

A Hybrid Wind – Power Energy System

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ABSTRACT:

Now a day's power is maximum needed facility for the person. All of the conventional power assets are depleting day by day. So we should shift from conventional to non-traditional power resources. In this the aggregate of power sources is takes place i.e. wind and solar power. This process reviles the sustainable power resources without negative the nature. We can give uninterrupted electricity by way of the use of hybrid power gadget. Essentially this gadget includes the integration of power system so that it will supply continuous electricity. Solar panels are used for changing sun strength and wind turbines are used for converting wind strength into power. This electric electricity can utilize for diverse motive. Era of power might be takes place at inexpensive fee. This paper deals with the technology of energy through the usage of two assets integrate which results in generate power with less costly cost without damaging the character stability.

Keywords: Electricity, Hybrid, Solar, Power, Wind.

INTRODUCTION

Solar energy and wind electricity have been deemed clean, inexhaustible, unlimited, and environmental friendly. Such traits have attracted the power area to use renewable power sources on a larger scale. However, all renewable energy sources have drawbacks. Wind and solar assets is depending on unpredictable elements inclusive of climate and climatic conditions. because of each assets, complementary nature, some of these issues can be overcome the weaknesses of 1 with the strengths of the alternative. This brings us to the hybrid sun-wind energy plant concept. Hybrid energy stations have

confirmed to be fantastic for lowering the depletion charge of fossil fuels, in addition to presenting power to far off rural regions, without harming the environment.

The main objective of this paper is to assess the feasibility and economic viability of utilizing hybrid Solar–Wind–battery based standalone power supply systems to meet the load requirements

SOLAR ENERGY

Solar energy is electricity from the sun. It's miles renewable, inexhaustible and environmental pollution unfastened. Nigeria, like maximum other nations is blessed with big quantity of light all of the 12 months with a mean sun electricity of 490W/m²/day. Sun charged battery structures offer power supply for complete 24hours a day no matter awful climate. More so, strength disasters or strength fluctuations because of service part of repair as the case can be is nonexistent.

WIND ENERGY

Wind is a natural phenomenon related to the motion of air masses brought on in most cases through the differential solar heating of the earth's floor. Seasonal versions within the strength received from the solar affect the electricity and path of the wind. The wind turbine captures the winds kinetic electricity in a rotor which includes or greater blades routinely coupled to an electrical generator. The turbine is installed on a tall tower to beautify the energy capture

HYBRID ENERGY SYSTEM

The world hybrid method something that made through the combination of a couple of element. In strength machine the electricity can be generated by means of

more than one source at a time like Wind, solar, biomass and so on. There are various module to generate hybrid strength like wind-solar hybrid, solar-diesel, Wind-hydro and Wind-diesel. A few of the above hybrid electricity generation module the wind-sun hybrid module are more crucial due to the fact it is considerable in nature and it's miles very tons surroundings pleasant.

Hybrid strength generation is extra important because the wind now not floe constantly and sun radiation is simplest present approx. 8 to 10 hours in a day. So for non-stop energy it's far essential to hybridize the solar and wind energy with the storage batteries. The hybridization in India has big prospect due to the fact over 75 % of Indian household face the problem like power cut particularly in summer

BLOCK DIAGRAM OF HYBRID WIND SOLAR ENERGYSYSTEM

The block diagram of the hybrid power generation system using wind and solar power includes the following blocks.

- Solar panel
- Wind turbine
- Charge controller
- Battery bank
- Inverter

Solar panel

Solar panel is locate to convert solar radiation to the electric power. The bodily of PV mobile is very much like that of the classical diode with a PN junction fashioned by semiconductor material. When the junction absorbs mild, the power of absorbed photon is transferred to the electron proton system of the material, growing charge carriers which might be separated at the junction. The charge providers inside the junction area create a ability gradient, get accelerated underneath the electric discipline, and circulate as cutting-edge through an external circuit. Solar array or panel is a set of a several modules electrically linked in collection parallel combination to generate the required present day and voltage. solar panels are the medium to convert solar energy into the electrical strength.

Wind turbine

Wind turbine is that system which extracts electricity from wind by rotation of the blades of the wind turbine. Essentially wind turbine has sorts one is vertical and any other is horizontal. as the wind velocity will increase strength era is likewise will increase. The strength generated from wind isn't always non-stop its fluctuating. For attain the non-fluctuating energy we need to store in battery and then offer it to the load.

Charge controller

Charge controller has fundamental characteristic is that it control the supply which is to be lively or inactive. It simultaneously fee battery and also offers power to the burden. The controller has over-charge protection, short-circuit safety, pole confusion protection and automatic dumpload function. It additionally the function is that it must vary the power as per the burden call for. It upload the both the strength so that the load demand can fulfill. And while strength is not generating it need to extract power from battery and give it to the weight

Battery Bank

We have to choose battery bank size per the load requirement so that it should fulfill the requirement of load for calculating the battery bank size we need to find following data

1. Find total daily use in watt-hour (Wh).
2. Find total back up time of the battery

For increase in battery bank size we need to connect cell in series so that we can get the larger battery bank size.

