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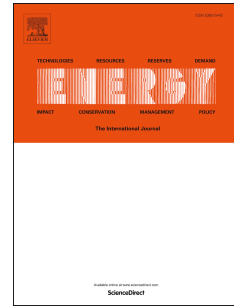
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Experimental investigation on power output of different photovoltaic array configurations under uniform and partial shading scenarios

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Abstract: The power output of photovoltaic systems is considerably affected by complete or partial shading of the modules in an array and it depends on the type of configuration, module position, and shading scenario. In this paper, the effect of uniform and non-uniform shading scenarios on the output of solar photovoltaic modules of different interconnection schemes has been investigated. In order to determine the characteristics curves of a photovoltaic system, experiments have been conducted on a given array size under different shaded conditions. Further, random shading patterns have been artificially generated using meshes of different transmissivity. The impact of bypass diode on the power output of a photovoltaic system has also been observed. Finally, the performance of different module configurations is analyzed and the most efficient configuration under uniform insolation and partial shading conditions have been identified. The results found under the present experimental study have a guiding significance for photovoltaic system design and operation under the influence of partial shading.

Keywords - Partial shading, Array configurations, PV array, Total cross tied (TCT)

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1. Introduction

The impact of an energy resource and its availability play a significant role in the development of world's developing societies and their substantial future. Energy needs of human population around the globe are met using fossil fuels. But, these fossil fuels are finite, rapidly depleting and their continuous utilization has detrimental consequences on the environment. Also, the world energy demand has increased by thirty folds in last two decades. With nuclear energy and hydro-electricity as an exception all other present energy resources are limited. As the present day energy demand has been continuously soaring, so have been the adverse

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