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INVESTMENT PROJECT ANALYSIS ON OIL PIPELINE REPLACEMENT PROJECT

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OPENING PARAGRAPH

One investment opportunity in one of Indonesia's largest crude oil producers is the replacement of existing 10-inch pipeline, approximately 12.6 km lengths, to secure crude oil delivery for the next 20 years. Data on pipeline general conditions, inspection results, and Right of Way (RoW) conditions clearly indicate critical concerns regarding internal and external risks due to pipeline age that near to end of useful life, heavy metal loss, and population and community growth around pipeline RoW. The pipeline replacement will solve the current problems and establish new infrastructure with 20 years of design life to support Indonesia oil production. The replacement project will require high investment costs. Project economics will be valuable input to evaluate whether the investment of pipeline replacement is feasible or not. This study assesses the financial analysis using gross split scheme to understand the economics of the proposed investment project as considerations prior to final investment decision. Discounted cash flow (DCF) method and sensitivity analysis are used as financial tools with specific profitability measures using Internal Rate Return (IRR), Net Present Value (NPV), Profitability Index (PI), and Payback Period. This study also performs cost risk assessment using Monte Carlo simulation as one of modern solutions to obtain probabilistic capital investment cost that fully reflect the impact of uncertainty and risk.

COMPANY BACKGROUND

Current Operator
The current operator operates one of biggest Indonesia's oilfield block located in Sumatera Island through production-sharing contract (PSC) in partnership with Special Task Force for Upstream Oil and Gas Business Activities (SKK Migas) as representative of government of Indonesia. The PSC will be valid until August 2021. Hydrocarbon Transportation Team (HCT) is the team which operates and maintains facilities used to ship oil to tank farm will henceforth be exported through the port and to ship gas from gas plant to power generator plant.

Next Operator
Government of Indonesia has selected the state-owned oil and gas firm to operate the oilfield block after the PSC expires in August 2021. The next operator will operate "Alfa" block until 2041 under gross split production sharing contract. The next operator has already realized the integrity issues of aging pipeline facilities that were already 45 years old. The next operator plans to start conceptual study of oil pipeline replacement in 2019 and start the replacement work immediately to avoid high risk of pipeline shut down in 2021 due to maintenance or replacement activities.

SPECIFIC PROBLEM

The existing aging pipeline was constructed 45 years ago in condition above ground and no community yet at that time. Current conditions, many pipeline spots have been buried without improved coating and additional cathodic protection to prevent corrosion. The existing pipeline has integrity issues due to wall thickness loss and community growth around the pipeline Right of Way (RoW).

Long Range Ultra Sonic Testing (LRUT) was conducted on the existing 10-inch pipeline in 2009 with result indicated some pipeline spots have heavy metal loss anomaly. The pipeline thickness in 2020 is predicted using corrosion rates simulation will be at high risks due to heavy metal loss thickness entire length.

This study assesses investment analysis of 10-inch oil pipeline replacement with objective to provide inputs from financial terms whether the project is feasible or not to be executed as an investment project. Sensitivity analysis is performed with objective to provide quantitative information on what financial effects will be caused by variations from what projected. Quantitative risk analysis using MCS is performed to provide more realistic and accurate capital investment cost target for the pipeline replacement project including supporting facilities such as powerline and maintenance access.

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ALTERNATIVES

Discounted Cash Flow (DCF) method and sensitivity analysis are used in this study to understand the economics of the proposed investment project. Investment analysis in this study refers to gross split PSC by considering the pipeline replacement will be performed by the next oil block operator. The flow diagram of investment analysis is depicted in figure 1 below.

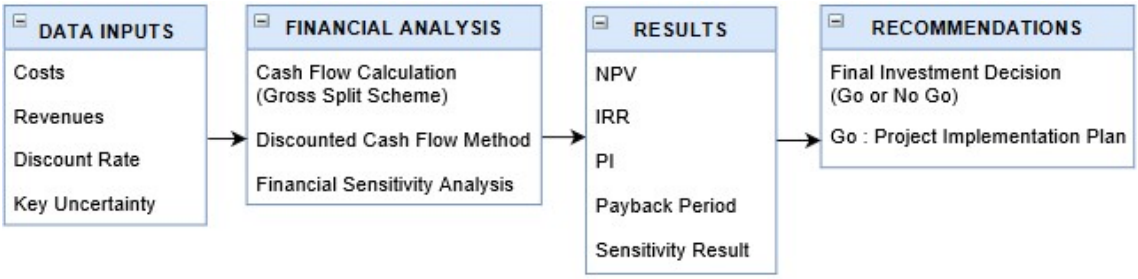

Figure 1 - Investment Analysis Flow Diagram

The calculation reference based on gross split mechanism is illustrated in figure 2 below.

