets Club, which is committed to reducing the effects of carbon emissions. These founding members of the Carbon Market Club are committed to support, promote carbon credit trading and set out to develop the current over-the-counter mode of trade into a digital platform that is convenient and modern and in line with

Important Events in 2021



international standards. This project is aligned with the company's aspiration and strategy to being a Thai energy company that conducts business in parallel with stewardship of the environment and society, engaging in the quality of life improvement for Thai society, and fulfilling Sustainable Development Goals.

- The company notified the Stock Exchange of Thailand in regards to the disposition of all shares in BCP Energy International Pte. Ltd. ("BCPE"), a wholly-owned subsidiary of the company in Singapore, with Sargasco Limited, a company listed in Australian Securities Exchange. The transaction was completed on 2nd July 2021 and is not impacting the company's business operation.

- On 20th July 2021, the company exercised Warrant of BCPG Public Company Limited No.1 (BCPG-W1) for 69.15 million units at exercise price of THB 8 per share, for a value of THB 553 million. The company's ownership interest in BCPG Plc. has changed to be at 61.31% without change in control over BCPG Plc.

August

- The company notified the Stock Exchange of Thailand in regards to notify the change in the company name, objective, registered capital, and disposition of shares in the subsidiary company. The Board of Directors Meeting approved the development of liquefied natural gas (LNG) business in response to future business expansion strategy. BCVP Partnership Co., Ltd. ("BCVP") (a wholly owned subsidiary of the company) will register the change of the company name to BTSG Co., Ltd. ("BTSG"). Objective is to operate in the supply and distribution of liquefied natural gas and related business. Registered capital has a value of THB 200 million (initial registered capital a value of THB 20 million). At the time of the notification of capital increase, the company and Thai Special Gas Co., Ltd. ("TSG") will inject the equity into BTSG which the company and TSG will hold 51% and 49% of BTSG's shares respectively, resulting in BTSG remaining a subsidiary of the company.

- The company announced its interim dividend payment for the first six-month period of 2021 to the company's shareholders at THB 1.00 per share, totaling THB 1,357 million. The dividend has been paid to the shareholders on 21st September 2021.

October

- The company's Board of Directors resolved to approve the establishment of a new subsidiary company, Bangkok Fuel Pipeline and Logistics Company Limited ("BFPL"), the company holds 100% of the shares, with registered capital of THB 1.0 million initially and will continue to increase capital. With objectives to operate fuel transportation and logistics business. The company completed its establishment on 4th October 2021.

November

- The company issued Unsubordinated and Unsecured Debentures with a Debentureholders' Representative in the Name-Registered Certificate to Institutional Investors and/or High Net Worth Investors in the amount of THB 7,000 million. The debentures are split into 4 series which are tenors of 2, 5, 8 and 10 years with fixed coupon rate of 1.45%, 2.29%, 3.11% and 3.43%, respectively.

Important Events in 2021



December

- The company's Board of Directors resolved to approve BFPL, a wholly-owned subsidiary of the company, to sign the Agreement for the Grant of Right to Manage the Fuel Pipeline Systems (Bangkok - Bang Pa-in) dated 30th December 2021 with Fuel Pipeline Transportation Limited ("FPT") in the total amount of THB 1,600 million for 20 years starting from 1st January 2022 to 31st December 2041.

Statement of Income



Consolidated Statement of Income (THB Million)	Q4/2021	Q3/2021	QoQ	Q4/2020	YoY	2021	2020	YoY
Revenue from sale of goods and rendering of services	66,762	47,649	40%	33,134	101%	199,417	136,450	46%
Cost of sale of goods and rendering of services	(57,473)	(41,613)	38%	(30,741)	87%	(175,744)	(132,122)	33%
Gross Profit	9,289	6,036	54%	2,393	288%	23,673	4,328	447%
Other income	228	777	-71%	120	89%	1,279	533	140%
Selling and administrative expenses	(2,465)	(1,652)	49%	(2,180)	13%	(7,153)	(7,141)	0.2%
Exploration and Evaluation expenses	(344)	(133)	159%	-	N/A	(516)	-	N/A
Gain (Loss) from derivatives	133	(777)	N/A	165	N/A	(1,274)	17	N/A
Gain (Loss) on foreign exchange	(75)	103	N/A	140	N/A	251	732	N/A
Gain (loss) from fair value adjustment of investment	(4)	575	N/A	-	N/A	614	-	N/A
Gain (Loss) from sale of investment	(2)	122	N/A	-	N/A	120	-	N/A
Reversal of (loss) from impairment of assets	(1,757)	(13)	N/A	115	N/A	(1,358)	(2,375)	N/A
Profit (loss) from operating activities	5,003	5,037	-1%	752	565%	15,635	(3,907)	N/A
Finance costs	(809)	(748)	8%	(484)	67%	(2,540)	(1,969)	29%
Impairment gain and reversal of impairment loss (impairment loss) determined in accordance with TFRS 9	(29)	0.3	N/A	23	N/A	(30)	(891)	N/A
Share of profit (loss) of associates and joint ventures accounted for using equity method	159	177	N/A	264	N/A	1,042	(592)	N/A
Profit (loss) before tax	4,323	4,466	-3%	555	679%	14,108	(7,359)	N/A
Tax income (expense)	(1,756)	(1,904)	N/A	46	N/A	(4,263)	1,589	N/A
Profit (loss) for the period	2,567	2,562	0.2%	601	327%	9,845	(5,770)	N/A
Owners of parent	1,756	1,820	-4%	251	595%	7,624	(6,967)	N/A
Non-controlling interests	811	742		349		2,221	1,197	
Basic earnings (loss) per share (Baht)	1.20	1.25		0.09		5.25	(5.50)	

Statement of Income



Performance in 2021, the company and its subsidiaries recorded a profit for the period THB 9,845 million, an increase of THB 15,615 million when compared with 2020, of which the net profit attributable to the owners of the parent was THB 7,624 million, or basic earning per shares of THB 5.25 mainly due to the following reasons:

- 1) The company group has changed the record of OKEA performance from share of profit (loss) to consolidated financial statement method since 1st July 2021. The difference of items in consolidated statement of income was significantly affected by the change as below.

Items in consolidated statement of income (THB Million)	Difference of consolidated statement of income (A)	OKEA's contribution (B)	% (B) / (A)
Revenue from sale of goods and rendering of services	62,967	10,068	16%
Cost of sale of goods and rendering of services	43,622	3,031	7%
Gross Profit	19,344	7,037	36%
Other income	746	203	27%
Selling and administrative expenses	12	308	>1,000%
Exploration and Evaluation expenses	516	477	92%
Impairment of assets	-1,017	1,402	138%
Finance costs	570	308	54%
Tax expense	5,852	3,171	54%

- 2) Revenue from sales and rendering services was THB 199,417 million, an increase of 46% YoY. OKEA's contribution to revenue increase was 16%. Excluding OKEA's revenue, the company group's revenue increased from petroleum related business. The company's revenue increased 32% YoY, from the rise in average selling price due to the increase in crude oil price in line with economic recovery and expansion of oil demand as COVID-19 vaccination progress globally. In addition, total sales volume for oil products increased 4% YoY, mainly attributed to export of low-sulfur fuel oil and UCO. Moreover, BCPT realized an increase in sales revenue with main factors being the rise in average selling price per unit and increase in sales volume of external customers outside the company group.
- 3) Gross profit was recorded at THB 23,673 million, an increase of 447% YoY, where an increase of 36% was contributed by OKEA. Excluding OKEA, the company group's gross profit increased from petroleum related business, mainly from the company group recorded Inventory Gain of THB 6,700 million in 2021 compared to Inventory Loss of THB 4,748 million in 2020. In addition, Operating GRM of Refinery Business was 4.52 \$/BBL, an increase of 1.31 \$/BBL from the previous year, due to the rise in crack spreads for most finished products as well as the decline in crude premium. While the Marketing Business saw its net marketing margin declined 14% YoY, due to the increase in finished product, biodiesel, and ethanol prices. In addition, the government issued price control measure for retail diesel as a result the company was unable to adjust retail prices in line with cost of finished products. This led net marketing margin per unit declined when compared to the previous year.

Statement of Income



- 4) Other income was recorded at THB 1,279 million, an increase of 140% YoY. OKEA's contribution to the increase was 27%. The remaining amount mainly came from construction delay claim which received from contractor.
- 5) Selling and administrative expenses was recorded at THB 7,153 million, attributed to OKEA was THB 308 million. The rest of the company's group (excluding OKEA) decreased due to the Marketing Business Group changing of its convenience store business model. As a result, expenses are comparable to the previous year.
- 6) Exploration and Evaluation expenses was recorded at THB 516 million entirely from OKEA, while in 2020 was from NIDO.
- 7) Loss from derivatives was recorded at THB 1,274 million, mostly from recognized loss from crude and product oil price hedging contract as well as forward foreign exchange contract.
- 8) Gain from fair value adjustment of investment was recorded at THB 614 million, result from recognized profit from changing investment status from investment in associate to other investment.
- 9) Gain from sale of investment was recorded at THB 120 million from disposal of investment in BCPE.
- 10) Impairment of assets was recorded at THB 1,358 million, mainly from OKEA's asset impairment result from the transfer of ownership of Yme field's asset.
- 11) Finance costs was recorded at THB 2,540 million, an increase of 29% YoY, an increase attributed to OKEA of 54%. Where the rest was mainly attributed to the company's construction of the Efficiency, Energy, and Environment Enhancement Project (3E) which was completed this year. As a result, the transfer of finance costs to project costs were reduced. In addition, BCPG has expenses related to refinance.
- 12) Share of profit (loss) of associates and joint ventures accounted for using equity method was recorded at THB 1,042 million mainly from Star Energy Group Holdings Pte.Ltd. in amount of THB 577 million and OKEA in amount of THB 371 million (before change status to investment in subsidiaries)
- 13) Tax expense was recorded at THB 4,263 million, consist of current tax expense in amount of THB 2,807 million and deferred tax expense in amount of THB 1,456 million. An increase in effective tax rate from the prior year mostly came from OKEA's tax which has total tax rate 78%, with 22% corporate income tax and 56% petroleum tax.

