

Strategy Formulation of Natural Gas Continuity Supply (Case Study PT ABC)

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ABSTRACT - This study aims to formulate a strategy for PT ABC in maintaining the continuity of natural gas supply. Feasibility analysis and decision tree method are used to determine the chosen strategy in maintaining the continuity of natural gas supply. Internal and external analysis are used to identify the key success factors of the company in implementing the chosen strategy and then summarized and evaluated using IFE and EFE matrix. To formulate implementation strategies by aligning key internal and external factors, IE and SWOT matrix are used. QSPM matrix is used to determine the priority of the implementation strategy. The results show IFE and EFE score are 2.55 and 2.76 respectively, so that PT ABC has sufficient internal resources to maintain the continuity of natural gas supply and able to respond well to opportunities and threats. This condition can be managed best with hold and maintain strategies which are market penetration and product development. QSPM Matrix analysis show that product development group strategy has the highest Total Attractiveness Score (TAS) thus become priority to be executed and then market penetration strategy.

Keywords: natural gas, feasibility analysis, decision tree, IFE, EFE, IE, SWOT, QSPM.

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INTRODUCTION

PLTG XYZ is one of the power plants that supply electricity in Kutai Kertanegara, East Kalimantan, who has fuel gas supply sourced from LNG (Liquified Natural Gas) from PT ABC since 2018 through trucking mode of transportation. Gas supply via LNG has weaknesses because of fluctuating gas prices depending on the crude oil price (Haq, 2020) and the continuity of LNG supply highly dependent on land traffic and the availability of trucking transportation fleets. These things pose a risk to the operational reliability of PLTG XYZ as one of the power plants that will support the electricity needs of the new capital.

The capital relocation is one of the government strategic priority projects as stated in the Presidential Regulation (Perpres) Republic of Indonesia Number

18 of 2020 on the 2020-2024 National Medium-Term Development Plan (National RPJM). The estimated electricity demand for new capital is approximately 900 mega volt-amperes (MVA) which will be prepared in stages by PT PLN (Persero) (Directorate General of Electricity, 2021).

Since first delivery, the LNG supply from PT ABC to PLTG XYZ has always been below its operational needs of 7.9 - 9.1 Bbtud. This causes PT ABC to lose potential additional revenue of USD 7.8 million per year and can cause bad image to PT ABC.

One of the LNG export contracts from the Bontang LNG plant, East Kalimantan, which is operated by Badak LNG to a consortium of buyers from Japan, Western Buyer (WBX) of 2 million tons per year (MTPA) or equivalent of 30 LNG cargoes per year has ended since December 2020.

Even though it has new LNG contracts with Kyushu and Shell, its volume commitment is still below the contract volume with WBX. The LNG contract with Kyushu totals 2 cargoes of LNG for the period 2021 to 2022, while the LNG contract with Shell totals 25 cargoes for the period 2021 to 2025 (Kontan. co.id, 2020).

Directorate General of Oil and Gas (2018) stated that natural gas reserves in the Kalimantan region are estimated at around 15.35 trillion standard cubic feet (TSCF) consist of 7.48 TSCF proven reserves and 7.87 TSCF potential reserves (probable & possible reserves).

This has resulted in a surplus of natural gas production and has the potential to become a competitor to PT ABC's LNG. This condition can threaten the continuity of PT ABC LNG supply to PLTG XYZ if the surplus natural gas is given by the government to other Gas Trading Business Entities which could result in PT ABC potentially experiencing a loss revenue of USD 29.7 million per year plus potential impairment of LNG facilities to PLTG XYZ if it is not utilized.

The monetization of the surplus natural gas production requires an investment of millions of US dollars for the construction of natural gas distribution pipelines with the risk of return on investment, permit and other risks. Gafur (2016) stated that distribution pipelines are used to distribute natural gas from transmission line to the end customer. The volume and pressure of natural gas delivered is smaller than the transmission pipeline with pipe diameter between 2-24 inches.

To maintain the continuity of natural gas supply to PLTG XYZ, PT ABC has 2 (two) alternative strategies: (1) increasing the truck delivery quantity of LNG supply, or (2) compete to obtain allocation for natural gas surplus production and investing in the construction of natural gas distribution pipeline to PLTG XYZ.

Mulyati and Hendratno (2019) stated that before a project infrastructure is implemented, a feasibility study is carried out to find out whether the project is feasible or not in terms of the project owner and end customer view. Ghozali (2016) stated that decision tree analysis visualizes the decision-making process to choose the best alternative based on the parameters that follow. Decision tree analysis as an analytical method in making business decisions is very suitable for use in investment planning because it can identify all alternatives to provide the best decision.

Rosadi & Marimin (2000) stated that an investment is considered feasible if the $NPV > 0$, the $IRR >$ discount rate, the Payback Period $<$ the time determined by the investor and the Profitability Index > 1 . This investment rule is in line with that conveyed by Vernimmen (2005). After the feasibility analysis has been carried out, then a sensitivity analysis is carried out on the parameters that can lead to project failure, namely volume, capital expenditure (capex), and the project implementation time period (Jannah, et al., 2019).

