NOVATEUR PUBLICATIONS
International Journal of Research Publications in Engineering and Technology [IJRPET]
ISSN: 2454-7875
VOLUME 3, ISSUE 4, Apr.-2017

HYBRID SYSTEM PARAMETER MONITORING USING BUCK-BOOST CONVERTER & GSM TECHNOLOGY

PROF. REDEKAR ABHIJEET PRAKASH
Project guide, Department of electrical engineering Sanjeevan engineering and institute of technology Panhala , Kolhapur ,india Abhijeet.redekar@seti.edu.in

MR.VAIDYA PRASHANT PANDURANG
Department of electrical engineering Sanjeevan engineering and institute of technology Panhala , Kolhapur ,india prashantvaidya45@gmail.com

MR. JAMBILKAR SUHAS SAKHARAM
Department of electrical engineering Sanjeevan engineering and institute of technology Panhala , Kolhapur ,india Jambilkars44@gmail.com

MR.TELAVEKAR OMKAR VILAS
Department of electrical engineering Sanjeevan engineering and institute of technology Panhala , Kolhapur ,india omkar.telavekar2211@gmail.com

MR.PATIL SUNIL MANIKRAO
Department of electrical engineering Sanjeevan engineering and institute of technology Panhala , Kolhapur ,india Electricalsunil@gmail.com

ABSTRACT:

There is a current global demand for clean and renewable energy sources. Fossil fuels are renewable and finite resources are reduced due to high recovery technology, environmentally friendly and needed. So it is very necessary for the need for economical and accessible resources. So, the purpose of this project is to generate electricity without using non-renewable resources and pollution. The disadvantage of this system in which wind energy and solar energy is variable in power is a major cause of the generation of non-conventional energy, even if there is a change due to wind speed and radiation flow naturally, So the production is so variable the power of the grid, and we cannot get constant, furthermore to maintain the voltage range not only to explain the search of windmills and solar panels, but also the basic way to invent. We are going for a long time using buck &boost technology to examine through the communication protocol using GSM wireless system, such as remotely controlling voltage, current, wind controloutput.

INDEX TERMS: Buck-boost converter, Solar panel , Wind mill , PIC 16f877A Micro-Controller, GSM.

I. INTRODUCTION:

While demand for energy is increasing exponentially around the world, it is no longer a luxury of seeking sources of energy other than fossil fuels. Fossil fuels, carbon dioxide and the environment are damaging other greenhouse gases, but will provide a temporary solution to the energy crisis.

The output of the solar-wind power plant is not a constant. It can give a lot of energy and the rest of it could give you less or not at all. Therefore, using this buck-bust converter, it is possible to stabilize the voltage and power of this hybrid system has become important. The purpose of this document is, if the output and input power is stabilized, is to verify the reliability of the proposed system. The power of each system was simulated. The parameters of all elements are derived mathematically, and the system has been designed using the calculated value. In this work, the solar system and the wind system are connected to each other so that one source can not accessible, so that other systems can be balanced. They can also work independently as well as simultaneously. Next, the synthesized output of the solar wind system is transferred to buck bust for voltage regulation. Following a constant output voltage from buck bust converter is given to the voltage divider circuit which compares both wind output and solar output via the PIC16F877A controller. Output shown on the LCD screen from the PIC16F877A. Also, this output is shown to mobile device through GSM technology.

II. HYBRID ENERGY SYSTEM:

Hybrid power system is a combination of the two power sources to power the load. In other words, it can be defined as “An energy system manufactured or designed to extract energy by using two energy sources is called hybrid energy systems." Hybrid power system,

good reliability, efficiency in this proposed solar and wind power system is used to generate power. There are advantages over any other non-conventional energy sources of Solar and wind power. They also have greater availability in all areas of both energy resources. Lower cost is required to produce electricity from both resources. There is no need for a special place to install this system.

III.NEED OF HYBRIDIZATION:

In order to maintain the source of energy, we need to devise an alternative to save this energy so that non-renewable energy sources will be depleted in the near future. This form of non-renewable energy is solar energy to utilize solar energy. Solar power generation and wind power generation can be used for various households, public lighting. This can save non-renewable resources like coal. Therefore, hybridization technology is necessary for days and days.

IV.DESIGN OF SOLAR-WIND HYBRID SYSTEM :

SOLAR SYSTEM:

Here, the solar cell panel used is a panel of Vikram Solar Energy's solar panel, under the maximum output power of 100 W under the standard test conditions (STC). At STC, irradiation at 25º temperature conditions is1,000 W / m; the panel is simulated in order to provide an output voltage of 24V. Design parameters of the solar system are listed in Table I

TABLE I. Design parameters of solar system

Rated maximum power	Pmpp	100W
Open circuit voltage	Vac	21.9V
Short circuit current	Isc	6.0A
Rated voltage	Vmpp	17.5V
Rated current	Impp	5.7A
Solar Radiation Rate	SRR	1000W/M^2
Antimiradation	AM	1.5
Ideal Temperature	IT	25 deg.clc

WIND MILL SYSTEM:

The term "wind power" describes a process that wind is used to generate mechanical energy or electricity. Wind turbine converts wind movement into mechanical energy. This mechanical energy, using the generator can convert the mechanical energy into electricity.

