Economic Analysis Of PSC Cost Recovery And Psc Revenue Over Cost For Long Term Exploration Block

Reyhan Kamil, Syamsul Irham, Prayang Sunny, Arinda Ristawati

Abstract: This study aims to analyze the strengths associated with PSC Cost Recovery and PSC Revenue Over Cost from the Government and Contractor perspective. There are some differences in the PSC fiscal component of each country, especially for the components in Indonesia and Malaysia, which consists of royalty components in Malaysia's PSC Revenue Over Cost and Indonesia's PSC Cost Recovery. In addition, there is a component of First Tranche Petroleum in Malaysia's PSC where profit is shared using Revenue Over Cost (R/C) factor, thereby creating differences in the PSC economic indicator of both countries. The Net Present Value (NPV) obtained are 277,14 MMUSD for PSC Revenue Over Cost and 275,49 MMUSD for PSC Cost Recovery, while the Pay Out Time (POT) results are 25,86 years for PSC Revenue Over Cost and 25,30 years for PSC Cost Recovery. Finally, the Internal Rate of Return (IRR) of 3.52% for PSC Revenue Over Cost and 3.47%. for PSC Cost Recovery were obtained

Keywords: Cost Recovery, Economic Analysis, Fiscal Terms, Production Sharing Contract, Revenue Over Cost.

1. INTRODUCTION

The oil and gas industry is complex with very large investment characteristics, as well as high operational risks, both of which are investment failure and safety risk. This industry is different from others such as in the existence of a step process that must be passed by each company, starting from the exploration stage, development and production (exploitation), down to the recovery stage for the exploited land. Each of these stages has a different risk level which must be considered by prospective investors. Many oil and gas companies carry out exploration and exploitation activities in Indonesia and Malaysia, thereby, leading to an increase in investors. However, they are faced with the need for large capital costs, which demand long periods of time in order to t obtain a return on investment. In addition, the use of the latest technology and the potential for high risk of business failure need to be considered to determine whether the project should be carried out, and investors' capability of gaining adequate benefits to maintain their business.

Presently, the PSC Cost Recovery scheme is widely used for the oil and gas contract system in Indonesia and the PSC Revenue Over Cost in Malaysia. Fiscal Regimes are one of the most important factors that need to be considered while making investment decisions in the oil and gas industry. Royalty Levels, Cost Recovery, Contractor Shares, Domestic Market Obligations, Investment Loans, Signature Bonuses, Production Bonuses, First Tranche Petroleum and Tax Rates all have a significant influence on investment decisions. Similarly in Malaysia, The use of PSCs is different from the Royalty and Cost Recovery policies. The XYZ Block, discovered in 1998, is a functional oil and gas region which became officially operational in 2007 with 33 natural gas and petroleum wells. It is located in the Northeast of Java. The economic analysis of the oil and gas industry is widely discussed due to its risk. It is also very interesting and that is one of the reasons why many papers discuss its economic analysis in Indonesia. Some of these papers are as follows, "The new management policy: Gross Split Indonesian PSC applied on CO2 flooding project "[7], "The new energy management policy: Indonesian Gross PSC split applied on steam flooding project"[6] by Mr. Syamsul Irham and "Indonesia Milestone in Production Sharing Contracts in Perspective of The Government Take, Contractor Take, Cost Recovery and Production Target "[3] discussed by Mr. Daniel.

Some research papers have also discussed the comparison of fiscal terms in various countries, such as "Fiscal Regimes Competitiveness Comparison of Oil and Gas Producing Countries in Asia Pacific"[4]. This research, however, led to the study of "Economic Analysis of PSC Cost Recovery and PSC Revenue Over Long Exploration Block" based on several references such as "Comparative Study Between Indonesia, Malaysia and Norwegia Petroleum Fiscal System"[15] and also "Fiscal Termination Comparative Analysis Non-Cost Recovery as well as Production Sharing Contracts in Malaysia and Indonesia"[5]

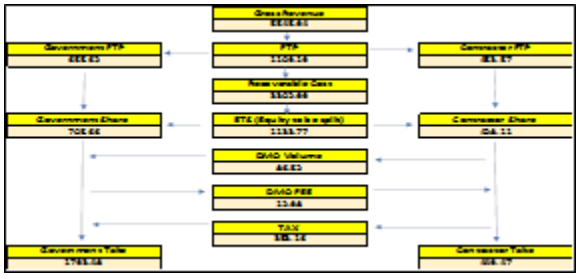

Figure 1 *PSC Cost Recovery Calculation Scheme*

2 METHOD

Production Sharing Contract

Agreements or contracts are made by the government and business entities to carry out exploitation activities under the profit sharing principle. The PSC is valid for several years depending on contract conditions, and the discovery of oil and gas in commercial quantities within a certain period.

