

An Exploration of the Technical and Economic Feasibility of a Stand Alone Solar PV Generated DC Distribution System over AC Distribution System for Use in the Modern as Well as Future Houses of Isolated Areas

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Abstract : Standalone Photovoltaic (PV) systems are designed and sized to supply certain AC and/or DC electrical loads. In computers, consumer electronics and many small appliances as well as LED lighting the actual power consumed is DC. The DC system, which requires only voltage control, has many advantages such as feasible connection of the distributed energy sources and reduction of the conversion losses for DC-based loads. Also by using the DC power directly the cost of the size of the Inverter and Solar panel reduced hence the overall cost of the system reduced. This paper explores the technical and economic feasibility of supplying electrical power to homes/houses using DC voltage mains within the house. Theoretical calculated results are presented to demonstrate the advantage of DC system over AC system with PV on sustainable rural/isolated development.

Keywords : distribution system, energy efficiency, off-grid, stand-alone PV system, sustainability, techno-socio-economic

Conference Title : ICPSEPT 2016 : International Conference on Photovoltaic Solar Energy and Power Technology

Conference Location : London, United Kingdom

Conference Dates : April 22-23, 2016