ABSTRACT

Name : Adi Sunandar
Study Program: Electrical Engineering
Title : Efficiency Analysis of 24 V 17 Ah Lead Acid Battery In Electric Bicycles Designed To Build Using A 350 W Motor With A Photovoltaic Charging System

Currently, electric bicycles on the market still use PLN energy to charge the battery, thus increasing expenditure costs and resulting in increased carbon emissions which can damage the earth's atmosphere. To reduce this, renewable energy from solar energy is used as a source for recharging batteries. The aim of this study was to analyze the rate of charging from photovoltaic to electric bicycles so as to find out whether they are efficient or not after the addition of photovoltaics and to analyze the efficiency of a 24 V 17 Ah Lead Acid battery for a 350 W DC motor used in an electric bicycle. The working method is capturing solar energy through photovoltaics and forwarding it to the Solar Charge Controller to control the voltage that is supplied to the battery and used to drive a DC motor. The data from the largest energy photovoltaic test results was at 11.30 with a power of 24.82 W before Solar Charge Controller and 27 W after Solar Charge Controller. The test results based on weight, distance, and speed after adding photovoltaic are less efficient because the output power is greater than the input power. Unless the no-load test has a very high efficiency of 267% of the total power consumed, this test does not require the motor to spin the wheels too hard so that it does not require a lot of energy to turn the wheels. The highest battery efficiency is based on a distance of 15 km which is 97%, based on weight the greatest efficiency is at 60 kg which is 40%, based on speed the greatest efficiency is at a speed of 11 km/h which is 21.8%.

Keywords: Battery Efficiency, Design of Electric Bicycles, DC Motors, Lead Acid Batteries, Solar Panels,