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Solar Power Absorption Refrigeration System

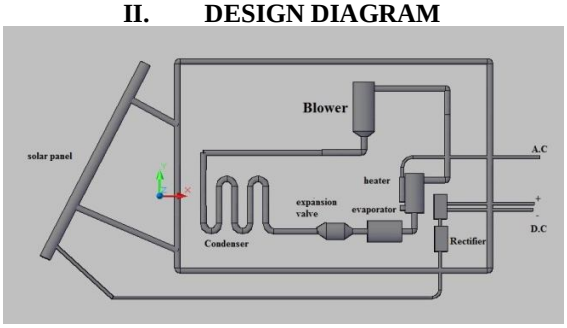
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Abstract- In our day to day life we depend upon the machine and equipment to complete everyday task. Every equipment run by means of energy. Our main demand is energy and our economic development depends on it. In our project we utilize the natural resource. The energy conservation and environment protection are key to sustainable development and the proposed design is solar power absorption refrigeration system, since it has high coefficient of performance in solar power absorption refrigeration system. The ultimate goal is to design a system that uses a renewable energy to supply necessary energy to operate the system. Due to the energy efficient and reduction in consumption, used to calculate the cop of solar power absorption refrigeration system.
Keywords-solar power,heater,refrigerator.

I. INTRODUCTION

Refrigeration system is defined as the process of maintaining a temperature below that of the ambient temperature, Its main purpose is to cool space to the required temperature. The most important applications of refrigeration is preserving the perishable food products by storing them at low temperatures.. Air Condition refers to the treatment of air so as to simultaneously control its temperature, moisture content, cleanliness, odor and circulation, as required by occupants, products in the surroundings. The subject of refrigeration and air conditioning has evolved out of human need for food and comfort, and its history dates back to several decades.

II. DESIGN DIAGRAM



III. COMPONENTS

The following are the components involved in our project

Condenser
Evaparator
Expansion valve
Heater
Battery
Solar panel
Blower
Inverter

A. Condenser

The refrigerant vapor to liquid refrigerant. It can change heat from one phase to another phase and eleminate heat to the environment (the room in case of domestic refrigerators). The refrigerant undergoes a phase change process and hence both the pressure and temperature remain constant before and after condensation. So, a condenser change a high-pressure high-temperature

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refrigerant vapor to a high-pressure high-temperature liquid refrigerant .A condense is generally to increase the surface area to facilitate heat transfer.

B. Evaporator

It is in the evaporators where the normal cooling effect takes place in the refrigeration systems. The evaporator is the main part of the refrigeration system when they compared to other parts it is very useful. The evaporators are heat exchanger surfaces that transfer the heat from the material to be cooled to the refrigerant, thus removing the heat from the material. The evaporators are used for many applications in refrigeration processes and hence they are available in huge variety of geometry. They are also classified into different methods depending on the feeding the refrigerant, construction of evaporator, direction of air circulation around the evaporator, application and also the refrigerant control.

C. Expansion Valve

A thermal expansion valve is a component in refrigeration systems that controls the amount of refrigerant librate into the evaporator. It can reduce temperature and pressure from the refrigerant. It can change higher pressure of liquid refrigerant in the condensing unit to lower pressure gas refrigerant in the evaporator.

D. Heater

A heating element can producing the electrical energy into heat through the process of heating element. Electric current pass through a copper wire inside the heater. It can release more amount heat energy to a material and temperature can be raised to maximum level.

E. Battery

A battery is a storage device. It consists of one or more electrochemical cells within external connections provide to store energy. When a battery is supply the electric power from positive terminal as cathode and negative terminal as anode. The terminal marked negative is the source of electrons that will flow through an external electric circuit to the positive terminal. It can store AC sources as well as DC sources.

F. Solar Panel

Solar panels is a device that convert heat energy into electricity. It can be used to store the energy. Lot of small solar cells spread over a large area can work together to provide enough power for working substances. The more light that hits a cell, the more electricity it produces the solar cell. The type of semiconductor are used in solar panel like, silicon crystal are classified into into N type and P type.

