Project Investment Plan Valuation Using Discounted Cash Flow Analysis (Case Study of LLP Compression Project Investment Plan at Tango Field, Mehacca Block)

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ABSTRACT

This article performs a valuation analysis of LLP Compression in project investment plan at Tango Field in Mehacca Block. The LLP Compression investment project plan is currently under consideration for a Final Investment Decision (FID). The analysis is conducted by using quantitative methodology approach to evaluate 2 project scenarios based on its cash flow. The outcome of financial valuation could assist decision maker in the company, in determining whether the project is economically profitable, whether it should be executed, what scenario can generate maximum economic profit for the company, and what financial factor affecting LLP Compression Project cash flow that should be managed to avoid negative financial results and to forecast project likelihood of success.

For DCF analysis, with company discount rate at 10.2%, the Net Present Value (NPV) result is 1.12 million USD for Scenario 1 and 0.91 million USD for Scenario 2. Internal Rate of Return (IRR) for both scenarios are higher than company’s discount rate. Payback Period for both scenarios are also the same in year 2026, or 2 years after production. Profitability Index (PI) for Scenario 1 is slightly higher than Scenario 1 amounting at 1.07, while PI for scenario 2 is 1.03. All of the parameters from DCF gives positive result more than the expected return, with scenario 1 that provide better value than scenario 2.

Monte Carlo simulation is also used to provide a likelihood of having a negative NPV. The result is that both scenarios have probability negative NPV amounting 28% for scenario 1 and 30% for scenario 2. Based on Monte Carlo Simulation result, scenario 1 has slightly lower probability of generating negative NPV than Scenario 2.

Sensitivity analysis is also being used to look how large NPV project varies if the parameter inputs are changed. Four parameters tested with assumption change at ±25% from original condition. Based on sensitivity analysis, it is observed that Gas Production, Gas Price are the most sensitive parameter for both scenarios of LLP Compression project.

In summary, the LLP Compression Project investment plan is feasible to be executed for both scenarios, with scenario 1 provides higher economic profit than scenario 2, and it also generates slightly lower probability negative NPV than scenario 2. Since LLP Compression Project has probability of gaining negative NPV based on Monte Carlo Simulation Result, hence several strategies to minimize project risk exposure are required to be determined before project execution.

Keywords: Discounted Cash Flow, Monte Carlo, Project Financial Valuation, Sensitivity Analysis.

I. INTRODUCTION

One of the efforts to sustain Tango field production is by lowering well head pressure from Low Pressure (LP) mode at 10 bar to Low-Low Pressure (LLP) mode at 2 bar. Lowering well head pressure is expected to increase Tango Main Zone recovery factor since its driving mechanism is depletion drive. This LLP Compression Project aims at further optimizing the future production from Tango field by defining the best way to achieve incremental gains by producing Tango wells in LLP mode in 2024 forwards. The identified mechanism to create incremental gains (reserves) is by lowering the network back pressure so that the abandonment of production from deeper reservoir layers in a well is postponed.

LLP Compression will give the following effects:

- Enhance outflow curve by reducing network backpressure;
- Reduce column weight;
- Postpone permanent loss of reservoir layers, hence it could postpone the decrease of the inflow curve.
In order to perform LLP Compression in Tango field, a mobile compression barge is required to be utilized. There are 2 scenarios for this project which are:

- Scenario 1: LLP Compression production from 7 GTS Flank.
- Scenario 2: LLP Compression production from 4 GTS in Flank and Crestal Area.

Both scenarios have a different amounts of gas production and expenditures. Company is required to perform thorough analysis on both scenarios of project investment plan to decide whether LLP Compression project can be executed or not, and which scenario can generate the maximum benefit for the company.

II. PROBLEM STATEMENT

The problem focusses in this study is the valuation of Tango LLP Compression Project Plan to determine whether the project is profitable or not in order to support company’s management decision. As a result, project feasibility study plays an essential role in determining the viability of a project investment. The final project problem statement and challenges are as follows, based on the context and project's fundamental principle:

- Will the Tango LLP Compression Project Plan deliver a favorable financial return for the company?
- Based on the Discounted Cash Flow approach, how much each scenario of Tango LLP Compression Project worth?
- What are the most sensitive financial aspects influencing the Tango LLP Compression Project's valuation on each scenario?
- Based on Monte Carlo simulation, how likely is Tango LLP Compression Project to succeed or underperform for each scenario?
- What is the best scenario to perform Tango LLP Compression Project?

