



บริษัท บางจากปิโตรเลียม จำกัด (มหาชน)

สำนักงานใหญ่ : ชั้น 10 อาคาร A ศูนย์เอนเนอร์ยีคอมเพล็กซ์
555/1 ถนนวิภาวดีรังสิต แขวงจตุจักร เขตจตุจักร กรุงเทพฯ 10900
Head Office : The Bangchak Petroleum Public Company Limited
10th Fl., Building A Energy Complex, 555/1 Vibhavadi Rangsit Rd.,
Chatuchak, Bangkok 10900 Thailand
Tel : 66 (0) 2140 8999 Fax : 66 (0) 2140 8900

โรงงาน : 210 หมู่ 1 ซอยสุขุมวิท 64 ถนนสุขุมวิท
แขวงบางจาก เขตพระโขนง กรุงเทพฯ 10260
Refinery : The Bangchak Petroleum Public Company Limited
210 Moo 1 Soi Sukhumvit 64 Sukhumvit Rd., Bangchak,
Phrakanong, Bangkok 10260 Thailand
Tel : 66 (0) 2335 4999 Fax : 66 (0) 2335 4009

ทะเบียนเลขที่ 0107536000269
www.bangchak.co.th

Management's Discussion and Analysis for Business Operations

For the year ended December 31, 2010

Business Overview for 2010

Oil Price Situation

The average oil price in 2010 had continually increased at almost USD 20 per barrel. The main factors supported the increase in oil price at the beginning of the year were the cold weathers in the US and North Asia, particularly in the US where the weather condition was the coldest in the past 9 years and its eastern part had the heaviest snow storm in the past 30 years, leading to the oil demand increased. Moreover, the oil price had increased because the investors were more confident in the world economic, and the worry in European debt crisis was relieved. Many banks jointly provided loans to European countries that faced huge amount of Public Debt – USD 180 Billion, which were Portugal, Ireland, Greece, and Spain.

The factors which had driven the oil price in the second half of the year was the Quantitative Easing 2 of the US which was approved to inject USD 600 billion to the system through the purchase of the bond. As a result, the US Dollar had continuously depreciated against the Euro in the second half of the year, so most investors had moved their investments to the commodities markets such as oil and gold markets. In addition, the concern over the European Countries' financial stability was eased up when the European Union and the International Monetary Fund (IMF) had approved the emergency funding of USD 113 billion to Ireland. Moreover, the Enbridge's crude oil pipeline from Canada to the US, with capacity of 670 KBD, ceased its operation due to pipeline leakage problem. Also, the rapid growth of China's economy had affected the country's high oil demand, in which the Chinese government had to post measurements to slowdown its economy's dramatic growth such as the increase in banks' reserves, the increase in the interest rate, and the control of financial institutes' investments. All mentioned facts above were main factors affecting the movement of oil price in 2010.



The table of oil price comparison

USD/BBL

Price	2010			2009			Changing (A)-(B)
	Max	Min	Avg. (A)	Max	Min	Avg. (B)	
DB	91.83	68.22	78.04	79.57	36.40	61.82	16.22
UNL95/DB	15.13	6.60	10.32	20.91	0.38	8.55	1.77
GO/DB	15.16	6.68	11.42	18.25	1.14	7.24	4.18
FO/DB	0.11	-12.20	-8.18	-0.86	-12.89	-5.06	-3.12

Production and Distribution

- The Company's average crude run increased from 79.2 thousand barrels per day in 2009 to 86.0 thousand barrels per day in 2010 since its refinery had operated as Complex Refinery from December 7, 2009 onwards.
- The Company's total product distribution in 2010 (excluding crude oil and lubricant) was at an average of 102.9 thousand barrels per day, whereas the previous year's figure was 99.7 thousand barrels per day.

Sales through marketing business were increased to be 67.1 KBD, from last year's figure of 61.0 KBD.

