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Transform Dreams into Reality

An Implementation of Solar PV Array Based Multifunctional EV Charger

In this project, for residential Electric Vehicle (EV) charger, a Solar Photovoltaic (PV) array powered grid is implemented, which caters the need of an EV, household loads and the grid. The charger is allowed to work autonomously using a PV array to provide household loads with uninterrupted charging and control. However, the grid connected mode of operation is presented in the absence of the PV array or inadequate PV array generation. In addition, the synchronization and smooth mode switching control assist the charger, so that the charger connects/disconnects from the grid automatically without interfering with the EV charging and household supply. The charger is also allowed to support grid and Vehicle-To-Home (V2H) power transmission with Vehicle-To-Grid (V2G) active/reactive power support to support local loads in island conditions. To achieve Unity Power Factor (UPF) operation and Total Harmonic Distortion (THD) of the grid current within 5 percent, the charger is also controlled to function as an active power filter. In addition, a dc-link voltage regulation dependent energy management technique is used for achieving energy management and a Sliding Mode Control (SMC) is used to regulate the dc-link voltage. A Second-Order Generalized Integrator Frequency Locked Loop with DC Offset Rejection (SOGI-FLL-DR) is used to produce the sinusoidal reference grid current for satisfactory operation under distorted voltage conditions. The charger is designed for a single-phase 230V, 50Hz grid and by using Matlab/Simulink software to validate the simulation results

Domain: Power Systems solar Power Generation

Technology: Electrical