A Review on Methodologies of Multi Array PV Battery Based Bi- Directional Converter for Grid System

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Abstract - - In this research paper power system control for power flow management of a multi array PV battery based system connected transformer coupled bi directional DC-DC converter is introduced. The proposed system are expects to fulfill the heap request deal with the power flow from various source inject surplus power in to the grid. Bi-directional buck-bust converter is used to control power from photovoltaic along with battery charging – discharging control. The proposed system aims to satisfy the load demand, manage the power flow from multiple sources, inject surplus power into the grid and charge the battery from grid as and when required. The proposed system number of steps is less to convert solar dc power to high quality ac power, and decrease power losses compared to existing grid-connected hybrid systems. In these power system are connected same source (two PV source) and improves the voltage regulation, efficiency and reliability of the system.

Key Words: PV array, Battery, Bidirectional DC-DC converter, Grid.

1. INTRODUCTION

Renewable energy generation is eco friendly option for power generation. The proposed configuration can not only boost the usually low photovoltaic (PV) array voltage, but can also convert the solar dc power into high quality of ac power for feeding into the connected grid, while tracking the maximum power (MPP) from the PV array. Writing on PV related themes covers procedures for most extreme force point following (MPPT), late surveyed for instance in, power quality improve and exact regulate in electronic circuit geographies for DC-DC converters, DC-AC inverters, and single stage power converters [1] Photovoltaic energy is expecting progressively significant as an environmentally friendly power source due for its unmistakable potential benefits, like basic arrangement, simple assignment, liberated from contamination for the few decades ago using solar energy for power generating houses was the unbelievable task but quick transformations form the few years for developing the solar power having the energy supply is implemented[2]. Today the solar PV systems are widely used for extracting the energy for using for household purpose commonly [3]. The power from solar PV is used commonly for purpose like right powering from all homes.

In current paper multi level PV system the solar panel under examination is isolated into cover a few areas, and each part has its own DC-DC converter and its input connect with MPPT and connects two-level DC-AC inverter. Those PV array work equal in change environment.

2. Literature survey

Shafinaz A. Lopa et al.(2016) - It contains the theoretical derivations and parameters equations with design and examples. We have analyzed the equation of a buck; boost and buck boost converters and proposed the design components and simulation of these converters. We have achieved performance parameter equations for these three regulators. It was completed the design and investigation of these three converters through mathematical examples and have generated the circuits for simulating buck, boost and buck boost converters. And also have attained different output voltage curve with the change of input parameters. The output graphs for all the converters are well fitted.

B. Venkata Seshu Babu et al. (2017) – In this paper A hybrid wind/PV system for supplying an isolated small connectivity system with electrical energy is digitally simulated and presented. A control strategy for power flow management of a grid-connected hybrid photovoltaic (PV)–wind battery based system with an efficient multi-input bidirectional dc–dc converter is presented. A converter is used to harness power from wind, while a bidirectional buck–boost converter is used to harness power from PV along with battery charging/discharging control. The proposed converter architecture has reduced number of power conversion stages with less component count and reduced losses compared with existing grid-connected hybrid systems. This improves the efficiency and the reliability of the system. The proposed controllers are coordinated dynamic error driven PI regulators to control the interface converters.

K.SUDARSHANA et al (2017) - Another control technique for an efficient multi input transformer-coupled bidirectional dc– dc converter for control stream administration in a grid-connected hybrid photovoltaic (PV) – wind-battery-based system is introduced in this paper. A transformer-coupled lift half-bridge converter is utilized to outfit control from wind, while a bidirectional

buck– support converter is utilized to bridle control from PV alongside battery charging/releasing control. Single phase H6 inverter is used for sustaining air conditioning burdens and connection with the grid. The proposed system means to fulfill the heap request, deal with the power spill out of various sources, infuse the surplus power into the grid, and charge the battery from the grid as and when required. This enhances the effectiveness and the unwavering quality of the system. Reproduction comes about got utilizing MATLAB/ Simulink demonstrate the execution of the proposed control techniques for controlling stream administration under different method of operations.

