

DEVELOPING ELECTRICITY-INDEPENDENT VILLAGE USING REGION'S RENEWABLE ENERGY POTENTIAL

(Case Study: Takengon Rural Aceh, Indonesia)

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1. INTRODUCTION

Electricity today becomes an essential element and a basic need for human being. It is required for the sustainability of humans' daily activities thus has a very strategic role to support nation's economic development. Because of its strategic role, it is plausible to provide sufficient quantity and quality of electricity to all regions particularly in developing countries like Indonesia.

However, electricity supply in remote areas remains a difficult problem to solve in Indonesia. This is mainly due to the huge costs that must be spent to reach the remote areas are not balanced with the amount of income that may be generated from the electricity bill payment from a small number of users in the areas. Along with the increasing public awareness of the need for electricity and in order to support the environmentally friendly energy policy, it needs an effort to develop the use of renewable energy based on the potential of the region.

2. PREVIOUS THEME OF STUDY

I obtained my bachelor degree from the Department of Electrical Engineering of the University of Al Azhar Indonesia. My previous theme of study is a simulation of robot's arm control system using artificial neural networks. This system is an information processing system that is designed to mimic the workings of the human brain in solving a problem by performing the processes of learning through its synaptic weight changes

3. RESEARCH THEME

Electricity-independent Village Program (called Desa Mandiri Energi/DME in Bahasa Indonesia) is a program of developing a village where the community has the ability to meet more than 60% of their electricity and fuels needs from the source of energy produced through the utilization of the potential of local resources. DME is developed using the concept of local renewable energy utilization, especially for fulfilling the energy needs for productive activities. The goal is to increase productivity, employment and welfare of society through the provision of affordable and sustainable renewable energy.

DME Program involves the central, provincial and local government as well as the local community. The aim is to achieve the target of National Electricity General Plan in which 93% of households have to had electricity in 2025 and 100% of villages have to had electricity in 2050. The role of the government in this program is to provide the electricity generator for local renewable energy and develop a community development program to prepare the people who will then manage the facility.

For Aceh as the western region in Indonesia, as of April 2010, there are nine villages targeted in DME Program, but no one chose to use micro-hydro potential for this program, whereas the potential energy resources in the form of streams of water flowing through some of the major rivers in the region of Aceh is huge. Upstream of the rivers are generally located in the rural region, such as Geumpang and Tangse-Pidie, Bener Meriah, Central Aceh, Gayo Lues and Aceh Tenggara. The major rivers include Woyla, Teunom, Tripa, Meureudu, Peusangan, Kluet, Pase, Jambu Aye, Lawe Alas, Peureulak, Simpang Kiri and Simpang Kanan. In addition to those large rivers, there are still small streams, flow, and watery ditches that heavy enough to generate small scale electrical energy. Therefore, it is arguable that the potential of developing renewable energy from micro-hydro power in Aceh is very promising.

4. RESEARCH PLAN

4.1 Objectives

This research is aimed to identify and measure prospect of developing electricity-independent village in rural area of Aceh in terms of testing the possibilities of using micro-hydro as local renewable energy potential, and measuring cost efficiency and productivity increase that will be gained after implementing the program. In addition, the research also examines the possible role of many stakeholders and the community members in the planning process, implementation, as well as the monitoring and evaluation of the program.

4.2 Research Questions

1. Is the micro-hydro energy reliable enough to be developed in rural Aceh?
2. How much is the cost efficiency and productivity increase that can be gained by the program?
3. What is the role of each stakeholder in planning, implementing, and monitoring the program?

Keywords: Sustainability, Renewable energy, Micro-hydro, DME, Region.

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5. MEANING AND FEATURES OF THE RESEARCH

This research is expected to produce appropriate recommendation for developing electricity-independent village in rural Aceh and any other regions in Indonesia, in terms of choosing the best local renewable energy potential and assessing its effectiveness for the community activities. Further, the implementation of such program is expected to increase national electrification ratio and reduce the dependency on conservative energy resources as well as promote the sustainable energy provision in Indonesia.

6. ANTICIPATED RESULT

The results expected from this research are the proof that micro-hydro is very potential to be developed in rural Aceh and that this program can reduce daily energy costs of the community as well as increase the productivity and the welfare of the society.

8. CONCLUSIONS

Even this research is still on progress, but in my mind I think that management through the development of micro-hydro renewable energy is expected to provide benefits for the long term. This benefit is the availability of hydroelectric power to the people in remote areas in Aceh, which will protect tropical rain forests and support local economies. With several stages of achieving goals, such as for rural electricity supply that integrates watershed management. And economic opportunities and innovation-based electricity with the potential of local resources through strengthening institutional and management capacity and raise awareness of renewable energy public. Management through micro-hydro development is expected to provide benefits for the long term. These benefits are the availability of hydroelectric power to the people in remote areas in Aceh, which will protect tropical rain forests and support local economies. With several stages of achieving goals, such as for rural electricity supply that integrates watershed management. And economic opportunities and innovation-based electricity with the potential of local resources through strengthening institutional and management capacity and to improve public awareness.

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