- According to the information from the Department of Energy Business, sales volume through service stations of all brands in Thailand had decreased from 1,390.4 million liters per month in 2009 to 1,374.6 million liters per month in 2010 or decreased by 1.1%.
- The Company's sales volume through service stations decreased around 0.5% which was a lower decrease rate than the decrease rate of Thailand's all brands sales through service stations. The Company's market share through service stations in 2010 was at 13.8%, ranked the third place.

1. Explanation and Analysis of the Operating Results

1.1 Net Profit/(Loss) Analysis

- 1) For the year 2010, the Consolidated Financial Statements recorded a net profit of Baht 2,889 million, which was the Company's net profit of Baht 2,649 million, the subsidiaries' (Bangchak Green Net Company Limited-BGN and Bangchak Bio Fuel Company Limited-



BBF) net profit of 7 million and 252 million Baht respectively but the consolidated figures were adjusted by connected transactions of Baht 19 million. When taking out the profit attributed to Minority interests of Baht 76 million, the remaining net profit to equity holders of the Company was Baht 2,813 million (EPS 2.40 Baht).

- 2) The Company's base performance EBITDA in 2010 was Baht 5,365 million. When combine with Baht 28 million gain from hedging transaction and Baht 434 million gain from inventory effect, total accounting EBITDA was Baht 5,827 million. Total Gross Integrated Margin-GIM was USD 8.24 per barrel (weighted calculation from Total Gross Refining Margin-GRM of USD 6.09 per barrel and Marketing Margin-MKM of USD 2.75 per barrel.) The breakdown EBITDA by business units comparing Year 2010 to Year 2009 was summarized as follows:

Table: Details of breakdown EBITDA

(Unit: Million Baht)

	2010 (A)	2009 (B)	Changing +/- (A) - (B)
■ Base Performance EBITDA	5,635	3,450	+1915
- Refinery business	4,004	2,045	+1959
- Marketing business	1,361	1,405	-44
■ Gain from hedging	28	5,631	-5,603
■ Gain(loss) from inventory effect	434	3,163	-2,729
■ Total Accounting EBITDA	5,827	12,244	-6,417
- Refinery business	4,466	10,839	-6,373
- Marketing business	1,361	1,405	-44

Refinery Business

- In 2010, the Refinery business's base performance EBITDA was Baht 4,004 million, an increase of Baht 1,959 million from last year's EBITDA of Baht 2,045 million. Operating as a Complex Refinery had effected to a better margin. And there was an increase in crude run. Crude run increased from 79.2 thousand barrels per day in 2009 to 86.0 thousand barrels per day in 2010.
- The profits from hedging transaction and the gains from inventory effect in 2010 were lower than those in 2009. As a result, Refinery business' total EBITDA in 2010 was Baht 4,466 million, compared to Baht 10,839 million in 2009.



- Total GRM in 2010 was USD 6.09 per barrel, compared to USD 12.76 per barrel in 2009. In 2009 there were huge gains from hedging transaction USD 5.62 per barrel and inventory gain of USD 3.16 per barrel whereas in 2010 hedging transaction was USD 0.03 per barrel and inventory gain of USD 0.43 per barrel.

GRM analysis was summarized as follows:

Unit: USD/BBL

GRM from	2010	2009	Changing +/-
Base GRM	5.63	3.98	+1.65
GRM Hedging	0.03	5.62	-5.59
Inventory Gain/(Loss)	0.43	2.22	-1.79
LCM	-	0.94	-0.94
Total	6.09	12.76	-6.67

Base GRM An increase of USD 1.65 per barrel, from 2009's base GRM of USD 3.98 per barrel to USD 5.63 per barrel per barrel in 2010. The company operated as Complex Refinery resulting in less production of Fuel Oil and higher production in Diesel. Therefore, the Company received better refining margin from an increase of diesel production and better products crack spread. The following table illustrates the spread of finished products and crude oil.