IV. WORKING PRINCIPLE

Refrigeration is working under the solar power and power source. The compressor (mechanical component) is replaced by the heater(electrical component).The power can be collected by the solar panel(DC).It can be converted from direct current to alternate current by using the inventor (AC). From the inventor power will passes through the heater. In heater lithium bromium refrigerant can be stored and then the heater works. The refrigerant can be evaporated. So high temperature can be raised. In order to raise the pressure blower can be used. The vapour can passes through the condenser it changes the vapour state to liquid state. Then the liquid can passes through the expansion valve so the temperature and pressure can be reduced and then liquid passes through the evaporator low pressure gas are produced and then cooling produced. The major test of this study is to test the performance and feasibility of running the absorption refrigeration System by using the power generated by solar cell during the day. Regarding the backup battery power supply performance.

V. CONCLUSION

Using solar energy as the power source of the system proved to be regular. Solar energy being a renewable source of energy proved to be effective as compared to using electric energy at the same place with the flow of bromide through the system, we were able to use it as an air conditioner and that too with the help of renewable and non-polluting source of energy. All over system coefficient of performance (COP) can be defined as the ratio of refrigeration capacity to input solar energy. The COP is low for all three types of solar refrigeration systems. However, this define as efficient may not be the most relevant metric for a solar refrigeration system because the fuel that drives the system during operation, solar energy. Other system that are more important are the Specific size,

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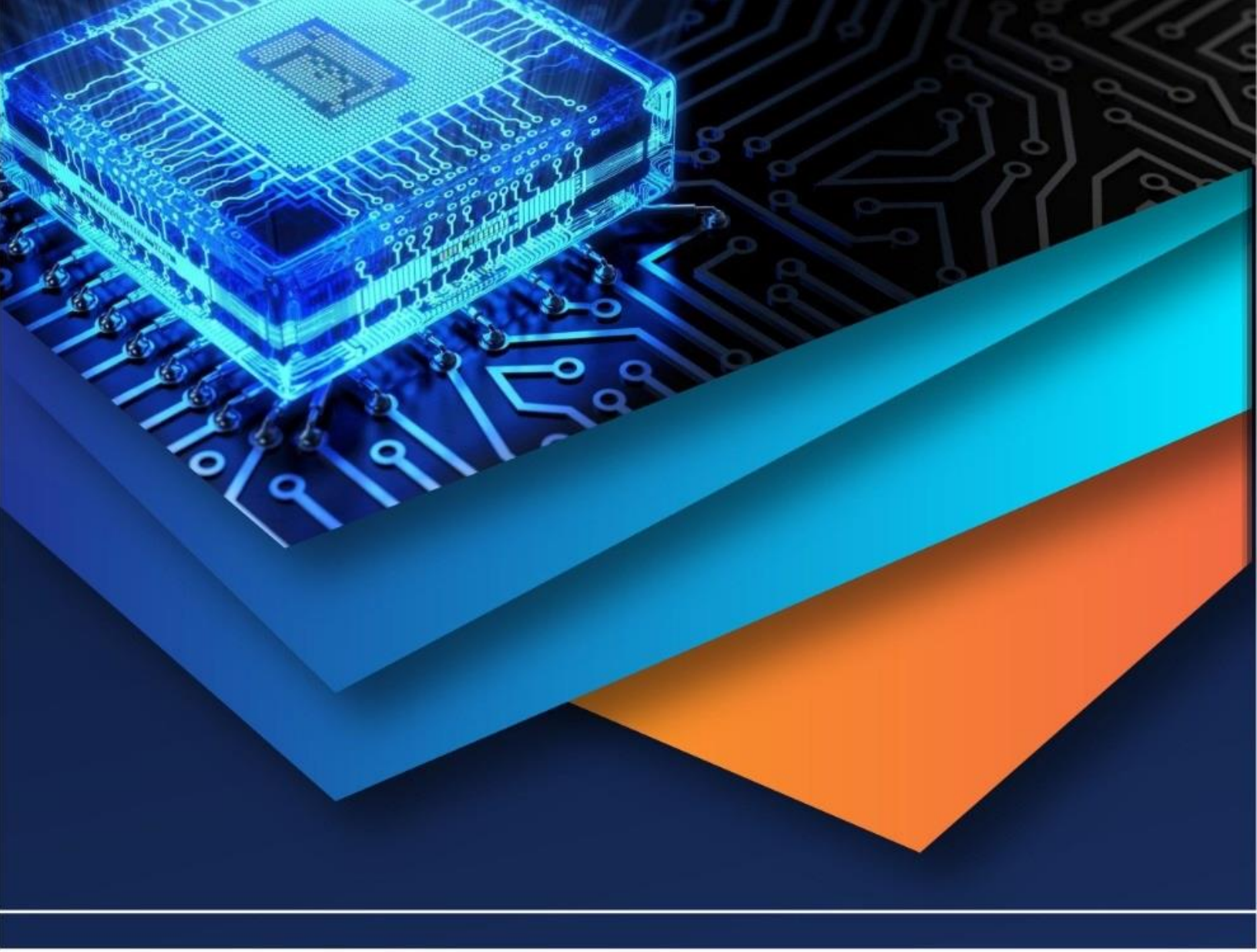
weight, and, of course, the cost number of barriers have prevented more economic use of solar refrigeration systems. Primary, solar refrigeration systems necessarily are more complex, costly, and huge in size than conventional fluctuation vapor compression systems because of the necessity to locally generate the power needed to operate the refrigeration cycle. Secondary, the ability of a solar refrigeration system to function is driven by the availability of solar radiation. Because this energy resource is variable, some form of redundancy or energy storage (electrical or thermal) is required for most applications, which further adds to the bulk than and cost. The merits of solar refrigeration systems is that they displace some or all of the standard fuel use. The processing costs of a solar refrigeration system should be lesser than that of standard systems, but at present and projected fuel costs, this operating cost savings would not likely compensate for their additional initial costs, even in a long term life-cycle analysis.

