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An Impact of Renewable Solar Energy System in Hybrid Grid Environment for Indian Power Sector

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ABSTRACT:- In the modern power sector, the use of non-conventional power resources along with conventional power has become very essential. Given the unregulated availability of power generation and transmission, various types of renewable energy resources are being used during solar power renewable energy resources in an important system. In this paper, an effort has been made to solve the power irregularities by using solar power with a conventional grid system. The paper attempts to adapt the system to the Indian power sector by using the MATLAB SIMULINK R-2018 SIM power tool box.

KEYWORDS: - Solar Power Panel (SPP), Renewable Energy Resources, Indian Power Market, Micro grid.

I. INTRODUCTION

In view of the future potential of conventional power in the world, many experiments are being done for Renewable Energy Utilization. These experiments are commonly designed in the Matlab simulating environment with microgrid models and photovoltaic systems at the initial stage [1]. Renewable energy sources are being integrated with the Conventional Power Grid System, given the unlimited possibilities of research in Distributed Generation (DG) [2].

Solar-based energy resources have become an important part of renewable energy systems in a reliable, affordable and protective way, and are being used in many developing countries to overcome power irregularities with conventional power systems [3]. Due to durability and ease of use, microgrid systems are used as initial test systems, which can be connected to the main power network as and when required [4]. Renewable and conventional energy resources that are initially formulated with a micro grid are called hybrid micro grid power systems or energy resources which are being used in developing countries like Pakistan, India, Bangladesh, Kuwait, Taiwan etc.[5].

New elements such as photovoltaic (PV), batteries, etc. have also been used in the paper for load estimation of the load capacity of the system. The above element is useful for testing the efficiency of the system [6]. After the test, an attempt has been made to produce the work done with Indian frequency and power [7]. MATLAB Simulink Power Sim Toolbox R-2018 has been used to test the system

II. METHODOLOGY

A small scale single phase 5 KW, 220 volt micro grid system is designed for testing with solar power panel storage battery and nonlinear load.

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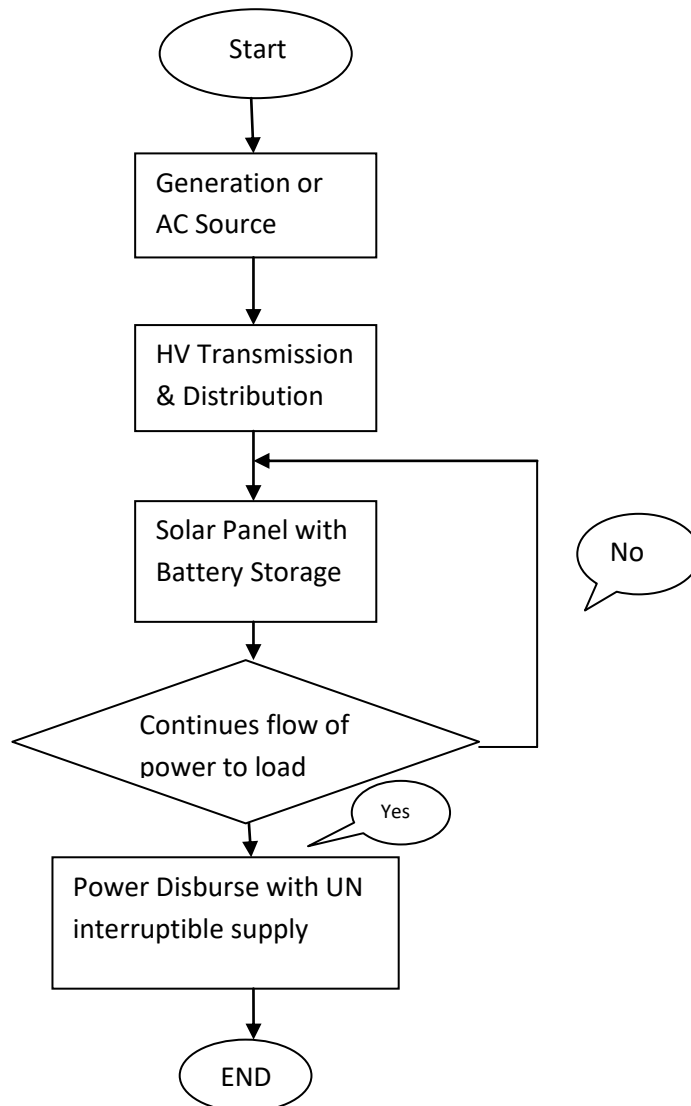


Fig.4.1 Flow Chart of methodology

The above system can also be largely implemented for 33kv and other high voltage systems. Looking at the load here, a solar panel on the front of the high voltage transformer has been added between the main grid and the load, attempting to display the photovoltaic power, load power, battery power, and load duration curve in the paper.

