



International Journal of Intellectual Advancements and Research in Engineering Computations

Energy management of PV and wind hybrid system

Elango. S¹, Navin Kumar. S², Ranjith Kumar .S², Surendran .V.P²

¹Professor, Dept of EEE, Nandha Engineering College, Erode, Tamilnadu, India

²Under Graduate, Dept of EEE, Nandha Engineering College, Erode, India

ABSTRACT

Now a day's electricity is most needed facility for the human being. All the conventional energy resources are depleting day by day. So, we have to shift from conventional to non-conventional energy resources. In this the combination of two energy resources is takes place i.e. wind and solar energy. This process reviles the sustainable energy resources without damaging the nature. We can give uninterrupted power by using hybrid energy system conventional energy resources. It is cost effective solution for generation. It only needs initial investment.

INTRODUCTION

Basically, this system involves the integration of two energy system that will give continuous power. Solar panels are used for converting solar energy and wind turbines are used for converting wind energy into electricity. This electrical power can utilize for various purpose. Generation of electricity will be takes place at affordable cost. This paper deals with the generation of electricity by using two sources combine which leads to generate electricity with affordable cost without damaging the nature balance.

EXISTING SYSTEM

In the existing system electrical energy is generated by the conventional energy resources like coal, diesel, and nuclear etc. The main drawback of

these sources is that it produces waste like ash in coal power plant, nuclear waste in nuclear power plant and taking care of this wastage is very costly. And it also damages the nature. The nuclear waste is very harmful to human being also.

PROPOSED SYSTEM MODEL

In this proposed system solar and wind power is used for generating power. Solar and wind has good advantages than other than any other non-conventional energy sources. Both the energy sources have greater availability in all areas. It needs lower cost. There is no need to find special location to install this system. It is highly safe for the environment as it doesn't produce any emission and harmful waste product like

BLOCK DIAGRAM OF PROPOSED SYSTEM

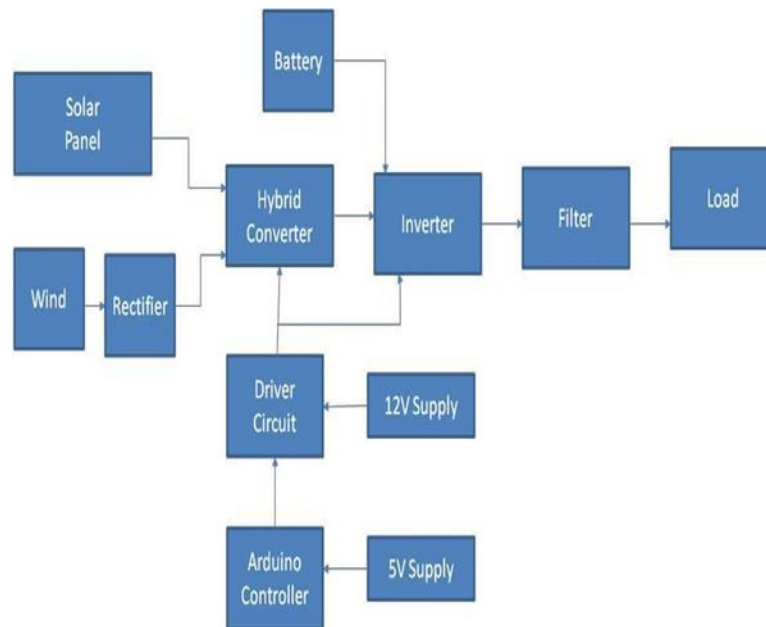


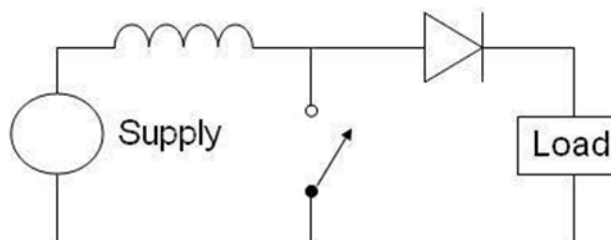
Fig 1. Block diagram of proposed model

The basic block diagram and circuit diagram are as shown in figure. The solar and wind system consist of solar panel, wind, Arduino controller, Battery, Inverter, hybrid converter, filter, rectifier etc. It uses solar and wind energy to operate. First the solar (photovoltaic cell) panel collects solar radiation and converts it into electrical energy by photovoltaic conversion process and wind turbine can convert wind energy to electrical energy. Then the hybrid converter can get the output from the two sources and boost the power. Then the Battery consumes this electricity to charge itself. The stored electricity used to run the portable devices. When the consuming time the arduino should be work the part of to give the required output for the portable

devices. The inverter can convert the DC to AC supply for the output load.

