

BIOMASS BUSINESS STRATEGY AT PERUM PERHUTANI

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ABSTRACT : *This study explores the business strategy for biomass management in Perum Perhutani which has planted energy plants for biomass energy covering an area of 39,110.07 hectares and built three biomass processing plants that will be used for cofiring raw materials for power plants (PLTU), the upstream-downstream integrated biomass business strategy is a new business in Indonesia so it is necessary to conduct research on this business strategy to further improve sustainability business and environmental sustainability, with a focus on sustainable practices and economic viability. The study investigates the potential of biomass as a renewable energy source, evaluates current operational frameworks, and identifies opportunities to improve efficiency and profitability. By analyzing market trends and stakeholder engagement, the study aims to provide recommendations that are in line with environmental goals and promote the sustainable development of biomass resources. The research findings show that strategic partnerships, technological innovation, and effective resource management are essential to drive competitive advantage in the biomass sector*

KEYWORDS - *Cofiring, Biomass, Perum Perhutani, Resource Management*

I. INTRODUCTION

The development of biomass energy as renewable energy in Indonesia where biomass energy is considered as energy derived from natural resources that can be naturally renewable in a relatively short period of time and this energy source will not be exhausted if used sustainably because of its natural processes that continue to iterate, has been proclaimed by the Government since 2006 as contained in Presidential Regulation No. 5/2006 concerning National Energy Policy with the target of The optimal energy mix by 2025 is 25% as part of energy transition efforts to reduce dependence on fossil fuels and improve the environment by reducing carbon emissions generated from fossil fuels.

One of the efforts to increase the total energy mix with new and renewable energy is through seema cofiring where it is considered a quick win to accelerate the national energy mix target of 23% in 2025. Cofiring technology is considered the most reliable because it does not require new investment in coal-fired power plants (Roni et al. 2017). The achievement of an energy mix of 12.3%, especially with the cofiring method at cofiring coal-fired power plants with the use of biomass is still constrained by the supply of biomass for cofiring which cannot be sustained, the raw materials are still available because they still use waste, it is recorded that until 2022 the use of biomass will only be satisfied at 0.54 million tons (President Director of PLN Darmawan Prasodjo, 2022 in the delivery of the 2022 kaleidoscope press release of PLN Cofiring Implementation) from the need of 8.4 million tons per year.

Perum Perhutani as a forest manager in Java and Madura covering an area of 2.4 million hectares seized the business opportunity in fulfilling cofiring raw materials to coal-fired power plants by implementing business model innovations through the development of upstream-downstream biomass business strategies, this is expected to make the Company's new business strategy so as to generate new revenue streams for Perhutani in addition to revenue from Perhutani's core business.

The upstream-downstream business strategy developed by Perhutani is the development of an integrated biomass business starting from the planting of energy plants, maintenance and production of energy crops (upstream), where until 2023 it has been planted covering an area of 39,110.07 hectares and the biomass potential produced is 2.2 million tons. In the downstream part, Perhutani will build 3 biomass processing plants by paying attention to the location of the biomass raw material supply (the location of the Energy Plantation Forest) so that the biomass processing and production process can be sustainable and sustainable with the appropriate amount of volume.

This research aims to analyze the biomass business strategy implemented by Perhutani, explain the biomass business conditions and formulate a biomass business development strategy in Perhutani to strengthen the business strategy as an effort to increase the Company's revenue and will provide information to other companies that will carry out an integrated upstream-downstream biomass business.

