CAPITAL BUDGETING OF MANDALA BLOCK UNDER INDONESIA'S GROSS SPLIT PRODUCTION SHARING CONTRACT

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ABSTRACT

Mandala Block is one of the oil and gas working area terminated in 2018. In the Production Sharing Contract (PSC) extension, the government has stated Mandala Block to apply the Gross Split PSC based on Minister of Energy and Mineral Resources Regulation No.52/2018 and the Operator has been granted to PT NOC as National Oil Company. Change in PSC regime from Cost Recovery to Gross Split in Mandala Block should ensure the investment activities and oil & gas operation remain profitable so that the oil and gas production will not decline after contract termination. The purpose of this study is to evaluate the investment feasibility in Mandala Block under the Gross Split scheme during its PSC extension. As comparison, we also assess an economic performance of Mandala Block when the Cost Recovery PSC is applied. This is to understand whether change in PSC regulation from Cost Recovery to Gross Split is more attractive for the Contractor or it makes profitability of the Contractor worse than previous PSC contract. The methodology used in this study is capital budgeting approach with discounted cash flow model which applied to both Gross Split and Cost Recovery PSC. The relevant indicators specifically cash flow, net present value (NPV) and internal rate of return (IRR) are used to determine whether the investment in Mandala Block in PSC extension is more feasible under the Gross Split scheme. The same indicators are also used to assess whether the Gross Split PSC is more attractive compared to Cost Recovery PSC. The study demonstrates that Mandala Block is viable under the Gross Split PSC scheme as reflected by positive net cash flow and net present value for the Contractor. However, these economic results are not quite attractive compared to the economic performance of Mandala Block under the Cost Recovery PSC regime. This may be partially attributed to the features of the specific fiscal systems included in the study. The main reason for the lower profitability under the Gross Split PSC is due to the costs cannot be shared with the Government.

Keywords: Capital Budgeting, Cost Recovery, Gross Split, Production Sharing Contract, Sensitivity Analysis.

INTRODUCTION

In order to meet the energy target stated in National Energy Plan, the big challenges faced by the Government of Indonesia (GOI) are to increase domestic oil and gas production or at least to maintain oil and gas production at the current level. The certainty in investment for the operator of oil and gas block is also crucial issue to avoid a decline in oil and gas production including certainty in the extension contract for oil and gas blocks that will expiry in near future.

One of the blocks expired in 2018 is Mandala Block operated by Joint Operating Body. The Mandala Block is located in South Sumatra and covers 1,155 km2 (Wood Mackenzie, 2016). Production Sharing Contract (PSC) of Mandala Block follows cost recovery regime. GOI confirmed that the petroleum contract of Mandala Block has been extended and it implements its new PSC regime based on Gross Split PSC. GOI also stated that in the petroleum contract extension, PT NOC has been assigned as operator for Mandala Block. Therefore, change in operatorship and PSC regime in Mandala Block should ensure the investment activities and oil & gas operation remains profitable so that the oil and gas production will not decline after contract termination.

The Gross Split PSC Regulation provides that gross production of oil and gas is to be divided between the Contractor and the GoI based on percentages, one specific to oil production and the other to gas production. The starting point for deriving these percentages are the base split percentages which are then adjusted according to a number of variables such as variable components, progressive components and Minister of Energy and Mineral Resources' discretion.

Under the Gross Split PSC, the investment feasibility in Mandala Block should be evaluated due to the results may differs from the previous PSC based on Cost Recovery PSC. Some projects of Mandala Block may achieve specified economic results under the Cost Recovery PSC but it does not achieve under the Gross Split PSC and vice versa. In addition, external factors such as crude oil price and world oil production are still in the uncertain situation. Oil price is estimated remain at low level in the near future. Thus, PT NOC as the new operator of Mandala Block has a big challenge to operate more efficient and apply cost leadership in order to achieve a specified economic result. Based on those issues, the research questions for this study are: (i) does it financially feasible for the Contractor to invest in Mandala Block PSC extension 2018-2038 under the Gross Split scheme? (ii) What is the effect of change in PSC regime from Cost Recovery to Gross Split in relation to the investment feasibility in Mandala Block? (iii) What does the significant variable influences the investment feasibility in Mandala Block PSC extension?

RESEARCH METHODOLOGY

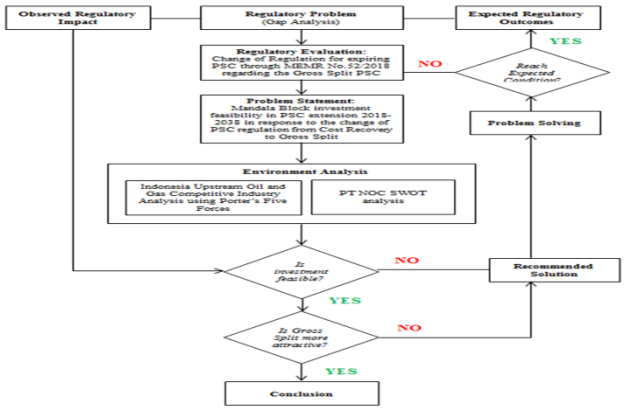
Conceptual Framework

The expiring PSC is one of the biggest issues in upstream oil and gas sector (Wood Mackenzie, 2016). The change of regulation through MEMR No.52/2017 regarding the Gross Split PSC has the effect to the investment value of expiring PSC including Mandala Block PSC that will expire in 2018. PT NOC, as the new operator of Mandala Block in PSC extension, has to evaluate its investment feasibility in Mandala Block in response to the change of PSC regime from Cost Recovery to Gross Split. In relation

