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THE INTEGRATION MODEL ON IMPLEMENTATION OF THE BIODIESEL MANDATORY POLICY

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ABSTRACT

The increase in economic activity in the industrial sector and the rapid growth of the world population has driven the increase in energy demand. In 2004, Indonesia earned the status of a net importer of oil so that it becomes a challenge for the Indonesian government in developing the use of renewable energy to achieve ideal conditions for national energy Resilience. Indonesia has the potential for large amounts of renewable energy sources, one of which is palm-based *biodiesel*. The mandatory biodiesel policy program was implemented in 2008 with biodiesel content of 2.5% and gradually until 2019 with a *biodiesel* content of 30% (B30). The mandatory *biodiesel* policy is closely related to the achievement of the Sustainable Development Goals (SDGs), and the concept of maintaining the balance of Trilemma Energy. The current energy management and utilization policies in Indonesia continue to increase in line with modern life consumption patterns that require a more environmentally friendly energy variable for energy absorption in Indonesia, especially renewable energy. The purpose of this research is to synchronize biodiesel policy with an integrated performance measurement model for palm-based renewable energy. This study uses several strategic frameworks by combining a quantitative approach through the BSC. Based on the results of the SEM PLS validation on 20 BSC perspective variables, it was found that two invalid variables, namely the variable efficiency port service cost, and value-added creation, had a P-value > 0.05.

KEY WORDS

Renewable energy, biodiesel policy, energy resilience, strategic framework, validation.

One form of national resilience is economic resilience. National resilience in the economic field can be seen from the condition of the nation's economic life, which in that nation can maintain the independence of its national economy. Zaenal and Adi (2018) state that the real manifestation of economic resilience is the ability to maintain a healthy and dynamic economic stability, with the ability of highly competitive economic independence. This large consumption of energy both at the domestic and global levels has prompted every country to constantly explore and exploit nature to meet energy needs while still paying attention to environmental factors. Based on Law Number 32 of 2009 concerning the protection and management of the environment, Indonesia has included the foundation of sustainable and environmentally sound development in economic development.

This anticipatory step for depleting conventional energy reserves has encouraged countries in the world, including Indonesia, to seek to develop the use of renewable energy while at the same time increasing their energy Resilience. Biofuels as Other Fuels. In this ministerial regulation, the government seeks to encourage the phasing of the use of other fuels to achieve national energy Resilience.

One of the sectors that are interesting to study from the four priority policies above is the energy independence sector. The existence of energy is very important because of its role in the wheels of politics and government, economy, social life as well as defense and Resilience under Article 33 of the 1945 Constitution. Our national energy sector faces challenges that affect national energy Resilience and energy independence in Indonesia, including real conditions where since 2004 Indonesia has held the status of a net importer of oil. This net importer condition is carried out to meet domestic oil consumption which cannot be fulfilled by domestic oil production. Data from the Special Task Force for Upstream Oil

and Gas Business Activities (SKK Migas) in 2016 showed that Indonesia's oil production was only 831,000 barrels per day. This figure is far from the national demand which reached 1.6 million barrels per day.

To realize the use of environmentally friendly energy in Indonesia, the government needs to find solutions to the problems of inequality that exist in Indonesian society to realize a fair transition process for people to switch to using environmentally friendly energy (Qurbani, Heffron, & Rifano, 2020). Indonesia has the potential for renewable energy sources in large quantities. One of them is biodiesel as a substitute for diesel. Several countries have chosen biodiesel as an alternative fuel or substitute product, namely Germany with biodiesel made from rapeseed and America with biodiesel made from soybean and canola, Russia with biodiesel made from rapeseed, sunflower, and soybean, Australia with biodiesel made from canola, Korea with soybean-based biodiesel. Meanwhile, Indonesian biodiesel is produced from palm oil as raw material. Indonesia has the potential for renewable energy sources in large quantities. One of them is biodiesel as a substitute for diesel. Several countries have chosen biodiesel as an alternative fuel or substitute product, namely Germany with biodiesel made from rapeseed and America with biodiesel made from soybean and canola, Russia with biodiesel made from rapeseed, sunflower, and soybean, Australia with biodiesel made from canola, Korea with soybean-based biodiesel. Meanwhile, Indonesian biodiesel is produced from palm oil as raw material.