III. METHODOLOGY

The methodology applied in this study is a quantitative method for estimating project value by analyzing its cash flow stream using the Discounted Cash Flow Method, Monte Carlo Simulation, and Sensitivity Analysis.

IV. LIMITATION OF RESEARCH

Several limitations and data assumptions on this study are described as follows:

1) Geographical Limitation

Limited to one Exploration & Production upstream project with a case study of LLP Compression Project in Tango Field, with scenario for gas production only, depending on the result of reserve calculation estimation by subsurface forecast.

2) Time Limitation

The Economics calculation of cash flow for this project is performed using predictive analysis based on LLP Compression Project cost assumption which are gathered from market survey for related service potential vendor in 2021, and in accordance with the terminology of the Production Sharing Contract (PSC) Scheme between Government of Indonesia and Contractor.

3) Methodology Limitation

Limitation on number of sensitivity factor as per guideline from SKK Migas. According to SKK Migas PTK POD (Pedoman Tata Kerja Plan of Development) no. 72, year 2010 (Page 26), sensitivity analysis should be simulated at least with three parameters: price or production volume, capital expenditures, and operational expenditures.

V. BUSINESS ISSUE EXPLORATION

A. Research Framework

The research answers the business issue of the project through the explanation of research framework. The followings are several steps in this research to seek the solution of LLP Compression project investment plan valuation as a part of field development in Tango Field, Mehacca Block.

Patronyc Energy is aiming an opportunity to invest in LLP Compression project with 2 available scenarios. Scenario 1 to produce 3.78 Bscf gas with 0.74 million USD Capex and 19.08 Opex, and scenario 2 to produce 3.58 Bscf gas with
0.43 million USD Capex and 18.92 million USD Opex. The company require to perform thorough analysis of LLP Compression Project, and to decide the best scenario that generate maximum profit.

The business environment analysis consists of external and internal analysis. External analysis explains the current and forecasted conditions outside company, which may affect the financial performance of the project. Internal analysis explains related conditions inside company that may also affect project’s financial performance.

The business situation analysis will later be used to construct project’s financial projection. The project’s financial valuation consists of gross revenue from gas production, operating expenditure, capital expenditure, project cash in, project cash out and project free cash flow.

**B. Business Environment External Analysis: PESTEL**

Industry analysis is a methodology for evaluating an industry's profit potential and generating consequences for a company's business strategic role within industry. Michael Porter created the prominent five forces model to guide managers in identifying the profit potential of various businesses and how they would organize their particular companies to obtain and maintain competitiveness. Porter's five forces model provides a framework for determining five factors that influence an industry's profit potential and influence a firm's competitive strategy (Rothaermel, 2017: 72-73). The figure below illustrates a competitive analysis of the five factors in the oil and gas industry.

1) **Threat of New Entrants**

Due to strong barriers, the threat of new entrants in the oil and gas business is limited or insignificant. The greatest barrier is the large capital expenditure required to establish an oil and gas corporation. It will involve millions or billions of dollars to develop a field and generate oil and gas from resources that may be hundreds or thousands of meters underneath the seabed and will require sophisticated equipment.

2) **Bargaining Power of Buyers**

Buyer power represents the amount of pressure an industry's customer could impose on the producer's margins by demanding a discounted price or superior quality of the product (Rothaermel, 2017: 80). However, the circumstance would be unique in the oil and gas business. The global oil rate is driven by the oil quantity demanded. It enables the price of oil to swing more depending on the worldwide scenario. Furthermore, improved oil quality may result in increased oil prices.

Producers and consumers of natural gas, on the other hand, tend to be in similar circumstances. While natural gas is distributed under a long-term contract arrangement, normally until the expiration of the PSC contract, and the gas price is defined by both participants throughout a GSA (Gas Sales Agreement). As a result, the price of gas is more constant when compared to the price of oil.

3) **Bargaining Power of Suppliers**

Many major service providers in the petroleum industry are fully incorporated throughout the whole life cycle of the oil and gas sector. These corporations might be large international oil companies, oil-rich countries, or institutions that control worldwide oil supply and have an influence on global crude prices. As a result, suppliers' bargaining strength is greater than purchasers'.