to the evaluation of investment feasibility in Mandala Block, it is required to analyze the current environment of upstream oil and gas sector. The industry analysis by using Porter's Five Forces is provided to describe the Indonesia upstream oil and gas competitive industry. In addition, PT NOC internal SWOT (Strength, Weakness, Opportunity, and Threat) is carried out to explore the situations that could potentially impact the capability of PT NOC in operating the Mandala Block from different perspectives.

Since the government of Indonesia has stated Mandala Block will apply the Gross Split PSC in its PSC extension, PT NOC's investment in Mandala Block should be evaluated whether feasible or not. Then, investment evaluation under Cost Recovery PSC is also exercised to understand the effect of regulation change in relation to the PT NOC's profitability and cash flow. The conceptual framework used in this research is provided in the following diagram:

Figure 1. Conceptual Framework



LITERATURE REVIEW

The features of Gross Split and Cost Recovery PSC

Minister of Energy and Mineral Resources (MEMR) Regulation No.8/2017 that has been amended by MEMR Regulation No. 52/2017 regulates the characteristics of Gross Split PSC such as split calculation, SKK Migas role, procurement, transfer of ownership, etc. We focus to elaborate one of key features of Gross Split PSC regulation i.e split calculation that impact significantly on economics of oil and gas block.

Under the Gross Split PSC, there is no cost recovery mechanism therefore Contractor's and Government of Indonesia (GOI's) revenue are divided from its share of gross production based on percentages, one specific to oil production and the other to gas production. The starting point for deriving these percentages is the Base Split percentages and it is adjusted by reference to Variable Components, Progressive Components and Minister Discretion. The fundamental difference between Cost Recovery versus Gross Split PSC regime is described in the following table.

Table 1. The Features of Cost Recovery and Gross Split PSC

No	Parameter	Cost Recovery PSC	Gross Split PSC
1	DMO Fee	25% ICP	100% ICP
2	Tax	40.5%	25%
3	Capex	Tangible Only	Tangible Only
4	Depreciation	5 years Declining Balance	5 years Declining Balance
5	Indirect Tax	Included (PPN & PBB)	Included (PPN & PBB)
6	Undepreciated Balance	Accounted, Carry forward	Accounted
8	Oil Split	60:40 (After Tax)	Base Split + Variable Split + Progressive Split + Minister Discretion
9	Gas Split	70:30 (After Tax)	

Capital Budgeting

According to Dayananda et al. (2002), capital budgeting is the process of deciding investment projects which create in maximization of shareholder value. Capital budgeting is not a short term aspect, generally prepared a year in advance and extendable to five, ten or even fifteen years in future. Furthermore, capital budgeting is the process of analyzing and selecting investment opportunities in long term assets where its benefits last for more than one year. Capital budgeting is a fundamental and used everywhere as a tool for planning, control, and allocation of scare resources among competing demands.

The most common capital budgeting techniques in the finance literature include Net Present Value (NPV), Internal Rate of Return (IRR) and Weighted Average Cost of Capital (WACC). Net Present Value (NPV) is defined as the difference between an

investment's market value and its cost (Ross et.al, 2016, 298). An investment should be accepted if the NPV is positive and rejected if it is negative. IRR is a rate of return used to measure and compare the profitability of investments. It is also called the discounted cash flow rate of return (DCFROR) or the rate of return (ROR). In more specific terms, the IRR of an investment is the discount rate that makes the NPV of investment zero (Ross et.al, 2016, 310). Based on the IRR rule, an investment is acceptable if the IRR exceeds the required return. It should be rejected otherwise.

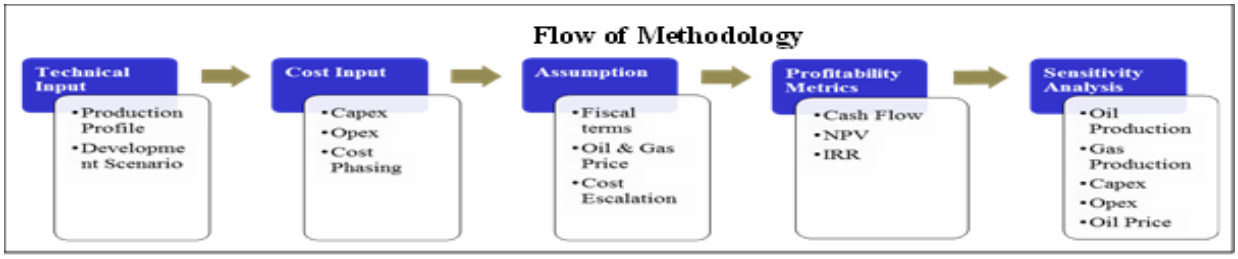
WACC is the weighted average of the cost of equity and the after tax cost of debt (Ross et.al, 2016, 492). WACC has a straightforward interpretation. It is the overall return the firm must earn on its existing assets to maintain the value of its stock. It is also the required return on any investments by the firm that have essentially the same risk as existing operations. So, if we are calculating the cash flow from a proposed expansion of our existing operations, this is the discount rate we will use.

