

A Practical Study, Analysis & Implementation of Hybrid Power Plant Comprising Solar and Wind

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Abstract

Nowadays electricity is the most necessary installation for man. All conventional energy sources are drain day after day. So we have to go from the traditional to unconventional energy resources. In this combination of the energy resources of energy are carrying out, for example, wind energy and solar energy. This process sinks sustainable energy resources without and damaging nature. We can give uninterrupted energy using Hybrid power system. Basically, this system implies the integration of the system of two energies that will give continuous force. The use of solar panels is requiring producing electricity from solar energy. Correspondingly, we generate electricity from wind energy through wind turbine. This electric power can be used for different purposes. Electricity generation will be a place, at a reasonable cost. This paper deals with the generation of electricity from two sources gathered leads to electricity generation with reasonable cost without damaging the balance of nature.

Keywords: Solar plate, Wind turbine, Hybrid power plant, DC generator, Electrical power.

1. Introduction

Electricity has a great need in our daily lives. There one of the traditional two ways to generate electricity, or energy resources, or non-conventional energy resources increase demand for electricity in words that can meet demand we need to generate electricity. Electrical today evolution of existing energy sources such as major disadvantages of

these sources such as coal, diesel and nuclear power produces such residues as coal power plant materials and nuclear power waste from the nuclear power plant takes care of the waste very expensive. It is also harmful to nature. Nuclear waste is very harmful to human body. Conventional energy resource is draining at very fast pace day. It will soon be complete. We disappear from the ground to find another way electricity generation. New sources must be trusted free and affordable non-traditional sources of energy. It should have good alternatives to normal energy resources energy source. There is much unconventional energy such as geothermal, tidal, wind, solar energy, etc. These flaws can only be done in the sea. During geothermal energy takes so many steps to extract heat from beer earth. Solar and wind energy are easy to use in all cases. And non-conventional energy resources such as solar and wind can help in balancing the scale of nature and also fulfill the human needs.

Hybrid models are an effective means for the production of electricity generated around the world. According to this paper, the system is design with solar wind with backup and storage batteries integrated and optimized to predict the behavior from the generation system. In this paper we propose a hybrid power turbine system that combines photovoltaic and wind energy on a small scale alternative source of electric power, where conventional generation is not practical. It suggests tracking point for wind turbines and photovoltaic technology.

Working of hybrid power plant of solar and wind

Every device we use in our day to day life, such as cell phones, computers, induction furnaces, washing machines, vacuum cleaners, etc., requires power supply. Therefore, advances in technology increases the use of electrical and electronic devices - and this in turn, increased energy demand. Therefore, to meet the demand for generation, different techniques are used for the generation of electrical energy. Recently, to avoid pollution and conserve non-renewable energy resources such as coal, oil, and others, are favoring renewable energy sources such as solar energy, wind energy, etc., for the generation of energy. It can also be a combination of renewable energy sources for power generation is called hybrid power system. Special issue, we will discuss about the work of the solar wind hybrid system.

of these electrons and holes. Therefore, the solar panels related to the battery behave like another type of battery, and thus is comparable with two batteries connected advanced techniques to improve the production of solar panels using the arrangement of solar tracking solar panels, which rotates the solar panel in order to get more sunlight. It should be the quality of the light and have a good enough size to deal with the power to ensure the battery charge properly. If you increase the cable length, then reduce the current gaining. Therefore, the solar panels are arranged at a height of 10-20 feet above ground level. It is recommended to clean the surface of the solar panels correctly to remove dust, moisture and also to reconnect the terminals.

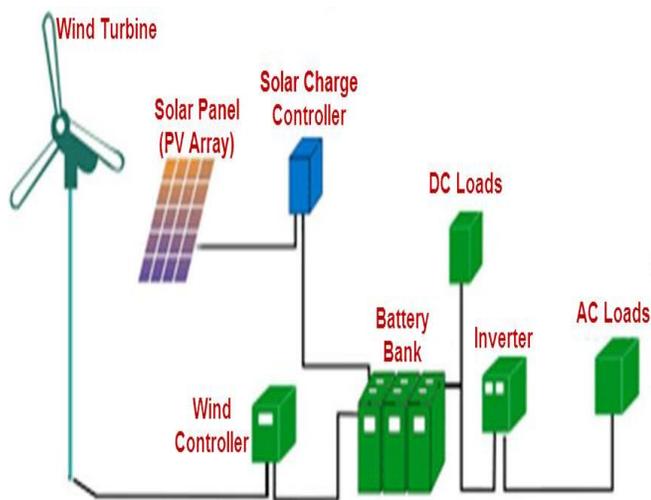


Fig. 1 Solar wind hybrid power plant

Solar panel working

Solar panels consist of solar cells or solar photovoltaic cells, which are used to convert solar energy into electrical energy. The use of Ohmic solar panels materials for internal connections and external terminals. Therefore, passing electrons produce in the N-type material to the battery through the electrode and cables. From the battery, electrons to the material of type p, where the combination

