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Investment Project Analysis For Offshore Complex Hydrocarbon Field Using

Additional Base Split: Case Study Of Gala Bunga Field – Matahari Block

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ABSTRACT
This research is conducted with the following objectives evaluate the feasibility of developing oil and gas fields based on the application of new production techniques in multi-phase fluid reservoirs, to enalyze the primary parameters that distinctly impact the project's NPV and IRR through sensitivity analysis, to estimate the probability of deficient NPV outcomes through Monte Carlo simulation which applies uncertainty in prices, production, and costs against a scenario of negative NPV, and to evaluate the value of advanced contractor pays as a result of the modified gross split contract in improving the overall project NPV. A quantitative research design is the type of research used in this study. The study finds that the feasibility of developing the GLB Field using advanced production techniques in multi-phase fluid reservoirs is limited under current conditions due to high financial uncertainty. Sensitivity analysis reveals that oil prices, production volumes, and capital expenditures are the primary drivers of NPV and IRR fluctuations. Monte Carlo simulation further confirms a significant probability of negative NPV outcomes, highlighting the project's vulnerability to market volatility. However, modifying the Gross Split PSC to include an additional contractor split substantially improves NPV expectations, indicating that a more flexible fiscal framework can enhance the project's commercial viability.
Keywords : *Marginal Oil Field, Offshore Development, Gross Split PSC, NPV, Feasibility Study.*

ABSTRAK
Penelitian ini dilakukan dengan tujuan sebagai berikut: mengevaluasi kelayakan pengembangan lapangan minyak dan gas berdasarkan penerapan teknik produksi baru pada reservoir fluida multifase, menganalisis parameter utama yang secara signifikan mempengaruhi NPV dan IRR proyek melalui analisis sensitivitas, memperkirakan probabilitas hasil NPV yang defisit melalui simulasi Monte Carlo yang menerapkan ketidakpastian dalam harga, produksi, dan biaya terhadap skenario NPV negatif, dan mengevaluasi nilai pembayaran kontraktor yang lebih tinggi sebagai hasil dari kontrak pembagian bruto yang dimodifikasi dalam meningkatkan NPV proyek secara keseluruhan. Desain penelitian kuantitatif digunakan dalam studi ini. Studi ini menemukan bahwa kelayakan pengembangan Lapangan GLB menggunakan teknik produksi canggih di reservoir fluida multi-fase terbatas dalam kondisi saat ini akibat ketidakpastian finansial yang tinggi. Analisis sensitivitas menunjukkan bahwa harga minyak, volume produksi, dan pengeluaran modal merupakan faktor utama yang memengaruhi fluktuasi NPV dan IRR. Simulasi Monte Carlo lebih lanjut mengonfirmasi probabilitas signifikan hasil NPV negatif, menyoroti kerentanan proyek terhadap volatilitas pasar. Namun, memodifikasi Kontrak Pembagian Bruto (PSC) untuk memasukkan pembagian tambahan bagi kontraktor secara signifikan meningkatkan ekspektasi NPV, menunjukkan bahwa kerangka fiskal yang lebih fleksibel dapat meningkatkan kelayakan komersial proyek.
Kata Kunci: Lapangan Minyak Marjinal, Pengembangan Lepas Pantai, Kontrak Pembagian Bruto (PSC), NPV, Studi Kelayakan.

1. Introduction

Indonesia consumes close to 1600 MBOPD in 2023, meanwhile the oil production 605 MBOPD as cited from the Ministry of Energy and Mineral Resources (ESDM), hence the deficit needs to come from abroad.

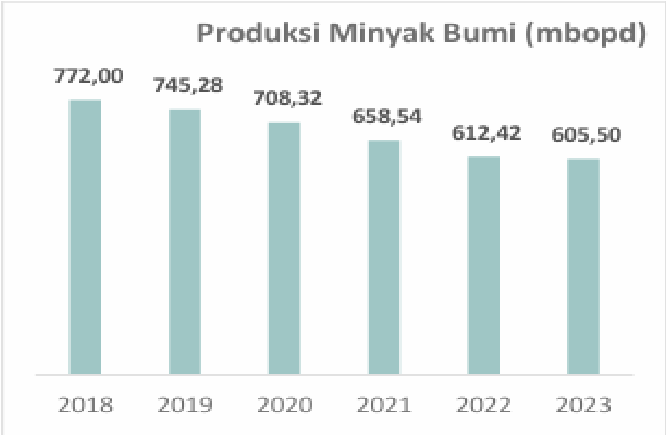


Figure 1. Indonesia's Oil and Gas Production 2018 – 2023

As part of the work plans included in Long Term Plan, the government through the Ministry of Energy and Mineral Resources (ESDM) and SKK Migas have set an oil and gas production target of 1000 MBOPD and a 12 BSCFD gas output for the year 2030.