Research Methodology

The investment feasibility of Mandala Block is exercised by using the capital budgeting approach with discounted cash flow model based on both the Gross Split and Cost Recovery PSC. The relevant indicators specifically cash flow, NPV and IRR are used to determine whether the investment in Mandala Block in PSC extension feasible or not under the Gross Split scheme. The same indicators are also used to assess whether the Gross Split PSC is more attractive compared to Cost Recovery PSC. If NPV and IRR result the different findings, we use NPV as indicator to determine investment feasibility rather than IRR because NPV takes into account the variation in cash flow and discount rate.

In order to analyze the impact a set of variables to the investment feasibility in Mandala Block, the sensitivity analysis is conducted to find the most influenced variable. The variables exercised are oil production, gas production, oil price, capital expenditure and operating expenditure. Data used to evaluate the investment feasibility in Mandala Block are secondary data from internal and external over the period of 2018-2038.

Figure 2. Flow of Methodology



Model Assumption

The key assumptions used in calculating the economic performance of Mandala Block are:

- Fiscal Term and Pricing
  1. Fiscal terms based on the Gross Split PSC.
  2. The development scenario is existing fields and development of three gas prospective fields (Field A, Field B and Field C). The gas production from three prospective fields will be started in 2023.
  3. Total split for oil and gas in existing fields is 54.5% and 59.5%, respectively while total split for oil and gas in other three prospective fields is 53% and 58%, respectively.
  4. Oil and condensate price are assumed at USD 78.27 per barrel in average.
  5. LPG price is at USD 60.51 per barrel.
  6. Gas price set at USD 6 per mmbtu with escalation factor of 2%.
  7. A tax rate of 25% applies.
  8. Economic limit is calculated during 2018-2038 (20 years) based on PSC extension of Mandala Block.
  9. A progressive revenue split is applied based on crude oil price, gas price and cumulative production.
  10. PT NOC has 100% participating interest without any ownership of BUMD.

- Capital and Operating Expenditure

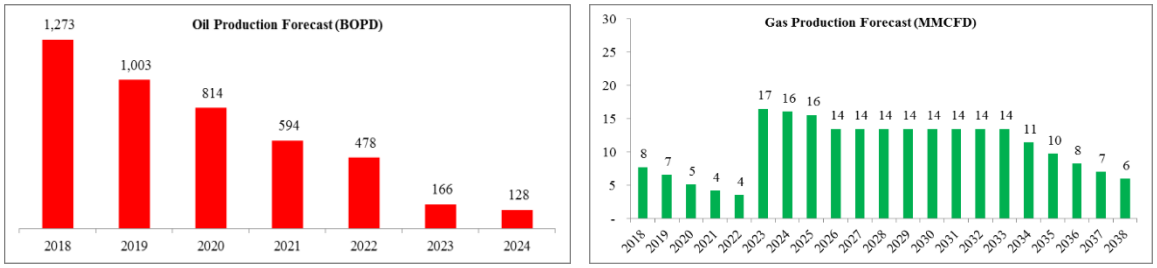
The Capital Expenditure (Capex) represents costs related to drilling exploration wells, pipeline, compressor, etc. The model assumes Total Capex is at USD 82.50 million primarily from cost of exploration well of USD 9.7 million and cost of field development of USD 52 million for pipeline, compressor and other cost. The intangible assets were expensed in the year they incurred, while the tangible assets were depreciated using declining balance over 5 years. The Total Capex was also distributed as (25%, 19%, 14%, 11% and 32%) over the first 5 years of the project. The Capex escalation set at 2% per annum.

The Operating Expenditure (Opex) is estimated at approximately USD 242.38 million comprises of Exploration Administration, Rentals, Direct Production Cost, General & Administrative, and Abandonment & Site Restoration. The Opex range is from USD 8.4 million to USD 16.1 million per year and a base cost of USD 17.90 per barrel. The Opex inflation is assumed at 2% per annum.

- Production and Lifting Profile

Figure 3 shows the oil and gas production forecast in Mandala Block starts with 464.8 thousand barrels per annum (equivalent to 1.273,600 barrels of crude oil production per day) and ends with 46.83 per annum (equivalent to 128 barrels of crude oil production per day) by the year 2024. There is no oil and production by 2025 onward in existing fields and Mandala Block will be producing gas from the development of other three fields (Field A, Field B and Field C) started in 2023 with a peak production of 13.5 MMSCFD during 11 years followed by an exponential decline rate of 15% over the life of the project. The peak production of oil is 1.273 BOPD in 2018. Lifting oil represents 98% production while gas sales reflect 85% production. The gas sales is based on the sales contract with buyers excluding gas utilization for flaring and own use.

