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Environmental Friendly Air Conditioners are they Possible?

Vishal Kunwar

Civil Engineering 3rd Year, Netaji Subhash Engineering College, Kolkata, West Bengal, India
B. Tech, Netaji Subhash Engineering College (Mauza Ranabhutia, Garia, Kolkata, West Bengal 700152) , India

Abstract: ***We all know environment is a beautiful gift to us. It is also one of the basic public assets of a human system, and it must be protected by special means. According to a report as of 2009, nearly 90 percent of American homes have air-conditioners, which account for about 6 percent of all the country's residential energy use which is a big amount. All that air-conditioning gives us about 100 million tons of carbon dioxide each year. The paper summarises the conditions for sustainable development, tools, methods and techniques to solve the environmental problems.***

Keywords: Environment. Air conditioners, Sustainability, Innovation in air conditioners, Methods & tool

1. Introduction

The paper summarizes the results of the systematic study of what are the possible ways in which we can create environment friendly air conditioners. It starts from cognition of the studied subject on the present level and summarizes the conditions and limits of eco-friendly air conditioners, as well as the tools, methods and techniques we can use to solve the environment problems by this innovations. **N**ow day's environmental conservation is most important challenge which we face today or we can say it's a last call from our environment to rectify our mistakes but as we know that environmental pollution is an incurable disease , it can only be prevented.

In India there are three type of cooling system are present.

1) Coolers: they are generally used were power supply is low. They don't create any harm to environment but they are not very useful during summer seasons.
2) Air conditioners: they are generally used in urban area where power supply is good. But they cause harm to our environment (global warming). Air conditioners use compressors as their main ingredient which makes them to draw huge amount of electric energy.
3) Air conditioners in buses: they also run on compressor so they drew huge amount of oil as their fuel. Ac buses are creating much environmental pollution then ac at home.

Problems which we are facing due to air conditioners are:

Problem

1) Compressors in air conditioner drew much energy from source resulting in more power consumption and high electric bills.
2) Generally air conditioner can't work on low power supply i.e. we cannot use it in the area where energy supply is very often like in village area.
3) Air conditioner in buses use huge amount of fuel compare to other NON-AC buses so their fairs are also high.
4) Air conditioner cannot be used where there is no power supply, many deaths occur during summer due to excessive heat in some region of our state.
5) Air conditioner are not of potable type

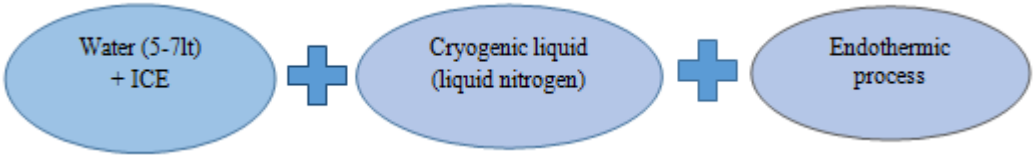
So what can be the solution of this above problems? According to my research I came to know we can create a perpetual motion machine. Which can drew very less energy compare to other air conditioners and it will not work on compressor. So it will be environmentally friendly too.

Before going to solution we will know, what are the possible ways in which we can create an Eco-machine. (Perpetual machine)

Cooler	Air conditioners	Eco machine
20-30 litre of water is need for cooling a small room of 9-4foot.	Compressor + coolant is used for Colling down air in a room	We have to replace compressor &we can't use 20-30 litre of water
Uses - 0.2-0.3 unit of electrical energy per hour.	Uses- 1.2-1.5 units of electrical energy per hour.	Uses - 0.2- 1.2 unit of electrical energy per hour.

So what we can do is we can create a machine which will be the combination of one and two (cooler +A.C.). I.e. we will try to replace compressor by eco machine. As compressor is the heart of air conditioners so replacing it will not an easy task. We have to create a machine which can deliver same amount of work even faster than compressor by drawing very less amount of electrical energy.

On the way of finding its solution we came to know that it is only possible i.e. we can achieve the desire result by following 3 ways only.



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1) Water (5-7 lit) +ICE: in normal cooler 20-25lt of water is used for cooling. That's the challenge for us to reduce this amount to 4-5lt water. Because 20-25lt water can absorb 2100 KJ (heat=M*S*T) of heat from surrounding. 5-7lt water will absorb only 420kJ of heat.

To get good results we will use distilled water as we know distilled water can absorb more heat than any other material.