The mandatory policy for palm-based biodiesel is the government's effort to increase sustainable energy production as well as an effort to increase added value as well as a solution in the context of realizing the SDGs, including the Availability of Sustainable Energy and Prevention of Climate Change and its impacts. The purpose of synchronizing the implementation of policies that support the mandatory biodiesel program is to make it a sustainability concept as the SDGs and the Energy Trilemma Index. For this reason, a long-term strategic plan is needed based on the vision and mission, and the goal is to develop a model of an integrated palm-based renewable energy performance measurement system. An integrated model that can describe, describe and evaluate the synchronization of the implementation of the national biodiesel program along with its supporting policies and inter-sectoral synergies. The integrated model that will be built is packaged as an alternative solution to the implementation of policies that cover mandatory programs in the performance management framework so that the development of palm oil, especially CPO as renewable energy, should not only be the domain of the Ministry of Energy and Human Resources (ESDM) but need to integrate the perspectives of the Ministry of Energy and Mineral Resources, the strategic perspective from the relevant technical institutions, which include legal, regulatory and technical aspects of other Ministries.

Further mandatory biodiesel policies are how to produce productive oil palm planting technology, produce more efficient and effective biodiesel user machines, improve the welfare of the palm oil industry players, the mechanism for distributing raw materials, blending processes, good distribution, enforcement of incentives, subsidies and taxes. decent, alleviating poverty and reducing unemployment and others. This is done as a reflection of the realization of the mandate of Article 33 of the 1945 Constitution paragraph 3 that the earth, water, and natural resources contained therein are controlled by the state and used for the greatest prosperity of the people.

By developing an alternative integration model in the implementation of palm oil-based biodiesel policy as a renewable energy Resilience commodity using the balanced scorecard method validated with SEM-PLS to the Steering Committee, it is hoped that the relationship between its strategic objectives both vertically and horizontally between various perspectives and the achievements of each subsequent perspective will be built more comprehensively as a strategic step for biodiesel development in Indonesia.

Based on the background of the problems that have been discussed previously, the formulation of the problem in this research is: How to develop an integrated model for the implementation of the national palm oil-based biodiesel policy to be able to support the performance of the mandatory biodiesel program towards achieving energy Resilience and the realization of energy independence in Indonesia. The objectives to be achieved in this

study are: Develop a proposal for an integration model in policy implementation to support the mandatory national palm oil-based biodiesel program, within the framework of the Balanced Scorecard (BSC) performance management system validated by SEM-PLS to achieve energy Resilience and the realization of independence. energy in Indonesia.

MATERIALS AND METHODS OF RESEARCH

The rationale for energy resilience is stated in Law No. 30 of 2007 on energy. In-Law no. 30 of 2007, article 2 states that "energy is managed based on the principles of benefit, rationality, efficiency, justice, increased added value, sustainability, community welfare, preservation of environmental functions, national resilience and integration by prioritizing national capabilities". Then in Law no. 30 of 2007, in article 3 paragraph 2 states that "to support sustainable national development and improve national resilience, the objectives of energy management are, among others, for independence, supply, management, use of energy, efficiency, public access, the energy industry, and the environment". From the two articles, it can be concluded that energy Resilience does not only include efforts to meet energy needs but also the community's ability to obtain and utilize energy and consider energy management aspects including environmental aspects.

According to the National Energy Council (DEN), as quoted in Agustiawan, 2014 *"energy Resilience is a condition of ensuring the availability of energy, public access to energy at affordable prices in the long term while still paying attention to environmental protection"*. Furthermore, in the World Economic Forum (2006), it is explained that energy Resilience is the ability of the economy to ensure the availability of a sustainable and timely supply of energy resources with energy prices at a level that will not affect economic performance. Brown, et al. (2003) stated: Energy Resilience refers to a resilient energy system. This resilient system would be capable of withstanding threats through a combination of active, direct Resilience measures—such as surveillance and guards—and passive or more indirect measures—such as redundancy, duplication of critical equipment, diversity in fuel, other sources of energy, and reliance on less vulnerable infrastructure. Energy Resilience can be described as "the uninterrupted physical availability at a price which is affordable while respecting environment concerns" (US EIA).