Performance by Business Group



1) Refinery and Oil Trading Business Group

Crude Oil Price Situation

Crude Oil Price (\$/BBL)	Q4/2021			Q3/2021	QoQ	Q4/2020	YoY	2021	2020	YoY
	MAX	MIN	AVG	AVG	+/-	AVG	+/-			+/-
Dubai (DB)	84.34	69.11	78.27	71.68	6.59	44.64	33.63	69.39	42.27	27.11
Dated Brent (DTD)	86.12	69.03	79.76	73.51	6.25	44.16	35.60	70.91	41.84	29.07
DTD - DB	1.77	(0.08)	1.49	1.83	-0.34	(0.48)	1.97	1.53	(0.44)	1.96

In Q4/2021, average Dubai crude price increased compared to Q3/2021 due to economic recovery and increase in global demand for oil following the progress of global COVID-19 vaccinations while supply increase from OPEC+ was limited after reaching the agreement to gradual increase and high oil demand during winter season at the end of the year. Moreover, the global energy shortage, especially in Europe and China have led to the increase in oil demand as power industry and heavy industries switched from high prices natural gas and coal to oil. In 2021, average Dubai crude price increased significantly compared to 2020. Price increase was driven by economic recovery and expansion in oil demand after progress of global COVID-19 vaccination leading to declining trends in number of new cases and loosening of lockdown measures in many countries around the world. While supply increase was limited from OPEC+ decision to slowly increase supply and production delay from producers as investments in transition to clean energy were disrupted. In addition, global energy shortage led to increase oil demand from fuel switching to oil for replacing natural gas and coal.

Average Dated Brent and Dubai spread (DTD - DB) in Q4/2021 declined when compared to Q3/2021, from the slowdown of European demand for Light crude due to the new wave of COVID-19 and resume lockdown measures in various countries. While Asian demand for Dubai crude was still strong. For the Dated Brent and Dubai spread (DTD - DB) average in 2021 increased when compared to 2020, from the recovery of Light crude demand after the easing of lockdown measures. Also, the improved COVID-19 situation, especially in the US and Europe after vaccines rollout which led to lower new cases, resulting in driving activity begin to return to normal.

Crack Spreads Situation

Crack Spreads (\$/BBL)	Q4/2021			Q3/2021	QoQ	Q4/2020	YoY	2021	2020	YoY
	MAX	MIN	AVG	AVG	+/-	AVG	+/-			+/-
UNL95 - DB	23.25	9.68	15.44	11.76	3.68	4.11	11.33	11.11	4.43	6.68
IK - DB	12.32	5.59	10.21	5.40	4.80	2.42	7.79	5.86	2.54	3.32
GO - DB	13.20	7.71	11.45	5.44	6.01	3.69	7.76	6.73	6.14	0.59
FO - DB	1.00	(10.74)	(6.89)	(3.33)	-3.56	(0.57)	-6.32	(4.88)	(2.98)	-1.90

Gasoline and Dubai crack spread (UNL95 - DB) average in Q4/2021 increased when compared to Q3/2021. The increase was supported by strong rebound in demand for Asia after the easing of lockdowns amid tight supply due to lower export volumes from oil refineries in North Asia and China. For the gasoline and Dubai crack spread (UNL95 - DB) average in 2021 increased when compared to 2020 due to global demand recovery from loosening of

Performance by Business Group



lockdowns after continuing decline in trends of COVID-19 new cases which led to recovery in driving activities. As for **Jet (Kerosene) - Dubai crack spread (IK - DB)** average in Q4/2021 increased when compared to Q3/2021 as result of high demand for kerosene for heating during the winter season in North Asia and Europe as well as global energy crisis which push up demand for oil as substitute for natural gas and coal. For the Jet (Kerosene) - Dubai crack spread (IK - DB) average in 2021 increased when compared to 2020 due to the recovery of jet fuel demand from resume commercial flights as COVID-19 situations improved. As for **Diesel and Dubai crack spread (GO - DB)** average in Q4/2021 was higher than Q3/2021 from the continued recovery of Asian demand due to loosening of travel restrictions. While regional supply remained tight due to lower export volume from China. Diesel and Dubai crack spread (GO - DB) average in 2021 increased when compared to 2020 as a result of soften lockdown measures and economic recovery. As for **Fuel oil and Dubai crack spread (FO - DB)** average in Q4/2021 declined when compared to Q3/2021, due to the decrease in demand for high sulfur fuel oil for power generation in the Middle East and South Asia after end of summer season in Q3/2021. Meanwhile, supply from refineries have increased due to the increase in demand for refined products to serve the market. In addition, sulfur removal unit of a Kuwait refinery experienced unplanned shutdown which increase the supply of high sulfur fuel oil in the export market. Fuel oil and Dubai crack spread (FO - DB) average in 2021 declined compared to 2020 due to the increase in heavy crude supply from OPEC after global demand recovery; thus, increasing the supply of fuel oil.

Refinery and Oil Trading Business Group Performance

	Q4/2021	Q3/2021	QoQ	Q2/2020	YoY	2021	2020	YoY
EBITDA (THB Million)	3,084	1,891	63%	600	414%	9,363	(2,169)	N/A
Average Crude Run (KBD)	112.2	111.4	1%	100.0	12%	99.0	97.2	2%
Utilization Rate (%)	94%	93%		83%		83%	81%	
Average FX (THB/USD)	33.55	33.09		30.78		32.16	31.46	
<i>(Unit: \$/BBL)</i>								
Operating GRM	6.79	3.07	3.72	3.74	3.05	4.52	3.20	1.31
Oil Hedging	(0.72)	(1.24)	0.52	(0.39)	-0.34	(0.69)	0.03	-0.72
Inventory Gain/ (Loss) ^{1/}	3.91	3.72	0.19	(0.03)	3.94	5.13	(3.91)	9.04
Total GRM	9.97	5.54	4.43	3.32	6.65	8.96	(0.68)	9.64
Total Sales Volume in each market category of the company ^{2/} (Million Liters)								
Marketing Business	1,379	1,052	31%	1,284	7%	4,854	5,140	-6%
Petroleum traders in accordance with section 7	211	212	-1%	161	31%	738	670	10%
Export	510	462	10%	206	147%	1,494	990	51%
Total Sales Volume	2,101	1,726	22%	1,651	27%	7,086	6,800	4%

Note: 1/ Inventory Gain/(Loss) in the table included (Reversal of) losses on inventories devaluation (NRV)

2/ Sales volume does not include oil swaps between major oil companies (petroleum traders in accordance with section 7) and sales of crude oil

Performance for Q4/2021, the Refinery and Oil Trading Business Group recorded EBITDA of THB 3,084 million, an increase of THB 1,193 million when compared to Q3/2021, with the following factors affecting performance as follow:

Performance by Business Group



1. The Bangchak refinery's average production in Q4/2021 was 112.2 KBD or 94% utilization rate, which is slightly higher than the previous quarter, due to the recovery in domestic demand after improvements in COVID-19 situation led to the loosening of restrictions. This led to recovery of economy and increase in consumers' travels.

2. During this quarter, the refinery's Total Gross Refinery Margin (Total GRM) was recorded 9.97 \$/BBL, an increase of 4.43 \$/BBL when compared to the previous quarter, due to the following reasons:

- Operating GRM was recorded at 6.79 \$/BBL, an increase of 3.72 \$/BBL, due to the increase in crack spread of most products in line with global markets where demand was supported by the continued economic recovery in Asia after easing the lockdown measures. Especially, Diesel and Dubai crack spread (GO - DB) increased significantly which is the largest product yield of the Bangchak refinery.
- During this quarter, the refinery business recorded loss from crude and product oil price forward contract 0.72 \$/BBL. Whereas, the previous quarter recorded a loss of 1.24 \$/BBL
- This quarter the refinery business recorded Inventory gain of 3.91 \$/BBL or THB 1,355 million, an increase from Q3/2021 where inventory gain was 3.72 \$/BBL or THB 1,261 million. The gain is attributed to the continue increase in global crude oil price as a result of rise in demand after the increase coverage of COVID-19 vaccinations in many countries. Also, the global energy was shortage from switching fuel to oil for replacing natural gas and coal which pushed up the prices. Especially, in October where the price of Dubai crude reached the maximum of 84.34 \$/BBL, resulting in average Dubai crude price in October was 81.59 \$/BBL.

