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Construction of Solar Air Cooler

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Abstract: *Mechanical Engineering without production and manufacturing is meaningless. Production and manufacturing process deals with conversion of raw materials inputs to finished products as per required dimensions, specification and efficiently using recent technology. The new developments and requirements inspired us to consider new improvements in air con engineering field. In our project, solar energy is captured and stored during a battery. This power is employed to run the air cooler whenever required. Solar energy means the radiation energy that reaches the world from the sun. It provides daylight makes the world hot and is that the source of energy for plants to grow. Solar electric systems are suitable for lots of sun and are ideal when there's no main electricity. That the technology of converting sunlight directly in to electricity. It's supported photo-voltaic or solar modules, which are very reliable and don't require any fuel. Our objective is to style and develop a solar electric system namely "CONSTRUCTION OF SOLAR AIR COOLER"*

Keywords: solar power, Photovoltaic cells, fan, Charge controller, Storage and conversion

I. INTRODUCTION

The physical body considered as thermal machine with 20% thermal efficiency. The remaining 80% heat must be disposed of from the body to the environment otherwise accumulation of warmth results and causes discomfort. The physical body works best at a specific blood heat like all other machine but cannot tolerate wide range of variation in environmental temperature like thermodynamic machines.

A. Need For Air Cooler

Human beings give off heat, around a mean of 100 kcal per hour per person, thanks to what's referred to as 'metabolism'. The temperature mechanism within the human body maintains a blood heat of around 36.90 C (98.40F). But the skin temperature varies consistent with the encompassing temperature and ratio.

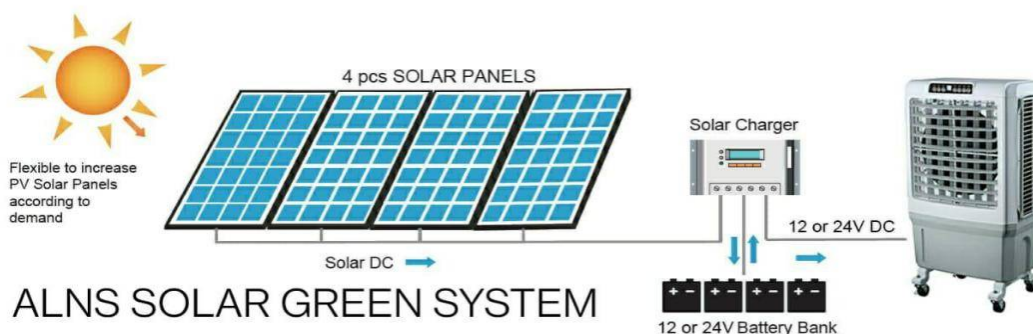
To dissipate the warmth generated by metabolism so as to take care of the blood heat at the traditional level, there must be a flow of warmth from the skin to the encompassing air. If the surrounding temperature is slightly but that of the body, there'll be steady flow of warmth from the skin.

But is that the surrounding temperature is extremely low, as on cold winter day the speed of warmth be due the body are going to be quite rapid, thus the person feels cold, on the opposite hand on a hot summer day, the encompassing temperature is higher than that of the body, then there can't be flow of warmth from the skin to the surroundings, thus the person feels hot. In such a situation water from the body evaporates at the skin surface dissipating water from the body evaporates at the skin surface dissipating the warmth thanks to metabolism.

This helps in maintaining normal body temperature. But if the encompassing air isn't only hot but highly humid also, very little evaporation of water can happen from the skin surface, then the person feels hot and uncomfortable.

B. Need For Non-Conventional Energy

Fuel deposit within the will soon deplete by the top of 2020, fuel scarcity are going to be maximum. Country like India might not have the prospect to use petroleum products. Keeping this dangerous situation in mind we tried to form use of non-pollutant natural resource of petrol energy. The creation of latest source of perennial environmentally acceptable, low cost electrical energy as a replacement for energy from rapidly depleting resources of fossil fuels is that the fundamental need for the survival of mankind. We've only about 25 years of oil reserves and 100 years of coal reserves. Resort to live beginning of coal in thermal electric stations to serve the population would end in global elemental change in resulting in worldwide drought and decertification. The buzzards of nuclear electric-stations are only two will. Now electrical power beamed directly by micro-wave for orbiting satellite. solar energy stations provide an economical solution even though work on solar photo voltaic and solar thermo electric energy sources has been extensively pursued by many countries. Earth based solar stations suffer certain basic limitations. It's impossible to think about such systems and meeting continuous uninterrupted concentrated base load electrical power requirements.

