

Government's Strategy in Optimising Renewable Energy Programs through the Participatory Approach in Gorontalo, Indonesia

Muh. Firyal Akbar^a, Widya Kurniati Mohi^b, Zulfan Nahrudin^c, Ilyas Lamuda^d, Ahmad Harakan^e, Kittisak Jermsittiparsert^{f*}, ^{a,b}Department of Public Administration, Universitas Muhammadiyah Gorontalo, Indonesia, ^cDepartment of Government Studies, Universitas Muhammadiyah Makassar, Indonesia, ^dDepartment of Management, Universitas Gorontalo, Indonesia, ^eDepartment of Government Studies, Universitas Muhammadiyah Makassar, Indonesia, ^fSocial Research Institute, Chulalongkorn University, Thailand, E-mail: ^afiryalakbar@umgo.ac.id, ^bwidyakurniati@umgo.ac.id, ^cZulfan@unismuh.ac.id, ^dillyaslamuda@gmail.com, ^eAhmad.harakan@unismuh.ac.id, ^{f*}Corresponding author: kittisak.j@chula.ac.th

This research aims to examine the government's strategy in optimising renewable energy programs through a participatory approach in Gorontalo, Indonesia. In this study, the government's strategy is outlined in several aspects: availability, acceptability, accessibility, and affordability. In addition, this research also suggests aspects of participation that are the government's approach to renewable energy development, such as Solar Power Plants (PLTS) and Hydropower Generators (PLTA). This type of research uses mix method, data obtained from the field directly through questionnaires and interviews with informants and respondents. Data analysis activities are conducted through data reduction, data presentation, and conclusion drawing. The results of the study show that the strategy of the regional government, in terms of future accessibility, is aimed at areas that are remote hamlets and have not received access in the long-term. Community participation in the construction and implementation of community energy development was more involved in the development of hydropower compared to PLTS. However, from the aspect of monitoring and utilisation, community participation in the PLTS program was higher than the PLTA. Participation in monitoring and evaluating the supply of renewable energy has been an input for

the improvement of the renewable energy program in Gorontalo, which demands for additional power that is considered to be of insufficient power and less stable.

Key words: *Government Strategy, Renewable Energy, Participation, Society.*

Introduction

Quality of public service is a very basic demand in the governance system of good governance (Muhammadiyah, 2011; Jermisittiparsert, Sriyakul, Pamornmast, Rodboonsong, Boonprong, Sangperm, Pakvichai, Vipaporn, & Maneechote, 2016). Indonesia has a large potential of renewable energy. The advantage of renewable energy is the low cost of operation by utilising energy sources in the form of water and air (Thummajariyawat, 2018; Tangjitprom & Romprasert, 2019; Romprasert & Jermisittiparsert, 2019). Geothermal energy used in an isolated region is useful. Engineering hybrid generator systems as well as programs and regulations in the field of renewable energy have launched (Hasan, Mahlia, & Nur, 2012).

Efforts to support new and renewable energy sources (EBT) have been carried out by the government through regulations — such as Ministerial regulation ESDM Number 12 of 2017 — that support the optimisation of EBT sources. This particular regulation encourages the creation of new technologies from EBT private developers in the utilisation of EBT resources. This regulation also encourages PT PLN (Persero) and Independent Power Producer (IPP) to increase efficiency that can produce electricity at low prices, which ultimately does not burden the people.

The policy from the Ministry of Energy and Mineral Resources needs to be responded to by the regional government with several program strategies emphasising that the implementation of local economic development requires a partnership. This is important and fundamental in order to use the potential resource of a region, considering that the government itself has limitations in community development. At the same time, partnerships can be used as a vehicle to reduce the dominance of certain sectors in the integrated policy planning process (Iqbal & Anugrah, 2016).

Government policies related to various renewable energy development programs need to be supported by community participation which depends on the values that are practiced and trusted by community members (Walker & Devine-Wright, 2008; Walker, Devine-Wright, Hunter, High, & Evans, 2010). The existence of community participation in the implementation of renewable energy programs can foster the ability of the community to

develop independently, while the output of participation is stimulation or motivation through various joint efforts with government and society (Hoffman & High-Pippert, 2010).