3. BCPT recorded total trade transactions of crude oil and finished product of 7.99 million barrels, an increase of 1.03 million barrels (+15%) compared to the previous quarter. Gain was mainly attributed to the increase in transactions of naphtha and low sulfur fuel oil products group. In addition, gross profit increased from the previous quarter, mainly from crude oil transactions. This was due to oil demand recovery in many countries as well as benefited from continued power industry and industrial fuel switching from high prices of natural gas and coal to oil. BCPT was able to expand its customer base to new countries such as the Oman and Gabon in accordance with BCPT strategic direction.

Performance for 2021, the Refinery and Oil Trading Business Group recorded EBITDA of THB 9,363 million, an increase of THB 11,532 million when compared to 2020, with the following factors affecting performance:

1. In 2021, Bangchak refinery's production rate continually increased to support the expansion of UCO export which helps to offset the decline in domestic oil consumption due to COVID-19 outbreaks. However, the refinery underwent annual turnaround maintenance during Q1/2021. These resulted Bangchak refinery's average production rate was 99.0 KBD or 83% utilization rate in 2021. However, average production rate increased 2% YoY.

2. Total Gross Refinery Margin was 8.96 \$/BBL increased 9.64 \$/BBL when compared to 2020, mainly due to the following reasons:

- Operating GRM was 4.52 \$/BBL, an increase of 1.31 \$/BBL, due to the increase in crack spread of most products, decline in crude premium, and the production yield of UCO increased to 2 times compared to 2020 for supporting refining margins.

Performance by Business Group



- In 2021, the refinery recorded loss from crude and product oil price hedging contract 0.69 \$/BBL, whereas 2020 realized a gain of 0.03 \$/BBL
- The refinery business recorded an inventory gain of 5.13 \$/BBL or THB 5,966 million due to crude oil price increase throughout 2021 as a result of recovery in global demand after the progress of COVID-19 vaccination in many countries, while supply increase was limited. In 2020, the refinery business recorded an inventory loss of 3.91 \$/BBL or THB 4,379 million due to the crash in crude oil price from the first wave of COVID-19 and oil price war after the OPEC+ meeting in March 2020.

3. BCPT recorded a decline in trade transactions of crude oil and finished product by 2.41 million barrels (-8%) when compared to 2020, mainly from the decrease in crude oil transaction. This was due to Bangchak refinery's annual turnaround maintenance in Q1/2021 and the need to manage inventory's Bangchak to maintain at appropriate level. However, BCPT was able to increase gross profit, mainly from transactions of low sulfur fuel oil and diesel products group due to increase in demand from global economic recovery and the easing of lockdown restrictions in many countries. In addition, BCPT recognized other income from its trade collaboration with partners in Q4/2021. This year, BCPT continues to expand its trade transactions with partners to new countries such as the United Arab Emirates, Oman and Gabon, in accordance with BCPT strategic plan.

2) Marketing Business Group

Marketing Business Performance	Q4/2021	Q3/2021	QoQ	Q4/2020	YoY	2021	2020	YoY
EBITDA (THB Million)	255	562	-55%	602	-58%	2,614	2,174	20%
Net Marketing Margin (Baht / Liter)	0.54	0.73	-26%	0.77	-30%	0.72	0.84	-14%
Sales Volume (Million Liters)								
Retail	1,142	900	27%	1,101	4%	4,091	4,197	-3%
Industrial	237	153	55%	183	29%	762	943	-19%
Total	1,379	1,052	31%	1,284	7%	4,854	5,140	-6%
Sales volume in each product category (Million Liters)								
LPG	28	26	8%	35	-21%	97	138	-30%
Gasoline	4	3	59%	11	-60%	23	47	-52%
Gasohol	412	326	26%	415	-1%	1,474	1,603	-8%
Jet Fuel	60	33	85%	30	103%	163	266	-39%
Diesel	829	627	32%	746	11%	2,917	2,900	1%
Fuel Oil and Others	46	37	22%	47	-3%	180	186	-3%
Total	1,379	1,052	31%	1,284	7%	4,854	5,140	-6%

Note: Net Marketing Margin of Bangchak only (excluding Inventory Gain/(Loss) and NRV)

Performance by Business Group



Performance for Q4/2021, the Marketing Business Group recorded EBITDA of THB 255 million, a decrease of THB 307 million compared to Q3/2021, with the following factors affecting performance:

1. Total sale volume of the Marketing Business Group increased 31% QoQ, attributed to the sold through retail channel and industrial channel increasing by 27% and 55% QoQ, respectively. This was due to improved COVID-19 outbreak situation after decline in number of COVID-19 cases compared to the previous quarter. As a result, the government announced the soften restrictions on control measures. Also, the government economic stimulus, the harvest crops and travel season helped to boost economic and consumers activities. Also, the continuous sales promotions have resulted in a record new high of retail sales in December 2021 of 432 million liters per month.

2. Net marketing margin per unit declined by 26% QoQ, due to the increase in the cost of finished product and biodiesel (B100) which rose in line with global energy demand. In addition, the government controlled the retail diesel price by limit the price to below 30 baht per liter and the marketing margin of diesel in order to alleviate cost of living for consumers. As a result, the company was unable to adjust retail price in line with cost of finished products that increase based on the global market, resulting in lower net marketing margin per unit, especially during October where marketing margin dropped significantly. However, due to the continual rise in oil prices, inventory gain for this quarter increased from previous quarter.

3. Bangchak's cumulative retail sales volume market share in 2021 was 16.2% (data from the Department of Energy Business). The company continues to expand the number of service stations to expand its geographic reach to customers and push up sales through service stations. This quarter, Bangchak opens 27 new service stations. At the end of Q4/2021, Bangchak has a total of 1,277 service stations. In addition, the company played its part to alleviate the PM2.5 problem by producing low Sulphur Euro 5 standard diesel to be sold in Bangchak service stations in Bangkok between 15th November 2021 to 28th February 2022. Moreover, Bangchak partners public and private sectors signed a memorandum of understanding for the operations of the digital fuel dispenser under the name "Krating" which is a platform to provide quality fuel to small communities, and access to other services in addition to fuel in the future, lifting the quality of life for local communities in all aspects.

4. Marketing Business Group continues to develop and expand its non-oil business, during the quarter 87 new Inthanin coffee shops were opened. As of the end of Q4/2021, the total number of Inthanin coffee shops was 817 branches. Also, there was 15 branches of DAKASI pearl milk tea operating in Bangchak service stations. The number of cups sold per day increased 10% QoQ as COVID-19 situation improved and many Inthanin coffee branches returned to normal operations. In addition, never stops creating new experiences to customers, Inthanin collaborated with Cha Tra Mue (Inthanin X Cha Tra Mue) to create new beverage menus in this quarter such as Dalgona Cocoa Rose Tea and Dalgona Rose Matcha. Inthanin coffee continually create storefront and online delivery platforms promotions to increase sales. The company also cooperated with other non-oil business partnerships to improve service stations for responding to consumers' demand as well as increase returns for business such as restaurant business, car care business and EV chargers.

Performance by Business Group



5. Normally, during this quarter there is an increase in selling and administrative expenses from employee expense, service station maintenance costs, and marketing promotion, resulting in a decline in EBITDA compared to the previous quarter.

Performance for 2021, the Marketing Business Group recorded EBITDA of THB 2,614 million, an increase of THB 440 million compared to 2020, with factors affecting operations as follow:

1. Total sale volume of the Marketing Business Group decreased by 6% YoY where retail and industrial sales declined 3% and 19% YoY, respectively. Reduction in sale volume was a result of COVID-19 outbreak which started in April resulting in lower oil demand. Especially, during Q3/2021 where COVID-19 outbreaks situation deteriorate due to the spread of Delta variant which resulted in the government declaring highest lockdown measures for the maximum and strict controlled areas as well as asking for cooperation from both public and private sector to implement work from home; thus, reducing consumer travel and out-of-home activities. In addition, the aviation industry has not fully recovered due to COVID-19 outbreaks throughout the year which resulted in lower jet fuel sales compared to 2020.

2. Net marketing margin per unit declined 14% YoY, due the increase in the cost of finished product as global energy demand recovered. The prices of ethanol and biodiesel also rose. In addition, the government issued price control measure for retail diesel which experienced high impact during Q4/2021 as a result the company was unable to adjust retail price in line with cost of finished products. This led net marketing margin per unit declined when compared to the previous year. However, due to increase in oil price, resulted in recording inventory gain in this year while the company recorded inventory loss in 2020.

3. The company continues to implement its strategy to expand customer base and strive for increase sale per service station by expanding the number of service stations in high potential locations as well as plans to open more Unique Design Service Stations. There were 57 new service stations. At the end of 2021, Bangchak has 1,277 service station. The cumulative retail sales volume market share in 2021 was 16.2% whereas in 2020 was 15.6% (data from the Department of Energy Business). Under the concept of Greenovative Destination strategy, the company plans to develop service stations into destinations that can fulfill customers' desires but still respond to changing lifestyles. The company partnered with leading brands to develop "Bangchak Food Truck" business. In addition, lifestyle products have been introduced at service station in Grab & Go format. At the end of Q4/2021, the company opened food trucks in 9 service stations. In addition, there were 70 service stations with EV charging service in 37 provinces across the country. In 2021, Bangchak received the Superbrands Award for the 4th consecutive year for being the top 25 brands in Thailand, organized by Superbrands Thailand.