Figure 3. (a) Oil Production Forecast; (b) Gas Production Forecast



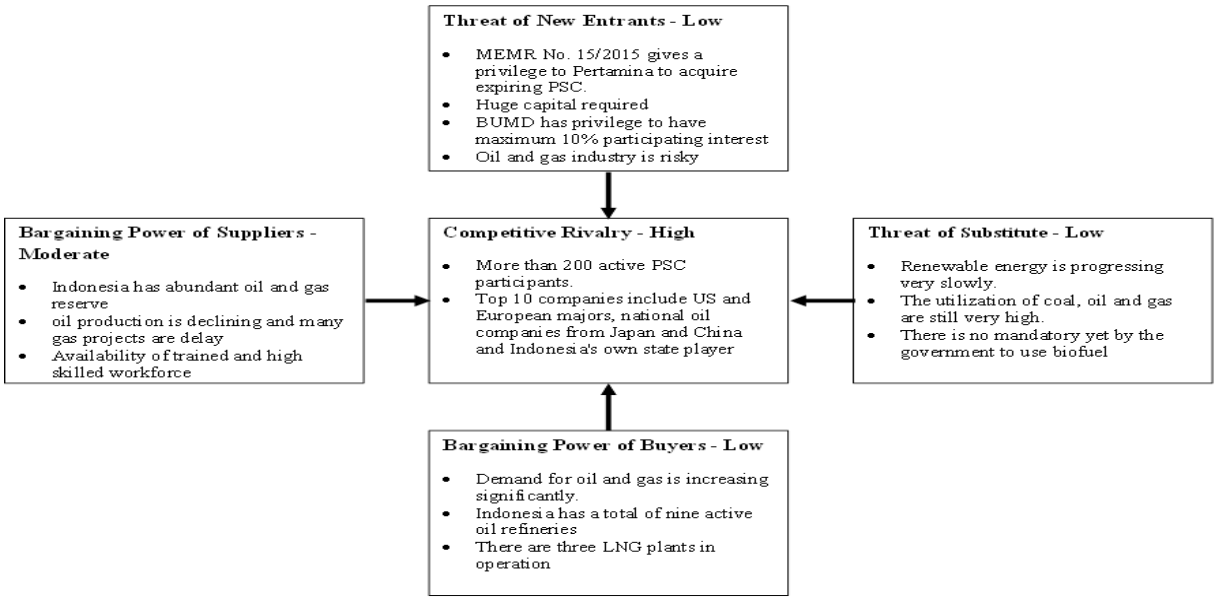
RESULTS AND DISCUSSIONS

This section provides the analysis which addressed the objective of the study. The study of economic viability of oil and gas projects become very essential in deciding whether oil and gas firms will invest in such fields or not (Iledare, 2014).

Indonesia Upstream Oil and Gas Industry Analysis - Porter's Five Forces

Porter's five forces analysis is a framework for the industry analysis and business strategy developed by Michael Porter for Harvard Business School (Porter, 2008). The competition in upstream oil and gas industry is intensifying with more than 200 players in active PSC. MEMR Regulation No. 15/2015 is becoming a significant barrier for new players to enter this industry. This regulation has given Pertamina a privilege to acquire expiring PSC Block. Other barriers such as high capital investment and permit/land acquisition process may limit new players to come. In fact, eventhough crude oil price is declining significantly, the consumption of oil and gas is still very high. The utilization of alternatives energy such as geothermal, hydropower, etc is increasing very slowly. The increasing oil and gas demand especially from domestic market has created a low bargaining power of buyers. Despite Indonesia has abundant oil and gas reserve, oil production is continuing to decline and many gas developments are facing project delays.

Figure 4. Porter's 5 Forces for Upstream Oil & Gas Industry Analysis



The Gross Split PSC Analysis & Results

Table 2 shows the result of the discounted cash flow statement developed for the extension PSC scenario under the Gross Split scheme for Mandala Block. This takes into consideration the entire assumptions as mentioned above which is used to develop the financial model. The result shows that with the average crude oil price of USD 78 per barrel and other assumptions as earlier stated, the Mandala Block will generate the Cumulative Contractor Net Cash Flow of USD 43 million and USD 275 thousand as post tax NPV discounted at 10%. This indicates that the Mandala Block is feasible under the Gross Split PSC scheme since the value of post-tax NPV is greater than zero.

Table 2. The Economic Result of Mandala Block under Gross Split PSC 2018-2038

No	Indicators	Units	Results
1	Oil Production	MMBO	1.63
2	Gas Production	BCF	82.51
3	Gross Revenue	$ Million	656.92
4	Total Capital Expenditure	$ Million	82.50
5	Total Operating Expenditure	$ Million	242.38
	Contractor Take		
6	Total Contractor Take	$ Million	367.44
7	Cumulative Contractor Net Cash Flow	$ Million	42.56
8	NPV Contractor (Discount Rate 10%)	$ Thousand	0.28
9	IRR	%	10.18%
	Government Take		
10	Total Government Take	$ Million	289.48
11	NPV Government (Discount Rate 10%)	$ Million	119.95
12	Government Take	%	44.07%