4) **Threat of Substitute Products**

Coal, nuclear energy, hydrogen, biofuel, and renewable energy are some alternatives replacement to oil and gas as renewable resources for power, industry, and transportation. However, these substitutes are not sufficient enough yet to meet the global energy requirement. Furthermore, the effort to rebuild hydrocarbons as an energy source needs significant funding for research, technology, and delivery. As a result, the threat of a substitute product is minimal.

5) **Rivalry among existing competitors**

Competition between existing rivals refers to the intensity with which firms in the same sector compete for market share and profitability (Rothaermel, 2017: 82). The rivalry in the oil and gas business is considered strong. The competition occurs between multinational, private, and national oil businesses, with few strong players with a competitive
advantage over its competitors and numerous lesser knowns with a small market share.

C. Internal Environment Analysis: VRIO

One of the biggest, most intricate, and crucial worldwide sectors is the oil and gas sector. With products including fuels for transportation, heating and power, asphalt, lubricants, propane, and dozens of more petrochemical goods like carpet, eyeglasses, and clothing, the sector affects everyone's lives. Elections, geopolitics, international conflicts, and national security are all impacted by the industry. The world economy's two most carefully followed commodity prices are likely the prices of crude oil and natural gas. The industry has experienced many turbulent events in recent years, including the rise in American oil and gas production, sanctions against Russia and improved relations with Iran, ongoing conflict in Iraq, Libya, and other oil-exporting nations, and technological advancements in unconventional oil and gas. All of this comes amid predictions that the global demand for energy will increase by 30-40% by 2040.

Patronyc Energy as one of oil and gas company in Indonesia will face the future challenge in developing its asset which already in mature phase. The more mature an oil and gas field, the more challenge on higher cost and complex operation that will be faced by an operator.

VRIO analysis will be used to perform the internal environment analysis to figure out company’s strong competencies to face the future challenge. Based on the premise that strategic resources can give the chance to establish a long-lasting competitive edge over its competitors in the industry, resource-based strategic analysis is used to analyze the company's options. This long-lasting competitive advantage may enable company to generate profits that are above normal for the sector and stave off rivalry.

1) Valuable

Oil and gas as an output product as the primary resources of Patronyc Energy. Oil and gas operation are categorized as high-risk high capital industry, hence it is difficult and expensive for future entrants to enter the market. While Patronyc energy also has covered almost 90% gas supply in Kalimantan.

2) Rare

Patronyc energy is also one of oil and gas operator that has a great history to perform “exotic” operation in mature field. While Patronyc Energy is also being the one and only oil and gas company which operate typical swamp field. Swamp field operation requires specific resources and experience. It may create a difficult for new entry to enter the competitive landscape.

3) Imitation Costly

The majority of sectors are currently dealing with escalating disruption concerns. Data from The Global Oil and Gas Industry suggests that Gas Oil's primary differentiator is challenging to be imitated with renewable sources. On a larger scale, imitation of Gas Oil products can take place in two ways: duplication of the company's products, and competitors developing substitute items that upend the existing industry structure.

Based on forecast from BP Global Energy Outlook Report in 2021, renewable source is expected to be the main energy sources in the next 30 years (2050), while existing renewable source only can cover less than 10% of global energy demand.

4) Organizational Competence & Capabilities to Make Most of the Resources

An integrated energy corporation from upstream to downstream is Patronyc Energy and its subsidiary. It is the responsibility of the company to maximize all activity lines in order to provide value to its operations. To add more value to its current position, the corporation actively integrates and streamlines its operations.

D. Root Cause Analysis

Author utilizes Root Cause Analysis (RCA), a commonly used approach, to identify and analyze the root of the issue and provide an explanation for why the issue occurred in the first place. RCA is a methodical procedure that can be used to identify the root cause or contributing variables of a negative or near-miss situation. The root cause analysis diagram for this study is shown as follows:

![Root Cause Analysis Diagram](image)

Fig. 4. Root Cause Analysis. Source: Author Analysis.

