

The Role of Local Community and The Barriers to Participation in A Mini Hydro Energy Project in Indonesia

Volume 5 Issue 2
(August 2023)

e-ISSN 2716-5191

doi: [10.30997/ijsr.v5i2.300](https://doi.org/10.30997/ijsr.v5i2.300)

Annisa Qurani¹, Ricardi Adnan¹

Universitas Indonesia, Indonesia

ARTICLE INFO

Article history:

Received: 02-20-2023

Revised version received: 03-11-2023

Accepted: 05-21-2023

Available online: 07-11-2023

Keywords:

renewable energy, community participation, public-private-people partnership

How to Cite:

Qurani, A., & Adnan, R. (2023). The Role of Local Community and The Barriers to Participation in A Mini Hydro Energy Project in Indonesia. *Indonesian Journal of Social Research (IJSR)*, 5(2), 103-118.

<https://doi.org/10.30997/ijsr.v5i2.300>

Corresponding Author:

Annisa Qurani

quraniannisa@gmail.com

ABSTRACT

The Indonesian government's policy to encourage the involvement of private companies to contribute to renewable energy (RE) projects affects the lives of the local community in the surrounding areas. However, the local community's role in the RE project implementation must be clarified. The study identifies a possible role for the local community to participate in the RE project. It examines the barriers to its participation under the lens of public-private-people partnership. The study was conducted in a mini hydro power plant project in Indonesia. Eight representatives from the village government, community members, and company management were interviewed. The data were analyzed and presented in a descriptive-qualitative manner. The study found that local community participation is needed to manage water as a natural resource for mini hydro power plants. Still, the need for explicit agreement on responsibility and benefit-sharing between the local community, village government, and private companies becomes the barrier to community participation. The findings emphasize the need for formal partnership to specify how local government, private businesses, and communities supposedly develop renewable energy as the basis to involve stakeholders at the local level.



Available online at <https://iojs.unida.ac.id/index.php/IJSR/>
Copyright (c) 2023 by Indonesian Journal of Social Research (IJSR)

1. Introduction

The Indonesian government needs to reach a target of 23% of the energy mix in 2025 (Ministry of Energy and Mineral Resources, 2021). Conversely, developing renewable energy (RE) requires high costs that the state budget cannot fully cover. To address this issue, the government encourages the involvement of multiple private energy producers to utilize the existing potential energy sources using several policies (Setyowati, 2020). However, the energy sources used to produce electricity from RE generators are generally used by local communities where the resources exist (Kennedy, 2018). The use of RE sources such as wind, solar, water, and the surrounding areas is inextricably linked to community involvement because residents depend on them.

The government is targeting private electricity companies to contribute 20.9 gigawatts (GW) of electricity from RE sources. Until 2020, this target had only been achieved at 12.7% (Ministry of Energy and Mineral Resources, 2020). The gap between achievement and target will be closed by increasing the production capacity of renewable power plants. With the government encouraging the involvement of private companies to reach the goal of the energy mix, more natural resources will be used for commercial purposes, one of which is water. Many regions in Indonesia are rich in water resources that can become a source of hydro energy. The government has found 89 potential new hydro energy locations, most of which are for mini-hydropower plants (Ministry of Energy and Mineral Resources, 2020). This potential number of hydro energy sources will continue to grow as more areas are explored.

Current RE regulations allow private companies investing in RE to profit only after a long operational time or to operate using significant potential energy sources (Kennedy, 2018). However, a mini hydro power plant has limited capacity due to limiting the maximum water discharge from one water source. Instead of increasing production capacity, private companies that develop mini hydro power plants will likely increase the number of power plants. An issue arises in RE development when water as a natural resource is allocated as an RE source, thus interfering with its existing use by the local community on the risks of freshwater eco-toxicity at the initial phase of infrastructure building (Hanafi & Riman, 2015) and decreasing water flow for agriculture (Novitasari et al., 2023; Nyanti et al., 2021). The increasing number of mini hydro power plants means more local communities will likely be affected.

Several mini hydro power plants in Indonesia are close enough to residential areas where the community relies on water for daily needs and irrigation (Purwanto, 2014). However, several mini hydro power plants in Indonesia are located in areas where the local community already has access to electricity from the national grid; consequently, they do not directly use the electricity produced by the RE power plant. As such, the local community is neither a customer nor a producer but a stakeholder affected by the power plant's infrastructural building and operational activities (Whitton et al., 2015). Previous research on RE development generally positions the local community as the direct user and producer of the generated electricity as the focus in community-based RE (Guerreiro & Botetzagias, 2018). Aside from the fact that community-based RE often faces challenges in management and business model (Prilandita et al., 2022), several mini hydro power plants in Indonesia are located in areas where the local community already has access to electricity from the national grid, so they do not directly use the electricity produced from RE power plant. The competition over water resources as part of natural resources and RE sources; is not only bound to the relationship with the government and private companies (as legal-formal owners and as investor-developer, respectively) but also with the local community (Poncian & Jose, 2019). Due to the gap in existing studies, it is still being determined what the community's role in the mini-hydro energy project should be.

This study closes the gap between existing research on renewable energy and community with empirical evidence. Positioning the local community as a significant stakeholder becomes the novelty in this study, thus providing a perspective on how the interrelation of parties is played out at the local level regarding the issue of energy and community in Indonesia. Based on the background above, this study aims to 1) examines possible options for the role of the local community concerning mini hydro power plant development and 2) identify the barriers to community participation through the partnership of the public, private, and people. The data were collected from field observation and interviews with the representatives from the village government, company management, and local community member. The data were analyzed and presented in a descriptive-qualitative manner.