Based on several theories related to energy Resilience, it can be concluded that energy Resilience is an economic capacity that not only includes efforts to meet energy needs but also ensures energy availability and considers energy management aspects including environmental aspects by prioritizing national capabilities. Several factors will affect energy Resilience, Boedoyo (2015):

- a. Availability of fuel reserves both domestically and for export purposes;
- b. The ability of the economy to explore the supply/source of energy to meet demand;
- c. The degree of economic diversification of energy resources;
- d. Accessibility of energy resources, in this case, is related to the availability of energy and transportation infrastructure;
- e. Geopolitical stability and Resilience around energy resources.

According to the World Energy Council (WEC) & Asia Pacific Energy Research Center (APEREC), energy Resilience indicators are Availability (availability), Affordability (affordability), Accessibility (convenience), Community & environmental acceptance, and Sustainability (sustainability). According to the National Energy Council (DEN), five things are generally indicators of the existence of energy Resilience:

- a. Availability: Availability of energy in sufficient quantities for the sustainability of economic activities either obtained from local resources or imported from other countries;
- b. Accessibility: The aspect of energy affordability for people in need from a spatial perspective;
- c. Affordability: Aspects of energy affordability for consumers in terms of economic level and people's purchasing power;

d. Acceptability: The acceptance of all elements of the nation towards the exploitation and utilization of certain types of energy resources, especially related to social and economic aspects;

e. Sustainability: Availability of energy continuously.

The selection of oil palm (*Elaeis guineensis* Jacq) began around 1920 in Africa and Asia (Malaysia and Sumatra) when the species began to be used for commercial vegetable oil (Rajanaidu, et. al., 1981). It is an infinite blessing from Allah SWT when it turns out that Palm Oil thrives in Indonesia as a tropical area along the Equator with abundant rainfall so that it becomes Indonesia's leading commodity and as future energy for the Indonesian state. Oil palm plants require a high enough intensity of sunlight to carry out photosynthesis. In clear sky conditions in the equatorial zone, the intensity of sunlight varies from 1,410-1,540 J/cm²/day. (Pahan, 2006). The required altitude is 0-600 m above sea level (asl). Optimum 0-200 m above sea level. Based on a survey in certain cases, it can be suggested up to an altitude of 850 above sea level (Wahyono, et al, 1996).

The humidity factor is very influential on the growth of oil palm. The factors that affect humidity include rainfall, temperature, and sunlight. The optimum humidity for oil palm ranges from 80%-90% (Risza, 1994). Wind speeds of 5-6 km / h are very good to help the pollination process. Winds that are too strong will cause new plants to sway or tilt (Lubis, 1992). The optimum temperature required is around 24-28°C although it can still grow at the lowest temperature of 18°C and the highest temperature of 32°C. Several factors that affect the high and low temperature are the lengths of irradiation and altitude. The longer the irradiation or the lower the temperature, the higher the temperature, and oil palm can grow at a soil pH between 4.0-6.5 while the optimum pH is 5-5.5 (Fauzi et al, 2004). Under optimal conditions, the harvest period for oil palm is 3-4 years old and productivity increases rapidly at 8-12 years, then decreases slowly until the economic age of 25 years. In well-managed oil palm plantations in Indonesia and Malaysia, the maximum productivity of fresh fruit bunches can reach 24-32 tons/ha/year (Corley, 2003).

Based on Mineral Energy Resources and Mining (2015), palm oil processing produces two types of oil as an upstream industry:

a. Colorless/pale oil derived from palm kernel is called Palm Kernel Oil (PKO);

b. Reddish-colored oil that comes from the mesocarp/outer part of the palm kernel as Crude Palm Oil (CPO).