E. Production Sharing Contract (PSC) Scheme

Patronyc Energy adopt Indonesia's upstream oil and gas Production Sharing Contracts (PSC) during operating the Mehadca Block. PSC is a contract between both the Indonesian government and an oil and gas operator to perform exploration and exploitation operations at a particular region associated with production splitting (Haq, 2009: 159)

According to Johnston (1994: 39), a PSC is a contractual arrangement between a contractor and a government alike in which the contractor covers all exploration expenses and risks, as well as development and production costs, in exchange for a specified portion of the production from this operation. The following are the fundamental characteristics of the production sharing principle:

- The state retained ownership to the hydrocarbons.
- SKK Migas maintains supervision, and the operator is liable to SKK Migas for the implementation of oil and gas operations in line with the provisions of the agreement.
- The agreement is related to the production sharing instead of profit sharing. The Government determines the split for the Government and the Contractor.
- The contractor provided all necessary resources and technology for operations and bore all risks.
- The development and production phases are 20–30 years.
- The exploration phase is 6 years, and it can be extended up to 4 years.
- Contractor is obliged and requested to gradually abandon the working area.
- Contractors are authorized to cost recovery thru their production split share.

Fig. 5. Production Sharing Contract (PSC) Scheme (Source: Internal source Patronymic Energy Ltd.).

F. Project Description

Tango LLP will be implemented at Gathering Testing Satellite (GTS) level, with compressor will be located as close as possible to wellhead to improve effectiveness. The project is estimated to start on January 2024 and following the estimated production profile duration (low case, medium case and high case production profile). At the end of production, the tangible asset or equipment is assumed has been fully depreciated and has zero salvage value.

LLP Mobile Compression scenario is assumed to be performed by compressor equipment on board of barge that can be relocated easily from one GTS to the next. This mobile concept would allow to take low LLP stakes at several GTS, while maintaining economic of the activities (daily costs vs gain).

LLP Mobile Compression barge is adopting the concept of existing well testing barge, but equipped with Compression Package, with main functional requirements as follow:
- Well offloading/unloading, including gas flaring;
- Gas-Liquid Separation & Liquid Pumping;
- Gas Compression.

Typical Well Testing Barge in Tango field already consists of testing equipment (separator, flare gas scrubber, gauge tank, pump, boom burner, crane, choke manifold).

Compressor Package will be then installed on board. Compressor Package will be an additional package to be added on well testing barge, with function to compress gas from test separator and return the fluid back to production at higher pressure.

1) Scenario 1

1.1) Production Profile

Estimated incremental production gain from Scenario 1 is at 3.78 Bscf from several wells located at 7 GTS Flank Area. The forecast of natural gas production is described in below table:

<table>
<thead>
<tr>
<th>No</th>
<th>Start Production Month / Year</th>
<th>GTS</th>
<th>Gas Production (Bscf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>January 2024</td>
<td>GTS - K</td>
<td>0.47</td>
</tr>
<tr>
<td>2</td>
<td>July 2024</td>
<td>GTS - R</td>
<td>0.32</td>
</tr>
<tr>
<td>3</td>
<td>December 2024</td>
<td>GTS - E</td>
<td>0.27</td>
</tr>
<tr>
<td>4</td>
<td>May 2025</td>
<td>GTS - F</td>
<td>0.58</td>
</tr>
<tr>
<td>5</td>
<td>December 2025</td>
<td>GTS - M</td>
<td>0.52</td>
</tr>
<tr>
<td>6</td>
<td>September 2026</td>
<td>GTS - Fx</td>
<td>0.84</td>
</tr>
<tr>
<td>7</td>
<td>June 2027</td>
<td>GTS - G</td>
<td>0.88</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>GTS</td>
<td>3.78</td>
</tr>
</tbody>
</table>

(Source: Company Data).

1.2) Capital Expenditure (Capex)

Scenario 1 is estimated require capital expenditure as much as 0.70 million USD or 0.74 million USD ($Mod = Money of the Day) with 2% inflation rate per year as basis of assumption. This Capex estimation include the installation of surface facilities connection from LLP Compression Barge and wellhead platform.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Total</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Expenditure</td>
<td>Million USD</td>
<td>0.70</td>
<td>0.30</td>
<td>0.20</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>Capital Expenditure</td>
<td>Million USD</td>
<td>0.74</td>
<td>0.31</td>
<td>0.21</td>
<td>0.11</td>
<td>0.11</td>
</tr>
</tbody>
</table>

1.3) Operating Expenditures (Opex)