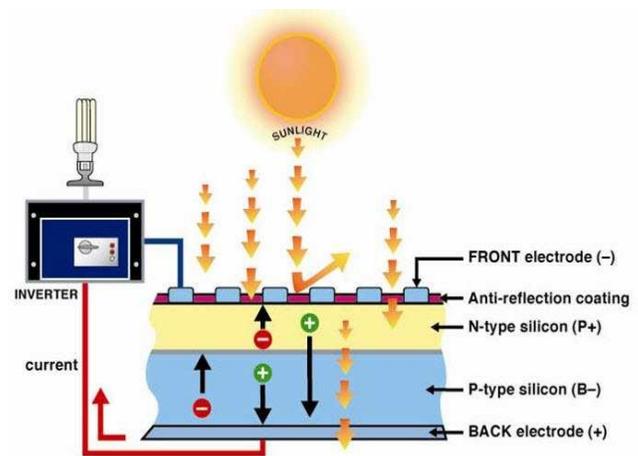


Fig.2 Solar cell, module and array

Solar photo voltaic cell working

We must also know the work of solar cells to understand how solar panels convert solar energy into electrical energy. Solar cells or solar photovoltaic cells are devices that are used to convert solar energy into electrical energy by taking advantage of the photovoltaic effect. These cells are used in many real-time applications such as rail signaling systems, street lighting systems, local lighting systems and tele-communications systems.

P-type photovoltaic cells consist of a silicon layer that is placed in contact with the N-type silicon layer. The electrons spread from N-type to P-Type. Holes in P-type materials accept electrons but there are more electrons in N-type materials. Therefore, with the influence of solar energy, these electrons in the N-type material move from the N-type to the P-type. Thus, these electrons and holes unit in the P-N junction. Because of this combination the charge is charged on either side of the P-N junction and creates this electric field charge. This electric field formation results in the development of a diode-like system that enhances charge flow. This is called current drift and the spread of electrons and holes balanced by current drift. This current drift occurs in an area where mobile charge carriers lack the so-called depletion zone or space charge area. Thus, during the night or in the dark, these solar photovoltaic cells behave like diodes aligned bias.

Generally the solar panel open circuit voltage (voltage when not connected to the battery) is higher than the solar panel voltage. For example, consider a 12 volt solar panel that produces a voltage of about 20 volts in bright sunlight, but whenever the battery is connected to the solar panel, the voltage drops to 14-15 volts. Solar cells are made of the most commonly used semiconductor materials such as silicon.

Solar photovoltaic (SPF) effect is the process of converting solar energy into electrical dips using a set of solar panels. This, DPS electricity can be stored in the batteries or can be used to feed the DDS loads directly or can be used to feed the S loads using an inverter that turns the power dipping to 120 volts of electricity.

Working of Wind Power System

Wind power is also one of the renewable energy that can be used to generate electricity with wind turbines as well as generating resources. There are several advantages of

wind power, such as wind turbine power generation, mechanical energy with windmills to pump water using wind pumps, and so large wind turbines to spin with wind blowing, and therefore can generate electricity. The minimum required wind speed required connecting the generator to the grid as a reduction in speed and the maximum wind speed of the generator required to separate the generator from the power grid is called the cutting speed. In general, wind turbines operate in a speed range between the cut and cutting speeds.

