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Article

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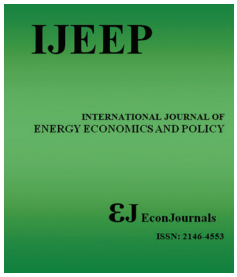

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Village Fund for Renewable Energy Development: A Case Study of Rural Area in Indonesia

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ABSTRACT

Energy is a fundamental element for development in all countries. However, the problem is that not all people have access to energy, especially in Indonesia where 42% of the population lives in rural areas. The Indonesian government has created a Village Funds program to improve rural and energy development. This study aims to uncover the effectiveness of using the Village Fund, especially for affordable and clean energy, to support achieving Sustainable Development Goal number 7. The method used in this research is a case study method using document study and several interviews with the member of Fiscal Ministry of Indonesia. The result shows that after mapping all Village Funds activities during 2018-2020, Kalimantan and Sulawesi become the most extensive realization of the use of Village Funds to alternative and renewable energy activities. To achieve SDGs number 7, the allocation of Village Funds for renewable energy development still needs to be increased, especially in the island of Java. The role of government in making Village Funds policy is still required. Village development should not only focus on infrastructure, but the affordability of village communities to develop clean and renewable energy is also important.

Keywords: Village Funds, Energy Development, SDG No.7, Clean and Renewable Energy
JEL Classifications: O13, P25, P28, Q28

1. INTRODUCTION

Energy is a core component in development in all countries. Without energy, it is impossible to eradicate poverty and increase people's living standards. Energy contributes directly to meeting human needs from the most basic to the most sophisticated. However, the problem is that not all people have access to energy, especially in rural areas. Around 40% of Indian people cannot consume energy; for this problem, India has announced in 2032 to start alleviating energy poverty (Kumar et al., 2020). In China, the need for energy is still a big problem (poverty trap) because there is a high correlation between economic poverty and energy poverty. This lack/poor consumption of energy is partly due to the unavailability of abundant access to renewable energy due to limited fossil energy, even if there is a relatively high price/cost that is not affordable by rural communities (Liao et al., 2016; He et al., 2018). The government in China has launched an ambitious project to eradicate poverty, especially in rural areas, to end this energy poverty in 2020, even though economic poverty is not the only cause or factor that makes energy consumption so problematic.

Energy development in Brazil, especially in remote areas, can be realized through cooperation with multinational enterprise (MNEs). The government's role is essential in this partnership with MNEs because working with MNEs impacts the development of infrastructure, finance, and technology, especially those urgently needed in remote areas. The stark differences between the north and south regarding access to energy in Brazil attest to

the importance of this collaboration and the significant role of the government (Akter et al., 2017). Although many studies have found that the energy transition from fossil to renewable energy must be carried out especially in rural areas, these findings must be more explicit in the context or relationship between the energy transition and rural development. In a recent study in Denmark and Scotland-countries that have recently advanced in renewable energy-mismatched government policies hindered development in rural areas, especially in the energy transition. Thus, discussions about energy transition, especially in rural areas, must be taken seriously through government policy (Clausen and Rudolph, 2020).

In Indonesia, energy consumption is still a big problem, especially in rural areas where the population is 42% of the total population of Indonesian people shows that there are more than 70,000 villages in Indonesia, most of which have not been able to enjoy electricity as a form of energy consumption. The National Team for the Acceleration of Poverty Reduction said that only five provinces in Indonesia had budgeted funds for the provision of electricity in villages (Institute for Essential Service Reform, 2019). Access to affordable and sustainable energy is an unavoidable need and significant for improving the welfare of the whole community. Under President Joko Widodo, the Indonesian government has created a Village Fund program through the Ministry of Finance to increase rural development in rural areas, including energy development.

Several studies on Village Funds have been conducted, several studies focusing on how village fund assistance has increased the economy of residents through infrastructure development, construction of PLTH, use of biogas from livestock manure, and village electricity programs (Anggraeni et al., 2018), as well as encouraging the realization poverty alleviation, as well as suggestions for policies towards inclusive food security (Manurung et al., 2022). However, only few focus on the allocation and effectiveness of Village Fund for developing energy sources and their maintenance has not become a priority. Of the entire Village Fund budget, the allocation of funds for energy development is still relatively small, <1% of the total funds (Permatasari et al., 2021). Several findings show the success of the Village Fund program for poverty alleviation and renewable energy development, but several others also found failures in developing jatropha-based biofuels, energy-independent villages, and unequal access to energy in remote and rural areas hard to reach (Amir et al., 2008; Al Qadi et al., 2018; Manurung et al., 2022). This is the importance of the research.

2. LITERATURE REVIEW

2.1. Village Funds and Sustainable Development Goals in Indonesia

The Village Fund Program is a fund sourced from the State Revenue and Expenditure Budget (APBN) earmarked for villages, transferred through the district/city Regional Revenue and Expenditure Budget (APBD), which prioritizes the implementation of development and empowerment of rural communities. This fund focuses on the more marginalized and less developed areas of Indonesia. It aims to close the high disparities in public services between rural and urban areas and improve social welfare in rural areas. The Village Fund Program is a vital instrument for the Central Government to encourage economic development and reduce inequality and poverty in villages in Indonesia (Saragi, 2021). There are several priorities for using Village Funds, such as meeting basic needs and encouraging infrastructure development, developing the local economy, and using natural resources and the environment sustainably. Allocation of Village Funds mandated by Law Number 6 of 2014, the Government is mandated to allocate Village Funds to support the implementation of village roles and functions for village development in various aspects (The Indonesian Minister of Finance, 2017).

Village Funds as a source of village income are managed within the framework of village financial management. Village finances are managed based on transparent, accountable, participatory principles and are carried out in an orderly and budgetary manner. The Village Fund Program, which covers over 74,000 villages and provides grants of IDR 68 trillion, will be an accelerated fund to spur local welfare and develop the necessary infrastructure, including agricultural needs, in 2022 (Yuwono, 2022). However, apart from the potential for village wealth in the future, some experts are concerned about the limited ability and experience of village stakeholders in managing funds which can lead to various problems, such as a discrepancy between real needs and the allocation of resources, corruption, and abuse of power (Martinez-Bravo, 2014).

The existence of the Village Fund is, of course, inseparable from dependence on the SDGs. The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all Member States of the United Nations in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. The 17 SDGs are integrated-that is, they recognize that actions in one area will influence outcomes in other areas and that development must balance social, economic, and environmental sustainability (United Nations Sustainable Development, 2019). To accelerate the achievement of SDGs, the government plays an important role. The President of Indonesia, Mr. Joko Widodo, has mandated the Ministry of National Development Planning of the Republic of Indonesia to provide the Indonesian SDGs Roadmap with Presidential Regulation of the Republic of Indonesia number 59/2017. The Indonesian SDGs Roadmap was prepared through a lengthy process and discussion involving multi-stakeholder participation, ensuring that this roadmap's contents reflect all stakeholders' aspirations.

