

Micro-Hydro/Solar Hybrid System Framework for Off-Grid Application

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Abstract

This paper introduces the conceptual system design of micro-hydro/solar hybrid system for Kampung Semulong Ulu, Sri Aman, Sarawak. Currently, Kampung Semulong Ulu is powered by solar and diesel-generator energy systems. The existing solar system generates less than 160 W for each door of the longhouse. With the completion of micro-hydro system along with the existing solar panel in the village, the community is hoping to get the proper and continuous power generation. Community in Kampung Semulong Ulu is facing difficulties since solar is only available for a limited period and yield electricity within a limited range of load. On the other hand, the running cost of diesel-generator is very expensive and unaffordable. However, even with the existence of power generated by micro-hydro system, better utilization of the energy produced is still of vital importance due to the fact that the amount of energy generated is limited. Therefore, the conceptual system design of the hydro-solar system integration is presented. The proposed system is to ensure that the energy produced will be well-distributed and at the same time, both systems must be utilized sufficiently to ensure their sustainability. In overall, this paper presents the micro-hydro/solar hybrid system framework for off-grid application toward the community in Kampung Semulong Ulu.

Keywords: controller system, micro-hydro, solar, hybrid system, rural area.

1. Introduction

Against backdrop of challenging in the modern days with the rapid growth of human population and social-economic development, energy demand has been raising exponentially to cater the energy requirements especially in these current modern societies. In fact, electricity is an ongoing issue and plays a significant role as developed country cannot survive without electricity [1]. The conventional energy is depleting at alarming stage as the human population and activities are progressively developing. Thus, harnessing the renewable energy has attracted special attention among the researchers. Gearing up the renewable energy technology innovation is a great aspiration for many nations as the global requirement for energy generation is growing beyond the limits of current available generation capacity.

The integration between the renewable energy resources systems has grown and of great interest for the developed countries as hybrid renewable energy systems appeared to be the right solution for a clean and well distributed energy productions. Many hybrid systems have been proposed in the past literature studies in order to offer the enhanced power facilities and adequate energy production

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