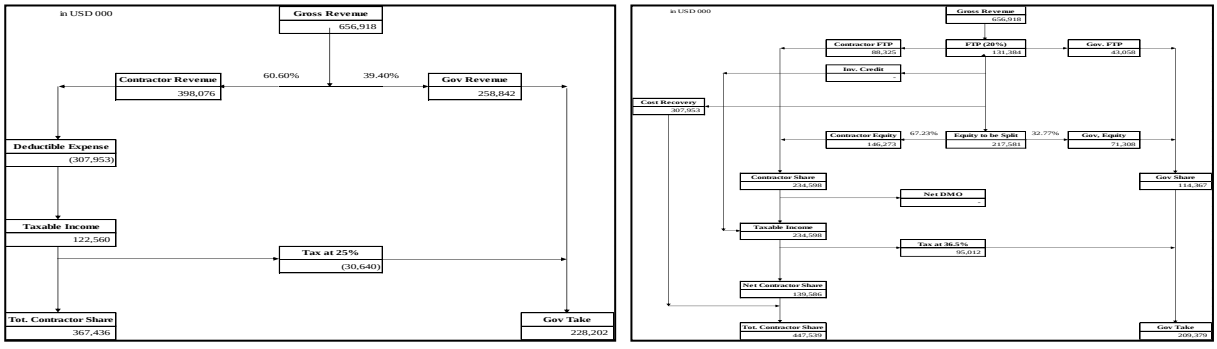
Furthermore, IRR on investment for the Contractor is 10.18%. This also indicates that the investment in Mandala Block is feasible since the IRR exceeds the discount rate of 10%. In summary, the investment of PT NOC in Mandala Block PSC extension is feasible because it generates positive NPV and IRR exceeds the discount rate. Government take which is the proportion of the Mandala Block's profits was also measured. Government always wants to maximize its take in the revenue generated from the oil and gas exploration as much as possible. The Government's Net Cash Flow is projected at USD 289 million, followed by post tax NPV of USD 120 million at 10% discount rate.

In general, the government take is 44.07% under the Gross Split PSC and relatively stable compared to the Cost Recovery PSC. It ranges from USD 7.13 million to USD 19.40 million. The fluctuation of government take is only influenced by production profile and movement in oil and gas price. Government take tends to decrease as crude oil price reduces which is not good for the profitability of the block. This implies that government will earn more from this block when crude oil price drops and will earn less when the crude oil price rises.

Gross Split versus Cost Recovery PSC

Two sets of diagrams below are comparing the economics of the Gross Split and Cost Recovery PSC. The first diagram shows the GoI and Contractor take under the Gross Split PSC, and the second diagram depicts a scenario when it applies Cost Recovery Scheme.

Figure 5. (a) Gross Split PSC Results; (b) Cost Recovery PSC Results



As can be seen above, the returns to the Contractor in the Gross Split PSC are worse. The Total Contractor Share in the Gross Split PSC is USD 367.44 million compared to USD 447.54 million under the Cost Recovery PSC. However, the government revenue from tax is lower under the Gross Split PSC as it set at 25% effective rate compared to 40.5% in the Cost Recovery. By introducing the Gross Split PSC, the Government aims to guarantee a share of production to them, which would have normally only come after recovery of operating costs after First Tranche Petroleum under Cost Recovery scheme. It means that if operating costs are high, the significant amount of the Contractor production revenues are required to meet operating costs.

The Government hopes that by allowing Contractors to manage their costs, Contractors will be able to significantly reduce their costs. The model has suggested that cost reductions by 10% to 20% are necessary in order to bring the economics of Gross Split PSC equal to the Cost Recovery PSC. The Contractor should maintain cost at maximum USD 12.22 per barrel from USD 17.90 per barrel at baseline scenario.

Table 3. Investment Feasibility in Mandala Block 2018-2038

No	Indicators	Units	Gross Split	Cost Recovery
1	Oil Production	MMBO	1.63	1.63
2	Gas Production	BCF	82.51	82.51
3	Gross Revenue	$ Million	656.92	656.92
4	Total Capital Expenditure	$ Million	82.50	82.50
5	Total Operating Expenditure	$ Million	242.38	242.38
	Contractor Take			
6	Total Contractor Take	$ Million	367.44	447.54
7	Cumulative Contractor Net Cash Flow	$ Million	42.56	122.66
8	NPV Contractor (Discount Rate 10%)	$ Million	0.28	38.00
9	IRR	%	10.18%	12.00%
	Government Take			
10	Total Government Take	$ Million	289.48	224.16
11	NPV Government (Discount Rate 10%)	$ Million	119.95	92.58
12	Government Take	%	44.07%	34.12%

Table 3 shows that the Total Contractor Net Cash Flow under the Gross Split PSC is lower than that of the Cost Recovery PSC, USD 42.56 million and USD 122.66 million, respectively. Although this may be partially attributed to the features of the specific fiscal systems included in the study, the main reason for the lower Contractor Net Cash Flow under the Gross Split PSC is the costs cannot be shared with the Government.

One of the important elements of Cost Recovery regime is the ability of Contractor to recover their investments and the ability of the Government to control the costs. The current Cost Recovery regime provides no limitation on the percentage of oil and gas production that can be used to recover costs. If costs exceed the oil and gas revenues, the difference is carried forward for recovery in subsequent periods. Higher cost recovery allows the contractor to achieve payback of its investment faster and therefore serve as incentive for investments.

