

POWER GENERATION USING WIND-SOLAR ENERGY

Sowmya Raman¹, N.Samanvita², Sujatha S S³, Siridevi N.C⁴

^{1,2,3,4} Assistant Professor NMIT

ABSTRACT

To meet its growing energy needs world discovers energy generated from Sun and wind which is well-known as solar power and wind power which are being considered as a means of generating power. This paper deals with a hardware model of hybrid solar / wind energy, which uses battery as its storage system also improvement in battery lifespan that is achievable by diverting short-term charge/discharge cycles to an energy-storage system.

Keywords: *Solar, Wind, Battery Lifespan.*

I. INTRODUCTION

In our society to ensure our quality of life and to underpin all other elements of our economy energy is essential. In developing industrial and agricultural sector Energy is the ultimate factor. Renewable energy is generally defined as energy that comes from resources which are naturally replenished on a human timescale such as sunlight, wind tides, plant growth, and geothermal heat. Renewable energies are inexhaustible, dirt-free and they can be used in a decentralized way. Also they have the added advantage of being complimentary, the integration between them being favorable.

Solar energy and wind energy have been considered clean, inexhaustible, unlimited, and environmental friendly. Efforts are made to suppress carbon dioxide (CO₂), greenhouse gases (GHG) and other power plant pollutants. Global awareness of climate variations has led to the urgency to develop renewable energy sources. Such characteristics have engrossed the energy sector to use renewable energy sources on a bigger scale. Wind- solar power generations are visible options for potential power generation. They are free of recurring costs.

In the last few decades significant attention is given to the design of hybrid solar –wind power systems. Main reason for adopting these two energies are Firstly, wind turbine generator will not bring any adverse effect on the environment. Secondly PV arrays are durable, and do not produce emission and require minimal maintenance to operate. The main drawback of these resources is they are time dependent. During night time and cloudy day solar energy is not available which might be pretty unpredictable. Similarly, wind energy also will not be available throughout the year. As both sources of energy are dependent on weather conditions power fluctuation occurs. To minimize these effects on the power system, batteries to store energy is used.

In various demanding situations of power system storage batteries will absorb surplus power and supply the shortage of power

II. HYBRID ENERGY SYSTEM

Hybrid power systems are autonomous electricity generating systems, incorporating more than one type of power sources, operated together with related supporting equipment to provide electric power to the grid or on site and also to provide better system efficiency as well as improved balance in energy supply. The main advantage of using a hybrid system is to Increase the reliability of energy, thereby avoiding significant costs with power outages and Decrease environmental impacts of energy supply. In this paper, combined use of wind and sun light has been used as sources of generating electricity.

2.1 Wind Turbines

A wind turbine is a windmill-like structure particularly developed to generate electricity. They can be seen as the next step in the development of the windmill. A wind turbine is a device that converts kinetic energy from the wind into electrical power. A wind turbine also used for charging batteries is referred to as a wind charger. The power generated from wind is not continuous its fluctuating. To obtain the non-fluctuating power we have to store in battery and then provide it to the load.

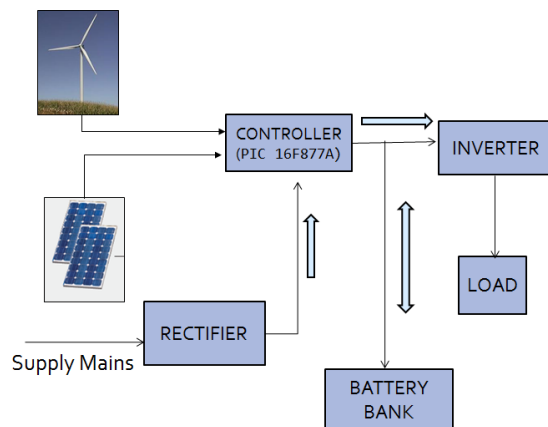
2.2 Solar Panel

Solar panels receives from the sun's rays and convert it into useful energy that can be used in homes and business. There are two types of solar panel: solar thermal and photovoltaic, or PV. Solar thermal panels use the sun's energy to heat water that can be used for various purposes. PV panels use the photovoltaic effect to turn the sun's energy directly into electricity, which can act as supplement to the usual supply. In this paper PV panels is been used which is made up of a silicon-based semiconducting material, sandwiched between two electrical contacts. To generate high amount of electricity, PV panels need to spend more time under direct sunlight. When sunlight strikes the panel and is absorbed, it releases loose electrons from some of the atoms that make up the semiconductor to create an electric current

2.3 Battery Storage

Batteries provide an "economical" form of storage as they are required for hybrid systems. During night hours and cloudy weather conditions, the energy stored in the battery can be used as backup electrical supply. The battery to be used must be able to withstand several charge and discharge cycles, must have a low self-discharge rate and must be able to operate within the specified limits. The aim of this paper is to develop a system to prolong the expected battery lifetime, thus reducing battery-replacement costs.

III. HARDWARE IMPLEMENTATION



The energy generated by the Hybrid systems is in the form of DC and is given to the PIC microcontroller. This controller has the function of charging the battery and also giving supply to the load. It also has to vary the supply given to the load. On shortage of supply to the load, it has to draw current from the battery. Since the output obtained from the hybrid system is DC, an inverter is used to convert to AC, so that the supply can be given to the load efficiently. The LED displays the battery status and the mode of battery charging and discharging.

IV. CONCLUSION

Energy generated from solar and wind is stored in battery for future use, the life of battery is increased by limiting charging and discharging voltage, this project can be implemented on highways for lighting the bulbs, Power generated from this can be used for supplying to the remote areas near highways on small scale. Battery storage is provided to obtain a steady constant supply to the loads even at the time of power fluctuations, thereby assuring protection. These are largely useful in the places where power fluctuations cannot be tolerated. Wind and solar hybrid energy systems offer a sustainable way to reduce a home's electrical bills or take a home off of the power grid completely. By combining both the sources of energy i.e., wind and solar along with battery storage, more reliable and sustainable electricity can be generated.

The main objective of the project is to improve the battery lifetime and increase the use of renewable sources of energy.

REFERENCES

- [1]. Hamilton. C , Gamboa.G , Elmes.J , Kerle. R , Acias.A , Pepper.M , Shen.J , Batarseh.I, "System Architecture of a Modular Direct-DC PV charging Station for Plug-in Electric Vehicles", IEEE Conference Publications , 2010
- [2]. Chian-Song Chin, "T.S Fuzzy MPPT Control of Solar Power Generation Systems", IEEE Journals & Magazines , 2010

- [3]. Ashish S. Ingole*, Prof. Bhushan S. Rakhonde** Hybrid Power Generation System Using Wind Energy and Solar Energy International Journal of Scientific and Research Publications, Volume 5, Issue 3, March 2015 1 ISSN 2250-3153
- [4]. I.A. Adejumobi¹, S.G. Oyagbinrin², F. G. Akinboro³ & M.B. Olajide⁴ Hybrid Power Generation System Using Wind Energy and Solar Energy IJRRAS 9 (1) October 2011, volume 19 issue 1
- [5]. [4] YandraShivrath , P. BadariNarayana , SrikanthThirumalasetty , Dr.E.LaxmiNarsaiah , “ Design & Integration of Wind-Solar Hybrid Energy System for Drip Irrigation Pumping Application”, *International Journal of Modern Engineering Research (IJMER)*, Vol.2, Issue.4, July-Aug 2012 pp-2947-2950