Nano - Grid Smart Home With Plug-in Electric Vechicle using a Hybrid Solar-Battery Power Source

V.Jayaprakash, S.Divyapriya, A.Amudha, G.Emayavaramban, M.Siva Ramkumar

Abstract: ***Hybrid solar-battery power supply is important within the nexus of plug-in electric powered automobile (PEV), renewable, and clever constructing. This paper formulates an optimization structure for green strength supervision and additives PEV, home batteries sized based on smart domestic application and photovoltaic (PV) arrays. We look for increase the house financial system, at the same time as satisfying domestic power call for and PEV using. Based on the clever domestic Nano-grid and the machine structure, Formulation of Convex Programming (CP) is done rapidly. It precisely optimizes the various parameters of the home battery energy storage system (BESS) and its selection. Considering the undistinguished time perspective of optimization, the parameters of home BESS and electric value such as domestic BESS worth, type and influence style of PEVs are systematically investigated. The house with BESS does, no longer to get the power from the electric grid at some stage in the electrical fee's height period which depends on the developed Convex programming control law in (H2V) mode and (V2H) mode of operation.***

KEYWORDS: Solar PV Array, BESS, Smart Home Energy Management system

I. INTRODUCTION

The current ecological calamity and energy requirement has been proceeds the fast development of renewable and electric vehicles (EVs) [1, 2]. In any case, Electric Vehicles charging exercises and a few sustainable power sources, for example, Solar and Wind are constantly discontinuous and unstable. Accommodating EVs and inexhaustible to guarantee ideal utilization of electric power is crucial for the implementation and financial system of smart grid [3,4], particularly when EVs and large scale distributed generation (DG) units are sent [5].

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The outcome says the researchers are centered on creating viable administration and estimating systems while incorporating the Electric Vehicles and renewable energy into domestic loads and to the state or central grid. For example, a recently planned miniaturized scale fluidic design with a hyper adaptable silicone grid is projected in [6], which is a polymeric confine in dye sensitized solar cell (DSSC). This New material and structure of renewable devices also accounted. A photo curable polymeric layer utilized for both the electro chromic gadget and the DSSC in [7] as a semi strong electrolyte. In addition, coupling DSSC and an electrical twofold layer super capacitor formulating a flexible incorporated vitality gathering and capacity framework in [8]. Identified with the ongoing consideration agreed to smart grid vision, smart home nano frameworks that can develop the power usage and reduce the electricity invoice have likewise increased specific significance.

II PROPOSED SYSTEM:

Fig.1 shows the simple single smart home[34], which includes solar panel, PEV battery, home equipment, Home BESS, a SHEMS and utility grid. The home battery management system is communicating with SHEMS, home appliances, battery management system (BMS), solar panels and the PEV BMS.

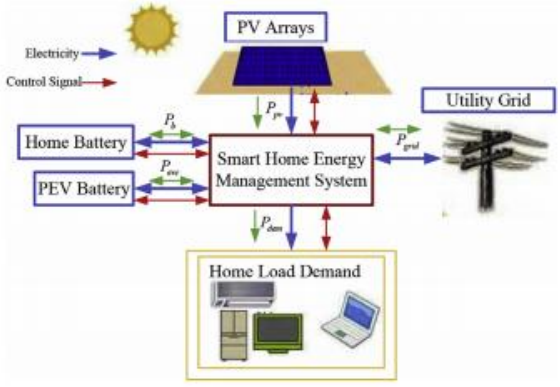

Fig 1 Block Diagram

The home battery system is designed in such a way to allow a bidirectional power flow

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meanwhile PEV battery is allowing bidirectional and unidirectional power flow.

Among the home appliances and battery, PEV battery, PV arrays and the utility grid the SHEMS is operated to supervise the power flow. To overcome the drawback of the earlier study, three different key factors discussed in this paper. First, CP is leveraged efficiently optimizes both the control decision and parameters of the home BESS and quickly in the smart home. With the knowledge of the authors, CP-driven joint optimization control strategy and component size of the home BESS with the participation of PEV and PV arrays is the first study. Second, control modes of PEV, home BESS prices and types, we achieve the optimal parameters and electric utilization price depends on various time periods of optimization. In difference home economy is systematically evaluated without home BESS which increase the total electric cost of a home and the usefulness of home battery energy storage.

