

ANALYSIS OF THE UTILIZATION OF BIOGAS MADE OF BUFFER AREA

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Abstract

The government's efforts to create alternative energy sources encourage the development of renewable energy derived from livestock. Important industries that promise advances in renewable energy use waste as an alternative energy source. The aim of this research is to analyze the use of biogas made in the buffer area. This research is a component of qualitative research that uses systematic review methodology. Utilizing previous evidence-based research through review, assessment, structured evaluation, classification, and categorization is known as a systematic review. Based on the results of the analysis carried out, the use of buffered biogas is a useful tool for securing land and preventing contamination from household waste, industry, and agriculture. The benefits of buffer areas are used for visitor promotion to encourage regional economic growth, and as buffers, they are a useful tool for securing land and preventing contamination from household, industrial, and agricultural waste.

Keywords: Biogas, Buffer Area, Renewable Energy, Industry.

INTRODUCTION

One of the factors limiting Indonesia's economic growth rate is the lack of energy resources, which shows how essential energy resources are in a country's economic development (Agustin et al., 2023). Even though Indonesia is one of the oil and gas-producing countries, its oil reserves are running low, the removal of subsidies increases oil prices, and excessive use of fossil fuels causes environmental damage (Rahmat, 2023). To meet human needs, the industrial sector and transportation infrastructure will develop rapidly along with population growth. Along with the acceleration of industrial development with transportation, the need for fuel will continue to increase, especially those originating from fossil fuels. Using fossil fuels, including coal, petroleum and natural gas, in large quantities will affect the earth's ability to supply energy (Palupi, 2015). The availability of fossil fuels, especially petroleum, is currently decreasing. In this century, the world may experience an energy shortage in the future due to the increasing challenges in finding fossil fuels.

The government's efforts to create alternative energy sources encourage the development of renewable energy derived from livestock. Cattle farming is an important industry that promises advances in renewable energy (Ningrum et al., 2019). Utilizing waste as an alternative energy source for livestock offers many benefits, including producing high-quality and odourless fuel (Hidayat & Maret, 2023). Consequently, using alternative energy sources, such as livestock manure, is an example of an environmentally friendly and renewable resource. Three energies are present. Nyamplung biofuel, geothermal energy, solar energy and biogas are examples of alternatives (renewable resources) that can be developed in Indonesia (Mustikawati, 2019). One effort can be made to convert animal waste into biogas, an alternative energy source to replace fuel oil (BBM). Besides affecting the earth's

capacity to produce fossil fuels, their use is widespread. Apart from that, the use of fossil fuels will damage the ecosystem in the environment (Iriani et al., 2017). The residue remaining after burning fossil fuels, such as coal, petroleum and natural gas, will cause the atmosphere to be filled with greenhouse gasses such as carbon dioxide (CO₂) and several other known gasses (Azizah et al., 2024). The more house gasses the atmosphere absorbs will create an additional layer that traps more of the sun's heat and reflects it to the earth's surface. We call this phenomenon the greenhouse effect. By 2030, Indonesia wants to reduce greenhouse gas emissions by 29%, and with the help of other countries, this figure will reach 41%. With the National Energy Policy, the replacement of fossil fuels with environmentally friendly energy sources by focusing mitigation efforts on the energy sector (Nurlaila et al., 2023). Biogas, produced from agricultural and livestock waste biomass, is an environmentally friendly substitute.

The need to preserve and repair contaminated environments is increasingly widely recognized in the international community as environmental problems worsen and threaten the survival of humans and other living things. Through human effort (Robinson et al., 2013). Because it can impact many aspects of life, such as community welfare and global economic development, environmental damage is a severe problem. Therefore, countries and the international community have a shared obligation to end human activities that damage the environment. The buffer zone idea can be used to reduce water and other pollution. The buffer zone is a sterile space within the building to prevent external contaminants from affecting the interior. This idea can stop pollution and protect an area from pollution. Sources of pollution can come from human activities such as mining and agriculture (Rohani & Ramadhan, 2019). Many countries recommend buffer zones to minimize the spread of contaminants from agriculture. Buffer zones can improve the quality of water used for agricultural land and livestock (Oktavia & Firmansyah, 2016). Dirty water sources can cause agricultural production to decline. Landform and altitude impact water quality.

