Adaptive Scenario Planning Development for Indonesian Upstream Oil and Gas Industry: Case Study of PT Kelola Migas in Managing Mature Field Phase

Rolly Hermawan Sridjaya and Ir Ahmad Yuniarto

ABSTRACT

The global economic conditions after the COVID pandemic, which have not fully recovered, the vulnerability of global oil prices due to unpredictable external factors, global pressure for decarbonization efforts and the fulfillment of Environmental, Social and Governance (ESG) parameters to support energy transition, the less competitive condition of oil and gas reserves in Indonesia, and the contract schemes and fiscal incentives in Indonesia that are considered unattractive by investors are part of the tip of the iceberg of uncertainty in the external conditions of the upstream oil and gas industry in Indonesia. In relation to the above conditions, PT Kelola Migas (PT KM) requires a comprehensive strategy formulation process based on a long-term understanding of potential future scenarios that focus on external factors as uncontrollable factors that will significantly impact the company. This research is conducted with a focus on the use of adaptive scenario planning methodology, which will provide a fresh perspective for PT KM in utilizing strategic tools oriented towards the medium and long term. Exploring the implications and mitigation options for each scenario is conducted to provide strategic choices in facing potential situations. The identification of early warning signals for each scenario is also carried out as indicators of changes in the current situation towards one scenario or another.

Keywords: Adaptive Scenario Planning, Critical Uncertainties, Early Warning Signals, Upstream Oil and Gas Industry.

I. INTRODUCTION

The challenges currently faced by the Indonesian upstream oil and gas (“upstream”) industry are not easy, as various global and domestic external factors have led some observers to “assume” the industry is entering the era of sunset industry. Several noteworthy global and domestic occurrences include, the global pandemic which still under recovery, oil price vulnerability, uncompetitive reserve to production rate, unfavorable contractual scheme and the pressure to make efforts towards decarbonization, contribution in energy transition and efforts to achieve net zero carbon, these challenges further strengthen the uncertainties faced by PT Kelola Migas (PT KM) as one of Indonesian oil and gas contractor which in parallel must grapple with internal declining production level due to mature field phase. The combination of external and internal business challenges raises further concern upon PT KM long term operational sustainability in facing unpredictable uncertainties. Therefore, in this unpredictable environment, long term scenario planning is crucial to anticipate uncertain changes in the global and domestic upstream industry. Since trends of the past are no longer accurate predictors, so PT. KM should look and think ahead and prepare for more unpredictable futures (Stapleton, 2020). Following is the key focal issue in this research:

“What would be the condition of upstream oil and gas industry in Indonesia in the next 10 years”.

II. LITERATURE REVIEW

A. Planning vs. Forecasting

The most common misconception is forecasting often considered equal to scenario planning, to the extent that both are predicting and generating future conditions. Scenarios are different from forecasts because in scenarios a range of possible outcomes resulting from uncertainty are explored whereas, purpose of forecasts is to identify the most likely pathway and estimate uncertainties (Ghalambor et al., 2012) as seen on Fig. 1. Therefore, scenario planning is not forecasting of the most probable future, but it creates a set of the plausible futures. Further, scenario does not predict the future, but it explores multiple plausible future situations with the purpose of broaden the boundaries of thought of the participants in the scenario development process (Godet, 2000). Scenarios are also not concerned with getting the “right” future, rather they aim at challenging current paradigms of thinking and generate series of plausible stories in which purpose is to reveal evidence that does not fit our current conceptual maps, especially when it threatens our very existence (Schoemaker, 1995).
Moreover, scenarios are particularly valuable as a tool for strategic planning when it comes to paradigmatic or non-linear change, for instance when organizations are reaching a level of “over-maturity” and need to be replaced with something new, or in the face of rule-breaking competition that is creating a new business logic (Lindgren & Bandhold, 2003). In this research PT KM currently facing “maturity level” in term of field production level and there is a need to maintain its operation and profitability over the period of contract scheme, hence ability and readiness to prepare for critical uncertainties through portray of plausible scenarios of the future is prominent to determine its sustainability and or even providing new ground for new business logic.

B. PT KM Current Business Strategy

PT KM is an Indonesian National Oil Company (INOC) that has been assigned by the government to take over the management of Block “X,” which is a terminated block previously operated by Petro since late 2010s. Though the transition period was quite challenging in term of operation and technical arrangement, work program establishment has merely returned to the level of work program prior to previous operator where aggressive work program is needed due to reserve characteristic and the maturity phase which currently undergo by Block “X” as shown in Table I.

