CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

In this thesis is focused on two main parts, namely 1) Technical analysis and 2) Economic evaluation of PV battery charging station using c-Si PV modules compare to diesel station under Kampot's situation.

Part 1 Technical analysis

In this part presents the results of calculation and design PV station in Kampot province where was selected to install PV battery charging station in the Kingdom of Cambodia based on the energy needed of each household in that areas (40-60 W_p), due to its present relatively higher solar radiation value between 5.00 to 5.20 kWh/m^2/day than other provinces in the Kingdom of Cambodia. But, Kampot province has lowest electrification rate (nearly 55% can access to the national grid or mini-grid) and according to the electricity price is very high about 0.27 US$/kWh compare to neighboring countries [2]. As a result, the PV battery charging station has to install such as the fix mounted PV modules are faced to the south with a tilt angle of 10^0-11^0 and c-Si PV modules are selected for the tropical climate conditions. The site for PV battery charging station was installed with capacity of 10 kW_p in Kampot province where it can provide the electricity to people in rural areas about 250 households.

Part 2 Economic evaluation

The economic evaluation shows that the capacity of 10 kW_p with original electricity price of 0.27 US$/kWh of PV battery charging station using c-Si PV modules compare to diesel station which was found that the NPV (7,340 US$), EIRR (1.91%), BCR (1.14) but shorter payback period (10.57 years) than the diesel battery charging station with the NPV (1,892 US$), IRR (2.15%), BCR (1.03) and long simple payback period (11.72 years) values.

Based on the technical and economic evaluation of c-Si PV battery charging station was most suitable for rural electrification in the Kingdom of Cambodia than

diesel battery charging station. Especially, it can help meet part of the ambitious objectives of the Royal Government of Cambodia.

Recommendations

The c-Si PV modules are most suitable for countries or provinces that have high solar radiation and no shading by trees, buildings and others. The c-Si PV modules are used less land area than thin film modules. The c-Si PV modules are more profitable for stand-alone systems as well as PV battery charging station for decentralized rural electrification applications are based in rural areas where short-grid like the Kingdom of Cambodia have and they are very available in Cambodia's market today.

The Royal Government of Cambodia should be building capacity on renewable energy to people who are living in rural areas, especially solar PV battery charging station.

The subsidy and incentive costs from the government are more attractive to investors. The public and private sectors should be given loans and grants to investors with low interest rate especially in rural areas of the Kingdom of Cambodia in order to improve their living standard and conditions, reduce poverty at least 1% each year and help reach the government's targets and goals in near future soon.