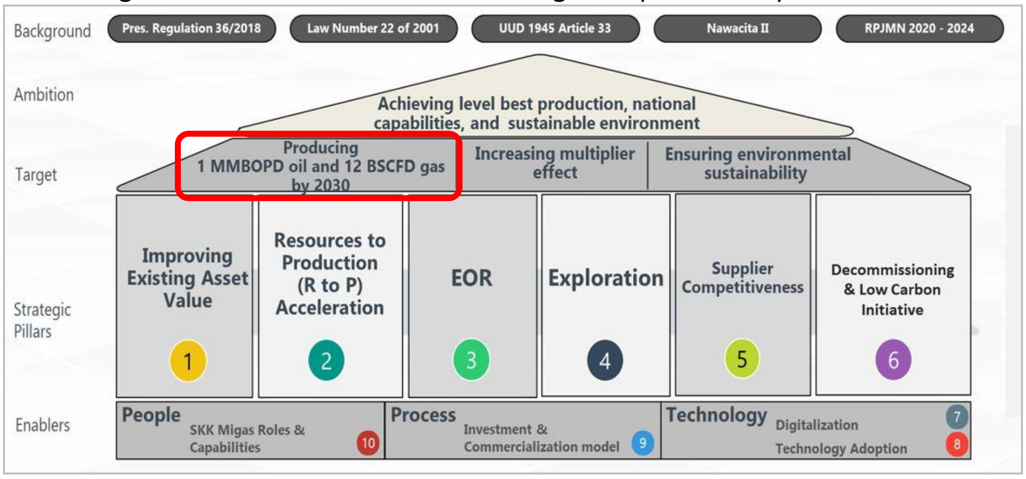


Figure 2. Long Term Plan SKK Migas

The Matahari Block (a pseudonym used for confidentiality) is one of Indonesia oil and gas working areas which is strategically important for the national oil production target. The block has more than 20 oil fields and more than 5 gas fields, all situated offshore, many of which have been producing for decades. However, like other mature fields, the block's oil production has sharply decreased owing to depleting natural reservoir pressure and overall reservoir maturity.

Matahari Block's oil fields have been developed from conventional oil reservoirs and require secondary recovery, specifically Electric Submersible Pumps (ESP) for production; hence sustain reservoir pressure. The production approach adopted these past decades drastic cutbacks has obviously weakening the economy. The low-hanging fruit have been aggressively exploited, most often integrating the use of advanced technologies to more intricately designed but economically marginally reservoirs that were high in gas to oil ratio, multi-phase fluids composition, or thin margins. A shift towards these previously deprioritized reservoirs is pivotal in the wake of new technology and strategy to foster potential for growth. One of the fields under study is Gala Bunga (GLB) Field, located within the Matahari Block.

In Matahari Block, both oil and gas have always been extracted separately; thus, simultaneous oil and gas production technology was not adopted until 2025. On the other hand, the GLB Field possesses a more sophisticated reservoir comprising interbedded layers of oil and gas. After a month-long production test in 2005, which was believed to be a success, there proved to be unstable output as well, but this was predominantly due to excessive gas interfering with the functioning of the production pump. Studies conducted in 2021-2023 suggested solving this issue using a natural gas lift for initial production, and shifting to oil with an Electric Submersible Pump (ESP) after the gas content decreases. The GLB Field is further challenged by offshore location, which requires the addition of a production platform, seven new wells, plus a 9-kilometer subsea pipeline.

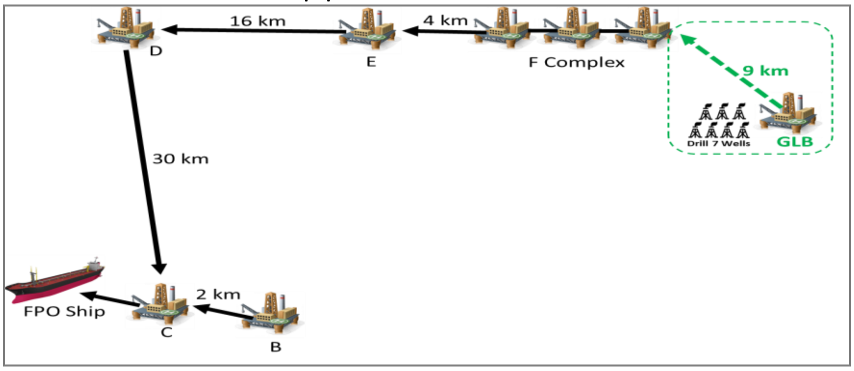


Figure 3. Oil Production Scheme Plan of GLB Field

2. Literature Review

The gross split scheme embodies three themes: certainty, simplicity and efficiency. “Certainty” refers to the intentions incorporated into the design of the gross split sharing scheme, to provide certainty for the Contractors of Cooperation Contracts on the profit-share they will receive. “Simplicity” is embodied in the fiscal system, which makes it easy for the contractors to avoid long discussions with the Government Task Force, SKK Migas, on the work plan and budget. Finally, “efficiency” is more aimed at the process of procurement of goods and services, which can now be done by the contractors alone (D.K., 2017a.) There are three types of gross splits that can be applied, namely “base split”, “split” and “progressive split” (Ferry Hidayat, 2016). The basic split for petroleum is 57:43 (government: contractor), while for natural gas it is 52:48.