4. For non-oil business, in 2021 there were 170 new Inthanin coffee shops. As of the end of 2021, the total number of Inthanin coffee shop was 817 branches with 44 branches being the unique design. In addition, Bangchak Retail Company Limited ("BCR") continues to look for opportunities to diversity its beverage business line and create new partnerships to make Inthanin becomes more than coffee shop. The company acquired license for DAKASI bubble tea to expand DAKASI shops in service stations across the country. In 2021, there were 15 DAKASI branches. In addition, BCR partners with Thai Airways International Plc. to sell Puff & Pie products in Inthanin coffee shops. As a result, in 2021, BCR's revenue from Inthanin coffee shops increased 18% YoY, in line with the increase in number of

Performance by Business Group



cups sold per day of 20% YoY. Additionally, Inthanin had record new high for the number of cups sold per day in December. Due to the COVID-19 situation, Inthanin Coffee Shop has continuously pushed sales through online platforms which include 7 major online delivery players to be in line with changing consumer behavior. As a result, online sales revenue increased to 3 times when compared to the previous year. Furthermore, Inthanin received the Superbrands Award for the first time in 2021.

3) Power Plant Business Group

Power Plant Business Performance (THB Million)	Q4/2021	Q3/2021	QoQ	Q4/2020	YoY	2021	2020	YoY
EBITDA	1,038	1,179	-12%	868	20%	4,193	3,640	15%
Revenue from sale and rendering of services	1,232	1,302	-5%	1,137	8%	4,669	4,231	10%
Share of profit (loss) from associated companies	152	150	1%	(25)	N/A	600	270	122%
Wind Power Plant	5	(5)	N/A	50	-89%	23	37	-38%
Geothermal Power Plant	147	156	-6%	(74)	N/A	577	233	148%
Electricity Sales (Million KWh)								
Solar Power Business - Thailand (171.8 MW)	80.09	75.30	6%	73.49	9%	317.03	290.46	9%
Wind Power Business - Thailand (9.0 MW)	3.31	3.95	-16%	3.41	-3%	13.39	11.66	15%
Solar Power Business - Japan (34.7 MW)	8.63	5.02	72%	4.22	104%	22.21	17.20	29%
Hydropower Business - Lao PDR (114.0 MW)	142.19	210.24	-32%	157.12	-10%	522.57	453.32	15%
Total Electricity Sales	234.22	294.52	-20%	238.25	-2%	875.21	772.64	13%

Performance for Q4/2021, the Power Plant Business Group recorded EBITDA of THB 1,038 million, a decrease of THB 140 million compared to Q3/2021, with the following factors affecting operations:

- Solar Power Plant projects in Thailand recorded an increase in total electricity sales by 6% QoQ, mainly due to seasonal factor as quarter 3 is low season for solar power plants in Thailand.
- Wind Power Plant project in Thailand, "Lom Ligor", recorded a decrease in total electricity sales by 16% QoQ, due to seasonal factors of wind power plants.
- Solar Power Plant projects in Japan recorded an increase in total electricity sales by 72% QoQ, due to the commencement of commercial operation of Chiba 1 Solar Power Plant (PPA 20 MW) in November 2021.
- Hydro Power Plant project in Lao PDR recorded a decrease in total electricity sales by 32% QoQ, due to seasonal factor as quarter 3 was high season for hydro power plant.
- Recorded shares of profit from investments in associated companies THB 152 million in line with last quarter, with details as follow:
 - Share of profit from the Wind Power Plant business in the Philippines was recorded at THB 5 million, an increase from the previous quarter by THB 11 million, due to high season of wind power plant in the Philippines.

Performance by Business Group



- Share of profit from the Geothermal Power Plant business in Indonesia was recorded at THB 147 million, a decrease from the previous quarter of THB 9 million, due to higher operational expenses included depreciation expenses from the open of new production well in Q4/2021. Although, the electricity sales volumes increased compared to the previous quarter due to lower shutdown days.

Performance for 2021, the Power Plant Business Group recorded EBITDA of THB 4,193 million, an increase of THB 553 million compared to 2020, with the following factor affecting operations:

1. Solar Power Plant projects in Thailand recorded an increase in total electricity sales by 9% YoY, due to recorded full year revenue from the investment in the 4 new Solar Power Plant projects (PPA 20 MW) in August 2020 and the efficiency improvement program of solar power plants.

2. Wind Power Plant project in Thailand, the “Lom Ligor”, recorded an increase in total electricity sales by 15% YoY, mainly from increase in wind speeds at the projects compared to previous year.

3. Solar Power Plant projects in Japan recorded an increase in total electricity sales by 29% YoY, mainly from the commencement of commercial operation of Chiba 1 solar power plant project.

4. Hydro Power Plant projects in Lao PDR recorded an increase in total electricity sales by 15% YoY, due to the full year contribution of “Nam San 3B”, which has acquired since February 2020 and higher rainfall compared to previous year.

5. Recorded shares of profit from investments in associated companies THB 600 million, an increase of THB 330 million compared to last year, with details as follow:

- Share of profit from the Wind Power Plant business in the Philippines decreased by THB 14 million, due to the 5-years retroactive payment recorded in 2020 which resulted in higher profit sharing compared to this year. Although, in 2021 the electricity generation improved from the better wind speed at the project.
- Share of profit from the Geothermal Power Plant business in Indonesia increased by THB 344 million, due to the project received an increase in the tariff rate and lower financial costs.

Performance by Business Group



4) Bio-Based Product Business Group

As for the performance of the Bio-Based Product Business Group in Q4/2021, EBITDA was recorded at THB 255 million, and for the entirety of 2021 recorded EBITDA of THB 1,863 million. Performance of each business unit are as follow:

Biodiesel Business

Biodiesel Business Performance	Q4/2021	Q3/2021	QoQ	Q4/2020	YoY	2021	2020	YoY
Revenue (THB Million)	2,701	1,999	35%	2,604	4%	9,482	8,143	16%
Gross Profit (THB Million)	298	178	68%	484	-38%	910	1,089	-17%
B100 Production Volume (Million Liters)	56.98	55.69	2%	71.74	-21%	238.60	258.02	-8%
B100 Sales Volume (Million Liters)	58.04	53.51	8%	73.74	-21%	239.14	268.08	-11%

Performance comparison between Q4/2021 and Q3/2021 are as follow:

1. Production of B100 was 56.98 million liters and sales of B100 was 58.04 million liters up 2% and 8% QoQ, respectively. This was due to the loosening of COVID-19 restrictions by the government as outbreak situations subsided as well as the measures to stimulate domestic travels, resulting in demand for biodiesel increase. Although, the Committee of Energy Policy Administration (CEPA) issued a resolution to reduce biodiesel blending mandates from 20% (B20), 10% (B10), and 7% (B7) to 6% (B6) during 11st - 31st October 2021 and adjusted the blending mandate to 7% (B7) during 1st December 2021 - 4th February 2022 to alleviate the impacts of global oil and B100 price increase on domestic diesel prices.

2. Sales revenue was THB 2,701 million, an increase of 35% QoQ. Growth mainly came from the increase in B100 average selling price compared to last quarter. This was in line with the increase in crude palm oil (CPO) price due to the reduced production level from Indonesia and Malaysia, the major producers of palm oil, which experienced labor shortages because of COVID-19. In addition, costs of palm oil production increase in tandem with the price of fertilizer, the main input. On the demand side, the economic recovery has increased demand for CPO and deplete domestic CPO stock. However, due to costs management during high CPO prices and the increase in B100 sales volume as well as increase in refined glycerin sales compared to last quarter, these have caused Biodiesel Business realized gross profit of THB 298 million, an increase of 68% QoQ.

Performance comparison between 2021 and 2020 are as follow:

1. Production of B100 was 238.60 million liters and sales of B100 was 239.14 million liters down 8% and 11% YoY, respectively. The COVID-19 pandemic from the Delta variant during 2021 which was more severer and prolonged than the previous year result in the highest cases and deaths. The government imposed the strict controlled to curb the outbreak, consumers' reduction in travel and outside activities to limit outbreaks and government's measure to control domestic retail diesel prices through the lowering of blending mandates have suppressed biodiesel demand compared to last year.

Performance by Business Group



2. Sale revenue was THB 9,482 million, increasing 16% YoY mainly from the increase in average selling price of B100 compared to the previous year. In 2021, the average price for B100 (according to announcement made by the Department of Energy Business) 41.09 baht/liter, an increase of 29% YoY. This was due to the reduced production level from Malaysia and Indonesia, which are the major palm oil producers and labor shortages during COVID-19 outbreaks resulting in selling price of CPO increase compared to the previous year. Thus, Thailand's export of CPO increased result in domestic selling price of CPO increase. Although the sale volume of B100 was declined from the previous year together with higher competition; however, due to increase in sale of refined glycerin in 2021, resulting in gross profit of THB 910 million, a decline of 17% YoY.