In line with the Net Cash Flow, the Gross Split PSC will result lower NPV for Contractor compared to the Cost Recovery PSC. Contractor's NPV is projected USD 0.28 million under the Gross Split PSC compared to USD 38 million in the Cost Recovery PSC. Otherwise, Government's NPV is estimated at USD 119.95 million under the Gross Split PSC or higher than under the Cost Recovery PSC of USD 92.58 million.

Sensitivity Analysis

In order to analyze the influences a set of variables to the Mandala Block economic calculation, we need to run sensitivity analysis to find the most influenced variable to economic performance of Mandala Block. Some variables can be considered as uncertain. The sensitivity analysis could not examine every potential source of uncertainty but focused on set of variables that might have a major impact on the results. Set of variables used in this sensitivity analysis are Oil Production, Gas Production, Oil Price, Capital Expenditure and Operating Expenditure. The baseline scenario used in the previous economic calculation is presented in the table 4.

Five variables have been exercised and tested its sensitivity by looking at the changes from baseline scenario. The economic indicators used in this sensitivity analysis are Undiscounted Net Cash Flow, Net Present Value of Contractor Take and the Government Take. The sensitivity ranges from negative 20% up to positive 20%. There is no combination sensitivity in this analysis. It means one variable change while keeping other variables remain at the baseline.

Table 4. Baseline Scenario

Year	Oil Production	Gas Production	Oil Price	Capex	Opex
	mmbbl	BCF	$/bbl	USD Million	USD Million
2018	0.46	2.83	59.30	-	11.16
2019	0.37	2.40	61.38	10.31	13.42
2020	0.30	1.89	64.71	2.49	11.64
2021	0.22	1.54	66.17	25.21	11.12
2022	0.17	1.30	67.73	44.49	12.53
2023	0.06	6.03	69.29	-	12.41
2024	0.05	5.87	70.95	-	12.27
2025	-	5.69	72.62	-	12.96
2026	-	4.93	74.28	-	10.46
2027	-	4.93	76.05	-	10.05
2028	-	4.93	77.82	-	10.38

2029	-	4.93	79.59	-	10.70
2030	-	4.93	81.46	-	11.04
2031	-	4.93	83.44	-	11.39
2032	-	4.93	85.31	-	11.76
2033	-	4.93	87.39	-	12.13
2034	-	4.19	89.37	-	11.77
2035	-	3.56	91.45	-	11.50
2036	-	3.03	93.28	-	11.32
2037	-	2.57	95.14	-	11.21
2038	-	2.19	97.05	-	11.17

Effect on the Contractor's Net Cash Flow

Table 5 shows the Contractor's Undiscounted Net Cash Flow results based on the changes of five variable inputs. It demonstrates that Oil Production, Gas Production and Oil Price have positive relationship with the Contractor's Net Cash Flow, which means as each of these parameters increases, Contractor's Net Cash Flow also increases. On the other hand, Capital and Operating Expenditure have negative relationship with the Contractor's Net Cash Flow. That is, as Capital and Operating Expenditure increase, the Contractor's Net Cash Flow decreases.

The highest Contractor's Net Cash Flow in amount of USD 91.40 million can be achieved as Gas Production increases by 20% from the initial 82.51 BCF to 99.01 BCF. Otherwise, as Gas Production decrease by 20%, the Contractor's Net Cash Flow will be negative of USD 7.27 million. Another attractive finding is a decrease in Operating Expenditure can bring a significant increase in the Contractor's Net Cash Flow. As Operating Expenditure decrease by 20% from the initial USD 242.38 million to USD 193.91 million, the Contractor's Net Cash Flow increases by approximately USD 33.57 million to become USD 76.12 million. Otherwise, the Contractor's Net Cash Flow decreases to become USD 8.5 million as Operating Expenditure increases by 20%.

Table 5. Sensitivity Analysis - The Cumulative Contractor Net Cash Flow 2018-2038 (USD 000)

Variable	Change				
	-20%	-10%	0%	10%	20%
Oil Production	32,642	37,460	42,557	47,654	52,751
Gas Production	(7,274)	18,232	42,557	66,977	91,397
Oil Price	39,202	40,888	42,557	43,903	44,332
Capex	69,139	56,450	42,557	27,461	11,063
Opex	76,125	59,341	42,557	25,625	8,519

Another tool commonly used in sensitivity analysis is to use spider plots. Spider plots useful to describe how much sensitive the value of an output variable to its variable input of the model. By using spider plot, it will find which economic input that has big influence or sensitive to investment feasibility in Mandala Block.