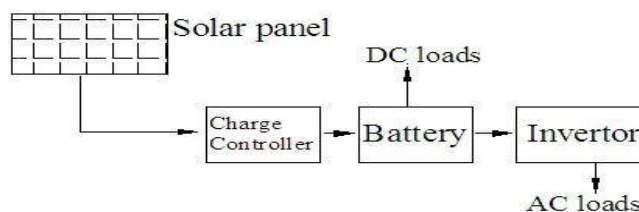


II. METHODOLOGY

The solar array is converting sun rays to the Electricity by Photo-Voltaic Effect. This electric power is stored during a 12 V battery. Battery D.C power is employed to run the D.C motor and D.C pump. diagram, Photovoltaic Effect and major components of our project are already discussed within the above chapters. The D.C motor is including impeller blades. The D.C motor runs when the air cooler button is ON, the impeller blades starts rotating. The pump is employed to circulate the water to the blower unit. The forced air flows through the water which is sprayed by pump, in order that the cold air is produced. The switch control is employed to ON/OFF the solar air cooler circuit

A. Cool Air Generation By Centrifugal Fan

Solar energy conversion is completed by using battery, inverter and charge controller. As sun light falls on solar array, which converts into electricity by photoelectric effect. This electricity stored in battery within the sort of energy



III. WORKING PRINCIPLE

The solar array is converting sun rays to the Electricity by Photo-Voltaic Effect . This electric power is stored during a 12 V battery. Battery D.C power is employed to run the D.C motor and D.C pump. Block diagram, Photo-voltaic Effect and major components of our project are already discussed within the above chapters. The D.C motor is including impeller blades. The D.C motor runs when the air cooler button is ON, the impeller blades starts rotating. The pump is employed to circulate the water to the blower unit. The forced air flows through the water which is sprayed by pump, in order that the cold air is produced. The switch control is employed to ON/OFF the solar air cooler circuit and therefore the heater circuit.

A. Sun Radiation Time

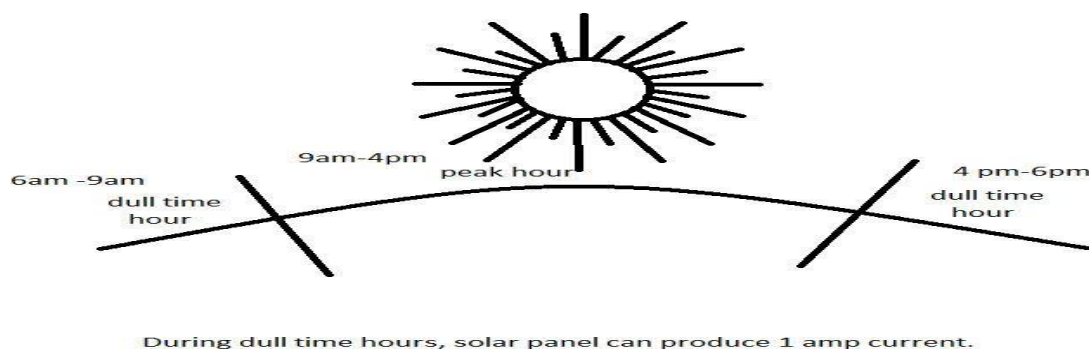


Fig 3.1 during dull time hours, solar panel can produce 1 amp current.

Power produced from solar panel = 20 watts

Battery storing capacity = 7 amps

Motor capacity = 1.4 amps

Pump capacity = 1.4 amps

Average working time = 5 hrs per day

Voltmeter shows 16 volts in stationary condition. = 20 watts / 16 volts = 1.25 amps/hr.

Formula:

$$P = V \times I$$

$$V = \text{volts } I = \text{current}$$

$$P = 16 \text{ volts} \times 1.25 \text{ amps} = 20 \text{ Watts per hour.}$$

IV. RESULTS AND DISCUSSION

The output of the project is

- 1) Comfort thermal conditions achieved within the front room. that's temperature up to 24 °C and ratio of 60%.
- 2) At lower cost natural cooling cabin for preservation of food has been developed.