Ethanol Business

Ethanol Business Performance	Q4/2021	Q3/2021	QoQ	Q4/2020	YoY	2021	2020	YoY
Revenue (THB Million)	1,299	1,158	12%	1,171	11%	4,611	4,428	4%
Gross Profit (Loss) (THB Million)	(67)	31	-314%	93	-172%	140	634	-78%
Ethanol Production Volume (Million Liters)	32.16	44.54	-28%	31.95	1%	174.54	178.85	-2%
Ethanol Sales Volume (Million Liters)	51.71	44.56	16%	49.22	5%	179.93	185.28	-3%

Performance comparison between Q4/2021 and Q3/2021 are as follow:

1. Production volume of Ethanol products was at 32.16 million liters, a decrease of 28% QoQ, due to the annual maintenance activities at KSL Green Innovation Public Company Limited ("KGI") in Amphoe Boploy, Kanchanaburi province and Amphoe Namphong, Khon Kaen province which continued from last quarter. Whereas, sales volume of Ethanol products was at 51.71 million liters, an increase of 16% QoQ, due to the improved prospects of COVID-19 outbreaks which lead to the loosening of government's restrictions and higher consumers activities including vehicles usage resulting in higher demand for ethanol in the production of gasohol.

2. Sales revenue was recorded at THB 1,299 million, an increase of 12% QoQ, mainly from higher sale volume compared to last quarter while sale price for ethanol decreased due to more intense competition in the industry. In addition, in Q4/2021 KGI incurred cost associated with planned annual maintenance which resulted in gross loss of THB 67 million, a decrease of 314% QoQ.

Performance comparison between 2021 and 2020 are as follow:

1. Production volume of Ethanol products was at 174.54 million liters, a decrease of 2% YoY, as the KGI plant in Amphoe Namphong underwent annual maintenance for a longer duration than the previous year. Sales volume of ethanol products was at 179.93 million liters, a decline of 3% YoY, mainly from the more severed and prolonged of COVID-19 pandemic from the Delta variant. The government imposed the strict controlled and the population cut down on travel and outside activities. Additionally, the industrial grade Ethanol, which to be used in the production of alcohol gel and disinfectant products, declined in sales volume. Due to the sales efforts, the sales volume of fuel grade Ethanol declined slightly.

2. Sales revenue was THB 4,611 million, an increase of 4% YoY, mainly from the increase in average selling price of ethanol products increasing in tandem with higher raw material cost. This was due to low production of sugar



cane because of drought in 2020. In addition, domestic cassava price also increased due to growth in export volume compared to last year. However, the decline in ethanol demand resulted in Ethanol Business to record a gross profit of THB 140 million, a decline of 78% YoY.

However, the Bio-Based Product Business Group's EBITDA in 2021 is on par with the previous year due to the recognized gains from fair value adjustment of investments.

Progress of High Value Products (HVP) Business in 2021

In 2021, BBGI began expanding the business from biofuel products to health-related high value bio-products with a strategic plan to invest in an integrated value chain from upstream to downstream. Currently, BBGI has a Memorandum of Understanding (MOU) with Bio-Om Co., Ltd., a biotechnology research and development company headed by researchers from Chulalongkorn University who have gone through incubation from CU Innovation Hub and the National Science and Technology Development Agency (NSTDA) to jointly develop high value bio-based enzyme that has the ability to destroy the chemical structure of pesticide residues in fruits and vegetables (insecticide detoxification) and develop the technology to commercial scale.

In addition, Win Ingredient Company Limited ("WIN"), a joint venture company between BBGI and Manus Bio Inc., has already selected distributors of sugar substitute sweeteners in 5 countries: Thailand, Malaysia, Vietnam, Indonesia, and the Philippines. BBGI has also begun commercial distributions in two formats. The distribution of Astaxanthin, a high valued bio-based product that contains high antioxidant and is found to have anti-aging and skin care properties on a Business-to-Business (B2B) format. The distribution on a Business-to-Customers (B2C) format under the brand "B Nature Plus", which include food supplement ASTA-IMMU - an antioxidant, skin care extracted from red algae (Astaxanthin), ASTA-VIS dietary supplement - a product that helps to nourish eyes extracted from red algae (Astaxanthin), Bilberry, Lutein and Fish Oil and GMP HACCP-certified pharmaceutical-grade hand sanitizer that is safe and fragrance-free. These products are distributed through Facebook: BNaturePlus, Line official: @BNaturePlus, Shopee: BBGI Official Store, and Lazada: BBGI Flagship Store.

Performance by Business Group



5) Natural Resources Business Group

Natural Resources Business Group Performance	Q4/2021	Q3/2021	QoQ	Q4/2020	YoY	2021	2020	YoY
EBITDA (THB Million) ^{1/}	4,832	3,112	55%	221	>1000%	8,251	(1,004)	N/A
Share of profit (loss) OKEA (THB Million) ^{2/}	N/A	N/A	N/A	275	N/A	371	(914)	N/A
OKEA Performance								
EBITDA (THB Million)	4,827	3,005	61%	775	522%	9,850	2,890	241%
Revenue from crude oil and gas sales (THB Million)	6,247	3,822	63%	1,959	219%	14,201	5,511	158%
Production volume - Net to OKEA (KBD)	16.04	16.32	-2%	16.17	-1%	15.53	16.15	-4%
Sales volume - Net to OKEA (KBD)	18.10	16.98	7%	18.79	-4%	15.84	15.87	-0.2%
Realized liquids price (USD/BBL)	78.00	67.40	16%	39.00	100%	65.30	36.30	80%
Realized gas price (USD/MMBTU)	31.44	16.15	95%	5.38	484%	17.56	3.12	464%

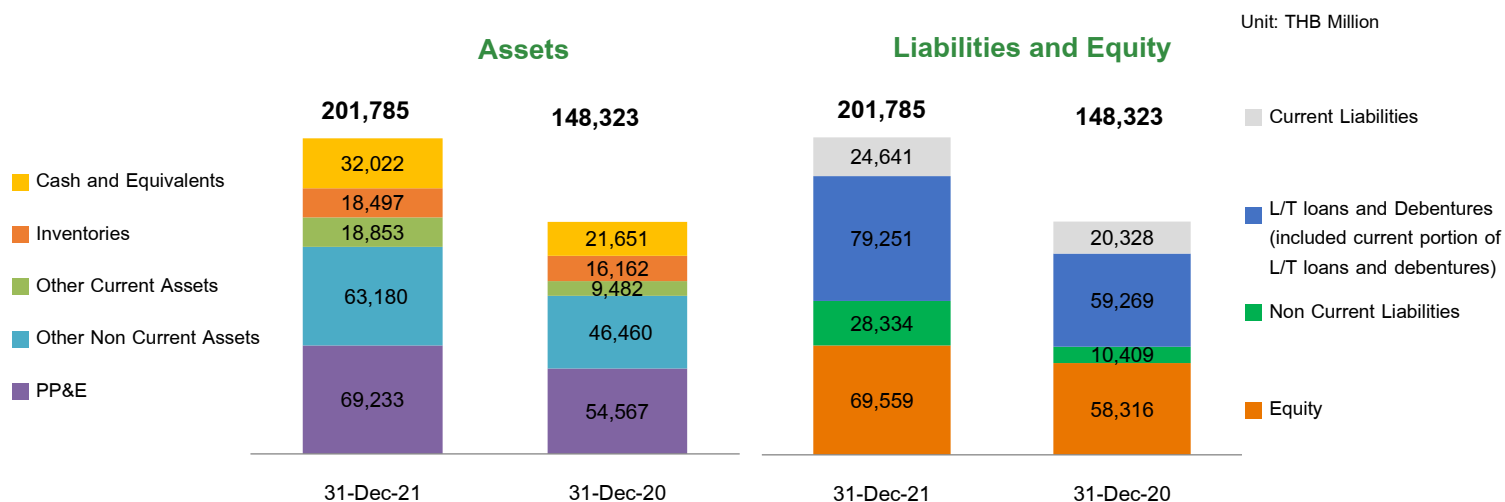
Note: 1/ Natural Resources Business Group changed the recording of OKEA's performance from share of profit (loss) to consolidated method since Q3/2021.

2/ Share of Profit from OKEA in 2021 recorded from share of profit between 1st January - 30th June 2021 (before changing the status of investment).

In Q4/2021, the Natural Resource Business Group recorded EBITDA of THB 4,832 million, an increase of THB 1,720 million compared to Q3/2021. This quarter OKEA's performance improved mainly due to the increase in average oil and natural gas prices from the continual increase in oil demand from global economic recovery after COVID-19 vaccination efforts in many countries have progressed well. Revenue from sales of crude oil and gas sales was THB 6,247 million, increase of 63% QoQ, where this quarter's revenue was the highest recorded and on par with the full year revenue in 2020. In addition, sales volume increased 7% QoQ mainly from the distribution of Ivar Aasen field and Yme field. Of which Yme field began production in October 2021.