David (2011) stated that strategy formulation can be carried out in 3 (three) stages, namely the input stage, the matching stage and the decision stage. At the input stage, data or information is collected from internal to determine the company's strengths and weaknesses and externally to identify opportunities and threats for the company. At the matching stage, matching the external and internal key success factors is the key to effectively generating viable alternative strategies. The decision stage aims to choose the best strategy by evaluating alternative strategies objectively, based on previously identified external and internal key success factors.

This study aims to analyze the feasibility of natural gas distribution pipeline investment as an alternative strategy to maintain the continuity of natural gas supply, to analyze the driving success factors of the selected strategy and to formulate strategic steps to implement the selected strategy in maintaining the continuity of natural gas supply.

This research was conducted at holding PT ABC and PT ABC. The scope of this research includes the formulation of a strategy for the continuity of natural gas supply (case study of PT ABC) by first determining the selected strategy based on the magnitude of the risk value that may occur from 2 (two) alternative strategies. The value is obtained through a feasibility analysis with a conceptual study, estimation of possible results and estimation of financial consequences. Next, identify and evaluate the success factors of the chosen strategy to formulate implementation strategies. Then the priority of implementation strategies is determined to maintain the continuity of natural gas supply.

DATA AND METHODS

Primary data is taken from the first source, namely interviews and questionnaires from respondents who are expert in the field of natural gas within PT ABC

and Holding PT ABC. Secondary data in this study comes from companies data of Holding PT ABC and PT ABC, literature, print and electronic media as well as relevant literature to the study.

To conduct a feasibility analysis, interviews and questionnaires were conducted on the condition of the existing LNG gas distribution related to the pressure requirements, absorption volume and specifications of natural gas. Then to design and identify the pipeline route plan, Google Earth software is used. To determine the pipe diameter, a simulation was carried out using the Checalc tool which can be accessed at <https://checalc.com/solved/gasPipeSizing.html>.

To determine the strategy for the continuity of natural gas supply, a decision tree analysis was performed with Expected Monetary Value (EMV) Maximum. The purpose of doing this decision tree is to understand the case and all related aspects, describe a systematic thinking framework and describe the structure of decision making carried out by the decision maker throughout the stages or time sequence including all possible decisions and their outcomes (Romadhoni & Nurhasanah, 2020).

After determining the selected strategy based on the results of the decision tree, then identifying the company's internal and external key driving success factors of the selected strategy using the Internal Factor Evaluation (IFE) Matrix and External Factor Evaluation (EFE) Matrix. The weighting and assessment of each factor is carried out through questionnaires to expert respondents.

The weighted values of the IFE and EFE Matrix are then plotted in the IE (Internal External) Matrix to find out the right implementation strategy for the company. The formulation of the implementation selected strategy is carried out using a SWOT analysis. QSPM (Quantitative Strategic Planning Matrix) analysis is used to determine the priority of the implementation strategy.

RESULTS AND DISCUSSION

A. Feasibility Analysis

Based on the results of the technical simulation, the pipe diameter of the distribution pipeline to be used is 6 inches. Cost components and data used in the economic analysis are: est Capex USD 6 Million (ref company data), est Opex USD 500.000/year (ref company data), volume 7.92 Mmbtud (Ref Kepmen ESDM 91K/2020) and 5 years depreciation.

Sources of investment funding for the construction of natural gas distribution pipelines come from the company's internal (equity) and debt (loans). The funding composition will affect the project's Weighted Average Cost of Capital (WACC) structure which becomes the discount factor after adding the risk premium according to the Company's policy. The discount factor must be smaller than the Internal Rate of Return (IRR) which has been set by the Government of 11% based on the Directorate General of Oil and Gas (2019) to meet the investment feasibility criteria.

Based on the WACC calculation as shown in Table 1, the Cost of Equity (CoE) value is 15.47% because the reference of historical data used is only 5 (five) years according to depreciation in the economic calculation. This value is higher than the IRR set by the Government so that it would be uneconomical or not feasible for PT ABC to use all its funding sources from equity. PT ABC needs to find external funding sources so that the WACC can be below the IRR and the project is feasible to implement. Assuming PT ABC uses 30% equity to funding the distribution pipeline, then the WACC is 6.69% and the discount rate is 9.09%. The WACC calculation formulation refers to Downstream Regulatory Body of Oil and Gas (2019). From the economic calculation, the economic indicators as shown in Table 2.

To see the impact of costs changes in feasibility criteria, it is necessary to do a sensitivity analysis. Parameters used in sensitivity analysis include Capex, Opex and natural gas volume. As shown in Figure 1, the investment will be not feasible ($NPV = 0$) if Capex increases 18%, Opex increases 85% and volume decreases 12%.

To compare the feasibility of investing in distribution pipeline to the existing supply through LNG with trucking mode, a Decision Tree analysis as shown in Figure 2 is carried out to determine which strategy provides the highest Expected Monetary Value (EMV) which will be the chosen strategy. A decision tree is a comprehensive tool for modeling all possible decision options. Decision trees can show problems in more detail and describe events in chronological order.

The value in the decision tree is the EBITDA (Earnings Before Interest, Tax, Depreciation and Amortization) of each alternative strategy. The percentage of possible results obtained from expert respondents through interviews and questionnaires.