Along with this, an attempt has been made to observe the charging and discharging status of the battery in the paper, and the final system is tested at 220 volts 50 Hz and the results of the results are contained in the paper.[8],in the above flowchart, generation and AC sources as well as HV transmission and distribution have been combined with regular power supply with batteries for renewal energy resources (solar panels) and state of charge, if the power supply is regular then the process is regular and Shows flow of charge and position or process starts again.[9]

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III. SIMULATION & DISCUSSION

To illustrate the importance of renewable energy sources, a Simulink model in Power SIM Toolbox R-2018 has been designed in which generation and AC sources have been added to a grid or an across of microgrids, isolators and mounted transformers. Regular supply of power to the entire system In order to maintain the solar panel and battery connection is done with load, MCB and Ruges to use the system is to keep a regular and safe

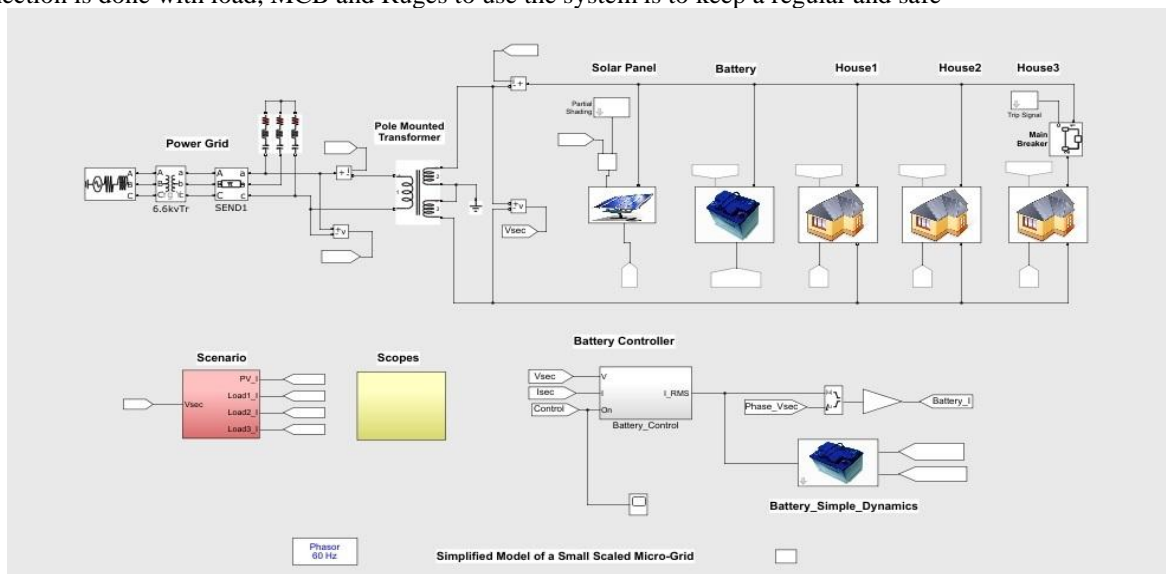


Fig.5.1 Simulink Model of a Small Scale Microgird

In the above base model the photovoltaic power displays the standard of zero value during charging and the peak value during discharging as well as it shows peak value when photovoltaic power at load and output reverts from its peak to study state condition. Slope and inclined lines display at the time of second alternation and charging, indicating that in spite of power irregularities the system is operating regularly. Figure 5.1 shows the web representation of all the above.