Potential renewable energy can be optimised by the Gorontalo regional government by designing strategies that refer to aspects including the availability of energy sources; environmental considerations; security of power resources that can be accessed by the wider community; and the affordability, which includes both costs and purchasing power (Radtke, 2014). Participatory development must begin with the community as human beings who have aspirations and are most aware of the need for the importance of energy to support their daily needs (Akbar, Kesmawan, Harun, Nahrudin, & Mohi, 2019; Mathie & Cunningham, 2003; Williams, 1999). The main development actors and local governments must be able to position themselves as facilitators (Clark, 2010). This is important to create an atmosphere that supports community activities that are expected to support the success of energy-independent village development.

Gorontalo, Indonesia has a significant hydro and mineral potential which has not been utilised optimally. The potential owned can produce electricity of 166.96 GWh. The Bone River potential produces maximum hydropower energy of 61.05 MW. Then there are other hydropower potentials located in Tilamuta District, Boalemo Regency, Paguat Pohuwato District, Lemito District, and Suwawa District, Bone Bolango District. Next is the Solar Power Plant (PLTS) and Hydroelectric Power Plant (PLTA) in Biawu District, North Gorontalo Regency. The power plant in this location — with a power of 10 kilowatts — is an effort of the regional government to fulfill electricity demands through the development of renewable energy. A number of previous studies, such as Kanata's research (Kanata, 2015), has not shown a review that illustrates community participation in energy development in Gorontalo.

The same is not found in Harun's research (Harun, 2016), although it clearly illustrates the potential mapping and hybrid utilisation of renewable energy in supporting the realisation of independent power villages in Gorontalo Province. However, the involvement of the community through participation has not been clearly explained, therefore this study aims to examine the government's strategy in optimising renewable energy programs through a participatory approach in Gorontalo Indonesia.

Research Methods

The type of research undertaken is the Mix Method, using a combination of qualitative and quantitative models. To become fully aware of the success of renewable energy development at the Gorontalo regional level, it is necessary to explore the community participation in this study. Specifically, this comprises four energy independent villages: Tapada'a Village,

Tulabolo Village, Liyodu Village, and Dulamayo Village. In this study, data is obtained from the field directly through questionnaires and the results of interviews with informants and respondents. Informants and respondents were determined by purposive sampling. Informants were employees of the Department of Mineral Resources and Energy of Gorontalo Province and the community consisted of 200 people from the villages of Tapada'a, Tulabolo, Liyodu, and Dulamayo. Data analysis activities went through data reduction, data presentation, and conclusion drawing. This research has an emphasis on the strategy of the Gorontalo Regional Government in optimising renewable energy potential related to availability, acceptability, accessibility, and affordability aspects. In addition, this research also emphasises the approach of community participation in the optimisation of renewable energy programs.

Research Result

This study presents several findings regarding the implementation of the government's strategies in optimising renewable energy programs through a participatory approach. Government strategies are outlined in the aspects of availability, acceptability, accessibility, and affordability. Renewable energy includes the Solar Power Plant (PLTS) and Hydroelectric Power Plant (PLTA) in the four energy independent villages of Tapada'a, Tulabolo, Liyodu, and Dulamayo.

Availability

The availability of renewable energy resources in a number of locations in Gorontalo are assets that must be developed. It will be a loss if the potential is not maximised in the framework of patching the lack of electricity in areas that are difficult to reach by PLN electricity. The availability of energy sources and potential that have not been used in Tapada'a Village, Tulabolo Village, Liyodu Village, and Dulamayo Village are presented in Table 1.

Table 1: Availability of Renewable Energy in Gorontalo by Village

Village	Renewable energy produced (kWh) for PLTA and PLTS Criteria for Renewable Energy in Gorontalo by Village	Un-optimised energy potential (kWh) for hydropower and solar power plants
Tapada'a	645	603
Tulabolo	1556	1364
Liyodu	3557	3464
Dulamayo Selatan	3325	3188

Based on the data presented, there are potentials that have not been optimised in a number of villages with a large amount of energy per kWh. This includes the villages of Liyodu and Dulamayo Selatan, which are 3466 kWh and 3191 kWh.

Based on interviews, it can be understood that the maximum target of renewable energy utilisation is isolated areas that have not yet been electrified by electricity with a 98% electricity percentage. The future development of renewable energy will be narrow, because it is looking for isolated areas that have not been electrified and the criteria for the locations are not expected to be electrified for two to three years.

Based on the results of the interview, it is highlighted that the future strategy of the Gorontalo provincial government is regional energy preparation that collaborates with Universities and NGOs to design regional energy plans for both hydroelectric and solar power plants.

