

The Role of Village-Owned Enterprises (BUMDesa) in Accelerating the Management of Renewable Energy

M. Musa Al Hasyim¹, Dimas Purbo Pambudi², Titi Rahmawati³, and Shinta Julianti⁴

¹ International Relations Universitas Jenderal Soedirman

² Political Science Universitas Jenderal Soedirman

³ Public Administration Science Universitas Jenderal Soedirman

⁴ Sociology Universitas Jenderal Soedirman

* Corresponding Author: Author 1: m.musa@unsoed.ac.id

Author 2: dimas.purbo@unsoed.ac.id

Author 3: titi.rahmawati@unsoed.ac.id

Author 4: shinta.julianti@unsoed.ac.id

Abstract

This study focuses on exploring the role of village-owned enterprises (BUMDesa) in accelerating the management of renewable energy at the local level. The success of managing the transition of renewable energy can be accelerated when collaborating with BUMDesa which can benefit for the village community. This study aims to analyze the role of BUMDesa with an interactive governance function by considering the impact of social, economic and the other. The results of this study indicate that the best model towards interactive governance for BUMDesa in managing new renewable energy is the pentahelix model which has a positive impact on the social economy, and its quasi. The role of BUMDesa in the management of renewable energy can bring success to revive the community's economy, becoming the trust of local residents as a liaison to ensure that cooperation in managing the energy transition can run effectively. In order to further optimize its role, BUMDesa must be able to collaborate with various stakeholders in order to advance their business units.

Keywords: BUMDesa, pentahelix, renewable energy, village community

1. Introduction

The role of village-owned enterprises (BUMDesa) is one of the interesting study topics today. The management of BUMDes is accompanied by legal certainty by referring to Government Regulation Number 11 of 2021 this regulation regulates the establishment, management and development of BUMDes as an effort to implement the job creation Law Number 11 of 2020 concerning job creation. In various regulations, it can be understood that BUMDesa is a business entity managed by the village government and the community to strengthen the village economy. BUMDesa was established based on the needs and potential of the village, and its formation was stipulated by local regulations and Village regulations on BUMDesa, and now it must be a legal entity so that it can still guarantee sustainable management principles (Pardi & Istiyanto, 2020). Sustainable development will run optimally by prioritizing villages, because villages are the vanguard of development in the community and provide direct benefits to the community (Indrawati & Richard, 2016).

Empirical conditions show that there are still shortcomings in Village-Owned Enterprises such as research results from (Ramadana, Ribawanto, 2013) which states that village-owned enterprises are only limited to nameplates. Then, other shortcomings such as the planned business program are not in accordance with the potential that exists in the village (Rahmadani, Basori, 2022). But on the other hand, many BUMDesa managed to bring positive benefits, namely reducing consumptive lifestyles and increasing community productivity (Febryani, 2018). The success of BUMDesa can also be seen from its ability to manage various business units ranging from savings and Loan Management (Budiarta &

Sulindawati, 2017), tourism (Abdullah, 2018), joper chicken farm (Haryono, 2021) to new renewable energy (Winarsi & Nugraha, 2022). In order to further optimize its management, BUMDesa still needs capacity building and management and network development for its strengthening (Srirejeki, 2020).

The success of the role of BUMDesa and its management can be categorized by two indicators, namely financial and social success. There are several BUMDes that have good financial achievements including the Tirta Mandiri BUMDes in Ponggok village, Klaten regency which at the beginning of its establishment had a capital of hundreds of millions (Pradana, 2017) but along with the success of its business units can reach billions of rupiah (Mandiri, 2024), this also happened to BUMDes in Tirtonirmolo Bantul with membership reaching thousands, and many other achievements.

Not only financial success but also social success by having a significant influence on the economic development of the village and the welfare of the community (Sering & Manossoh, 2021). BUMDesa can also be a trigger for social community involvement (Arindhawati & Utami, 2020), can play a role in bringing awareness, organizing and delivering human resources by involving various stakeholders (Hastutik & Padmaningrum, 2021); BUMDesa can overcome unemployment (Qodir, 2020); touching on the level of economic potential and empowerment (Permana, 2021) and can play a role in increasing the yield of economically valuable products for the welfare of society (Iskandar et al., 2021).

