

Implementation of Hybrid system (Solar +wind) – Case study

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Abstract: Recent years, Renewable energy system is an vital role in power generation. Natural sources are the base for all type of renewable energies. In future years, every country will generate the 80% of power by using the renewable energy. In this paper, we discuss about the 50Kw hybrid system (solar wind) plant and various components are using the hybrid plant. We are using solar and wind energy because it is one of the most renewable forms of energy which is found to be abundance in all part of the world. The energy stored at all the times, that purposes only we installed hybrid systems. This paper had written in the purpose of knowing the importance of renewable energy systems and creates the awareness of natural sources.

Keywords: Hybrid systems, Wind energy, Solar Energy (Renewable Energy).

I. INTRODUCTION

Generally power produced from various ways, In thermal power plant, the power produced by using steam. In India, 80% of power produced from thermal power plants. But the problem of thermal power plant is to create the pollution in environment and the cost of the coal material is high.

In nuclear power plant, the power produced by using uranium, plutonium. In India, very less % of power produced from nuclear power plants. It does not create the environmental pollution but the cost of the coal materials is so high compare than thermal power plants. But the main disadvantage of nuclear power plant is, it creates very big problem when any components failure.

In order to avoid that, we enter the renewable energy systems. It does not create the environmental pollution. It does not require the coal materials and capital cost. Only natural

sources (wind, tidal, solar) are required. There are many types of renewable energy sources are available such as solar, wind, tidal etc. Our system proposes a 50 KW hybrid system (solar wind). The density of solar level is high in day timings because Tamilnadu (south India) is one of the hottest places. The wind density is average for all the timings. So, our hybrid system has the combination of solar with wind.

The paper is organized as follows: Section 2 explains the overall hybrid system. . Section 3 discusses the wind section. Section 4 explains the solar system. The inverter section is discussed in Section 5. Batteries and other components discussed in Section 6, and conclusions are summarized in Section 7.

II. OVER ALL HYBRID SYSTEM

A hybrid renewable energy system means the combination of different type of system like solar wind. Solar Hydel etc. 80% of the hybrid system is the combination of solar wind. In the proposed system plant capacity is 50KW. 30KW of power generate from wind systems (wind turbines) and 20 KW of power from solar systems (solar panels). In day time most of powers generate the solar systems. Wind systems generate more power from evening to night (5p.m to night). We get the average power for 24hrs. So we choose the hybrid systems. The total energy stored in the batteries through charge controller unit. The output of the batteries is connected through the inverters. The output of the inverter is connected load.



Fig1.over all hybrid system

III.WIND SECTION

Generally the wind mills are not located at all the places. It has some criteria to locate the wind mills. Based upon the criteria, we installed the 30KW wind systems. Among the 50KW, 30KW of power get from wind systems. In the wind section consists of ten wind generators. Each generates 3KW of power. Total capacity is 30KW (3KW*10). The wind generators are move the direction depends upon which direction has a high air velocity it changes and rotates fast. The wind tail is constructed to change the directions depends upon the wind velocity. Wind generators are two blade systems. It has synchronous generator type model. A mechanical braking system was used to stop the rotation of wind systems.

The output power of the wind section is not a constant one, varying depends upon the climate changes. So we cannot predict exact power generation from the wind systems. The specifications are given in the table.

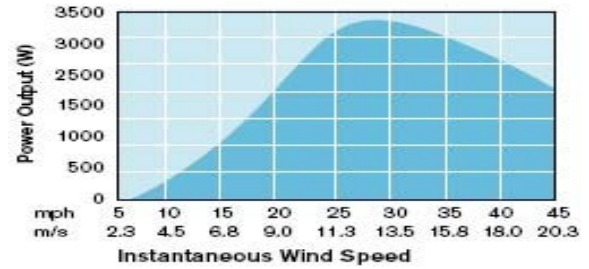
No of wind mills	6
Power	3.2kw
Line voltage	110volts
Type	PMMC
Synchronous speed	1500RPM
No of poles	4
Frequency	50hz
Total power	19.2kw

Power	200w
Output voltage	30v
No of panels	48
Total power	9.6kw

Rating of solar panel



Fig 2.view of wind section



Power output vs wind speed

IV.SOLAR SECTION

In our area situation, the solar system is the optimal system among others systems. Because our area located in the equilateral region .so among the renewable system solar is the best and optimal system for us. Solar system capacity is 20 KW (one third of the capacity). In solar section consist of 100 panels. Each panel capacity is 200 watts. Total capacity is 20KW (200*100).The solar section is not moving type Model. It is fixed model only. Why we noted this point? Because, most of the solar plants having the rotating type. The advantage of the rotating type Model is, it moves the direction likewise the sun because Time to time varying the position of sun. We get the maximum power at some time periods only normally noon time. The solar panels are 18% poly crystalline structure.



Fig 3.view of solar section

V.BATTERIES

We cannot store the alternating Current quantity in practical. So we convert AC to DC by rectifier. Then the dc quantity is stored in batteries. In wind section the output power is AC. So only we convert into DC, then stored into batteries. But the solar section output is DC only. So rectification not required in solar section. Battery is the storage device. The output of wind section is connected to batteries through charge control unit (AC to DC) and solar section output is directly connected (DC) to the batteries. The output of the batteries to inverter circuit. The specifications of batteries are given in the table.

Power rating	20kva
Max utilizing load	15kva

Rating of Batteries

Current rating	120AH
No of batteries	20
Back up time	4hrs



Fig 4.view of batteries

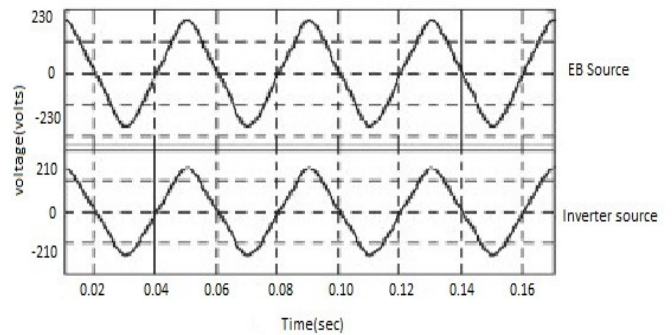
VI.INVERTER

The inverter section output is connected through the load. The battery output is connected through the inverter. The Direct current quantity is converted into alternating current quantity is done by the use of inverters. The specifications of inverter are in the table.



Fig 5.view of inverters

Voltage vs. time characteristics



Rating of inverters

The specifications of inverters are given below

Power rating	20kva
Max utilizing load	15kva

VI.LOAD

Only the lighting loads are connected to the renewable systems. The following loads are to be connected with the hybrid systems.

Rating of loads

Usages	Power rating	Per hour	
Fan	120*40	4800/h	48000/10
Light	120*60	7200/h	86400/12
Computer	12*150	1800/h	18000/10

VII.CONCLUSION

This paper presents the literature study of hybrid system (solar wind).In a recent years, the renewable energy is the very important source of electrical energy and it produced by a various way(wind to electrical. Solar to electrical etc).This system adopted in our institution and satisfies the lighting load (details given in chapter 6).

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