

Pimnapat Iemsomboon 2012: Modeling Remote Area Community QOL for Developing  
Appropriate PV System Operations. Doctor of Philosophy (Environmental Science),  
Major Field: Environmental Science, College of Environment. Thesis Advisor:  
Professor Nipon Tangtham, Ph.D. 247 pages.

The purpose of this study is to assess the current status and efficiency of the community Solar Home System (SHS). Based on primary information from this study, a general assessment of quality of life (QOL) relating to the benefits of the SHS program was made. The information was also used to simulate an optimized SHS-related QOL model, and eventually, to determine the most beneficial way to develop the SHS.

The sampling method was applied through an interviewing technique on the participants of the SHS program, including 97 households from Mae Slong Nai Sub-district, Mae Fah Luang District, Chiang Rai Province, and a further 17 SHS experts. The raw data was then computerized and calculated into average, mean and standard deviation. The samplers' priority of QOL was determined using an analytic hierarchy process (AHP). Lastly, Goal Programming (GP) was used to simulate the most beneficial SHS usage model for living in remote areas.

The results indicated that SHS greatly improves the QOL of the participants, however the function of SHS is inefficient and the practical number of a variable subject, being the number of each house's fluorescent lamps, was not equal to the number pre-optimized by using the Goal Programming. To optimize the operation of both SHS and QOL, each household should use up to four 10 watt fluorescent lamps and a 21" screen television. Nevertheless, each family is willing to invest up to 800bht for the matter. Lastly, compared to other power generation methods, a larger size solar panel of 240 watt will reduce CO<sub>2</sub> emissions around 1.325 tCO<sub>2</sub>/year. The results gained from this research suggest that more communication between the government offices and SHS end-users is needed about the development and maintenance of SHS. Moreover, the government officers will have to monitor the SHS efficiency and reliability in the future.

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