

CHAPTER V: CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

These conclusions are made based on all the process experienced during this thesis experiment, which includes the design of the system, components selection and data collection, as well as the analysis on the obtained data.

1. The device can provide more than enough electrical energy for an average household electricity demand during an average duration of a blackout in Indonesia ($\cong 180\text{Wh}$).
2. The inverter used is very inefficient, especially at very low wattage loads. The average efficiency measured from the output power relative to its input power from the batteries is only 38.36%. The rest of the energy is lost as heat, and some energy is used to power the internal fan.
3. When loading the inverter with a resistive load at around 70W, the data collected is more consistent compared to the 200W load. This is because the inverter does not have to work as hard, and its internal fan is only running at very low speed.
4. The batteries work as intended and meets the required specification. Its theoretical capacity is 576Wh, and the results show that the battery array can deliver up to 723Wh.
5. The device can be left without charging for 24 hours and can still be used thereafter.

5.2 Recommendations

Several recommendations are made to improve this project:

1. For long term use, especially with loads bigger than 200W, it is recommended to use an inverter with better technical specifications. Not only will this significantly improve efficiency, thus enabling it to provide more energy, it also decreases energy loss through heat. Power inverters for household PV systems are recommended, as usually these inverters have better efficiency and are made with toroidal transformers and higher quality internal components.
2. Should the device be replicated for mass production, the chassis skeleton could be made with ABS plastic or aluminum to improve its robustness. The design should be waterproof for the internal components and its connecting ports should be made weatherproof.