Natamihardja's study (2019) has mapped the SDGs agenda with the 2019 Village Fund priority. The results show that the regulations for prioritizing the use of Village Funds are also compatible with the 17 SDGs. The sustainable use of natural resources and the environment as one of the priorities for using Village Funds is closely related to SDGs agenda no. 7 "Affordable and Clean Energy." "The Affordable and Clean Energy" is focuses on universal access to energy, increased energy efficiency, and the increased use of renewable energy through new economic and job

opportunities by ensuring access to affordable, reliable, sustainable and modern energy (United Nations Sustainable Development, 2019). As the population increases, demand for cheap energy and an economy dependent on fossil fuels drastically change our climate. Investing in solar, wind, and thermal power, increasing energy productivity, and ensuring energy for all is critical if we achieve SDGs no 7 by 2030 (UNDP, n.d.).

2.2. Transition to Renewable Energy

The energy transition is a topic that is being widely discussed, including being a priority in Indonesia's G20 Presidency in 2022. All G20 members agree on three main energy transition strategies: access, technology, and finance. The strategy aims to accelerate the energy transition and achieve global goals, both SDGs no. 7 and climate mitigation action targets (Ministry of Energy and Mineral Resources of the Republic of Indonesia, 2022). The energy transition is an effort to reduce the risk of global warming, which can potentially threaten life in the future.

As an effective form of transformation, the energy transition aims to change the current status quo in the energy sector, which was previously based more on fossil fuels with a highly centralized structure to a low-carbon and decentralized structure. The implementation of SDGs no. 7 regarding affordable and clean energy now becomes the focus. According to Lauranti and Djamhari (2017), Indonesia is currently faced with increasing greenhouse gas emissions, more than 80% of which come from land use and fires on peatlands and forests. Therefore, Indonesia needs an energy transition. As a big player in producing oil and gas, Indonesia is starting to turn to renewable energy as the primary goal in achieving energy sustainability and independence and for fossil fuel reduction. However, achieving the share of renewable energy in Indonesia is always lower than the target. To be able to achieve the targets of renewable energy development, several things must be met, including laws and regulations in favour of developing renewable energy, economic and investment environment that encourages the development of renewable energy, innovations, renewable energy technology, public awareness, and institutions in charge of developing renewable energy (Nugroho et al., 2022).

There are various obstacles to carrying out the energy transition in Indonesia. Some obstacles are limited funds due to the need for large-scale investment in developing new and renewable energy. In addition, uncoordinated planning and implementation among government agencies have resulted in the government's Infrastructure Development Plan in all sectors failing to run consistently. As well as another obstacle is the existence of political decentralization, which gives more authority to regional governments to implement a project. However, local/regional governments often need more skills to make policies and implement programs.

2.3. Renewable Energy Development in Indonesia

Several countries have implemented the energy transition. The first study is that of (Schilmann et al., 2021). The discussion of a just, equitable, and sustainable energy transition has been established as a global priority, being the subject of several Sustainable Development Goals (SDGs), particularly SDGs no 7 "Energy for all". The study results show that some rural residents in America do not have the economic means to access LPG or electrical energy, and to reduce poverty and inequality in rural areas, there must be a driver that prevents universal access to clean household energy. Kim (2017) also researched the energy transition model in rural areas of South Korea. Energy Self-Reliant Villages (ESV) is an excellent model to encourage collective action for energy transition, especially for metropolitan areas where neighbourhoods and communities lack connections. ESV undertakes unique activities to reduce energy poverty using the economic benefits of collective action for the energy transition. Roesler (2019) research shows that Germany has also undergone an energy transition. The realization that is quite prominent is the existence of a bioenergy village. Applying village bioenergy has resulted in systemic changes in the village heat supply system. Based on Vela-Cobos et al. (2021), the achievement of SDGs no 7 needs to pay attention to the technological, economic, and social aspects of the problems faced. Research by van Gevelt et al. (2018) shows that with only 12 years to 2030, progress in providing universal energy access and improving rural development outcomes in many rural areas has needed to be faster if the Sustainable Development Goals are to be achieved. Therefore, a requirements framework is needed to identify the provision of energy services to rural communities and ensure that energy access leads to better rural development outcomes.

Compared to other countries, Indonesia has different approach in developing renewable energy. Sagala et al. (2015) stated that three factors influence the implementation of rural biogas adoption, including the availability of resources, financial cooperation between the government and non-governmental organizations, and stakeholder participation. These three factors are the key to success in developing rural biogas in Selo Boyolali Regency and show the potential of an energy-resilient village. Sudibyo et al. (2021) found that Maluku and Papua have 230 islands, but only 100 have electricity. Whereas the Maluku and Papua Islands are the places that have significant renewable energy natural resources, namely hydro potential. Based on Alberdi et al. (2018), rural areas in Indonesia lack an energy supply. Therefore, it is necessary to create an energy-resilient village. In this study, one of the villages that have succeeded in creating renewable energy is Kampung Areng in Cibodas Village, Lembang District, West Java. The farmers in this area can generate renewable energy by converting animal waste using biogas digesters. Adopting biogas digesters in this area can provide an alternative energy source for the community.

A study from Ningtyas et al. (2021) examines village energy independence in Klaten, Central Java. In this study, the success factors in developing independent villages are support from various parties, an open mindset, potential development, encouragement to utilize environmentally friendly energy, and information transparency. This study explains that one of the obstacles to the progress of energy-independent villages is their limited funds. Hartono et al. (2020), study the accessibility and affordability of current energy consumption in Indonesia. It was stated that the government had implemented a modern energy program in the last decade to improve accessibility and maintain the affordability of modern energy, as stated in SDGs no. 7. As

a result, the energy program is significantly increasing access to modern energy and maintaining affordability even for households low income. Allocation of Village Fund and exemplary program implementation can close the gap between economies of scale and access to energy and provide a transfer of knowledge and technology. Based on Arifin et al. (2020), village funds provided to various villages in Indonesia still need to be increased. The study concludes that village funds per capita in Java are much smaller than outside Java due to the large population in Java.

Research on renewable energy in Indonesia by Akbar (2017) shows that the formal partnership model in the form of a Public-Private Partnership (PPP) is suitable for large-scale power systems, while PPP Pro-Poor (5P) is suitable for small-scale power systems and decentralized electricity systems. Indonesia is increasing its share of renewable energy by targeting the Paris COP 21 to reduce the threat of climate change. Local partnerships have a significant role in achieving sustainable goals, SDGs no. 7 build on Indonesia's goal to provide accessible and affordable energy throughout the archipelago.

3. METHODOLOGY

The method used in this study is a qualitative method namely case study. A case study is an in-depth investigation of an individual or group over a particular event and period. The researchers explore a certain phenomenon at a time and activity and collect information in detail and in-depth data using various data collection procedures over a certain period. The challenges are also many, such as the findings cannot be generalized, and it also requires a long time period of research or *time-consuming* (Starman, 2013). Another researcher also argue that case study research is a challenging endeavour that hinges upon the researcher's skills and expertise (Yin, 2014). It is also a research method that describes a comprehensive explanation of aspects of an individual, a group, or an organization so that in the study, the researcher must process as much data as possible regarding the subject under investigation (Mulyana, 2018).