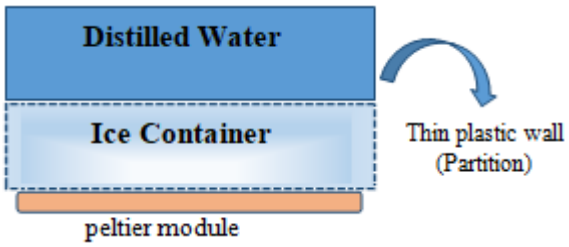
[Note: for elements lower the atomic number the higher the heat capacity in joule/gmk. Hydrogen is the winner with 14.304 followed by helium 5.193. Among liquids water has the highest heat capacity (4.18k.j/kg.k)but hydrogen has the highest (14.3 kj/kg.k) heat capacity of all.]Hydrogen gas & liquid are hazardous to health so we can't use them.

So by using only distilled water with some ice we can absorb =334.8+h ice.

Some people might be thinking why not create a Peltier module fridge in which we will store ice instead of water. Actually we can't do that because when we mix water and ice. When heat enters to water it will try to break hydrogen bond and as we know breaking hydrogen bond will need heat. So water can act as greater heat absorber but when we add ice in water heat will be easily drawn by ice so, function of water will get suppressed .

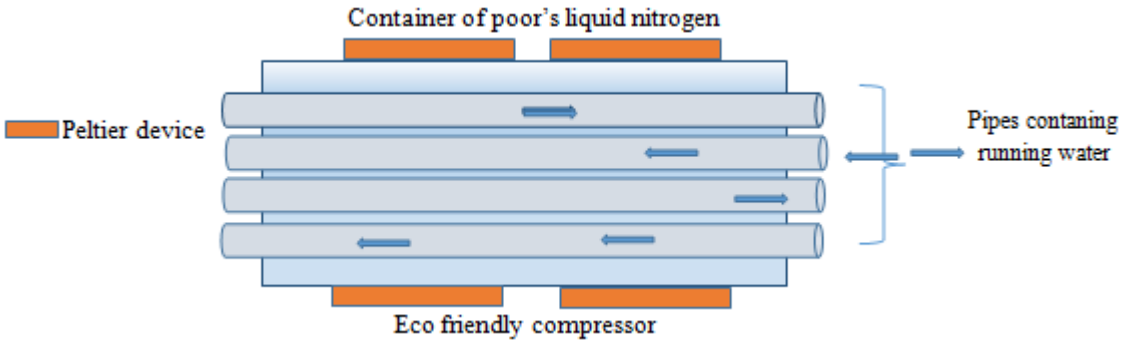
So to get a combine result of both water and ice we should place both of them in different container.

Type of container which can deliver us great results



2) Cryogenic liquid (liquid nitrogen): peoples in different part of the world has tried to a much extent to replace compressor function by cryogenic liquid but they failed. Cryogenic liquid needs much care and they can't be stored for a long period. Cryogenic liquid like liquid nitrogen is hazardeous to health as it replaces atmospheric oxygen by nitrogen. So till date there is no solution present for all above problems.

BUT we will use this liquid in our Eco machine, we will use it for cooling the running water in our machine. For this purpose we will need only 2-3lt of poor's man liquid nitrogen. We will store it in liquid nitrogen container so that it can remain there for about a week. After a week we will replace it.



3) Endothermic process: Maximum heat absorb or emitted out can occur in endothermic and exothermic reaction respectively. Running a process in reverse produces heat flow of same magnitude but of opposite sign as running in the forward process. Thus to absorb more heat from surrounding we will use endothermic reaction. But to get the desire result, reaction must be a spontaneous one. Spontaneous reactions which are present are not suitable for our use because maximum of them are hazardous.

Reaction like: Barium hydroxide and Ammonium chloride reaction temperature drops from 22* Celsius to -25* Celsius. It's a good reaction but hazardous as well.

So, in our Eco machine we will use a solution of Ammonium chloride and water as they are not hazardous. We can buy ammonium chloride at very cheap rate easily. But the big challenge is to make it a spontaneous process.

Zeolite thermal storage: can absorb 4 times more heat than water. The best part of zeolite is they get converted in liquid when the absorb heat and get solidified when releases heat so that's a plus point for us.

Conclusion

1) Nothing is better heat absorbent then water so we will definitely use water.
2) For getting fast results we should prefer endothermic reaction.
3) Can we create a spontaneous endothermic process for complete cycle of flow?
4) We will use liquid nitrogen as a chiller.