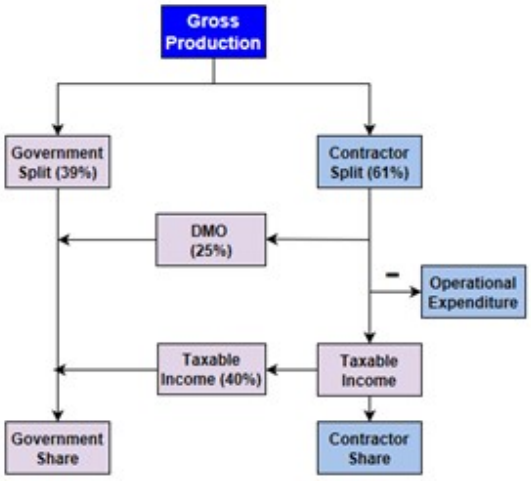

Figure 2 - Gross Split Mechanism

1. Capital Investment Cost
   There are 2 (two) components identified as capital expenditures in the overall economic analysis of existing 10-inch pipeline replacement projects.
   a. Cost of new pipeline and supporting facilities such as powerline facilities and maintenance access
      The scope of capital cost consists of engineering, procurement and construction of new pipeline and supporting facilities, and also land acquisition costs. The project is expected to be started by 2019 with estimated construction duration is 2 years including land acquisition process for new pipeline RoW.

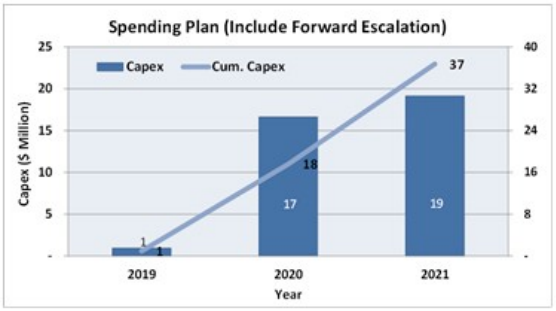

Figure 3 – Spending Plan of Capital Expenditure

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b. Cost of New Infill Wells

There will be 5 (five) new infill wells drilled every 3 years over 20 (twenty) years.

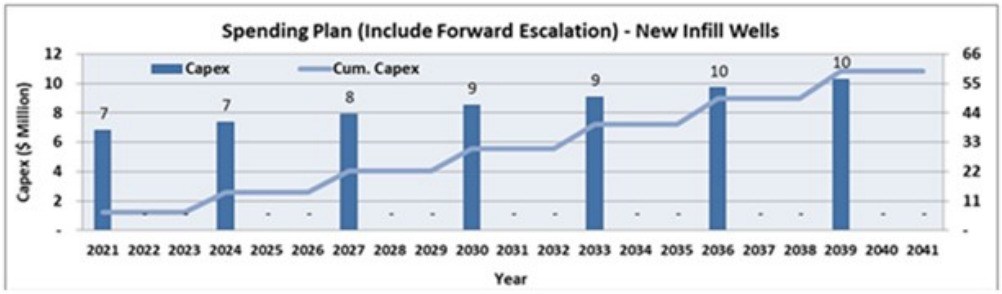

Figure 4 – Spending Plan of New Infill Wells

2. Abandonment Cost

There are 2 (two) demolition cost includes in this financial analysis:

a. Demolition of existing aging facilities after new facilities put in service (year 2021)

b. Demolition of new facilities at the end economic life assumption (year 2041)

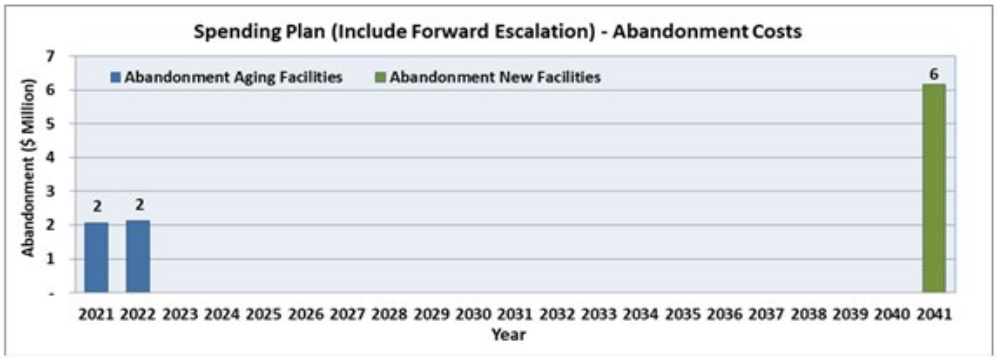

Figure 5 – Spending Plan of Abandonment Costs

3. Operational Cost

Operational expenditures or OPEX is an ongoing cost required for oil pipeline operation and maintenance. Assumption of operational cost is $16/ bbl. based on average production cost data.