Table 1
WACC calculation

Parameter	Value	Description
Risk Free (Rf), %	8,31%	Average Government bonds due date 4 – 6 years (USD)
Risk Market (Rm), %	12,38%	Geometric Average Indonesian Market Return (USD)
Beta (β)	1,76	The size of the fluctuations in the portfolio investment of gas companies compared to the market (BEI)
Cost of Equity (CoE), %	15,47%	$CoE = Rf + \beta \times (Rm - Rf)$
i (interest rate), %	3,76%	USD Interest rate (BI)
T (tax), %	22%	(Ministry of Finance 2020)
Cost of Debt (CoD), %	2,87%	$CoD = i \times (1 - T)$
Equity (E)	30%	Asumsi
Debt (D)	70%	Asumsi
WACC	6,69%	$WACC = CoE \times \%E + CoD \times \%D$
Risk Premium/Insentif	2,4%	$Risk\ Premium = 2\% \times \%D + 1\%$
Discount Rate	9,09%	$Discount\ Rate = WACC + Risk\ Premium$

Table 2
Feasibility indicator

Indicator	Feasibility Criteria	Government Reg. (Equity 100%)	Equity Level (Equity 30%)
NPV	> 0	N/A	USD 0,75 Millions
IRR	> discount rate	11%	21%
Payback Period	< depreciation	4,63 years	3,98 years
Profitability Index	> 1	N/A	1,13

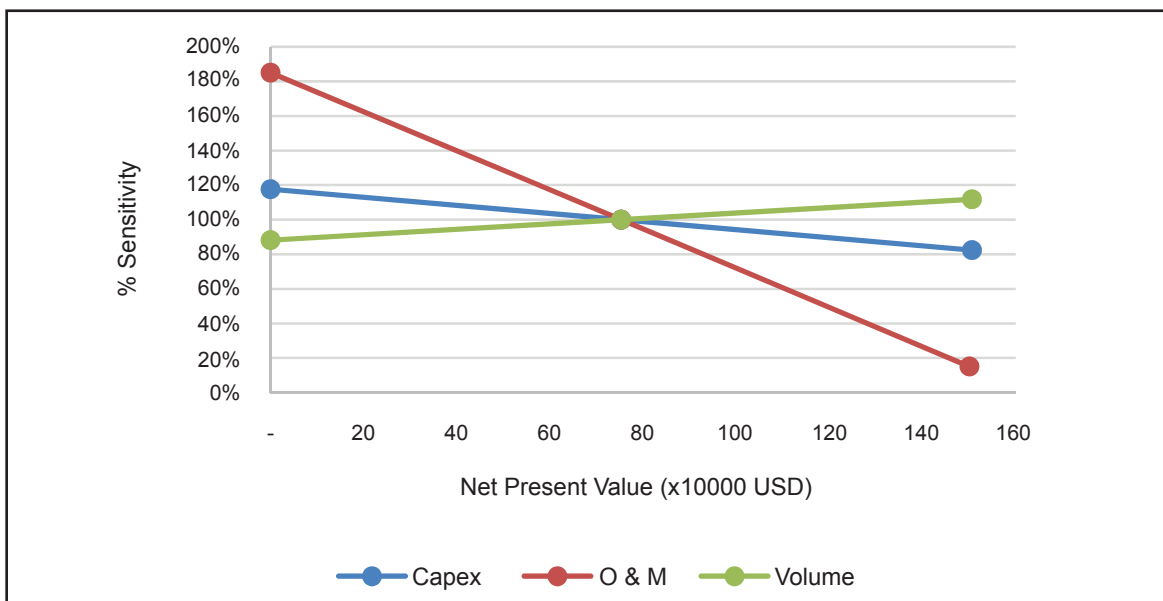


Figure 1
Sensitivity analysis.

