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The Solar Power and Vertical Wind Power Charge Controller

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ABSTRACT: An innovative renewable hybrid microgeneration unit has been designed to be fully embedded into a dedicated LED street lighting system. The key feature of this new concept is the arrangement of a multiple Savonius vertical axis wind turbine into the structure itself of the post. A photovoltaic panel is integrated to contribute to power generation.
The main application of this project is the standalone street lighting, but also a grid connected option is feasible, making the system compatible with microgrid concepts. The wind and solar energy are called green energies. They have many advantages and have become important newly arisen energy types. When using wind and solar energy alone, they greatly depend on weather. But the wind-solar hybrid system can make up for this disadvantage, because it can effectively use the solar energy.

KEYWORDS- Solar Energy, Wind Energy, Hybrid Energy systems, VAWT, street lighting.

1. INTRODUCTION

The test of research in renewable energy micro generation technology is the lucky combination of efficiency.Solar energy is a major renewable energy source with the potential to meet many of the challenges facing the world. There are many reasons to promote its share in the energy market. This power source is increasing in popularity because it is versatile with many benefits to people and the environment.

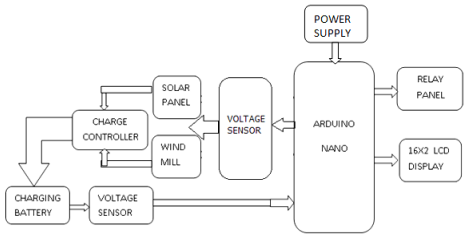
Wind power is the conversion of Wind energy into a useful form of energy, such as using wind turbines to produce electrical power. Large Wind farms consist of hundreds of individual wind turbines which are connected to the electric power transmissionnetwork. For new constructions, onshore wind is an inexpensive source of electricity, competitive with or in many places cheaper than fossil fuel plants.

Both Sources are playing an vital role in our life. Both sources are available free of cost and the use of these sources does not affects on the environment.

Objectives:

- In Remote areas implementing power systems units at each apartment.
- Multistoried buildings
- Homes, schools.
- Street lightings covering a large area.
- Off grid applications.
- Electric kettles solar vehicles
- Traffic signaling and in many applications.
- To obtain a maximum energy

Proposed Work:



To better understand the working of solar wind hybrid system, we must know the working of solar energy system and wind energy system. Solar power system can be defined as the system that uses solar energy for

power generation with solar panels. The block diagram of solar wind hybrid system is shown in the figure in which the solar panels and wind turbine are used for power generation A solar panel is made up of solar cells or solar photovoltaic cells, and is used for converting solar energy into electrical energy.

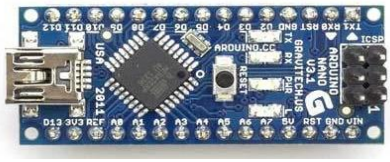
The solar panels utilize Ohmic material for interconnections and external terminals. Thus, the electrons produced in the N-type material are passed to the battery through electrode and wire. From the battery, electrons reach p-type material, where these electrons and holes are combined. Hence, the solar panel connected to the battery behaves like another battery, and hence, is comparable to the two serially connected batteries. The solar panel output is electric power and is measured in terms of Watts or Kilo watts.

Wind energy is also one of the renewable energy resources that can be used for generating electrical energy with wind turbines coupled with generators. There are various advantages of wind energy, such as wind turbines power generation, for mechanical power with windmills, for pumping water using wind pumps, and so on. Large wind turbines are made to rotate with the blowing wind and accordingly electricity can be generated. The minimum wind speed required for connecting the generator to the power grid is called as cut in speed and maximum wind speed required for the generator for disconnecting the generator from the power grid is called as cut off speed.

