

Social Engagement for Building Off Grid Photovoltaic Systems for Rural Community Electrification of Baan Sor-Ae, Om Koi District, Chiangmai, Thailand

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Abstract

Thai government enacted a policy to promote the development of energy security and its foundation into rural area since 2007 in order to ensure the better quality of life of rural communities in remote area. The Energy Act of 2007 supports the government agencies to expand electric power into remote rural area while also concern environmental balance, customer fairness and renewal energy. However, the government's operation lacks of progress and continuity. The mountainous terrain of Northern Thailand and the disperse of the village settlements inside the National Forest Reserve prove to be too difficult for the expansion of cable-wired electrical energy system. The low demand for energy in rural households and fluctuation of usage in the evening made the investment for wired system infeasible. The freestanding solar house became the most suitable solution for generating clean energy in rural Thailand. Various government agencies, between 2004 to 2005, installed solar houses in the highland villages in Chiang Mai and set up task groups in communities for maintaining solar system and repairing basic problems. However, the field research by King Mongkut's University of Technology Thonburi in Om Koi District over past decade found that most villagers still lacked of technical skills and management causing the failure of solar systems.

The key success in rural development is to building capacity of local community to have stable work and sustainable livings in locality. Clean electrical energy is one of the factors supporting social and economic development. It provides better living condition, more reliable communication and longer working period with less consumption of fossil fuel. However, most of off-grid solar energy system in rural area became malfunction a few years after its inauguration due to the lack of maintenance system in local level and shortage of supply for equipment in the country due to the inconsistency of the government policies to support solar energy industry.

In 2015, collaborative team of Rajamangala University of Technology Lanna (RMUTL) and King Mongkut's University of Technology Thonburi (KMUTT) initiated clean energy system for the Informal and Non-formal Education Center at Sor Ae Village in Om Koi District of Chiang Mai Province. The team introduced the dual system that use both Pico hydro turbine and solar cells to generate electricity. The volunteer teachers at the Non-Formal Education Center became leaders to organize community to construct and maintain micro dam, turbine and water channel while also looked after solar power system. The researchers regularly visited Sor Ae Village for assisting the volunteer teachers. The team gradually began to engage with community to train them for knowledge of electrical system. Within 2 years, 6 villagers became semi-professional electricians and could maintain solar electrification system at Non-Formal Education Center. The team also trained approximately 10 electricians in nearby villages that already possessed access to electricity.

With the network of semi-professional electricians in the area, the researchers can assure that the villagers can repair and maintain larger power generating system for the entire village. Therefore, the research team can secure enough funding for building the system at the end of 2017. However, the villagers also need to learn how to manage and maintain the system in the future without regular assistance from the expert team. This article discusses the solution in engaging community to participate in both the technical maintenance and financial management for off-grid Photovoltage Electrification system. Moreover, this research paper also explores the methods that researchers and the village community will collaborate to formulate the co-operative framework of management to generate sufficient sinking fund for replacement of the system equipment in the future and participate in municipality council for local government support. If the village of Sor Ae can sustainably manage this solar electrification system as a self-reliant community enterprise, it can be the successful model for other highland communities to operate independent and clean energy system for better environmental friendly and rural development projects.

Key words

Off-Grid Photovoltage Electrification System, Solar Energy, Om Koi District, Co-operative framework, Highland Community, Social Engagement