



บริษัท บางจากปิโตรเลียม จำกัด (มหาชน)

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Management Discussion and Analysis for Business Operation

For the first quarter ended March 31, 2013

1. Executive Summary

At the end of the first quarter of 2013, the Consolidated Financial Statement recorded a total revenue of Baht 47,283 million, EBITDA of Baht 3,478 million and net profit of Baht 2,219 million, in which profit attributable to owners of the Company was Baht 2,198 million. Earnings per share was Baht 1.60.

The Company and its subsidiaries' operating results are summarized as below;

(Unit: Baht Million)	1Q		% Change YoY
	2013	2012	
Revenue	47,283	47,610	-0.7
EBITDA	3,478	3,714	-6.4
• EBITDA (Refinery Business and BBF)	2,816	3,120	-9.7
• EBITDA (Marketing Business and BGN)	444	591	-24.9
• EBITDA (Solar Power Plant and and BSE)	218	(0.24)	N/A
Adjusted EBITDA ^{1/}	2,312	2,101	+10.0
Net profit ^{2/}	2,198	2,438	-9.8
Earnings per share (Baht)	1.60	1.77	-9.6

1/ Adjusted EBITDA mentioned to EBITDA excluding an impact of inventory gain or loss.

2/ Excluding the profit attributable to Non-controlling interests.



Company's projects progress status are shown as follow:

Project	Details	Progress
1. Refinery Business Project		
1.1 Tail Gas Treating Unit Project	The project helps decrease emission of Sulfur Dioxide from the Sulfur Recovery Unit. The total project value is approximately USD 37 million.	The structural work was finished and at present the work stage is the installation of equipment, piping and electrical systems which are on schedule. Project completion is expected to be around the end of 2013.
2. Marketing Business Project		
2.1 Gasohol Promotion Project	The project aims to promote and expand the use of gasohol through increasing numbers of E20 and E85 service stations, including sales promotion through gasohol club card.	At the end of the 1Q2013, the Company had a monthly average sales volume of 23.1 million litres for E20 and of 4.9 million litres for E85. The number of E20 service stations and E85 service stations are 646 and 51 stations, respectively.
2.2 Mini BigC in Bangchak Service Stations	It is a cooperation between the Company and BigC. BigC invests and operates Mini BigC convenient stores in Bangchak Service Stations. Bangchak will receive benefits in terms of revenue sharing. The cooperation will also bring in new customer base for Bangchak service stations.	At the end of the 1Q2013, there were 10 branches of Mini BigC in Bangchak service station, in which 3 branches (Bang Lamung, Kae-ha Bangplee, and Pinklao 2) were opened in Q12013.
3. Renewable Energy Business Project		
3.1 Electricity Generation from Solar Energy – Solar Power Plant Phase 2 (under Bangchak Solar Energy	There are 2 sites of solar energy power plants with a total power purchase agreement (PPA) of 32 MW supplied to Provincial	



Project	Details	Progress
Co., Ltd. /BSE)	Electricity Authority (PEA), namely	
	1. A PPA of 16 MW at Bam Net Narong District, Chaiyaphum Province.	Start Commercial Operation on March 6, 2013
	2. A PPA of 16 MW at Bang Pa Han District, Ayudhaya Province.	Start Commercial Operation on April 5, 2013
3.2 Electricity Generation from Solar Energy – Solar Power Plant Phase 3	The electricity generation from solar energy with a total power purchase agreement (PPA) of 48 MW supplied to PEA. The project will be located in the east and northeast of Thailand.	The project is during contractor selection process and expected to start construction in August 2013. Target project completion date is expected to be in May, 2014
3.4 Ethanol Production by Ubon Bio Ethanol Co., Ltd. / UBE	<ol style="list-style-type: none"> 1. To produce Ethanol with a capacity of 400,000 litres per day. 2. Cassava flour production plant with a capacity of 300 Tons per day including biogas production plant. 	The project was commissioning in December 2012 and started selling ethanol to BCP and other majors oil companies.