Operating Expenditure is estimated as much as 17.83 million USD22 or 19.08 million USDMOD ($ Money of the Day) for Scenario1 and with 2% inflation rate per year as basis of assumption. This Opex estimation includes the cost for LLP Compression Barge Equipment rental, dredging cost to facilitate access for barge mobilization, Logistic cost such as tugboat, fuel, supporting sea truck, and also the manpower cost (supervision and engineering).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Total</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Expense</td>
<td>Million USD</td>
<td>17.83</td>
<td>5.07</td>
<td>4.45</td>
<td>4.15</td>
<td>4.15</td>
</tr>
<tr>
<td>Operating Expense</td>
<td>Million USD</td>
<td>19.08</td>
<td>5.27</td>
<td>4.73</td>
<td>4.50</td>
<td>4.59</td>
</tr>
</tbody>
</table>

2) Scenario 2

2.1) Production Profile

Estimated incremental production gain at 3.58 Bscf from several wells located at 4 GTS Flank and Crestal Area. The forecast of natural gas production is described in below table:
2.2) Capital Expenditures (Capex)
Scenario 2 is estimated require capital expenditure as much as 0.40 million USD2 or 0.43 million USD ($Mod = Money of the Day) with 2% inflation rate per year as basis of assumption. This Capex estimation include the installation of surface facilities connection from LLC Compression Barge and wellhead platform.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Investment USD22</td>
<td>Million</td>
<td>0.40</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>Capital Investment USD20</td>
<td>Million</td>
<td>0.43</td>
<td>0.10</td>
<td>0.11</td>
<td>0.11</td>
</tr>
</tbody>
</table>

2.3) Operating Expenditure (Opex)
Operating Expenditure is estimated as much as 17.66 million USD2 or 18.92 million USD2 (O Mod = Money of the Day) for Scenario2 and with 2% inflation rate per year as basis of assumption. This Opex estimation includes the cost for LLP Compression Barge Equipment rental, dredging cost to facilitate access for barge mobilization, Logistic cost such as tugboat, fuel, supporting sea truck, and also the manpower cost (supervision and engineering).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Expense USD22</td>
<td>Million</td>
<td>17.66</td>
<td>4.65</td>
<td>4.34</td>
<td>4.34</td>
</tr>
<tr>
<td>Operating Expense USD20</td>
<td>Million</td>
<td>18.92</td>
<td>4.84</td>
<td>4.60</td>
<td>4.69</td>
</tr>
</tbody>
</table>

VI. BUSINESS SOLUTION

A. Discounted Cash Flow Summary
To support this study, several assumptions are made to illustrate summary of PSC agreement between Patronyc Energy as CONTRACTOR, BUMD with 10% of Participating Interest, and the government of Indonesia for this Mehacca working area, which are described as follow:
- PSC Company is responsible for all of the operation management.
- PSC Company will provide all of the capital and technology required in operation.
- PSC Company will receive cost recovery after production.
- PSC Company’s share split before tax for gas and oil production is based on yearly split stated on Production Sharing Contract, as described in Chapter 2.
- First Tranche Petroleum (FTP) is 5% of total production.
- 0% Investment Credit.
- The current PSC will be expired on 31th December 2037.

- LLP Compression Project will be expired at 31st December 2032.
- Net Profit Tax to be paid by PSC Company to government of Indonesia is 36.25%.
- Hurdle Rate as per WACC calculation described in Appendix F amounting 10.2%.