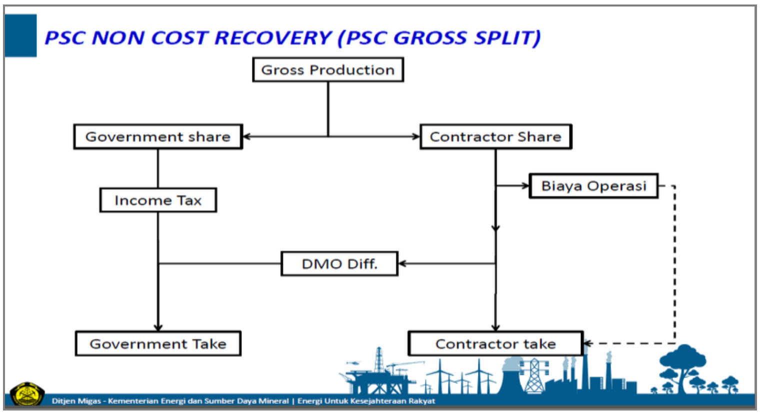


Figure 4. Gross Split Scheme

The following are the variable components considered in the base split:
1) the status of the working area;
2) field location;
3) reservoir depth;
4) availability of supporting infrastructure;
5) reservoir type;
6) carbon dioxide (CO2) content;

7) hydrogen sulphide (H2S) content;
8) specific gravity of petroleum;
9) the level of domestic components during the development period; and
10) production stages.

The decision-making process for a specific project using assessment of quantitative factors that include, for instance, Net Present Value (NPV) and Profitability Index (PI). For NPV assessment, this is accomplished by determining the accrued cash inflows and outflows over a specified period of time. In economic terms, a positive NPV expresses that the forecasted returns to be incurred from a project or investment will be greater than the anticipated outlay thus creating a probability of profits. On the other hand, a negative NPV does suggest that investments have incurred a net loss. The Profitability Index (PI) which is also called Value Investment Ratio (VIR) or Profit Investment Ratio (PIR) is a kind of multiplier that indicates the ratio of costs incurred to the net profits realizable from an investment proposal. It is measured as the ratio of present value of the expected future cash inflows over the amount invested in the project at its beginning. Other things being equal a higher PI is a sign of a better and feasible project. The equations for determining NPV and PI are appended below:

$$NPV = \sum_{t=1}^{n} \frac{CF_t}{(1+i)^n}$$

$$PI = 1 + \frac{Net\ Present\ Value\ (NPV)}{Present\ Value\ Investment\ (PVI)}$$

where:
CFt = Net cash inflow-outflows during a single period t
i = Discount rate or return that could be earned in alternative investments.
t = Number of timer periods

Other than NPV and PI, there are two economic parameters that are also used to evaluate project feasibility, Pay out Time (POT) and Payback Period, measure the amount of time it will take a project to bring cash inflows equal to the cash outflows for the project. This calculation is useful to determine how long it will take a project to be profitable. Meanwhile, Payback Period is the the amount of time it takes to recover the cost of an investment.

$$POT = \frac{Initial\ Investment}{Cash\ Inflow}$$

$$Payback\ Period = \frac{Initial\ Investment}{Yearly\ Cash\ Flow}$$

The specific calculations regarding the economic parameters outlined here correlate to estimated, projected oil output, its cost and other related costs and expenditures. In order to enable equitable consideration between each alternative investment, one of the approaches being used is incremental economic analysis.

3. Research Methods

A quantitative research design is the necessity of obtaining results that are objective, measurable and generalizable in relation to the research problem. This method enables the collection of numeric data which attracts statistical analysis aimed at testing hypothesizes as well as determining association and correlation among variables. The numeric and statistical nature of quantitative findings offers actionable insights, making it easier for stakeholders to make informed decisions.

Research Design

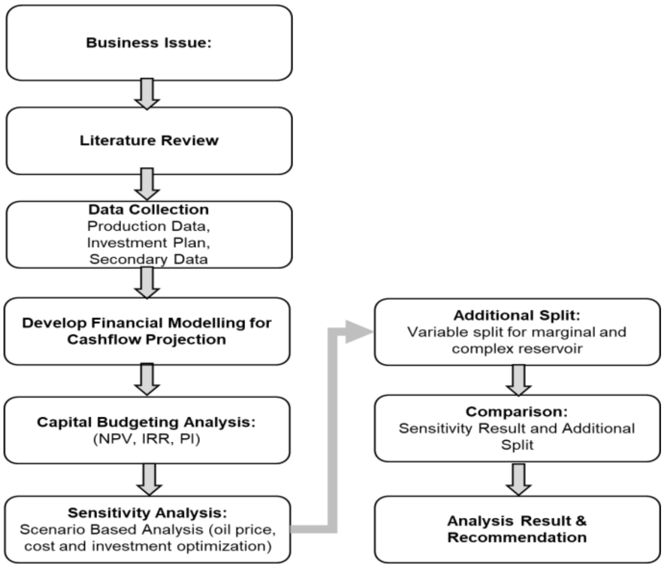


Figure 5. Research Method – Quantitative

The research process begins by identifying the primary business issue, which involves strategizing the commercialization of underutilized oil reserves within broader corporate goals. A literature review follows, offering theoretical and practical insights into marginal field development and highlighting research gaps. Next, relevant operational and financial data are collected to support accurate modeling. Based on this, cash flow forecasting models are developed under multiple scenarios to estimate future revenues and costs. Capital budgeting analysis is then conducted using metrics like NPV, IRR, and PI to assess investment viability. Sensitivity analysis evaluates how changes in key variables such as oil prices and costs impact financial outcomes. The study then applies an additional base split within the Gross Split PSC to examine whether increasing the contractor's share enhances project returns. A comparison of results using fixed versus dynamic oil prices provides further insight into economic viability under varying market conditions. The final stage consolidates findings and offers investment recommendations based on profitability and risk evaluation.