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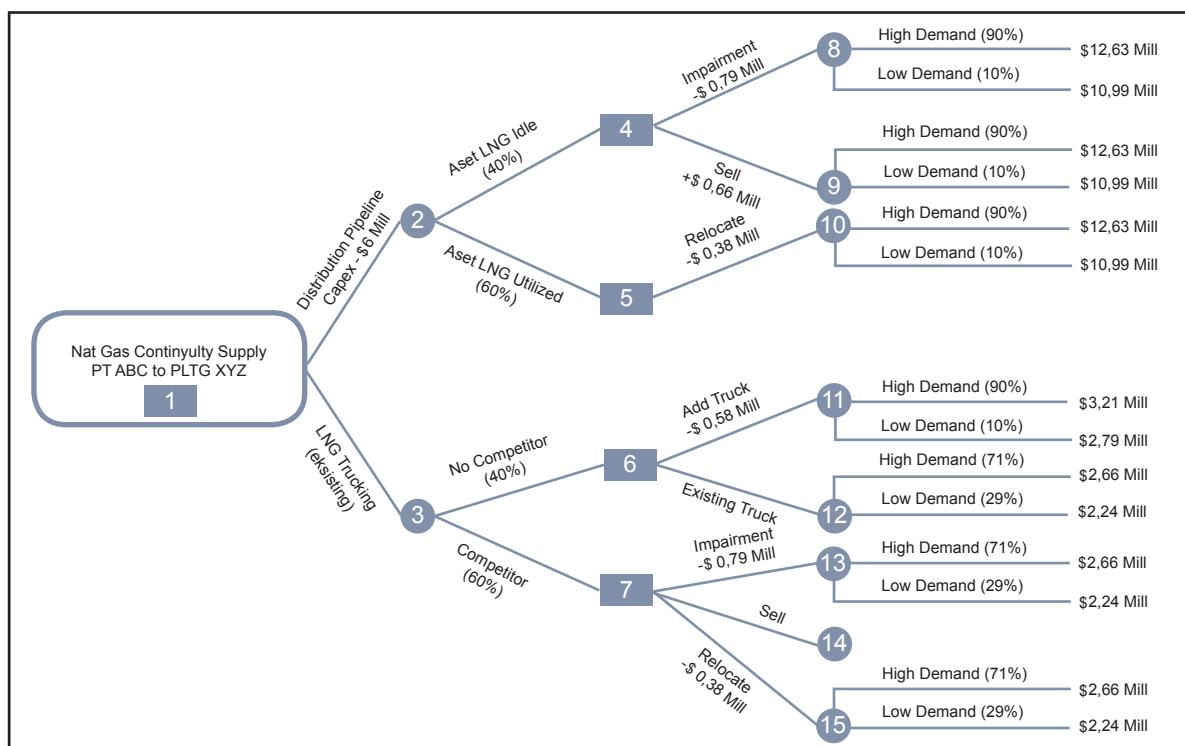


Figure 2
Decision tree.

For other costs obtained from external bidding and with a replacement cost approach.

The circle node represents the uncertain variable, where the decision maker has no control over the outcome of this variable. The square node represents the decision-making point, where the decision maker has complete freedom to decide. The EMV calculation results from the Decision Tree as shown in Table 3.

From the results of the EMV Decision Tree calculation, the node 1 value from Distribution Pipeline strategy provides a higher value than the node 1 value from LNG trucking strategy, so the selected strategy to maintain the continuity of PT ABC’s natural gas supply is the Distribution Pipeline Strategy.

B. Key Success Factors Identification and Evaluation of Selected Strategy

To encourage the success of the selected strategy, it is necessary to identify and evaluate the PT ABC internal and external key success factors with the IFE Matrix and EFE Matrix tools. This analysis is the input stage in the strategy formulation framework.

To identify PT ABC internal and external key success factors, interviews and filling out questionnaires to expert respondents were conducted within PT ABC and Holding PT ABC. The Five

Force Model and PESTEL were used to identify the external key success factors of PT ABC’s, while to identify the internal key success factors of PT ABC’s, interviews and questionnaires were filled out by considering aspects of management, operations, finance, HR and marketing.

After the internal and external key success factors were identified, the next step is to evaluate these factors through weighting and ranking assessment. The weighting was done by providing a comparative value based on the importance of one factor to another. Rating assessment is carried out based on PT ABC’s response in dealing with opportunities and threats (External Factors) and assessment of strengths and weaknesses (Internal Factors) that reflect PT ABC’s internal conditions. The results of the identification and evaluation of internal and external factors as shown in Table 4 and Table 5.

From the results of the internal and external evaluation factors, it is known that PT ABC’s IFE Matrix score is 2.55 from a scale of 4 and PT ABC’s EFE Matrix score is 2.76 from a scale of 4. This shows that PT ABC has sufficient internal resources to maintain the continuity of natural gas supply and able to respond well to opportunities and threats.

Table 3
Expected monetary value decision tree

Distribution Pipeline Strategy			LNG Trucking Strategy		
Node	EMV (Mill USD)	Note	Node	EMV (Mill USD)	Note
8	12,47		11	3,17	
9	12,47		12	2,54	
10	12,47		13	2,54	
4 (Sell)	12,99	Max	14	0,66	
4 (Impair)	11,67		15	2,54	
5 (Relocate)	12,10		6 (Add Truck)	2,58	Max
2	12,46		6 (Eksisting)	2,54	
1	6,46	Max	7 (Impair)	1,74	
			7 (Sell)	0,66	
			7 (Relocate)	2,17	Max
			3	2,34	
			1	2,34	Min

Table 4
Internal factor evaluation matrix

No.	Internal Key Success Factor	Weight	Rating	Score
Strength				
1	Experience in natural gas distribution through pipelines	0,08	3,80	0,31
2	Company brand	0,07	3,63	0,26
3	Good Government relation	0,09	3,38	0,32
4	Competent Employee	0,09	3,75	0,32
5	Organizational structure that supports business activities	0,08	3,13	0,24
6	Clear company goals and objectives	0,09	3,50	0,31
Weakness				
1	Tiered investment approval	0,08	1,50	0,13
2	Overlapping business activities with affiliates	0,07	1,63	0,11
3	Lack of company investment funding capability	0,09	1,75	0,15
4	Not experienced in building natural gas pipelines	0,08	1,63	0,13
5	Do not have natural gas allocation for commerce through pipelines	0,09	1,50	0,14
6	Does not control/control the entire supply chain of natural gas distribution	0,09	1,50	0,13
Total Weighted Score Internal Factor Evaluation		1,00		2,55

C. Strategy Formulation for Implementation of Selected Strategy

In formulating an implementation strategy for the selected strategy that is applicable by aligning the PT ABC's internal and external key success factors, the Internal External (IE) Matrix and the SWOT Matrix

were used. This analysis is the matching stage in the strategy formulation framework.