Previously, the public-private partnership (3Ps) approach is often used when studying the development of infrastructures utilizing public resources. It provides a framework to understand and structure the government's role in ensuring that social obligations are met, and public investments are achieved (Batidzirai et al., 2021). The public partners in the 3Ps are government entities, including ministries, departments, municipalities, or state-owned enterprises. In contrast, the private partners could be local or international businesses or investors related to the project. The partnership is built to optimize the allocation of resources, obligations, and risks between both parties. Public partners usually provide support in the form of capital, social responsibility, environmental awareness, local knowledge, and the ability to mobilize political support. Private entities offer capital support and expertise in managing the project most efficiently. 3Ps consist of mobilizing private resources for public infrastructure development.

Mobilizing resources for infrastructure development takes more significant risks the longer it gets (Kumaraswamy et al., 2015). The risks arise from the dynamics in environmental and social situations related to the lives of people in the surrounding area (Gustafsson & Amer, 2023); therefore, the involvement of public and private alone is not enough without the participation of the community to ensure its sustainability. Marana et al. (2018) included the people element in the concept of the 3Ps to emphasize the importance of society's position as the product's end-user. The end-user position becomes critical when discussing the resilience of products resulting from a partnership. End-user involvement can strengthen the product's resilience since it is impossible for a public-private relationship to predict and solve all the problems that arise during the partnership period (Kusmarwati et al., 2014). Regarding RE projects, Batidzirai et al. (2021) emphasize the importance of the people component to reduce the risk of project failure, avoid disputes or conflicts, and save time and costs incurred during implementation. The concept of public-private partnerships (3Ps) becomes a public-private-people partnership (4Ps).

This study uses the 4Ps to identify the role of the local community in a mini hydro power plant project. There is a slight difference in contexts regarding the term end-user. In this study, the community is seen not as the end-user of produced electricity but as the directly affected party (Marana et al., 2018) caused by using water as a natural resource and RE source. To achieve sustainability in energy transition, the public, private sectors, and local communities must find more effective ways to work together (Batidzirai et al., 2021). How the three parties work together is conceptually drawn in Figure 1:

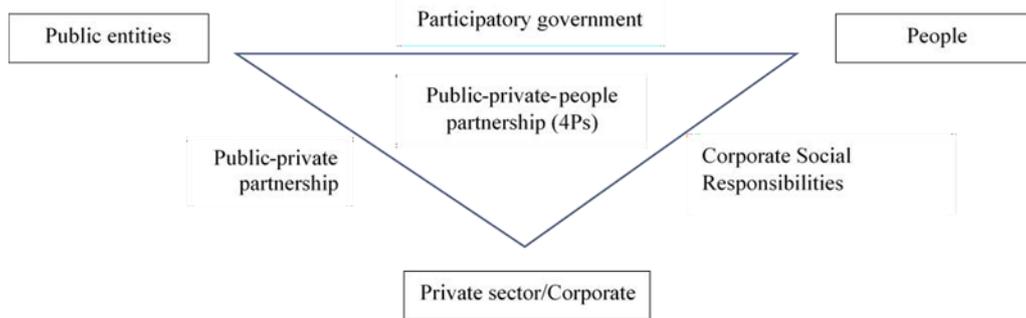


Figure 1. Public-Private-People Partnership (4Ps) (Marana, Labaka, & Sarriegi 2017)

The additional element of people in 4Ps proposes that the community needs to be engaged through institutionalization in the form of constant feedback (Liu et al., 2021), participatory budgeting and crowdsourcing (Muñoz & Kimmitt, 2019), and various community-based projects such as RE development (Fathoni et al., 2021). According to Xue et al. (2021) press the importance of participatory government to encourage community participation by providing an effective information-sharing method between three parties. Conversely, the company needs to fulfill its responsibility towards the surrounding environment and community through Corporate Social Responsibility (CSR) as any other private company. In order to build a quality partnership, three conditions are needed (Marana et al., 2018). First, there is a clear understanding of the stakeholders' distribution of responsibility and benefit. Second, the flow of communication between stakeholders needs to be transparent. Third, there is a mechanism for conflict resolution between parties.

2. Methods

2.1. Location

PLTM JDG Cianten 1B is a mini hydro power plant project chosen as the location of this study. The power plant is located in Cibunian Village, Bogor Regency, West Java, around 1,5 to 2 hours of driving from the central district. It uses water from the Cianten River, which flows through the village, close to residential and agricultural areas. The village's hilly area is separated into two sub-areas: Kampung Muara 1 and Kampung Muara 2. Most of the villagers who live in Kampung Muara 1 and Kampung Muara 2 are farmers who also use the water from the Cianten River for irrigation and daily needs.

2.2. Data Collection

The nature of the site-specific mini hydropower plant and the character of the area around its location are factors in choosing direct observation as the method of this study. The author conducted the direct observation by living with a villager and his family in Kampung Muara 1, close to the powerhouse where the mini hydro generator is. The direct observation was done to assess how the life of the villagers is connected to the natural resources, such as land and water, that PLTM JDG Cianten 1B also uses.

Further data were collected through interviews with eight representatives of the related parties in this study which are village government, company management, and villagers or community members, as seen in Table 1.

