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ENERGY SELF-SUFFIENCY IN REALIZING SUSTAINABLE DEVELOPMENT IN INDONESIA : BETWEEN REALISTIC AND IMAGINARY GOALS

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Abstract

One of the hot topics of discussion at the moment is the government's policy of continuing to develop renewable energy alternatives. Energy Self-Sufficiency in Realizing Sustainable Development in Indonesia. This research aims to analyze the possibility of an Energy Self-Sufficiency development plan in realizing sustainable development in Indonesia, whether it is implemented realistically or not. If it is realistic then it can be categorized as a plan and if it is not realistic then the plan can be categorized as mere discourse. This research is qualitative research with a descriptive approach. The data used in this research is secondary data which researchers obtained from trusted websites, scientific journals, books and other trusted sources that are credible and commonly used in research. The analysis technique in this research uses descriptive analysis techniques to describe whether Energy Self-Sufficiency in realizing Sustainable Development in Indonesia is realistic or not. These data were analyzed using analytical tools with stages of data collection, data selection, data reduction and drawing conclusions.

Keywords: *Energy Self-Sufficiency, Sustainable Development, Energy*

INTRODUCTION

Sustainable Energy Development is a guideline for all industries and organizations in carrying out their business processes by observing and considering the damage that will result from their activities (Jazuli, 2015). Business people are expected to heed the goals of sustainable energy development in order to protect the environment which will be passed on to future generations (Patra, 2022).

Oil energy sources or BBM (Fuel Oil) is still the most widely used energy source in Indonesia with a share of 52.50%. This is the most prioritized concentration by the Government so that the use of fuel oil can be reduced (Kholiq, 2015). According to Gultom (2018) fuel oil itself can damage the environment, the most easily visible environmental damage is through natural exploration to obtain crude oil, the effect of burning fuel oil which produces CO2, resulting in air pollution and directly causing global warming. will result in climate change which is dangerous for the survival of living ecosystems.

As time goes by and the industrial world develops, energy and fuel become a primary need and their use continues to increase (Radjagukguk, *et.al.,* 2015). When using energy, especially fossil energy, it is necessary to pay attention to the impact on the environment, starting from climate change due to the resulting pollution, global warming, to its existence which will gradually run out, because fossil fuels cannot be renewed. So it is necessary to develop renewable energy that does not damage the environment and ecosystem and can continue to be renewed. Indonesia itself has many sources for developing renewable energy ranging from water, solar, geothermal, biomass and wind (Adzikri *et. al.,* 2017). The existence of renewable energy can reduce pollution and environmental damage. Renewable energy itself means energy that comes from sources that can be continuously renewed and has environmentally friendly properties (Azhar, *et. al.,* 2018).

The government continues to develop renewable energy alternatives. One of them, Sustainable Aviation Fuel or sustainable bioavtur which is based on biofuel, with a focus on a mixture of palm oil. In line with Trianto (2024), there are efforts to increase the use of electric vehicles. As many as 1,081 SPKLU units owned by PLN and private partners have been operating by the end of 2023. The potential for renewable energy such as biodiesel and bioavtur from palm oil offers bright prospects. By optimizing supply, Indonesia has great potential to achieve energy self-sufficiency before 2045. This effort is also directed at supporting community welfare, especially through the use of biomass (Aprobi, 2024).

Current technological advances and the increasing growth of Indonesia's population have caused energy needs to increase. Various activities of the Indonesian population require large amounts of energy. Activities such as economic activities, households, transportation and other activities. These various activities are carried out to meet the living needs of the population. These activities require main or primary energy to help activities with maximum results (Puspita, *et. al.,* 2024).

According to Tampubolon, *et. al.* (2021) The need for energy is met mainly from fossil energy sources, namely petroleum, coal and natural gas. Natural gas has a very good role in the industrial and domestic sectors. Natural gas is expected to be a link between fossil energy and renewable energy. Because mining is carried out to extract primary energy sources from fossils (petroleum, coal, natural gas), the need for primary

energy causes changes in the ecosystem which leads to environmental damage. Mining activities have a negative impact on the environment, such as increasing carbon dioxide emissions, producing acid rain, depleting the ozone layer, and increasing the greenhouse effect (Pramudiyanto, *et. al.,* 2020).

Energy consumption in Indonesia is currently continuing to increase, but fossil energy reserves are increasingly depleting, so the use of new and renewable energy has become the main focus of the Indonesian government (Putra, *et. al.,* 2020). The use of energy that relies heavily on fossil energy can cause the government to consider using other energy sources to ensure Indonesia's energy security, protect the environment and reduce the negative impacts it causes.

In addition, the government has taken concrete steps to encourage low-carbon investment through the Economic Value of Carbon (NEK) regulations and the implementation of the Emissions Trading System in the electricity sector. The launch of the carbon exchange last year also shows the government's commitment to optimizing the potential of the carbon market. Through these various initiatives, the government hopes to convey the urgency of the energy transition, the potential of renewable energy and the carbon market scheme to the public clearly. Thus, cross-sector collaboration and effective policy implementation are expected to accelerate sustainable energy development for Indonesia's future (Aprobi, 2024).