The scores obtained from the IFE Matrix and the EFE Matrix were plotted to the IE Matrix to determine the appropriate implementation strategy for PT ABC. Referring to David (2011), from Figure 3

the IE Matrix shows that the appropriate strategy for PT ABC to implement the selected strategy (natural gas supply through distribution pipelines) is hold and maintain through product development and market penetration. Product development is defined as an effort to increase sales through modification of existing products, while market penetration is defined as an effort to increase market share of existing products through marketing activities.

Product development and market penetration strategy can be determined by aligning the internal

and external key success factors through the SWOT Matrix. In the SWOT Matrix, strategies for product development and market penetration were determined by reviewing a combination of the following internal and external key success factors:

- Strength and Opportunity Strategy (S-O)
This strategy maximizes the company's strengths to take advantage of opportunities.
- Strengths and Threats Strategy (S-T)
This strategy maximizes the company's strengths to avoid threats.

Table 5
External evaluation factor matrix

No.	External Key Success Factor	Weight	Rating	Score
Opportunities				
1	Opportunity to obtain excess natural gas allocation at competitive price	0,08	3,00	0,25
2	Increase in power plants gas demand for new capital needs	0,08	2,88	0,23
3	The growth of the natural gas demand for industry due to capital relocation	0,08	2,63	0,22
4	Government support for low emission fuel	0,07	2,88	0,20
5	Government assignment for city gas network development	0,09	2,88	0,25
6	Opportunity to obtain special rights of Distribution Network Area	0,10	3,13	0,30
Threats				
1	Rise of Competitors	0,09	2,88	0,27
2	Sources of excess natural gas are limited to certain areas	0,09	2,63	0,24
3	Permit complexity	0,08	2,88	0,24
4	Inflation and changes in currency rates	0,08	2,38	0,18
5	Not many creditors are interested in distribution pipeline investment	0,08	2,38	0,18
6	The development of NRE technology as a substitute for fossil fuel	0,08	2,50	0,20
Total Weighted Score External Evaluation Factor		1,00		2,76

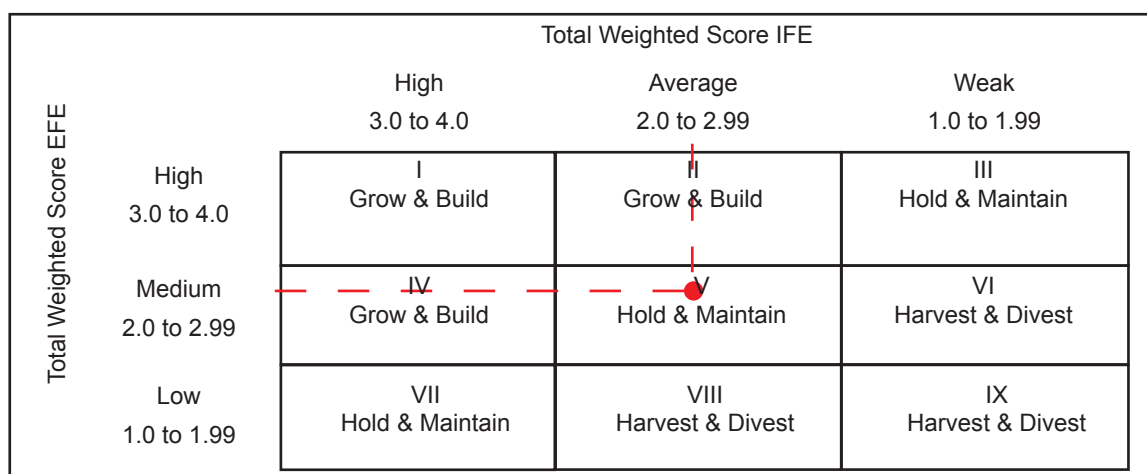


Figure 3
Internal-external matrix.

Table 6
Strength and opportunity strategy

No.	Internal Key Factor (Strength)	External Key Factor (Opportunity)	Implementation Strategy (Strategy S-O)	Group Strategy
1	Experience in natural gas distribution through pipelines	Opportunity to obtain excess natural gas allocation at competitive price	· Propose the allocation of excess natural gas to the Minister of Energy and Mineral Resources for the fulfillment of existing and potential consumers (S1,S2, S3,O1,O2,O3, O4)	Product Development
2	Company brand	Increase in power plants gas demand for new capital needs	· Propose a contract adjustment on the gas supply scheme and volume commitment to PLTG XYZ (S1,S4,O1,O2)	Product Development
3	Good Government relation	The growth of the natural gas demand for industry due to capital relocation	· Apply for special rights for the East Kalimantan Distribution Network Area to the Directorate General of Oil and Gas (S1,S3,S4,S5,S6,O5,O6)	Market Penetration
4	Competent Employee	Government support for low emission fuel	· Conducting workshops with industry players in East Kalimantan to market canvass natural gas demand (S1,S2,S4,S5,S6,O3,O4,O5)	Market Penetration
5	Organizational structure that supports business activities	Government assignment for city gas network development	· Making a MoU with potential natural gas user industries (S1,S2,S4,O3)	Market Penetration
6	Clear company goals and objectives	Opportunity to obtain special rights of Distribution Network Area	· Develop distribution pipeline infrastructure to potential natural gas user industries (S1,S2,S4,O3,O5)	Market Penetration