Data Collection Method

In addition to primary source data, this research relies on secondary data as well, sourced from financial reports, news articles, laws and relevant literatures. Specifically, the sources include the following:

1. Previous research related to this study, such as credible journals and articles.
2. Secondary Data: Market research reports, government publications, industry databases and trade articles related to oil and gas industry.
3. Internal Company Data includes Focus Group Discussions (FGD) result including Subsurface and Surface plan of development, financial reports, operational data, strategic plans, and legal documents specific to company's projects and operations.

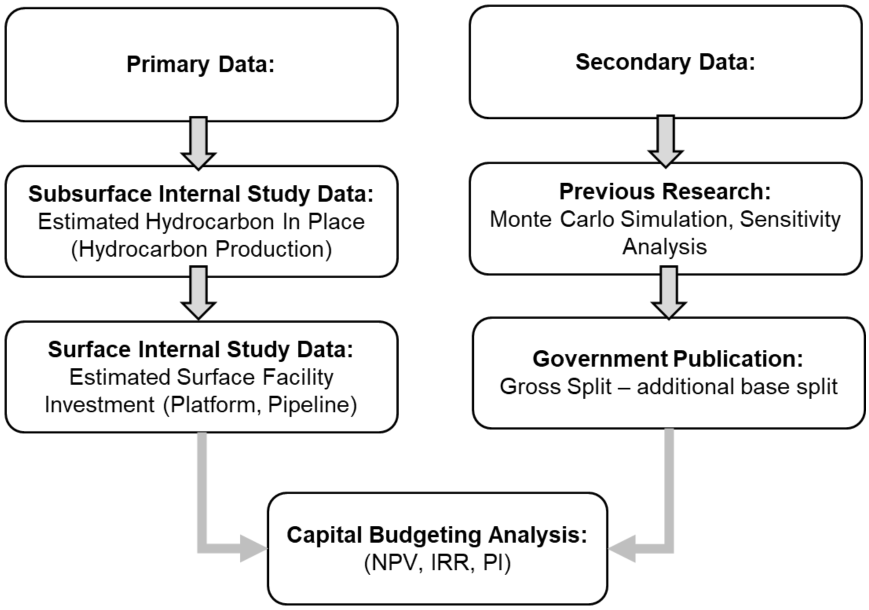


Figure 6. Data Collection Method

Data Analysis Method

According to Indonesia's Gross Split PSC scheme, the so-called "marginal fields" which are associated with greater risks and higher costs, are given the opportunity to propose an additional base split. This is done in order to enhance the economics of the project by increasing driver's revenue share to address their technical and financial difficulties compensation for the technical and financial challenges faced. By adding this adjustment to the financial model, project viability analysis becomes more realistic by considering market volatility, fiscal incentives, and uncertainty, along with calculations. This approach facilitates multi-dimensional decision-making where all the risks and opportunities for investment to develop marginal oil and gas fields are taken into account.

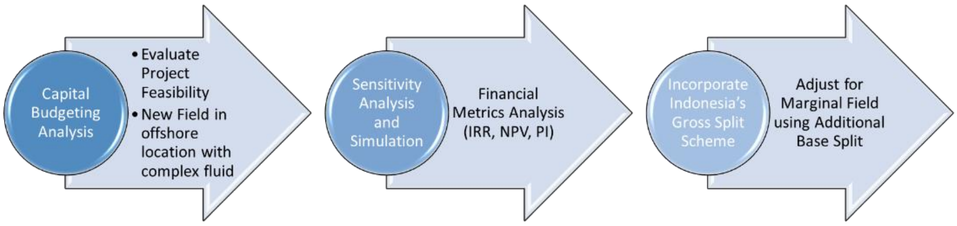


Figure 7. Data Analysis Method

4. Results and Discussions

Analysis

Regulatory Terms Governing the Gross Split PSC (Production Sharing Contract)

The Gala Bunga Field is classified as a New Field (not included among the Existing Fields listed in Appendix F of the Matahari Block Production Sharing Contract). Accordingly, the Variable Split will be determined in this GLB Field Development Plan, while remaining subject to the provisions outlined in the Matahari Block PSC. A summary of the provisions used in this economic evaluation are shown in Table 1 below.