C. PESTEL Analysis

PESTEL (Political, Economic, Sociocultural, Technological, Ecological and Legal), This analysis will be applied to capture plausible external driving forces, trends and or weak signals which might affect PT KM in determining its strategic planning and decision.

III. RESEARCH METHOD

Research methodology applied in this research is scenario planning, a process that stimulates imaginative, creative thinking to better prepare an organization for the future (Garvin & Levesque, 2006) while the scenario planning type used in this study is Adaptive Scenario Planning which focuses on identification plausible futures to enable organization to learn, anticipate, plan and formulate strategies imperatives to adapt, survive and thrive (Kahane, 2012). Further this research also adopted the scenario planning stages as introduced by Garvin and Levesque (2006) with 5 (five) consecutive stages in conducting scenario planning process mentioned in Fig. 2.

This qualitative research is also supported with the primary and secondary data collection to support scenario planning. Primary data sources will be obtained by conducting 3 (three) steps questionnaire, in depth interview (Woodsong et al., 2005) and Focus Group Discussion (FGD) with the key respondents. Secondary data was obtained from internal and external documents including annual reports, as for external data, consists of journal articles, research papers, and other relevant external reports (Kumar, 2011). In addition, referring to the population study by Linneman and Klein (1983) in the US industry during 1977-1981 indicates that 72% of population is generating scenarios with time horizon for 10 years or more with majority of scenario users belong to capital intensive industries including petroleum industry, consistent with the subject of this research. Referring to these

![Forecast vs Scenarios (Ghalambor et al., 2018).](image1.png)

**Fig. 1. Forecast vs Scenarios (Ghalambor et al., 2018).**

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production Indicator</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production - Oil</td>
<td>Boepd</td>
<td>57,625</td>
<td>52,702</td>
<td>46,852</td>
<td>34,029</td>
<td>31,731</td>
<td>26,362</td>
<td>24,922</td>
</tr>
<tr>
<td>Production - Gas</td>
<td>Mimsfd</td>
<td>1,772</td>
<td>1,711</td>
<td>1,437</td>
<td>803</td>
<td>711</td>
<td>606</td>
<td>528</td>
</tr>
<tr>
<td><strong>Financial Indicator</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Profit</td>
<td>MUSD</td>
<td>148</td>
<td>98</td>
<td>141</td>
<td>728</td>
<td>402</td>
<td>103</td>
<td>252</td>
</tr>
<tr>
<td>EBITDA</td>
<td>MUSD</td>
<td>2,306</td>
<td>1,362</td>
<td>1,035</td>
<td>1,219</td>
<td>883</td>
<td>550</td>
<td>755</td>
</tr>
<tr>
<td><strong>Operation Indicator</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wells Quantity</td>
<td>Number</td>
<td>106</td>
<td>46</td>
<td>22</td>
<td>61</td>
<td>128</td>
<td>81</td>
<td>62</td>
</tr>
<tr>
<td>Well Intervention</td>
<td>Number</td>
<td>8,534</td>
<td>7,151</td>
<td>7,371</td>
<td>6,671</td>
<td>6,828</td>
<td>5,103</td>
<td>4,234</td>
</tr>
</tbody>
</table>

**TABLE I: PT KM PRODUCTION – FINANCIAL – OPERATIONAL INDICATOR (INTERNAL REPORT, 2021)**

**Fig. 2. Scenario Planning Stages (Garvin & Levesque, 2006).**

![Scenario Planning Stages (Garvin & Levesque, 2006).](image2.png)
IV. RESULT

The key step prior to conducting scenario planning development is to identify and determine the key respondent to avoid bias perception and analysis. As a reference prior determining the key respondents, the identification of contextual environment and transactional environment aspects (Ramirez & Wilkinson, 2016) for PT KM should be done to understand the external factors that can influence the upstream oil and gas industry in Indonesia and also to identify the actors who have been associated with PT KM in carrying out its operations as shown in Fig. 3.

Fourteen key respondents are chosen to comprise with six respondents from internal PT KM and PT Migas Indonesia (PT MI) as its holding company, while eight respondents comprise external stakeholders comprise of oil and gas expert practitioner, oil and gas regulators, gas buyer representative, energy consultants, International Oil Company (IOC), Non-Government Organization (NGO) and service provider.

A. Stage 1 Orientation

At this stage, in addition to introducing the adaptive scenario planning method, the most important aspect to emphasize is the discussion on the key focal issue: ‘What would be the condition of the upstream oil and gas industry in Indonesia in the next 10 years?’ By synchronizing the key focal issue with PT KM’s vision and mission, the main objective is

“What strategies can be considered by PT KM to face the uncertainties in the upstream oil and gas industry while maintaining sustainability and/or gaining a competitive advantage in the next 10 years?”