Table 7
Strength and threat strategy

No.	Internal Key Factor (Strength)	External Key Factor (Threat)	Implementation Strategy (Strategy S-T)	Group Strategy
1	Experience in natural gas distribution through pipelines	Rise of Competitors	· Propose a contract adjustment on the gas supply scheme and volume commitment to PLTG (S1,S2,S4,T1,T6)	Product Development
2	Company brand	Sources of excess natural gas are limited to certain areas	· Utilization of the Bontang LNG terminal regas facility so that LNG gas can be distributed to consumers because the distribution pipeline infra are going to be build (S1,S3,S4,T2)	Market Penetration
3	Good Government relation	Permit complexity		
4	Competent Employee	Inflation and changes in currency rates	· Cooperate with Holding PT ABC to build distribution pipeline (S1,S5,T3, T4,T5)	Product Development
5	Organizational structure that supports business activities	Not many creditors are interested in distribution pipeline investment	· Intensive coordination with the Directorate General of Oil and Gas and SKK Migas to get priority for natural gas allocation (S2,S3,T2)	Product Development
6	Clear company goals and objectives	The development of NRE technology as a substitute for fossil fuel	· Conduct a study related to the coal gasification process which is the main mining commodity in Kalimantan (S4,S6,T6)	Product Development

- Weakness and Opportunity Strategies (W-O)

This strategy minimizes the company's weaknesses to take advantage of opportunities.

- Weaknesses and Threats Strategy (W-T)

This strategy minimizes the company's weaknesses to anticipate existing threats

The implementation strategies for product development and market penetration are as shown in Table 6 to Table 9.

The implementation strategies that have been determined from SWOT Matrix were then grouped according to their objectives, whether they are part of the implementation strategy of product development or market penetration as shown in Table 10.

To determine the priority of the implementation strategy by aligning the PT ABC's internal and external key factors success, the QSPM Matrix tool is used. This analysis is the decision stage in the strategy formulation framework.

The QSPM matrix is used to determine the relative attractiveness of several implementation strategies so that it can be determined which strategy is considered a priority to be implemented. Through a questionnaire, expert respondents gave a rating value based on the level of attractiveness of each implementation strategy to the company's internal and external key success factors. This value is then multiplied by the weight of the company's internal and external key success factors taken from the IFE and EFE Matrix

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Table 8
Weakness and opportunity strategy

No.	Internal Key Factor (Weakness)	External Key Factor (Opportunity)	Implementation Strategy (Strategy W-O)	Group Strategy
1	Tiered investment approval	Opportunity to obtain excess natural gas allocation at competitive price		
2	Overlapping business activities with affiliates	Increase in power plants gas demand for new capital needs	· Cooperate with Holding PT ABC to build distribution pipeline (W1,W3,W4,W6, O2,O3, O5,O6)	Product Development
3	Lack of company investment funding capability	The growth of the natural gas demand for industry due to capital relocation	· Clustering of business activities between affiliates based on business maturity (W2,O2,O3,O5,O6)	Product Development
4	Not experienced in building natural gas pipelines	Government support for low emission fuel	· Propose the allocation of excess natural gas to the Minister of Energy and Mineral Resources for the fulfillment of existing and potential consumers (W5,O1,O2,O3, O4)	Product Development
5	Do not have natural gas allocation for commerce through pipelines	Government assignment for city gas network development		
6	Does not control/control the entire supply chain of natural gas distribution	Opportunity to obtain special rights of Distribution Network Area		

Table 9
Weakness and threat strategy

No.	Internal Key Factor (Weakness)	External Key Factor (Threat)	Implementation Strategy (Strategy W-T)	Group Strategy
1	Tiered investment approval	Rise of Competitors		
2	Overlapping business activities with affiliates	Sources of excess natural gas are limited to certain areas	· Make a competitive offer of natural gas price due to the distribution pipeline mode reducing the distribution supply chain (W6,T1)	Product Development
3	Lack of company investment funding capability	Permit complexity	· Cooperate with Holding PT ABC to build distribution pipeline (W1,W3,W4,W6,T3,T4,T5)	Product Development
4	Not experienced in building natural gas pipelines	Inflation and changes in currency rates	· Propose the allocation of excess natural gas to the Minister of Energy and Mineral Resources for the fulfillment of existing and potential consumers (W5,T5)	Product Development
5	Do not have natural gas allocation for commerce through pipelines	Not many creditors are interested in distribution pipeline investment		
6	Does not control/control the entire supply chain of natural gas distribution	The development of NRE technology as a substitute for fossil fuel		

to obtain the Total Attractiveness Score (TAS) as shown in Table 11.

Based on the TAS value and the implementation strategy group, the priority of implementation strategy are formulated for the selected strategy (natural gas supply through distribution pipelines) as shown in Table 12.