2. Operating Result

2.1 Summary of the Operating Results on consolidated basis

Unit: Million Baht

Statements of Income	1Q				% Change YoY
	2013	%	2012	%	
Revenue from sale of goods and rendering of services	47,283	100	47,610	100	-0.7
Cost of sale of goods and rendering of services	(44,320)	93.7	(44,281)	93	+0.1
Gross Profit	2,963	6.3	3,329	7	-10.8
Gain from crude and product oil price hedging contract	19	0	114	0.2	-83.3
Gain from foreign currencies forward contract	614	1.3	467	1	+31.5
Gain on foreign exchange	201	0.4	232	0.5	-13.4
Reversal of loss from impairment of assets	8	0	4	0	+100
Other income / expense	101	0.2	79	0.2	+27.8
Selling & Administrative Expenses	(924)	2	(835)	1.8	+10.8
Share of profit of associate	25	0.1	2	0	+1,150.0
Profit before finance costs and income tax expense	3,007	6.4	3,393	7.1	-11.4
Finance costs	(268)	0.6	(191)	0.4	+40.3
Income tax expense	(520)	1.1	(751)	1.6	-30.8
Profit for the period	2,219	4.7	2,450	5.1	-9.5
Non-controlling interests	21	0	12	0	+75.0
Owners of the Company	2,198	4.6	2,438	5.1	-9.8



At the end of the first quarter of 2013, the Consolidated Statement of Income recorded a net profit of Baht 2,219 million, declined by 9.5% from the same period of last year. Net profit of the Company was Baht 2,054 million, Bangchak Green Net Co., Ltd. (BGN)'s net profit of Baht 41 million, Bangchak Biofuel Co., Ltd. (BBF)'s net profit of Baht 70 million and Bangchak Solar Energy Co., Ltd. (BSE)'s net profit of Baht 25 million.

- **Refinery and Biofuel Business** recorded EBITDA of Baht 2,816 million, a decline of 9.7% compared to the same period of last year. Refinery's Base Performance EBITDA was Baht 2,147 million, an increase of Baht 234 million or 12.2% over the same period of last year. However, a gain from inventory (including LCM and oil & FX hedging on inventory) was decreased by Baht 405 million or 26.4% compared to the inventory gain in 1Q 2012. A gain from crude and petroleum product price hedging contract as well as gain from foreign currencies forward contract on GRM were also decreased by Baht 65 million or 45%, compared to the same period of last year.
- **Marketing Business and BGN** recorded EBITDA of Baht 444 million, a decline of 24.9% from the same period of last year. The total average sales volumes from all market channels increase by 7.3% when compared to the first quarter of 2012 but average marketing margin was dropped by 19.4%, from Baht 0.62 per litre to Baht 0.50 per litre.
- **Solar Power Plant Business** recorded EBITDA of Baht 218 million from the operation of Solar Power Plant Phase 1 (38 MW PPA) at Ayutthaya province and Phase 2 (16 MW PPA) at Chaiyaphum province.

2.2 Performance Summary

2.2.1 Crude Oil Price Situation

The demand of crude oil prices have been driven from the winter season demand and newly started refineries in China. For the supply side, Saudi Arabia cut its oil production and export since the late of 2012 to reduce excess supply.

In the first quarter of 2013, average Dubai crude oil price rose by \$1.06 per barrel from the average price in the fourth quarter of 2012.

Crude oil prices increased during the beginning of first quarter of 2013 after the U.S. could avoid Fiscal Cliff situation, though still continues to struggle with the automatic spending cut programs or Sequestration since March onwards. Factors supporting the crude oil price driven were the unrest in Algeria and Yemen as well as Iran's nuclear program tensions.

Crude oil prices have declined since mid of February onwards as U.S. and Asia refineries started their turnaround maintenance periods. The ongoing increase in U.S. crude oil reserve from Shale oil production also



had an impact to crude oil price. In addition, market remained concerns over European debts problems especially the deal to help Cyprus, Italy's political uncertainty, the shrinking EU economy and high unemployment rates.

Crack Spreads Analysis

An average Mogas-Dubai crack spread in the first quarter of 2013 was \$18.15 compared to an average of \$13.40 in the same quarter last year. In the beginning of the quarter, the spread was pressured by the declining demand in the winter but later increased rapidly from the expectation of supply of gasoline tightening due to turnarounds of refineries in Asia; particularly in India, South Korea and Taiwan, which are the main exporters whom announced a planned maintenance period from March to April.

An average jet fuel/kerosene-Dubai crack spread was \$20.17 compared to an average of \$15.56 in the same quarter last year. The spread has been driven by the demand from North Asia and China's jet fuel demand due to the Chinese travelling season.