In 2021, the Natural Resources Business Group recorded EBITDA of THB 8,251 million, an increase of THB 9,254 million when compared to 2020, mainly from the company group changed recording of investment status in OKEA from associated company to subsidiary which resulted in the change in recording of performance from share of profit (loss) to consolidated method since 1st July 2021. In addition, during Q3/2021 the company recorded gain from sales of investment in BCPE (net of exchange rate) of THB 120 million. As a result, the Natural Resources Business Group realized a significant increase in EBITDA. If consider the OKEA's full year performance, EBITDA increase 241% YoY, mainly from the significant rise in average price of oil and natural gas. Especially, natural gas price increased 464% YoY, due to high demand during the winter season in Europe and easing of lockdown measures in many countries. Whereas, Europe's gas reserve was low level.

Statement of Financial Position



The company group has changed record of OKEA performance from share of profit (loss) basis to consolidated financial statement basis since 1st July 2021. OKEA's financial statement has caused differences in consolidated financial statement of financial position as shown below.

Items in consolidated statement of financial position (THB Million)	Difference of consolidated statement of financial position as of 31 st December 2021 compared to 31 st December 2020		
	Total difference	OKEA's financial statement	The company group (Excluding OKEA)
Cash and Cash Equivalents	10,371	7,680	2,690
Inventories	2,335	954	1,380
Other Current Assets	9,371	5,073	4,298
Other Non-Current Assets	16,720	15,214	1,506
PP&E	14,666	17,690	(3,024)
Assets	53,463	46,611	6,851
Current Liabilities	4,313	6,591	(2,277)
L/T loans and Debentures (included current portion of L/T loans and debentures)	19,982	10,504	9,478
Non-Current Liabilities	17,925	23,079	(5,155)
Equity	11,243	6,437	4,806
Liabilities and Equity	53,463	46,611	6,851

Assets

As of the 31st December 2021, the company and its subsidiaries had Total Assets in the amount of THB 201,785 million, an increase of THB 53,463 million when compared to the 31st December 2020, changes in assets are as follow:

1. Cash and cash equivalents increased by THB 10,371 million, increased from OKEA's contribution was THB 7,680 million and the company group (excluding OKEA) by THB 2,690 million. Details are stated in Analysis of the Cash Flow Statement.

Statement of Financial Position



2. Inventories increased by THB 2,335 million, mainly from increased in the company group (excluding OKEA) was THB 1,380 million, which came from the increase in cost of oil inventory per unit in line with global oil prices. The rest of inventories rose of THB 954 million was contributed by OKEA.
3. Other current assets increased THB 9,371 million, increased from OKEA's contribution was THB 5,073 million which mainly from other current receivables. The rest of the increase in amount of THB 4,298 million mostly came from the company's trade account receivables due to the increase in export sales volume and average selling price of finished products, and BCPG's trade account receivable due to the longer duration of electricity payment period from The Electricite du Laos ("EDL"). However, BCPG closely monitored EDL debt collection and continues to receive payment.
4. Other non-current assets main items consist of investments, right of use assets, intangible assets and indemnification assets. Other non-current assets increased by THB 16,720 million, increased from OKEA's contribution was THB 15,214 million, which mainly from indemnification assets. These expenses related to close-down and removal of oil equipment for Draugen and Gjøa field, which could be collected from the seller. The rest of the increase was THB 1,506 million, mainly from
 - Other non-current financial assets rose by THB 2,851 million from increase in other investment (1) BBGI changing investment status from associate company to other investment in amount of THB 1,164 million. (2) BCPG's investment in VRB Energy Inc in amount of THB 775 million and (3) the company invested in FPT and BAFS in amount of THB 583 million.
 - Right-of-use assets increased by THB 1,656 million, mainly occur from BFPL granted the Right to Manage the Fuel Pipeline Systems (Bangkok - Bang Pa-in) from FPT.
 - Goodwill decreased by THB 1,004 million, result from the purchase price allocation (PPA) on the investment in OKEA due to the change of OKEA's investment status to subsidiary.
 - Deferred tax assets decreased by THB 855 million, majority from reversal of impairment in assets and investments.
 - Long term loan decreased by THB 855 million, from Lithium Americas Corp. ("LAC") repaying the long-term loan to BCPI.
5. Property, plant and equipment net increased by THB 14,666 million which rose from OKEA's contribution (including depreciation) in amount of THB 17,690 million and the rest of contribution decreased in amount of THB 3,024 million, mostly from the PPA on the investment in OKEA by THB 6,280 million. In addition, the depreciation of the company group for the period (excluding OKEA) was THB 4,474 million. While the company group invested in amount of THB 7,366 million which consist of (1) the company invested by THB 3,063 million, mainly from major turnaround and Efficiency, Energy, and Environment Enhancement Project (3E) (2) Power Plant Business invested in solar power business in Japan by THB 3,565 million and

Statement of Financial Position



(3) Bio-Based Product Business enhance the production capacity of the Ethanol plant and construct the power and steam generator plant by THB 574 million.

Liabilities

As of the 31st December 2021, the company and its subsidiaries had Total Liabilities THB 132,226 million, an increase of THB 42,220 million, changes in liabilities are as follow:

1. Current liabilities (exclude current portion of long-term loans and debentures) increased by THB 4,313 million. The increase was from OKEA's contribution by THB 6,591 million which mainly from trade and other current payables and current income tax payable. While the company group (excluding OKEA) decreased THB 2,277 million mainly from decreased in short-term loan from financial institutions of BCPG and BBGI.
2. Long-term loans and debentures (included current portion of long-term loans and debentures) increased by THB 19,982 million. OKEA's contribution to debentures increase was THB 10,504 million. The rest was from (1) issuance of debentures by THB 20,300 million which were the company by THB 7,000 million, BCPG by THB 12,000 million and BBGI by THB 1,300 million (2) loan drawdown increased by THB 3,352 million which mainly from BCPG. While there were loan repayment by THB 13,055 million and debenture repayment of the company by THB 2,500 million. Besides, the company group had the effects of foreign exchange rate led to the increase in liabilities value of THB 1,333 million.
3. Other non-current liabilities increased by THB 17,925 million. OKEA's contribution to the increase was THB 23,079 million, which was mainly from the provision for decommissioning cost. The rest decreased by THB 5,155 million from the PPA on the investment in OKEA, resulting in deferred tax liabilities decline of THB 4,887 million.

Equity

As of 31st December 2021, the company and its subsidiaries had Total Equity in the amount of THB 69,559 million, an increase of THB 11,243 million. Mainly from (1) the net profit for the period of THB 9,845 million (2) changes in ownership interests in subsidiary of THB 760 million (3) increased in other comprehensive income by THB 2,311 million, which mostly occurred from exchange rate differences on translating financial statements by THB 1,984 million due to the depreciation of THB against USD (4) share-based payment transactions by THB 1,476 million (5) dividend paid by THB 2,672 million and (6) coupon payment on perpetual subordinated debentures by THB 500 million. There was total equity attributable to owners of the parent was THB 53,467 million, and book value per share (exclude perpetual subordinated debentures) was THB 32.06.

Statement of Cash Flows



As of 31st December 2021, the company and its subsidiaries had Cash and cash equivalents in the amount of THB 32,022 million, details are as follow:

Cash Flows (THB Million)	2021	2020
Net cash received from operating activities	16,980	6,340
Net cash used in investing activities	(5,840)	(6,353)
Net cash received (used in) financing activities	(1,019)	14,567
Effect of exchange rate changes on cash and cash equivalents	249	(178)
Net increase in cash and cash equivalents	10,371	14,375
Cash and cash equivalents as of 1 st January	21,651	7,276
Cash and cash equivalents as of 31st December	32,022	21,651

Details of each activity are as follows:

Net cash received from operating activities in the amount of THB 16,980 million which was derived from (1) profit for the period by THB 9,845 million (2) adjustments the gain transactions by THB 15,497, in which the main activities that affected an increase in cash flow were depreciation and amortization by THB 8,074 million, tax expense by THB 4,263 million, finance costs by THB 2,540 million, impairment loss on assets by THB 1,358 million and unrealized loss on foreign exchange by THB 640 million. Whereas, the main items that affected a decrease in cash flow were share of profit of associates and joint ventures by THB 1,042 million and gain from fair value adjustment of investment by THB 614 million (3) change in net operating assets and operating liabilities resulted in cash flow declining by THB 8,097 million, and (4) taxes paid by THB 265 million.

Net Cash used in investing activities of THB 5,840 million, mainly from cash paid for (1) property, plant and equipment in the amount of THB 7,972 million which details are aforementioned in assets section of financial position statement. (2) right-of-use assets of THB 2,198 million and (3) other investment of THB 1,708 million. Whereas, cash received from (1) acquisition of OKEA in amount of THB 5,011 million and (2) loans repayment of THB 1,024 million.

Net Cash used in financing activities of THB 1,019 million, mostly from cash paid for (1) repayment of long-term loans from financial institutions by THB 13,055 million (2) redemption of debentures by THB 3,323 million (3) short-term loans from financial institutions by THB 2,720 million (4) dividends by THB 2,672 million and (5) finance costs by THB 2,392 million. Whereas, cash received from (1) issuance of debentures by THB 20,284 million and (2) long-term loans by THB 3,352 million.