Table 1. Participants of the study

Participant	Position	Role	Date of Interview
SH (M)	Head of RT 3 (neighborhood association) in Kampung Muara 1	Connecting community members with village government as a formal representative of the smallest group of households	
AJ (M)	Community member	Involved in the initial infrastructure building of the mini hydro power plant as a member of the contractor	30 October 2022
SR (F)	Community member	Witnessing the development stages of the power plant infrastructure with other community members	
HF (M)	Secretary of the village government	Connecting community members with company management	3 October 2022
OD (M)	Former secretary of the village government	Involved in the initial planning of a mini hydro power plant as a government representative	
IZ (F)	The staff of General Affairs of the company managing PLTM JDG Cianten 1B	Connecting the company with the village government and the community members as a company representative	28 October 2022
RF (M)	General Manager of PLTM JDG Cianten 1B	Supervising the management of PLTM JDG Cianten 1B and making decisions	28 October 2022
AD (M)	Operational staf of PLTM JDG Cianten 1B	Overseeing and maintaining the water source and infrastructures of PLTM JDG Cianten 1B	

The eight participants were chosen as representatives for each respective party related to the issue in this study. Questionnaire guidance was used in the semi-structured interviews. The main topics were 1) the participant's perspective on the existence of the mini hydro power plant in Cibunian Village, 2) the role of each party in the planning and implementation of the mini hydro power plant project, and 3) the participant's expectation upon the existence of mini hydro power plant as the representative of each party. The discussion progressed following the information from each participant and the data that had been previously obtained from field observation. All the interviews were done in October 2022, each lasting about 40 to 60 minutes.

2.3 Data Analysis

The data obtained were transcribed and analyzed to categorize the information in a qualitative approach. The author created the categories based on the research questions, which are 1) the possible roles of the local community in the mini hydro power plant project and 2) the barriers to its participation. The possible roles were obtained from the information about what the village government and the company expected from the community related to the issue in this study. The barriers to participation were collected from the information about the

role of each party and how the parties are ideally interrelated in practice according to the concept of public-private-people partnership. The results are presented descriptively to explain and understand the social situation specific to the case study. Other secondary data from online reports, policy documents, and previous studies were used as supporting data to enrich the discussion.

3. Results

3.1 Findings

The community members were involved in developing PLTM JDG Cianten 1B when the company assessed the social and environmental risks in 2011 and during the land acquisition. It was where negotiations took place between the company and some residents who owned the land where the power plant waterway would pass. The company recruited several community leaders as mediators to speed up the land acquisition. About ten people from the village government and residents were appointed mediators by the company.

“The appointment of these people is based on their knowledge of the land ownership intricacies. Some of them are community leaders whom residents respect, so they are expected to expedite the land acquisition negotiation process, which is carried out door to door” (AJ).

After the feasibility study and measurement of social and environmental impacts were carried out, the development process was entirely handed over to the private sector. It was done after a permit was issued. The local relationship was between the company and the village government. It was the closest formal authority in the area where the power plant was built. However, PLTM JDG Cianten 1B still needed a formal agreement with the village government or a legal contract. The village government only interfered a little in the initial infrastructure building since the district government already issued the permit. The Cibunian Village government only asked the company for employment opportunities for local community members.

Although in limited roles, the village government was more of a mediator between the company and the community. This mediation was carried out, among others, when residents complained about the impact of company activities. The process was also carried out when residents requested social and economic aid.

“When residents requested information or assistance, the village government communicated the issue with the company's public relations personnel. In most cases, the assistance consists of building houses of worship, providing daily needs assistance for orphans, and providing sanitation.” (HF)

The partnership also took shape when natural disasters happened. Cibunian Village was in the disaster-prone yellow zone with medium natural disaster risk. Although Cibunian Village was not in the red zone, landslides repeatedly occurred at several points, especially in Kampung Muara 2, for ten years. It was due to heavy rains. When landslides occurred (see Figure 2), district government assistance often took a long time to reach the location. The village government then obtained the fastest assistance from private companies operating in the area, including those managing the mini hydro power plant.

“The village government asked for the company's help to unload heavy equipment to open access to the road blocked by the landslide” (HF).



Figure 2. Landslide on the access road from Kampung Muara 1 and Kampung Muara 2

Somehow the partnership also burdened the company with high social costs in the name of corporate social responsibility (CSR). This cost occurred in the infrastructure building process and along the operation in the form of various aids given by the company to compensate for any losses claimed by the villagers, such as the cut off of some residential waterways due to land dredging, the reduced water supply for some agricultural areas, and landslides at several points near the power plant infrastructures. The company used to accept its claims regardless of whether its losses were caused by the power plant operation or other causes unrelated to its operations.

“We were also affected by the landslide because our waterway was blocked, but we still helped the village government to open the village access road hit by the landslide even though the landslide was due to the heavy rains instead of our fault” (IZ).

Renewable energy infrastructure tied to the nearby community could only avoid unpredictable social costs even with specific regulations or contracts (Adegbite et al., 2019). If the company did not know about this unforeseen cost, it would likely affect sustainability (Scherer et al., 2013). This cost burden was also one reason PLTM JDG Cianten 1B management was changed in 2019. The initial company that built the power plant sold its ownership rights to the current company because of bankruptcy. The newly appointed management thought the previous management needed to be more burdened with social costs because they tend to respond to all community requests directly and through the village government to gain community acceptance.

“There are many inefficient costs. Among them was the absorption of workers who did not meet the qualifications and the provision of compensation whenever residents feel disadvantaged due to company activities” (RF).

