



The 7th International Conference on Applied Energy – ICAE2015

A combined experimental and simulation study on the effects of irradiance and temperature on photovoltaic modules.

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Abstract

Solar cell is one of the crucial components in photovoltaic systems. Silicon solar modules are widely used in the Photovoltaic (PV) industry. The silicon PV electrical performance is described by its current–voltage (I–V) characteristic, which is as function of the device used and material properties. This study provides a comparison between a simplified PV-cell and module model and its parameterization, guaranteeing that the I–V characteristic curves fit with the typical points given by manufacturers' datasheets and experimental data. The PV performance study is carried out as function of the junction temperature and insolation. This contribution gives an overview over PV module defects and degradation.

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Selection and/or peer-review under responsibility of ICAE

Keyword: photovoltaic panel, polycrystallin, temperature, performance analysis, indoor outdoor test.

1-INTRODUCTION:

During the last decade the direct conversion of solar energy to electricity by photovoltaic (PV) cells has emerged from a pilot technology to one that produced 11 GW_p of electricity generating capacity in 2009 [1]. The rapid evolution of PV as an alternative means of energy generation is bringing it closer to the point where it can make a significant contribution to challenge posed by the rapid growth of worldwide energy demand and the associated environmental issues, together with the main existing technology, which based on silicon (Si), the growth of the field is intertwined with the development of new materials and fabrication approaches [2]. Fundamental physical, chemical, and materials for energy is reported in [3] specific issues about (PV) plants can affect the PV modules or the inverters. Some of them regarding the PV modules are reported in [4]-[5], while specific models of defects implemented in Finite Element Method in FEM -based software are reported in [6]. Reliability issues about the several parts of PV plants

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