Components Required:

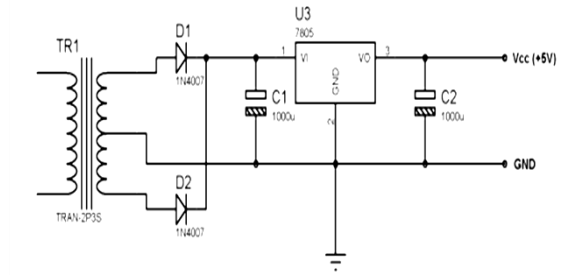
Arduino Nano:

- The Arduino Nano is a small, complete, and breadboard-friendly board
- based on the ATmega328 (Arduino Nano 3.x) or ATmega168
- It has more or less the same functionality of the Arduino Duemilanove, but in a different package.
- It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.
- The Nano was designed and is being produced by Gravitech.



Power Supply:
The microcontroller need +5V DC, These specifications dictate the use of a low-cost, ubiquitous linear regulator National Semiconductor LM7805. The LM7805 requires an input voltage of at least 7.5V in order to guarantee regulation, so the unregulated power supply should supply at least this voltage under worst-case current consumption, assumed to be about 200mA.

Relay:



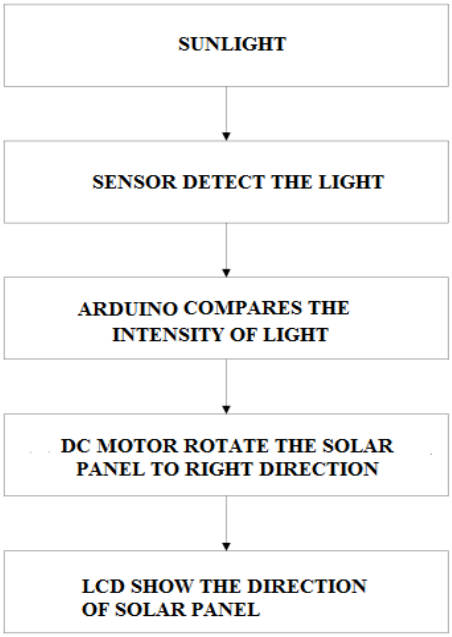
Relay:

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such assolid-state relays. Relays are used where it is necessary to control a circuit by a low-power signal or where several circuits must be controlled by one signal.

Battery

- The battery can be mounted in any position.
- Have shorter recharge time.
- Maintenance free.

Flowchart:



Advantages:

1. This system having high daily electricity generation capacity, low fabrication cost, maintenance is low .
2. The generator doesn't use any fuel hence , it not produces pollution.
3.The hybrid energy system is based on free energy.
4.It ensuring adequate and affordable energy for all.

Applications

- Used in between highways as there is wide space for installation of our system.
- Power supply point is located below the system in order to charge any application. Here, we have considered a grass cutting application which runs on DC motor and battery.

Future Scope:

All portable grass cutting machines which runs on diesel and petrol costs more and are creating noise and air pollution. So, using this system, we can use a DC motor, and can charge the battery of DC motor using this system which is placed in between highways. By using this, fuel cost is eliminated, weight of system is reduces, no hard work for carrying by operator.

Now-a-days, electric vehicles are in growth of applications. Customers are turnings towards purchasing electric vehicles. Dubai and other countries are widely using electric cars. Tesla is one of most famous brand among providing electric cars. Thus in future, electric vehicle charging system is needed. So, using this system, we can built electric charging station.

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Conclusion

- Wind energy and solar energy are renewable. They are non-polluting and zero emission new energies.
- The wind-solar hybrid streetlight system is an independent system based on of the best resource conditions.
- According to the wind power system structure, it has analyzed the wind electronic systems, photovoltaic electronic system.

REFERENCES:

1. J. Dong, G. Xue, M. Dong, X. Xu, "Energy-saving power generation dispatching in China: Regulations pilot projects and policy recommendations – a review", *Renewable and Sustainable Energy Reviews*, vol. 43, pp. 1285-1300, 2015.
2. Show Context CrossRef Google Scholar
3. R. Saidur, N. A. Rahim, M. R. Islam, K. H. Solangi, "Environmental impact of wind energy", *Renewable and Sustainable Energy Reviews*, vol. 15, no. 5, pp. 2423-2430, 2011.
4. Show Context CrossRef
5. *Renewable Energy Target Setting*, [online] Available: http://www.irena.org/DocumentDownloads/Publications/IRENA_RE_Target_Setting_2015