Unit: USD/BBL

Products crack spread	2010	2009	Changing +/-
UNL95/DB	10.31	8.55	+1.76
IK/DB	12.10	8.28	+3.82
GO/DB	11.41	7.24	+4.17
FO/DB	-5.68	-5.06	-0.62

Oil hedging A decrease of USD 5.59 per barrel in GRM Hedging. The narrow spread of finished products and crude oil during 2009-2010 led to an unfavorable market condition for hedging transaction. For the year 2010, the hedged position was approximately 25% of the average refinery production level (the hedging policy is at 30%) and the actual spread was barely different from the hedged position, leading to slight gain from the hedging transaction. While, the hedged position in 2009 was at 54% of the average refinery production level and the actual spread was much lower than the hedged position. Thus, in 2009 the Company received much gain from the



transaction. The determination of forward contract price depends mainly on the market situation at certain period.

- **Inventory Effect** The Company reported a stock gain of USD 0.43 per barrel in 2010 due to a slightly increase in oil price in 2010. In 2009 the oil price was rising sharply and led to a stock gain of USD 3.16 per barrel.

Marketing Business

- In 2010, the sales volume through the Marketing Business increased from 61.0 thousand barrels per day to 67.1 thousand barrels per day.
- EBITDA from the Marketing Business was Baht 1,361 million, comparing to 2009's EBITDA of Baht 1,405 million. In 2010, the Company's marketing margin (excluding lubricant) was at Baht 0.55 per litre (equivalent to USD 2.75 per barrel) which was slightly lower from last year's marketing margin of Baht 0.57 per litre (equivalent to USD 2.62 per barrel).

1.2 Income Analysis

- 1) Revenues from of sale of goods and rendering of services of the Company and its subsidiaries for 2010 were

Baht 136,369 million, comprised of the Company's revenues of Baht 134,638 million and its subsidiaries' (Bangchak Green Net Company Limited-BGN and Bangchak Bio Fuel Company Limited-BBF) of Baht 19,334 million and Baht 2,441 million respectively, adjusted by connected transaction of Baht 20,044 million which mostly associates with the sale transactions from the Company to BGN and the sale transaction of B100 from BBF to the Company. The major changes in the Company's revenues comparing to those of last year were as follows:

- Revenues from sale (exclude lubricant) of Baht 132,935 million were higher than those of last year by Baht 26,781 million, or increased by 25.2%. Reasons of revenue increase were an increase of 4.1% in total sales volume and an increase of 20.5% in average oil selling price.
- An increase of Baht 467 million in Other Revenues, mainly from Insurance Compensation, Oil reservation fee, and dividend received from Bangchak Green Net Co., Ltd.
- Baht 932 million gain on foreign exchange was mainly from Foreign Exchange Hedging on Crude Purchase and Product Selling transactions and a Mark-to-Market



effect of USD 200 million Loan in which the Company had swapped the Thai Baht Loan to USD Loan (Cross Currency Swap), according to Company's policy of Natural Hedge to protect the business from exchange rate fluctuations impact.

- Gain from Oil Hedging Transaction decreased by Baht 5,603 million or decrease by 99.5% due to the decline in hedging transaction as already explained under Oil Hedging section.
- Stock gain decreased by Baht 2,729 million or decreased by 86.3% due to a slightly increase in oil price in 2010 whereas in 2009 the oil price was rising sharply and led to a high stock gain.

1.3 Expense Analysis

1) In 2010 Cost of sale of goods and rendering of services of Consolidated Income Statement was Baht 130,020 million, comprising of the Company's costs of Baht 129,115 million and of its subsidiaries' (Bangchak Green Net Company Limited-BGN and Bangchak Bio Fuel Company Limited-BBF) of Baht 18,699 million and Baht 2,154 million respectively, adjusted by connected transaction of Baht 19,948 million, which mostly was cost of sales from the Company to BGN. Major components in changes of the Company's expenses comparing to last year were as follows:

- The Cost of sale of goods and rendering of services increased by Baht 27,372 million or by 28% because of a 4.1% increase in sales volume and an increase in costs of crude oil, which was in the same direction of the increase in Revenue from Sales.
- Depreciation and Amortization increased by Baht 821 million due to the record of Amortization from the PQI
- Finance Cost increased by Baht 350 million, after the Commercial Operation of PQI Project in December 7, 2009 in which the Company realized the interest expense in the Statements of income since then.
- Income Tax expense decreased by Baht 2,173 million due to the decrease in the profit.