Case studies encompass a range of qualitative and quantitative research tools to investigate the underlying principles of an occurrence within a real-life context. The most significant benefit of case studies is that they enable a holistic review. Unlike standalone research techniques that give more of a snapshot, e.g., surveys, a case study offers the opportunity for a researcher to use a range of tools on one subject. This gives time and space to build a detailed understanding of the topic, establishing a sound platform from which to explore the factors influencing the case study in greater detail.

A case study was one of the research method used in the qualitative field. The case study method often used in the research field of psychology history, education, and medicine. Case study method has been found in many areas of social science and is particularly valuable in practice-oriented fields such as management, public administration, and social work. That is why this case study method was chosen because it is suitable with the orientation of this research which is public administration using Village Funds as a tool for energy development in rural area in Indonesia (Ozan Leymun et al., 2017; Starman, 2013).

The flow of data collection, processing, and analysis summarized in the four research stages as shown in Figure 1.

Big data of Indonesia Village Funds during 2018-2020 have collected in Stage 1, and continue with mapping it into three output code as described in Table 1.

Permatasari et al. (2021) mention 6 Village Fund activities that support SDGs no 7. However, only three activity programs can be implemented nationally, considering that the other three programs only became available in 2018. All 3 Village Fund activities that apply nationally are listed in Table 1. In addition, this study also maps the realization of village fund in supporting the 7th SDGs goals based on the islands in Indonesia. These islands are Sumatra, Java, Bali and Nusa Tenggara, Kalimantan, Sulawesi, Maluku and Papua. This comparison between islands aims to see the distribution of realization of village fund activities in SDGs no 7. This analysis can also help to see the gaps between islands in utilizing village funds.

The analysis will consist of three sections per activity code. The first is a comparison of the number of villages organizing village fund activities. The analysis will compare inter-island data on the number of villages implementing village fund activities from 2018 to 2020. The second analysis is a comparative analysis of the realization of activity implementation. This analysis will compare budget realization data between islands for activities from 2018 to 2020. This analysis shows which island has the highest budget absorption per activity. Finally, a comparison will be made on the village fund allocation in relation to DVI (Developing Villages Index). This analysis was carried out to see which village categories had realized village fund activities

Figure 1: Research stages

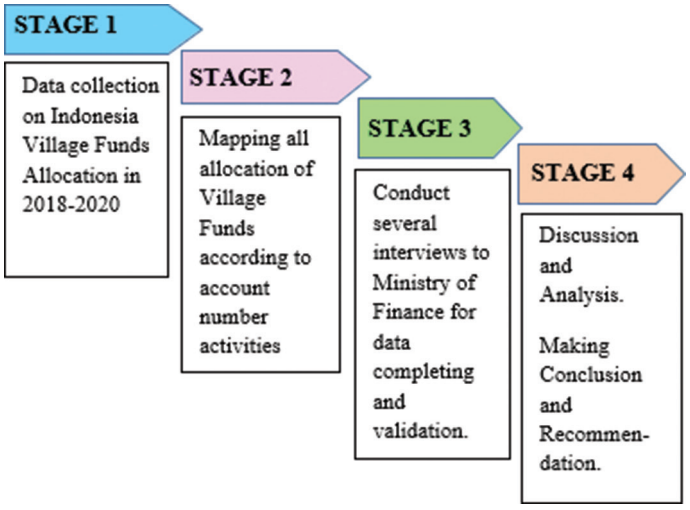

Table 1: Nationally applicable energy-related village fund activities

No	Output code	Output description
1	270101	Maintenance of Alternative Energy Facilities and Infrastructure at the Village level
2	270201	Village Level Alternative Energy Facilities and Infrastructure
3	270202	Rehabilitation/Improvement of Alternative Energy Facilities and Infrastructure at the Village level

for SDGs no 7 and which village categories needed more assistance to realize village fund activities for SDGs no 7.

Data collection is a crucial stage to support the results of this study. Secondary data sources are Village Fund Activity Program (Activity Code) and Realization of Village Funds data obtained from the Treasury and Budget Online Monitoring System for the period 2018-2020. The Sustainable Development Goals Indicator data was obtained from the United Nations in 2020.

4. DISCUSSION AND ANALYSIS

4.1. Village Funds for Activities related to Alternative Energy at the Village level 2018-2020

Village funds can be likened to strong contributors in developing and empowering an independent village. Based on Permendesa No 8 of 2016, funds from the State Budget are used to fund various village administrations, development implementation, community development, and community empowerment. The allocation of village fund can fluctuate and increase every year as shown in Tables 2 and 3.

Based on data from the Directorate General of the Treasury, village funds have increased yearly. The data is shown in Table 2, which reveals the number of villages with the realization of funds occurring in the range from 2018 to 2020. Realizing funds in 2018 reached IDR 59,083,174,924,195, then increased by 15% in 2019, and increased again in 2020 by 7%. Based on Arifin's research cited by Iftitah and Wibowo (2022), this increase in village funds is associated with the number of BUMDes, which has also increased. The increase in BUMDes resulted in more planned activities requiring sufficient village funds.

Unlike village funds, which increase yearly, the number of villages has not changed significantly. In 2018, it was recorded that Indonesia had 74,875 villages, while in 2019, there was a decrease to 74,774 villages. Ministry of Finance (2021) explained that this decline occurred due to the role of Transfers to Regions and Village Funds (TKDD) which were carried out to provide progress for villages in Indonesia, causing the number of villages with very underdeveloped status and underdeveloped villages decrease. Whereas in 2020, the number of villages increased again by 74,886 villages. It also happened due to the impact of TKDD, which caused more developed villages to grow in the following year. This increase in village funds positively impacts each village because the increased funds received can be used to meet needs while advancing the village (Kartika, 2012).

Table 2: Amount of village funds for 2018-2020

Year	Number of villages	Realization of village funds (in IDR)
2018	74,875	59,083,174,924,195
2019	74,774	67,771,581,253,810
2020	74,886	72,311,220,967,766

The dependency on fossil energy in Indonesia is continuing, even though dependence on fossil energy will gradually make Indonesia face an energy crisis due to a lack of energy production to complete domestic consumption (Ristawati et al., 2021). It has also become a problem in various Indonesian villages that are still dependent on fossil energy such as LPG or electricity. The ever-increasing need for electrical energy makes energy availability even more scarce, coupled with rising prices that make it difficult to get electricity supply in rural areas. Therefore, efforts to build renewable energy by empowering the potential of each village are urgently needed as an alternative energy source (Mirmanto, 2019).