Acceptability

Renewable energy must accept environmental and security considerations. This is based on the result of interviews with community informants regarding environmental and security considerations. Based on interviews with a number of informants, it can be understood that the development and utilisation of renewable energy is safe from environmental impacts that may have arisen. Feasibility studies had been conducted at the beginning of the program and public consultations with various components of the community have taken place. Therefore, the assurance of renewable energy development in Tapada'a village, Tulabolo village, Liyodu village, and Dulamayo village is considered safe and beneficial by the community.

Accessibility

Based on the results of the interview, broad access of the community towards renewable energy is limited to the off-grid area of PLN and after electricity entered the area, renewable energy is no longer used; it is only temporary. Based on the interview results, the accessibility of renewable energy utilisation for the community is opened for those who need it. However, only limited to the PLN off-grid area so that the regional government's strategy for increasing accessibility is aimed at remote hamlets that have not received access for a long time.

Affordability

Affordability of both the costs and purchasing power of the community is an aspect that must be considered by regional governments in developing a strategy for developing renewable energy. Based on the results of the interview, it can be inferred that the installation of

equipment in each house is free, but there are fees charged. For example, in East Tulabolo Village, the operational cost is 35,000.

Furthermore, tracking from the strategy of the regional government, there is no concrete effort at this time to make renewable energy in the form of industrialisation. Based on the results of the interview, the industrialisation of renewable energy has not been able to be marketed because of temporary development with low-yielded power. Moreover, industrialisation must pay attention to service quality with large power so the implementation of the current program is indeed based on energy fulfillment strategies for areas that have not been touched by electricity installation by the state.

It can be concluded that the strategy of the Gorontalo Government in optimising the potential of renewable energy in terms of availability, acceptability, accessibility, and affordability shows that the renewable energy development strategy is aimed at a maximum target in isolated areas that have not yet been electrified by 98% electricity. The development of renewable energy in the future will be narrower, because it focuses on isolated areas that have not been electrified and the criteria for those locations is not expected to be electrified in two to three years. The regional government's strategy in future accessibility is to hamlet far areas that have not received access for a long time. In addition, the regional energy planning is intended to be carried out with collaborations with Universities and NGOs to design regional energy plans for geothermal energy, hydropower and solar power.

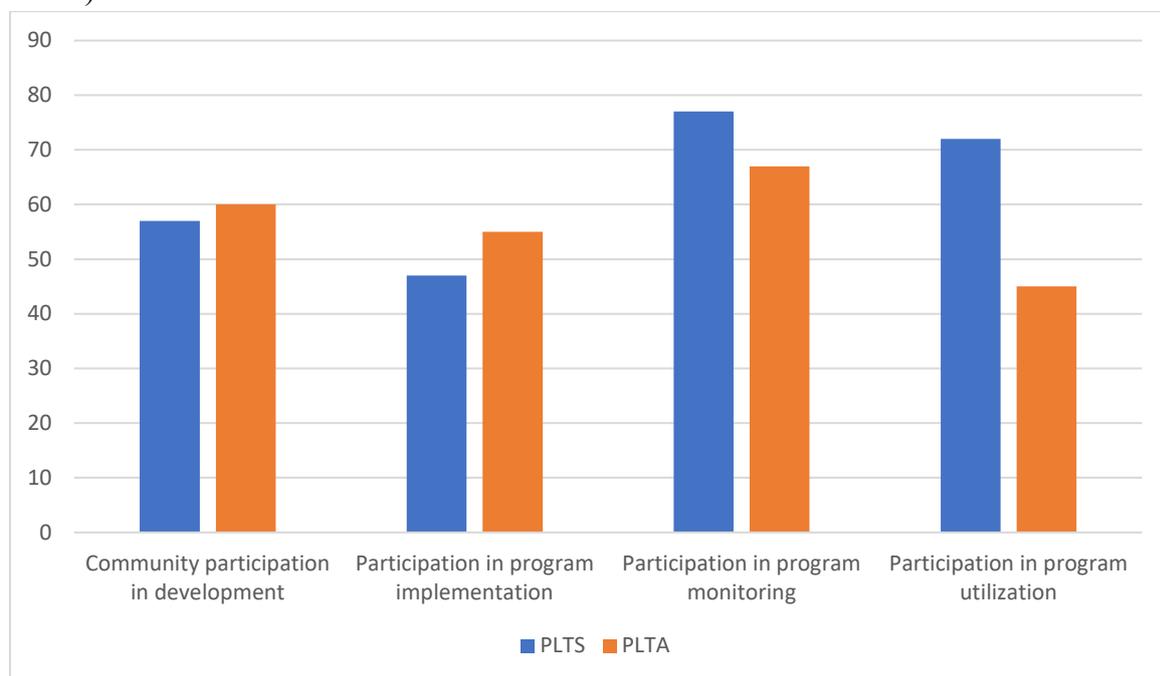
The current weakness is that renewable energy has not been able to touch on industrialisation because the power produced is low and only focuses on fulfilling electricity in isolated areas, far from access to electricity. The Gorontalo government strategy also complies with the rules of the game made by the central government, so that strategies and programs designed in the regions need to pay attention to policy changes that exist in the future. Including, providing space for potential investors in monitoring and licensing so that the private sector can play a big role in maximising energy renewable in Gorontalo.