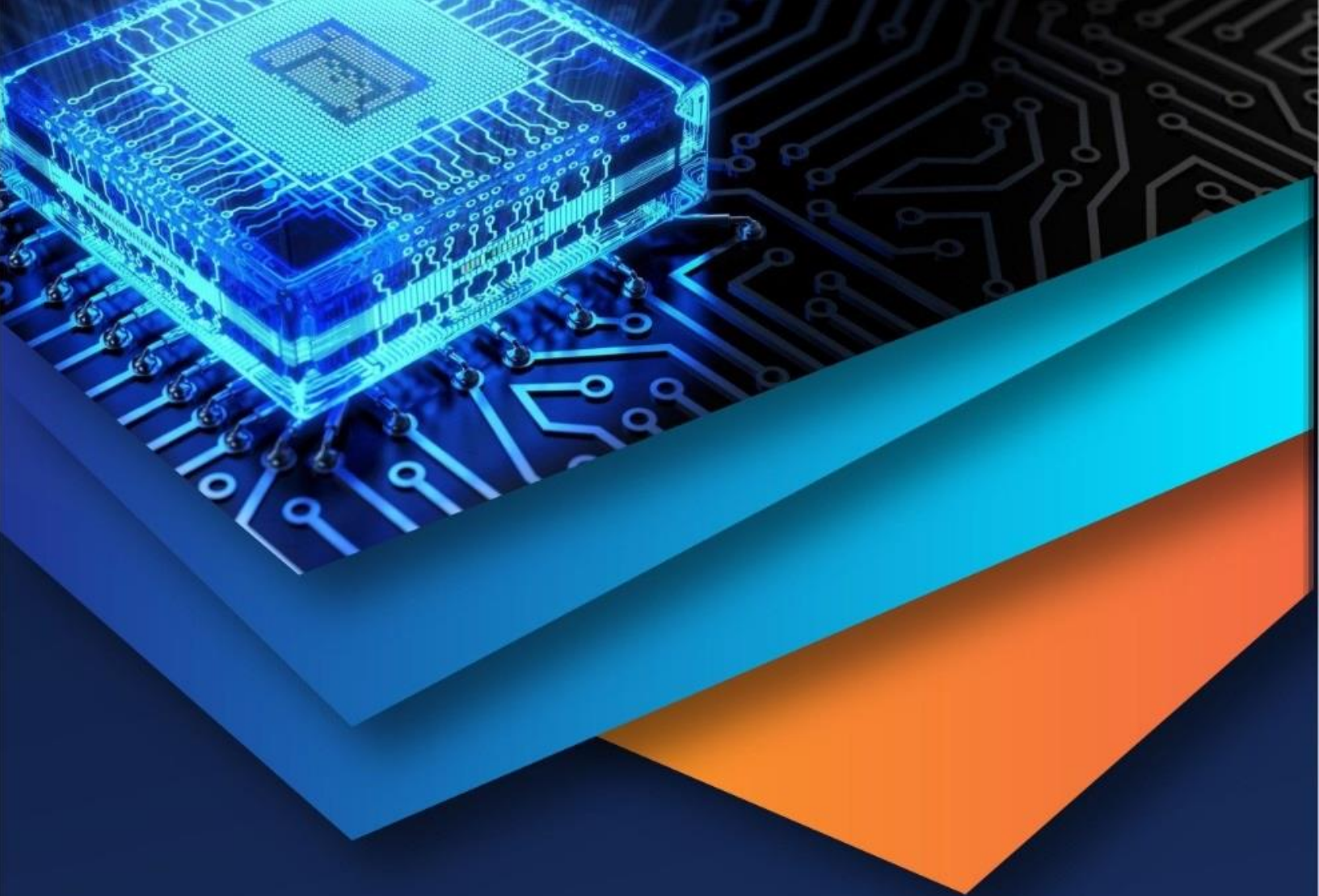
Table 1: Temperature Achieved in Cooling Cabin with Respect to Time						
Time (min)	15	30	45	60	75	90
Temperature (C)	28	26	23	21	20	18

V. CONCLUSION

It reduces the value of air con compare to normal air conditioning. It's eco-friendly. It's efficient for cooling in small area. Initial cost of its installation is high but on end of the day it proves eco-friendly. We got lot of data regarding our field which isn't available within the book. We learnt the way to add team by dividing the load and work with solidarity.

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