Implementing activities related to alternative energy in villages requires quite large funds, which has resulted in many villages depending on village fund allocations from the government (Novita, 2016). Various variations of alternative energy activities in the village are divided into three activity codes. First, activity code 270101 indicates alternative energy facilities and infrastructure maintenance. Second, activity code 270201 shows the activities of alternative energy facilities and infrastructure. Third, activity code 270202 indicates activities for rehabilitating or improving alternative energy facilities and infrastructure. During these 3 years, alternative energy facilities and infrastructure activities were most widely implemented in Indonesian villages. As happened in Seren Selimbau Village, which used village funds for the construction of a PLTMH, so did Manalu Dolok Village previously used village funds for a dynamo waterwheel before 2021, and Karyasari Village for LPJ energy renewal activities on village roads (Ayustia et al., 2020.; Silaban, 2022; Subekan, 2020).

Based on Permendesa No 8 of 2016, there are various priorities in using village funds, one of which is in developing village facilities and infrastructure for new and renewable energy. The use of village funds in constructing village facilities and infrastructure in Indonesia also varies according to the alternative energy activities. As the data described in Table 3, the number of villages carrying out activities related to alternative energy at the village level fluctuated between 2018 and 2020. However, there has been a

Table 3: Village funds for village-level alternative energy activities

Activity code	2018		2019		2020	
	Number of villages	Realization of village funds for village-level alternative energy activities (in IDR)	Number of villages	Realization of village funds for village-level alternative energy activities (in IDR)	Number of villages	Realization of village funds for village-level alternative energy activities (in IDR)
270101	333	34.546.942.577	1.818	121.896.926.342	2.034	123.072.937.510
270201	825	96.989.603.344	3.326	394.974.268.280	2.770	272.471.674.941
270202	262	28.691.029.267	1.107	103.698.696.085	1.215	99.880.927.158
Total	1.420	160.227.575.188	6.251	620.569.890.707	6.019	495.425.539.609

significant decrease in 2020; the number of villages has decreased to 6019 villages with a classification of 2,034 villages that have carried out maintenance of facilities, 2,770 villages with alternative energy facilities and infrastructure, and 1,215 villages have carried out rehabilitation or improvement of facilities. The realization of village funds for alternative energy activities also decreased in 2020 compared to the previous year. This decrease in village funds occurred due to the deconcentration of the president's budget, which was more focused on preventing COVID-19, which had hit since the beginning of 2020 in Indonesia (Muzaqi et al., 2022). In addition, according to the Central Statistics Agency (2021), this affected various sectors of imports, production, and energy. However, for the past 3 years, alternative energy activities have continuously increased in various villages in Indonesia.

Table 4 presents the conclusions from Tables 2 and 3 which provide information regarding the ratio of the total number of villages to the number of villages carrying out alternative energy activities, as well as the ratio of the total realized village funds to the realization of village funds used for alternative energy activities in the 2018-2020 period. This ratio shows that the use of village funds from all village fund allocations for alternative energy activities tends to increase yearly. Data shows that in 2019 there was a significant increase in alternative energy activities in villages, possibly due to a significant increase in the number of villages and the realization of village funds from the previous year.

4.2. Village Funds for Village-level Alternative Energy Activities Based on Large Islands in Indonesia 2018-2020

The government establishes priorities for using village funds regularly by issuing policies that are adjusted to meet the annual targets. Village funds are used to organize, build and foster villages throughout Indonesia, including Sumatra, Java, Bali and Nusa Tenggara, Kalimantan, Sulawesi, Maluku and Papua. In practice, each village government must manage the budget wisely according to priority needs to increase the success of development and independence in their village (Kharisma et al., 2021). It causes the allocation and realization of alternative energy activities in each province in Indonesia to vary according to each village's necessities.

Based on the explanation in Table 5, on 2018 Kalimantan Island became the island with the highest percentage of villages implementing alternative energy activities, with 28.03% of the total number of villages in Indonesia. In 2019 Sulawesi Island had the highest percentage, 25.1% and in 2020 Sumatra Island had the highest percentage 26.4%. In 2018-2020, Java Island always had the lowest percentage in the number of villages implementing alternative energy activities. It means that Java Island still needs more awareness regarding implementing alternative energy activities. Susilo et al. (2016), in their research at Sumber Bendo Village, Madiun Regency, East Java, stated that villagers considered several factors in using energy: Price, safety, convenience, affordability, and availability. It can conclude that the low awareness of rural communities in Java Island regarding implementing alternative energy activities is influenced by the accessibility, availability, and affordability of rural communities in Java Island for cheap energy.

Table 4: Comparison of village funds for alternative energy activities with total village funds for 2018-2020

Year	Village number ratio (%)	Village fund realization ratio (%)
2018	1.90	0.27
2019	8.36	0.92
2020	8.04	0.69

On Table 6, of the total village funds allocated to all villages in Indonesia in 2018, Kalimantan Island became the island with the most extensive realization of the use of village funds for alternative energy activities, with IDR 65,305,166,801 and has a percentage of village funds used for alternative energy activities of 1.26% of the entire village funds of the Island. In 2019 Sulawesi Island had the most significant realization of using village funds for alternative energy activities, with IDR 137,273,549,783 a percentage of use of 1.90% of the total village funds of the island. In 2020 Sulawesi Island became an Island with the realization of the most prominent use of village funds for alternative energy activities, with IDR 106,735,533,912, a usage percentage of 1.33% of the island's total village funds.

The realization of village funds for alternative energy activities in Java is still very low when compared to other islands, this is because Java has more accessible and more affordable access to energy sources, and the use of village funds is more focused on other sub-sectors such as infrastructure procurement and BUMDes management. The study results also show that villages outside Java Island more dominantly carry out the effectiveness of using village funds for alternative energy activities because access to electricity is still challenging to reach and the geographical location is difficult to access.

4.3. Village Funds for Alternative Energy Activities Based on the Village Development Index 2018-2020

Indonesia has a large number of villages. Based on the sub-chapters discussed earlier, Indonesia has 74,886 villages, and most Indonesian citizens live in rural areas. In addition, according to the Ministry of Villages, village areas are also where the majority of the poor live, so village development is significant for advancing the people living in these areas. In advancing each village, it is necessary to measure the development and empowerment of village communities. This measurement is ultimately carried out by the Ministry of Villages using the Developing Villages Index (DVI) so that the Ministry can find out how far the village has developed and the independence of village funds through its DVI value (Setyowati, 2019; Yulitasari and Tyas, 2020). Village levels are divided into Independent Villages, Developed Villages, Developing Villages, Underdeveloped Villages, and Very Underdeveloped Villages.