An average Gasoil-Dubai crack spread was \$19.52 compared to \$16.24 in the in the same quarter last year. The spread was driven by the trend of less Gasoil supply due to refinery maintenance. However, around the end of the quarter, the spread fell down due to a weaker demand particularly from Indonesia who is a major importer in the region, and the export by new Chinese refineries.

An average Fuel oil-Dubai spread was \$-7.30 compared to \$-0.71 in the same quarter last year. Although there was a strong demand for fuel oil by Japan and South Korea, the spread was pressured by the high refinery run rate of producing fuel oil. Western arbitrage inflow Asia also had impact against spread. Nevertheless, the spread had improved in March after a decrease in the arbitrage and a starting period of refinery turnarounds in the region.

The table of oil price and crack spreads comparison

Unit: USD/bbl

Price	1Q 2013			1Q 2012	Changes	
	MAX	MIN	AVG (A)	AVG (B)	(A)-(B)	%
DB	113.65	104.10	108.09	116.45	-8.36	-7.2
UNL95/DB	24.86	12.01	18.15	14.30	+3.86	+27.0
IK/DB	23.96	14.76	20.17	15.56	+4.61	+29.6
GO/DB*	22.43	15.22	19.52	16.24	+3.28	+20.2
FO/DB	-3.56	-10.15	-7.30	-0.71	-6.60	-930.0

*2013 GO/DB based on Gasoil 0.05% sulfur, in 2012 was based on Gasoil 0.50% sulfur



2.2.2 Refinery Business and Bangchak Biofuel Co., Ltd.

Refinery Business	1Q 2013		1Q 2012		% Change YoY
Average Crude Run (KBD)	99.95		100.99		-1.0
Utilization Rate (%)	83.30%		84.16%		
Average FX (THB/1 USD)	29.94		31.12		-3.8
	Baht Million	\$/bbl	Baht Million	\$/bbl	% Change YoY
Market GRM	2,147	7.97	1,913	6.68	+12.2
GRM Hedging (oil & FX hedging)	75	0.28	140	0.49	-46.4
Gain from Inventory (include LCM, inventory & FX hedging)	1,129	4.19	1,534	5.36	-26.4
TOTAL	3,351	12.44	3,587	12.53	-6.6
EBITDA	2,698		3,061		-11.9
Adjusted EBITDA	1,569		1,527		+2.8

For the first quarter of 2013, Refinery's average crude run capacity was at 99,950 barrel per day (an average utilization rate of 83.30%) slightly decreased from the same period last year which was at 100,990 barrel per day (an average utilization rate of 84.16%)

Refinery's Base Performance EBITDA was Baht 2,147 million (7.97 \$/bbl), increased from the first quarter of 2012 which was at Baht 1,913 million (6.68 \$/bbl), or an increase of 12.2%. Main reason was from an increase in crack spreads of Company's main finished products.

Refinery business had a gain from crude and petroleum product price hedging contract as well as gain from foreign currencies forward contact on GRM of Baht 75 million (0.28 \$/bbl) which was mainly from gain in FX GRM Hedging resulted from the 3.8% appreciation of Thai Baht when compared to the first quarter of 2012.

Refinery business had a gain from inventory (including LCM and oil & FX hedging on inventory) of Baht 1,128 million (4.19 \$/bbl) which were gain from inventory price effect of Baht 579 million (2.15 \$/bbl)



and gain from FX inventory Hedging of Baht 558 million (2.07 \$/bbl) but there was a record of LCM of Baht 8 million (0.03 \$/bbl).

Refinery's total GRM was at Baht 3,351 million (12.44 \$/bbl). EBITDA was Baht 2,698 million, a decrease of Baht 363 million or 11.9% compared to the first quarter of 2012. Adjusted EBITDA was Baht 1,569 million, an increase of Baht 43 million or 2.8% when compared to the same period last year.

For Bangchak Biofuel Co., Ltd., there was an increase in capacity from 300,000 litres per day to 360,000 litres per day. EBITDA was Baht 94 million, an increase of Baht 33 million or 54.1% when compared to same period last year and an Adjusted EBITDA of Baht 67 million, an increase of Baht 32 million or 91.4% when compared to the first quarter of 2012.

In summary, Refinery business and biofuel had EBITDA of Baht 2,816 million, a decreased of 9.7% from Baht 3,120 million in the first quarter last year, which was mainly from a decrease in inventory gain.