Figure 6. The Effect on the Contractor's Net Cash Flow

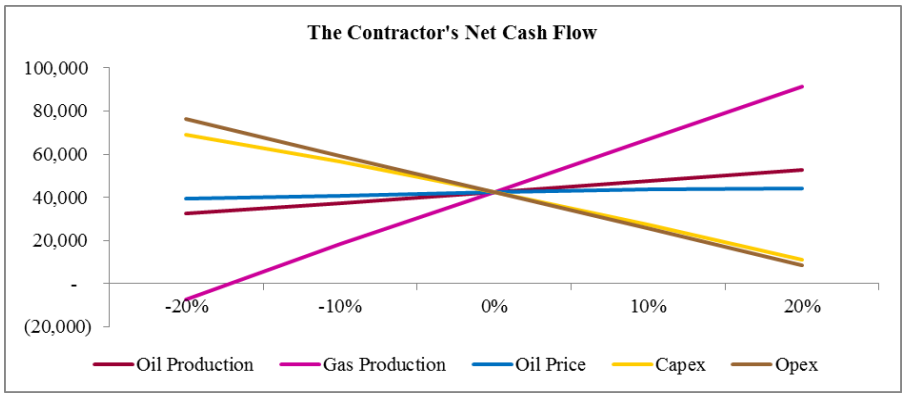


Figure 6 shows the spider chart which depicts the effect of each parameter on the Contractor's Net Cash Flow with the steepness of the slope. Curves with steep slopes either positive or negative, indicate that those variables have a large effect on the forecast, while curves that are almost horizontal have little or no effect on the forecast. The Spider Chart summarizes the following results:

1. Gas Production is the most sensitive variable to the Contractor's Net Cash Flow primarily when it decreases. 20% decrease in Gas Production will lead to the negative Net Cash Flow of USD 7.27 million.
2. Operating and Capital Expenditure are the second and third most sensitive variables to the Contractor's Net Cash Flow. Both Operating and Capital Expenditure have a similar influence to the Contractor's Net Cash Flow.

3. Oil Price and Oil Production have relatively small impact on the Contractor's Net Cash Flow as Mandala Block revenue is contributed mostly from gas production which its price is largely not associated with the crude oil price.

Effect on the Contractor's Net Present Value

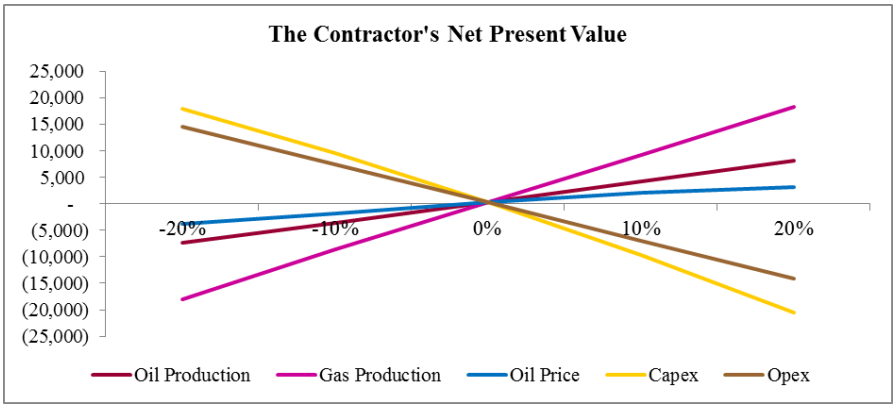
This section shows the impact of each variable on the Post-Tax NPV of the Contractor. Table 6 show the effect of these input variables on the base scenario of the financial model built in this study. Figure 7 revealed that Capital Expenditure, Operating Expenditure and Gas Production have much impact on the Contractor's NPV, respectively. This is followed by Oil Production and Oil Price, respectively.

Table 6. The Contractor's Net Cash Flow - Sensitivity Analysis (USD 000)

Variable	Change				
	-20%	-10%	0%	10%	20%
Oil Production	(7,402)	(3,635)	275	4,185	8,095
Gas Production	(17,966)	(8,608)	275	9,268	18,261
Oil Price	(3,719)	(1,815)	275	2,128	3,202
Capex	17,974	9,516	275	(9,749)	(20,601)
Opex	14,591	7,433	275	(6,903)	(14,122)

An increase in Capital Expenditure by 10% and 20% will reduce the Contractor's NPV to be negative USD 9.75 thousand and negative USD 20.60 thousand, respectively. So, 10 % and 20% increase in Capital Expenditure will make the Mandala Block unviable for the Contractor. If there is a reduction in Capital Expenditure by 10% and 20%, the NPV for the Contractor will increase to USD 9.5 thousand and USD 17.97 thousand, respectively.

Figure 7. The Effect on the Contractor's Net Present Value



Reduction in Operating Expenditure by 10% and 20% from the initial USD 242.38 million increases the NPV of the Contractor to USD 7.43 thousand and USD 14.59 thousand, respectively. In the other words, a reduction in cost per barrel by 10% and 20% from initial USD 15.27 per barrel to become USD 14.28 per barrel and USD 12.69 per barrel increases the Contractor's NPV. Meanwhile, an increase in Operating Expenditure by 10% and 20% decreases the Contractor's profitability to USD 6.90 thousand and USD 14.12 thousand, respectively. This indicates that if cost per barrel increases to USD 16.80, then the Mandala Block will become unviable as the NPV becomes negative.

Declining in Gas Production by 10% and 20% from the initial 82.51 BCF decreases the NPV of the Contractor to USD 8.61 thousand and USD 17.97 thousand, respectively. This indicates that if Gas Production is below 12.82 BCF, then the Mandala Block will become unviable as the NPV becomes negative. A reduction in Oil Price will also generate negative NPV for the Contractor. This indicates that if the Oil Price decrease below USD 70.45 per barrel, Mandala Block will no longer visible.