Village development in terms of energy is also considered crucial in advancing the village level. According to Permendes No 8 of 2022, developing alternative energy facilities and infrastructure is also included in the priority use of village funds. Therefore, village energy needs can be met if villagers can take advantage

Table 5: Number of Villages with Alternative Energy Activities Based on Large Islands in Indonesia in 2018-2020

Island in Indonesia	2018				Island in Indonesia	2019				Island in Indonesia	2020			
	Total number of villages (A)	Number of villages with alternative energy activities (B)	Percentage of the number of energy villages per island to total number of villages (B/A) (%)	Percentage of the number of energy villages per island to number of villages using alternative energy (%)		Total Number of Villages (A)	Number of Villages with Alternative Energy Activities (B)	Percentage of the Number of Energy Villages per island to total number of villages (B/A) (%)	Percentage of the number of energy villages per island to number of villages using alternative energy (%)		Total number of villages (A)	Number of villages with alternative energy activities (B)	Percentage of the number of energy villages per island to total number of villages (b/a (%))	Percentage of the number of energy villages per island to number of villages using alternative energy (%)
Sumatra	23.024	204	0.89	14.37	Sumatra	23.000	1.351	5.87	21.61	Sumatra	23.040	1.589	6.90	26.40
Java	22.460	36	0.16	2.54	Java	22.434	392	1.75	6.27	Java	22.471	426	1.90	7.08
Bali and Nusa Southeast	4.645	271	5.83	19.08	Bali and Nusa Southeast	4.646	754	16.23	12.06	Bali and Nusa Southeast	4.657	673	14.45	11.18
Borneo	6.601	398	6.03	28.03	Borneo	6.599	722	10.94	11.55	Borneo	6.614	687	10.39	11.41
Sulawesi	8.740	338	3.87	23.80	Sulawesi	8.739	1.569	17.95	25.10	Sulawesi	8.691	1.356	15.60	22.53
Maluku	2.261	38	1.68	2.68	Maluku	2.256	542	24.02	8.67	Maluku	2.261	691	30.56	11.48
Papuan	7.144	135	1.89	9.51	Papuan	7.100	921	12.97	14.73	Papuan	7.152	597	8.35	9.92
Total	74.875	1.420	1.90	100	Total	74.774	6.251	8.36	100	Total	74.886	6.019	8.04	100

of their various potential natural resources (Setyowati, 2019). The realization of alternative energy and village funds for alternative energy activities in each village also varies. Table 7 Number of Village for Village-level Alternative Energy Activities Based on Developing Villages Index 2018-2020

The study results show that in 2018, most village levels in Indonesia were at the Developing Village level, with 39.550 out of 74.875 villages in Indonesia. With all the total villages in Indonesia, 1420 villages or 1.9% of the total villages have carried out alternative energy activities. In 2019 and 2020, most village levels in Indonesia were still at the Developing Village level, with 39.680 villages in 2019 and 39.748 villages in 2020. Significantly different from the previous year, in 2019 there were already 6.251 villages or 8.36% of the total villages have carried out alternative energy activities. Meanwhile in 2020, there were already 6.019 villages or 8.04% of the total villages that already carried out alternative energy activities. Table 8 Village Funds for Village-level Alternative Activities Based on Developing Village Index 2018-2020

Otherwise, level of village that have implemented alternative energy activities are different. In 2018, Underdeveloped Villages is the most village level that have implemented alternative energy with total percentage of number of energy villages per DVI is 3.73% from total 15.645 villages. Meanwhile in 2019 and 2020, Not Identified Villages is the largest total number of villages that have implemented alternative energy. In 2019, percentage of number of energy villages per DVI is 66.90% to 423 total number of villages, and in 2020 it has 76.76% as many as 2.573 villages in total that have adopted alternative energy activities.

In 2018, the status of the village that has realized the most village funds for alternative energy activities at the Underdeveloped Village level, with a realization percentage of 0.68% of all underdeveloped village funds or realized funds of IDR 81,710,770,471 out of a total of IDR 12,046,659,003,689 village funds. In addition, percentage of total energy realization per DVI to total village fund in 2018 is only at 0.27% from total village funds IDR 59.083.174.924.195.

Unlike previous year, in 2019, village that realized the most village funds for alternative energy activities was at the Not Identified level, with a realization percentage of 2.14% of all village funds at that level or realized IDR 7.790.381.977 out of a total of IDR 363.955.780.698 not identified level village funds, meanwhile for percentage of total energy realization per DVI to total village fund in 2019 is only at 0.92% from total village funds IDR 67.771.581.253.810.

The same thing happens in 2020 which village status with the most significant realization of village funds for alternative energy activities is at the Not Identified level, with a realization percentage of 2.47% of all village funds at that level or realized IDR 8.037.562.246 out of a total of IDR 325.858.406.329 not identified level village funds. As the same as the previous year, percentage of total energy realization per DVI to total village fund in 2020 is still below 1% that is only at 0.69% from total village funds IDR 72.311.220.967.766.

Table 6: Village fund for village-level alternative energy activities based on large Islands in Indonesia in 2018-2020

Island in Indonesia	2018			
	Total village funds in data (C)	Realization of village fund (D)	Percentage of energy realization per island to total village funds (D/C) (%)	Percentage of total energy realization per island to total energy realization (%)
Sumatra	16.968.972.505.053	14.987.037.527	0.09	9.35
Java	18.919.461.287.375	1.451.413.789	0.01	0.91
Bali and Nusa Southeast	3.928.193.182.626	34.670.634.196	0.88	21.64
Borneo	5.182.282.441.886	65.305.166.801	1.26	40.76
Sulawesi	6.736.371.488.418	24.987.027.331	0.37	15.59
Maluku	1.717.987.218.397	6.445.714.701	0.38	4.02
Papuan	5.629.906.800.440	12.380.580.843	0.22	7.73
Total	59.083.174.924.195	160.227.575.188	0.27	100
Island in Indonesia	**2019**			
	Total village funds in data (C)	**Realization of village fund (D)**	**Percentage of energy realization per island to total village funds (D/C) (%)**	**Percentage of total energy realization per island to total energy realization (%)**
Sumatra	19.089.675.344.942	82.823.304.059	0.43	13.35
Java	21.880.985.865.548	18.676.126.662	0.09	3.01
Bali and Nusa Southeast	4.682.120.670.754	74.837.337.859	1.60	12.06
Borneo	5.955.237.698.391	113.261.046.472	1.90	18.25
Sulawesi	7.758.638.678.756	137.273.549.783	1.77	22.12
Maluku	1.934.104.045.568	82.215.493.509	4.25	13.25
Papuan	6.470.818.949.851	111.483.032.363	1.72	17.96
Total	67.771.581.253.810	620.569.890.707	0.92	100
Island in Indonesia	**2020**			
	Total village funds in data (C)	**Realization of village fund (D)**	**Percentage of energy realization per island to total village funds (D/C) (%)**	**Percentage of total energy realization per island to total energy realization (%)**
Sumatra	20.072.515.087.439	93.824.866.598	0.47	18.94
Java	23.781.318.947.043	19.598.113.051	0.08	3.96
Bali and Nusa Southeast	4.982.265.928.472	58.617.189.162	1.18	11.83
Borneo	6.344.506.760.811	80.991.439.889	1.28	16.35
Sulawesi	8.020.343.964.808	106.735.533.912	1.33	21.54
Maluku	2.070.111.517.829	72.435.067.251	3.50	14.62
Papuan	7.040.158.761.364	63.223.329.746	0.90	12.76
Total	72.311.220.967.766	495.425.539.609	0.69	100

In addition, from 2018 until 2020 the independent village has the smallest realized funds with a percentage of realization amounting to 0.08%, 0.3%, and 0.21% of all independent village funds at that year.