Inverter

We must pick greater rating inverter than the preferred rating .The pure signal wave inverter is recommended in other to lengthen the lifespan of the inverter. Inverter is need to transform DC electricity into AC strength. As our load working at the AC deliver so we need to convert DC energy. The input voltage Output voltage and frequency, and general strength handling relies upon at the design of the unique tool or the circuitry. The inverter does not produce any energy. The electricity is provided by means of the DC supply

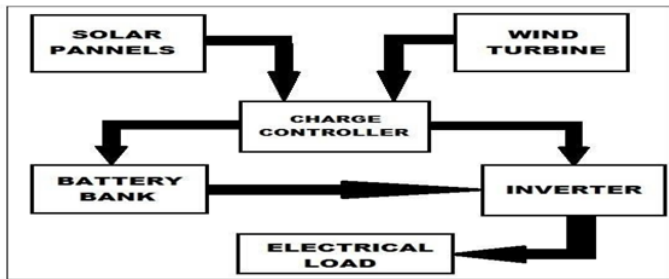


Fig.1 Block diagram of Hybrid energy system

SIMULATION RESULTS

Simulating the complete HPS is an effective and safe manner to test one-of-a-kind control systems. The HPS version became evolved in pieces with Simu link. First a solar model became created then tested. Next, a wind turbine version turned into developed from the solar version and tested via ha type of instances. The HPS version, shown underneath inFigure-2, includes a valuable bus capacitor with inputs for wind, sun, and dollar modern. Similarly, there's a bus voltage output.

This capacitor need to have balanced currents on the enter if the voltage is to stay solid.

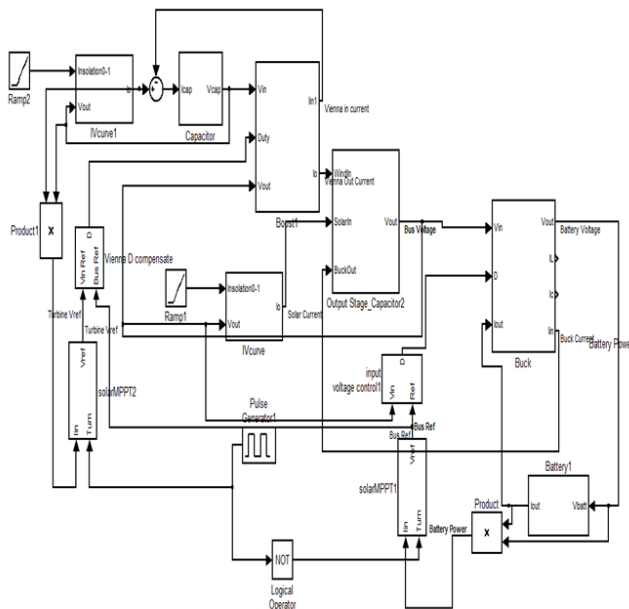


Fig.2 Hybrid Power System Simulink Model

The results of this simulation proven in Figure-3 display quicker convergence times for the sun power. Wind

power appears to take longer randomly. It seems that the algorithm stumbled upon an appropriate value. The rest of the startups have a whole lot longer convergence times.

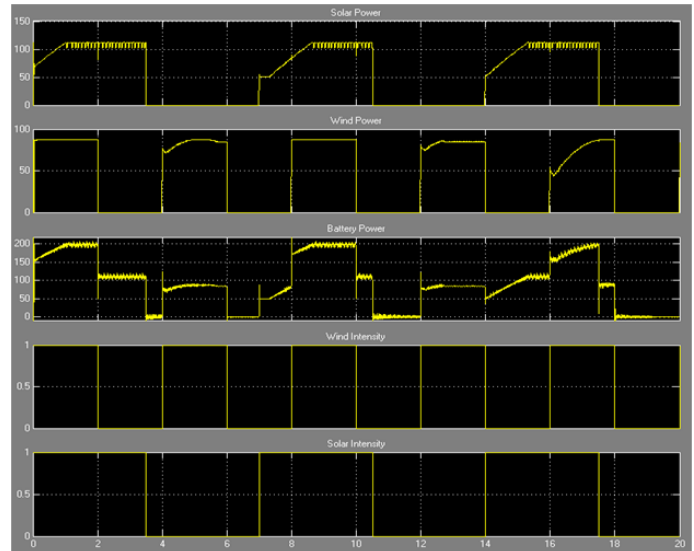


Fig.3 Both sources vary, Simultaneous MPPT method

CONCLUSION

Hybrid power generation gadget is right and effective answer for strength generation than conventional strength sources. It has more performance. It is able to offer to foreign places wherein authorities is not able to reach. So that the electricity can be make use of where it generated that allows you to lessen the transmission losses and cost. Price reduction may be executed by way of growing the production of the system. Human beings should encourage to use the non traditional power resources. It's miles pretty secure for the surroundings as it doesn't produce any emission and dangerous waste product like traditional energy assets. It is price effective solution for era. It only want preliminary funding. It has also long life span. General it proper, dependable and less expensive solution for power technology

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