2.2.3 Marketing Business and Bangchak Green Net Co., Ltd.,

Average sales volume in each market category of the Company

Unit: KBD

	1Q 2013	1Q 2012	% Change YoY
Marketing Business	87.79	85.08	+3.2
- Retail	50.96	46.34	+10.0
- Industrial	36.83	38.74	-4.9
Wholesale Business	35.02	29.38	+19.2
- PTT	10.28	14.17	-27.5
- Export	17.76	10.98	+61.7
- Other	6.99	4.23	+65.2
TOTAL	122.81	114.46	+7.3%

In the first quarter of 2013 the total average sales volumes from all market channels increase 7.3% from 114.46 KBD to 122.81 KBD.



An average sales volume through Marketing business was at 87.79 KBD or an increase of 3.2% when compared to the same period last year. The increase in sale volume was from a 10% growth in Retail business.

The government policy of stop selling 91-octane petrol, together with the increasing number of new car from the first-time car buyer tax rebate program led to an increase in gasohol products by 13%. An average sales volume of Gasohol E20 and Gasohol E85 had increased by 90.9% and 343.5% respectively when compared to the same period last year. An average sales volume of Diesel product increased by 7%.

However, Industrial sales volume was decreased 5% from the same period last year from the lower sales volume of Jet fuel and fuel oil for industrial customers.

For Wholesale business, an average sale in this period was at 35.02 KBD, an increase of 19% from the same period last year. Export sales increase by 61.7% mainly from an export of Fuel Oil premium grade very low sulfur product.

Average sales volume in each product category of only marketing business

Unit: KBD

	1Q 2013	1Q 2012	% Change YoY
Diesel	49.55	45.86	+8.1
Gasohol	20.87	19.29	+8.2
- UNL 91	0.48	6.50	-92.6
- Gasohol 91	8.90	6.74	+32.0
- Gasohol 95	5.64	3.31	+70.4
- Gasohol E20	4.83	2.53	+90.9
- Gasohol E85	1.02	0.23	+343.5
Jet Fuel	12.55	14.49	-13.4
Fuel Oil	3.51	4.25	-17.4
LPG	0.32	0.51	-37.3
Lubricant	0.96	0.61	+57.4
Others	0.04	0.07	-42.9
Total	87.80	85.08	+3.2



Overall sales volume through service station of petroleum traders in accordance with section 7 (Data available for 1Q2013 was data of January and February) (source: Department of Energy Business, Ministry of Energy)

Unit: Million litre per month

	1Q		Change	
	2013	2012	+/-	%
PTT	589.9	571.4	+18.5	+3.2
ESSO	243.1	234.3	+8.8	+3.7
BCP	224.6	201.9	+22.7	+11.2
SHELL	199.8	183.0	+16.8	+9.2
CALTEX	86.1	88.3	-2.2	-2.4
Others	204.0	192.7	+11.3	+5.9
TOTAL	1,547.5	1,471.6	+7.6	+5.2

The table below shows the Marketing Margin

Unit: Baht per Litre

	1Q 2013	1Q 2012	% Change YoY
- Retail Margin	0.68	0.81	-16.0
- Industrial Margin	0.25	0.38	-34.2
TOTAL	0.50	0.62	-19.4

For the first quarter of 2013, Retail Margin was at 0.68 baht per litre, a decrease of 16% and, the Industrial Margin was at 0.25 baht per litre, a decreased of 34.2% when compared to the same period last year.

Total Marketing Margin was at Baht 625 million and EBITDA of Baht 386 million, a decrease of Baht 163 million or 29.7% from the first quarter 2012.

Marketing Business and Bangchak Green Net had combined EBITDA of Baht 444 million, a decrease of Baht 147 million or 24.9% from the first quarter last year.



2.2.4 Solar Power Plant Business

Revenues from Solar Power Plant Phase II (16 MW) at Bamnet Narong District, Chaiyaphum province which has been commercial operated since March 6, 2013, together with revenue from Solar Power Plant Phase I at Bang Pa-In, Ayutthaya province, recorded a total revenue of Baht 229 million and EBITDA of Baht 218 million.