According to company management, the villagers also utilized several other company resources. Due to a landslide in 2017, the access road from Kampung Muara 1 to Kampung Muara 2 was destroyed. Villagers in Kampung Muara 2 needed to use the rocky road along the company's waterway to travel anywhere. The village government had only been allowed to utilize the company's road as temporary access for villagers until a new road was built. However, the village government still uses the company's road instead of building a new one.

“They even paved the road with asphalt as if it were their own. The village government seemed to think that the use of the company's road by the villagers was part of our responsibility” (IZ).

In several cases, government-mediated communication was also not fully implemented because neither the village government nor the company had a particular community outreach program. The village government usually held an annual meeting with community representatives called Musrenbangdes. The purpose of Musrenbangdes is to involve the

community in village development planning, as stated in National Law Number 6 of 2014 concerning villages. The community members had the chance to communicate their concerns regarding the power plant issues, and the company could use this meeting to inform the village government and community members about the recent issues. However, it did not happen since neither party took the initiative.

“Informing community members in such crowd meeting with many things to discuss is quite a waste of time. We did that before and only a few of the participants listening and even fewer that actually understand. It’s better to talk directly with people who actually has something to deal with us. We took care their proposals and complaints directly.” (RF)

Communication between the company and the community members relied on informal channels through mediation by residents who work as company employees. However, the communication became interrupted when the newly appointed management significantly reduced the number of employees from 150 to 49. When the newly appointed management downsized the workforce, many residents needed to meet qualifications and were laid off. As a result, the community needed to figure out where to turn when they needed social assistance (SH).

The lack of direct communication between residents and the company due to the absence of an intermediary role interrupted the transfer of information between the company and the community. It negatively affected the company as well. The community considered the mini hydro power plant in Cibunian Village the same as the big-scale steam power plant PLTU Gunung Salak and hydropower plant PLTA Kracak. The two power plants produce electricity with a much larger capacity. PLTU Gunung Salak even gave financial aid to five villages in Pamijahan Sub-district as its CSR.

“PLTU Gunung Salak gives us about 500 to 700 millions (rupiah) each year to five villages in Pamijahan as some kind of profit sharing, or some kind of CSR, I don’t know much about the details because the one distributing is the district government” (OD).

“We’ve never heard about how much the PLTM make in a year but there should be any kind of contribution to the community... or maybe they have a deal with the (village) government which we don’t know yet” (SH).

Even though the local community accepted the mini hydro power plant development more readily due to the earlier power plant construction, expectations of social reciprocity for PLTM JDG Cianten 1B were equated with its predecessors. A negative image was imposed when the anticipated shared benefit was not realized, even though the mini hydro power plant already contributed to the clean energy transition goal. The company representatives also added that they had already looked the other way when they knew that some residents were using the land surrounding the waterway to plant crops. Those areas the company had already acquitted were supposed to be cleared out from any activities to keep the surface from landslides and minimize the damage in flood. Some residents insisted on "borrowing" the land because the replacement was too far from their home and not as fertile as the ones they used before. In order to prevent damage claimed from those residents, the new management asked them to sign an agreement that they would not claim damages from the company if any problems occurred in those land.

“When they took over our land, some of us received money as the payment but there were some others who didn’t want to sell their land so the company gave them replacement in different location. But they found the location was too far from the house, others said the new land was not fertile, so some of them came back to the old land to farm.” (SR)

The resident's activities in the river basin and waterway area increase the risks of damage when natural disasters occur, such as landslides in 2017 and 2022 and some floods whenever heavy rains pour for days. Tens of houses near the power plant waterway were destroyed by a landslide in 2017. The residents were relocated, but six houses were damaged

by another landslide in 2022. The land used for relocation was a catchment area that stored water from the mountainous area to the Cianten River; thus, building houses on it was risky. The government decided on the location without consulting the local community.

Using the land alongside the waterway for residents' activities also affected the electricity the power plant generator produces. "We often found lots of thrases thrown out to the river, lots and lots that the dam was blocked by trashes and the water didn't flow as much as usual. Sometimes we need to check the dam, but if it isn't there, then we needed to go check the upstream area to remove the quickly trashes that blocked the water flow so the production amount would not be affected too much." (AD)

3.2 Discussion

3.2.1. Possible Roles for Community Participation

From the public sector point of view, electrification using renewable energy (RE) is complex since it has to align with the goal of the energy mix and energy access. The partnership between stakeholders and each stakeholder's role must be clear to ensure that the goal is achieved. As the public sector, the government needs to determine the purpose of stakeholder engagement, including the community (Batidzirai et al., 2021). Participation is the involvement of people at all levels of decision-making but the treatment of the community as an equal partner in the decision-making processes (Leonard, 2019). Decentralization has put the local community into consideration in the decision-making process. However, the community's role is often limited to information gathering during risk assessment (Poncian & Jose, 2019), just like in the case of PLTM JDG Cianten 1B. The community was only involved when the developer needed information regarding the potential risks without having a chance to give feedback based on the community's interest. Only a few community representatives were involved in this phase. The involvement did not reach the level of participation where the community had equal power to negotiate their interest. Herington et al. (2017) found that less than a third of the studied RE projects already involved the local community in meaningful engagement.

In order to build more meaningful engagement in the public-private-people partnership (4Ps), there must be a precise distribution of responsibility and benefit between parties, including the role of the local community (Marana et al., 2018). This study identifies that in the case of the mini hydro power plant project, there are two other issues where the role of the local community is needed. The two issues are natural resources management and disaster mitigation.

Water resources management

Sustainability has become the central issue of the environmental debate, including mini-grid power plant projects (Whitton et al., 2015). In mini-hydro energy developed by private companies, environmental sustainability is not just a concern for the planet but also a commercial one as well because the electricity generation is associated with water discharge and land use in the surrounding river basin (Stickler et al., 2013; Tesfaw et al., 2018).