Table 1. Summary of Matahari Block PSC

Fluid Type	Oil	Gas
Base Split	43%	48%
Variable Split	a. Area Status b. Field Location c. Reservoir Depth d. Infrastructure Availability e. Reservoir Type f. CO_2 Content g. H_2S Content h. API i. Local Content (TKDN) j. Production Stage	a. Area Status b. Field Location c. Reservoir Depth d. Infrastructure Availability e. Reservoir Type f. CO_2 Content g. H_2S Content h. API i. Local Content (TKDN) j. Production Stage
Progressive Split	- Cumulative Production - ICP (Indonesia Crude Price)	- Cumulative Production - GAS price
Variable Split	17%	17%
DMO Exemption (for new fields)	-	-
DMO Volume	25% from contractor's share with DMO fee 100% of sales price	25% from contractor's share with DMO fee 100% of sales price
DMO Price	According to Sales Price	According to Sales Price
Tax Rate	25%	25%
Depreciation of Drilling Tangibles and Production Facilities	- Drilling and Production Facilities (Tangible)	- Drilling and Production Facilities (Tangible)
	- 5-year Declining Balance at 25% (for oil and gas)	- 5-year Declining Balance at 25% (for oil and gas)
	- Depreciation starts from the month placed into service (continuing until fully depreciated)	- Depreciation starts from the month placed into service (continuing until fully depreciated)

Assumptions

A comprehensive subsurface, drilling, and facility integration study conducted to calculate each aspect of Developing Gala Bunga Field at Matahari Block. Oil and gas production forecast based on the optimized production forecast with the development concept of seven wells in the GLB Field, and by considering the EPCI (Engineering, Procurement, Construction, and Installation) project schedule and the batch drilling plan coordinated with non-subsurface functions, the start of production from the seven development wells in the GLB Field is estimated to be started on 2027. The project is expected to deliver total oil reserves of 6.61 MMSTB and associated gas reserves of 14.87 BCF.

Table 2. Forecast Cumulative Oil and Gas Production (Dec.2038)

Well	Cumulative Oil (MSTB)	Cumulative Gas (BSCF)
GLB-01	1,050.00	4.00
GLB-02	1,460.00	3.47
GLB-03	1,133.00	2.00
GLB-04	920.00	1.60
GLB-05	773.00	1.20
GLB-06	622.00	1.40
GLB-07	658.00	1.20
Total	**6,616.00**	**14.87**

The estimated capital expenditure for the GLB Field Development is US$226.88 million, consisting of US$135.5 million for drilling costs, US$91.4 million for production facility costs. The other investment is US$60.60 million for operating costs and US$15.56 million allocated for Abandonment & Site Restoration costs.

Table 3. Data Input Summary

Parameter	Unit	Gala Bunga Field
Oil Production Forecast	MSTB	6,616
Gas Production Forecast	BSCF	14.87
Domestic Gas Price	US$/MMBTU	7.00
Oil Average Price	US$/BBL	69
Investment (Drilling Surface Facilities, G&A etc)	MM$	226,200
Operating Expenditure	MM$	60,622
ASR (Abandonment & Site Restoration)	MM$	15,556

Weighted Average Cost of Capital (WACC)

The Matahari Block's parent company set the hurdle rate to 10.22% which will be used as the discount rate in NPV calculations. For this particular case study, the WACC obtained from the dataset of listed companies from the same sector will be employed to measure the impact of changing discount rates as a sensitivity analysis, or competitively as a WACC sensitivity factor.

WACC = Debt weight x Kd + Equity Weight x Ke
Kd = Rf + default spread
Ke = Rf + beta x (Rm-Rf)
beta = Unlevered beta x [1 + (1 - Tax) x DER)]
where:
beta = measure of the volatility of security portfolio compared to market
DER = Debt to Equity ratio
Ke = Cost of Equity
Kd = Cost of Debt
Rf = Risk Free Rate (10-year government bond)
Rm = Market Return
Default spread = Damodaran's Default Spreads and Synthetic Credit Ratings

Capital Budgeting

To determine the viability of the GLB Project, a financial analysis has been carried out using data input as described. Parameters such as total oil and gas production, capital investments, operational expenditures, and forecasted sales price for oil and gas are used in the financial analysis. This model captures the gross revenue available, recoverable costs, contractor's cumulative net cash flow, and net profit appraisal indications. The economic evaluation conducted for GLB Project in the following table outlines the results of Gross Split Scheme up until the PSC expiry in 2038.

Table 4. Economic Evaluation Result

Parameter	Unit	Gala Bunga Field (PSC Expiry 2038)
Sales Oil	MSTB	6,616
Sales Gas	BSCF	14.87
Domestic Gas Price	US$/MMBTU	7.00
Oil Average Price	US$/BBL	69
Gross Rev.	MM$	565,789
Investasi (Drilling, Facilities, G&A etc)	MM$	226,200
Opex	MM$	60.60
ASR	MM$	15.56
Deductable Cost/Cost Recoverable	MM$	302,378
(% Gross Rev)	%	53.44%
Contr. NCF	MM$	88,049
Net Contr. Share	MM$	88,049
(%Contr)	%	15.56%
NPV10 (point forward)	MM$	1.323
IRR (point Forward)	%	10.26%
POT (yrs)	Years	7.59
PI Ratio		1.01