B. Stage 2 Exploration

In the second stage, exploration is conducted on events, issues, black swan events/wildcards, and trends that can influence the upstream oil and gas industry in Indonesia over the next 10 years through distribution of 2 (two) table of questionnaires. Qualitative aggregation is then carried out to determine the main driving forces by referring to the similarity of themes and backgrounds among these external factors. The result of 10 (ten) main external driving factors that serve as primary considerations are (1) government policy and regulation, (2) government policy and regulation, (3) oil and gas supply and demand, (4) Economic Growth, (5) ESG awareness and requirement, (6) oil and gas technology advancement, (7) technology disruption and economic scalability of new and renewable energy, (8) growth in electricity utilization, (9) population growth and (10) Pace of energy transition.

Referring to the 10 external driving forces, key respondents provides scoring ranging from 1 to 10, based on two aspects: the level of impact and the level of uncertainty. From the scoring feedback provided by the key respondents, the prioritization scale of the external driving forces is determined using (1).

\[ \text{Priority Number} = \text{Degree of Impact} \times \text{Degree of Uncertainty} \]

The Degree of Impact or Degree of Uncertainty is calculated using (2).

\[ \text{Degree of Impact or Degree of Uncertainty} = \frac{\text{Total sum score from all key respondents}}{\text{Total number of key respondents}} \]

Referring to the results in Table II, the two external driving forces that will be used as a framework to build plausible scenarios for the upstream oil and gas industry in Indonesia over the next 10 years are “Government Policy & Regulation” and “Geopolitical Tension”.

C. Stage 3 Scenarios Creation

The third stage involves the selection of plausible scenarios based on the two external driving forces previously chosen: “Government Policy & Regulation” and “Geopolitical Tension” as shown in Fig. 4. This stage also involves the creation of scenario narratives, consisting of three plausible scenarios for the upstream oil and gas industry in Indonesia over the next 10 years, they are:

1) Hiding to Nothing Scenario (“HtoN”)

2) Growth and Energy Transition

3) Conflict and Energy Transition

The geopolitical conditions reached a culmination of conflicts never seen before, with several “near misses” to
World War III. The crisis of fossil fuel availability worldwide, soaring oil prices, high inflation rates, sluggish global economic growth, and the return of foreign funding to their respective countries are some of the resulting impacts. OPEC, as one of the crucial organizations responsible for balancing oil production, appeared silent and failed to take concrete steps to address these issues.

Fig. 4. Scenario Matrix for Indonesian Upstream Oil and Gas upstream oil and gas industry in Indonesia over the next 10 years.

This led to an exponential growth of NRE in Europe, which had to be pursued in survival mode. The share of NRE in Europe’s energy mix reached 40%, nearly doubling compared to 2021, with solar PV and offshore wind as the main contributors, while gas and nuclear energy were still needed as base loaders. The United States, with its relatively stable shale oil production, not only assisted Europe but also emerged as a global player in Enhanced Oil Recovery (EOR), Carbon Capture Storage or Carbon Capture Storage and Utilization (CCS/CCUS) in the upstream oil and gas industry, and also kept up with developments in hydrogen, geothermal, and biofuels. Both Europe and the United States not only secured energy supply but also placed increasing emphasis on the importance of ESG aspects in all sectors, including the upstream oil and gas industry.

The unfriendly geopolitical conditions and reluctance to take sides, put Indonesia in a complicated geopolitical position. The scarcity of oil commodities, high prices, and high inflation pressures forced Indonesia to take drastic steps to secure energy fulfillment by turning to a widely available, affordable, and fast option: coal. With the 11th largest reserves in the world and ease of exploitation compared to oil and gas, it is not difficult to prioritize coal as the first choice, especially considering that coal-fired power infrastructure still accounts for over 40% of the existing power generation capacity. As a consequence, the upstream oil and gas industry became a secondary priority, with policy focus and regulatory priorities that should have been the main drivers for its development in Indonesia being neglected. Inconsistencies in the upstream industry roadmap, the delayed passage of the Oil and Gas Law, the absence of new incentive schemes, lengthy and costly bureaucratic processes for permits, the lack of participation and operaritoship rights guarantees, and uncertainty in field commerciality are basic aspects that have not been addressed through government policies. Fiscal incentives have been provided to oil and gas contractors, but the mechanism for granting incentives is individual-based, with requests and objections made by the business entities themselves. The cumulative effect of this unfavorable investment climate has led to a decrease in investment flows, a lack of oil and gas contractors willing to take risks in entering non-producing basins, and the halted management of long-stranded assets held by both NOCs and IOCs, resulting in the unattainment of the production target, 1 Mbopd oil and 12 Bscfd gas. The implementation of the latest upstream technologies, EOR, and decarbonization technologies such as CCS and CCUS, has become unattractive due to the lack of incentives hence disinterest from service companies due to uncompromising commercial margins. The untapped potential of reserves, the management of mature blocks that can still contribute with proper business strategies and technology, the existence of long-stranded assets due to policy inconsistencies, and the significant economic potential for decarbonization efforts and relatively high oil prices are the strength points of the upstream oil and gas industry in Indonesia. However, these strengths require progressive support in the form of government policies and regulations.