II. LITERATUR REVIEW

Perum Perhutani

Perum Perhutani is a state-owned Forest Management Company in Indonesia with forest management located on the islands of Java and Madura based on Government Regulation Number 72 of 2010 concerning State Forestry Public Companies (Perum) and in accordance with Government Regulation Number 73 of 2014, Perum Perhutani was appointed as the Holding Holding of Forestry SOEs (Perhutani Group). The total area of Forest Management Rights in Java and Madura is around 2.4 million hectares or about 19% of the area of Java Island, including Protected Forests and Production Forests, which are divided into Production Forests covering an area of 1,417,742.25 Ha (58.14%), Limited Production Forests covering an area of 383,395.35 Ha (15.72%) and Protected Forests covering an area of 637,027.85 Ha (26.12%). Perum Perhutani's strategic role is to support the forest environmental preservation system, socio-cultural, and forestry economy as well as sustainable forest management.

Biomass

In general, biomass is a plant material that comes from the reaction of CO₂ in air, water, and sunlight to produce carbohydrates and lignin in plants (photosynthesis process). According to Brown (2002), biomass is the total amount of living matter on the surface, on a tree, and is expressed in tons of dry weight per unit area.

Cofiring Biomass

Cofiring is the mixing of biomass in a certain form (powder, wood chip or wood pellet) according to the type of boiler (CFB, PC and Stoker) with a certain percentage of a maximum of 10%. Cofiring is considered a quick win to accelerate the national energy mix target of 23% in 2025. Cofiring technology is considered the most reliable because it does not require new investment in coal-fired power plants (Roni et al. 2017).

Development of Biomass Business Strategy

According to Erfan (2023), a business strategy is a strategy to achieve goals. In business organization and management, strategy is a management work plan to run a business, this means that the Company's strategy is an action taken in the face of competition and a business approach used to develop new businesses, attract and satisfy customers, compete successfully, and achieve the Company's performance targets that have been set.

Analysis of the Internal and External Business Environment

Strategy formulation includes setting a vision and mission, identifying external opportunities and threats of an organization. Awareness of internal strengths and weaknesses, setting long-term goals, seeking alternative strategies and choosing specific strategies to achieve goals (David 2017). At the stage of analysis of the internal and external environment, it is carried out through the weighting of the business-strength and industry attractiveness matrix.

SWOT Analysis

SWOT analysis is carried out using information obtained from the results of external analysis, internal analysis and evaluation of management values. The SWOT Analysis Model by Leigh (2009) is an analysis that is often used to formulate strategies that a company can adopt based on its organizational capabilities.

Internal and External Strategy Analysis (IE Matrix)

The Internal and External Matrix (IE) based on Umar (2019) consists of two groups, namely the total score of the IFE matrix on the X axis and the total score of the EFE matrix on the Y axis. and a total score of 3.0 up to 4.0 indicates a strong internal position. Meanwhile, on the Y axis, the total EFE weight score of 1.0 to 1.99 indicates a low external position, a score of 2.0 to 2.99 indicates a moderate external position, and a score of 3.0 to 4.0 indicates a high external position.

III. RESEARCH METHODS

The type of research in this research is qualitative descriptive, which is research that aims to develop a good understanding of the problems that exist in the description of the data and existing conditions. The author will compile a number of questions and answers from these questions to provide an overview of the phenomenon regarding the research subject. The types of research questions include what, who, why, how, and when to find out the relationship to the research indicators (Cooper and Schindler 2014).

The respondents in this study consisted of the Commercial Director of Perhutani who is a high-ranking company with the authority to make strategic decisions of the Company and the Head of the Perum Perhutani Price Valuation Department as a PIC in the development of biomass business strategies at Perum Perhutani, several stakeholders related to biomass business development, namely industry experts as well as biomass academics from the Faculty of Forestry IPB University and Vice President of Marketing Business Development & Biomass Planning PT Perusahaan Listrik Negara (PT. PLN).

