RENEWABLE ENERGY WITH GRID CONNECTED FOR ENERGY MANAGEMENT STATERGY AND SIMULATION

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***Abstract*— This project is about renewable energy with grid connected for energy management strategy and simulation. Use of green energy as an alternative to the generation of electricity from conventional resources is currently on the rise this is because the conventional resources are being exhausted. Micro-grid is defined in as a low tension distribution network consisting of distributed generation, storage devices and loads which are flexible. The commonly installed distributed generations are solar photo-voltaic (PV) and wind turbine systems. In this project we are using solar PV systems.**

***Keywords*—**SOLAR ENERGY, BATTERY, INVERTER, LOADS, BATTERY, SOLAR PANNEL.

1. INTRODUCTION

The micro-grid system is a technology that provides a solution to green energy production. As a low-tension distribution network consisting of distributed generations, storage devices, and loads that are flexible. The Micro-Grid system is controllable, provides reliable energy, is localized, minimizes environmental pollution, and is able to reduce grid electricity needs. The commonly installed distributed generations are solar Photo-Voltaic (PV) and wind turbine systems. This reduces the unreliability problem of the solar energy. Use of green energy as an alternative to the generation of electricity from conventional resources is currently on the rise because the conventional resources are being exhausted.

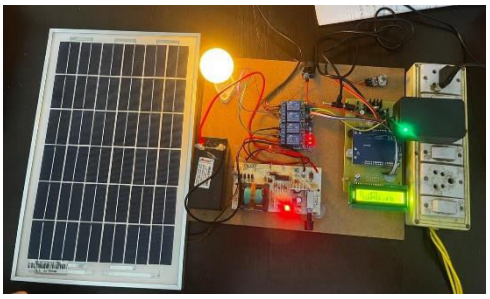

Fig.1: Renewable Energy with grid connected for energy management strategy

2. LITERATURE SURVEY

The fuzzy logic controller system is one of the intelligent methods of energy management system that aims at conserving energy. These should be considered to obtain optimal results it terms of energy conservation. Therefore, the objective of this study was to maximize power supply from solar and battery for energy saving. Thus, 80% of the national grid energy was saved during day time and 35%during night time. The majority of the loads were shared by solar in day time and battery and grid in night time using.

3. METHODOLOGY

The various components of the micro grid system are modeled using mat lab/Simulink software PV modelling, inverter modelling, battery modelling, load modelling,
And grid modelling are using this project.

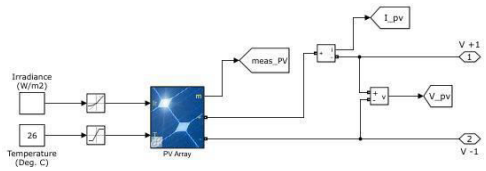

Fig: 2 Simulink model of a solar PV

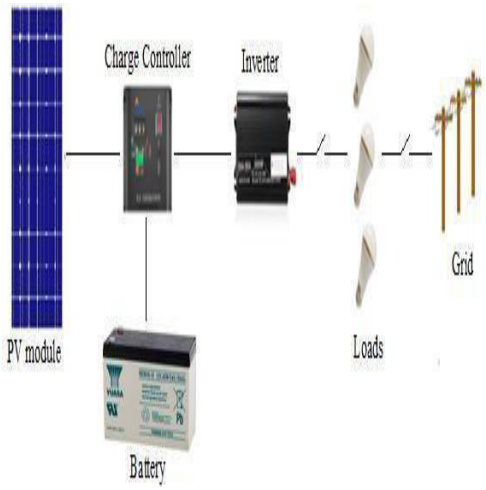

Fig: 3 proposed micro-grid system

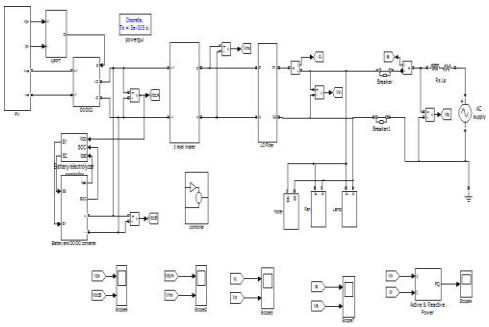

Fig: 4 MATLAB Simulink diagram of proposed system

4. SOLAR PANEL

The term "solar panel" is commonly used to describe a flat solar thermal collector, such as a solar hot water or air panel designed to heat water, air, or collect solar thermal energy. Furthermore, the term "solar panel" can also relate to a photovoltaic module, which is a collection of solar cells assembled to produce energy.

. In both cases, these panels are typically flat and come in various grouping of solar-thermal panels or photovoltaic (PV) modules, which can heights and widths. An array refers to a be connected either in parallel or series depending on the specific design objective. Solar panels are commonly utilized in residential, commercial, and industrial applications to harness solar energy for various purposes.

