

**NET-METERED REAL-TIME MONITORING SYSTEM OF CENTRAL LUZON  
STATE UNIVERSITY (CLSU) GRID-TIE INVERTER SOLAR HYBRID  
PHOTOVOLTAIC SYSTEM**

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An Undergraduate Thesis Submitted to the Faculty of the Department of Agricultural and  
Biosystems Engineering, College of Engineering, Central Luzon State University,  
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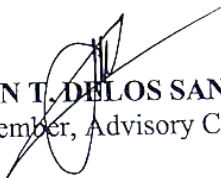
**BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING  
(AB Machinery and Power Engineering)**

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**ACCEPTANCE SHEET**

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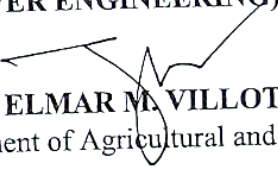
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## **BIOGRAPHICAL SKETCH**

The author, Bea Coleen P. Sahagun, was born on November 30, 2000, in Olongapo City. She is currently living in Brgy. Cuayan, Angeles City, Pampanga. She is the eldest child among the two children of Mr. Sandro G. Sahagun and Myra P. Sahagun. She completed her primary education in Sto. Rosario Elementary School and attended her junior high school at Angeles City National High School and senior high school at Angeles City Science High School. She then pursue her tertiary education and took up a Bachelor of Science in Agricultural and Biosystems Engineering major in AB Power, Energy and Machinery Engineering at Central Luzon State University.

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## ABSTRACT

**SAHAGUN, BEA COLEEN P.**, Department of Agricultural and Biosystems Engineering, College of Engineering, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines, **JULY 2023, NET-METERED REAL-TIME MONITORING SYSTEM OF CENTRAL LUZON STATE UNIVERSITY GRID-TIE (CLSU) INVERTER SOLAR HYBRID PHOTOVOLTAIC SYSTEM'**

Adviser: ROLDAN T. QUITOS

Solar energy is an environmentally friendly and sustainable solution that offers various advantages. Including reduced electricity costs and decreased greenhouse gas emissions. To effectively monitor the performance of Hybrid PV Solar Systems, this study presents an innovative monitoring system that utilizes a Short Message System (SMS) Notification System of hybrid PV solar power system to validate the electric bills of CLSU and Solaric Corporation. The system allows users to remotely access and monitor crucial energy output data, enabling efficient management of solar power generation. The monitoring system comprises of calibration, installation, and fabrication of multiple components, including the main components of the microcontroller which are the ESP32 development board, FAT-32 data logger, SIM card and etc. for SMS transmission. The evaluation performance of the real-time monitoring device for hybrid PV solar system was evaluated in terms of accuracy of the sensors through calibration process to have a clean data before data gathering.

The system measures and records critical parameters, securely storing data on a micro-SD card and transferring it via SMS to the user's mobile device. The Crop Resources Research and Development Center at Central Luzon State University successfully implemented a monitoring system for a Hybrid PV Solar System, offering real-time data

recording and remote accessibility through SMS for efficient solar energy management. Therefore, the data received from Solaric Corporation and Energy Monitoring Device has the same total output of energy in total kilowatt-hour (kWh) ranging from 30-45 kWh on its peak-hour from 9:00 a.m. to 1:00 p.m. from Day 1 to Day 7. The data gathered from the solaric data and energy monitor, underwent the T-test analysis and it was found that there is no significant difference between the solaric data and the energy monitor. Therefore, future research efforts may focus on expanding the application of this monitoring system to other solar energy installations, ensuring widespread adoption of this efficient and reliable monitoring solution.

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