METHODS

Researchers believe that Energy Self-Sufficiency can Achieve Sustainable Development in Indonesia. Therefore, this study aims to analyze the effective possibilities of the Energy Self-Sufficiency plan whether it is implemented realistically or not. If it is realistic then it can be categorized as a plan and if it is not realistic then the tomb can be categorized as mere discourse. This research is qualitative research with a descriptive approach with an explanatory approach (Moleong, 2018). The data used in this research is secondary data that researchers obtained from books, credible websites, scientific articles, books, and other things that are usually used as reference data from researchers (Sugiono, 2011). The data sources were analyzed using the stages of data collection, data selection, data reduction, and drawing conclusions (Maksum, 2020).

RESULT AND DISCUSSION

ENERGY SELF-SUFFICIENCY IN REALIZING SUSTAINABLE DEVELOPMENT IN INDONESIA

Energy is very necessary in carrying out Indonesian economic activities, both for consumption needs and for production activities. Population changes greatly influence the size and composition of energy demand, the largest national energy consumption is fuel (Suharyati, *et. al.,* 2019).

Indonesia's energy use is not yet fully balanced between production and consumption. Energy demand is partly supplied and processed in Indonesia, but the majority is exported abroad. In fact, energy consumption in Indonesia is growing at around twice the rate of production growth and 96% of energy has an impact on the environment (Sasana, *et. al.,* 2019). In 2018, total primary energy production consisting of oil, natural gas, coal and renewable energy reached 411.6 MTOE. 64% or 261.4 MTOE of the total production was exported, especially coal and LNG. Apart from that, Indonesia also imports energy, especially crude oil and fuel products amounting to 43.2 MTOE as well as a small amount of high calorie coal which is needed to meet the needs of the industrial sector (Annisa, *et. al.,* 2023).

According to the Central Statistics Agency (2017), Indonesia's status is still as an exporter of raw energy with a percentage of around 64.8%. This situation highlights the dual challenges of technology, namely non-optimal energy production and the negative impact of future energy use that is not environmentally friendly. Most of Indonesia's energy comes from fossil sources: petroleum, coal and natural gas. Even though not all of this energy is renewable energy, the share of renewable energy in Indonesia is still low (Sasana, *et. al.,* 2019).

The Ministry of Energy and Mineral Resources noted that Indonesia's energy consumption in 2017 reached 1.23 billion Barrels Oil Equivalent (BOE), up 9% from the previous year. Of this amount, fuel reached 356.33 million BOE or 28.88% of total consumption. Total final energy consumption (without traditional biomass) in 2018 was around 114 MTOE consisting of the transportation sector 40%, then industry 36%, household 16%, commercial and other sectors 6% and 2% respectively (Databoks, 2018).

Indonesia is a country that is very rich in new and renewable energy potential. If the Indonesian people are able to utilize this energy potential, it will be very beneficial and have an impact on people's lives. According to Al-Hakim (2020), the potential for renewable energy is:

1. Electrical Energy

All areas of life and public infrastructure use electricity. For example, the use of electricity for public street lighting (PJU). As public infrastructure develops, the number of public street lights will increase, and the amount of electricity will also increase. Electricity generation in Indonesia is mostly generated by coal. However, renewable energy can be used to generate electricity, for example through innovative use of organic waste through thermochemical and biochemical conversion technology and replacing coal-based electrical energy sources. The development of this technological innovation will have an impact on the demand for electrical energy supply.

2. Geothermal Energy

Alternative energy to replace fossil energy is geothermal. Geothermal energy is an alternative energy to replace fossil energy. Geothermal energy can effectively and

efficiently support the use of renewable energy without reducing electricity consumption at the national level.

3. Hydro Energy and Wind Energy

Hydro energy is part of environmentally friendly renewable energy. Meanwhile, Indonesia's wind turbine technology is still immature so further research is still needed to develop this technology to fulfill Indonesia's wind energy potential.

4. Marine Energy

The geographical location of Indonesia is largely dominated by islands so that it can take advantage of these conditions, namely marine energy. The ocean energy used is waves. The strength of the waves will vary from place to place. Wave energy in several locations in Indonesia can reach 70 Kw/m. Ocean energy, including ocean currents, is one of Indonesia's new renewable energy sources. The potential for this energy in Indonesia alone is 17.9 GW, but utilization is still very low.

5. Solar Energy

Environmentally friendly renewable energy also includes solar energy (sunlight). Indonesia receives solar radiation almost evenly throughout the year. The potential for solar energy is increasing because of the geographical location which is always illuminated by the sun every year and more and more solar energy can be utilized as renewable energy. Solar energy can be directly converted and converted into uses that can be categorized into two areas: solar energy for electricity generation and solar thermal energy for heating applications.