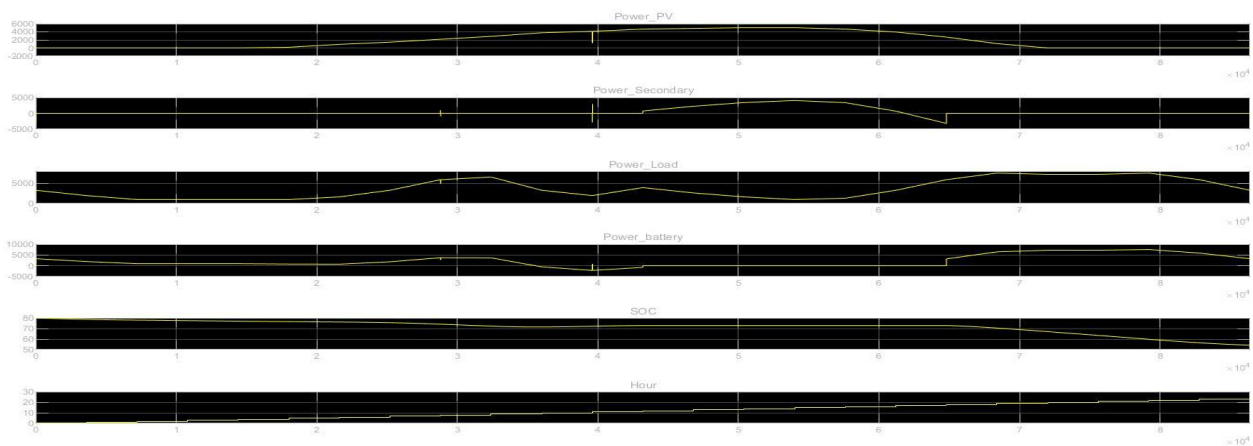


fig.5.2 Wave Representation of Base Model



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In this paper, an attempt has been made to set the entire system to Indian standard (50 Hz, 220 Volt) which we can see in figure 5.2 when the value of frequency is changed in figure 5.2 with photovoltaic power and secondary load power given by the battery Increases with oxalary power, here the state of charge shows the inclined slope in both the charging and discharging conditions and finally the system Process time done by is represented by Wave

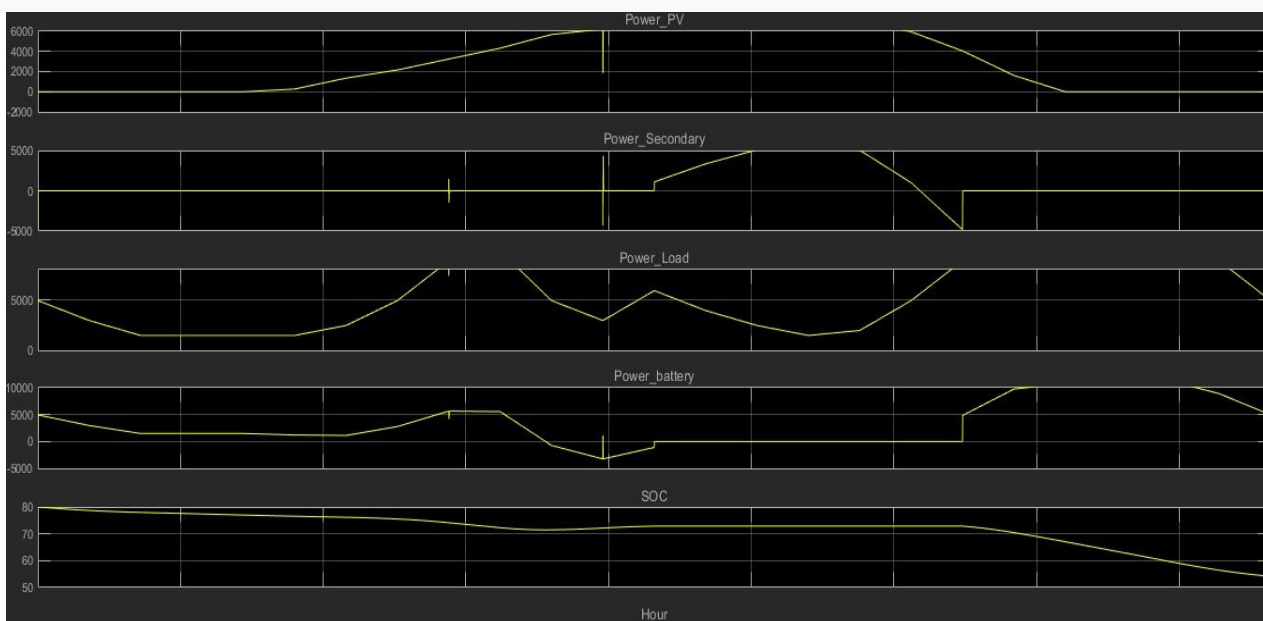


Fig.5.3 Wave Representation of model for Indian values

IV. CONCLUSION

The system featured in the paper has been used in line with Indian standards to promote unregulated supply and renewable energy resources. The use of other renewable energy resources like wind, etc. is also proposed in future along with the above system.

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