Effect on the Government Take

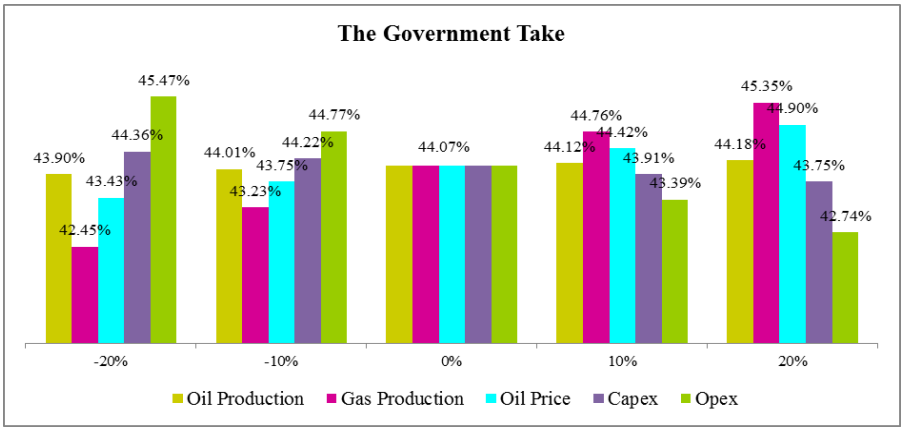
The Government take is the total amount of revenue that the government receives from oil and gas operation. The Government Take in a Gross Split PSC is calculated based on gross production and income taxes. The economic benefit from the Gross Split PSC is that it awards more certain share of production income taxes to the government, while Contractors receive a share of the production according to the percentage of their gross splits less income taxes.

Under the Gross Split PSC, the Government Take is more stable compared to Cost Recovery PSC Regime as illustrated in the figure below. The Government Take ranges from 42%-45% when some variable change. Government take tends to increase as

Gas Production increases which is good for the profitability of the Mandala Block. This implies that government will earn more from Mandala Block when production rises and will earn less when the production decreases.

Furthermore, movement in Capital and Operating Expenditure has no significant impact on the Government Take. An increase in Capital and Operating Expenditure by 10%-20% impacts on 1%-2% decrease in the Government Take. Different from the Cost Recovery PSC, the impact of Capital and Operating Expenditure is through income tax or it is not directly influencing split of production between Contractor and the Government. The level of sensitivity of Government Take to crude oil price is low below 1%, but this may impair investment when the price of oil falls to a greater extent.

Figure 8. The Effect on the Government Take



CONCLUSIONS & RECOMMENDATIONS

Conclusions

The following is the conclusion of this study:

1. According to the investment evaluation of Mandala Block, it shows that under the Gross Split PSC, the investment in Mandala Block is feasible as indicated by positive post-tax NPV of USD 275 thousand and 10.18% IRR exceeds the discount rate.
2. The Gross Split PSC discourages investment in Mandala Block because the returns of Contractor in the Gross Split PSC are worse compared to Cost Recovery regime. The Contractor Net Cash Flow under the Gross Split PSC is lower than that of the Cost Recovery PSC, USD 42.56 million and USD 122.66 million, respectively. The Gross Split PSC also generates lower NPV for Contractor of USD 0.28 million compared to USD 38 million under the Cost Recovery PSC.
3. Gas Production, Capital and Operating Expenditure are the most sensitive variable to the Contractor's Net Cash Flow and NPV. 20% decrease in Gas Production will lead the Contractor's Net Cash Flow to be negative while an increase in Capital and Operating Expenditure by 10% and 20% will result negative the Contractor's NPV. In addition, if cost per barrel increases to become USD 16.80 or more, then the Mandala Block will become unviable as the NPV becomes negative.

Under the Gross Split PSC, the Government Take is more stable and certain compared to Cost Recovery PSC Regime. The Government Take ranges from 42%-45% when some variable change. Government take tends to increase as Gas Production increases. This implies that government will earn more from Mandala Block when production rises and will earn less when the production decreases.

Recommendations

The following is our recommendations in order to increase the financial results of the Gross Split PSC in Mandala Block:

1. Lower the Capital Expenditure and Operating Expenditure by 20% to become USD 66 million and USD 193 million, respectively. It implies that the Contractor should maintain cost per barrel at USD 12.22 per barrel. If the Contractor can achieve that level of expenditure, Mandala Block generates NPV in amount of USD 31.89 million.
2. MEMR 52/2018 allows the Minister of Energy and Mineral Resources to grant an additional production share to the Contractor to meet certain economic level. Our calculation demonstrates that it requires an additional split by 25% to achieve NPV level of USD 37 million as obtained under the Cost Recovery PSC. Thus, the split for oil and gas for the Contractor should be at 70% and 75% or higher from the initial split 54.5% and 59.5%.
3. The development of 3 gas prospective fields should be accelerated and gas production from those fields should be on stream before 2023 to reduce cost of money.
4. Petroleum contract under Gross Split PSC will be more profitable for the contractor as long as the they can maintain its cost efficiently. Otherwise, the contractor will be more favourable under Cost Recovery PSC due to it guarantee cost sharing with government. This implies that the government of Indonesia should not force a single petroleum contract under Gross Split PSC. The government should determine petroleum contract more flexible between Gross Split and Cost Recovery depending on the contractor and field characteristic.

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