General configuration of wind mill:

Rotation Axis	Horizontal
Model	Small Wind turbine
Material	Ms
Height of wind mill	4.5ft
No. of Blades	5
Blade Height	1.5ft
Output voltage	12V
DC generator	12V,500RPM

GSM :

The GPRS / GSM-RS232 modem is built with the dual-band GSM / GPRS band - SIM900A works at 900/1800 MHz frequencies. The modem comes with the RS232 interface, which connects the PC and a microcontroller with the RS232 chip (MAX232). The transmission speed is configurable from 9600 to 11500 at the AT command. The GSM / GPRS modem has a TCP / IP stack inside which allows you to connect to the Internet via GPRS. It is suitable for SMS, voice, and application data transfer in the M2M interface.

PIC MICROCONTROLLER:

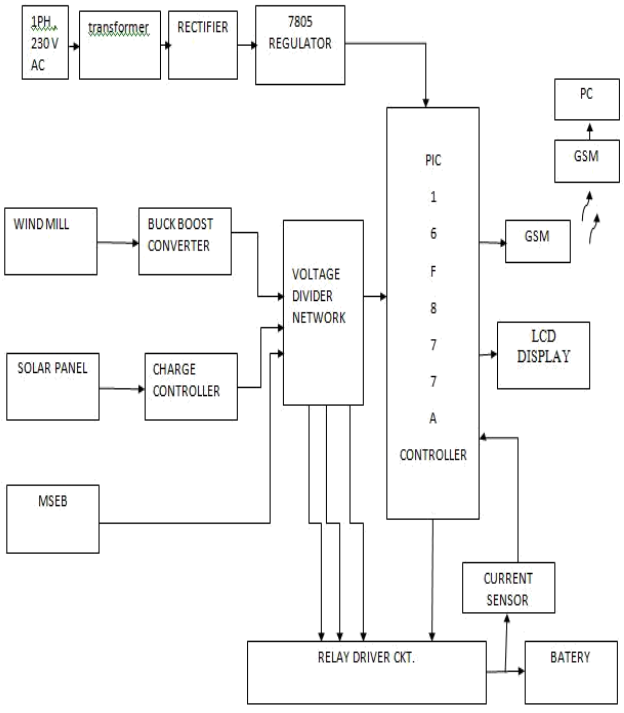
The PIC name initially provided by the Peripheral Interface Controller. Hardware capabilities of PIC devices range from 8-pin DIP chips up to 100-pin SMD chips with discrete I/O pins, ADC pin and DAC modules, communication ports such as UART, I2C, CAN, and even USB.

BUCK BOOST CONVERTER

The buck–boost converter which is DC-DC converter having the voltageoutput magnitude is more or less than the magnitude of the input voltage. This is equivalent to a flybackconverter that uses a single inductor instead of transformer.

The converter which includes two different topologies that is buck and boost is called the buck-boost converter. Both of them can produce a high range of output voltages, from an output voltage much larger than the input voltage, down to almost zero.

V. BLOCK DIAGRAM:



In this three-phase system, AC 230 V power is reduced to 12 V using a transformer and becomes dc using the full wave rectifier bridge circuit. The output of the rectifier bridge is given to the input 7805 regulator. Then the 7805 regulator converts 12V regulated 5V power. This supply the PIC 16F877A controller is given. The output of the solar windmill and varying time may be constant with the charge controller and the buck-boost converter. The mill output and solar panel are connected to the voltage divider network. This network is connected to the PIC controller. In the PIC controller, compares the output of this windmill and solar panel and reports the relay pilot circuit. If the output of the mill is high, then this is linked LED will glow and the power continuity is switched on and stored in the battery. Other sources of supply automatically cut. The maximum output of the sources is display on the LCD display and sends mobile messaging and PC via GSM technology.

VI. ADVANTAGES:

- No pollution, fatal for any noise and pollution of the environment.
- High reliability and long-term sustainability.
- Low maintenance cost.
- Pure and clean-high energy production.
- Provide an uninterruptible power supply for the equipment.

VII. APPLICATIONS

- Hotels.
- Small scale industries.
- Large estate houses.
- Factories and manufacturing facilities.
- Commercial power generation.
- Street lighting.

VIII. RESULTS:

By performing the experiment on Hybrid system consisting of horizontal structure wind mill and solar panel .wind mill consist of D.C generator of output 12 v at 500 rpm and solar panel of 100 w. We get constant output voltage and parameters such as voltage, current and power display on pcand mobile through GSM.

IX. CONCLUSION:

In this project, rural areas get electrified. It also meets the growing demand for electricity. It reduces dependence on a single source. Monitoring Hybrid System Parameters, that is why we improve the efficiency of the system with respect to their individual generation mode.

REFERENCES:

1) J. Hui, A. Bakhshai, P. K. Jain, "*A Hybrid Wind-Solar Energy System: A New Rectifier Stage Topology*," Twenty-Fifth Annual IEEE Applied Power Electronics Conference & Exposition (APEC), 2010.
2) "*A Two-Mode Control Scheme With Input Voltage Feed Forward for the Two-Switch Buck-Boost DC–DC Converter*," IEEE Transaction, VOL. 29, NO. 4, APRIL 2014.
3) *"Solar Panel and Battery Street Light Monitoring System Using GSM Wireless Communication System".* Simon Siregar Telkom Applied Science School Telkom University.
4) B. S. P. a. R. G. A. M. M. Harish Ramamurthy, "*Wireless Industrial Monitoring and Control using a Smart Sensor Platform,"* IEEE Sensor Journal, 2007.