The method of data collection is then observed that focuses on scientific investigation, is planned, and carried out in a structured manner, using appropriate and reliable constraints related to the phenomena that occur during observation (Cooper and Schindler 2014). Observations are made on the company's internal documents such as financial statement data, performance reports, company plans, company landscapes and various

company reports that are able to support primary data to answer research objectives. The secondary data collection method is carried out by the author through a literature review related to the existing conditions of the forestry industry, government plans in terms of forestry and cofiring, micro and macroeconomic conditions and various studies from the public sector regarding the condition of the Company and the policies of the forestry and renewable energy industry sector

IV. RESULTS AND DISCUSSION

The results of the identification of strengths, weaknesses, opportunities and threats produced, all components will be used as questions and weighted questionnaires which will later be assessed based on the impact and level of controlling activities, which are presented in the table and figure below :

Table 1. SWOT identification of Perum Perhutani's biomass business

STRENGTH		WEAKNESS		OPPORTUNITY		THREAT	
S1	The land area owned is large	W1	Human resources are considered inadequate in the downstream sector (factory operations)	O1	Qualified raw material supplier	T1	Quite a long bureaucracy in state owned enterprises (SOEs)
S2	Human resources who have forestry expertise in the upstream sector	W2	Manufacturing operations are not yet effective	O2	Government support for state-owned companies in financing, incentives and taxation	T2	Government policy regulations that limit Perhutani's movements
S3	The infrastructure owned is in the form of a qualified Energy Plantation	W3	Productivity is not optimal in terms of quantity	O3	Support from other agencies (PT. National Electricity Company / PT. PLN) in establishing cooperation	T3	Competitors
S4	Ownership of sufficient financial assets and fixed assets	W4	Profitability of some projects is not good	O4	International support in renewable energy products from Perum	T4	Fluctuations in raw material prices
		W5	Insufficient technological adjustment	O5	Market demand for Perum Perhutani products is high		
		W6	High investment costs				
		W7	Carbon emissions are a side effect of production				

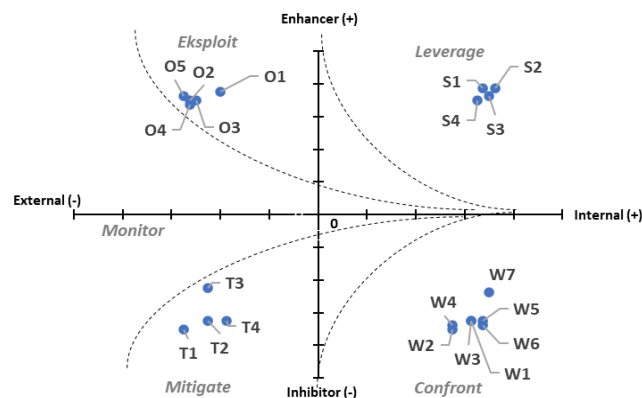


Figure 1 SWOT Chart

The results of the analysis of the company's environment externally and internally with strengths-weaknesses-opportunities-threats (SWOT) show that the company's position is in the stability quadrant. The quadrant emphasizes that the potential to strengthen internal capabilities can be used as a catalyst for the Company's growth, by strengthening the key namely, namely in a more mature HR planning process, focusing on several selected business lines, overseeing the entire value chain process and in line with improving human resource capabilities as well as the implementation of technology and digitalization. Based on the results of the questionnaire collected, the SWOT results of Perhutani's Biomass business are as follows:

Table 2. SWOT Calculation Results

Internal Analysis				
Strength		Rating	Weight	Score
S1	The land area owned is large	3.63	0.10	0.35
S2	Human resources who have forestry expertise in the upstream sector	3.75	0.10	0.36
S3	The infrastructure owned is in the form of a qualified Energy Plantation Forest	3.56	0.09	0.31
S4	Ownership of sufficient financial assets and fixed assets	3.38	0.10	0.33
Total Strength				1.35
Weakness		Rating	Weight	Score
W1	Human resources are considered inadequate in the downstream sector (factory operations)	3.19	0.09	0.28
W2	Operasional pabrikasi belum efektif	3.13	0.09	0.29
W3	Produktivitas belum optimal dari segi kuantitas	3.19	0.10	0.31
W4	Profitabilitas beberapa proyek belum baik	3.06	0.09	0.28
W5	Penyesuaian teknologi yang belum cukup	3.31	0.08	0.28
W6	Biaya investasi tinggi	3.38	0.09	0.30
W7	Emisi karbon dampak samping dari produksi	2.94	0.08	0.23
Total Weakness				1.97
TOTAL INTERNAL				3.33