The two types of products are then developed into various downstream industrial products. The downstream palm oil industry products are in the form of food and non-food products. Its food products include cakes, bread, biscuits, chocolate, confectionery, ice cream, vegetable milk flour, coffee mate, and instant noodles. In the pharmaceutical industry, its use is mainly in vitamin A and E products. For non-food products, including soap, cream lotion, shampoo, "metallic soap" for lubricating oil and paint mixtures, lubricants, and surface rust protection for steel sheets in the rolled steel industry. The cold rolling mill, a floating agent used to separate copper or cobalt ores from steel, the body industry, as well as the printing ink, wax, and crayon industries (Pratomo & Puraka, 2008).

Palm Kernel Oil (PKO) is used as an ingredient for several industries such as soap, cosmetics, and animal feed. In the process of making animal feed, the fruit is processed by softening the flesh at a temperature of 90°C. The softened meat is forced to separate from the core and shell by pressing on a hollow cylinder machine. The core and shell meat are separated by heating and pressing techniques. After that, it has flowed into the mud so that the remaining shells will go down to the bottom of the mud. The rest of the palm fruit processing has the potential to become a mixture of animal feed and fermented into compost (Pratomo & Puraka, 2008). Palm oil is Indonesia's most important commodity is the most consumed and produced in the world. This cheap, easy to produce, and very stable oil can be used as biodiesel. World palm oil production is dominated by Indonesia and Malaysia. These two countries in total produce around 85-90% of the total world palm oil production. Indonesia is the world's largest producer and exporter of palm oil.

Indonesia's production is almost double that of Malaysia as the world's second-largest palm oil producer and tens of times greater than Thailand's third rank, as shown in Figure 1. Indonesia as the World's Largest Palm Oil Producer (Muttaqiena, 2018).

Figure 1 – Indonesia as the World's Largest Palm Oil Producer (Muttaqiena, 2018)

In the Indonesian economic system, palm oil commodities have bright prospects as a source of foreign exchange that can create broad job opportunities to improve the welfare of the Indonesian people, according to Presidential Regulation no. 24 of 2015 oil palm is a strategic plantation commodity that can be used for various products such as food, oleochemicals, and bioenergy. Utilization of palm oil into bioenergy, among others, is into biodiesel, biogas, bio-oil, bio pellet, bio briquette, methane gas, and biomass power plants.

The area of oil palm plantations in Indonesia is growing very rapidly. The increase in oil palm area was at 15.75% in 2017 but decreased in 2016 by around 0.53%. In 2015-2020, oil palm plantation areas were spread across 26 provinces, and the largest was in Riau province, which was 2.85 million hectares or around 19.21% of the total area of oil palm plantations in Indonesia in 2020. Meanwhile, the development of oil production Palm oil (CPO) from 2015 – 2020 has increased where the highest increase occurred in 2018 which reached 42.88 million tons or an increase of about 22.72%. Palm oil production also continues to increase, reaching 51.6 million tonnes in 2020, as shown in Figure 2.2. Development of Indonesian Palm Oil Area and Production 2015-2020 (BPS, 2020).

Figure 2 – Development of Indonesian Palm Oil Area and Production (Million Tons)
(Source: BPS, 2020)

The potential of palm oil other than as a raw material for non-food industries such as soap, chemicals, and others is as a plant that already has a surplus value to meet food ingredients in Indonesia such as cooking oil, margarine, and others. The overall value of palm oil exports over the last six years has tended to increase, except in 2016 it decreased by 13.96%. Palm oil exports during 2015 – 2020 experienced the largest increase in 2017 or

an increase of 19.44%. The increase in export volume was not accompanied by an increase in the value of exports. The export value of palm oil decreased by 12.03 percent in 2018 compared to 2017 and 12.32 percent in 2019 compared to 2018. With palm oil production in 2017 reaching 34.94 million tons, it shows that there are no problems with meeting market demand. . In 2020, the export value of palm oil experienced a fairly high increase, by 43.70% compared to 2019. It can be seen in Figure 2.3. Development of Palm Oil Export Volume and Value 2015-2020 (BPS, 2020).