Air conditioners cool down the room by removing hot air by cold air. Cooler cool down the room by absorbing heat from the air inside the room. We will use this property for cooling our buses our main aim will be to cool down the air inside the bus by absorbing heat from it.

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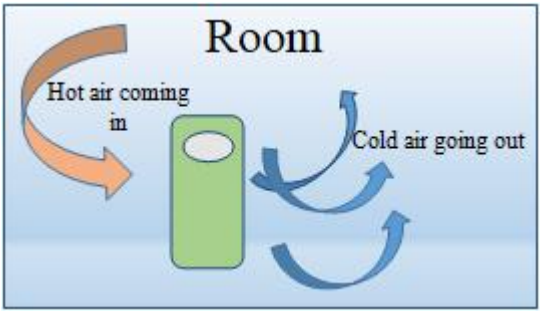


Flow of air in closed room

As we know hot air are lighter then cold air so this conventional current process will help us to achieve our desire temperature (-16*Celsius) in less time compare to air conditioners. We can use this process for buses' also.

2. Calculations

Heat obtain due to body heat of human beings
A working body has a temperature of 37.5*-38.2*Celsius.
LET,
In buses there are 45 people
Heat capacity=3.5kJ/kg.k
Average mass of human beings =70kg temperature=15K
Heat generated = (30*70*3.5*15) kJ =110250 KJ

Heat obtain due to size of bus:
Size of bus =960pt3
Which is equal to 27184.20 Litter or27.184 m3 or 33.304 kg
Heat generated =(33.304)*(1.005)*20 =669.4104 KJ of heat.

Total amount of heat we have to remove will be equal to 110250 KJ+669.4104KJ =111000 kJ.

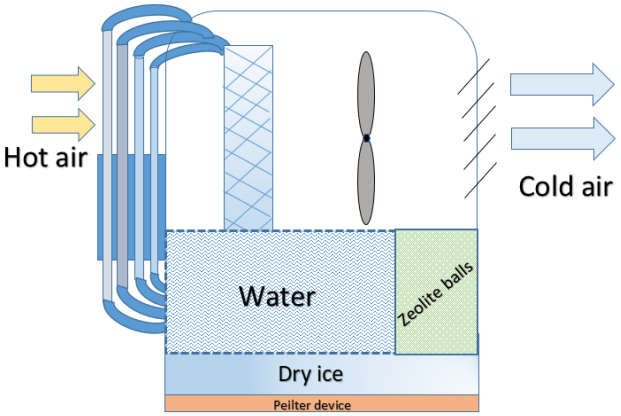
So at the end of the day we will get following solutions:

Solutions
1) By this innovation we will reduce the household electricity consumption to much extent.
2) By this innovation pollution will be controlled to some extent & consumption of diesel or petrol will be reduce by some extent in cars and buses.
3) It will be of low cost so any people in any state of India can buy it easily and they can use it by operating it with a small battery of 12volt DC.
4) Its cost will be RS 10, 000 only which is very less compare to any other air conditioner so, it will soon be in demand in market.
5) It will be portable.

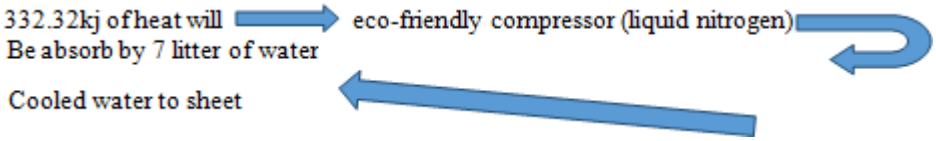
This Eco machine is not possible as we cannot create a spontaneous endothermic chemical reaction of ammonium chloride and water.

We cannot store liquid nitrogen for more than 3 days in above specified container.

But if we can tackle out the above problems we can then easily create a machine which will drew very few amount of electricity. And it can be installed anywhere so by this machine we can lower down energy consumption of our country by much extent. Most important it will be a new innovation for the world in the field of air conditioners



Final model of eco machine



3. Conclusion

Air conditioners are now days are consuming 6% of residential electric supply. So having an innovation in this filed will always be in high demand. In my paper I have shown what are the possible ways in which we can create eco-friendly air conditioners by replacing compressor. But the machine I have created is a type of perpetual motion machine.

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