This study identified the importance of the community to be involved in conserving water resources. The findings indicated that community activities around the watershed risk affecting the water flow and the power plant infrastructure and the blockage of the floodgates at the dam and in the waterway area by household waste dumped into the river. In addition, using watersheds for agriculture will loosen the soil and reduce soil density (Chen et al., 2018). It will increase the risk of the waterway embankment breaking down into residential areas. As

the community also uses the river for irrigation, the developers must find a way to collaborate with them to avoid potential loss.

Disaster management

The locations of the mini hydro power plant projects are mainly in hilly areas susceptible to disasters such as floods and landslides. Even though in the initial stage of planning, the developers had conducted an environmental risk assessment, they likely could not foresee the environmental changes that would happen in the long term (Adegbite et al., 2019). Collaboration among stakeholders is required to minimize the risk. There are many cases where the local community is involved in disaster management, which has proven effective (Buchori et al., 2022; Lessy et al., 2018; Mane, 2019). Local community members generally have knowledge and experiences about local culture and histories that are valuable in disaster risk management (Kumaraswamy et al., 2015). In the case of a mini hydro power plant project such as PLTM JDG Cianten 1B, the knowledge of the community who lived in the disaster-prone zone could be utilized to create a disaster management mechanism based on empirical experiences.

The village government, the private company, and the local community are interrelated regarding exchange needs. However, the existing barriers prevent the three parties from working together constructively. Next, this study discusses the barriers to community participation that become partnership challenges.

3.2.2. The Barriers to Community Participation

Many countries (including Indonesia) require public community consultation in the initial stage of mini-grid development. However, they need to specify how the developers should engage with the community (Batidzirai et al., 2021). The public-private-people partnership model, further developed by Marana et al. (2018), consists of three main factors that affect the ongoing partnership: 1) stakeholder relationship, 2) information flow, and 3) conflict resolution. Partnerships should ideally consist of commitment and coordination, especially in the early stages. Trust and interconnectedness must be built through interactions when the partnership is on the run, along with commitment and coordination. Exchanging quality information through transparent communication will ensure interconnectedness and trust among stakeholders, thus helping to avoid conflict and to resolve if any dispute occurs. The study found several barriers in the partnership that prevented it from the ideal.

Stakeholder Relationship in Natural Resource Policy

The first stage of analysis to determine the barriers in the partnership was to determine the relationship between stakeholders. The analysis was done by grouping information based on "what connects this party to the others in the case of mini hydro power plant development and what kind of connection is made ."The result of the stakeholder relationship analysis in the PLTM JDG Cianten 1B is shown in Figure 3.

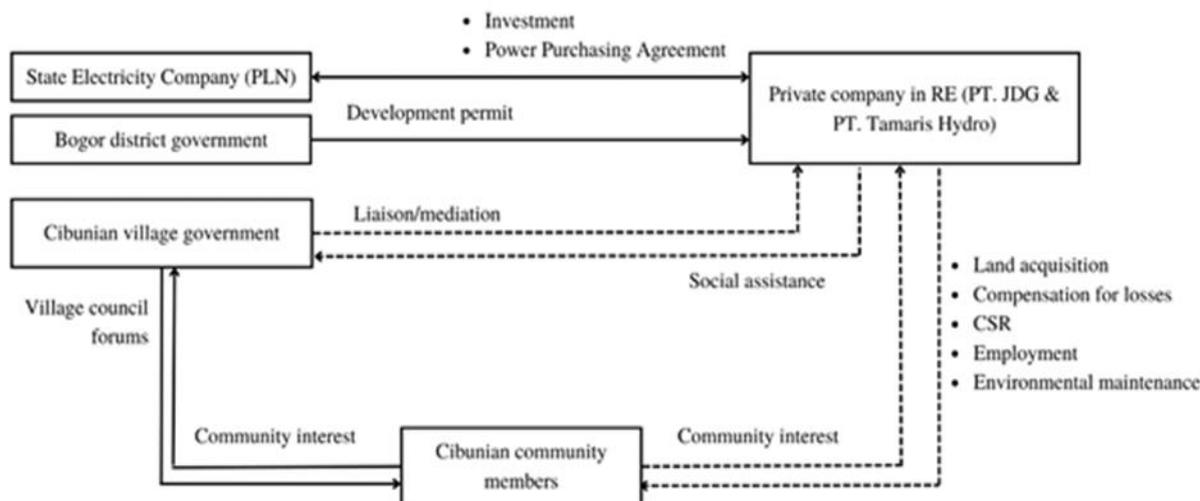


Figure 3. The relationship of stakeholders in PLTM JDG Cianten 1B

Figure 4 shows the relationship between the parties involved in developing PLTM JDG Cianten 1B. Since the government body that was formally connected with the private company was the government at the district level, there needed to be clear guidance on the role of the village government. The village government was more of a mediator between the company and the community. However, no formal agreement binds this relationship (shown in dotted lines).

Based on Article 33, paragraph 3 of the 1945 Constitution, Indonesia adheres to the principle of state control of natural resources. One of these is revealed in Law of the Republic of Indonesia Number 17 of 2019, (2019). Water resources. It regulates state control of water resources, including rivers and riverside areas or watersheds, to meet community needs and protect their interests. This authority is given to provincial and district/city governments, including permits for using water resources for business purposes. Thus, RE development is a meeting point between the interests of the government, the private sector, and the community who use potential energy sources for their daily needs—the meeting of these three forms a relationship that affects the project's sustainability.