Figure 3 – Development of Palm Oil Export Volume and Value (Thousand Ton – Million \$)
(Source: BPS, 2020)

The mandatory biodiesel policy to achieve the Sustainable Development Goals (SDGs) is an inseparable part of the concept of maintaining a balance of the energy trilemma, namely:

- a. Energy Resilience is the effective management of domestic primary energy supply as well as external resources, reliable energy infrastructure, and the ability to supply energy to meet current and future needs;
- b. Energy Equity that can provide access to energy at affordable prices for all residents in the country;
- c. Environmental sustainability which includes achieving efficient energy supply and utilization, developing energy supplies from renewable energy and other low-carbon energy sources (World Energy Council, 2019).

Figure 4 – Trilemma Energy (World Energy Council, 2019)

Indonesia's national energy Resilience is ranked 69th out of 128 countries based on the ranking issued by the World Energy Council or the World Energy Council through the Energy Trilemma Index which consists of three assessment variables related to energy Resilience globally, namely energy Resilience, energy equity (accessibility and affordability)

and environmental sustainability (World Trilemma ranking for 128 countries, 2019). From the ranking order, it is proper for the Indonesian government to be more serious in immediately fixing the energy sector so that national energy Resilience becomes more reliable and does not depend on fuel imports by optimizing the implementation of mandatory biodiesel, building new refineries so that they are not dependent on other countries and ensuring supply and must pay attention to factors such as: clean and environmentally friendly.

The implementation of the mandatory biodiesel policy is a manifestation of the strategic plan and implementation of the use of alternative fuels that are effective in the use of renewable energy and has been worldwide. The government has stimulated the use of biodiesel to reduce the use of fossil fuels and as a substitute product for diesel-based power plants. The utilization of renewable energy into environmentally friendly power plant fuels is closely related to the concept of a balanced Energy Trilemma Index. The challenge to achieve energy equity is an effort to balance accessibility and affordability, given the economic level of the Indonesian people as a developing country, which has the ultimate goal of people's welfare, business climate, and sustainable economic growth.

Realization in 2018 targets for the National Energy General Plan (RUEN) the highest ratio is oil at 40.21%, coal at 33.7%, natural gas at 20.1%, and renewable energy at 6.2%. This shows that the use of renewable energy is still far from the government's target according to the energy mix target in 2025 which is 23% and 31% in 2050. It is a must for the government to try to be more aggressive in implementing the substance of the energy trilemma with an emphasis on environmental sustainability. In which the optimization of the use of renewable energy contributes to suppressing the growth of carbon gas emissions from various types of power plants as one of the main causes of air pollution that continues to increase. Likewise, the use of coal as compared to the use of biodiesel.

The mandatory biodiesel program is expected to empower palm oil production in Indonesia by relying on a population of oil palm farmers whose welfare level must also be considered. Furthermore, it is expected to reduce air pollution levels and contribute to several types of power plants, one of which is the Diesel Power Plant (PLTD).

Figure 5 – Research Framework Design

The strength of the relationship between the factors that make up the model is expressed in the structural model. The structural model or inner model is the relationship between one latent variable and another latent variable (Ghozali, 2016). This test is incorporated into the research model by looking at the results of the R-square and the level of significance of each relationship. There are 2 (two) methods that can be used to complete the structural model, namely SEM (Structural Equation Modeling) and PLS (Partial Least Square).

Structural Equation Modeling (SEM) is an integrated approach between factor analysis, structural modeling, and path analysis. SEM is also an integrated approach between data analysis and concept construction. In SEM we can carry out activities simultaneously, namely equality of instrument validity and reliability (equivalent to confirmatory analysis), model testing related to the relationship between latent variables (equivalent to path analysis), and obtaining useful models for estimation (equivalent to structural models).

Partial Least Square (PLS) is a powerful method of analysis because it lacks dependence on the measurement scale (eg measurements that require interval or ratio scales), sample size, and distribution of residuals (Wold, 2013). Indicators in PLS can be formed with reflexive or formative types.

