

The variable behaviour of the photovoltaic (PV) generation arises as the main drawback of this technology. Therefore, Battery Energy Storage (BES) units appear as a promising solution to overcome the inherent intermittent generation profile of PV systems. BES can be implemented separated from the PV generation units or integrated within a single power system. The latter option gives a better dynamic response, as the variable generation can be directly complemented with the BES, controlling the power flow between both elements with the grid. Thus, there is a need for power converters with capability of interface both PV and BES with the grid in a reliable and efficient way. This paper proposes a Three-Port NPC converter to connect a PV array and a BES unit with the ac grid using a single power processing stage. The converter is based in the H-NPC inverter and allows the connection of a low voltage battery to act as a power buffer ensuring a firm energy dispatch to the grid. Furthermore, simulation results show that the proposed topology maintains the good performance of the H-NPC in terms of efficiency, voltage harmonic distortion and reduced leakage current.