Modeling of PV Standalone Microgrid Based on IEEE Standards, 1562-2007, 1361-2003 and 1013-2007.

ABSTRACT

Rooftop solar panels and solar farms has become popular as a means of generating green and emission free electric energy. A standalone Microgrid is fully controlled by sophisticated controlling scheme and ready to contribute to utility grid. A standalone solar Microgrid is an economic solution in residential area as well in far off location. It consists of PV panels, DC/DC converters, storage blocks, MPPT controller, Inverter, main controller and loads. A standalone PV system has two stages design. In power stage, all components will properly be sized to supply demand loads. Control stage contains all controllers to meet the predefined requirements. There is plenty of research on each individual element; however, for system integrator there are only a few studies which have considered the whole system. This study tries to show a systematic step design for Photovoltaic-based (PV) Microgrid. All power and control design stages will be discussed. IEEE standards and recommendation for standalone PV grid and storage banks (batteries) are used as guideline.

Keyword: MPPT; PV; Solar cell; DC/DC converter; Inverter; filter; FLC; PI; Matlab/Simulink