The Gala Bunga Field's economic assessment translates to the contractor's gross revenue of legally entitled value, projected close to USD 566 million. In this basis, the revenue stream is calculated based on the expected oil production revenue set at USD 69 per barrel, coupled with a gas sales price of 7 USD per MMBtu. Operating, capital, and site restoration expenditures of total USD 226.2 million are also aligned under this round number. The dismantlement and site rehabilitation costs are evaluated at USD 15.56 million, while the operating budget located at USD 60.6 million. Under this scenario, the total number adds up to an NPV of USD 88.05 million cash flow surplus to the contractor's net. The Gala Bunga Field's first order expansion estimates set for an outperform scenario at 6.616 MMSTB oil sales along gas production 14.873 BSCF, shares hope for timely production increase alongside the USD 7 domestic gas exchange price with the abandonment reservoir expenditure stream. The evaluation using Gross Split Scheme indicates that the GLB Field New Development Project has low economic value. To increase the appeal of the project and make economically viable, it is suggested that the sustained development of the GLB Field be supported with policy change of higher variable split or more favorable fiscal terms or other contractual modification aimed to enhance project attractiveness.

Risk Analysis

An economic sensitivity analysis was performed to determine the effect of CAPEX, PROD, Oil Price, and OPEX on the Contractor's Net Present Value (NPV). A ±10% and ±20% variation was applied to each parameter to assess the changes in NPV. According to the CAPEX and PROD parameters, project economics proved to be the most sensitive. The contractor's NPV CAPEX fetches a 20% enhancement whilst a reduction yields devastating results. Likewise, a production volume shift will also correlate and depend with NPV Projections, with boosted production yielding favorable economic returns and diminished production yielding unfavorable returns. Moreover, the oil price displays strong correlation with NPV providing direct enhancement to Project Revenue thus NPV. Reduced oil price yields devastating effects on revenue and subsequently, NPV. Changes in OPEX do not exhibit great impact on the contractor's NPV as it does the other factors. Operating costs tend to lose favor in the middle of the pack when his ratio is assessed against total expenditure.

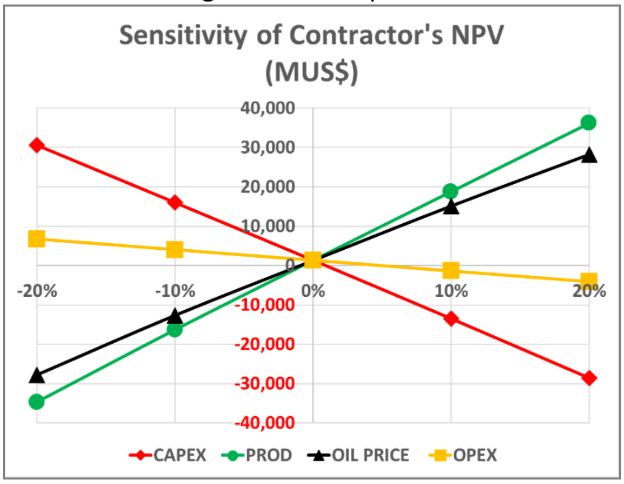


Figure 8. Sensitivity of Contractor's NPV

In summary, the evaluation emphasizes that the economic sustainability of the project can be improved by managing cost efficiency (specifically by reducing CAPEX), optimizing production, and controlling the selling prices of oil. Profitability will be managed, and commercial success will be fundamentally driven by how these parameters are managed. Combining sensitivity analysis with Monte Carlo simulation is an approach that allows assessing the risk profile in detail. The simulation applies key input distributions identified during the sensitivity analysis for estimating NPV in a diverse range. The assessment of risks considering multiple uncertainties at once is more realistic taking into account more than single point estimates.

This research incorporates a 1000 iteration Monte Carlo simulation in which every iteration was considered a scenario based on deviations in production volumes, oil prices, and capital expenditures. For the oil price variable, a log-normal distribution was utilized. The parameters for this model were the mean and standard deviation derived from the log returns of WTI crude oil prices from 1986 to 2023. This approach captures the underlying skewness and multiplicative nature of oil price volatility, thus depicting it more reliably. Monte Carlo simulation yielded a simulation with varying NPV distributions which illustrates the possible risk-return profile of the project. The results are presented below:

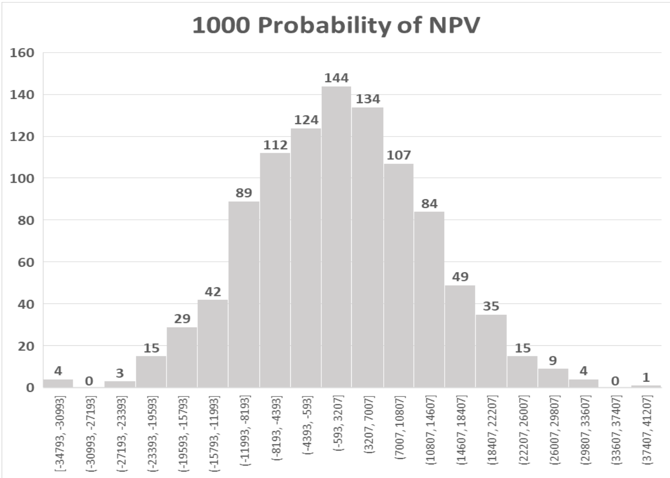


Figure 9. Histrogram of 1000 Probability NPV

The histogram trends towards normal distribution which suggests that most NPV results are centered around some average value. This average value does not shift towards the extreme high or low sides. As previously stated, most probable simulations were within the NPV range of -593 to 3207 which fits the expectation of being the modal value for the distribution.