5. CONCLUSION AND RECOMENDATION

Renewable sources of energy can help countries to decrease energy costs and build resilience to volatile prices. Especially now when fossil fuel increases a lot triggered by the war in Ukraine and debilitating poor energy importing countries. In addition to reducing carbon emissions, large-scale renewable power projects also provide demonstrable economic benefits for investors, governments, and especially users (society) who need reliable and low-cost energy (World Economic Forum, 2022).

Building renewable energy needs to be a priority, considering that energy needs are increasing and Indonesia's dependence on fossil energy is still high. It is crucial to develop village-based clean and affordable energy to increase the national clean energy capacity target and increase people's access to energy. Therefore, efforts to build renewable energy with each village's potential must be an alternative energy source (Mirmanto et al., 2019). The allocation of village funds from 2018 to 2020 for achieving SDGs no 7 still needs to be considered much higher. Most of the funds are allocated for other purposes, which are considered

Table 7: Number of village for village-level alternative energy activities based on developing villages index 2018-2020

Developing villages index	2018			
	Number of All Villages (A)	Number of village with alternative energy activity (B)	Percentage of energy villages per DVI to total villages (B/A) (%)	Percentage of the number of energy villages per DVI to the number of villages using alternative energy (%)
Independent Village	1.720	18	1.05	1.27
Developed Village	11.780	84	0.71	5.92
Developing Village	39.550	565	1.43	39.79
Underdeveloped Village	15.645	584	3.73	41.13
Very Underdeveloped Village	5.311	148	2.79	10.42
Not Identified	869	21	2.42	1.48
Total	74.875	1.420	1.90	100.00
Developing villages index	**2019**			
	Number of All villages (A)	Number of village with alternative energy activity (B)	Percentage of energy villages per DVI to total villages (B/A) (%)	Percentage of the number of energy villages per DVI to the number of villages using Alternative Energy (%)
Independent Village	1.736	57	3.28	0.91
Developed Village	11.818	516	4.37	8.25
Developing Village	39.680	2.542	6.41	40.67
Underdeveloped Village	15.761	2.107	13.37	33.71
Very Underdeveloped Village	5.356	746	13.93	11.93
Not Identified	423	283	66.90	4.53
Total	74.77	6.251	8.36	100.00
Developing villages index	**2020**			
	Number of All Villages (A)	Number of village with alternative energy activity (B)	Percentage of energy villages per DVI to Total villages (B/A) (%)	Percentage of the number of energy villages per DVI to the number of villages using alternative energy (%)
Independent Village	1.738	53	3.05	0.88
Developed Village	11.831	477	4.03	7.92
Developing Village	39.748	2.573	6.47	42.75
Underdeveloped Village	15.806	1.986	12.56	33.00
Very Underdeveloped Village	5.380	636	11.82	10.57
Not Identified	383	294	76.76	4.88
Total	74.886	6.019	8.04	100.00

more important by village stakeholders in determining village fund allocations.

The realization of the village funds allocated by the province varies according to predetermined priorities. During 2018-2020, Kalimantan and Sulawesi islands became the most extensive realization of the use of Village Funds for energy alternative activities. On the other hand, Java Island became the island with the most significant number of village funds, with the lowest realization of village funds for alternative energy of all the big islands in Indonesia. The central and local governments need to be concerned about making policies that can encourage implementing alternative energy activities on the island of Java. Considering that Java Island has excellent potential with natural resources and qualified human resources, as well as easily accessible locations, Java Island should carry out alternative energy activities to fulfill energy needs in the region and contribute to meeting Indonesia's climate mitigation action targets.

Another study result to conclude is, in 2018 till 2020, most village levels in Indonesia were at the Developing Village level. In 2018, the highest number of villages with alternative energy activities is in Underdeveloped Village level. Unlike the previous year, in 2019 and 2020, the highest number of villages with alternative energy activities is in not identified level. The percentage of total energy realization per DVI to total village fund in 2018-2020 is still low, which is below 1% (0.27% in 2018, 0.92% in 2019 and 0.69% in 2020). The highest percentage of total energy realization per DVI to total village fund in 2018 is in Underdeveloped Village level (0.68%). While in 2019 and 2020, the highest percentage of total energy realization per DVI to total village fund is in not identified level (2.14% and 2.47%).

Table 8: Village funds for village-level alternative energy activities based on developing village index 2018-2020

Developing village index	2018			
	Total village funds in data (A)	Number of village funds with alternative energy activity (B)	Percentage of total energy realization per dvi to total village funds (B/A) (%)	Percentage of total energy realization per dvi to total energy realization (%)
Independent village	1.447.829.536.162	1.162.906.882	0.08	0.73
Developed village	9.557.253.952.609	5.008.582.809	0.05	3.13
Developing village	31.290.901.019.950	49.496.618.592	0.16	30.89
Underdeveloped village	12.046.659.003.689	81.710.770.471	0.68	51.00
Very underdeveloped village	4.074.183.895.116	20.454.708.325	0.50	12.77
Not identified	666.347.516.669	2.393.988.109	0.36	1.49
Total	59.083.174.924.195	160.227.575.188	0.27	100.00
Developing village index	**2019**			
	Total village funds in data (A)	Number of village funds with alternative energy activity (B)	Percentage of total energy realization per DVI to total village funds (B/A) (%)	Percentage of total energy realization per DVI to total energy realization (%)
Independent village	1.692.606.622.952	5.055.878.403	0.30	0.81
Developed village	11.070.111.498.529	32.909.576.973	0.30	5.30
Developing village	36.010.260.254.767	217.254.083.749	0.60	35.01
Underdeveloped village	13.895.235.492.961	258.829.167.504	1.86	41.71
Very underdeveloped village	4.739.411.603.903	98.730.802.101	2.08	15.91
Not identified	363.955.780.698	7.790.381.977	2.14	1.26
Total	67.771.581.253.810	620.569.890.707	0.92	100.00
Developing village index	**2020**			
	Total village funds in data (A)	Number of village funds with alternative energy activity (B)	Percentage of total energy realization per DVI to total village funds (B/A) (%)	Percentage of total energy realization per dvi to total energy realization (%)
Independent village	1.888.888.698.781	4.053.757.111	0.21	0.82
Developed village	12.063.188.364.846	29.003.157.654	0.24	5.85
Developing village	38.183.994.229.453	197.399.369.057	0.52	39.84
Underdeveloped village	14.815.101.084.258	194.675.821.720	1.31	39.29
Very underdeveloped village	5.034.190.184.099	62.255.871.821	1.24	12.57
Not identified	325.858.406.329	8.037.562.246	2.47	1.62
Total	72.311.220.967.766	495.425.539.609	0.69	100.00

