

A wireless monitoring system for monocrystalline PV system

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Abstract. Photovoltaic systems are progressively attached importance and their installed capacity increases day by day because of their reliability, decremented installation and operating cost and simple construction structure. Generated power obtained from a photovoltaic system changes depending upon regional distinctness, and It can be estimated approximately by taking into consideration mean global radiation amount, temperature and humidity. However, there may be different regional negative or positive factors like dust, air pollution, desert powder which affect generated power. The best reliable data for a region can be obtained from the existing photovoltaic system in the region. For this purpose, a monitoring system for 1000W monocrystalline photovoltaic system constructed at Kocaeli University Uzunciftlik Nuh Cimento Vocational High Scholl is prepared. The installed monitoring system shows and records real values generated from the photovoltaic system and environmental data. In the study, Instantaneous data obtained from the monitoring system for October 2018 and 7th October 2018 is given within figures. Additionally, daily and monthly total energy productions of the photovoltaic system are given for October 2018 and date interval between July 2018 and March 2018, respectively.

Keywords: PV systems; monitoring

1. Introduction

Photovoltaic (PV) systems are one of the most important renewable energy sources (RES). PV systems consist of integrated solar cells invert solar radiation into electricity. When solar cells absorb sunlight, the solar energy knocks electrons loose from their atoms, allowing the electrons to flow through the material to produce electricity. This process of converting light (photons) to electricity (voltage) is called the photovoltaic (PV) effect. Energy production of a PV system depends on directly the solar irradiance and negatively working temperature, humidity and pollution of air. During the operation of the PV cell, only around 15% of solar radiation is converted to electricity and residual energy is converted to heat. The electrical efficiency will decrease when the operating temperature of the PV module increases (Teo *et al.* 2012).

PV systems can be separated into two classes as standalone and on-grid systems. Standalone

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