2) "Peek-a-boo Scenario ("Pab")"

Geopolitical tensions have reached their highest point in the past two decades. The world is divided into three main blocs: Russia and China, The West, and the Non-Aligned Movement. The formation of these power blocs is not only based on political influence but also on socio-economic similarities and even energy fulfillment. In the year 2032, fossil fuels still account for 70% of global primary base load energy fulfillment, despite the rapidly development and economic viability of new and renewable energy, which is driven by the increasingly massive and affordable technology in the sector. OPEC+ also plays a crucial role in determining the scale of oil production and the global supply chain, which impacts the price of crude oil and global economic stability.

Europe has become a leader in the exponential development of New and Renewable Energy (NRE) due to the scarcity of oil and natural gas. Technological advancements, government support, and the commitment of

<table>
<thead>
<tr>
<th>TABLE II: EXTERNAL DRIVING FORCES RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Driving Forces</td>
</tr>
<tr>
<td>Government policy and regulation</td>
</tr>
<tr>
<td>Geopolitic tension</td>
</tr>
<tr>
<td>Pace of energy transition</td>
</tr>
<tr>
<td>Technology disruption and economic scalability of new and renewable energy</td>
</tr>
<tr>
<td>Oil and gas supply and demand</td>
</tr>
<tr>
<td>Oil and gas technology advancement</td>
</tr>
<tr>
<td>Growth in electricity utilization</td>
</tr>
<tr>
<td>ESG awareness &amp; requirement</td>
</tr>
<tr>
<td>Economic growth</td>
</tr>
<tr>
<td>Population growth</td>
</tr>
</tbody>
</table>

DOI: http://dx.doi.org/10.24018/ejbmr.2023.8.4.2019
major energy companies have made NRE more affordable, leading to widespread electrification. On the other hand, the United States leads in achieving "green oil" through decarbonization technologies such as CCS/CCUS, hydrogen, and geothermal energy.

With the scarcity of fossil fuel commodities, unfavorable global economic conditions, and the pressure of domestic demand, the Indonesian government has implemented several important policies and strategic decisions in the upstream oil and gas industry to ensure continued investment flow and sustainable energy availability. Rejoining OPEC is the first step taken by Indonesia to secure access to the global oil market. The enactment of the Oil and Gas Law, the Production Sharing Contract (PSC) Cost Recovery Generation 5 scheme packed with incentives, especially for gas field development and green field areas, centralization and acceleration of bureaucratic licensing processes, domestic gas price limitations, the ban on oil and gas exports, as well as guarantees of participating interest and operatorship for IOCs and the absence of mandatory assignment for INOC, which sparked lengthy political debates, demonstrate the government's determination to ensure energy fulfillment regardless of the entities involved. Incentive packages for the implementation of EOR using CO$_2$, CCS, and CCUS are also available, but the focus mindset is on accelerating production and supported with clear roadmap, with oil and gas contractors showing more interest in the latest upstream technologies and non-CO$_2$ EOR. These policies have resulted in a significant increase in foreign investment in the upstream oil and gas sector, the acceleration of Field Development Plan (POD) processes, production increase, the initiation of Engineering, Procurement, and Construction (EPC) for several fields with major reserve discoveries that had been delayed for a long time, including Masela Block and, most importantly, the achievement of the production targets of 1 Mboepd and 12 Bscfd of gas. However, the optimistic side of decarbonization in the Indonesian NDC is not accompanied by the commitment and implementation, which leads to the unfulfilled decarbonization targets in the upstream oil and gas industry have led to limited access to funding from the global market. Changing the mindset of local governments regarding the "no cash, no pay" policy for their 10% Participating Interest (PI) and concerns about reducing the state's share due to numerous incentives are among the issues that need to be addressed by the government.