Fig.5: Solar Thermal Panel

5. BATTERY

Types of electric car batteries:

1. Lead-acid batteries: Widely available and proven to be economical and reliable. However, concerns exist about their disposal and the need for effective pollution control during recycling. Due to their heavier weight, they are not as portable.

2. Nickel metal hydride batteries: These have a higher energy density compared to lead-acid batteries, around

69.4Wh/kg. They have been utilized in various all-electric plug-in vehicles like the Toyota RAV4 EV, General Motors EV1, and Honda EV Plus, as well as in hybrid vehicles such as the Toyota Prius and Honda Civic Hybrid. They generally have a lower environmental impact than nickel-cadmium batteries due to the absence of toxic cadmium. Industrial nickel is often recycled due to its high value.

3.Lithium-ion batteries: Widely preferred for electric vehicles due to their superior range per charge and lower cost compared to nickel-metal hydride batteries. Lithium-ion batteries have a low discharge rate of approximately five percent per month, significantly lower than the 30 percent per month of nickel-metal hydride batteries. To extend the lifespan of lithium-ion batteries, they should be charged early and often, never allowed to drop below their minimum voltage, and kept cool.

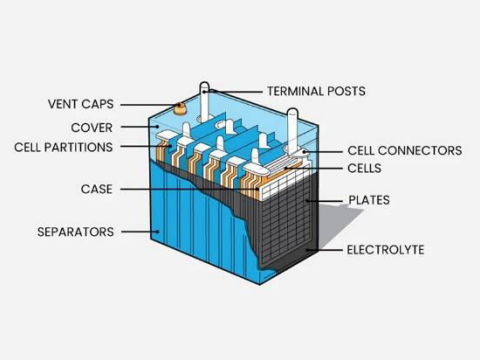

Fig.6: Lead Acid Battery

6. BOOST CONVERTER

One kind of DC-DC converter that effectively ramps up voltage levels is the boost converter. It is essential for applications requiring a steady, elevated voltage, such as LED drivers or battery-powered devices, because its output exceeds its input. It has two modes of operation: continuous and discontinuous, and its power efficiency and versatility make it highly valued.

Fig.7 Boost converter

7. LCD

An electrical display module with many uses is the LCD (Liquid Crystal Display) screen. A 16x2 LCD display is a relatively basic module that is frequently seen in many different kinds of circuits and devices. Compared to other multi-segment LEDs particularly those with seven segments, these modules are preferable. The reasons are as follows: LCDs can display special and even custom characters (unlike in seven segments); they are inexpensive; they are easily programmable; and they can display animations and other content.

ADVANTAGES & APPLICATIONS

Advantages

- Reduces Electricity Bills
- Diverse Applications
- Low Maintenance Costs
- Technology Development

Applications

- Solar water heating
- Solar heating of buildings
- Solar distillation
- Solar pumping
- Solar drying of agricultural and animal products
- Solar furnaces
- Solar cooking
- Solar electric power generation

8. RESULT

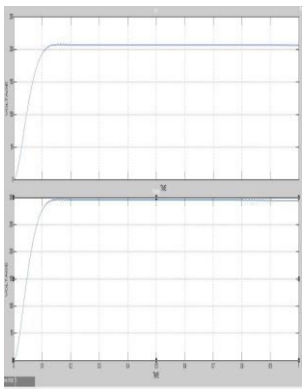

Fig: 8 Simulink output of battery

Voltage& pv voltage

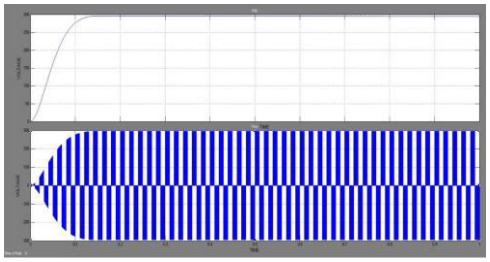

Fig: 9 inverter input voltage & output voltage

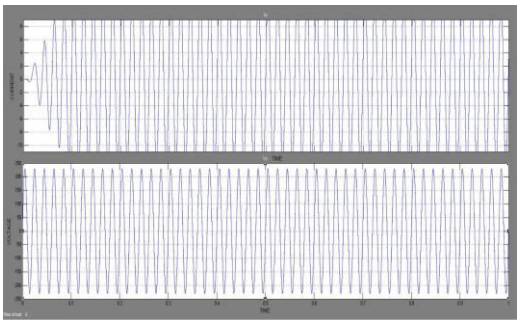

Fig: 10 load current & volt

9. CONCLUSION

- An energy management system that will help to use the stored renewable power efficiently there by dependency of the power from grid especially during peak hours
- Can be minimized and result in reduction in the electricity bill of consumers
- By using the stored renewable power at proper time

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