The main goal is to enlarge a control model for controlling such systems in an optimum manner using a control action without overshoot or delay and ensuring stability of the system. Control theory is a subfield of mathematics and information engineering in control systems which deals the continuously control the dynamic systems in the processes and machines.

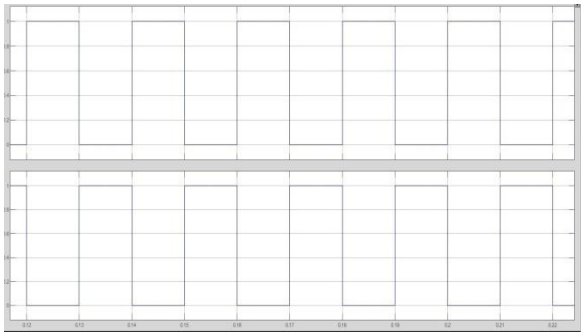

Fig 2 Controller output for switches

II. RESULTS

The fig 3 shows the simulation diagram of the hybrid solar-battery power smart home system. The Fig. 2 shows the controller waveform for switches. Fig. 4 gives the voltage waveform across the AC load which is connected in this system. Fig.5 shows the DC load voltage across the load terminals.

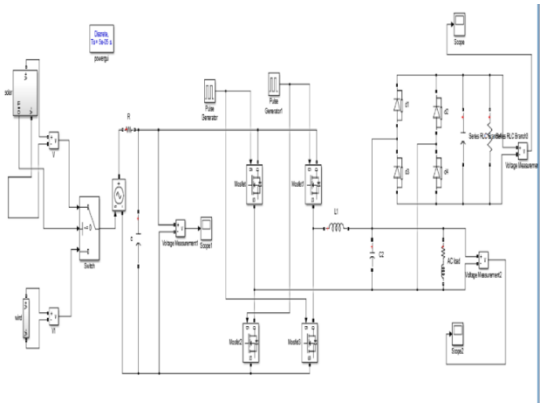

Fig 3 Simulation Diagram

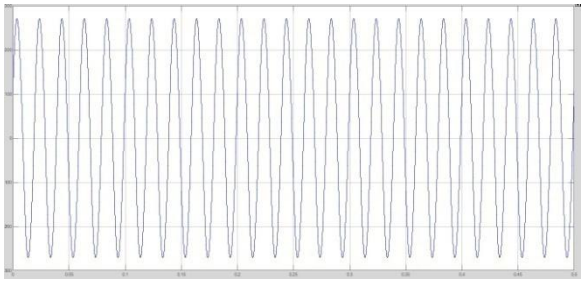

Fig 4Voltage Waveform of AC load

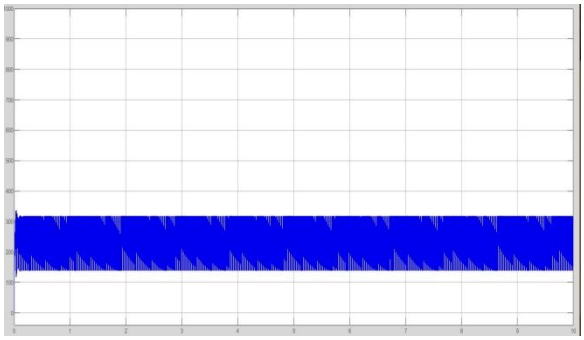

Fig 5 Voltage Waveform of DC load

IV. CONCLUSION

The Component sizing of a hybrid solar-battery power source for smart home nano grid with PEV load and the CP framework for optimal energy management is developed in this paper. Electric power allocation is optimized by mathematically formulating the CP problem among the PV arrays, PEV battery, utility grid and home battery. At the same time, the CP policy unambiguously considers the home BESS optimization constraint in various time periods. Here types, control modes of PEVs and home battery prices, are also considered in wide simulation process. Results are validated that the developed CP method can economically resolve the optimization problem, and the home BESS, accounting for a suitable time period for optimization which contributes in

important functioning cost funds, and difference to the option without home BESS.

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