B. Analysis Summary
Scenario 1 and scenario 2 analysis are summarized on table below:

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Production from 7 GTS Flank</th>
<th>Scenario</th>
<th>Production from 4 GTS Flank and Crestal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Start Up</td>
<td>January 2024</td>
<td>Total Reserve Volume, Bscf</td>
<td>3.78</td>
</tr>
<tr>
<td>Total Capex, Million USD (Mod)</td>
<td>0.74</td>
<td>0.43</td>
<td></td>
</tr>
<tr>
<td>Total Opex, Million USD (Mod)</td>
<td>19.08</td>
<td>18.92</td>
<td></td>
</tr>
<tr>
<td>NPV, Million USD (Mod)</td>
<td>1.12</td>
<td>0.91</td>
<td></td>
</tr>
<tr>
<td>IRR, %</td>
<td>Higher than Company Hurdle Rate</td>
<td>Higher than Company Hurdle Rate</td>
<td></td>
</tr>
<tr>
<td>PI</td>
<td>1.07</td>
<td>1.03</td>
<td></td>
</tr>
<tr>
<td>Payback Period</td>
<td>2026</td>
<td>2026</td>
<td></td>
</tr>
<tr>
<td>The most sensitive parameters for NPV</td>
<td>Gas Production &amp; Gas Price</td>
<td>Gas Production &amp; Gas Price</td>
<td></td>
</tr>
<tr>
<td>Probability for negative, NPV, Million USD (Mod) (Monte Carlo Simulation)</td>
<td>28%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Minimum NPV Result, Million USD (Mod) (Monte Carlo Simulation)</td>
<td>(2.35)</td>
<td>(2.93)</td>
<td></td>
</tr>
<tr>
<td>Maximum NPV Result, Million USD (Mod) (Monte Carlo Simulation)</td>
<td>4.61</td>
<td>3.21</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author Calculation.

C. Discounted Cash Flow Analysis
Both scenarios give positive Net Present Value and IRR higher than Company’s hurdle rate. Both parameters indicate project revenue exceeds the cost, and it could be considered as feasible project and worth to invest. Both of the scenario has and give the same year of payback period, in 2026 or two years after project start up.

Scenario 1 gives higher NPV and Profitability Index than scenario 2, even though Scenario 1 has higher total capital and operational expenditure than scenario2.

D. Sensitivity Analysis
After calculating 4 key parameters in sensitivity analysis, it shows that both scenarios would be more sensitive to the changes of gas price and gas production.

E. Monte Carlo Simulation
Both of scenario has the similar probability of having negative Net Present Value based on the Monte Carlo...
Simulation, hence Scenario 1 negative Net Present Value probability is slightly lower than Scenario 2.

VII. CONCLUSION

The following financial conclusions for this LLP Compression Project could be established based on calculation, analysis, and simulation from earlier chapters:

A. Discounted Cash Flow Analysis

Net Present Value for both scenario LLP Compression Project is positive amounting 1.12 million USD for Scenario 1 and 0.91 million USD for Scenario 2. Positive NPV implies that project revenue exceeds its costs and could be considered as feasible project and worth for investment. NPV for Scenario 1 in this LLP Compression Project is greater than Scenario 2. Both scenarios have Internal Rate of Returns (IRR) that are higher than the company's discount rate at 10.2 percent. The IRR result confirms the NPV's conclusion that both project scenarios are economically secure. Based on the payback period parameter, both scenarios are forecasted to achieve break-even point at 2 years following their production stage. The project forecasts being able to recover the investment from the cash inflow generated by that time. Profitability Index for both scenarios are more than 1, amounting to 1.07 for scenario 1 and 1.03 for scenario 2. It indicates that project cash inflow is more than cash outflow. All of the above parameters give similar conclusion, which is LLP Compression Project for Tango field development is feasible and viable to be executed, with scenario 1 generates more value than scenario 2. This conclusion will be achieved if all assumptions mentioned in earlier chapters are actually occurred.

B. Sensitivity Analysis

The sensitivity analysis for both scenarios reveals that this project is more vulnerable to changes in gas price and gas production volume. The second important factor is operational expenditure. As the most dominant key parameter, price changes would give impact NPV result from USD.

Based on scenario project estimations of the lowest case (all variables are 25% lower) and high case (all variables are 25% higher), the lowest potential NPV is negative 0.21 million USD and the maximum NPV is 2.45 million USD, accordingly.

Both the gas volume of production and the gas price are becoming more vulnerable in comparison to others, as the majority of the LLP Compression Project’s gas output will be marketed on the spot price, which is determined by worldwide oil prices and production volume. As a result, management should pay special attention to these critical parameters in order to keep the project profitable.

C. Monte Carlo Simulation

Using four variables in sensitivity analysis, Monte Carlo simulation would like to portray the scenario when these variables vary by 75 percent to 125 percent over a 1,000-iteration period.

The result of failure probability or having negative NPV based on the above scenario are at 27% probability. The NPV simulation result vary from negative 2.5 million USD up to 4.34 million USD.

CONFLICT OF INTEREST

Authors declare that they do not have any conflict of interest.

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