RESULT

A boost converter (step-up converter) is a DC-to-DC power converter that steps up voltage (while stepping down current) from its input (supply) to its output (load). It is a class of switched-mode power supply (SMPS) containing at least two semiconductors (a diode and a transistor) and at least one energy storage element: a capacitor, inductor, or the two in combination. To reduce voltage ripple, filters made of capacitors (sometimes in combination with inductors) are normally added to such a converter's output (load-side filter) and input (supply-side filter).



Arduino

Peripheral features

- The Arduino Uno board is a microcontroller based on the ATmega328.
- It has 14 digital input/output pins in which 6 can be used as PWM outputs, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 analog inputs, a power jack and a reset button. □

- This contains all the required support needed for microcontroller.
- In order to get started, they are simply connected to a computer with a USB cable or with a AC-to-DC adapter or battery.
- Arduino Uno Board varies from all other boards and they will not use the FTDI USB-to-serial driver chip in them.
- It is featured by the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter



Fig.1 Experimental Setup

Fig 2: Proposed System Output Kit Image

We have used solar and wind energy it can be either used for home appliance or any other use.

power. Can be used for 24 hrs power generation. Operational in all weather and green energy.

APPLICATION

- Domestic & Industrial
- Home appliance
- Provide extra energy to grid

FEATURES

Two different energy sources are used to provide a diversity supply, to reducing the risk of

CONCLUSION

This project explains several hybrid system combinations for PV and wind turbine, modeling parameters of hybrid system component, software tools for sizing, criteria for PV– wind hybrid system optimization, and control schemes for energy flow management.

REFERENCES

- [1]. Merabet, K. Tawfique Ahmed, H. Ibrahim, R. Beguenane and A. M.Y. M. Ghias, "Energy Management and Control System for Laboratory Scale Microgrid Based Wind-PV-Battery," *IEEE Transactions on Sustainable Energy*, 8(1), 2017, 145-154.
- [2]. K. Sathish Kumar and K. Shivarama Krishna, "A review on hybrid renewable Energy systems," *Renewable and Sustainable Energy Reviews*, 52, 2017, 907-916.
- [3]. H. S. Das, A. Dey, C. W. Tan and A. H. M. Yatim, "Feasibility Analysis of Standalone PV/Wind/Battery Hybrid Energy System for Rural Bangladesh," *International Journal of Renewable Energy Research (IJRER)*, 6(2), 2016, 402- 412.
- [4]. P. hounthong, V. Chunkag, P. Sethakul, S. Sikkabut, S. Pierfederici and B. Davat, "Energy management of fuel cell/solar cell/supercapacitor hybrid power source," *Journal of power sources*, 196(1), 2016, 313-324.
- [5]. L. Bokopane, K. Kusakana and H. J. Vermaak, "Optimal energy management of an isolated electric Tuk-Tuk charging station powered by hybrid renewable systems," 2016 International Conference on the Domestic Use of Energy (DUE), Cape Town, 2016, 193-201.
- [6]. Housseini, A. F. Okou and R. Beguenane, "Energy management strategy of ongrid/off-grid wind energy battery-storage system," 2015 IEEE Canadian Conference on Electrical and Computer Engineering (CCECE), 2015, 1-6.
- [7]. M. Fatu, F. Blaabjerg and I. Boldea, "Grid to Standalone Transition Motion Sensor less Dual-Inverter Control of PMSG with Asymmetrical Grid Voltage Sags and Harmonics Filtering," *IEEE Transactions on Power Electronics*, 29(7), 2015, 3463-3472.
- [8]. P. P. Das and S. Chattopadhyay, "Smooth mode transition of A DC bus voltage controlled PV inverter using a novel phase locked loop method," 2015 IEEE Applied Power Electronics Conference and Exposition (APEC), 2015, 2133-2140.