3. Analysis of the Financial Position of the Company and its subsidiaries (Consolidated)

(Unit: Million Baht), (% of total assets)

Financial Position	31 March 2013		31 December 2012	
	Value	%	Value	%
Current assets	38,794	52.3%	37,107	52.4%
Investments in associates	748	1.0%	723	1.0%
Property, plant and equipment	31,486	42.5%	29,919	42.2%
Other non-current assets	3,149	4.2%	3,104	4.4%
Total assets	74,178	100.0%	70,853	100.0%
Current liabilities	19,450	26.2%	18,218	25.7%
Long-term borrowings (including current portion of long-term loans)	18,848	25.4%	19,023	26.8%
Other non-current liabilities	1,336	1.8%	1,290	1.82
Total liabilities	39,635	53.4%	38,530	54.4%
Total equity attributable to owners of the Company	34,341	46.3%	32,143	45.4%
Non-controlling interests	202	0.3%	180	0.3%
Total equity	34,543	46.6%	32,323	45.6%
Total liabilities and equity	74,178	100.0%	70,853	100.0%



Assets

As of March 31, 2013, Total Assets of the Company and its subsidiaries were Baht 74,178 million compared to the end of 2012 which was at Baht 70,853 million.

The assets increase by Baht 3,324 million were mainly from

- Cash of Baht 8,859 million, increased by Baht 853 million (Detail is stated under Cash Flow Analysis Section).
- Trade Accounts Receivable was Baht 8,040 million, increased by Baht 303 million which was mainly from Export Trade Accounts Receivable.
- Oil Fuel Fund subsidies receivable was Baht 1,144 million, increased by Baht 322 million from last year, mainly for LPG, gasohol E85 and E20.
- Property, plant and equipment were Baht 31,486 million, increased by Baht 1,567 million, mainly from Solar Power Plant Phase 2 (PPA of 32 MW)

Liabilities

As of March 31, 2013, Total Liabilities of the Company and its subsidiaries were Baht 39,635 million, increased by Baht 1,105 million compared to the end of 2012 which was at Baht 38,530 million. The change of Liabilities were mainly from

- Accounts Payable was Baht 15,626 million, increased by Baht 1,926 million which was mainly from the crude oil transaction between the Company and PTT Plc. and Thai Oil Plc.
- Other Payables were Baht 1,824 million, decreased by Baht 967 million which were mainly from decrease in Accrued Expenses and decrease in payments due to contractors.
- Income Tax Payable was Baht 1,061 million, increased by Baht 529 million mainly from Corporate Income Tax in 2012 and first quarter of 2013 which are not yet due.

Equities

As of March 31, 2013, the Consolidated Total Equity was Baht 34,543 million, increased by Baht 2,219 million which resulted from the 1Q2013 net profit, with a book value of Baht 24.94 per share.



4. Analysis of the Cash Flows Statement of the Company and its subsidiaries (Consolidated)

In the first quarter of 2013, the Company and Subsidiaries had net cash received from operating activities of Baht 3,642 million, net cash used in investing activities of Baht 2,259 million and net cash used for financing activities of Baht 530 million, as a result there was a net increase in cash and cash equivalents of Baht 853 million. Cash and cash equivalents at 1 January was Baht 8,006 million, so cash and cash equivalents as of March 31, 2013 accounted for Baht 8,859 million.

Details of cash received and used are as follows:

Unit: Million Baht

Cash Flows	For 3 month period ended	
	31 March 2013	31 March 2012
Net cash received from operating activities	3,642	2,099
Net cash used in investing activities	(2,259)	(367)
Net cash used in financing activities	(530)	(2,219)
Net increase in cash and cash equivalents	853	(487)
Cash and cash equivalents at 1 January	8,006	4,021
Cash and cash equivalents at 31 March	8,859	3,533

Cash received and used details are as follows:

- Net cash received of Baht 3,642 million from operating activities which comprised of net profit of Baht 2,219 million. The adjustments were Depreciation and Amortization of Baht 683 million, Unrealized Gain on foreign exchange of Baht 278 million, Finance costs of Baht 268 million and Income tax expense of Baht 520 million. Cash from operating activities were
 - Cash of Baht 809 million used in the operating assets, which were Trade Accounts Receivable and Others current assets
 - Cash of Baht 1,068 million received from operating liabilities which mainly from an increase in Accounts Payable
- Net cash used in investing activities of Baht 2,259 million, mainly from
 - Investment in Property, Plants and Equipment of Baht 2,189 million,
 - Investment in Other Assets of Baht 73 million
- Net cash used in financing activities of Baht 530 million, mainly from
 - Finance costs of Baht 352 million
 - Repayment of long – term loans of Baht 178 million