Based on these conclusion, the following are recommendations given to the government, especially Village Fund stakeholders in Indonesia:

1. To accelerate the increase in national clean energy capacity and increase access of all people to energy, the central government as a policy maker needs to consider regulations on the priority use of village funds to achieve SDGs no 7. Allocation of village funds for alternative energy activities can be increased with intervention from government agencies central/regional in developing alternative energy infrastructure/facilities, as well as providing technical and managerial training to village governments to ensure the management of alternative energy infrastructure is sustainable.
2. All stakeholders must be aware of the importance of alternative energy, starting from the central government, regional governments and village governments. The village government needs to educate village communities about the importance of using alternative energy and various alternative energy sources and the various benefits of using them compared to fossil-based energy. For example, providing education related to alternative energy, such as the use of solar energy as a source of electrical energy with solar cell devices, this alternative energy source is suitable for use in villages in tropical areas. This energy source also has various advantages, such as cheap, practical, never runs out, clean, has a long life, and not requiring special maintenance. This is expected to increase public awareness regarding the importance of procurement and management of alternative energy.
3. Village development should not solely focus on infrastructure development, but the affordability of village communities to energy also needs to be a concern. Energy is a vital aspect driving the economy as a fulfilment of the basic needs of

every human being. Allocating village funds for alternative energy can be a solution to advance the village level and can increase people's access to cheap and clean energy.

REFERENCES

Akbar, I. (2017), Understanding the partnership landscape for renewable energy development in Indonesia. Jurnal Universitas Paramadina, 14, 1549-1562.

Akter, S., Fu, X., Bremermann, L., Rosa, M., Nattrodt, V., Väätänen, J., Teplov, R., Khairullina, I. (2017), MNEs' contribution to sustainable energy and development: The case of "light for all" program in Brazil. International Business and Management, 33, 195-224.

Al Qadi, S., Sodagar, B., Elnokaly, A. (2018), Estimating the heating energy consumption of the residential buildings in Hebron, Palestine. Journal of Cleaner Production, 196, 1292-1305.

Alberdi, H.A., Sagala, S.A.H., Wulandari, Y., Srajar, S.L., Nugraha, D. (2018), Biogas implementation as waste management effort in lembang Sub-district, West Bandung District. IOP Conference Series: Earth and Environmental Science, 158, 012031.

Amir, S., Nurlaila, I., Yuliar, S. (2008), Cultivating energy, reducing poverty: Biofuel development in an Indonesian village. Perspectives on Global Development and Technology, 7, 113-132.

Anggraeni, A., Sahfitri, A., Hassan, F., Octavian, A., Pudjiatmoko, S. (2018), Biogas Utilization as Renewable Energy to Achieve National Energy Security (Study of Wonolelo Village, Bantul, Yogyakarta). In: 3rd International Conference of Integrated Intellectual Community (ICONIC).

Arifin, B., Wicaksono, E., Tenrini, R.H., Wardhana, I.W., Setiawan, H., Damayanty, S.A., Solikin, A., Suhendra, M., Saputra, A.H., Ariutama, G.A., Djunedi, P., Rahman, A.B., Handoko, R. (2020), Village fund, village-owned-enterprises, and employment: Evidence from Indonesia. Journal of Rural Studies, 79, 382-394.

Ayustia, R., Dokman, D., Situmorang, M., Tinggi, S., Manajemen, I., Bhuana, S. Optimalisasi Dana Desa Di Daerah Perbatasan. Management and Sustainable Development Journal. pp. 1-14. DOI: 10.46229/msdj.v2i1.151

Central Statistics Agency. (2021). Energy Balances of Indonesia. Indonesia: Badan Pusat Statistik.

Clausen, L.T., Rudolph, D. (2020), Renewable energy for sustainable rural development: Synergies and mismatches. Energy Policy, 138, 111289.

Hartono, D., Hastuti, S.H., Balya, A.A., Pramono, W. (2020), Modern energy consumption in Indonesia: Assessment for accessibility and affordability. Energy for Sustainable Development, 57, 57-68.

He, L.Y., Hou, B., Liao, H. (2018), Rural energy policy in China: Achievements, challenges and ways forward during the 40-year rural reform. China Agricultural Economic Review, 10(2), 224-240.

Iftitah, A.E., Wibowo, P. (2022), Pengaruh dana desa, alokasi dana desa, dan pendapatan asli desa terhadap indeks desa membangun di kabupaten Gowa. Jurnal Ilmu Pemerintahan Widya Praja, 48(1), 17-36.

Institute for Essential Service Reform. (n.d.), Jejak Karbon dan Kenaikan Emisi Gas Rumah Kaca. IESR Web Site. Indonesia: Institute for Essential Service Reform Available from: http://www.iesr.or.id/kkv3/tentang-jejak-karbon [Last accessed on 2022 Jan 21].

Kharisma, B., Taifur, W.D., Muharja, F. (2021), Distribusi belanja desa dan capaian status pembangunan desa di provinsi riau. Ekonomis: Journal of Economics and Business, 5(2), 407.

Kim, H. (2017), A community energy transition model for urban areas: The energy self-reliant village program in seoul, South Korea. Sustainability, 9(7), 1260.

Kumar, N.M., Chopra, S.S., Chand, A.A., Elavarasan, R.M., Shafiullah, G.M. (2020), Hybrid renewable energy microgrid for a residential community: A techno-economic and environmental perspective in the context of the SDG7. Sustainability, 12(10), 3944.

Lauranti, M., Djamhari, E.A. (2017), Transisi Energi yang Setara di Indonesia: Tantangan dan Peluang. Available from: http://library.fes.de/pdf-files/bueros/indonesien/14758.pdf

Liao, H., Tang, X., Wei, Y.M. (2016), Solid fuel use in rural China and its health effects. Renewable and Sustainable Energy Reviews, 60, 900-908.

Manurung, E.M., Diyanah, M.C., Permatasari, P., Wardhana, I.W. (2022), Energy equality in Indonesia villages: A discourse analysis. International Journal of Energy Economics and Policy, 12(1), 169-176.

Manurung, E.T., Maratno, S.F.E., Permatasari, P., Rahman, A.B., Qisthi, R., Manurung, E.M. (2022), Do village allocation funds contribute towards alleviating hunger among the local community (SDG#2)? An insight from Indonesia. Economies, 10(7), 155.

Martinez-Bravo, M. (2014), The role of local officials in new democracies: Evidence from Indonesia. American Economic Review, 104(4), 1244-1287.

Ministry of Energy and Mineral Resources of the Republic of Indonesia. (2022), Energi Bersih dan Terjangkau. Indonesia: Ministry of Energy and Mineral Resources of the Republic of Indonesia.