Referring to the National Energy Council data that Indonesia has a national energy mix target of 23% in 2025, but only reached 13.09% in 2023 (Adi, 2024) so acceleration needs to be done to achieve it. One of the efforts to do so is to explore the availability of renewable energy sources that have been carried out including exploration of renewable energy sources in the form of solar power plants (PLTS) in Pekanbaru (Rosma, 2018), then in Semarang there is the potential of Biogas, PLTS, PLTSa and PLTMH (Setyono, 2019) and the potential in Bali with marine current power plants (Yuningsih & Masduki, 2010).

But on the other hand, successfully managing the energy transition faces many challenges. Based on the results of research from IRID (Indonesia Research Institute for Decarbonization), there are several challenges in the management of EBT, namely First, the governance problems and weak business models in community-based EBT management that threaten the sustainability of the facility. Second, is the problem of lack of coordination and distribution of roles between regional device organizations (OPD). The third is related to policies and regulations that limit the passage of the transition process to the energy transition (Kuswardono, 2024). The above challenges and problems refer to the empirical conditions that occur in East Nusa Tenggara, which are also generally applicable in various regions in Indonesia. Therefore, massive efforts are needed to accelerate the management of EBT to the local level by involving the smallest organizations/ communities or institutions at the village level.

Until now, trust has been built in BUMDesa to manage EBT. This is reflected in his involvement in managing solar power plants in Mata Reti and Maya Yoga villages, Central Sumba regency, East Nusa Tenggara. The management of the PLTS considers that the two villages are located far from the PLN network but have a centralized distribution of houses so that the development of PLT EBT is carried out first by utilizing the existing potential and entrusting BUMDesa Hali Dewa to run and manage the generation system after previously being given training and workshops to develop carpentry & electrical skills (EBTKE, 2022).

Based on information in the media, several BUMDesa in Cilacap regency were cooperated to support the acceleration of EBT with the creation of biomass ecosystems. The effort is to realize the pilot project of Gamal and Kaliandra tree-type energy plants located in three districts in Cilacap Regency, namely Kawunganten, Jeruklegi, and Kesugihan, with a target of 100 hectares of land. The development of the biomass ecosystem aims to encourage the community's economy in the role and provision of biomass (Ika, 2024) this pilot project effort is concretized by the signing of an MoU between BUMDesa and PT Artha Daya Coalindo (Energika.id, 2024). Various research on the role of BUMDesa continues to be carried out to see its contribution to society.

There are research results from (Najiah et al., 2022) conducted to assess the role of BUMDesa in increasing empowerment. There is also research that states BUMDesa plays a positive role according to (Mulianingsih, 2022) which states that if BUMDesa is managed properly and professionally, involving community participation to produce entrepreneurs, it can alleviate poverty. Meanwhile, (Lazuardiah et al., 2020) stated that BUMDesa plays a role in creating new jobs for residents, increasing community income and encouraging Village PAD improvements. But on the other hand, research results from (Pribadi et al., 2023) shows that the existence of BUMDesa in Bangkalan Regency has not been able to encourage the dynamization of economic life in the countryside.

Research on the role of Village-Owned Enterprises has been conducted, but not much research that suggests the relevance of the role of Village-Owned Enterprises in accelerating the management of EBT. Departing from the urgency that BUMDesa can be used as a strategic partner to accelerate the energy transition, then to achieve the energy transition targets set, it is time for BUMDesa to be mobilized to achieve the energy transition for the welfare of local communities. This research fills the gap in the study of the role of BUMDesa by focusing on exploring the extent of the role that BUMDesa can do to manage the energy transition (EBT) by looking at the management of BUMDesa in Cilacap Regency. Then apply the success of its management principles to serve as a role model for BUMDesa to accelerate the management of EBT in an ideal form in various regions of Indonesia.

2. Methods

Village-owned enterprises (BUMDes) are essentially institutions established by the village. According to statutory provisions, BUMDes can run economic and public service businesses. Village deliberations, as stipulated in the Village Regulations, agree on the establishment of BUMDesa, based on Law No. 6 of 2014 concerning Villages, Chapter X. The Village Budget stipulates the use of BUMDesa's business results for business development, village development, community empowerment, and poverty assistance through grants, social aid, and revolving fund activities.

In this case, it is important to remember that BUMDes has a social function in addition to being economic (Suparji, 2019). The social function of BUMDes benefits village communities by empowering them. Conceptually, community empowerment is defined as an economic development concept that encapsulates social values. This concept reflects a new paradigm of development, namely people-centered, participatory, empowering, and sustainable (Habib, 2021). The ultimate goal of the community empowerment process is to make community members independent so they can improve their family's standard of living and optimize their existing resources (Kusuma and Permatasari, 2016). Various studies of the village economy should not overlook the condition of the village community's social capital, which is already extremely strong. Village communities possess a variety of social ties and a strong sense of social solidarity, which serves as a crucial foundation for government, development, and community activities. Research has proven that the village's "original autonomy" primarily relies on self-reliance and cooperation. The social capital of the village community consists of social bonds, social bridging, and social networks (Eko et al., 2014).