Buffer areas, also called buffer zones, are expected to reduce negative impacts and increase the beneficial effects of conservation areas on the surrounding environment and vice versa. A buffer area is next to a conservation area where land use is restricted to improve the environmental conditions of the community while adding a layer of protection to the conservation area. Create a buffer zone for visitor promotion. Planning and developing buffer areas is necessary to encourage regional economic growth. To improve the community's quality of life and promote tourism as a substitute example for improving the community's welfare in the Tanjung Lesung area, this research aims to provide development and management guidelines. Apart from that, there is also a focus on strategic tourism in the post-tsunami development buffer area of Tanjung Lesung, not only in the core but also in the supporting areas. Based on the explanation above, this article will analyze the use of biogas made in the buffer area.

METHODS

This research is a component of qualitative research that uses a systematic review methodology. Utilizing previous evidence-based research through review, assessment, structured evaluation, classification, and categorization is known as a systematic review. This approach differs significantly from those limited to communicating literature studies because the procedures and tactics in conducting systematic reviews are orderly and carefully structured (Sugiyono, 2016). A systematic

review synthesizes evidence in which a specific research topic, whether broad or limited, is developed, and relevant data is discovered and collected. Data was collected by looking at previously published research. This approach is considered the most suitable for exploring and observing the potential of biogas created in the Buffer Area. Deductive reasoning is then used to conclude (generic to specific).

The development of this research will be explained below.

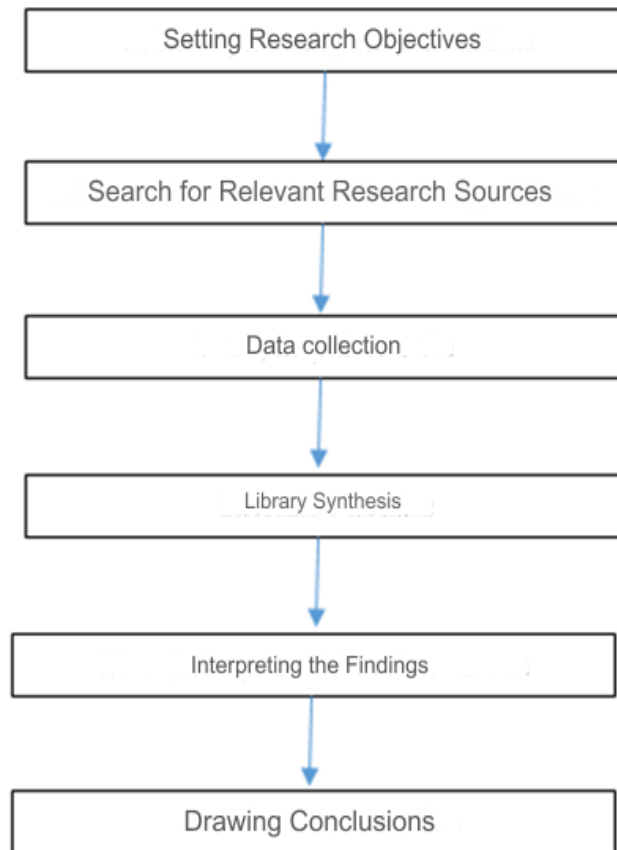


Figure 1: Research Development

RESULTS AND DISCUSSION

On August 10, 2007, the Indonesian government implemented Law Number 30 2007 concerning energy to respond to environmental and energy challenges (Agustin et al., 2023). Biomass, which can be converted into biogas and used as a renewable energy source, is covered by laws related to energy management. Although "biogas" is not used explicitly, bioenergy includes biogas, recognized by law as a renewable energy source. The emphasis of paragraph (2) of Article 4 is on the regulation and maximum utilization of new and renewable energy resources for the benefit of the people.

Waste management is carried out to minimize undesirable impacts. This can result in maximum profitability. Maintaining constant awareness of the balance between environmental life and industrial systems (Rahmat, 2023). Another reason why waste management is essential is because it can help (1) minimize contamination of air, land, and water and (2) make money by using waste as potential raw material, such as livestock manure. For biogas production, organic waste from plant residues and animal waste from sheep, buffalo, horses and chickens work well.