Indonesia is rich in natural resources and has the largest population in the world. For example, water, steam and solar energy are the largest sources of electrical energy in the world. Apart from that, utilizing the potential of other natural resources in the form of agriculture, plantations and forest products that produce organic waste (biomass) has not become the main focus for creating new and renewable energy (Puspita, *et. al.,* 2024).

According to Winata, *et. al.* (2020) Challenges in seeking energy self-sufficiency in Indonesia by using renewable energy in order to achieve the target of renewable energy utilization of 23% in 2025 in Indonesia, including:

1. The cost of producing electricity from renewable energy plants is still relatively higher so it is considered less competitive than the cost of producing electricity from conventional plants.
2. Several components for renewable energy power plants are still imported, which apart from affecting production prices, also poses challenges for maintenance.
3. In the maintenance and upkeep process, human resource capacity still needs to be increased. In several cases for renewable energy power plants built by the central government and handed over to regional governments, the operation and maintenance did not go well so that the plants eventually stopped working.

4. Current domestic policies are also considered not conducive by investors so they are less interested in investing in the renewable energy sector, for example the lack of incentives for developers and the changing dynamics of policy changes. For investors, policy certainty is an important factor in obtaining bank funding and also long-term business protection.
5. Another challenge related to renewable energy is the nature of some renewable energy sources which are intermittent (not continuous) and cannot be transported so they must be generated locally. This is actually good for electrifying locations that are difficult to reach by the network, such as rural areas.

REALISTIC AND IMAGINARY GOALS

A realistic goal is something that has a tendency to lead to a more pragmatic and actual view of the situation. This term is considered to have an absolute position and cannot be separated from a person's ideas, thoughts and consciousness (Sevilla, 2022). Management uses realistic goals to direct activities and also as a guide in the control process. Based on this, Imaginary is not accurate but takes into account several things related to natural resources, capital resources, human resources, and various things that can support the program to be realized. Different from Realistic, Imaginary is an intention/something that is desired without considering other aspects that can realize that intention/desire (Indonesia in Sari, *et. al.,* 2024).

Regarding the government's realistic goals in implementing Energy Self-Sufficiency to increase sustainable development, Indonesia has ratified the Paris Agreement and is committed to reducing Green House Gas (GHG) emissions by 31.89% to 43.2% with international assistance by 2030. One of the efforts to reduce GHG emissions namely through an energy transition where the existing energy system is transformed to accommodate high penetration of New Renewable Energy (EBT), so that the use of fossil fuels will gradually be reduced. In 2023, Indonesia will succeed in achieving a renewable energy share of 14%. However, the potential for utilizing new renewable energy for generating electricity is still very large. Of the electric power potential of 3,686 GW, the use of NRE has only reached 12,557 MW of which bioenergy contributes 3,086 MW (Limanseto, 2024).

In 2023, the realization of domestic biodiesel utilization will be 12.2 million kilo liters, exceeding the figure originally targeted at 10.65 million kilo liters. This year, the Government is targeting realization of 12.5 million kilo liters. It is hoped that consistently increasing biodiesel utilization can achieve the enhanced Nationally Determined Contribution (NDC) target for biodiesel utilization of 18 million kilo liters by 2030. (Ministry of Energy and Mineral Resources, 2023).

The government's use of Sustainable Aviation Fuel or sustainable bioavtur is based on biofuel, especially bioavtur mixed with palm oil (Aidil, 2024). The government continues to develop the ecosystem, namely electric vehicles from the supply side and

SPKLU. By the end of 2023, there will be 1081 SPKLU units operating, both owned by PLN and partners and the private sector. Implementation of a just energy transition, especially biomass-based, also takes into account and prioritizes community welfare (Meirina, 2024). To encourage low carbon investment, the Government has regulated the Economic Value of Carbon (NEK) along with several mechanisms such as through the implementation of the Emissions Trading System in the electricity sector in February 2023, and the launch of the carbon exchange in September 2023. The potential of the carbon market can still be optimized through improving regulations to encourage implementation of NEK in NDC priority sectors (Limanseto, 2024). which is expected to realize sustainable development so that Indonesia creates Energy Self-Sufficiency for the progress of Indonesia itself.

CONCLUSION

Based on the explanation above, several points can be concluded regarding Energy Self-Sufficiency in realizing sustainable development in Indonesia as follows:

1. Energy is a basic need that influences economic development and social welfare. As the population increases, energy needs will also increase. Because available energy sources are limited, more economical alternative energy sources must be sought and used.
2. The government's use of Sustainable Aviation Fuel or sustainable bioavtur based on biofuel, especially bioavtur with a mixture of palm oil which is expected to replace fossil fuels so as to create energy self-sufficiency for Indonesia.
3. From the results of the research, the Government's policy in developing the energy self-sufficiency program is good but it needs to be reviewed again and carried out and handled seriously and with good execution so that the Energy Self-Sufficiency program can be implemented well and can realize sustainable development for Indonesia.

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