Solar Operated Air Coolar

Prof. Jyoti Tilekar[1], Samarth Petkar[2], Tanmay Kumbhar[3], Pranav Udande[4], Suraj Hendre[5], Rupesh Madane[6]
[1, 2, 3, 4, 5, 6] College of Engineering Phaltan (Polytechnic)

Abstract- *The development of renewable energy is on the rise worldwide because of the growing demand on energy, high oil prices, and concerns of environmental impacts. In recent years, progress on solar-powered air conditioning has increased as nowadays, air conditioning system is almost a must in every building if we want to have a good indoor comfort inside the building. Therefore, this paper focuses in the design and construction of a direct current (DC) air conditioning system integrated with photovoltaic (PV) system which consists of PV panels, solar charger, inverter and batteries. The air conditioning system can be operated on solar and can be used in nonelectrified areas. As we all known, solar energy is cost effective, renewable and environmentally*

Keywords- Solar air oprated air coolar

I. INTRODUCTION

The demand of air conditioning is increasing due to the effect of climate change and global warming. If we still rely on the conventional electric air conditioning but electricity is generated form fossil fuels, the greenhouse gas emission would continuously worsen global warming, in turn the demand of air conditioning would be further increasing. In subtropical cities, air conditioning is a standard provision for buildings. However, air conditioning would commonly take up half of building electricity consumption air conditioning is defined as the simultaneous processing of temperature, humidity, purification and distribution of air current in compliance with the requirement of space needing air conditioning. In general, air conditioning which also can be known as refrigeration is defined as any process of heat removal. To produce the process, it requires energy where the sources are commonly gas and electricity. With increasing gas and electricity tariffs, solar energy becomes attractive once the system has been installed.

II. PROBLEM STATEMENT

Problem identification conventional air conditioning system has high power requirement, approximately 3-5 horsepower (HP). The high electricity demand for cooling purpose increase the electricity bills, which will lead to increase in living cost. In order to utilize the electricity efficiently, the need to design an alternative cooling system is inevitable. The development of evaporative solar cooler system is a reasonably good solution to provide low power and low cost cooling system for domestic sector

III. OBJECTIVES

- To carry out feasibility study on the possibility of utilizing solar energy for cooling purposes.
- To do cooling load analysis and develop cooling room.
- To provide solution for power cut problems in villages.
- Solar energy conversion is done by using battery, inverter and charge controller.

IV. LITERATURE REVIEW

A) Methodology

A solar cell (also called photovoltaic cell) is a solid state device that converts the energy of sunlight directly into electricity by the photovoltaic effect. Assemblies of cells are used to make solar modules,also known as solar panels. The energy generated from these solar modules, referred to as solar power,is an example of solar energy. Photovoltaicsis the field of technology and research related to the practical application of photovoltaic cells in producing electricity from light, though it is often used specifically to refer to the generation of electricity from sunlight. Cells are described as photovoltaic cells when the light source is not necessarily sunlight. These are used for detecting light or other electromagnetic radiation near the visible range, for example infrared detectors, or measurement of light intensity

V. CONSTRUCTION AND WORKING

- Collection of the required meteorological data: meteorological data for perlis was used. A typical meteorological year (TMY) was created and the hourly, monthly and annual
- Cooling load calculation: determine what kind of cooling and how much of cooling needed.
- using the weather data, and the selected design conditions, the components of the system could be sized.
- Optimisation of the system: the aim was to use least cost energy so the designed system was optimised with that in mind.

In designing a thermoelectric cooling system, one of the most critical processes is to reach an understanding of the thermal load. With this vital information, we can able to choose the best TE device or heat exchangers for the job. Each of the thermoelectric cooling system has a unique capacity for moving heat. In order to achieve the performance objectives estimate of the amount of heat must be removed from the thermal load is calculated. Once the module is selected, thermosiphon system for heat dissipation from the hot side of the module is designed based on the amount of heat that has to be removed.

