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Review On Design And New Development Of Dc Solar Air Cooler

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Abstract— *India producing electrical power is a challenging situation and also transmitting this power to the rural area in curbed huge amount of losses, which result in long power cut duration. In this paper focuses the desing and construction of a direct current (dc) air conditioning system integrated with photo voltaic (PV) cells or a PV panel. Solar charger controller and batteries which can be used in non-electrified areas for fulfilling the energy needs as the non-conventional resources is cost effective, ecofriendly and clean source of energy. This project is utilizing the non-conventional energy for cooler application. Arduino kit is being used to sense the water level and water end buzzer. It also includes the Bluetooth system to operate i.e. ON and OFF the cooler with the help of wireless system. DC motors are used for fan and water pump mechanism, the DC battery and solar power are more suitable for the purpose of solar and DC system being considering as the one of the path toward more sustainable energy system.*

Keywords— *Solar panel, Charger controller, Battery, Arduino kit, DC Motors.*

I. Introduction

The law of energy conservation is energy neither be created nor be destroyed but it can be transferred from one form to another form. There are two source of energy I.e. conventional and non conventional source of energy. The conventional sources are wood, oil, gas, coal and flowing water which can be used in long time.

The demand of air cooling is increasing due to effect of climate change and global warming. If we still rely on the conventional air cooling then consumption of electrical energy will increase day by day. In subtropical cities, air cooling or air conditioning is standard provision for building. Air cooling is defined as the simultaneous processing the tempreture, humidity, purification and distribution of air current in compliance with the requirement of space needing air cooling. The air cooling techniques are air conditioning, fan, dehumidifier and evaporative cooler but all these product run on electricity which is AC power and is generated from conventional sources of energy. Climate change is responsible for hot and humid conditions. These systems are most of the time not suitable for villages, school, offices because of long power cut duration and cost of these product and tariff is more.

II. Literature Review

Vijaykumar Kalwa and Prakash, 2014, This paper give us the information on , hot and humid condition feels sore because of hot climate and massive humidity. It is important to maintain the cooling condition. For this reason use of air conditioning and refrigeration has increased expontially and to run this product, we need electricity. Power consumtion is very big problem and it is not suitable for rural area because of long power cut duration. So the use of solar energy, Non conventional energy is clean and eco-friendly.

Non conventional energy can be transfer and dealing with charger controller, battery and inverter. Inverter are used to convert direct current to alternating current.

Shishi Bagal, Jeevan Dhobale, Akshay Surve, Rahul Satone, Mohammad Faizad, Shashi Pande, Rutuja Khodke, 2018, Tells us that water supply is important for plant growth. If the rainfall is not adequate, water requirement of plants increases. Sometimes people leaves water pumps ON thus wasting the water it might

happen that people may forget to switch OFF the water pumps and leave their home. As result there is scarcity of water in summer days. This paper gives the idea of semi automatic plant watering system. And use the sensor that show moisture content in the soiland and can provide water to the area where water is needed. It also uses micro-controller based design for control water supply.

Akash Kumar, Ankita Priyadarshini, Mihir Narayan Mohanty, 2017, This paper conclude that in the recent year, the fuel invention and the natural source are wastes severely, whereas the energy constraint and requirement for different application increase day by day and the technology is developed for the same, Still there is lack of electrical energy for electrical appliances accessible in rural area. This paper focused on the renewable energy such as solar energy to utilize in villages. The non conventional energy is used to produce the dc voltage that can maintain the growth in rural area. This voltage stored in battery, design of boost converter and filter has been discussed.

P.A. Jankar, A. S. Patil, 2016, Tell us that the environment problem are green house emission, global warming, waste disposal, climate change and many more. But it is very major problem to fulfill the energy requirement with the help of non renewable energy source. Also energy depreciation is another problem. The solar energy is one of the best ways toward the more sustainable power source. It is non pollutant and clean. Also it is easily available in nature. This paper has used sun tracking technique with the help of photo-voltaic system that are used to produce electrical energy. The system considers the dual axis tracking, use DC motors one is for Elevation angle tracking and another is for Azimuth angle tracking.

III. Solar Photo-Voltaic Cell

Solar PV cell is the technique by which renewable energy could be used to generate electrical energy. The solar PV cell are made up of the silicon or material like gallium arsenide and this transfer directly non conventional energy into the electrical energy but the efficiency of conversion is much lower and is only maximum 23% . It has got a few draw back like in gloomy and rainy days power cannot produce.

IV. Solar Photo-Voltaic System

When the customer are away form the main electrical supply system and remote areas, then PV technology may provide considerable non conventional energy. With the help of PV cell direct renovation of renewable energy is possible. These appliance convert sun rays to DC power without discharging destroy product also they have tiny maintenance and long life their energy source is infinite and they can be made from the raw material.

when the sun ray comes into the solar plate it switch solar energy into electrical energy, further this electrical energy either store in batteries or directly given to a DC load. In solar PV system the thermal energy stage is missing and renewable energy is directly converted into the electrical energy, therefore the troubles of high temperature material and unnecessary thermal loss are not present.

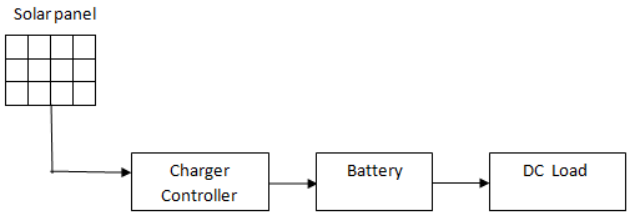

Fig. 1:- Solar photo-voltaic system

V. Dc Motor

DC motor is a range of rotary electrical machine has converts direct current electrical energy into mechanical energy. The most common type depends on the strength created by the magnetic field. The small rating of dc motor are used in toys, tools and appliances. The universal motor can operate on dc current but lightweight brushed motor is used for power tools. The large rating of dc motor are used in electrical vehicle, elevator, hoist etc.

The working principle of DC motor, "When an electrode is placed in the magnetic field, it experience mechanical strength" the direction of this force is given bye Fleming left hand rule and the ratio is given by,

F=BIL

Where,

F= Magnetic field

B= Magnetic flow density

I = Current
L= Length of the conductor.

VI. Charger Controller

Charger controller can be used to protection against the overvoltage and prevent overcharging. Also its reduce battery efficiency. Charge controller circuit are used for rechargeable electronics device such as cell phone, laptop, portable audio players.

The term charger controller or charge regulator can either refer to stand alone device or control the integrated circuitry in battery pack, battery charger.

VII. Conclusion

This paper conclude that the system design need to consider air cooling system in order to achieve air cooling. Non conventional energy is clean and non pollutant. Also it helps to reduce the electricity bill the durability of product is more thus minimizing the cost of product.

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