Table 5. Monte Carlo Statistical Result

1000 Statistical Result	NPV
Minimal	(34,793.17)
Maximal	37,553.06
Average	1,691.52
Skewness	0.02
Median	1,800.30
Standard Deviation	10,779.07
Kurtosis	0.03
Prob NPV>0, IRR>0.1, POT>10, PI<1	56%
Prob NPV<0, IRR<0.1, POT<10, PI>1	44%
Prob < Base Case	49%

The results of the simulations suggest that the project is economically viable in 56% of scenarios, constituting the majority. However, 44% of the scenarios depict a substantial downside risk. The low values of skewness and kurtosis suggest that the NPV distribution is almost normal, meaning the project will behave as expected when facing uncertainties. These findings justify further analysis for the project and underline the need for strategies to alleviate risks in adverse conditions.

Additional Split

To enhance the economic viability of the new field development project, there are needed several adjustments to key parameters. These adjustments propose additional contractor's split for developing GLB Project as New Oil Field to more favorable split structure.

Table 6. Sensitivity Additional Base Split

Parameter	Unit	Additional Base Split					
		0%	1%	2%	3%	4%	5%
Cumulative Gas Producti	BSCF	14.70	14.70	14.70	14.70	14.70	14.87
Cumulative Oil Productio	MSTB	6,616	6,616	6,616	6,616	6,616	6,616
Domestic Gas Price	US$/MMBTU	7.00	7.00	7.00	7.00	7.00	7.00
Oil Average Price	US$/bbl	69.00	69.00	69.00	69.00	69.00	69.00
Gross Rev	MUS$	565,789	565,789	565,789	565,789	565,789	565,789
Investment	MUS$	226,200	226,200	226,200	226,200	226,200	226,200
Opex+ASR	MUS$	76,178	76,178	76,178	76,178	76,178	76,178
Contr Net Operating Prof	MUS$	88,049	92,292	92,292	92,292	92,292	109,266
(% Gross Rev)		15.56%	16.31%	16.31%	16.31%	16.31%	19.31%
Total Contr Net Cash Flo	MUS$	88,049	92,292	96,536	100,779	105,023	109,266
(% Gross Rev)	%	15.56%	16.31%	16.31%	16.31%	16.31%	19.31%
Contr NPV 2024 Forward	MUS$	1,310	3,691	6,072	8,422	10,768	13,113
Contr IRR 2024 Forward	%	10.26%	10.72%	11.18%	11.63%	12.08%	12.53%
Contr POT (yrs)	Years	7.58	7.49	7.41	7.32	7.24	7.16
Contr PI Ratio Forward	MUS$	1.01	1.02	1.04	1.05	1.06	1.08
Gov Gross Share	MUS$	146,012	140,354	134,697	129,039	123,381	117,723
Tax	MUS$	29,350	30,764	32,179	33,593	35,008	36,422
GOI Take excl Indirect Ta	MUS$	175,362	171,119	166,875	162,632	158,388	154,145
(% Gross Rev)	MUS$	30.99%	30.24%	29.49%	28.74%	27.99%	27.24%
PV GOI Take exc Ind Tax	MUS$	91,890	89,509	87,128	84,778	82,432	80,086
Total Split Oil	%	74.00%	75.00%	76.00%	77.00%	78.00%	79.00%
Total Split Gas	%	75.00%	76.00%	77.00%	78.00%	79.00%	80.00%

In order to assess how other additional base split percentages under the gross split scheme ever so slightly alter the economic efficiency of the project, a sensitivity analysis was performed. The outcomes are encapsulated in the table above. Some of the key production parameters such as the cumulative gas production (14.87 BSCF) and the cumulative oil production (6,616 MSTB) remain unchanged in all scenarios. In the same way, the assumption of price for Domestic Gas Price (USD 7.00/MMBTU) and oil price (USD 69.00/bbl) are kept constant. A noticeable enhancement of the Contractor's economic indicators as the additional base split raise from 1% to 5%. The Contractor's Net Operating Profit increases from USD 88 million with additional 0% split to USD 109 million with a 5% additional split. In the same way, the Contractor's NPV (2024 onward) significantly increase from USD 1.31 million to USD 13 million. The IRR (2024 onward) also rise from 10.26% to 12.53%, whereas the Project Payout Time (POT) is reduced from 7.58 years to 7.16 years. The Contractor's PI Ratio (Profitability Index) increases from 1.01 to 1.08 across the scenarios. The results strongly indicate that offering an extra base split greatly improves the attractiveness of the project economically as the returns are higher, the cost recovery is quicker, and investment efficiency enhances for the contractor.

Business Solution

Considering the project's offshore remote area and its advanced technologies need to applied, measuring the project's economic consequences in terms of its financial exposure and potential opportunities is vital. This part details the outcomes of a certain probabilistic analysis as well as potential fiscal changes that could improve the project's profitability under the Gross Split PSC model.