3) **What You See is What You Get Scenario ("WYSWYG")**

The world conflicts have reached a point of resolution, leading to a gradual availability of global commodity supplies, including oil and natural gas. As a result, global inflation rates have started to decline, followed by a recovery in global economic growth and a positive trend in energy consumption. Europe, which was heavily reliant on Russian gas, has transitioned to sourcing 60% of its energy from new and renewable sources, but still relies on fossil fuels and nuclear energy to fill the energy base load gap.

The growth of NRE electrification is not only due to strong government regulations but also technological advancements and the commitment of supermajor companies that have diversified their assets not only in the upstream and downstream sectors but also in NRE, despite the supply chain risks of NRE still being 70% dependent on China. On the other hand, the United States remains focused on decarbonizing the upstream sector through the implementation of EOR, CCS, and CCUS, without neglecting hydrogen, geothermal, and biofuels.

The shift in the global energy landscape has significant positive impacts, allowing Indonesia the flexibility to import fossil fuels from the global market. From an energy political perspective, Indonesia feels that it is not necessary to rejoin OPEC to secure access and allocation for oil production, allowing Indonesia independency to control its own supply demand risk. This condition has led the Indonesian government optimism to focus not only on fulfilling domestic fossil fuel supply but also managing profitability and ensuring energy sovereignty, as reflected in the cautious energy policies it has implemented. The enactment of a new oil and gas law, followed by the issuance of the PSC Cost Recovery Gen. 5, packed with incentive schemes ("carrot"), requirements and sanctions ("stick") not only to achieve production targets but also for transitioning to clean energy, signifies a breakthrough policy. Restoring domestic gas prices, reopening opportunities for long-term Liquefied Natural Gas (LNG) commitments and "one-time" changes to contract schemes, are policy breakthroughs to enhance field economics. Meanwhile, granting privileges to INOC to obtain the second-largest PI, operatorship in new blocks, and the absence of mandatory assignment for ex-termination block management enhances the competitiveness of INOC and serves as a means for the government to maintain control over its domestic energy management.

The implementation of the oil and gas cutting edge technologies, as well as the economic viability and mass implementation of NRE, EOR (CO$_2$), CCS, and CCUS, is not only solely due to incentives and clear profitable business model environment, but also the support from China and US-based business entities. This further drives the compliance of the oil and gas industry in terms of ESG aspects and contributes to the reduction of carbon emissions from the upstream oil and gas industry in Indonesia. In the end, production targets of 1 Mboepd of oil and 12 Bscfd of gas are achieved, with the level of government take from the upstream oil and gas industry remaining stable and even slightly increasing due to the sustained production levels from mature fields and exploitation activities in green field areas and non-producing basins. The industry also faces challenges. With the implementation of ESG practices, the funding requirements from the global market will become stringent. Furthermore, the introduction of an ETS in Indonesia, the potential reduction in profitability for oil and gas contractors could occur, even with carbon credit prices still being "very low" at USD 5/tCO$_2$.

**D. Stage 4 Option Consideration**

After identifying the plausible scenarios that may occur in the upstream oil and gas industry in Indonesia over the next 10 years, the next step is to identify the plausible scenario implications to PT KM and determine options measures that can be prepared to adapt to these conditions. Please see Table III and Table IV for more detailed information.
E. Stage 5 Integration

In this stage, the external early warning signals will be determined for each plausible scenario. It is important to emphasize that these external conditions changes do not happen suddenly but gradually. Therefore, by conducting regular monitoring and evaluation, PT KM can assess and begin to identify which scenario is more likely to occur. Please see Table V for more detail information.

V. CONCLUSION

Three plausible scenarios have been created to provide an understanding of potential developments in the upstream oil and gas industry in Indonesia over the next 10 years (2023-2032), which will undoubtedly impact the business sustainability of PT KM they are: (i) "HtoN", (ii) "Pab", (iii) "WYSWYG". Based on the findings of this research, it can be stated that referring to the results of plausible scenario planning, implications, options, and early warning signals will enable PT KM to develop 3 (three) strategic imperatives as a crystallization of the identified options that have been conducted as follow: (1) Strengthening core business capabilities, (2) Strengthening strategic partnership and stakeholder relation, and (3) Acceleration of new upstream technology adoption and identification of new business opportunity. The strategic imperatives must also be formulated as an open plan, subject for modification as the scenario evolves based on the early warning signals.

A. Strengthening Core Business Capabilities

To be prepared for “all plausible scenarios”, PT KM must have a strong baseline in terms of operations and finances, especially considering the natural decline of "Block X".

1) Maintain asset integrity and maintenance. When Petro transferred the management of "Block X" to PT KM, 90% of the infrastructure assets were inherited from the previous operator that had been operating since 1967. With an average asset age of over 10 years, asset maintenance and integrity monitoring are fundamental not only in terms of HSSE aspects but also in minimizing incident costs and the opportunity cost of halting oil and gas production.

