ABSTRAK

DewaSaputra, Wahyuda. 2025. Studi Komparasi Jenis Reflektor Terhadap Daya Keluaran Panel Surya Statis. Skripsi. Tanjungpinang: Program Studi Teknik Elektro. Fakultas Teknik dan Teknologi Kemaritiman. Universitas Maritim Raja Ali Haji. Pembimbing I : Septia Refly, S.Pd., M.Si., Pembimbing II : Hollanda Arief Kusuma, S.IK., M.Si.

Efisiensi panel surya masih terkendala oleh intensitas cahaya yang tidak optimal. Penggunaan reflektor bertujuan meningkatkan daya keluaran dengan memantulkan cahaya tambahan ke permukaan panel. Penelitian ini dilakukan untuk membandingkan pengaruh dua jenis reflektor, yaitu aluminium foil dan cermin datar, terhadap daya keluaran panel surya statis. Hasil pengamatan menunjukkan bahwa panel tanpa reflektor menghasilkan daya tertinggi sebesar (3,48 W), sementara penggunaan reflektor justru menurunkan daya menjadi (3,27 W) aluminium foil dan (3,26 W) cermin datar. Penurunan tersebut disebabkan oleh peningkatan suhu permukaan panel akibat akumulasi panas. Suhu tertinggi dicapai oleh panel dengan cermin datar (71,31°C), diikuti aluminium foil (68,62°C), dan tanpa reflektor (56,37°C). Cermin datar memantulkan cahaya secara terarah sehingga memusatkan panas, sedangkan aluminium foil menyebarkannya secara difus. Kenaikan suhu berdampak langsung pada penurunan efisiensi daya keluaran. Uji Kruskal Wallis menunjukkan perbedaan signifikan pada daya dan suhu antar perlakuan, dengan uji Dunn mengonfirmasi perbedaan signifikan antara panel tanpa reflektor dan dua jenis reflektor, namun tidak antara aluminium foil dan cermin datar, yang menunjukkan dampak serupa terhadap performa panel.

Kata Kunci : Panel surya, reflektor, cermin datar, aluminium foil, ESP32, daya, suhu permukaan panel surya.

ABSTRACT

DewaSaputra, Wahyuda. 2025. *Study of the Correlation Between Reflector Types and Static Solar Panel Output Power*. Thesis. Tanjungpinang: Study Program of Electrical Engineering. Faculty of Engineering and Maritime Technology. University of Maritim Raja Ali Haji. Supervisor I: Septia Refly, S.Pd., M.Si., Supervisor II : Hollanda Arief Kusuma, S.IK., M.Si.

The efficiency of solar panels in Indonesia is still hindered by suboptimal light intensity. The use of reflectors aims to enhance power output by reflecting additional sunlight onto the panel surface. This study was conducted to compare the effects of two types of reflectors, namely aluminum foil and flat mirrors, on the power output of static solar panels. Observations showed that the panel without a reflector produced the highest power output at (3.48 W), while the use of reflectors actually reduced the output to (3.27 W) aluminum foil and (3.26 W) flat mirror. This decrease was caused by an increase in the panel surface temperature due to heat accumulation. The highest temperature was recorded on the panel with a flat mirror (71.31°C), followed by aluminum foil (68.62°C), and the panel without a reflector (56.37°C). The flat mirror reflected sunlight in a focused manner, concentrating heat, while the aluminum foil dispersed light diffusely, spreading the heat more evenly across the panel surface. The temperature rise directly affected the decline in power efficiency. The Kruskal-Wallis test showed significant differences in power and temperature between treatments, and the Dunn test confirmed significant differences between the panel without a reflector and those with reflectors. However, no significant difference was found between aluminum foil and flat mirror reflectors, indicating similar effects on panel performance.

Keywords: *Solar panel, reflector, flat mirror, aluminum foil, ESP32, power output, solar panel surface temperature.*