External Analysis				
Opportunity		Rating	Weight	Score
O1	Qualified raw material supplier	2.88	0.12	0.34
O2	Government support for state-owned companies in financing, incentives and taxation	3.06	0.12	0.37
O3	Support from other agencies (PT. National Electricity Company / PT. PLN) in establishing cooperation	3.00	0.12	0.36
O4	International support in renewable energy products from Perum Perhutani	3.00	0.11	0.33
O5	Market demand for Perum Perhutani products is high	3.19	0.11	0.36
Total Opportunity				1.76
Threats		Rating	Weight	Score
T1	Quite a long bureaucracy in state-owned enterprises (SOEs)	3.13	0.11	0.34
T2	Government policy regulations that limit Perhutani's movements	2.75	0.11	0.30
T3	Competitors	2.25	0.10	0.22
T4	Fluctuations in raw material prices	2.56	0.10	0.27
Total Threats				1.12
TOTAL EXTERNAL				2.88

The results of the analysis using the Internal Factor Evaluation Matrix (IFE) showed a score of 3.33 which means that the company has strong internal strengths, exceeding the average value (2.88), reflecting effective management, adequate resources, and operational capabilities that support competitive advantage. With a strong internal position, it allows the company to be more aggressive in developing growth strategies. Meanwhile, the results of the analysis using the External Factor Evaluation Matrix (EFE) gave a score of 2.88 indicating that the company operates in a fairly moderate external environment, where the company is able to identify and respond to opportunities and external threats quite well, although there is room for improvement in maximizing opportunities or reducing the impact of threats, but the external environment is demanding that the company continue to be adaptive to the market changes and competition. Based on the following IFE and EFE analysis, the Perhutani IE Matrix is shown in Figure 2

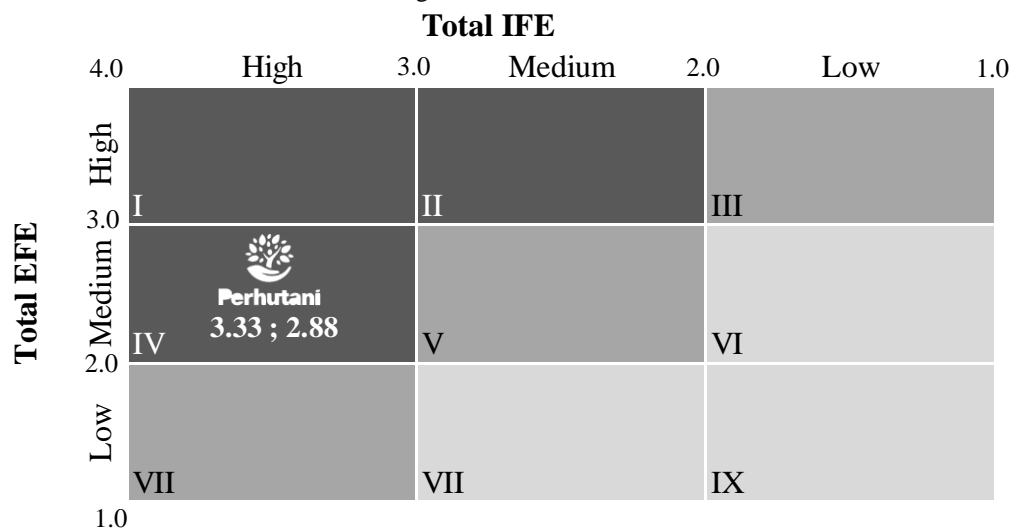


Figure 2 Results of IE matrix analysis in biomass business

With the Company's Internal score of 3.32 and External 2.88, the Company is in quadrant IV which has a strong internal position, and a good external position. Based on the position in the IE matrix, which is in quadrant IV, it is a business unit that is in a *grow and built* condition. In these conditions, the right strategy is to maintain the existing market position and focus on product development efforts. Market penetration and *product development* strategy, or integrative strategies, both *backward strategies*, *forward strategies*, and *horizontal strategies* will help maintain and maintain the company's position.