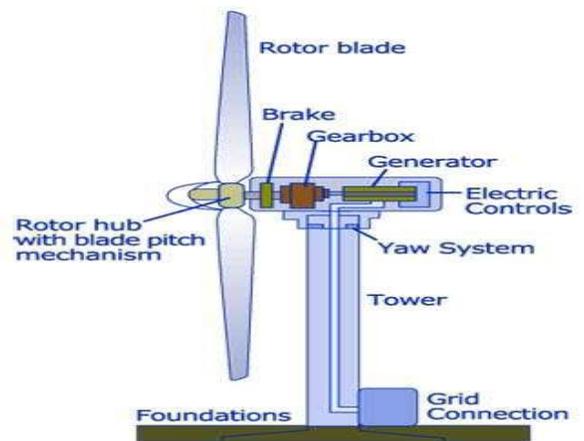


Fig.3 Wind power plant

Wind turbine

It can be defined as a wind turbine fan consisting of 3 blades that rotate due to the wind blowing so that the aligned shaft must be aligned with the direction the wind is blowing. The use of the gearbox to convert the energy of a device to another device by mechanical method. Therefore, it is called a high precision mechanical system. There are different types of wind turbines, but the wind frequently used turbines are horizontal axis turbines and vertical axis turbines. The figure shows the different wind turbine generator system blocks.

Wind generator

Along with an electric generator with a wind turbine. Therefore, it is called the wind turbine generator. There are different types of wind turbine generators and wind turbines can be linked to these generators directly to the

mains or loads or batteries based on different criteria. In general, there are four types:

1. Squirrel cage induction generator connected directly to the mains or power loads such as loads or days using the appropriate adapters.
2. Generator together with OS to DS to convert so connected to the mains.
3. Wound induction generator rotor, which is linked to the mains or batteries that can be adjusted using the Rjoostats speed to maintain the required outputs.
4. Dual induction power generator, which is linked to the mains that can control the speed by using the transformer from the back to the back.

Consider DFIG Double Induction Inductor Generator Rotor Coil 3 Phase Pro Coil 3 Stages. The AC is actuated in rotary coils due to the three-phase AC signal supply rotor winding. This is due to the mechanical strength produced by the wind, and the rotor starts to spin and produces a magnetic field. The rotor speed and the AC signal frequency applied to rotor twists correspond to each other. This is the result of a constant magnetic flow through the props. Since the speed variation in the wind speed it is possible to obtain the AC output signal with variable frequency. However, the AC signal with the desired frequency constant. Therefore, the input frequency of the AC signal varies due to the rotary coils the output signal can be obtained with AC constant frequency. On the network conversion side can be used to provide the regulator DC power supply to charge the batteries. On the rotor turn side can be used to provide controlled AC voltage to rotor.

Therefore, as shown in the figure above the solar wind hybrid system, the electric power generated by the solar system and wind power system can be used to charge batteries or DC loads or can use all energies for CA.

Power Loads The hybrid solar wind charger is a practical

project where electric energy generated by solar energy and wind energy is used to charge batteries.

Result

The hybrid solar wind power generation system helps to generate the electricity with the implementation of system in the following diagram. Both modeling and experimental measurements prove that the 90 percent of the energy available in the range can be utilized. The measured voltage current values of wind turbines, solar panels, battery, and load are shown in the table. Energy production and consumption by each unit can be calculated.

The specification of the solar panel use is 3 W with critical voltage of 8.86 V and 0.35 A.

Table 1 Result output of project during whole day

TIME	POWER GENERATION (SOLAR)	POWER GENERATION (WIND) Summer day (05/05/2017)
7:00	1.80	1.8
8:00	1.91	1.8
9:00	2.28	1.7
10:00	2.57	1.7
11:00	2.61	1.9
12:00	2.80	1.9
13:00	2.88	1.5
14:00	2.23	1.5
15:00	2.01	1.6
16:00	1.94	1.9
17:00	1.81	2.0
18:00	1.79	2.0



Fig.4 Implementation of hybrid power plant

Conclusion

This integration of the renewal energy source will be highly useful in all places, especially in commercial areas where we require more electricity. It has no adverse effect on nature. It is also useful for reducing energy requirement from the grid connected system thereby increasing the reliability of power system. With the use of this system, we can save electricity and which charges very less maintenance. The design and the equipment are very compact in such a way that it is easy to work with. When manufactured on a large scale, the cost of this integrated energy generation of natural resources is affordable. On the other hand, there are no power cuts or the disconnect charge situation at any time. Therefore, it is the most reliable renewable energy or electricity with fewer resources. The progress made by the research team, which has shown that some of the early barriers in this alternative concept can be removed with putting little effort with new emerging technologies in the power electronics it can be easily implemented on large scale with long life span and its constructive for providing the power or electricity to the country area. By using this hybrid power system, the generating capacity of electricity also increased.

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