

Evaluation of the effects of photovoltaic inverter controllers on grid injected power with local dynamic loads

ABSTRACT

In this paper, the most prominent inverter interface control techniques for the grid-connected photovoltaic (PV) systems; the constant-current control (CCC) and constant-power control (CPC) were evaluated based on the dynamics of the inverter local load. A fully controlled 100 kW grid-connected PV distributed generation (DG) with dynamic load is simulated in MATLAB Simulink. The CCC has one fast control loop while the CPC has two control loops, fast inner current loop and slow external power loop that sits on top of the inner loop. As loads on the DG may change dynamically due to demand variations, the effects due to these controllers on the grid-injected power are compared. The CCC is found to be more susceptible to THDi for larger load variation than the CPC although with better response to transients. From the results CPC can be considered best control option for grid-connected inverter.

Keyword: Controller; Dynamic; Inverter; Load; Photovoltaic