Solar trackers and feasibility analysis of usage of solar trackers in electricity production in Konya, Turkey

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Abstract

World energy needs increases every day and it becomes more difficult to meet the energy demand of the growing population without harming the environment. Therefore, renewable energy is the main area of study for concerned researchers and scientists. Electricity production by using solar energy is one of the best alternatives to fossil fuels that lose its importance, due to rising costs and damage to the environment. The number of studies to advance the efficiency of solar systems increases day by day. Especially in electricity supply, usage of high efficiency solar energy systems can meet the expectations. At this stage, solar trackers that provide us efficient utilization of solar energy, gains importance. In this paper, working principles, usage advantages and economical contributions of solar trackers are discussed. Fixed systems, one axis systems and two axis systems are compared in terms of efficiencies and economic advantages. During this study, Photovoltaic Geographical Information System (PVGIS) is used for comparison between systems. It is obtained that solar power generation systems with solar trackers are more feasible than fixed systems.

Key words: solar trackers, sun, tracker, PV, photovoltaic panel

INTRODUCTION

Solar energy is one of the most viable renewable energy sources which can take the role of fossil fuels. The total PV panel capacity has been about 40 GW in 2009 in the world. Europe dominated the PV market by having 80% of total installed PV capacity. Germany is in the first rank with total 17.3 GW of capacity and annually 2.75 TWh electricity production [1]. The Turkish government has been working to invest more on renewable energy sources in recent years. It is estimated that the total installed PV capacity has reached 3 MW in Turkey in 2010 [2]. However, low efficiency and high cost of solar energy make it difficult to invest. Because of this, researchers were looking for a new way to make solar energy production