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PSC Cost Recovery

The profit sharing scheme used in Indonesia is a Production Sharing Cost Recovery Contract which returns oil and gas exploration. The cost recovery is taken from gross revenue and given to the Contractors by Implementing Special Task Force Upstream Oil and gas business activities or SKK Migas as the government representative in the PSC Cost Recovery.

PSC Revenue Over Cost

The profit sharing scheme in Malaysia is almost the same in Indonesia where the PSC Revenue Over Cost is used to share oil and gas.

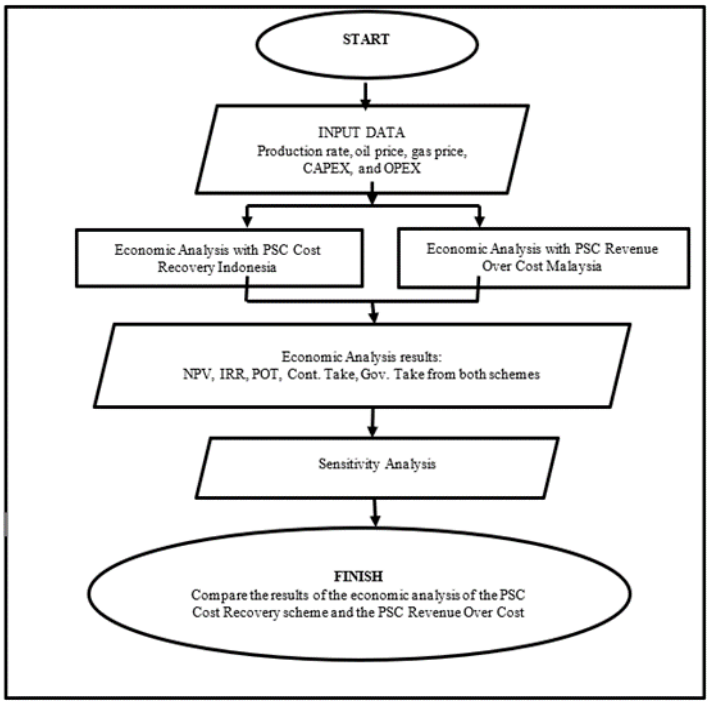

Figure 3 *Research Flowchart*

Regarding the contract terms provided, the cost recovery is depended on the Revenue Over Cost index where its minimum and maximum are between 30% to 70%. In 1997, a new PSC based on the concept of "cost-of-income" (R/C PSC) was introduced to encourage additional investment in Malaysia's upstream sector. The R/C PSC allows Contractors to speed up the recovery of their costs, using a certain cost target. The basic principle of R/C PSC is to enable the PSC Contractor produce higher parts when profitability is low and to increase production when profitability increases. Contractor's profitability is measured by the Revenue Over Cost Index (R/C Index), which is the ratio of the contractor's cumulative income over costs. Revenue Over Cost Index is used to determine the split to be divided as shown in the table below:

TABLE 1 *R/C INDEX TABLE*

Contractor R/C Ratio	Cost Recovery Limit	Unused Cost Recovery Limit		Profit Share	
		below thv	above thv	below thv	above thv
0.0 to 1.0	70%	0	0	80%	40%
1.0 to1.4	60%	80%	40%	70%	30%
1.4 to 2.0	50%	70%	40%	60%	30%
2.0 to 2.5	30%	60%	40%	50%	30%
2.5 to 3.0	30%	50%	40%	40%	30%
>3.0	30%	40%	20%	30%	10%

These are the steps in preparing the economic analysis on the XYZ block using PSC Cost Recovery scheme. This is compared with the Revenue Over Cost scheme using the Threshold Volume value (THV) for the Malaysian PSC Revenue Over Cost of 30 MMBBL for oil and 0.75 TCF for gas. Based on the R/C Index table, when the contractor ratio is small, they are allowed to obtain Limit Cost Recovery, Unused Cost, and Profit Share greater than the government, but the reverse is the case assuming the R/C index ratio is bigger. [1]