REFERENCES

[1] J.I. Zerbe, Reduction of atmospheric carbon emissions through displacement of Fossil Fuels, World Resource Review, 5(4), 414-423, 1973.
[2] US Environmental Protection Agency, Global Warming Climate, http://yosemite.epa.gov/oar/globalwarming.nfs/content/climate.html, 2006.
[3] NRDC (Natural Resources Defense Council) Annual Report: Air & Energy/Global Warming; http://www.nrdc.org/globalWarming, 2006.
[4] Australian Greenhouse office, Climate change/global warming and a home guide to reducing energy costs and Greenhouse Gases. http://www.greenhouse.gov.au , 2006.
[5] Environmental impacts of energy use, http://www.agenda-21.org.uk/enright.html , 2006.
[6] R. Weaver, Renewable energy projects in Council Buildings, Cities for Climate Protection Australia: an ICLEI program in collaboration with the Australian Greenhouse Office, Issue: April 2002.
[7] M. Meier, Tower of power: Australia could host the Wolrd's largest renewable energy power station, Engineering World, August/September, 6-11, 2005.
[8] Applications of solar energy, http://www.canren.gc.ca/tech_appl/index.asp?CaId=5&PgId=121 , 2006.
[9] M.G. Rasul,, D.W. Covey and M.M.K. Khan, Solar assisted desalination technology for water recycling, Proceedings Green Power 5, International Conference on Development & Management of Resources and Energy Security, CD-ROM, Hotel Hyatt Regency, New Delhi, India, 2-3 February 2006.
[10] ASHRAE Handbook – Refrigeration SI Edition, American Society of Heating, Refrigeration and Air Conditioning Engineers Inc, Atlanta, 1998.
[11] M.J. Moran and H.N. Shapiro, Fundamentals of Engineering Thermodynamics, 5th Edition, John Wiley & Sons. Inc., 2004.
[12] T.D. Eastop and A. McConkey, Applied Thermodynamics For Engineering Technologists, Pearson Prentice Hall, England, 1993.

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