2.1. Theory ABCD (Asset Based Community Development)

The ABCD (asset-based community development) approach is a viable approach for community empowerment efforts. ABCD is a community empowerment model that prioritizes the local community's use of assets and potential (Maulana, 2019). According to this approach, the community is considered a valuable asset for the village. The village's community groups, such as BUMDes, PKK, farmer groups, or youth groups, are highly valuable assets to the village. We can identify the skills or potential of these various community groups, then provide them with a forum to develop and empower them to produce work that can have social and economic value (Habib, 2021).

Community empowerment with the ABCD approach is an alternative to community empowerment that emphasizes local assets. In this context, "assets" refers to the potential that the community itself possesses

(Fitriawan, 2020). The ABCD approach views the community aiming for empowerment as a group capable of overcoming various challenges, such as enhancing their socioeconomic standard of living. Therefore, we can assert that the community's lack of empowerment stems from their inability to fully utilize their own potential, or from the limited resources available to them (Habib, 2021).

The problem-based approach, need-based approach, right-based approach, and asset-based approach are the four main components of the ABCD approach's implementation of community empowerment (Widjajanti, 2011).

1. The problem-based approach aspect refers to the community's potential in the form of awareness of the problems being faced.
2. The need-based approach focuses on meeting the basic needs of community members.
3. The right-based approach aspect is an aspect of community empowerment by using wealth (material) for community empowerment.
4. The asset-based approach is a component of community empowerment that leverages the inherent potential within the community.

In addition to the four aspects mentioned previously, there is another aspect that also needs to be considered in community empowerment, namely the Natural Resources (SDA) aspect (Suardi, Mallongi, and Baharuddin, 2019).

The aspects that must be considered in community empowerment efforts using the ABCB approach include human resources, institutions/associations/organizations, natural resources, finance/economy, opportunities, and the local community's social conditions (Riyanti & Raharjo, 2021).

b. Stakeholder Theory

According to Mitchell (1997), stakeholder theory focuses on who holds power, legitimacy, and an interest (urgency) in the organization. In the context of this research, this refers to who holds power and legitimacy, has a special interest and role in village dynamics, controls knowledge and resources, and has an interest in village economic development, or is referred to as a village key stakeholder.

The presence of empowerment actors facilitates active community participation, which in turn realizes community empowerment. This community empowerment activity is undoubtedly inseparable from the role of stakeholders, including the government as the creator, compiler, and implementer of empowerment, as well as the private sector, academics, empowered communities, and various other parties. Of course, these stakeholders can't perform their roles independently or in isolation; instead, they must collaborate and work together to accomplish shared objectives. Stakeholder theory is a strategic management concept that aims to help stakeholders strengthen relationships with external groups to achieve beneficial cooperation (Mardikanto, 2014).

Facilitators and all stakeholders, including beneficiary communities, must carry out the planning process for community empowerment programs in an integrated manner. This is in line with the BUMDes establishment mandate, which was agreed upon through village deliberations.

3. Results and Discussion

3.1. BUMdes model's in Energy Management based on Economic Benefits

The transition to renewable energy is an issue that captures the attention of the global community. Various studies and efforts are being conducted to achieve global economic polarization that takes into account environmental sustainability in reducing carbon emissions from economic activities. Energy, in its various forms, serves as the driving force behind all aspects of life and is closely related to the functioning of various sectors (Rahma Wardhana & Marifatullah, n.d.). Indonesia has committed to achieving Net Zero Emissions (NZE) by 2060, in accordance with the international agreement signed in France. However, based on data from the European Commission, Indonesia's greenhouse gas emissions volume reached 1.24 gigatons of carbon dioxide equivalent (Gt CO₂e) in 2022, approximately 2.3% of the total global greenhouse gas

emissions. The World Energy Trilemma Index places Indonesia at rank 53 out of 127 countries with a score of 59.7, below Brunei Darussalam, Malaysia, Singapore, and Thailand. Therefore, the performance of the energy system related to energy security, energy equity, and environmental sustainability still requires concrete action and special attention from the government.