2) Maximize well outcomes based on stringent cost-benefit analysis, which includes well intervention efforts, well services, alternate perforations, and reactivation of old wells. These measures are necessary to mitigate the decline in production rate and must be balanced with the associated costs.

3) Maximize borderless operations with other subsidiaries under PT Migas Energi (PT ME) and PT MI, the parent companies of PT KM. Borderless operations consist of several strategic steps of mutualistic cooperation to reduce costs and maintain competitiveness in production costs. These steps include joint procurement of open contracts for the same material or service, maximizing the use of ex-termination material among subsidiaries, maximizing intercompany transactions at competitive prices, and implementing new working methods through cost optimization sharing programs.

4) Undertake exploration efforts in the offshore areas of “Block X”, which have not been extensively explored before, to assess the potential for additional economic benefits that can be gained.

5) Rationalization between operational activities, company profitability, and the required input resources, with operational efficiency and profitability as the primary priorities for PT KM. Prudence should be exercised to avoid operational disruptions that could adversely affect the company's profitability.

Special emphasis is needed if the "HtoN" scenario starts to unfold, where high geopolitical tensions and minimal government support for the development of the upstream oil and gas industry are present. In such a scenario, these strategic imperatives become the primary options to ensure the company's sustainability until the end of the contract period.

Furthermore, the coverage of these strategic imperatives also serves as an important baseline strategy that has currently been implemented by PT KM. The current four pillars of PT KM's strategy that resemble the outline of these strategic imperatives are (1) pursuing aggressive work program based on value creation and quick gains to mitigate production decline, (2) continue maturing development portfolio to prepare & anticipate for global economic condition, (3) securing incentives from government to maintain sustainability of PT KM business and operation, and (4) continue efforts of optimization of development and operating costs to maintain profitable and sustainable operation. However, in order to effectively address several plausible scenarios in the upstream oil and gas industry in Indonesia, such as the "Pab" and "WYSWYG" scenarios, the implemented strategy pillars alone will not suffice for PT KM to adapt and maintain the necessary operational and financial sustainability. Therefore, the following recommendations for strategic imperatives need to be considered by PT KM.

B. Strengthening Strategic Partnership and Stakeholder Relation

PT KM must strengthen strategic partnerships with key stakeholders more than ever if the "Pab" or "WYSWYG" scenarios start to unfold.

1) Engage with LNG buyers in the JKT market who have proven to be reliable and trustworthy liabilities for over 30 years. While PT KM's current focus is on spot contracts, having long-term commitments ensures reliable pricing formulas and product purchasing commitments, taking into account the existing production levels. This strategy is more suitable to be implemented in the "WYSWYG" scenario, where the gas export market remains open with the push for long-term contracts and the determination of competitive pricing formulas.

2) Collaborate intensively with Indonesian oil and gas regulators and relevant ministries. With attractive contract schemes and fiscal incentives as depicted in the scenario narrative, PT KM needs to establish formal one-to-one forums periodically with the relevant parties, beyond the existing coordination mechanisms. Monitoring the replacement of reduced contractor takes due to domestic gas price limitations, updating progress on claims for all new incentive schemes such as carbon tax adjustments, full-price Domestic Market Obligation (DMO) holiday period, and other incentive schemes, as well as monitoring the
acceleration process of POD approvals and achieving a Green PROPER rating, which is one of the pillars of PT KM's ESG targets, are highly feasible and likely to receive cooperative responses in the context of the two aforementioned scenarios.

3) Strengthen collaboration with other NOCs and IOCs through formal Indonesian Petroleum Association (IPA) forums to amplify common issues and concerns that require immediate follow-up from regulators and relevant ministries to support field operations and economic viability.

4) Strengthen the relationship and collaboration between PT KM, PT MI, and PT ME. PT KM is a subsidiary of PT MI and a grandchild company of PT ME, which serves as the main holding company and determines strategic policies for all its subsidiary companies. Therefore, PT KM requires approval from PT MI and PT ME in every strategic decision to ensure streamlined planning and integrated business development within the entire business environment of PT ME. Collaboration, transparency, and intensive coordination need to be enhanced compared to before through regular joint forums that focus solely on strategic decision-making, such as risk divestment efforts involving the partial release of participating interest of “Block X” to other NOCs or IOCs and offering participating interest and/or operatorship in exploration blocks adjacent to "Block X" area. Collaboration for the assessment of participating interest divestment needs to be conducted promptly, not only to share risks but also to maintain investor interest in the production performance of the "Block X" field. Meanwhile, ownership of participating interest and/or operatorship in exploration blocks adjacent to "Block X" area, supported by contract schemes and incentives, considering the similarity in reserve characteristics and geographic conditions, as well as the existing infrastructure support in the "Block X" area, will increase the potential ratio of discovering oil and gas reserves and facilitate the required mobilization.