The relationship between the government and the private sector in RE projects can be seen through the power plant planning process and implementation. According to Indonesia Clean Energy Development (ICED), (2013), in general, the development of mini hydro power plants needs to proceed through eight stages: 1) feasibility study, 2) permit registration, 3) permit issuance, 4) land acquisition, 5) power purchase contract agreement through PPA (Power Purchasing Agreement) with the state electricity company, 6) approval financing from financial institutions, 7) construction, and 8) buying and selling of electricity products. Among these eight stages, local government involvement is generally limited to the feasibility study and permit issuance.

According to Laws of The Republic Indonesia Number 6 of 2014, (2014) the village government could partner with external parties to support village development. The idea of partnership should come from the community members through a village council meeting called Musrenbangdes and agreed on. However, this rarely happened since the community was not the direct consumer of the generated electricity; there needed to be a greater priority agenda. Relations with the government and local communities are usually left to companies directly involved at the construction site (Batidzirai et al., 2021).

Meanwhile, the company's initiatives to support the village's needs (in this instance, the form of compensation for losses, CSR, and employment) could be viewed positively as a means of addressing citizen's rights when the government cannot do so (Scherer et al., 2013).

Nevertheless, based on the findings, there was an imbalance. The partnership contract regarding mini hydro power plant development was between the district government as the authority over resources and the private company as the development implementer. However, the company needed help to avoid its relationship with the village government. Limited regulations and the absence of contracts or agreements that regulate the distribution of rights and obligations and cost and benefit at the village level had made the relationships that work unbalanced and threatened the sustainability of mini hydro power plant operations.

Communication Flow

A village council forum called Musrenbang was held annually to convey the community's aspirations to the village government. However, it did not work as expected because of the need for more initiative from the village government to bring the issue to the table. Another connection was formed between the community and the company. Community members could submit their interests through company representatives, but this was only limited to individuals with direct connections to company representatives. The community roles were limited by the need for more community outreach performed by the village government and the managing company. The government and the private sector tend to position the community in a passive role without giving a way to participate in decision-making actively (Whitton et al., 2015). Citizen participation is not only about for whose benefit is the development project implemented but also by what means the initiative is realized (Theyyan, 2018). Participation also means redistributing power upon knowledge, resources, skills, and benefits gained from decision-making (Saxsena in Theyyan, 2018). Redistribution of power through citizen participation increases development projects' sustainability by allowing citizens to take initiatives on their own. As the company downsized its workforce and reduced direct communication due to management change, the Cibunian Village community members needed to find an alternative channel to voice their needs.

Consequently, the company might view the explained condition as a positive change in their social cost because they had more layers that separated them from the community that previously could claim damages. Additionally, there was a negative impact. With many layers separating the company from the community, the community felt free to participate in the company's interests. It resulted in some villagers using the land in the company's waterway area, which was an agricultural area, to plant crops and make fish ponds, despite the risk of flooding and landslide. Water filters and dams near the penstock were commonly contaminated with residual waste from residential areas, affecting water flow stability. Farming activities upstream and along the watershed also contributed to the fluctuation of water discharge. It affected electricity generation. In this case, the company needed the community support to maintain the environment.

The findings indicate the understanding gap between the village government and the company. There needs to be more expected responsibility and benefit for both parties. It is essential to address this because apart from being site-specific, mini hydro power plants also have a maximum development capacity limit. It refers to how much water is discharged as a source of energy. Because of a significant investment in infrastructure development and limited maximum production capacity, the power plant must operate for a long time to reach profit (Kennedy, 2018).

Conflict Resolution

The relationship between stakeholders and how they interacted led to how well the local government managed conflicts between community members and the private company. Conflict resolution resolves partnership problems (Marana et al., 2018). In long-term partners such as renewable energy implementation, partnership quality is heavily affected by social

dynamics and stakeholder interaction (Kusmarwati et al., 2014). Disputes likely happened when the residents claimed damages caused by infrastructural malfunction (Shirley & Word, 2018) and water resource utility (Silber-Coats, 2017) upon which party is responsible for the damage. Natural disasters also trigger conflicts when the power plant is in a disaster-prone zone.

In renewable energy projects, issues such as stakeholder relations, communication, and conflict resolution are related to a need for mutual agreement on shared responsibility and benefits. The use of private resources for public interest without prior agreement, such as what happened in the case of PLTM JDG Cianten 1B, could pose a potential dispute in the future. A legal-formal agreement is needed to lay a foundation for the long-term partnership to ensure each party will act within the agreed boundaries (Kumaraswamy et al., 2015). However, it is imperative to note that the agreement also needs space for flexibility since a community is involved. Long-term partnerships are subject to change alongside social dynamics in the surrounding environment and require sustaining social transformation (Batidzirai et al., 2021). As demonstrated in the case of PLTM Cianten 1B, social dynamics are affected by natural disasters and employment policies that occurred throughout the power plant's operational span.

According to the lens of public-private-people partnership Marana et al. (2018), the government has the most significant obligation to encourage citizen participation. Nevertheless, it is difficult to determine which government is obligated to ensure citizen participation since there is no specific policy. The village government needs authority to issue power plant permits, as shown in Figure 3. The figure shows that the Cibunian village government's role needs to be clarified. In contrast, the private company can only expect fair distribution of responsibility and benefits to the local community with the active involvement of the village government. Despite the need for community participation regarding shared resources, the company's resources alone are limited to conducting CSR that encourages participatory citizenship. The right for the village government to form a formal partnership with external parties can only arise when the water management issue is put on the discussion table as an aspiration from the community through village council meetings or Musrenbangdes.