Parts used in the project

1. Solar panel
2. Mild steel
3. DC Fan
4. Dc water pump
5. Switch

Working of the project

Solar panel consists of number of silicon cells, when sun light falls on this panel it generate the voltage signals then these voltage signals are given to charging circuit. Depending on the panel board size the generated voltage amount is increased. In charging circuit the voltage signal from the board is gathered together and stored in the battery. There are two tanks provided one at the top and another one at the bottom. The water from the top tank is made to pass through the tubes which are fixed between the two tanks. A fan is provided at the centre of the tank in such a way that the supply for the fan is coming from the battery which stores the current from the solar panel. When the water falls from the top tank to the bottom tank due to gravity, the fan is made to run, so that the cool air will be supplied all the way through. At the bottom of the tank, there will be a DC pump which pumps the water again to the top tank. The power for the DC pump is coming from the battery connected to the solar panel. The fan and pump is controlled separately with help of manual operated switch

ADVANTAGES

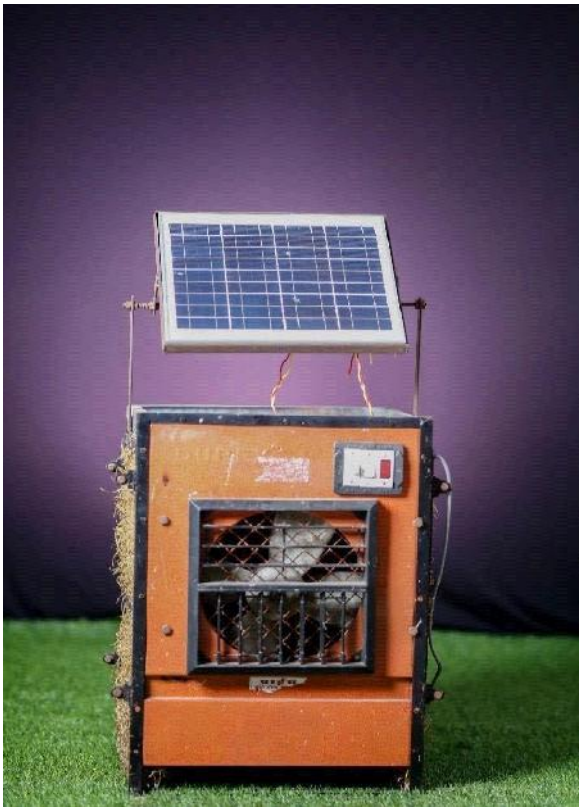
Applications

- It can be used in the rural areas where power cut is a problem.
- It can be used in schools, colleges, and offices.

VI. CONCLUSION

1It reduces the cost of air conditioning compare to normal air conditioner. It is eco- friendly. It is efficient for cooling in small area. Initial cost of its installation is high but on long run it proves eco-friendly. We got lot of knowledge regarding our field which is not available in the book. We learnt how to work in team by dividing the load and work with team spirit.

1. Low cost
2. High reliable
3. Low maintenance
4. Simple in design



REFERENCES

[1] Improving the environmental cooling for air- coolers by using the indirect- cooling method‖ ARPN journal of engineering and applied sciences, vol.5, no.2, page no.66-73. A. Salosaimy,2013

[2] Application of evaporative air coolers coupled with solar water heater for Dehumidification of indoor air‖international journal of mechanical & mechatronics engineering, vol: 13, no: 01-page no. 60- 68. Basic photovoltaic principles and methods

[3] ‖SERI/SP- 290- 1448 solar information module 6213 published february 1982 page.

[4] No. 9-15. Ajao K., Lawal A., Onaolabo N., And eniayenkan E. (2012) development and preliminary testing of a compressed laterite soil brick machine, annals of faculty of engineering, hunedoara, romania international journal of engineering ISSN 1584- 2665. Akelere F., And akhire N. (2013) design and construction of a three- mould hydraulic interlocking brick moulding machine, journal of emerging trends in engineering and applied sciences (JETEAS) 4(3): 527- 532, www. Jeteas.Scholarlinkresearch.Org . umar

[5] M.B. (2014), design, fabrication and testing of a multipurpose brick/block making machine, a thesis submitted to the department of mechanical engineering, nigerian defense academy, kaduna, nigeria.