Financial Ratios



	Q4/2021	Q3/2021	Q4/2020	2021	2020
Profitability Ratios (%)					
Gross Profit Margin	13.91%	12.67%	7.22%	11.87%	3.17%
EBITDA Margin	13.90%	15.80%	8.30%	12.95%	3.01%
Net Profit Margin	3.84%	5.38%	1.81%	4.94%	-4.23%
Return on Equity ^{1/} (ROE)	15.27%	12.37%	-14.22%	15.27%	-14.22%
Efficiency Ratio (%)					
Return on Assets (ROA)	9.51%	7.43%	-3.90%	9.51%	-3.90%

1/ Profit and Total equity attributable to owners of the parent

	2021	2020
Liquidity Ratios (Times)		
Current Ratio	2.03	1.85
Quick Ratio	1.40	1.10
AR Turnover	26.29	18.33
Collection Period (Days)	14	20
AP Turnover	18.61	13.44
Payment Period (Days)	20	27
Leverage Ratios (Times)		
Debt to Equity	1.90	1.54
Interest bearing Debt to Equity	1.28	1.22
Net Interest-bearing Debt to Equity	0.81	0.85
Release of Debenture Ratio (Times)		
Net Debt to Equity	0.70	0.66

Financial Ratios Calculation

Profitability Ratios

- Gross Profit Margin (%) = $\frac{\text{Gross Profit}}{\text{Revenue from sale of goods and rendering of services}}$
- EBITDA Margin (%) = $\frac{\text{EBITDA}}{\text{Revenue from sale of goods and rendering of services}}$
- Net Profit Margin (%) = $\frac{\text{Profit attributable to owners of the parent}}{\text{Revenue from sale of goods and rendering of services}}$
- Return on Equity (%) = $\frac{\text{Profit attributable to owners of the parent (Yearly)}}{\text{Total Equity attributable to owners of the parent (Average)}}$

Efficiency Ratio (%)

- Return on Assets (%) = $\frac{\text{EBIT (Yearly)}}{\text{Total Asset (Average)}}$

Liquidity Ratios (Times)

- Current Ratio (Times) = $\frac{\text{Current Asset}}{\text{Current Liabilities}}$
- Quick Ratio (Times) = $\frac{(\text{Cash \& Equivalents} + \text{Short-term investments} + \text{Trade and other Account Receivable})}{\text{Current Liabilities}}$

Financial Ratios



- Accounts Receivable Turnover (Times) = $\frac{\text{Revenue from sale of goods and rendering of services}}{\text{Accounts receivable before doubtful debt (Average)}}$
- Collection Period (Days) = $\frac{365}{\text{Account Receivable Turnover}}$
- Accounts Payable Turnover (Times) = $\frac{\text{Cost of sale of goods and rendering of services}}{\text{Accounts Payable (Average)}}$
- Payment Period (Days) = $\frac{365}{\text{Account Payable Turnover}}$

Leverage Ratios (Times)

- Debt to Equity (Times) = $\frac{\text{Total Debt}}{\text{Equity}}$
- Interest Bearing Debt to Equity (Times) = $\frac{\text{Interest bearing Debt}}{\text{Total equity}}$
- Net Interest Bearing Debt to Equity (Times) = $\frac{(\text{Interest bearing Debt} - \text{Cash and cash equivalents} - \text{Short-term investments})}{\text{Total equity}}$

Issuance of Debenture Ratio (Times)

- Net Debt to Equity (Times) = $\frac{(\text{Interest bearing Debt} - \text{Cash and cash equivalents} - \text{Short-term investments})}{(\text{Total equity} - \text{Unrealized gain/loss from derivatives} - \text{Unrealized gain/loss on foreign exchange} - \text{Inventory gain/loss})}$

Note:

1/ Average Total Equity attributable to owners of the parent

- Yearly = $\frac{(\text{Total Equity attributable to owners of the parent of the year before} + \text{Total Equity attributable to owners of the company of this year})}{2}$
- Quarterly = $\frac{(\text{Total Equity attributable to owners of the parent of the quarter of the year before} + \text{Total Equity attributable to owners of the parent of the quarter this year})}{2}$

2/ Average Total Assets

- Yearly = $\frac{(\text{Total Assets of the year before} + \text{Total Assets of the company of this year})}{2}$
- Quarterly = $\frac{(\text{Total Assets of the quarter of the year before} + \text{Total Assets of the quarter this year})}{2}$

3/ The numerator of ROE is defined as the Profit attributable to owners of the parent and have to be annualized.

4/ The numerator of ROA is defined as EBIT and have to be annualized.

5/ Average Accounts Receivable before doubtful debt

- Yearly = $\frac{(\text{Accounts Receivable before doubtful debt of the year before} + \text{Accounts Receivable before doubtful debt of the company of this year})}{2}$
- Quarterly = $\frac{(\text{Accounts Receivable before doubtful debt of the quarter of the year before} + \text{Accounts Receivable before doubtful debt of the quarter this year})}{2}$

6/ Average Accounts payable

- Yearly = $\frac{(\text{Accounts payable of the year before} + \text{Accounts payable of the company of this year})}{2}$
- Quarterly = $\frac{(\text{Accounts payable of the quarter of the year before} + \text{Accounts payable of the quarter this year})}{2}$

7/ Interest Bearing Debt defined as Short-term loans + Long-term loans (including current portion of long-term loans) + Debentures (including current portion of long-term debentures) + Lease liabilities (including current portion of lease liabilities)



The company has always placed importance on sustainability performance through management of environmental, social, and good governance and economic performance. To bolster confidence in the company's sustainability management, the company participates in the Stock Exchange of Thailand's (SET) Thailand Sustainability Investment (THSI) and the DJSI Corporate Sustainability Assessment (DJSI/CSA 2021) which assessed by S&P Global. In addition, the company was assessed by Morgan Stanley Capital International (MSCI) ESG Research Rating, an organization with expertise and credibility in ESG indices internationally. The assessment process is to measure a company's resilience to environmental, social and governance risk (ESG risk) relevant to their respective industries. Results from ESG assessments are as follow:

- **Stock Exchange of Thailand's Assessment**

- The company was selected to be included in the Thailand Sustainability Investment (THSI) for the 7th year in a row (2015 - 2021).

- **International ESG Assessments**

- Ranked in the Top 3 of S&P Global DJSI Corporate Sustainability Assessment (DJSI/CSA 2021) in the category for Oil and Gas Refining and Marketing.
- Received AA Rating from MSCI ESG Ratings for the third consecutive year (2019 - 2021).

Three areas of focus for the company's ESG management are:

1) **Pandemic risk**

As the COVID-19 pandemic upend economic activities and livelihoods globally, new normal activities have emerged to control the spread of the virus. The company has assessed the impacts of the pandemic through multiple channels and have instituted measure to reduce risks as well as conducted Business Continuity Management (BCM). The company emphasizes on the health and safety of our employees, customers, and stakeholders. The company has conducted COVID-19 awareness activities, implemented social distancing measure between the refinery and head office at M Tower, established a safe house for essential employees during the peaks of the pandemic, and have implemented hybrid workplace to allow employees to work from home or from the office as condition changes. The company group's effort in procuring COVID-19 vaccines, over 90% of employees have received 2 doses. The company aims to have high percentage of employees who have received 3rd dose rapidly and continue to disinfect workspaces. In addition, COVID-19 screening via Antigen Test Kit (ATK) check point is set up for Bangchak Group's employees on a weekly basis. Moreover, ATKs are provided for employees who work at Bangchak service stations and Inthanin coffee shops. This enable employees to regularly test for COVID-19 themselves to ensure safety and build confidence for customers who come to use our services. Furthermore, the company places importance on being agile and adaptive to respond well to changing situation. In addition, the company has restructured its organization for sustainability and has managed the working capital to ensure sufficient funds for operations and investment plans.

2) **Implementation of the Personal Data Protection Act B.E. 2562 (2019)**

In accordance with the Personal Data Protection Act B.E. 2562 (2019) which was announced in the Government Gazette on 27th May 2019 and is currently postponed to take effect on 1st June 2022. To comply with the Act, the company has assessed measures to secure and protect personal data and has set up a committee to oversee and manage personal data. The committee is represented by members from relevant functions and work with leading consultancy to develop guidelines for protection and corrective actions in the events of data breach and misuse of personal information that can negatively impact the company.



3) Climate Change and the Environment

Climate change issues have always been top of mind for the company, the company strives to be part of the solutions to reduce energy consumption which is the main contributor of greenhouse gas emissions as follows:

3.1 Greenhouse Gas Accounting Management: the company joined “The Carbon Footprint for Organization” project and “Development of Economic Mechanisms for Carbon Price Determination and Investments to Reduce Greenhouse Gas Emissions” program organized by Thailand Greenhouse Gas Management Organization (“TGO”).