1.4 Performance Analysis of the Company and its subsidiaries by Business

Unit : Million Baht

	2010	2009	+/(-)
Intake			
• Refinery business (KBD)	86.0	79.2	+6.8
• Biodiesel (B100) (KL/Day)	71.5	-	n/a

Revenues from sale and services	136,369	108,681	+27,688
• Refinery business	130,787	104,138	+26,649
• Marketing & service station	95,168	75,137	+20,031
• Biodiesel (B100)	2,441	53	+2,388
• Connected transaction	(92,027)	(70,647)	(21,380)
EBITDA	6,165	12,316	-6,151
• Refinery business	4,466	10,841	-6,375
• Marketing & service station	1,358	1,460	-102
• Biodiesel (B100)	341	15	+326
Net Profit	2,889	7,523	-4,634
• Refinery business	2,034	6,832	-4,798
• Marketing & service station	603	696	-93
• Biodiesel (B100)	252	-5	+257

1.5 Profitability Analysis

	Consolidated		Company	
	2010	2009	2010	2009
▪ Sales and Services, Million Baht	136,369	108,681	134,638	107,678
▪ Net Profit (Loss), Million Baht	2,889	7,523	2,649	7,475
▪ Net Profit Margin, %	2.12	6.92	1.97	6.94
▪ Earning Per Share, Baht/Share ^{1/}	2.40	6.57	2.26	6.53
▪ Return on Equity-ROE, %	10.90	33.01	10.09	32.80
▪ ROE (excluding inventory effect), % ^{2/}	9.74	22.95	8.93	22.97

^{1/} Calculate from average number of shares in 2010 and 2009 which were 1,172 and 1,144 million shares respectively.

^{2/} Exclude impact from inventory gain or loss

Percentages of Net Profit Margin for the year 2010 as shown in the Consolidated Financial Statement and the Separate Financial Statements were 2.12% and 1.97% respectively, decreased from 2009's Margins of 6.92% and 6.94%.



Operating as a Complex Refinery had effected to a better margin. And there was an increase in crude run. Crude run increased from 79.2 thousand barrels per day in 2009 to 86.0 thousand barrels per day in 2010. However, the Gain from Hedging Transaction and Inventory Gain were much lower than those in 2009. Therefore, the Return on Equity for the Consolidated Financial Statement then decreased from 33.01% in 2009 to 10.09% in 2010.

2. Explanation and Analysis of the Financial Position as of December 31, 2010 compared with December 31, 2009

	Consolidated		Company	
	Dec 31, 2010	Dec 31, 2009	Dec 31, 2010	Dec 31, 2009
▪ Total Assets, Million Baht	62,453	53,891	61,180	52,901
▪ Total Liabilities, Million Baht	35,401	27,938	34,489	27,069
▪ Total Equity, Million Baht	27,052	25,953	26,691	25,832
▪ Current Ratio , Times	1.83	1.78	1.83	1.80
▪ Debt to Equity, Times	0.73	0.61	0.71	0.59
▪ Book Value, Baht/Share*	22.85	22.11	22.68	22.08

* Calculate from number of shares as of December 31, 2010 and December 31,2009 which were 1,177 and 1,170 million shares respectively.