PT KM can also utilize this strategic imperative in the event of the "HtoN" scenario that is likely to occur. However, with minimal government support for the upstream oil and gas industry, PT KM's relationship with Indonesian oil and gas regulators and other ministries becomes a lengthy process that often ends anticlimactically. Without new contract schemes and incentives being offered, PT KM will focus on individually submitting incentive claims rather than collectively with other oil and gas contractors, whether IOC or other NOCs. The incentives provided will also be focused on existing regulatory loopholes.

C. Acceleration of New Upstream Technology Adoption and Identification of New Business Opportunities

This strategy needs to be promptly considered by PT KM if the "Pab" or "WYSWYG" scenario begins to unfold, particularly in response to the Indonesian government's support for the upstream oil and gas industry in the form of more attractive contract schemes and fiscal incentives, regardless of potential geopolitical tensions.

1) The first imperative is the integration of the latest technologies such as unmanned operations, IoT, AI, and the implementation of non-CO₂ EOR or other artificial lift techniques in upstream oil and gas activities. Fiscal incentives and leveraging cash flow from the 10% BUMD participating interest are the primary enablers that give the green light for PT KM to start implementing these technologies, which are already available in the market, and proven to have positive impacts including operational efficiency, production enhancement, reliability, better environmental management, and increased workforce safety.

2) The second imperative is the implementation of upstream low-carbon technologies such as CO₂-based EOR, CCS, CCUS, and NRE to support field operation electrification. Fiscal incentives and the maturation of CCS, CCUS, and NRE technologies, which drive the decreasing cost of LCOCCS/LCOCCUS/LCOE, serve as the primary enablers for PT KM to consider implementing this strategy. In particular, regarding NRE, Indonesia's proximity to China in previous major projects such as KCIC serves as a good precedent, considering China's dominance of 70% of the supply chain for NRE, especially solar PV and offshore wind.

3) The third imperative is a joint study conducted by PT KM, PT MI, PT ME, service providers, research institutions, universities, and relevant businesses to conduct feasibility studies on (1) the depleted reservoir condition of "Block X" for potential storage for CCS and CCUS, (2) the use of gas pipeline infrastructure network passing through various strategic areas for gas distribution to retail consumers, (3) the utilization of LNG plants as regasification units and storage for Dimethyl Ether (DME), and (4) the potential utilization of hydrogen as an alternative fuel derived from the subsurface of the Block "X" production field. The ultimate outcome of these feasibility studies is the determination of the economic factors of new business opportunities for PT KM arising from the implementation of CCS/CCUS, support for gas utilization by retail consumers, utilization of LNG plant capacity, and utilization of hydrogen in the "Block X" reservoir.

APPENDIX

TABLE III: IMPLICATIONS OF PLAUSIBLE SCENARIOS FOR PT KM

<table>
<thead>
<tr>
<th>Implications</th>
<th>Pab</th>
<th>WYSWYG</th>
<th>HtoN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implication of the scenarios for PT KM</td>
<td>1. The economic viability of Block “X” is maintained, increased exploration for untapped areas within Block “X”. 2. The production downward trend mitigated through EOR (Non CO₂), new upstream technologies and operation optimization.</td>
<td>1. The economic viability of Block “X” is maintained, increased exploration for untapped areas within Block “X”. 2. The production downward trend mitigated through EOR, new upstream technologies and low carbon technologies (CCS/CCUS). 3. ESG compliance is achieved.</td>
<td>1. No new policy/incentive packages issued and or given based on individual initiative. The upstream policy inconsistency lead to economic viability uncertainty. Rigorous and lengthy negotiation renders the issued policies is irrelevant to the timing of needs and momentum.</td>
</tr>
</tbody>
</table>
3. No priority for low carbon technologies implementation hence limited ESG compliance.
4. Specific incentives for gas fields development provide endorsement in maximizing gas production.
5. The upstream policy providing assurance on the contract sanctity.
6. The absence of a carbon tax means no reduction in profitability.
7. Cash call obligation is provided in cash by Regional State-Owned Enterprises.
8. Oil and gas production is allocated fully for domestic.
   • For oil, high oil prices increase profit margin.
   • For gas, due to gas price capping, there are potential detrimental economic effect.
9. Low ESG scoring, contradictory to stringent global ESG funding term. Conventional funding is available, higher interest rate.
10. No CCS/CCUS & NRE implementation, focus on achieving production targets.
11. Asset Site Restoration (ASR) funding remain a cost burden for PT KM rather than previous contractor.

