A REVIEW ON TECHNIQUES OF REDUCING THE POWER CONSUMPTION FOR REFRIGERATOR & WATERCOOLER

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ABSTRACT

As we know that every year electricity gets more and more expensive because of its consumption demand is high. Energy is produce by different sources like hydroelectric power plant, Nuclear power plant etc. The device uses electricity and does the work but not all the energy is utilized. Some energy are gets waste and to avoid this wastage way must found out. Many researchers are found the way to recover this waste energy. This paper will give review of researches done for recovery technique. This paper emphasizes environmental impact for power reduction. Further cooler uses water to give cool air outside, for this application much more quantity of water has been used every year. Also to make this efficient woods product known as "wood wool / khas" have been used which became a major reason of deforestation. To restrict all these, an attempt is made to have an optimized unit by researchers, which will overcome for problem energy consumption for both the applications, and water savings which is helpful for social environment.

Keyword: - *Cool recovery1, refrigeration2, watercooler3, optimized4, Ecological balance5, pleasant environment6, consumption7.*

1. INTRODUCTION

There are several devices like water coolers, refrigerators, air coolers which consume high power. These systems also have impact on ecosystem. Proper choice of energy saving designs should be considered in order make ecosystem sustainable so that good harmony between environment and people can be made. The best innovation has been done in 20th century refrigerator and after that air condition and water coolers but according to survey around 30% of energy is consumed by these devices now days. However in over span of three decades the demand for energy is increased so far that necessity of energy saving is must due to exponential growth of population in India. These devices produces pollution and power consumption which no affordable in future. Researchers have developed many concepts which help to overcome the drawback of conventional system. The worldwide need of energy consumption arise big question of reducing the energy waste without effecting the efficiency and quality of installation. The purpose of this paper to provide a review on several concept which are used for the development of reducing the waste energy in applications like refrigerator and water cooler.

2. LITERATURE REVIEW

Sreejith K et al. [1] experimentally investigated the effect of different types of compressor oil in domestic refrigerator having water cooled condensers. The experiment was done using HFC134a as the refrigerant , Polyester oil (POE) oil which is used as conventional lubricant in the domestic refrigerator and SUNISO 3GS mineral oil as the alternatively. The performance of the domestic refrigerator and HFC134a/POE was compared with HFC134a/SUNISO 3GS mineral oil system for different load conditions. The result indicates that the refrigerator performance had improved when HFC134a/SUNISO 3GS mineral oil system is used instead of HFC134a/POE oil on all load conditions. The HFC134a/SUNISO 3GS mineral oil works normally and safely in the refrigerator. The water cooled heat exchanger was designed and the system was modified by retrofitting it, instead of the

conventional air-cooled condenser by making a bypass line and thus the system can be utilized as a waste heat recovery unit.

Romdhane ben slama et al. [2] developed a system that can recover heat from condenser of the refrigerator. In which air-cooled conventional condenser is replaced by heat water heat exchanger. The results show that water at a temperature 60^0C was produced by the system. This paper is also analyzed the economic importance of waste heat recovery.

Mukuna and kilfoil et al. [3] investigated technical feasibility of combined refrigerator, heat exchanger and geyser. It was concluded that 0.8%of total input energy of geyser was saved in cylindrical mode of refrigerator and continuous mode of geyser. However the refrigerators effectiveness was reduced because of refrigerant was not cooled enough.

Mathewlal and triloket al.[4]experimentally investigated that COP and power consumption. As we know that in water cooler some of cold water is simply drain out whose coldness can be used as sub cooling to condenser by introducing the device to condenser and shown the importance of waste heat recovery.

K. harby, Doaagebaly, Nadar koura, Mohammad hasan et al. [5] have given overview of performance improvement of vapour compression system using evaporative condensers. They stated that by using evaporative condenser it solves many quest of residential cooling systems problem of efficiency around the world and mostly problems are raised in middle east countries where heat is too high. Researchers have given several of simplified designs which can be used with refrigerator systems. With the help of this power can be reduced by 58% and COP improve by 118% .

S.C. kaushik et al. [6] has presented investigation feasibility of heat recovery from condenser of vapour compression refrigeration system with the help of canopus heat exchanger (CHE) between compressor and condenser component. CHE makes it possible to recover heat from superheated discharge vapour and can be used to increase temperature of external fluid (water) for removing heat from condenser. They did investigation on different inlet temperature and mass flow rates on the heat recovery output and distribution over the condenser and CHE. The parameter results obtain for different working fluids R-22, R-12, R-717 and R-500 are represented.

R.A. clark et al. [7] described design, construction and testing of an integrated heat recovery system was designed both for residential refrigerator and pre heated water for electric heaters. Experiment done with R-12 refrigerant which economical for ozone layer and temperature increase upto 30^0c in five days no use condition and operating cost and saving is achieved 18.3%. It is investigated that results will not positive for initial run or quick run.

AmanGadpandey, harishchimurkar, Dakshatadhanvij and AnmolKawaseet al. [8] has done comparative study on traditional indian coolers by using the R-134a which is eco-friendly with environment and non toxic. They used woodwool/khas which is reason for more deforestation. The refrigerant R-134a absorbs the heat from air and makes the cool air by getting vaporised in evaporator and cooled air is sent outward from the opening of research model and fan is running on motor to give extra cooling effect. There project is cheap with less power consumption and eco-friendly.

3. CONCLUSION

From above literature review, the experimental investigation on developments, modification of water cooler and refrigeration technology following conclusions are observed.

- By using different types of oils for compressor the performance of system can be enhance.
- By replacing conventional condenser to heat water heat exchanger and recovering waste heat from condenser the power consumption can be reduce.
- Combination of refrigerator, heat exchanger and geyser the improvement of 20% can be done.
- We can use the coldness of waste water to precool condenser
- With the help of evaporative condenser the performance can be enhanced
- The use of refrigerants has different effect on performance of refrigerator and water cooler so most efficient choise of refrigerant is needful.
- Refrigerant 134a is cheap, non-toxic, cheap, ecofriendly and helpful in reducing the power consumption.

This all researches and techniques have helped a lot to reduce power consumption as well as global warming problem.

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