One of the government's hard work is to formulate a Presidential Regulation on the National Energy General Plan, which targets 23% renewable energy usage by 2025 and aims to increase it to 31.2% by 2050. This target is implemented, among other things, through the widespread use of electricity generated from renewable energy sources such as hydroelectric, solar, and steam power plants. The potential of these Renewable Energy Sources (EBT) is directly related to the natural resources potential of each region, with its geographical advantages. Recognizing the distribution of natural resources spanning across the archipelago and the vast territory of Indonesia, the government certainly considers innovative strategies that prioritize collaboration and stakeholder interaction in energy governance. Interactive governance is a strategy aimed at directing the orientation of public management, which previously overlooked the role of civil society and positioned citizens as passive recipients or consumers, towards active involvement in policy formulation and influencing political decision-making through a more democratic, pluralistic, and multi-stakeholder approach (Jäntti et al., 2023). Therefore, in realizing effective EBT governance that emphasizes interactive aspects and the application of discretion principles, it is necessary to accelerate authority with the participation of both consumers and economic actors.

The community's involvement at the village government level is crucial during village meetings as a platform for expressing opinions in advancing the village. This is done solely to enhance participation in advocating for the welfare of the community itself. Considering these efforts, the central government has enacted regulations regarding villages in Law No. 6 of 2014, in order to realize the welfare of rural communities through Village-Owned Enterprises (BUMDes). According to the latest data from the Ministry of Village, Disadvantaged Regions, and Transmigration as of June 22, 2024, there are 65,941 BUMDes in Indonesia, with 18,850 of them having legal status. The existence of BUMDes is highly strategic, given their important role in the success of rural economies and village development (Nursetiawan, n.d.). The commercialization of Village-Owned Enterprises (BUMdes) is considered legitimate for seeking profits through the utilization of resources directly generated by the local area and community. This has an impact on increasing the village's original income, improving the management of village potential, and serving as a driver for rural economic growth (Ekonomi et al., 2023). Therefore, the central government's goal of achieving 23% utilization of Renewable Energy Sources (EBT) by 2025 can only be realized through the active participation and involvement of legally established BUMdes in managing the village's natural resources. This approach directly involves and targets the local community at the smallest administrative level, the village, thus enabling BUMdes to support Sustainable Development Goals (SDGs) at the village level.

The role of BUMdes encompasses five components in achieving village SDGs: evenly growing village economy, a village without disparities, a peaceful and just village, partnerships for village development, and dynamic village institutions along with adaptive village culture (Humanika et al., 2023). A study on stakeholder analysis in renewable energy development, specifically a case study on the solar power plant (PLTS) in Muara Enggelam Village, found that BUMdes plays two roles: as an accelerator and an implementer (Nugraha Barsei et al., n.d.). There are several models for BUMdes development from an economic perspective.

Table 1. BUMdes Development Model based on Economic Benefits

No.	Model	Information
1.	Pentahelix	pentahelix is a collaboration model involving five main actors: academics, business entities, the community, the government, and the media. The role of academics is to conduct research that produces products and fosters project development; Bumdes contribute to the

		Assessment system, become marketing collaborators and product developers; The community plays a central role as a central actor who actively participates in channeling the aspirations of BUMdes management; the Village government is not only a legitimacy but also an initiator, organizer and supervisory group; while the media plays a role as a distributor of public opinion and the imaging of BUMdes performance (Hakim & Yusuf Wahyudi, 2024)
2.	Green Economy Management Organization	The focus is on microfinance with several activities, including: 1) empowering the community by providing microfinancial services to enable the start-up and development of small businesses based on local and sustainable resources; 2) developing environmentally friendly products, such as organic farming, waste management, and renewable energy, through access to microfinance; 3) capacity building through training and mentoring to enhance the community's ability to manage profitable businesses. The targeted products include environmentally conscious business loans, profit-sharing schemes in organic farming, renewable energy savings, green business insurance, micro green bonds, and crowdfunding (Ashshiddiqi, n.d.).
3.	<i>Business</i>	Focus on business activities including: 1) service, where BUMdesa operates service businesses to generate profits by utilizing local resources and appropriate technology; 2) banking, running financial businesses such as village banks or credit institutions; 3) renting, operating rental businesses to meet the needs of the community and generate village income; 4) brokering, acting as intermediaries to market products produced by the community and collaborating with third parties (Iskandar et al., n.d.).