Figure 6 – Spending Plan of Operational Expenditures

4. Revenues

Production profile is developed with decline rate assumption 15% per year based on average historical data. Five new infill wells will be drilled every three years with decline rate 15% per year. Oil price assumption is $60.49/ bbl, flat for 20 years, based on 2019 dynamic Indonesia Crude Price data.

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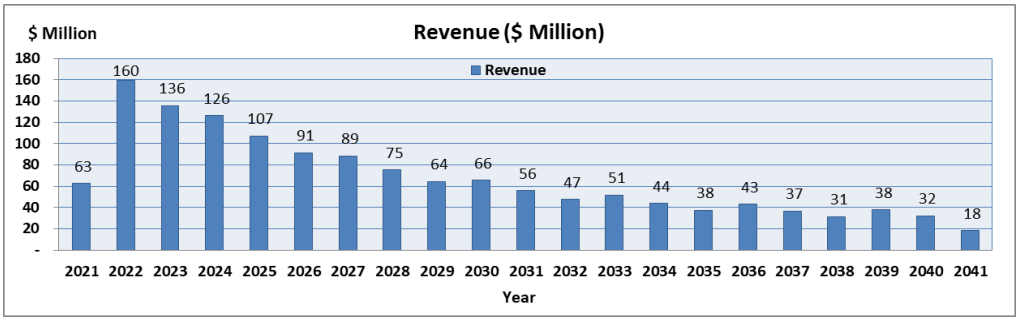

Figure 7 – Revenue Profile

5. Financial Analysis and Sensitivity Analysis
   This study uses 10% as discount rate based on the next operator's policy of standard single corporate discount rate (10%).

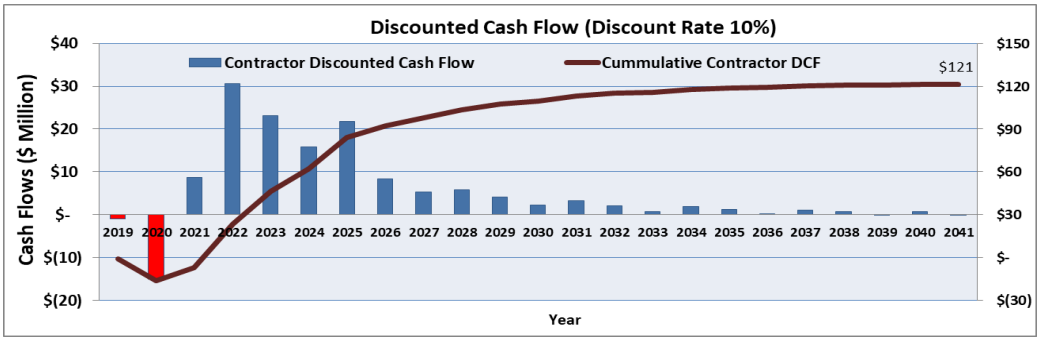

Figure 8 – Operator Discounted Cash Flow with 10% Discount Rate

Conclusions

1. Project economic indicators, resulted from financial analysis using discounted cash flow method and gross split financial terms, show positive NPV ($ 121 millions), IRR (99%) is higher than determined discount rate, high PI (4.8), and short payback period (less than 1 year). All economic indicators indicate the project is attractive and feasible to be executed.
2. The result of sensitivity analysis with low scenario in production profiles, oil prices, opex and capex show positive NPV and high PI number. The sensitivity analysis still recommend the final investment decision be taken to execute the replacement of the old pipeline including supporting facilities.

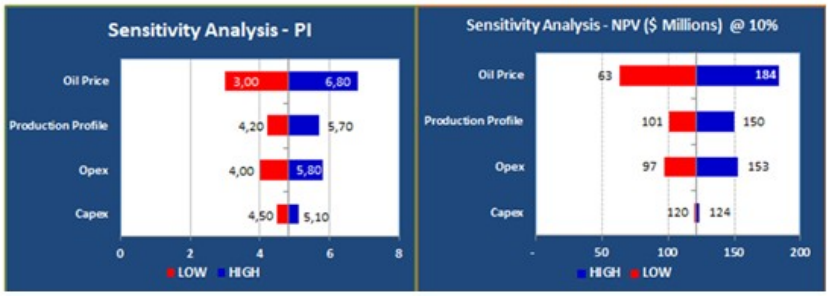

Figure 9 – Sensitivity Analysis Result

3. The recommendation for a realistic final investment budget for the replacement of existing 10-inch pipeline with approximately 12.6 kms length including supporting facilties is $ 35.9 millions based on the probabilistic cost resulted from cost risk analysis using Monte Carlo simulation. The cost includes 9.5 percent as the cost of contingency to cover uncertainty and risks.

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