SOLAR AIR COOLER

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ABSTRACT: *Air-cooler is one of the major consumers of electrical energy in many parts of the world today and air-cooler causes energy shortage in for example China. The demand can be expected to increase because of changing working times, increased comfort expectations and global warming. Air-cooling systems in use are most often driven by grid-electricity. However, most ways of generating the electricity today, have negative impact on the environment. Solar air-cooling might be a way to reduce the demand for electricity. In addition many solar air-conditioning systems are constructed in ways that eliminate the need for CFC, HCFC or HFC refrigerants. An aim of the paper is to describe and explain the working principles of the components and subsystem in such general terms that the paper is usable not only to those specifically interested in solar air cooling, but to anyone interested in renewable energy resources. The paper briefly deals with how the components can be combined to form a complete solar air-cooling system.*

1. INTRODUCTION

In the last two decades, the demand for residential cooling has sky rocketed, creating an increasingly large demand on the electricity grid during the summer months Solar cooling consists of using thermal energy collected from the sun as the principal energy input for the cooling system to cool and dehumidify the space .This replaces the existing electrical power input typically required in a conventional air cooling system cycle. The benefit of this system is that it has the potential to reduce the amount of electricity used (and carbon dioxide produced from the generation of electricity) during Canada's hot summer months when the demand on the power grid is at its highest. These systems can be effective as the availability of solar radiation coincides with the energy demands imposed on buildings by cooling loads, allowing for the greatest amount of cooling to be generated when it is needed most. A complete solar cooling system consists of many individual components, each working together to provide cooling, but each serving their own purpose within the system. Typical solar cooling systems are comprised of solar panel, Battery, DC motor, DC Pump.

2. WORKING PRINCIPLE

The solar panel converts sun rays to the Electricity by "Photo-Voltaic Effect". This electrical power is stored in a 12-Volt battery. DC power from the battery is used to run the DC motor and DC water pump. The DC motor is coupled with impeller blades. The water pump is used to circulate the water across the circuit. The DC motor run during the air cooler button is ON and the impeller blades start rotating. The air is sprayed with cold water, so that the cold air is produced.

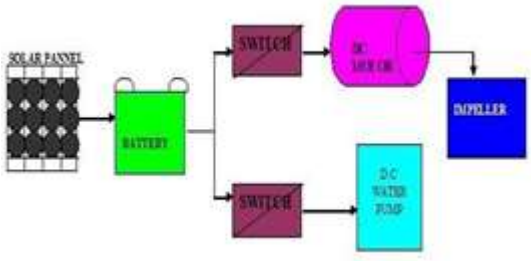

Figure 1: Block Diagram of Solar Air Cooler

3. COMPONENTS

- SOLAR PANEL
- SWITCH
- BATTERY
- DC MOTOR
- DC WATER PUMP
- IMPLLER

Solar panel

Solar panel refers either to a photovoltaic module, a solar thermal energy panel, or a set of solar photovoltaic (PV) modules electrically connected and mounted on a supporting structure. A PV module is a packaged, connected assembly of solar cells. Solar panels can be used as a component of a larger photovoltaic system to generate and supply electricity.

Model	KL010
Open circuit voltage	21.5
Short circuit Current	0.65
Number of Cells	64
Dimensions	300 3002 0mm
Weight	2.5Kg
Fill Factor	0.75
Price	650

Table 1: Specification of Solar panel

Switch

A switch is an electrical component which is used to break an electrical circuit, interrupting the current or diverting it from one conductor to another.

Battery

Battery is used to store the energy that is produced from solar panel and battery used is of secondary type

Type	Rechargeable
Capacity	7.5Ah
Voltage	12v
Operation Temperature range	-20^0 to $+60^0$
Weight	5kg
Battery Dimension	150 50 80mm
Price	1000

Table 2: Specification of Battery

DC Motor

The DC Motor is used to run the impeller fan by using electrical energy stored in a battery"

DC Water Pump

DC water pump is used to circulate the water across the circuit by mechanical action and electrical energy is supplied from energy stored in battery

Impeller

A standalone Impller is typically powered with an electric motor. Impeller is often attached directly to the motor's output, with no need for gears or belts. Smaller impller are often powered by shaded pole AC motors or brushed or brushless DC motors. In our case it is powered by dc motor having three blades.

4. COST ESTIMATION

S.NO	Components	Quantity	Price
1	Solar panel	1	**750**
2	Battery	1	**700**
3	Dc motor	1	**500**
4	DC Pump	1	**250**
5	Impeller	1	**1000**
6	Material		**1000**
7	Fabrication Cost		**1000**
		Total	**5200**

Table 3: Cost Estimation

5. CONCLUSION

So as comparing the cost of this product with the existing products in the market, solar Product appeals better and affordable by common people. This solar product perfectly Suits for villages, schools and offices and thus prevention from the power cut problems. It comprises of many attractive features such as usage of solar energy, cooler and cooling cabin at lower cost. The above method is eco friendly and natural, electricity savers. Durability of our product is more thus minimizing the cost. No electricity is spent so this product saves the energy and saves environment from getting polluted.

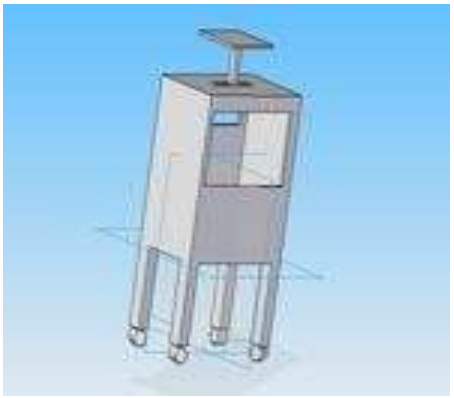

Fig2: Conceptual CAD Drawing

Fig 3: Working Model

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