4. Conclusion

A mini hydro power plant as a renewable energy project needs to involve the local community in the decision-making since the community also uses the same water resource as the one used for energy. To form an equal partnership, the community has to find its role in distributing responsibility and benefit as stated in the principle of the public-private-people partnership (4Ps). Based on the findings, the local community could involve more actively in the management and conservation of water and natural resources used for daily needs and RE sources, as well as in the disaster mitigation that often occurred in the location of the mini hydro power plant.

In order to actively involve the community, there are several barriers to solve. First, the informal relationship between the village government, the private company, and the local community prevents a precise distribution of responsibility and benefit among stakeholders. Second, the need for more information sharing prevents a better understanding of expectations and boundaries towards each other. Lastly, the absence of a conflict resolution mechanism results from informal relationships and a lack of communication. In order to increase the quality of the partnership, the village government's first step is to utilize the Musrenbangdes as the village council forum as the channel to bring the issue to the discussion table.

References

- Adegbite, E., Amaeshi, K., Johnston, A., & Osuji, O. (2019). Corporate Social Responsibility as Obligated Internalisation of Social Costs. *Journal of Business Ethics*, 170(1), 39-52. [10.1007/s10551-019-04329-y](https://doi.org/10.1007/s10551-019-04329-y).
- Batidzirai, B., Trotter, P. A., Brophy, A., Stritzke, S., Moyo, A., Twesigye, P., Puranasamriddhi, A., & Madhlopa, A. (2021). Towards people-private-public partnerships: An integrated community engagement model for capturing energy access needs. *Energy Research & Social Science*, 74, 101975. <https://doi.org/10.1016/j.erss.2021.101975>
- Buchori, I., Zaki, A., Pangi, P., Sejati, A. W., Pramitasari, A., & Liu, Y. (2022). Adaptation strategies and community participation in government-led mitigation projects: A comparison between urban and suburban communities in Pekalongan, Indonesia. *International Journal of Disaster Risk Reduction*, 81, 103271. [10.1016/j.ijdrr.2022.103271](https://doi.org/10.1016/j.ijdrr.2022.103271)
- Chen, W., He, B., Nover, D., Duan, W., Luo, C., Zhao, K., & Chen, W. (2018). Spatiotemporal patterns and source attribution of nitrogen pollution in a typical headwater agricultural watershed in Southeastern China. *Environmental Science and Pollution Research*, 25, 2756–2773. <https://doi.org/10.1007/s11356-017-0685-8>
- Fathoni, H. S., Setyowati, A. B., & Prest, J. (2021). Is community renewable energy always just? Examining energy injustices and inequalities in rural Indonesia. *Energy Research & Social Science*, 71, 101825. <https://doi.org/10.1016/j.erss.2020.101825>
- Guerreiro, S., & Botetzagias, I. (2018). Empowering communities—the role of intermediary organisations in community renewable energy projects in Indonesia. *Local Environment*, 23(2), 158–177. <https://doi.org/10.1080/13549839.2017.1394830>
- Gustafsson, C., & Amer, M. (2023). Forsvik, Sweden: Towards a People–Public–Private Partnership as a Circular Governance and Sustainable Culture Tourism Strategy. *Sustainability*, 15(5), 4687. <https://doi.org/10.3390/su15054687>
- Hanafi, J., & Riman, A. (2015). Life cycle assessment of a mini hydro power plant in Indonesia: A case study in Karai River. *Procedia Cirp*, 29, 444–449. <https://doi.org/10.1016/j.procir.2015.02.160>
- Herington, M., Van de Fliert, E., Smart, S., Greig, C., & Lant, P. (2017). Rural energy planning remains out-of-step with contemporary paradigms of energy access and development. *Renewable and Sustainable Energy Reviews*, 67, 1412–1419. <https://doi.org/10.1016/j.rser.2016.09.103>
- Indonesia Clean Energy Development (ICED) Program. (2013, Juni 13). <https://humas.ui.ac.id/sites/default/files/ICED-RFA-02-2013%20publication.pdf>
- Kennedy, S. F. (2018). Indonesia’s energy transition and its contradictions: Emerging geographies of energy and finance. *Energy Research & Social Science*, 41, 230–237. <https://doi.org/10.1016/j.erss.2018.04.023>
- Kumaraswamy, M., Zou, W., & Zhang, J. (2015). Reinforcing relationships for resilience—by embedding end-user ‘people’ in public–private partnerships. *Civil Engineering and Environmental Systems*, 32(1–2), 119–129. <https://doi.org/10.1080/10286608.2015.1022727>
- Kusmarwati, A., Arief, F. R., & Haryati, S. (2014). Eksplorasi bakteriosin dari bakteri asam laktat asal Rusip Bangka dan Kalimantan. *Jurnal Pascapanen Dan Bioteknologi Kelautan Dan Perikanan*, 9(1), 29–40. <https://doi.org/10.15578/jpbkp.v9i1.97>
- Law of the Republic of Indonesia Number 17 of 2019. (2019). Water resources
- Laws of The Republic Indonesia Number 6 Of 2014. (2014). *Village*. https://www.dpr.go.id/dokjdih/document/uu/UU_2014_6.pdf

