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IMPACT OF SOLAR ENERGY SYSTEM WITH AND WITHOUT REFLECTOR ON HOME-SCALE BATIK INDUSTRY

FAARIS MUJAAHID¹, SUKO FERBRIYANTO²,
RAMADONI SYAHPUTRA³, KUNNU PURWANTO⁴

Department of Electrical Engineering, Faculty of Engineering,
Universitas Muhammadiyah Yogyakarta, Yogyakarta, INDONESIA

¹email: fmujaahid@umy.ac.id

ABSTRACT

Harvesting energy from solar has been growing significantly in the past decades. It enlarges the utilization of solar system technology, such as a photovoltaic system. Not only in the large-scale application, but also in the home-scale application. Indonesia is known for traditional batik clothing. There is a lot of various batik from different cities in Indonesia, and Yogyakarta is a city that offers authentic batik clothing. This paper reports the utilization of photovoltaic system in home-scale batik industry in Yogyakarta. The objective is to investigate the system whether there will be an extra power generated from the photovoltaic if a reflector is applied to the panel. There are two kinds of reflectors used in this experiment, they are mirror glass and aluminum foil. The experiment was conducted in the day where the amount of solar radiation is in the same intensity among three conditions: a system without reflector, with mirror glass reflector, and aluminum foil reflector. The result shows that in average the system with reflector has produced higher output power compared to the system without the reflector.

Keywords = Renewable energy, Photovoltaic, Batik Industry, Off-grid, Yogyakarta

1. INTRODUCTION

The availability of renewable energy sources, especially solar energy, is very abundant. The sun is able to provide energy equals to 1×10^8 TW_a annually [1]. According to the data from New Renewable Energy and Energy Conservation (EBTKE), the Ministry of Energy and Mineral Resources, the solar power potential in Yogyakarta is about 996 M [2]. The city is a major tourist attraction and rich in history and culture. Two examples of solar energy application that have been implemented in Yogyakarta are to help the local tourist attraction and to increase the revenue of traditional products.

A 90 KW hybrid power plant and 46 KW solar-wind power plant were installed

in Pantai Baru beach and Baron Techno Park respectively, both attractions are in the rural area of Southern part of Yogyakarta [3][4][5]. According to the locals, considering the area where electricity is scarce, these installed power plants is highly needed to supply the electricity to run their business. Besides, since the power plant was installed, the number of visitors has increased.

Another implementation of non-fossil energy is to support the production of batik, a traditional clothing, in Desa Wijirejo [6]. Following the previous work of Ramadoni Syahputra in 2016 about the application of green energy for batik production [6], our work analyses the performances of the existing system if the reflectors (mirror and