Marginal Economic Evaluation

The project's economic evaluation reveals a marginal financial result which is associated with a high degree of variability in the Net Present Value (NPV) outcomes from the 1,000 Monte Carlo simulation iterations. Even though the mean NPV generated from simulations is positive (US$ 1,691.52), rather a large proportion of scenarios (44%) were shown to result in negative returns. This (along with the mean NPV being positive and standard deviation of over $10,000) indicates that the project is most likely to be adversely affected by the volatility of fundamental drivers of oil price, production levels, and capital spending. The economic model's near-symmetric distribution indicates balanced but precarious project economics, which drives the significant standard deviation and shifts the mean value towards US$ 10,000 illustrating uncertainty and volatility. Such project characteristics bear resemblance to complex offshore developments which have high technical complexity with high upfront costs, and literally turn the dial on breaches to revolving tune to the conceal fiscal parameters.

Additional Contractor Split to Strengthen Project Viability

Increasing the project's financial feasibility, particularly the contractor's division under Gross Split PSC, can be split into additional contracts within the boundaries of Ministerial Regulation No. 52/2017. That regulation has a mechanism for providing more profit sharing to classified undertakings of marginal, high-cost, or technically challenging automatic lower bound ranges. Marginal projects experience greater benefits. An increased contractor's share proportion will enhance the IRR and NPV to considerable extents. Equally adjusting revenue streams aids in overcoming elevated project risks. This helps attract investment into plotting fields which the government supports. There is a need to estimate the impact of additional splits on the project and restructure an economic model to aid in submission for regulatory approval.

Execution Strategy and Project Timeline

Initial Phase:

The first step of the project involves the preliminary planning and conceptual analysis, which includes feasibility studies, subsurface investigations, and early engineering work. These activities provide great support in economic justification and technical scope delineation which needs to be done before execution planning.

Renegotiation:

Prior to commencing detailed engineering design and procurement work, a renegotiation phase is inserted to review previously set terms of the Gross Split PSC, more specifically pertaining to the additional split. Contingent on the economic evaluation and probabilistic analysis, the project is categorized as marginal and extremely sensitive to investment expenditures and fluctuations in oil prices.

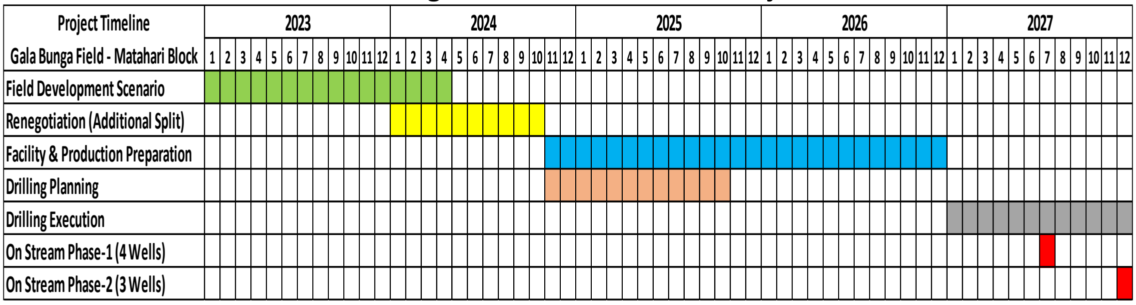
Main Engineering & Procurement:

In this step, the Front-End Engineering Design (FEED) is performed alongside detailed engineering, and it takes quite a long time. At the same time, preparation for procurement and tendering for Long Lead Items (LLI) is started to procure salient materials and equipment early in the schedule. Engineering draws towards the finish, which lengthens the gap between the completion of procurement activities and construction readiness. In this case, “readiness for construction” means availability of facilities and equipment, which is provided before the completion of engineering works.

Project Execution:

The last phase includes the manual physical execution which includes the drilling and production activities and it is done in two parts: In Phase 1, a total of 4 onstream wells are brought online which constitutes the initial production ramp-up. Phase 2 adds another 3 wells, increasing production alongside fulfilling the full dvelopment plan.

Table 7. Gala Bunga Field – Matahri Block Project Timeline



5. Conclusion

The financial examination of the GLB Field Development Plan indicates that at best the economic outcomes are questionable for the plan considering the base case scenario. That is because the Monte Carlo simulation illustrates some extreme volatility in NPV outcomes coupled with near half the scenarios being pessimistic on outcomes. That lack of conviction comes from how sensitive oil prices, capital expenditures, and production volumes dominate results alongside the severe volatility in existing market conditions. In simpler terms, the sim paints a dire picture of the multi-fluid phased reservoir development project with its vast resource potential. NPV and IRR results will always fluctuate as the crude market takes center stage. In a bid to improve the substantial uncertainty surrounding the project's market reception and viability, it was essential to explore the implications of implementing an additional contractor split under the Gross Split PSC model. Shuffling the model results in strong intentions towards profit that stems from increased NPV expectations proving that additional profit redistribution enhances project value making the endeavor commercially viable—confirming the need for changes in the fiscal framework governing offshore projects. Flexible fiscal terms notably aid investment within the technically complex and high-cost offshore developments that the GLB Field presents.

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