RURAL TECHNOLOGY DEVELOPMENT CENTRE

GOVERNMENT COLLEGE OF ENGINEERING KANNUR

SOLAR POWERED DC HOMES FOR RURAL AREAS

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ABOUT THE PROJECT :

The availability of power is important to meet basic needs. To remain powered during outages, most houses store energy in DC batteries, which is again inefficiently converted to AC by inverters. The advantage of DC home is that it becomes economical to generate energy in the form of DC and make use of it without converting to AC. Especially for rural area, the energy scenario is still in worse condition, and hence DC homes play a vital role to alleviate the energy crisis problem in the rural area. The proposed project is to design and set up an efficient DC power system for homes in rural areas. The project uses solar energy as the input power and battery/ super-capacitor as hybrid energy storage units. The work also involves the testing of DC power system with loads of variable characteristics.

OBJECTIVES :

A large part of the world's population, particularly in India and Africa, lives in villages that often lie beyond the reach of grid power supply. Isolated power systems, which generate power at site, are considered as a viable option for the electrification of these areas. The proposed project is to design and set up an efficient DC power system for homes in rural areas. The project uses solar energy as the input power and battery/ super-capacitor as hybrid energy storage units. The work also involves the testing of DC power system with loads of variable characteristics.

OUTCOME :

A new PV Based Hybrid Energy Storage for DC Motor application is presented, HES as a combination of battery and supercapacitor effectively handle the current stress on battery due to both source and load side disturbances. Observed that the DC link voltage is regulated at the desired value for all conditions. A single three port bidirectional with simple control is used for balancing the Power along with maximum power point operation of PV, inherent PV voltage boosting and supercapacitor voltage regulation. In comparison with the conventional configuration the proposed configuration has reduced number of switches, inherent voltage regulation and lesser number of sensors with reduced complexity. Verified performance of the proposed configuration and control scheme using MATLAB/SIMULINK environment. Experimental validation of the proposed control scheme is in progress.