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Publisher: IEEE

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Abstract:
A photovoltaic (PV) power system provides an effective method of power generation, this is particularly relevant to developing countries, where the demographics show that the majority of the population are settled in remote and isolated settlements. The problem with these settlements is that they generally have no access to the electric grid and often lack basic infrastructure. Technological developments such as the photo-voltaic power system has brought a lot of relief which helps to alleviate the energy problems experienced by the developing communities, as these systems are easy to install, low maintenance, modular and cost effective with regards to energy generation. This paper provides the analysis of the steady-state performance and dynamics of the photovoltaic fuel generator (PVFC) for localized load management in standalone systems. The results obtained for the dynamic and steady state characteristics are presented and discussed. Photovoltaic systems have been employed in driving different types of load, such as direct current motors; therefore understanding the system operation and matching of the system components for a particular PV system and load type are important factors in system design.

Published in: 2005 2nd International Conference on Electrical and Electronics Engineering

Date of Conference: 09-09 September 2005 **DOI:** 10.1109/ICEEE.2005.1529625

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Print ISBN:0-7803-9230-2 **Conference Location:** Mexico City, Mexico

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I. Introduction

Electric power is needed for domestic and commercial loads both in rural and semi urban areas. The population continues to experience growth but there hasn't been any expansion of the present capacity in most sub-urban areas. However, distributed generation (DG) is one of the new technologies needed to bridge the gap between population growth and the provision of efficient, quality and cheap energy. PV systems are examples of DG. The PV system is an uncontrolled power source whose behaviour is somewhat different from conventional power supplies. In the conventional power supply, the system designer makes the best adaptation of the electrical motor to a mechanical load. This is possible since the power supply is from an infinite bus. PV systems have to be designed economically and its operation has to be tailored such that it is very close to the maximum output of the solar generator.

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