Ministry of Finance. (2021), Available from: https://djpb.kemenkeu.go.id/kppn/bukittinggi/id/data-publikasi/artikel/2951-dana-desa-pengertian,-sumber-dana,-penyaluran-dana,-dan-prioritasnya.html

Mirmanto, M., Padang, Y.A., Pandiatmi, P., Syahrul, S., Sinarep, S. (2019), Pemanfaatan energi alternatif untuk keperluan rumah tangga menuju mandiri energi. Jurnal Karya Pengabdian, 1(2), 40-48.

Mulyana, D. (2013), Metodologi Penelitian Kualitatif: Paradigma Baru Ilmu Komunikasi Dan Ilmu Sosial Lainnya. Bandung: PT Remaja Rosdakarya.

Muzaqi, A.H., Djoko, S., Daimun, M., Tri, A. (2022), Analisis kebijakan dana desa dalam merespon masalah kemiskinan di Indonesia. Jurnal Ilmiah Manajemen Publik dan Kebijakan Sosial, 6(2), 122-144.

Ningtyas, D.W., Suwarto, S., Lestari, E. (2021), The success factor in developing an energy independent village in Klaten Central Java. IOP Conference Series: Earth and Environmental Science, 715(1), 012020.

Novita, D. (2016). Analisis Efisiensi dan Efektivitas Pengelolaan Anggaran Dana Desa tahun 2015 di Kecamatan Leuwiliang Kabupaten Bogor Provinsi Jawa Barat. SKRIPSI (n.d.). Indonesia: Universitas Islam Negeri Syarif Hidayatullah Jakarta.

Nugroho, H.Y.S.H., Indrawati, D.R., Wahyuningrum, N., Adi, R.N., Supangat, A.B., Indrajaya, Y., Putra, P.B., Cahyono, S.A., Nugroho, A.W., Basuki, T.M., Savitri, E., Yuwati, T.W., Narendra, B.H., Sallata, M.K., Allo, M.K., Bisjoe, A.R., Muin, N., Isnan, W., Ansari, F., Hani, A. (2022), Toward water, energy, and food security in rural Indonesia: A review. Water, 14(10), 14101645.

Ozan Leymun, Ş., Odabaşı, H.F., Yurdakul, I.K. (2017), The importance of case study research in educational settings. Journal of Qualitative Research in Education, 5(3), DOI: 10.14689/issn.2148-2624.1.5c3s16m

Permatasari, P., Ilman, A.S., Tilt, C.A., Lestari, D., Islam, S., Tenrini, R.H., Rahman, A.B., Samosir, A.P., Wardhana, I.W. (2021), The village fund program in Indonesia: Measuring the effectiveness and alignment to sustainable development goals. Sustainability, 13(21), 12294.

Ristawati, A., Fattahanisa, A., Pramadika, H., Palit, C. (2021), Pemanfaatan limbah produk plastik yang berasal dari minyak bumi. Jurnal Abdi Masyarakat Indonesia (JAMIN), 3(2), 10086.

Roesler, T. (2019), Community resources for energy transition:

Implementing bioenergy villages in Germany. Area, 51(2), 268-276.
Sagala, S., Lubis, W., Vitri, R., Rianawati, E., Nugraha, D., Ameridiyani, A. (2015), Energy Resilient Village Potential in Boyolali, Indonesia. In: RDI Working Paper Series.
Saragi, N.B. (2021), Indonesia's village fund program: Does it contribute to poverty reduction? Jurnal Bina Praja, 13(1), 65-80.
Sayekti, L.A. (2019), Evaluasi program desa mandiri energi berbasis biogas di desa mekarjaya. Publikauma: Jurnal Administrasi Publik Universitas Medan Area, 7(2), 26-29.
Schilmann, A., Ruiz-García, V., Serrano-Medrano, M., de la Sierra de la Vega, L.A., Olaya-García, B., Estevez-García, J.A., Berrueta, V., Riojas-Rodríguez, H., Masera, O. (2021), Just and fair household energy transition in rural Latin American households: Are we moving forward? Environmental Research Letters, 16(10), 105012.
Setyowati, E. (2019), Tata kelola pemerintahan desa pada perbedaan indeks desa membangun (IDM): Studi tiga desa di kabupaten malang. JISPO, 9(2), 170-188.
Starman, A.B. (2013), The case study as a type of qualitative research. Journal of Contemporary Education Studies, 1, 28-43.
Soerjatisnanta, H., & Natamihardja, R. (2019). Institutional and Cultural Approaches for Strengthening Human Right Cities and SDG's at the Village Level. Research Paper. Universitas Lampung. Indonesia.
Subekan, A. (2020), Analisis kesuksesan pengelolaan keuangan desa: Studi kasus Desa Ngroto, Kecamatan Pujon, Kabupaten Malang, Jawa Timur. Jurnal Widyaiswara Indonesia, 1(1), DOI: 10.56259/jwi.v1i1.11
Sudibyo, H., Pikra, G., Fudholi, A. (2021), The potential of hydro renewable energy technology to electricity remote villages in papua and Maluku Islands, Indonesia. IOP Conference Series: Earth and Environmental Science, 927(1), 012002.
Susilo, B., Hawa, L.C. (2016), Sistem pengembangan " desa mandiri energi " (DME) di desa sumber bendo, saradan, kabupaten madiun. Jurnal Keteknikan Pertanian Tropis dan Biosistem, 4(2), 128-135.
The Indonesian Minister of Finance. (2017), Village Fund Pocket Book. Indonesia: The Indonesian Minister of Finance.
UNDP. (n.d.), Goal 7: Affordable and Clean Energy, Sustainable Development Goals. United States: United Nations Development Programme (UNDP).
United Nations Sustainable Development. (2019), Ensure Access to Affordable, Reliable, Sustainable and Modern Energy. United Nations. United Nations Sustainable Development.
van Gevelt, T., Holzeis, C.C., Fennell, S., Heap, B., Holmes, J., Hurley Depret, M., Jones, B., Safdar, M.T. (2018), Achieving universal energy access and rural development through smart villages. Energy for Sustainable Development, 43, 139-142.
Vela-Cobos, F.J., Cavero, R., Platero, C.A., Sánchez-Fernández, J.A. (2021), Luces nuevas experience lighting rural Bolivia: A way to reach SDG 7. Sustainability, 13(18), 10041.
World Economic Forum. (2022), Energy Transition: These Developing Countries are Leading the Way on Renewable Energy. Available from: https://www.weforum.org/agenda/2022/07/renewables-are-the-key-to-green-secure-affordable-energy [Last accessed on 2023 Mar 15].
Yin., R.K. (2014), Case Study Research Design and Methods. 5th ed. Thousand Oaks, CA: Sage.
Yulitasari, Y., Tyas, W.P. (2020), Dana desa dan status desa di provinsi jawa tengah. Journal of Regional and Rural Development Planning, 4(2), 74-83.
Yuwono, T.P. (2022), Potensi dan Tantangan Dana Desa 2022. DetikNews. Available from: https://news.detik.com/kolom/d-5896313/potensi-dan-tantangan-dana-desa-2022#:~:text=Pagu