

**RANCANG BANGUN SISTEM *MONITORING* DAN  
*MEMBERSHIP* KARTU RFID BERBASIS PYTHON DAN  
MYSQL UNTUK SISTEM *CHARGING STATION*  
*PHOTOVOLTAIC OFF-GRID***

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**ABSTRAK**

Matahari merupakan sumber energi terbarukan yang melimpah dan memiliki potensi yang besar untuk memenuhi kebutuhan listrik manusia. Saat ini sebagian besar produksi listrik di dunia masih ditenagai oleh energi tak terbarukan seperti bahan bakar fosil dan batu-bara. Penggunaan kendaraan listrik sebagai upaya mengurangi penumpukan gas rumah kaca tidak sepenuhnya berjalan efektif, hal ini dikarenakan kendaraan listrik masih meninggalkan jejak karbon yang berasal dari pembangkit listrik. Salah satu upaya untuk mendapatkan listrik yang bebas dari emisi karbon adalah dengan memanfaatkan sinar matahari sebagai sumber energi listrik. Dengan memanfaatkan listrik dari matahari untuk mengisi baterai kendaraan listrik, kendaraan listrik dapat menjadi lebih ramah lingkungan. Pada penelitian ini dilakukan perancangan desain sistem *charging station photovoltaic off-grid* beserta sistem *monitoring* dan *membership*. Penelitian ini bertujuan untuk merancang sistem *charging station photovoltaic off-grid* beserta dengan sistem *monitoring* dan *membership* nya serta melakukan analisis dan presisi sistem *monitoring* dan keandalan sistem *membership*. Penelitian ini berhasil membuat Rancang Bangun Sistem *Monitoring* dan *Membership* Kartu RFID Berbasis *Python* dan *MySQL* Untuk Sistem *Charging Station Photovoltaic Off-Grid*. Setelah dilakukan analisis sistem *monitoring*, pada variabel tegangan panel surya didapatkan akurasi 98,8% dan presisi 71%. Sedangkan untuk variabel arus panel surya didapatkan akurasi 97,1% dan presisi 88%. Sedangkan untuk variabel tegangan baterai didapatkan akurasi 97,2% dan presisi 86%. Sedangkan untuk variabel arus baterai didapatkan akurasi 98,4% dan presisi 48%. Selain itu juga dilakukan analisis pada sistem *membership* dimana pada variabel *Tap-In* didapatkan akurasi 92%, lalu pada variabel *Tap-Out* didapatkan akurasi 97%. Untuk variabel menambah *member* baru, menghapus *member*, *top-up* saldo *member*, dan menampilkan *member* yang terdaftar didapatkan akurasi 100%.

**Kata Kunci:** Akurasi, Charging Station, RFID, Membership, Monitoring

***DESIGN OF AN RFID CARD MONITORING AND  
MEMBERSHIP SYSTEM BASED ON PYTHON AND MYSQL  
FOR CHARGING STATION SYSTEMS PHOTOVOLTAIC  
OFF-GRID***

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**ABSTRACT**

The sun is an abundant renewable energy source and has great potential to meet human electricity needs. Currently, most of the world's electricity production is still supported by non-renewable energy such as fossil fuels and coal. The use of electric vehicles as an effort to reduce greenhouse gas warming is not completely effective, this is because electric vehicles still leave a carbon footprint originating from power plants. One effort to get electricity that is free from carbon emissions is to use sunlight as a source of electrical energy. By utilizing electricity from the sun to charge electric vehicle batteries, electric vehicles can become more environmentally friendly. In this research, the design of an off-grid photovoltaic station charging system as well as a monitoring and membership system was carried out. This research aims to design an off-grid photovoltaic station charging system along with a monitoring and membership system as well as carry out analysis and precision of the monitoring system and validity of the membership system. This research succeeded in creating a Python and MySQL-based RFID Card Monitoring and Membership System Design for Off-Grid Photovoltaic Charging Station Systems. After analyzing the monitoring system, the solar panel voltage variable obtained an accuracy of 98.8% and a precision of 71%. Meanwhile, for the solar panel current variable, an accuracy of 97.1% and a precision of 88% were obtained. Meanwhile, for the battery voltage variable, an accuracy of 97.2% and a precision of 86% were obtained. Meanwhile, for the battery current variable, an accuracy of 98.4% and a precision of 48% were obtained. Apart from that, an analysis was also carried out on the membership system where the Tap-In variable obtained an accuracy of 92%, then the Tap-Out variable obtained an accuracy of 97%. For the variables adding new members, deleting members, adding member balances, and displaying registered members, 100% accuracy was obtained.

***Keywords:*** Accuracy, Charging Station, RFID, Membership, Monitoring