2.1 Assets

- 1) At the end of 2010, Total Assets were Baht 62,453 million, which comprised of the Company's total assets of Baht 61,180 million, its subsidiaries' (Bangchak Green Net Company Limited-BGN and Bangchak Bio Fuel Company Limited-BBF) total assets of Baht 861 million and Baht 1,470 million respectively, adjusted by connected transactions of Baht 1,058 million which was mainly Trade Account Receivable-BGN of Baht 711 million.
- 2) The Company's Total Assets at the end of 2010 increased by Baht 8,279 million, or increased by 15.6% compared to the end of 2009. The major changes of assets were as follows:
 - Cash and Cash Equivalents increased by Baht 6,793 million, part of it was increased Cash from Long-term Loan



- Net Accounts Receivable increased by Baht 813 million due to an increase of both local and export sales volumes.
- Inventories increased by Baht 963 million due to an increase of oil price and an increase of 29 million liters or 0.18 million barrels of inventory. The additional inventory was prepared for sales during Major Turnaround Period.
- Account Receivable from Oil Hedging Transaction decreased by Baht 443 million due to the decline in hedging transaction. In 2010, the transaction was accounting for 25% of the average refining volume (the hedging policy stipulates the transaction at approximately 30%)
- Insurance Compensation Receivable of Baht 416 million from Property Damage and Business Interruption Insurance Claims due to the accident during PQI construction in May 2009.
- Other long-term investments increased by Baht 88 million, or increased by 44.2%, from the acquisition of 1,165,500 common shares of ASEAN Potash Public Company Limited (APMC), or approximately 9.9% of the total common shares. At present the Company holds 16.4% stake in APMC.

2.2 Liabilities

- 1) At the end of 2010, Total Liabilities Baht 35,401 million, which consisted of the Company's Total Liabilities of Baht 34,489 million, of its subsidiaries' (Bangchak Green Net Company Limited-BGN and Bangchak Bio Fuel Company Limited-BBF) Total Liabilities of Baht 834 million and Baht 925 million respectively. Connected Transactions of Baht 847 million was adjusted, of which Baht 711 million was Trade Accounts Payable resulting from the Company's sales to Bangchak Green Net.
- 2) The Company's Total Liabilities at the end of 2010 increased by Baht 7,420 million, or increased by 27.4% compared to the end of 2009. The major changes of liabilities were as follows:
 - Loan increased Baht 3,772 million or increased by 24.7% from 2009 due to the Long-term loan drawdown of Baht 4,672 million and the Short-term loan repayment of Baht 800 million. There was a conversion of BCP141A debenture worth Baht 100 million to common shares.
 - Net Trade Accounts Payable at the end of 2010 was at Baht 10,094 million which increased by Baht 4,071 million or 67.6% due to an increase in oil price. Moreover,



the purchase volume of crude oil in December 2010 was 1.7 million barrels higher than those in December 2009.

- Excise Tax and Oil Fuel Fund Payable increased by Baht 217 million or increased around 36.3%. It was because production and sales volume were increased and the excise tax rates were back to the normal rate after the ending of Excise Tax Reduction Project.

2.3 Shareholders' Equity

- 1) At the end of 2010, the Consolidated Total Shareholders' Equity were Baht 27,052 million, which comprised of Baht 26,691 million from Total Shareholders' Equity of the Company and Baht 572 million of subsidiaries' equity, adjusted connected transactions by Baht 212 million.
- 2) The Company's Total Equity increased by Baht 859 million or 3.33% from the end of 2009. The changes in the Company's Equity were as follow;
 - The Company reported Net Profit of Baht 2,649 million in 2010
 - The Company's two times Dividend Payment (Baht 0.80 per share for the 2009 operating results and Baht 0.50 per share for the first 6 months of 2010 operating results), amounting Total Dividend Payment of Baht 1,521 million.
 - Baht 369 million of the Depreciation on the property revaluation.
 - Shareholders of BCP141A Debenture exercised their right to convert the debenture worth Baht 100 million to common shares at Baht 14.30 per 1 common share, leading to an increase in common share of Baht 7 million (with the par at Baht 1 per share), and the share premium increased by Baht 93 million.