<table>
<thead>
<tr>
<th>Options</th>
<th>Ph</th>
<th>WYSYG</th>
<th>HtoN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrepreneurial invention</td>
<td>1. Scale up exploration to other fields within “Block X”. 2. Maximizing long term contract to obtain competitive unit price. 4. Maximizing ex termination stock exchange. 5. Actively submit claims for any available incentives provided by the government.</td>
<td>1. Scale up exploration to other fields within “Block X”. 2. Maximizing long term contract to obtain competitive unit price. 3. Maximizing ex termination stock exchange. 4. Actively submit claims for any available incentives provided by the government. 5. POD acceleration.</td>
<td>1. Extensive exploitation in current field. 2. Maximizing long term contract to obtain competitive unit price. 3. Maximizing ex termination stock exchange. 4. Actively submit claims for every loophole available from existing regulation.</td>
</tr>
<tr>
<td>How do we sustain our value(s) creation/result</td>
<td>1. Engage in IPA forum and maintain stakeholder relations with policy-makers. 2. Continue cost optimization program.</td>
<td>1. Engage in IPA forum and maintain stakeholder relations with policy-makers. 2. Continue cost optimization program.</td>
<td>1. Engage in IPA forum and maintain stakeholder relations with policy-makers. 2. Continue cost optimization program.</td>
</tr>
<tr>
<td>Resources</td>
<td>1. Rationalize operation and optimize resources. 2. Feasibility studies on using existing gas pipeline network for gas distribution channel.</td>
<td>1. Rationalize operation and optimize resources. 2. Feasibility studies for (a) gas liquefaction plant as DME storage and regasification unit (c) gas pipeline network as gas distribution channel (d) economic viability of natural hydrogen as an alternate fuel.</td>
<td>1. Rationalize operation and optimize resources.</td>
</tr>
</tbody>
</table>

IV: LAUSIBLE
TABLE V: EARLY WARNING SIGNALS FOR PLAUSIBLE SCENARIOS

<table>
<thead>
<tr>
<th>Early Warning Signals</th>
<th>Pal</th>
<th>WYSWYG</th>
<th>HtoN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Enactment of new oil and gas law, with respect to contract sanctity.</td>
<td>1. Enactment of new oil and gas law, with no contract sanctity clause.</td>
<td>1. Absence of an oil and gas law.</td>
<td></td>
</tr>
<tr>
<td>2. Establishment of new PSC contract scheme with extensive incentives package.</td>
<td>2. Establishment of new PSC contract scheme with balanced “stick” and “carrot”. Contract changes is allowed.</td>
<td>2. Absence of new incentive packages.</td>
<td></td>
</tr>
<tr>
<td>3. Oil and gas exports limitation.</td>
<td>3. Gas export with long term focus.</td>
<td>3. Gas export with spot contract focus.</td>
<td></td>
</tr>
<tr>
<td>5. Oil and gas energy mix contribution &gt;45%.</td>
<td>5. Oil and gas energy mix contribution &gt;45%.</td>
<td>5. Coal energy mix contribution &gt;45%.</td>
<td></td>
</tr>
<tr>
<td>6. POD permit approval is below 6 months.</td>
<td>6. POD permit approval is 6 – 12 months.</td>
<td>6. POD permit approval is above 12 months.</td>
<td></td>
</tr>
<tr>
<td>7. Indonesia Economic Freedom index is stable from rank 66 (Fraser Institute, 2022)</td>
<td>7. Indonesia Economic Freedom Index is increased from rank 66.</td>
<td>7. Economic Freedom Index for Indonesia is decreased from rank 66.</td>
<td></td>
</tr>
<tr>
<td>8. Indonesia Upstream Competitiveness Index is increasing from rank 43 (Wood Mackenzie, 2022).</td>
<td>8. Upstream Competitiveness Index is relatively stable from rank 43.</td>
<td>8. Upstream Competitiveness Index is worsened from rank 43.</td>
<td></td>
</tr>
<tr>
<td>9. Gas infrastructure is reaching provincial capital cities throughout Indonesia.</td>
<td>Gas infrastructure is reaching provincial capital cities, limited to Java and Sumatra.</td>
<td>Gas infrastructure remain stagnant as per current condition.</td>
<td></td>
</tr>
</tbody>
</table>

**REFERENCES**


