

THE UTILIZATION OF PORTABLE PV BATTERY BANK AS SMALL SCALE OFF-GRID GENERATOR

by:

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BACHELOR'S DEGREE

in

Sustainable Energy and Environment
Faculty of Life Sciences and Technology

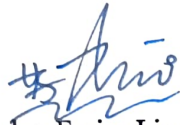


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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously written by another person, nor material which to a substantial extent has been accepted for the award of any degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.



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ABSTRACT

Reliable electricity access remains a critical challenge for remote and grid-interrupted communities in Indonesia. This thesis investigates the performance of a portable photovoltaic (PV) battery bank designed as a small-scale, decentralized off-grid generator to address this need. The primary objective was to evaluate the system's technical efficacy in meeting typical household electricity demands during power interruptions and for recreational use.

The system comprised an 1100Wp PV array, a 24V24Ah VRLA battery bank, a 30A PWM charge controller, and a 350W continuous pure sine wave inverter. Performance was assessed through monitored operational testing, measuring energy consumption, battery discharge characteristics, and load-delivery efficiency using multimeters and watt meters.

Results indicate the system can supply sufficient electricity (approx. 180Wh) for an average Indonesian household during a typical blackout duration. However, the inverter exhibited low average efficiency (38.36%), resulting in substantial energy loss. The battery bank performed as expected, delivering up to 723Wh, exceeding its theoretical capacity under the test conditions, and demonstrated minimal self-discharge over 24 hours. Recommendations include utilizing higher-efficiency inverters and enhancing the system's physical robustness for potential mass production, thereby improving overall system performance and suitability for practical deployment.

DEDICATION

To the people of the world,
To the citizens of Indonesia,
Who are living in cities or in rural areas;
To those who do research in the energy field;
To the coordinator of the study program;
To everyone that supports the green energy transition;
To the breathtaking nature of this rock we live on.

I dedicate this thesis to you.



ACKNOWLEDGEMENTS

My greatest heartfelt gratitude goes to my advisors, Dr. -Ing Evita H. Legowo and Gerald Justin Goenawan, S.T., B.Eng., M.Sc. I attribute my current standing to the substantive wisdom and direction you imparted since the utmost beginning of this thesis work. Your expert counsel and discerning guidance have formed the bedrock of my achievements.

I would like to also express my gratitude to the very kind Lab Supervisors and Lab Assistants, Stacia A. Fortunata, Devita V. Senzas, and Rizal P. Ramdhani, along with other lab co-workers.

To my cherished family, your constant and linear support, has given me the space in all four quadrants to develop and grow until this day. Your dedication towards me is simply invincible.

Immense gratitude and appreciation to my best friends, Jonathan Laurentius and Alexander F. Strack. Your mental support has enabled me to unemotionally write and complete this thesis work. The jokes that you told me at aperiodic intervals has served as vital homeostatic mechanism in maintaining my harmonic cognitive equilibrium. The magnitude of your assistance and support transcends conventional expressions of gratitude.

To the people that have come and gone from my life, you have introduced beneficial stochasticity into my life's trajectory, rendering it more dynamically engaging. Thank you for diversifying my otherwise linear progression of existence.

Finally, thank you to Swiss German University, the Dean of Faculty of Life Sciences and Technology, along with co-workers and members, and my classmates. Studying Sustainable Energy and Environment has equipped me with substantial and invaluable intellectual enrichment and practical skill competence.

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