D. Managerial Implications

Based on the study results, in order to avoid an even greater potential loss of revenue, considering

the term of the LNG contract which will end in 2023 and the timeline for the construction of the distribution pipeline, PT ABC needs to immediately implement the strategies that have been formulated.

To maintain the feasibility of investing in natural gas distribution pipeline, PT ABC needs to provide a minimum commitment of 90% natural gas volume, monitor the realization of Capex not over budget and maintain operational costs.

In order to support energy security for the new capital and to obtain natural gas trading privileges

Table 10
 Group of implementation strategy

Group Strategy	Implementation Strategy
Product Development	S1 Propose the allocation of excess natural gas to the Minister of Energy and Mineral Resources for the fulfillment of existing and potential consumers
	S2 Propose a contract adjustment on the gas supply scheme and volume commitment to PLTG XYZ
	S3 Cooperate with Holding PT ABC to build distribution pipeline
	S4 Intensive coordination with the Directorate General of Oil and Gas and SKK Migas to get priority for natural gas allocation
	S5 Clustering of business activities between affiliates based on business maturity
	S6 Make a competitive offer of natural gas price due to the distribution pipeline mode reducing the distribution supply chain
Market Penetration	S7 Apply for special rights for the East Kalimantan Distribution Network Area to the Directorate General of Oil and Gas
	S8 Conducting workshops with industry players in East Kalimantan to market canvass natural gas demand
	S9 Making a MoU with potential natural gas user industries
	S10 Develop distribution pipeline infrastructure to potential natural gas user industries
	S11 Utilization of the Bontang LNG terminal regas facility so that LNG gas can be distributed to consumers because the distribution pipeline infrastructure are going to be build
	S12 Conduct a study related to the coal gasification process which is the main mining commodity in Kalimantan

 Table 11
 QSPM matrix

No	Key Success Factors	TAS Implementation Strategy											
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
Strength													
1	Experience in natural gas distribution through pipelines	0,30	0,25	0,29	0,31	0,19	0,30	0,26	0,24	0,29	0,30	0,26	0,21
2	Company brand	0,26	0,23	0,23	0,24	0,18	0,24	0,22	0,21	0,24	0,23	0,22	0,19
3	Good Government relation	0,32	0,31	0,28	0,34	0,21	0,31	0,30	0,27	0,31	0,30	0,27	0,26
4	Competent Employee	0,29	0,26	0,27	0,31	0,21	0,24	0,23	0,26	0,29	0,29	0,29	0,24
5	Organizational structure that supports business activities	0,27	0,23	0,24	0,27	0,21	0,22	0,23	0,23	0,23	0,27	0,24	0,24
6	Clear company goals and objectives	0,32	0,28	0,28	0,32	0,24	0,32	0,32	0,26	0,32	0,31	0,29	0,22
Weakness													
1	Tiered investmen approval	0,23	0,23	0,27	0,27	0,27	0,27	0,28	0,24	0,24	0,27	0,24	0,24
2	Overlapping business activities with affiliates	0,23	0,22	0,23	0,23	0,20	0,22	0,23	0,19	0,23	0,24	0,22	0,18
3	Lack of company investment funding capability	0,29	0,30	0,29	0,31	0,25	0,30	0,29	0,23	0,30	0,29	0,30	0,21
4	Not experienced in building natural gas pipelines	0,25	0,19	0,28	0,25	0,22	0,22	0,25	0,24	0,25	0,25	0,25	0,19
5	Do not have natural gas allocation for commerce through pipelines	0,34	0,33	0,34	0,34	0,32	0,33	0,33	0,31	0,32	0,32	0,32	0,27
6	Does not control/control the entire supply chain of natural gas distribution	0,30	0,29	0,30	0,31	0,28	0,30	0,33	0,29	0,31	0,31	0,29	0,28
Opportunity													
1	Opportunity to obtain excess natural gas allocation at competitive price	0,29	0,27	0,27	0,29	0,22	0,28	0,27	0,23	0,26	0,27	0,27	0,22
2	Increase in power plants gas demand for new capital needs	0,19	0,28	0,28	0,30	0,23	0,29	0,28	0,23	0,25	0,25	0,28	0,21
3	The growth of natural gas demand for industry due to capital relocation	0,31	0,29	0,30	0,30	0,25	0,30	0,29	0,27	0,27	0,28	0,27	0,21
4	Government support for low emission fuel	0,25	0,22	0,25	0,24	0,20	0,24	0,24	0,22	0,22	0,24	0,22	0,16
5	Government assignment for city gas network development	0,30	0,29	0,30	0,31	0,29	0,30	0,33	0,28	0,30	0,31	0,29	0,21
6	Opportunity to obtain special rights of Distribution Network Area	0,26	0,33	0,30	0,34	0,28	0,33	0,33	0,32	0,33	0,34	0,28	0,22
Threat													
1	Rise of competitors	0,35	0,34	0,32	0,35	0,28	0,35	0,34	0,30	0,32	0,34	0,31	0,28
2	Source of excess natural gas are limited to certain areas	0,31	0,28	0,33	0,33	0,27	0,32	0,32	0,29	0,32	0,34	0,28	0,27
3	Permit complexity	0,25	0,23	0,30	0,27	0,25	0,26	0,26	0,24	0,26	0,27	0,21	0,15
4	Inflation and changes in currency rates	0,24	0,26	0,26	0,26	0,24	0,25	0,25	0,23	0,26	0,25	0,25	0,18
5	Not many creditors are interested in distribution pipeline investment	0,22	0,25	0,27	0,26	0,24	0,25	0,25	0,24	0,26	0,27	0,24	0,20
6	The development of NRE technology as a substitute for fosil fuel	0,22	0,26	0,26	0,27	0,24	0,27	0,25	0,26	0,27	0,27	0,27	0,25
Total Attractive Score (TAS)		6,79	6,40	6,75	7,04	5,76	6,72	6,67	6,06	6,67	6,82	6,37	5,29