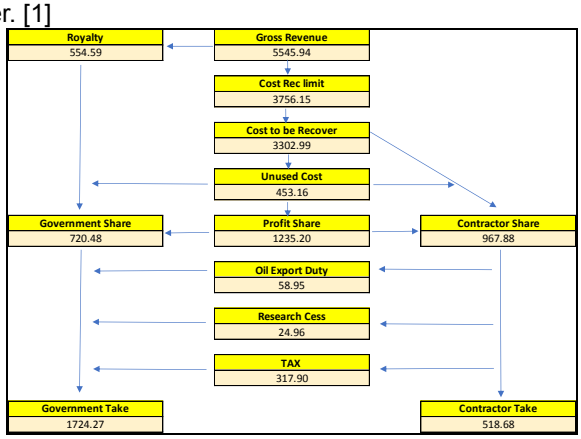

Figure 2 *PSC Revenue Over Cost Calculation Scheme*

3 RESULTS AND DISCUSSION

The following step shown in figure 4 shows the average daily production of XYZ block.

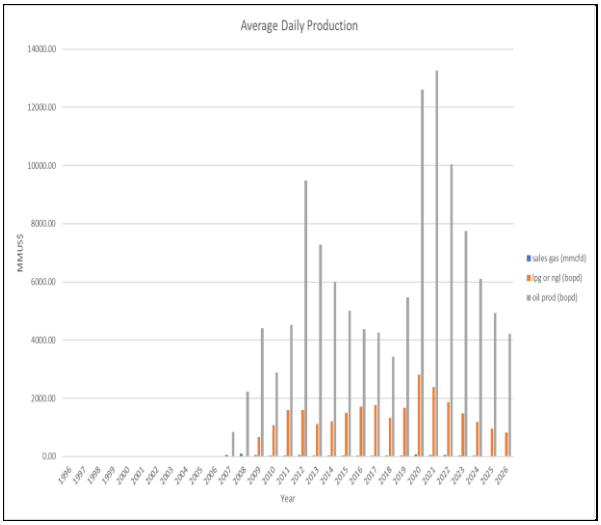

Figure 4: *Average Daily Production XYZ Block*

Figure 5 analyzes the capex and opex of XYZ block collected as follows:

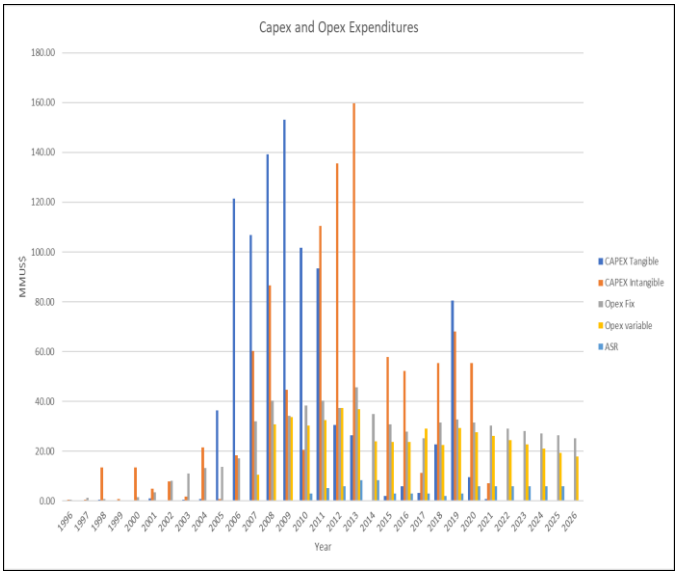

Figure 5 *Capex and Opex XYZ Block*

Table 2 is shows the reason and forecast for oil, gas, and lpg prices which is recent from 2007-2019 and forecast from 2020-2026.

TABLE 2 *OIL, GAS, AND LPG PRICES*

Year	Oil Price	Gas Price			LPG Price
		Tier 1		Tier 2	
	$/bbl	$/Mmbtu	Sales Gas, mmscfd	$/Mmbtu	$/MT
2007	0.0	2.38			
2008	74.44	2.38			
2009	61.62	2.38			531.33
2010	78.62	2.38			734.12
2011	111.76	2.38			846.02
2012	109.45	2.38	36	8.45	915.58
2013	103.54	2.38	31	7.32	874.31
2014	93.94	2.38	23	6.90	791.40
2015	46.36	2.38	17	6.81	424.01
2016	37.81	2.38	13	6.75	344.49
2017	49.90	2.38	13	7.02	425.35
2018	66.35	2.38	13	7.28	563.21
2019	70.00	2.38	13	7.52	594.19
2020	71.60	2.38	14	7.90	607.77
2021	73.30	2.38	14	8.46	622.20
2022	74.90	2.38	11	8.98	635.78
2023	76.70	2.38	7	9.06	651.06
2024	78.40	2.38	5	9.60	665.49
2025	80.20	2.38	4	10.85	680.77
2026	82.10	2.38	3	11.22	696.90

After obtaining prices from oil, gas and LPG, the economic analysis calculation is conducted based on the fiscal terms of each PSC Cost Recovery scheme and PSC Revenue Over Cost.