5. Financial Ratios (Consolidated)

	1Q 2013	1Q 2012	Change
Profitability Ratios			
- EBITDA Margin (%)	7.35	7.80	-0.45
- Profit Margin ¹ (%)	4.65	5.12	-0.47
- Return on Equity-ROE (%)	6.61	7.88	-1.27
- ROE (excluding inventory effect) (%)	3.81	3.98	-0.17
- Return on Assets-ROA (%)	3.03	3.79	-0.76
- ROA (excluding inventory effect) (%)	1.75	1.91	-0.16
	31 March 2013	31 December 2012	Change
Liquidity Ratios			
- Current Ratio (times)	1.90	1.93	-0.03
- Quick Ratio (times)	0.96	0.93	+0.03
Financial Policy Ratios			
- DSCR (times)	5.19	5.04	+0.15
- Interest bearing debt to Equity ² (times)	0.55	0.59	-0.04
- Total liabilities to Equity ² (times)	1.15	1.20	-0.05

1 Profit attributable to the owners of the Company, excluding the profit attributable to Non-controlling interests

2 Solely from the total equity attributable to owners of the Company

Financial Ratios Calculation

- EBITDA Margin (%) = EBITDA / Revenue
- Profit Margin (%) = Profit attributable to owners of the Company / Revenue
- Return on Equity (%) = Profit attributable to owners of the Company / Average Total Equity
- Return on Equity (Excl. Inventory) (%) = Profit attributable to owners of the Company – (Inventory Gain(Loss)*(1-Tax rate)) / Average Total Equity
- Return on Assets (%) = Profit attributable to owners of the Company / Average Total Asset
- Return on Assets (Excl. Inventory) (%) = Profit attributable to owners of the Company – (Inventory Gain(Loss)*(1-Tax rate)) / Average Total Asset



- Current Ratio (times) = Current Asset / Current Liabilities
- Quick Ratio (times) = (Current Asset – Inventory) / Current Liabilities
- DSCR = Adjusted EBITDA / (Paid for long-term debt + Financial cost)
- Interest Bearing Debt to Equity (times) = (Current portion of short-term and long-term loans from financial institutions + Debentures) / Total equity attributable to owners of the Company
- Total Liabilities to Equity (times) = Total Liabilities / Total Equity

6. Environment Management Accounting (EMA)

Having the environmental concerns and social responsibilities, the Company has prepared the environmental management accounting report since 2005. The environmental cost accounting helps the Company to keep track with the information which is useful for enhancing the environmental management effectiveness, and resource utilization. The Environmental Cost Accounting report covers refinery business unit, company and Bang Pa-in Oil distribution Centre.

(Unit : Million Baht)	1Q		Change +/-
	2013	2012	
Material Costs of Product Outputs : Consist of crude oil, ethanol, bio-diesel, chemical, energy and utilities in production	36,904.82	36,640.70	264.1
Material Costs of Non-Product Outputs : Consist of slop and sludge oil, waste water, chemical surplus	40.53	27.42	13.1
Waste and Emission Control Costs : Consist of maintenance cost of environmental control equipment and depreciation and other fees	43.08	62.30	(19.2)
Prevention and Other Environmental Management Costs : Consist of monitoring and measurement cost, environmental management system expenses	1.58	1.04	0.5
Benefit from by-product and waste recycling : The revenue realization from liquid sulfur, glycerin, waste paper	(6.49)	(8.94)	(2.5)



Environmental cost in the first quarter of 2013, in total, increased from the same period last year around Baht 259 million. More than 99% were material costs of product outputs. The average crude runs were 99.95 KBD and 101 KBD for the first quarter of 2013 and 2012, respectively.

- There was an increase in using ethanol in the production of 21.3 million litres and higher average price of 4.30 baht per litre
- Material costs of non-product outputs increased by Baht 13.11 million mainly from the rise in average cost of rerunning slop oil of 0.11 Baht per litre from same period last year.
- There was a decrease in Waste and Emission Control Costs of Baht 19.22 million resulted from the completion of turnaround maintenance period last year.
- The Benefit from by-product and waste recycling was decreased 27.4% when compared to same period last year from the decrease of Baht 5.57 million (174%) of sales of liquid sulfur.

Air pollution

As for environmental monitoring, the Company regularly measures stack-air quality to ensure that the total suspended particulate masses (TSPs), nitrogen oxides (NOx) and sulfur dioxide (SO₂) are superior to those announced by the Ministry of Industry and as required in environment impact assessment (EIA) reporting.