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BUSITEMA UNIVERSITY FACULTY OF ENGINEERING

DEPARTMENT OF WATER RESOURCES AND MINING ENGINEERING

DESIGN AND SIMULATION OF A HYBRID WIND-PV ENERGY SYSTEM.

(CASE STUDY: SEGET VILLAGE, MOROTO DISTRICT)

BY

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A final year project implementation report submitted to the Department of water resources and mining engineering in partial fulfilment for the award of the Bachelor of Science in Water Resources Engineering degree at Busitema University

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Abstract

This study presents the analysis of the feasibility of using a hybrid renewable energy system to supply the energy demand of a farm in Seget village, Moroto district. In this study, a simulation and optimization are performed to obtain the system design for application on a farm in the above-mentioned district. A field study was carried out to evaluate the energy load. Different system parameter inputs like solar and wind resource data were also investigated.

System simulation and optimization in regard to energy efficiency economic viability and environmental impact is carried out by applying the Hybrid Optimization Model for Electrical Renewables (HOMER) simulation and optimization tool. The broad set of result scenarios therefore provides a valuable reference to stakeholders and effectively communicates the potential for integration of renewable energies, the resulting system configurations and reduced costs. Considering the fact that a hybrid energy system consisting of two or more renewable energy systems has the advantage of stability, the information about the local wind and solar indicates that a feasible system can be planned, modelled and designed for energy purposes.

Key words: Design, feasible, renewable, intergration.

DECLARATION

I **MBABAZI LYNNET**, declare that all the material portrayed in this project proposal report is original and has never been submitted in for award of any Degree, certificate, or diploma to any university or institution of higher learning.

Student Name: ……………..…..…………………………………………………………….

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APPROVAL

This is to certify that the project proposal has been carried out under my supervision and this report is ready for submission to the Board of examiners and senate of Busitema University with my approval.

MAIN SUPERVISOR: MR. LUBAALE SOLOMON

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CO-SUPERVISOR: PROFESSOR KANT KANYARUSOKI

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DATE: …………/…………………/………………

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LIST OF ABBREVIATIONS

DRC Democratic Republic of Congo

PV Photovoltaic

HWSS Hybrid Wind and Solar System

VAWT Vertical Axis Wind Turbine

HAWT Horizontal Axis Wind Turbine

GW GigaWatt

DC Direct Current

AC Alternating Current

LCC Life Cycle Cost

NPC Net Present Cost

HOMER Hybrid Optimization Model for Electric Renewables

SOMES Simulation and Optimization Model for Renewable Energy Systems