The type of research in this study is to use the development of a multi-sectoral performance synchronization model based on the Balanced Scorecard (BSC) framework, by combining qualitative methods with quantitative methods. The quantitative method uses model validation with SEM-PLS and TCC. While the qualitative method relates to the use of Expert Opinion (EO), Focus Group Discussion (FGD), and brainstorming with regulators and biodiesel policy operators through the listing method of aligning strategic objectives with the vision and mission, an overview of the palm oil-based biodiesel business model through BMC initiation and the proposed omnibus design perspective palm-based biodiesel law based on the constraints found in the implementation of existing policies.

In Figure 5 Research Framework Design is a description of the main aspects of the conceptual model, namely the strategic mapping of the palm-based biodiesel BSC. The SEM-PLS validation test for variables in the strategic map is carried out through 2 (two) stages, namely the first stage validation at the national level model, after getting the variables that pass the test, the second stage is tested. The validation of the second stage of the model is done by combining valid national variables with international variables.

RESULTS AND DISCUSSION

From the strategic map model, the formulation and validity of the strategic mapping model (strategic mapping) are carried out from the base scorecard and internal business process perspective as well as the following perspective. The validity of the base scorecard perspective will be tested with the results of discussions with stakeholders, while other perspectives after the base scorecard will be tested for the validity of the model with the technology contribution coefficient. In the improvement model, the base scorecard consists of 13 ministries/agencies currently relevant to the development of biodiesel.

The mapping strategy at the next level is divided into 2 sectors, namely National and International. National Learning and growth are divided into 4 clusters, namely technology, human, information, and organization. The division at this level is based on the THIO concept which is used as a tool in the research framework. Meanwhile, international learning and growth have 1 cluster, namely Value Added Creation as shown in Figure 6.

Figure 6 – Learning and Growth

In the strategy map, the National internal business process is divided into 6 clusters in the following order: Sustainable Palm Farming & Value Added Agriculture, Participation of Non-Corporate Oil Palm Farmers, Increase Productivity Resources, Operating and Process Excellences, Low Production Cost, and Market Share of Bioenergy Increase. Meanwhile, the international internal business process has 1 cluster, namely, Increase Bioenergy Competitive as shown in Figure 7.

Figure 7 – Internal Business Process

Meanwhile, in the strategy map, the National customer and social section are divided into 5 clusters in the following order: Increase Cost Efficiency of Fuel Consumption, Reduce Air Pollution and GHG Emissions, Efficiency Port Service Cost, Create Direct & Indirect Jobs, and Energy Resilience & Balance. Meanwhile, international customers and social groups have 1 cluster, namely, Increase Contribution on Air Clean as shown in Figure 8.

Figure 8 – Customer and Social

The following is an overview of changes to the overall strategy map as shown in Figures 9 and 10.

Figure 9 – Proposed National Strategy Map

Figure 10 – Proposed National and International Strategy Map

Table 1 – National Key Performance Index

No	National Perspective	Code	Strategic Objective	Key Performance Indicator (KPI)	CODE
1	Prosperity	P_1	Sustainable Revenue APBN (State Budgeting) and Foreign Exchange	Imported value of fossil energy	P_11
				GDP Value	P_12
2	Customer and Social	CS_1	Increase Cost Efficiency of Fuel Consumption	Increased usage efficiency value per kilometer	CS_11
		CS_2	Reduce Air Pollution and GHG Emissions	Value of GHG emissions that are wasted into the air	CS_21
		CS_3	Efficiency Port Service Cost	Improved logistics cost saving	CS_31
		CS_4	Create Direct and Indirect Jobs	Increase in the rural workforce in biodiesel area	CS_41
		CS_5	Increase Energy Resilience and Balance	Increased use of biodiesel fuel	CS_51
3	Internal Business Process	IBP_1	Sustainable Palm Farming & Value-Added Agriculture	Increase in prices received by farmers	IBP_11
				Farmer welfare level	IBP_12
		IBP_2	Participation of non-Corporate Oil Palm Farmers	Amount of non-corporate farmer contribution	IBP_21
		IBP_3	Increase Productivity Resources	Use of idle land	IBP_31
				Profit per hectare of land	IBP_32
		IBP_4	Operating and Process Excellences	Mastery of biodiesel technology	IBP_41
				Yield [yield] per unit input	IBP_42
		IBP_5	Low Production Cost	The efficiency of biodiesel cost of goods sold	IBP_51
		IBP_6	Increase Market Share of Bioenergy	Increase in biodiesel market share index	IBP_61
4	Learning and Growth	LG_1	Increase Technology Infrastructure	Production process efficiency	LG_11
				Availability of energy technology and infrastructure	LG_12
		LG_2	Increase Human Resources Quality	Number of research HR outputs	LG_21
				The existence of a personnel certification body	LG_22
		LG_3	Information Readiness and Socialization	Accurate information database	LG_31
				Dissemination of policies related to biodiesel	LG_32
				Institutional system clarity	LG_41
		LG_4	Integrated Organization	Clear mechanisms for energy tax and incentives	LG_42
				Sustainability of community development	LG_43
				Policy alignment	LG_44