TABLE 3 *FISCAL TERMS PSC COST RECOVERY DAN PSC REVENUE OVER COST*

Fiscal terms	PSC Cost Recovery Percentage	PSC Revenue Over Cost Percentage
Royalty	-	10%
Research Cess	-	0.50%
Export Duty	-	10%
FTP	20%	-
Oil Contractor Share (After Tax)	15%	Based on R/C index
Oil Government Share (After Tax)	85%	Based on R/C index
Gas Contractor Share (After Tax)	35%	Based on R/C index
Gas Government Share (After Tax)	65%	Based on R/C index
DMO Price	15%	-
DMO Volume	25%	-
Tax	44%	38%
Depreciation (oil 5 years)	25%	25%
Depreciation (Gas 4 years)	10%	10%
Production Bonus		-
10 mmboe	$0.50 MM	-
15 mmboe	$0.75 MM	-
20 mmboe	$1.00 MM	-
30 mmboe	$1.25 MM	-
35 mmboe	$2.00 MM	-
Escalation from 2019	2%	2%
Contractor Before tax (oil)	26.79%	Based on R/C index
Government Before Tax (oil)	73.21%	Based on R/C index
Contractor Before tax (Gas)	62.50%	Based on R/C index
Government Before tax (Gas)	37.50%	Based on R/C index

Based on the Revenue Over Cost PSC there is an R / C index used to determine the contractor split for Cost Recovery Limit, Profit Share, and Unused Cost. The R / C index was started in 2007 during the first production of XYZ block and the way to determine it is by the Cumulative Cost Recovery Contractor, Unused Cost Recovery and Profit Oil divided by Cumulative Cost. [5]

TABLE 4 *OIL R/C INDEX*

	Oil ROC Index	Cost Recovery Oil Limit Percentage	Oil Profit Share Percentage	Unused oil Cost Percentage
		%	%	%
1996				
1997				
1998				
1999				
2000				
2001				
2002				
2003				
2004				
2005				
2006				
2007	0.00	70%	80%	0%
2008	0.00	70%	80%	0%
2009	0.11	70%	80%	0%
2010	0.22	70%	80%	0%
2011	0.28	70%	80%	0%
2012	0.40	70%	80%	0%
2013	0.65	70%	80%	0%
2014	0.75	70%	80%	0%
2015	0.86	70%	80%	0%
2016	0.86	70%	80%	0%
2017	0.86	70%	80%	0%
2018	0.88	70%	80%	0%
2019	0.88	70%	80%	0%
2020	0.88	70%	80%	0%
2021	0.99	70%	40%	0%
2022	1.08	60%	30%	40%
2023	1.10	60%	30%	40%
2024	1.11	60%	30%	40%
2025	1.12	60%	30%	40%
2026	1.13	60%	30%	40%

In addition to determining the R / C index for oil, the R / C index for gas is also analyzed because the XYZ block produces gas and oil.

TABLE 5 *GAS R/C INDEX*

	Gas ROC Index	Cost Recovery Gas Limit Percentage	Gas Profit Share Percentage	Unused gas Cost Percentage
		%	%	%
1996				
1997				
1998				
1999				
2000				
2001				
2002				
2003				
2004				
2005				
2006				
2007	0%	70%	80%	0%
2008	16%	70%	80%	0%
2009	27%	70%	80%	0%
2010	31%	70%	80%	0%
2011	35%	70%	80%	0%
2012	38%	70%	80%	0%
2013	45%	70%	80%	0%
2014	44%	70%	80%	0%
2015	50%	70%	80%	0%
2016	54%	70%	80%	0%
2017	60%	70%	80%	0%
2018	66%	70%	80%	0%
2019	69%	70%	80%	0%
2020	71%	70%	80%	0%
2021	82%	70%	80%	0%
2022	92%	70%	80%	0%
2023	99%	70%	80%	0%
2024	105%	60%	70%	80%
2025	108%	60%	70%	80%
2026	111%	60%	70%	80%

After calculating the PSC Cost Recovery scheme and Revenue Over Cost, the economic results of the XYZ Block are as follows:

TABLE 6 *ECONOMIC ANALYSIS IN XYZ BLOCK SUMMARY*

No.	Parameter	Unit	PSC Cost Recovery	PSC Revenue Over Cost
1	Oil Production	mmbbl	43500.00	43500.00
2	Gas Production	mmbtu	317131.35	317131.35
3	LPG or LNG Production	MT	840.03	840.03
2	Gross Revenue	MMUS$	5545.94	5545.94
	Contractor Share	MMUS$	881.68	836.59
	Government Share	MMUS$	705.66	767.87
3	Expenditure	MMUS$	3302.99	3302.99
	Capex	MMUS$	1948.28	1948.28
	OPEX	MMUS$	1272.17	1272.17
	ASR	MMUS$	82.54	82.54
4	Contractor			
	Cont. Take	MMUS$	449.47	518.68
	% Cont. Take	%	8.10%	9.35%
	IRR	%	3.48%	3.52%
	NPV at 10%	MMUS$	275.49	277.14
	Field Life	Year	1996-2026	1996-2026
	POT	Year	25.30	25.86
5	Government			
	Gov. Take	MMUS$	1793.48	1724.27
	% Gov. Take	%	32.34%	31.09%

Based on the table 6 above, all aspects of economic indicators show that the PSC Revenue Over Cost is more efficiently applied to the XYZ block. There are several influential factors from each scheme in the initial stage of revenue sharing where the PSC Cost Recovery scheme has FTP which is shared with contractors and the government at 20% Gross Revenue with only 10% shared with the government. Therefore, the difference in Fiscal Terms at the beginning of this scheme affects the amount of profit used for Cost Recovery. Figure 6 below reveals the contractor cashflow in PSC Cost Recovery.

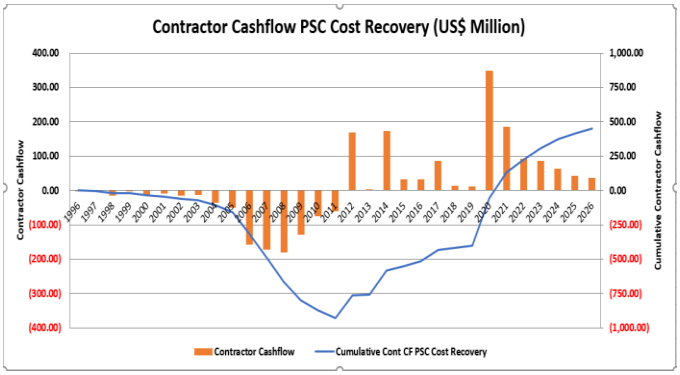

Figure 6 *PSC Cost Recovery Cashflow*

Figure 7 below reveals the contractor cashflow in PSC Revenue Over Cost.

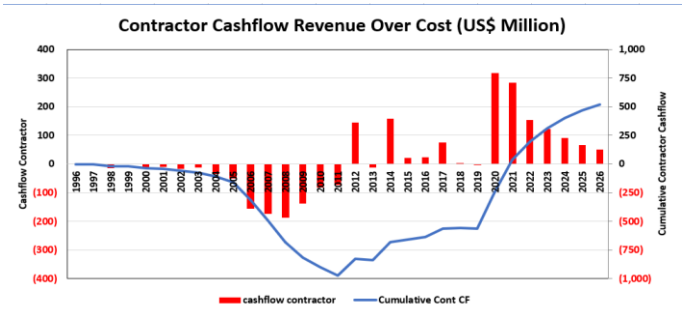

Figure 7: *PSC Revenue Over Cost Cashflow*

Based on the cashflow from contractors, there was a slight difference in the Cost Recovery PSC and Revenue Over Cost where the contractor's cashflow tends to be smaller due to the limitation on the Cost Recovery value. Therefore it cannot be fully paid from existing Revenue, while in the PSC Cost Recovery the amount is carried out maximally by the existing revenue.

4. CONCLUSION

From the contractor's positive point of PSC Cost Recovery there is no limitation on Cost Recovery, capable of making POT results faster as seen in the table 6 above. While the PSC Revenue Over Cost, consists of unused cost as seen in figure 2 which makes the contractor motivated to carry out cost saving thereby, obtaining the a portion plus a sliding scale of the unused cost. Meanwhile from the government's positive point, the PSC Cost Recovery tends to acquire shares from the percentage share. The number of variables seen in table 3 is short off as Royalty, Government Unused Cost, Government Profit Share, Research Cess, Export Duty, Supplementary Payment, and tax, which allow for more shares and split.

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