At the end of 2010 the company shareholders' equity were Baht 26,691 million, or accounting for the Book Value per Share of Baht 22.68.

- 3) As of December 31, 2010, the Company had quasi-equity instruments (CDDR, subordinated convertible debenture and warrant) which are equivalent to 205 million common shares or approximately 15% of total shares in full dilution if these were fully converted or exercised.

3. **Explanation and Analysis of the Cash Flows Statement for the year 2010**

- 3.1 In 2010, the Company and its subsidiaries had Beginning Cash and Cash Equivalents of total Baht 2,136 million. During the period, Net Cash increased from the utilizing in various activities by Baht 6,973 million, of which Baht 6,100 million were received from operating activities, while Baht 1,403 million were used in Investing Activities and Baht 2,276 million



were received from Financing Activities. Hence, Cash and Cash Equivalents as shown in the Consolidated Financial Statements at the end of 2010 were Baht 9,109 million, which consisted of Baht 8,504 million of the Company and Baht 439 million of Bangchak Green Net Company Limited as well as Baht 166 million of Bangchak Bio Fuel Company Limited.

3.2 Cash flow of the Company derived from the Beginning Cash of Baht 1,711 million. During the period, Net Cash increased by Baht 6,793 million from the following activities;

1) Net Cash received from Operation was Baht 5,808 million;

- Profit from the operation before the change in operating assets and liabilities of Baht 5,845 million
- Cash used in Operation of Baht 2,083 million consisted of Baht 963 million increases in Inventory, Baht 813 million increased in Trade Accounts Receivable, and Baht 306 million increases of Other Assets.
- Cash received from changes in operating liabilities of Baht 4,714 million consisted of Baht 4,065 million increased in Trade Accounts Payable and Baht 649 million increased in other liabilities.
- Cash payment of Interest and Income Tax was Baht 2,668 million.

2) Net Cash used for Investing Activities was Baht 1,367 million;

- Cash paid for Purchase of property, plant and equipment of Baht 1,299 million
- Cash paid for Purchasing of Other Assets of Baht 117 million
- Cash received from the proceed from sale of property, plant and equipment of Baht 31 million
- Cash received from Dividend of Baht 18 million

3) Cash received from Funding Activities of Baht 2,352 million:

- Short-term Loan Repayment of Baht 800 million
- Proceed from Long-term Loan of Baht 5,590 million
- Repayment of Long-term Loan of Baht 917 million
- Twice Dividend Payments to the shareholders at Baht 1.30 per share, totaling Baht 1,521 million

Thus, the end of 2010, the Company's Cash or Cash Equivalents was Baht 8,504 million.



4. Financial ratios analysis and the explanation for the year 2010 compared with 2009

	Unit	2010	2009
Liquidity Ratios			
Current Ratio	Time	1.8	1.8
Quick Ratio	Time	0.9	0.7
Receivable Turnover	Time	25.7	24.2
Average Collection Period	Day	14.2	15.1
Inventory Turnover	Time	8.9	10.1
Inventory Turnover Period	Day	41.0	36.1
Account Payable Turnover	Time	16.0	19.1
Average Payment Period	Day	22.9	19.1
Cash Cycle	Day	32.3	32.1
Profitability Ratios			
Net Profit Margin	%	2.1	6.9
Net Profit Margin (excluded inventory effect) ^{1/}	%	1.9	4.8
Return on Equity	%	10.9	33.0
Return on Equity (excluded inventory effect) ^{1/}	%	9.7	20.3
Efficiency Ratios			
Return on Total Assets	%	5.0	15.6
Return on Total Assets (excluded inventory effect) ^{1/}	%	4.4	9.8
Assets Turnover	Time	2.3	2.2
Financial Policy Ratios			
Debt to Equity ^{2/}	Time	0.7	0.6
Debt to Equity (included convertible debenture) ^{3/}	Time	0.6	0.5