- Leonard, L. (2019). Traditional leadership, community participation and mining development in South Africa: The case of Fuleni, Saint Lucia, KwaZulu-Natal. *Land Use Policy*, 86, 290–298. <https://doi.org/10.1016/j.landusepol.2019.05.007>
- Lessy, M. R., Bemba, J., & Nagu, N. (2018). *Assessing community resilience to natural disaster and climate change in Maitara Island, North Maluku-Indonesia*. 229, 02002. <https://doi.org/10.1051/mateconf/201822902002>
- Mane, A. (2019). *Community Participation, Mitigation Flood Disaster in Indonesia*. 271(1), 012031. <https://doi.org/10.1088/1755-1315/271/1/012031>
- Marana, P., Labaka, L., & Sarriegi, J. M. (2018). A framework for public-private-people partnerships in the city resilience-building process. *Safety Science*, 110, 39–50. <https://doi.org/10.1016/j.ssci.2017.12.011>
- Ministry of Energy and Mineral Resources. (2021, December 14). *Minister of Energy and Mineral Resources: Needs Concrete and Planned Efforts to Achieve 23% Mix Target in 2025*. [Press Conference]. <https://ebtke.esdm.go.id/post/2021/12/15/3038/menteri.esdm.perlu.upaya.konkrit.dan.terencana.capai.target.bauran.23.di.tahun.2025>
- Ministry of Energy and Mineral Resources. (2020, February 7). *Generating Capacity Increases to 69.6 GW, EBT Contributes 10.3 GW*. <https://ebtke.esdm.go.id/post/2020/02/10/2473/kapasitas.pembangkit.naik.jadi.696.gw.ebt.sumbang.103.gw>
- Muñoz, P., & Kimmitt, J. (2019). Social mission as competitive advantage: A configurational analysis of the strategic conditions of social entrepreneurship. *Journal of Business Research*, 101, 854–861. <https://doi.org/10.1016/j.jbusres.2018.11.044>
- Novitasari, D., Hadi, S. P., & Budiarto, R. (2023). The climate and land-use changes impact on water availability for hydropower plants in Indonesia. *Energy Strategy Reviews*, 46, 101043. <https://doi.org/10.1016/j.esr.2022.101043>
- Nyanti, L., Soo, C.-L., Chundi, A.-Y., Lambat, E.-C.-D., Tram, A., Ling, T.-Y., Sim, S.-F., Grinang, J., Ganyai, T., & Lee, K.-S.-P. (2021). Patterns of Fish Assemblage, Growth, and Diet Composition in a Tropical River between Two Cascading Hydropower Dams. *International Journal of Ecology*, 2021, 1–10. <https://doi.org/10.1155/2021/6652782>
- Poncian, J., & Jose, J. (2019). National resource ownership and community engagement in Tanzania's natural gas governance. *Energy Policy*, 133, 110903.
- Prilandita, N., Sagala, S., Azhari, D., & Habib, A. (2022). *Rural renewable energy development: Lessons learned from community-based renewable energy business model in East Sumba, Indonesia*. 1015(1), 012017. <https://doi.org/10.1088/1755-1315/1015/1/012017>
- Scherer, A. G., Baumann-Pauly, D., & Schneider, A. (2013). Democratizing corporate governance: Compensating for the democratic deficit of corporate political activity and corporate citizenship. *Business & Society*, 52(3), 473–514. <https://doi.org/10.1177/0007650312446931>
- Setyowati, A. B. (2020). Mitigating energy poverty: Mobilizing climate finance to manage the energy trilemma in Indonesia. *Sustainability*, 12(4), 1603. <https://doi.org/10.3390/su12041603>
- Shirley, R. G., & Word, J. (2018). Rights, rivers and renewables: Lessons from hydropower conflict in Borneo on the role of cultural politics in energy planning for Small Island Developing States. *Utilities Policy*, 55, 189–199. <https://doi.org/10.1016/j.jup.2018.09.010>
- Silber-Coats, N. (2017). *Clean energy and water conflicts: Contested narratives of small hydropower in Mexico's Sierra Madre Oriental*. 10(2). 578-601

- Stickler, C. M., Coe, M. T., Costa, M. H., Nepstad, D. C., McGrath, D. G., Dias, L. C., Rodrigues, H. O., & Soares-Filho, B. S. (2013). Dependence of hydropower energy generation on forests in the Amazon Basin at local and regional scales. *Proceedings of the National Academy of Sciences*, *110*(23), 9601–9606. <https://doi.org/10.1073/pnas.1215331110>
- Tesfaw, A. T., Pfaff, A., Golden Kroner, R. E., Qin, S., Medeiros, R., & Mascia, M. B. (2018). Land-use and land-cover change shape the sustainability and impacts of protected areas. *Proceedings of the National Academy of Sciences*, *115*(9), 2084–2089. <https://doi.org/10.1073/pnas.1716462115>
- Theyyan, B. (2018). Arnstein's ladder of citizen participation a critical discussion. *Asian Academic Research Journal of Multidisciplinary*, *2*(7).
- Whitton, J., Parry, I. M., Akiyoshi, M., & Lawless, W. (2015). Conceptualizing a social sustainability framework for energy infrastructure decisions. *Energy Research & Social Science*, *8*, 127–138. <https://doi.org/10.1016/j.erss.2015.05.010>
- Xue, Y., Lindkvist, C. M., & Temeljotov-Salaj, A. (2021). Barriers and potential solutions to the diffusion of solar photovoltaics from the public-private-people partnership perspective—Case study of Norway. *Renewable and Sustainable Energy Reviews*, *137*, 110636. <https://doi.org/10.1016/j.rser.2020.110636>