Society participation

Community participation in the development of renewable energy in the villages of Tapada'a, Tulabolo, Liyodu, and Dulamayo was initiated through a discussion forum at the village level that enabled the community to participate directly in the decision-making process on renewable energy development programs in Gorontalo Regency. Participation in development implementation means that the implementation of activities requires the equal distribution of community contributions in the form of labor that is commensurate with the benefits that will be received by each village community.

Participation in monitoring and evaluating the supply of renewable energy has been an input for the improvement of the renewable energy program in Gorontalo; a demand for additional power which was considered of insufficient power and less stable. Forms of community participation in monitoring and evaluating development programs and activities are urgently needed, to find out whether the energy goals achieved for the people in Tapada'a Village, Tulabolo Village, Liyodu Village, and Dulamayo Village are in line with expectations. Figure 1 shows community participation in the development of renewable energy by referring to the current government strategy that emphasises community involvement.

Figure 1. Community Participation in the optimisation of renewable energy (PLTA and PLTS)



From the results of the study, it was revealed that community participation in the construction and implementation of community energy development was highly involved in the development of hydropower compared to PLTS. However, from the monitoring and utilisation aspects, community participation in PLTS was higher than the PLTA. Public participation in monitoring is the highest aspect of participation with 77% for PLTS and 67% for PLTA. Whereas, the aspect of using hydropower for the community was considered low at 45%. For PLTS, the aspect of community participation in the implementation of the energy program was considered the lowest at 47%.

Solar power plants (PLTS) are located in Tulabolo village and Liyodu village. Electricity from PLTS operates in a bright house with intermittent intervals. Electricity in this village is managed by each house. Community involvement in the construction of PLTS was



centralised and easily pursued by the government. Community participation in the construction of facilities such as electricity generation is crucial for the age and sustainability of people's daily lives. Through community participation, it will build a sense of belonging to the facility. As for the Hydroelectric Power Plant (PLTA), in addition to being a source of electrical energy, the construction of hydropower will also be one of the attractions. The construction of this PLTA is a source of electrical energy for Bone Bolango Regency.

The use of electricity costs obtained from the use of generators is far more expensive than the economic benefits obtained from the use of renewable energy. In one night, the cost of using a generator can be a one-month cost for economically renewable energy. The benefits of sustainable energy are very significant. In addition to the social benefits of renewable energy, increasing community productivity that can be seen from the community carpentry activities that helped and worked together to accelerate the construction of 1000 KWh centralised PLTS.

In addition, this participation aims to determine the achievement of programs that have been previously planned by the government (Nolden, 2013). The success of the implementation of renewable energy development for the community is very dependent on the role of the government and society; both must be able to work together (Van Der Schoor & Scholtens, 2015). Without involving the community, the government will never achieve optimum development results (Smith, Hargreaves, Hielscher, Martiskainen, & Seyfang, 2016).

In the end, participation of those using renewable energy in Tapada'a Village, Tulabolo Village, Liyodu Village, and Dulamayo Village, often shows that people do not understand the benefits of each development program directly, so the development results are less attractive. However, community participation in socialisation activities and participation encouragement of willingness and volunteerism will help develop renewable energy.

Conclusion

The strategy of the regional government in terms of future accessibility is aimed at areas that are remote hamlets and have not received access for a long time. The maximum target of the use of renewable energy is isolated areas that have not yet been electrified with a percentage of 98% electricity. The advancement of renewable energy in the future will be narrower because the masters are looking for isolated areas that have not been electrified and criteria of the location is not expected to be electrified for two to three years. Community participation in the construction and implementation of community energy development had been highly involved in the hydropower development program compared to the PLTS development program. However, from the monitoring and utilisation aspect, community participation in the PLTS program is higher than the PLTA program. This participation is important to get



feedback about problems or obstacles that arise in the implementation of renewable energy development of both PLTA and PLTS that are implemented in Gorontalo.

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