3.2 Greenhouse Gas Emission Reduction Targets: the company has set targets for Bangchak Group to become carbon neutral by 2030 and to become net zero greenhouse gas emissions by 2050

3.3 Plans to Achieve Targets: the company has developed business plan to ensure growth while reducing greenhouse gas emissions as follows:

- 3.3.1 Increase share of green business by continuing to increase share of investment in green businesses and promote carbon credit market. The company spearheaded Thailand’s network for carbon credit market through the establishment of Carbon Markets Club which Bangchak co-founded. In addition, the company has signed a memorandum of understanding (MOU) in the Thailand Synthetic Biology Consortium, which is the first network to promote and drive innovation and develop synthetic biology industry in Thailand.
- 3.3.2 Increase efficiency of the production process through the use of cleaner energy by using natural gas cogeneration power plant as the main source of energy in the refining process instead of fuel oil. The plant has increased refinery energy efficiency and decrease carbon emissions.
- 3.3.3 Produce high quality clean fuel to reduce pollution and PM 2.5 by developing diesel fuel that contain sulfur lower than 10 PPM, a five times lower Sulphur content. Reducing sulfur in fuel not only help to lower combustion particulate but also help to reduce sulfur dioxide. The low sulfur diesel fuel is sold in the Bangkok metropolitan area during high PM 2.5 season. The company also produced a high value niche product with low energy consumption.
- 3.3.4 Improve resources use through 3R strategy - Reduce, Reuse, and Recycle - and focusing on conducting environmentally-friendly and sustainable business such as setting up plastic bottles collection points in the service stations where collected plastic bottles are used to make social products and project to recycle engine oil containers to make recycled pellets to be use in the production of new engine oil containers in order to preserve value of resources, reduce waste generation, and promote the circular use to resources to generate the highest benefits to the environment, society, and communities.
- 3.3.5 Reduce plastic use in non-oil business such as using plastic sip cap to reduce the use of straws and switching to bio-degradable cups

Management Outlook towards the Business and the state of the Economy in 2022



Economic Outlook

According to the International Monetary Fund (“IMF”), global economic recovery continues in 2022 at 4.4%, a slower pace than 2021. The global economic recovery is supported by improved economic recovery in developing countries, which will reduce economic recovery gaps across regions. Risks stemming from supply chain disruptions and labor shortages could impact inflation in many countries. Whilst the spread of Omicron and future variants, high debt and fiscal conditions as well as geopolitical conflicts are risks to be monitored.

The Bank of Thailand (“BOT”) expects the Thai economy to continue the recovery, expanding 3.4% in 2022. An increase in inflation is expected to be transitory and should decline within 2022. Economic recovery headwinds include the spread of Omicron impacting tourism and export sectors, supply chain disruption both domestic and abroad impacting prices of products and services and economic scarring effects of the COVID-19 pandemic from the rise in business closures, fragile labor market, as well as high household debt. Moreover, there are also economic scars arising from the business closure. A Fragile labor market and high household debt are also a barrier to economic recovery. However, the BOT expects continued expansion of private consumption and investment.

Forecast Summary			
% per annum	Y2020	Y2021(F)	Y2022(F)
GDP Growth	-6.1	0.9	3.4
Headline Inflation	-0.8	1.2	1.7

Source: The Bank of Thailand

Crude Oil Price Outlook

The International Energy Agency (IEA) forecast that crude oil demand will reach 100.79 million barrel per day in 2022, an increase of 3.32 million barrel per day from 2021, due to the demand recovery supported by the progress of global COVID-19 vaccination efforts. However, the spread of Omicron variant still presents a downside risk to international travels. The IEA expects a surplus of supply in the first quarter of 2022, due to more supply coming on the market more than expected demand increase in 2022.

Average Dubai crude oil price is expected to move between 75 - 85 \$/BBL in 2022. Price will be supported by demand recovery after softer COVID-19 outbreak and living with COVID-19 policy in many countries which drive up demand. However, oil supply is expected to grow in the second half of year, with the rise of supply from the US and the return of Iranian oil. In addition, downside risks to sustained economic recovery are risks of viral mutation of COVID-19, lockdowns, and inflation.

Average Dated Brent and Dubai spread (DTD - DB) is expected to 2.5 - 3.5 \$/BBL in 2022, due to increase demand for light crude as geopolitical conflict between Russia and Ukraine pushed European refineries to source light crude within the region and avoid importing crude oil from Russian which risk being sanctioned by the US and members of the North Atlantic Treaty Organization (NATO). In addition, demand for light crude is expected as production of diesel and jet fuel increase after COVID-19 outbreaks situation subsided and aviation demand begins to recover from the reopening of domestic and international routes.

As for the Gross Refinery Margin (GRM) in 2022, it is expected that Dubai crude cracking margin in Singapore is continuously increase from 2021. Demand for finished product in Asia is expected to recover from the improved COVID-19 outbreaks after COVID-19 vaccination efforts and adjustment to the new normal. The economy is expected to grow which will support continued increase in demand for gasoline and diesel while demand for jet fuel is expected

Management Outlook towards the Business and the state of the Economy in 2022



to strongly recover. However, recovery in oil demand could be hindered by viral mutation that forces governments to return to issue restrictions to limit new waves. Moreover, additional refinery capacity expecting to come online this year as planned and fewer planned maintenance will increase the supply of refined products which is pressure refining margin.

Performance Outlook

Due to the new wave of COVID-19 which dragged on into 2022, and volatile global oil prices which are expected to affect the performance of some businesses within Bangchak Group, but overall performance is expected to improve compare to the previous year. Oil demand in Asia is expected to recover from COVID-19 vaccination and adjustment to the new normal which will drive economic growth. However, Bangchak Group has readied itself for the situations and has placed importance on having effective, agile, and adaptable work processes. **The Refinery and Oil Trading Business Group** plans to improve the Hydro Cracking Unit to increase the production capacity of unconverted oil (UCO) for use as a reactant in the production of lube base oil and to adjust the production process to obtain low aromatic solvent which is safer to users and more environmental-friendly. The improvements are part of Bangchak's transition toward becoming a Niche Product Refinery. In 2022, Bangchak plans to maintain crude run at 120 KBD supported by the capacity increase of Continuous Catalyst Regeneration Unit (CCR) and Hydro Cracking Unit after the project to increase Energy Efficiency and Environment (3E) completed in 2021. Bangkok Fuel Pipeline and Logistics Co., Ltd. ("BFPL") targets and plans to expand businesses to cover all aspects of transportation, not just transportation via pipelines, but include other mode of transportations to create synergy in all activities related to logistics operations which will increase effectiveness and improve flexibility to compete in fast-pace and dynamic situations. In addition, the company strives to improve its international oil trading business with BCP Trading Pte. Ltd. ("BCPT") strategic focus on expanding proportion of out-out trading (oil procurement and trading with entities outside of Bangchak Group) and continues to expand trading with new partners including new countries. **The Marketing Business Group's** goal is to maintain 2nd place in market share of oil distribution through service stations by creating the highest satisfaction for customers through continual improvement of service stations, service standards, and non-oil businesses that meet customers' needs; thus, making Bangchak service stations to be "Your Greenovative Destination" for customers. The Marketing Business Group also continues to expand non-oil and lubricants businesses. In addition, the company implemented digitalization of processes to improve customer experiences and increase operational efficiency. In 2022, the Marketing Business Group plans to add around 100 new service stations as well as develop the Inthanin coffee shop business under the concept of "every cup of yours for our world" and to develop non-beverage products with leading partners. Inthanin plans to have 1,000 branches in 2022. **The Power Plant Business Group** under BCPG Plc. ("BCPG") aims to become leader in the power production in the ASEAN with plans to expand business domestically and internationally. In 2021, the company issued THB 12,000 million of green bonds to support business expansion plans. **The Bio-Based Product Business Group** under BBGI Plc. ("BBGI") has expanded into the high value bio-based product business and began selling products under "B Nature Plus" brand including ASTA-IMMU dietary supplement, ASTA-VIS dietary supplement, and pharmacist-grade alcohol hand sanitizer. In addition, in late January 2022, the Securities and Exchange Commission (SEC) has started counting 1 on the application for an offer for sale of securities and a registration statement for the offer for sale of securities. Raising Funds from the initial public offering (IPO) will be used for business expansion as well as investment in future projects. In addition, BBGI is committed to becoming a leader in high value bio-based products that promote health through green innovation through investment in startups or leading businesses with knowledge of advanced

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biotechnology both domestically and internationally which corresponds to Thailand's Bio-Circular-Green Economy (BCG) model. **Natural Resource Business Group** remains committed to expanding its business, with OKEA continuing to seek investment opportunities in the petroleum exploration and production business through mergers and acquisitions (M&A). For lithium business, the company plans to trade lithium which has purchase agreement with Lithium Americas Corps along with seeks new opportunities in related-businesses such as battery to name a few. In addition, the liquefied natural gas (LNG) business of BTSG Co., Ltd. ("BTSG") plans to expand its domestic business to industrial customers to meet the growing demand for LNG, a cleaner energy source, as well as the development of LNG projects for temperature control systems in commercial buildings such as department stores, universities, airports, and office buildings. **Bangchak Initiative and Innovation Center (BiIC)** plans to build innovative businesses within the company (internal startup) through the project to promote innovation within the organization. The internal startups will create opportunities for growth and increase revenue streams for the company, examples of projects include: a digital fuel dispensers under the name "Krating" which aims to bring innovation to communities located far away from service stations with plans to add financial services in the future. Moreover, building networks with external agencies from both the public and private sectors to support and drive innovation in the Synthetic Biology technology industry in line with the BCG (Bio-Circular-Green Economy) model that will enhance sustainable competitiveness. In addition, Bangchak plans to expand investment focus from mainly focusing on renewable energy into new areas such as hydrogen economy and carbon capture utilization and storage as well as expansion into bio-based and wellness and digital technology business in line with the company's policy.