Using plant waste alone, animal waste alone, or a combination of both. Another benefit of biogas is that it can be produced through anaerobic digestion of pollutants and is a smokeless alternative fuel to oil or natural gas. As a result of urbanization and industrialization, intensive agricultural practices are implemented, which cause heavy metal pollution on agricultural land and produce food containing metals that are dangerous for consumer health. Using animal waste as a raw material for biogas production can potentially be an alternative for reducing heavy metal pollution in agricultural land.

Several livestock businesses in Indonesia have started using livestock manure as a source of biogas made in buffer areas. Buffer zones/buffer areas are used as carbon filters and reduce plant temperatures in livestock areas to improve animal air quality. This type of plant is suitable for vegetation studies and external inspection. A decent farm certainly has a suitable working mechanism for processing the waste produced, especially if the farm has a large and intensive business scale. Cattle farming activities can positively impact development, increasing livestock income, expanding employment opportunities, increasing food availability, and saving the country's foreign exchange (Shitophyta et al., 2022). However, if the waste is not processed correctly, this activity will cause environmental problems. Efforts to reduce or eliminate the negative impact of cattle farming activities on the environment depend on several factors, such as government policy. And the accessibility of waste processing technology

Biogas energy can be produced from liquid animal manure from cows and household wastewater, and biogas is one of several renewable energy sources. Pigs, cows, chickens, organic waste from the food industry, markets and other waste sources (Rosyadah et al., 2023). Due to the rapid development of chicken farming in Indonesia today (Tantalo, 2010), there are many opportunities to use manure. However, most people use manure from cattle farms for biogas. Sustainable agriculture is made possible by biogas production using environmentally friendly and renewable process systems (Sanjaya, 2015). About 8–10 kg of manure per day, or 2.6–3.6 tons per year or equivalent, is produced by one cow daily.

Research conducted by Nurlaila stated that the buffer zone concept helps secure land and prevent contamination from household, industrial and agricultural waste. Teluk Sinar Village is located near the Lebak wetlands, an area rich in mining. Chemicals that leave residue and have the potential to damage the environment, including water, are still used in this line of work. Currently, partners are dealing with the impacts of water pollution on living things, including human health that are still poorly understood. (Nurlaila et al., 2023)

Other regions in Indonesia that implement buffer areas are Tanjung Lesung and the adjacent KSP area, which is included in the National Tourism Strategic Area (Rohani & Ramadhan, 2019). Tanjung Lesung is a potential tourist destination in Pandeglang Regency, Banten Province, West Java. The Tanjung Lesung Visitor Center is a tourist destination on the west coast of Pandeglang Regency. The Tanjung Lesung area is included in the KSPN and designated as a National Tourism Special Economic Zone (KEK) based on the PP number. 50 of 2011 and PP no. 26 of 2012. With the designation of Tanjung Lesung as a Special Economic Zone (KEK), the Central Government and Regional Government will automatically pay more attention to this

area in terms of developing infrastructure and facilities for tourists and facilitating investment.

Other research conducted (Rohani & Ramadhan, 2019) According to Wild and Mutebi (1996), buffer areas, also called buffer zones, are expected to reduce negative impacts and increase the beneficial impacts of conservation areas on the surrounding environment, and vice versa. A buffer area is next to a conservation area where land use is restricted to improve the environmental conditions of the community while adding a layer of protection to the conservation area (Hidayat & Maret, 2023) and creating Buffer Zones to promote visitors. To encourage regional economic growth, buffer zones (such as the Tanjung Lesung SEZ buffer) must be planned and developed because tourists are not only concentrated in the city centre. Therefore, buffer land in Panimbang and Cigeulis Districts is suitable for development. There are good reasons for the two sub-districts. The factors that were taken into consideration in selecting this location to be the Buffer Zone that will be developed are: these two places are close together, are the entrance to the Tanjung Lesung SEZ, have tourism potential that is worthy of being visited by tourists and has pretty good access.

CONCLUSION

Biogas energy can be produced from liquid animal manure from cows and household wastewater, and biogas is one of several renewable energy sources. Pigs, cows, chickens, organic waste from the food industry, markets and other waste sources. The buffer area concept helps secure land and prevent contamination from household, industrial and agricultural waste. The benefits of buffer areas are that they are used for visitor promotion to encourage regional economic growth, and being used as a buffer is a valuable tool for securing land and preventing contamination from household, industrial and agricultural waste.

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