G.suresh tiwari et al (2018) -: In this research paper, a control strategy for power flow management of a PV-wind battery based system with a productive multi-input transformer coupled bidirectional dc-dc converter is introduced. The proposed system is fulfilling the heap request, deal with the power flow from different sources, infuse surplus power into the lattice and charge the battery from matrix as and when required. A transformer coupled lift half-connect converter is utilized to tackle power from wind, while bidirectional buck-help converter is utilized to bridle power from PV alongside battery charging/releasing control. A solitary stage full-connect bidirectional converter is utilized for nourishing air conditioning burdens and collaboration with lattice. The proposed converter engineering has diminished number of power change stages with less segment check, and decreased misfortunes contrasted with existing lattice associated cross breed systems. This enhances the productivity and unwavering quality of the system. Re-enactment comes about got utilizing MATLAB/Simulink demonstrate the execution of the proposed control strategy for power flow management under different methods of task. The viability of the topology and adequacy of the proposed control strategy are approved through point by point trial examines, to exhibit the ability of the system task in various modes.

BLOCK DAIGRAM

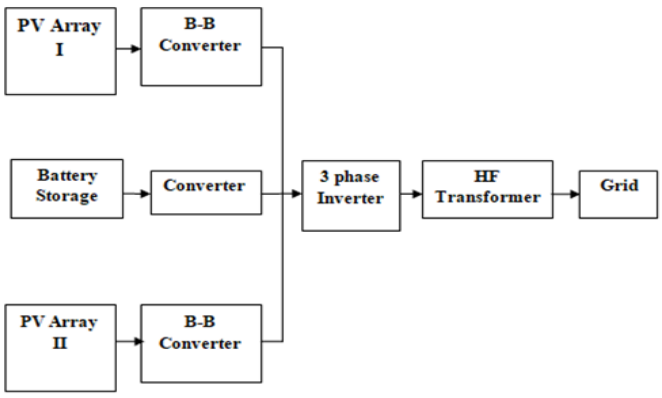

Fig -1 Block diagram of PV battery based bi directional dc-dc converter.

The fundamental target of the system is following-

- To detect and clearing of surplus power from multiple sources to the grid, and charging the battery from grid as and when required.
- To investigate multi level target control power for charging of the battery and utilizing different source as when required.
- Un-interruptible power supplying to connected grid.

Proposed control scheme for power flow management

The grid connect photo voltaic based battery system consist of transformer coupled half bridge bi-directional converter and voltage multiplier with bi-directional buck-boost converter and a three phase full bridge inverter. The proposed converter has reduced the number of power conversion stage with less component count with high efficiency compare to existing grid connected scheme. These system used two PV array connected with single VSC .The control theory for control stream administration of the multi array system is produced in light of the power adjust standard. In fig.1 the boost half-bridge converter and voltage multiplier have connected of the high-frequency transformer. Controlling the voltage of one of the dc-links ensures controlling the voltage of the other Moreover, additional converter be integrated with any one of the two dc-links. A Buck boost (B-B) converter is connected with the primary side dc-link and secondary side connected three-phase full bridge converter as shown in fig 1. The B-B converter is used to harness of power control from the PV along with battery charging / discharging. In this converter are connected maximum power tracking (MPPT) and the battery charging control and voltage boosting from PV array. After that boost voltage are DC and we need to change AC using VSC and then step up voltage through transformer. A transformer connected to grid.

Thus, the proposed configuration and controlling scheme provided an elegant integration of PV source. It has the following advantages:

 Voltage boosting capability is accomplished by a HF step-up transformer and is enhanced by voltage multiplier.

 Different modes of a grid-connected scheme ensure proper operating mode selection between different possible operating modes.

 MPPT technique is a simple and cost effective for tracking the power in PV system without measuring the condition of environmental.

3. CONCLUSION

The proposed system of multi array PV battery based bi directional dc to dc converter for using household application is provides an elegant way are the combination of multiple arrays to a grid and extract maximum energy from sources using MPPT. The proposed configuration is controlling the supplying un-interruptible power to loads and evacuating of surplus Photo voltaic power into the grid. The power fluctuation of these systems is less dependent on environmental condition compared to the power generated by individual PV system.

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