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Table 12
Strategy implementation priority

Group Strategy	Average TAS	Priority	Implementation Strategy	Target			PIC	
				< 1yr	2-3 yr	4-5 yr		
Product Development	6,58	1	S4	Intensive coordination with the Directorate General Oil and Gas and SKK Migas to get priority for natural gas allocation	x			
		2	S1	Propose th allocation of excess natural gas to the Minister of Energy and Mineral Resources for the fulfillment of existing and potential consumers	x		Commercial, Corsec, Bus. Dev., Strategic planning, Project management	
		3	S3	Cooperate with Holding PT ABC to build distribution pipeline	x			
		4	S6	Make a competitive offer of natural gas price due to the distribution pipeline mode reducing the distribution supply chain	x			
		5	S2	Propose a contract adjustment on the gas supply scheme and volume commitment to PLTG XYZ	x			
		6	S5	Clustering of business activities between affiliates based on business maturity	x			
Market Penetration	6,31	7	S10	Develop distribution pipeline infrastructure to potential natural gas user industries		x		Commercial, Corsec, Bus. Dev.,
		8	S7	Apply for special rights for the East Kalimantan Distribution Network Area to the Directorate General of Oil and Gas		x		
		9	S9	Making a MoU with potential natural gas user industries		x		
		10	S11	Utilization of the Bontang LNG terminal regas facility so that LNG gas can be distributed to consumers because the distribution pipeline infrastructure are going to be build			x	
		11	S8	Conducting workshops with industry players in East Kalimantan to market canvass natural gas demand			x	Commercial, Bus. Dev.,
		12	S12	Conduct a study related to the coal gasification process which is the main mining commodity in Kalimantan			x	

in East Kalimantan, PT ABC needs to develop natural gas infrastructure such as city gas distribution pipeline as the final value chain of gas supply from gas source to end user (Augar, 2017).

CONCLUSIONS

Based on the feasibility analysis and decision tree, the natural gas distribution pipeline investment meets the feasibility requirements and give a better EMV so that the supply of natural gas through the distribution pipeline becomes the selected strategy.

From the IFE, EFE and IE matrix analysis, to implement the selected strategy, PT ABC needs to carry out a product development strategy from LNG trucking supply mode to natural gas supply through distribution pipelines and then penetrate the market to increase natural gas market share. From the analysis of the QSPM matrix, the product development implementation strategy is a priority to be implemented with a completion target in 1 (one) year followed by a market penetration strategy.

The technical study of this research still needs to be further studied in the form of Front-End

Engineering Design (FEED) to obtain a more precise cost component. From this research, it can be continued to analyze and formulate strategies in the development of advanced natural gas infrastructure to other potential consumers in the East Kalimantan region which has been planned to become the new capital.

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GLOSSARY OF TERMS

Symbol	Definition	Unit
NPV	The present value of future money (net receipts) minus the present value of the initial investment	

Symbol	Definition	Unit	Symbol	Definition	Unit
IRR	a metric used in financial analysis to estimate the potential return on investment	%	QSPM	Analytical technique to determine the relative attractiveness of feasible alternative actions.	
EMV	The magnitude of the value of a risk that may occur. This EMV calculation is done by multiplying the probability/possibility of the risk occurring and the impact value of the risk if it occurs		WACC	Calculation of the cost of capital based on the portion of debt (debt) and equity (equity) of the company.	%
IFE	The strategy-formulation tool summarizes and evaluates the major strengths and weaknesses in the functional areas of a business, and it also provides a basis for identifying and evaluating relationships among those areas		CoE	The minimum rate of return that the company can theoretically provide to shareholders	
EFE	The strategy-formulation tool summarizes and evaluate economic, social, cultural, demographic, environmental, political, governmental, legal, technological, and competitive information		CoD	Interest rates required by financial institutions or other parties	
IE	The strategy-formulation tool involves plotting organization divisions in a schematic diagram				
SWOT Matrix	An important matching tool that helps managers develop four types of strategies: SO (strengths-opportunities) Strategies, WO (weaknesses-opportunities) Strategies, ST (strengths-threats) Strategies, and WT (weaknesses-threats) Strategies.				
QSPM	Analytical technique to determine the relative attractiveness of feasible alternative actions.				
WACC	Calculation of the cost of capital based on the portion of debt (debt) and equity (equity) of the company.	%			

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