Table 2 – International Key Performance Index

No	International Perspective	Code	Strategic Objective	Key Performance Indicator (KPI)	CODE
1	Prosperity	P_2	Emission Incentives	Air pollution level	P_21
				Community support	P_22
2	Customer and Social	CS_6	Increase Contribution on Air Clean	Comparison of air quality with the use of fossil energy	CS_61
				Comparison of air quality with biodiesel use	CS_62
3	Internal Business Process	oIBP_7	Increase Bioenergy Competitive	Biodiesel content in fossil energy blend	IBP_71
				The selling price of biodiesel	IBP_72
4	Learning and Growth	LG_5	Value Added Creation	Biodiesel performance comparison	LG_51
				Increasing the value of technology contributions	LG_52

CONCLUSION

Based on the results of qualitative data processing using the helicopter view Business Model Canvas approach and the Omnibus method through Expert Opinion (EO), Focus Group Discussion (FGD), and brainstorming with regulators and operators on biodiesel policy implementation. While quantitatively the variables used in the multi-sectoral performance synchronization research model based on the Balanced Scorecard (BSC) framework were validated using SEM-PLS and measured econometrically using TCC. From the results of data processing and discussion of the research model, it can be concluded that in each perspective of the balanced scorecard that has been aligned with the vision, mission, and strategic objectives in the implementation of palm oil-based biodiesel policies, validation has been carried out on each variable KPI. National BSC validation carried out 5 times of testing using SEM resulted in 1 invalid variable from the customer and social perspective, namely efficiency port service cost having a P-value > 0.05. It states that the efficiency port service cost variable does not have a significant consumable parts effect on the model in this study. So that the use of biodiesel has not been efficient to minimize port logistics transport tariffs as an effort to save vehicle operational costs because the use of biodiesel in vehicles that require it has also increased maintenance costs. While the National BSC validation which has been combined with the International BSC was carried out 3 times of testing and resulted in 1 invalid variable, namely the value-added creation variable in the learning and growth perspective which has a P-value > 0.05. This refers to the critical success factor that must be protected, meaning that every existing technology always has protection as well as the catalyst for B100 which cannot be freely sold internationally following:

- Regulation of the Ministry of Transportation concerning the monitoring, evaluation, and administration of the implementation of transport services at ports;
- Regulation of the Ministry of Finance regarding the allocation of research and development funds for palm-based biodiesel;
- Regulation of the Ministry of Education, Culture, Research and Technology regarding the planned research program for the development of technology and engineering for the palm-based biodiesel industry towards B100.

This research has been able to reveal important findings in the context of implementing the national performance of palm-based biodiesel to increase energy Resilience and the realization of energy independence in Indonesia. Further work related to the findings of this research can be submitted as follows:

- For Further Researchers. The existence of difficult conditions during the COVID-19 pandemic and the risk of competition for biodiesel raw materials as a result of producer responses to fluctuating world CPO prices. This has not been discussed in this study and can be used as input for further research.
- For Readers. Through this research, readers get information related to biofuels, especially biodiesel, and the development of their regulations as well as increase knowledge related to the research model and strategic analysis framework used in this research. In addition to getting information, the author hopes that readers will be able to participate

responsively in supporting efforts to maintain energy Resilience and independence, one of which is by switching to using biofuels such as biodiesel.

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