The three models in the development of BUMdes each have their own advantages and focuses. However, in implementing an interactive governance approach that actively involves the community as a strategy for maximizing economic benefits, the most suitable model must fulfill three layers: 1) the layer of strategy, vision, and policy objectives; 2) the executive layer, with an interactive institutional design emphasizing the interaction between finance, human resources, knowledge, materials, and technological resources; 3) the community surface layer, involving participatory processes that create space for discussion, knowledge exchange, and collaborative problem-solving (Jäntti et al., 2023). Therefore, the model considered most appropriate is the pentahelix model, which can realize these three layers in an interactive governance framework. The focus on the involvement of the five main actors in the pentahelix enables BUMdes to realize all three layers in its interactive governance, thus increasing opportunities to maximize economic benefits.

3.1. Village-Owned Enterprises (BUMDes) Performance in Environmental and International Collaboration

Like Non-Governmental Organizations and Non-Profit Organizations, BUMDes are part of the third sector that serves as a bridge between the first and second sectors, between the government and the capital investor. BUMDes able to assist the government and capital owners to solve existing problems (A'yun and Saptaningtyas, 2023) not only social and financial aspect but also as an answer to environmental issues. Environmental issues are major threat that endanger both human and the the planet. Climate change, a result of greenhouse gas emissions from human activities, is a problem that leads to melting ice caps, rising temperatures, and extreme weather. The impact does not only occur in urban area but also it

spreads widely across rural. The way people interact with one another is significantly altering the concept of ecological security in every place of earth (Jon Barnett, 2016).

The world's environmental and climate change issues are a big task for the United Nations (UN) in realizing the SDGs. Realizing clean and affordable energy is one of the goals. In prioritizing the development of clean energy, BUMDes can reduce the negative impacts that arise due to real climate change. In addition to being an actor in solving environmental problems, BUMDes can act as an educator that is able to raise the awareness of village communities on the importance of clean energy and preventive measures due to rapid climate change (Humanika, Trisusilo, and Setiawan, 2023).

The annual Climate Change Conferences (COPs) organized by United Nations have become important forums for global countries to establish common targets for reducing the huge impacts of climate change. Just Energy Transition Partnerships (or JETPs) are one of initiatives that approved during COP26 in Glasgow. JETPs provide climate financing scheme targeting energy transition from developed countries to developing countries such as Indonesia (Melinda Martinus, 2024).

BUMDes can be an implementer of Just Energy Transition Partnerships for many reasons. Firstly, the massive population movement from villages to cities has created a huge gap. According to data from BPS, more than half of the population in Indonesia lived in cities in 2020 (BPS, 2020). Meanwhile, according to predictions from the National Development Planning Agency (PPN), around 70 percent of the population will live in cities by 2045 (Pristiandaru, 2023). The big movement will create new problems especially in environmental issues.

Meanwhile, the biggest source in realizing clean and affordable energy comes from villages. Villages have more abundant water and wind resources than cities. Abandoned villages will increase the possibility of increased climate change. BUMDes can leverage investments from developed countries as part of Just Energy Transition Partnerships (JETPs) to anticipate the worst case.

Secondly, BUMDes have a great opportunity as a place to realize community awareness at the forefront of preventing climate change. Rural communities that still experience and protect their environment should be a source of inspiration for urban communities. They will return to their villages, as long as BUMDes are able to stabilize local revenues and create green jobs within them. Creating jobs need partner collaboration. Green School in Bali is one of the success stories of a Non-Profit Organization that educates the surrounding community on household waste management. Green School has extensive partnerships with the United Nations, BP REDD+, Bye Bye Plastic Bags, John Hardy, Swell Vision, Zero Mass Water, Potato Head and Sunseap. A climate of international collaboration such as Green School will reach a wider audience. Especially if there is content and news about their action that spreads widely in various languages. Not only in Bali, But the NGO also becomes an inspiration around the world (Listya, 2020).

4. Conclusion

BUMDesa can play a role in activating the economy of local communities with the pentahelix model, whose role is not dominant but can be a link between stakeholders. The role of BUMDesa as a provider or distributor of EBT resources to accelerate the business process of EBT management that can be useful to generate the economy at the local level and involve community participation. BUMDesa as a local institution more gain the trust of the local community so as to reduce the potential for conflict when there are external parties who want to invest and cooperate. The role of BUMDesa can also be a liaison between external stakeholders to accommodate the interests of the community. Renewable energy can be optimized for BUMDesa in running its business units. Although the role of BUMDesa in EBT management is not purely business oriented, it can facilitate a more conducive and open collaboration climate at the local, national and international levels.

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