The correlation between the SWOT diagram and the Company's strategy is that the company's strategy is designed based on the company's mindset, namely by utilizing the company's strengths to overcome the

threats applied through the utilization of existing opportunities by minimizing existing weaknesses based on the company's activities. The following is a list of corporate strategies obtained based on SWOT analysis based on strengths, weaknesses, opportunities and threats.

Perhutani's SWOT coordinates are (-0.62; 0.65). These coordinates provide an overview of the extent to which the Company's internal strengths and weaknesses impact external opportunities and threats. The results of the calculation of negative values on the X axis indicate that the strength is weaker than the weakness, while the positive value on the Y axis indicates that the odds are higher compared to the threat. Based on the results of the SWOT chart analysis, the company is in quadrant III, so the strategy that is priority III is the WO (Weakness-Opportunity) strategy with aggressive strengthening of management and business improvement.

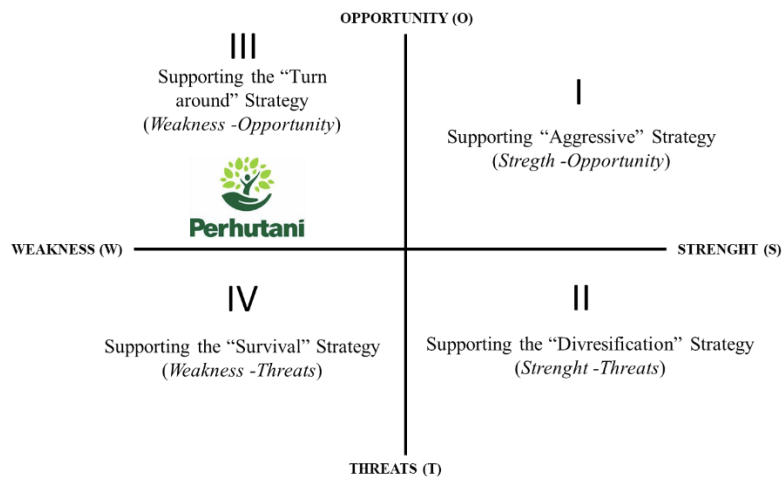


Figure 3 Quadrant of determining alternative corporate strategies

Based on the results of IE Matrix, the company is in quadrant IV which has a strong internal position, and a good external position. Based on the position in the IE matrix which is in quadrant IV is a business unit that is in a *grow and built* condition and based on Perhutani's SWOT coordinates in coordinate III the strategy components to be carried out are:

1. Optimizing forest resource management in the process of selecting plant locations, plant types, silviculture and social management to ensure the productivity of biomass produced as planned, as well as by adding alternative sources, namely felling waste, silviculture treatment (thinning) on Perhutani Teak Plus (JPP) plants.
2. Conduct regular training for employees in the factory operations. This training can include the introduction of new technologies, efficient production techniques, as well as quality management and benchmarking to other companies regarding the process flow of the biomass industry through collaboration with universities, training institutions and other biomass industry companies to develop education and certification programs for employees working in the downstream sector.
3. Establish a cooperation scheme with 3rd parties (synergy of SOEs or private parties) that have funds, resources, technology and markets for upstream-downstream biomass development to share risks and share knowledge so that it can be applied in other Perhutani industries.
4. Seeking long-term cooperation with buyers (PT. PLN, other SOEs or private parties) for market certainty with a guarantee of continuity of biomass supply and quality in accordance with SNI.
5. Identify and address *bottlenecks* in plant operations. This can be done by conducting operational audits, introducing a *lean manufacturing* management system, or implementing *Total Productive Maintenance* (TPM) principles.
6. Using government support to finance investments in new technologies that can improve factory productivity or by applying tax incentives to biomass renewable energy products.
7. Create a strict IT-based monitoring system on the productivity of each production line (upstream-downstream), to find out the points that need to be improved quickly and *in real time*.
8. Implement better production planning methods, such as *Material Requirement Planning* (MRP), to optimize the use of raw materials and minimize waste.
9. Allocating a portion of the funds for R&D in developing and implementing the latest technologies in forest resource management operations and plant operations.
10. Managing budgets more efficiently and prioritizing investments that have a direct impact on productivity and profitability, and to avoid high investment failures, Perhutani must ensure the planning, organizing, supervising, and controlling process of all aspects of the factory construction

project, from initial planning to completion to ensure projects are completed on time, on budget, and meet quality standards.

11. Implementing the latest technology that can increase the productivity of biomass products while reducing carbon emissions in the production process, such as clean combustion technology or waste management systems in addition to coordinating with policy makers (Ministry of Forestry) related to biomass emission value policies.

V. CONCLUSIONS AND SUGGESTIONS

This study evaluates the strategic factors and position of Perum Perhutani related to the development of biomass business strategies. Based on the analysis carried out, there are several important points as follows:

1. The main factors in the biomass business are sustainable raw materials, effective and efficient industrial governance with the use of the latest technology, qualified human resource capabilities, and support from policy makers (government/ministries/institutions) in supporting the running of an upstream-downstream biomass business that is suitable for a company.
2. Strategic Factors and Position of Perum Perhutani in Biomass Business Development:
 - Perum Perhutani has a significant competitive advantage in the development of the biomass business, especially related to the area of land it owns and the availability of raw material supply for biomass projects. In addition, the competence and experience of the workforce in the development of renewable energy technology (HTE) also provide a strong strategic position.
 - The infrastructure, both in the upstream and downstream sectors, supports the smooth operation of biomass projects, with high operational efficiency, both upstream and downstream. This provides an opportunity for Perhutani to strengthen its position in the biomass market, especially in increasing project productivity and profitability.
3. Biomass Business Performance Conditions in Perhutani:
 - Based on the existing performance assessment, Perhutani shows that the level of operational efficiency still needs to be improved, especially in the upstream part, which is reflected in the level of profitability that is still considered unproductive.
 - In addition, there is room for improvement in terms of product efficiency and innovation, given the ever-evolving market conditions and the increasingly fierce competition in the renewable energy industry.
4. Strategies to Improve Biomass Business Performance:

Based on the analysis of IFE (3.32) and EFE (2.88) values, which show the *growth and build* conditions, and looking at position III SWOT coordinates, the right strategy is to maintain the existing market position while focusing on product development and diversification in the biomass business (raw materials and products produced) and prioritizing aggressive improvement and improvement in integrated upstream-downstream management. That way, Perhutani can further optimize its competitive advantage and get good profitability.

This research has limitations that need further attention. This study does not accommodate a more in-depth investigation into technical improvements to the Company's detailed components, so there are several suggestions:

1. The suggestion for Perhutani is to improve the details that have been conveyed to this researcher.
2. Suggestions for further research based on the *grow and build conditions* as reflected in the IFE (3.32) and EFE (2.88) values, as well as the advantages possessed by Perum Perhutani in biomass projects, further research can focus on areas to strengthen Perhutani's position and accelerate the development of the biomass business, especially in the Diversification of Biomass Products and Markets.
3. To policy makers in the Government to pay more attention to and support the upstream-downstream biomass industry for renewable energy so that this business can develop, be profitable for business people and can be run by other companies in order to support the achievement of the energy mix in Indonesia

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