CHAPTER V

CONCLUSION AND RECOMMENDATION

5.1 CONCLUSION

The study of this research work was carried out considering three different types PV systems, namely, Stand -alone Solar Home System, Battery Charging Station and Centralized Mini Grid. Intra-comparison of PV system was carried out with diesel generator system for economic evaluation. Relevant data were collected from system site visit and interviewing of end users based on purposive samplings. Based on collected data the economic evaluation model of each of system was developed to compare the Life Cycle Costs of each of the system and the life Cycle cost of energy generated by each of the systems. The base load was taken as 297.5 Wh/day per household derived from PEA's load forecast model. Service life time of PV systems was assumed to be 20 years, where as same for Diesel Generator system assumed 10 years. For economic parameters, discount rate was taken 6.5%, general inflation rate 4.5% and fuel price escalation assumed to be 5.5%.

The economic analysis of the study by using developed economic model found that the Life Cycle Costs of SHS, BCS, CMG were 56,476, 96,989 and 878,269 THB respectively. Similarly, Life Cycle Cost of the diesel generator system was found to be 167,321. Life Cycle unit cost of energy generated by each of these considered systems were found to be THB 26, 45, 57 and 11 respectively. The cost of electricity generated by diesel generator was found to be the lowest, but still another social as well as environmental consequences that might be caused by diesel generator and reliability of fuel supply in remote areas should be given due consideration. From the study SHS systems were found to be more suitable for scattered rural household electrification.

Visiting the PV system installation site around Thailand and interviewing of end user showed that end users are benefited by PV electricity not only by getting light from it, but also getting facilities such as entertainment and knowledge development and information provided by modern medias like TV and radios. The most of the problematic PV systems that were found during the site visits were due to poor standard of wiring, failure of charge controllers. Poor wiring system could lead to serious accidents like fire broke out causing the wooden rural house to burn, hence causing serious economic lost. Government should standardize wiring system and monitor if it has been carried out properly or not.

The calculation of oil saving in study showed that 16.8 litres of kerosene and 109.9294 liters of diesel oil can be saved annually per house hold, incase the user uses oil lamps for lighting purpose instead. By saving the use of fossil fuel about 20,416.8 kg of over the life cycle of the SHS per household at 2005 CO_2 emission rates.

5.2 RECOMMENDATION

Certain guidelines must be strictly followed to make any PV system application successful for rural electrification. The load pattern of the community must be studied very well and a technology or a system must be chosen that suits the best as per the load profile of the community. A good introduction of the system has to be given to community so that they understand all the components of the system and will be familiar with functionality of the system. The selected system should be acceptable to the communities; otherwise, their willingness to maintain the system will decrease with the passing of the time. If an acceptable system is being selected for the remote community electrification, the community will be willing to co-invest and pay for maintenance of the system that makes system sustainable and longer life. The owner and operators of the system must be trained well about the operation and maintenance of the system.

Many Government organizations in Thailand have recognized the wider economic benefits of being first to stimulate a local solar energy market and industry. Many of the systems installed by the Government institution were found to be not working. It is because of poor wiring and maintenance work. A strict system installation or wiring standard should be introduced and monitored if the company's working in PV system are following those guidelines or not to avoid any accidental fire cause by the circuiting of the wires.

While designing a system, PRE-model developed during this study is anticipated to be a key model to help in selecting and designing appropriate system based on load profile, geographical location of the rural villages.

There is potential RE resources in Thailand, and it is anticipated that this research could be a guideline for RE evaluation for Rural Electrification in Thailand.