Remark: Calculation from consolidated financial statements

1/ Excluding impact from inventory gain or loss and apply tax rate at 30% for calculation only

2/ Calculating from Interest Bearing Debt

3/ Including convertible debenture in equity portion

5. Factors and major influences that may affect the Company's performance or financial status in the future

5.1 Foreign Exchange



The factor which may have impact on the Company's performance is the foreign exchange volatility (mostly Baht/USD). The Company pays for the feedstock in US dollar term and sells its product on US dollar-linked basis, and subsequently records transactions as trade payable and trade receivable respectively. Since the Company's assets are greater than liabilities', the appreciation of Thai Baht will cause the shrink in net assets value, Baht margin value, and vice versa. However, being aware of that risk, the Company has been managing to mitigate the risk by utilizing some market financial instrument. In addition, as completion of the loan refinancing on July 2, 2008, the Company has performed Cross Currency Swap (CCS) from Thai baht loan to Dollar link amounted USD 200 million following the policy to leverage the differences of US dollar liabilities balancing with revenue (natural Hedge) to protect the business from impact of the exchange rate fluctuations. Therefore, when the Baht depreciates, the Company will record loss from exchange rate and realize the increase revenue in the term of baht. But in the other hand, when the Baht appreciates, the revenue in the term of baht will be reduced however the Company will realize gain from the exchange rate. The referred CCS contracts affected from January 5, 2009 to June 30, 2013.

5.2 Gross Refining Margin from Hedging (GRM Hedging)

The oil price is likely to continually fluctuate according to fundamental factors both demand and supply as well as speculating, which directly affects gross refining margin. Being realized such risk, the Price Risk Management Committee (PRMC) consisted of high-level executives and related divisions was set up in 2006. PRMC is responsible in officiate prescribed hedging policy and objective as well as closely monitor the oil price market situation to minimize impact on business operations by utilizing some hedging instruments to determine the appropriate and level satisfied margin between product and crude in advance and/or inventory price management.

6. Environmental Cost Accounting

Having the environmental concerns and social responsibilities, since 2005, the Company has prepared the environmental management accounting report (production line) and also published in the Sustainability Report. The environmental cost accounting helps the Company to keep track the related information, which is useful for enhancing the environmental management effectiveness, and resource utilization. The report for 2010 compared to that of last year is summarized hereunder.



(Unit : Million Baht)	2010	2009	Change +/-
Material Costs of Product Outputs : Consist of crude oil, ethanol, bio-diesel, chemical, energy and utilities in production	84,091.34	64,172.54	+19,918.80
Material Costs of Non-Product Outputs : Consist of slop and sludge oil, waste water, chemical surplus	132.48	95.77	+36.71
Waste and Emission Control Costs : Consist of maintenance cost of environmental control equipments and depreciation and other fees	226.66	86.11	+136.55
Prevention and Other Environmental Management Costs : Consist of monitoring and measurement cost, environmental management system expenses	7.99	5.26	+2.73
Benefit from by-product and waste recycling : The revenue realization from liquid sulfur, glycerin, waste paper	(12.39)	(2.73)	(9.66)

- Environmental expense in 2010 was higher than 2009 around Baht 20,085.13 million or increased by 31%. Most of the increases which account for 99% was from the Material Costs of Product Outputs since the crude oil price increased with an average of Baht 3.01 per liters, or increased by 23.79% while the capacity slightly increased around 5.86% from 2009.
- The Material Costs of Non-Product Outputs increased around Baht 36.71 million, or increased by 38.33% due to the rerun cost of the slop oil which increased more than 200%.
- Expenses in Pollution control equipment increased by Baht 136.55 million or increased by 158.58% from the depreciation of equipments because of the establishment of many pollution control units.
- Environmental prevention expense increased by Baht 2.73 million or increased by 51.90% due to the Company's focus more on being alert, following, and continuous measuring of quality of environment.