REVIEW ON NATURAL AIR FLOW AIR CONDITIONING FOR LOW-COST COLD STORAGE AND GREEN BUILDINGS.

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Abstract -The Indian agricultural sectors are leading towards use of the cold storage and cold chain management for the use of their crops long life storage. Also, the construction industries are adopting green buildings owing to their advantages of using less electrical energy. The very basic problem arises in the development and long-time run of cold storage for small scale farmer is that its energy consumption. And high energy bills increased the cost of their products in the market making economy of food products costly. By proper use of natural resources and well-designed mechanical system we can easily overcome these problems.
Natural air flow air conditioning will be the most effective, low cost, and innovative solution for the applications of cold storages and green buildings. Here we will be targeting mostly towards cold storages because Indian agricultural need such innovative solutions and it's a big market waiting for the solutions. This system will make use of natural air flow. By concentrating natural air flow using concentrator and impacted this air with speed towards the water-cooled condenser will help to reduce air temperature and use it for cold storage rooms. This continuous gradual decrease of temperature will be monitored by a digital temperature display in our project modal. By making use of natural air flow, sunlight and small amount of water this system will make air cooled to desired temperature. As these recourses are abundantly available and are almost hundred percent free of cost by the nature the operational cost and energy consumption of our air conditioners will be very less making it more suitable and attractive for the betterment of Indian agricultural fields.

Key Words: cold storage, electricity consumption, green buildings, natural air flow , natural resource .

1. INTRODUCTION

Ancient Egyptian buildings used a wide variety of passive air-conditioning techniques. These became widespread from the North Africa, the Middle East, and Northern India. Similar techniques were developed in hot climates elsewhere Passive techniques remained widespread until the 20th century, when they fell out of fashion, replaced by powered A/C. Using information from engineering studies of traditional buildings, passive techniques are being revived and modified for 21st-century architectural designs. An array of air conditioners outside a commercial office building Air conditioners allow the building indoor environment to remain relatively constant largely independent of changes in external weather conditions and internal heat loads. They also allow deep plan buildings to be created and have allowed people to live comfortably in hotter parts of the world. But now, there is need of some modification as the world is indigenously turning towards solar and other natural resources. There is also a need of change in air conditioning system, as the source of generating electricity such as coal will get vanish in upcoming years. Therefore, solar power is only long lasting technique of generating electricity. Increasing global warming is due to large no. of cutting trees, pollution from factories, due to the various refrigerants (e.g. R-22). Therefore, our aim is to publish this paper for the awareness of people to **GO GREEN** and use natural resources and reduce the use of electricity. We are planning natural air flow air conditioning without refrigerant and very low energy consumption for cold storage and green buildings. As increasing population demand of high living standards by constructing huge buildings and lavish furniture's this sacrifice large no. of jungle area and trees. The United States got concern about it and brought some of green buildings in the state of New York. In new York, Brooklyn botanic garden is spread in 52 acres area and four sides of it is covered by the city. The main thing about this garden is that this garden not made by government. But it's peoples idea. As India is also a country which has a large no. of population it should also opt. Some same idea of protecting the nature . Humid city like Mumbai should opt. Some natural air conditioning.

2. Literature Review

Karin Lundgren Kownacki, Elisabeth Dalholm Hornyanszky, Johanna Alkan Olsson, Air conditioning the most effective means for the cooling of indoor space. However, its increased global use is problematic for various reasons. The author had describe challenges linked to increased AC use and discusses more sustainable alternatives. A literature review was conducted applying a transdisciplinary approach. It was further complemented by examples from cities in hot climates. To analyses the findings, an analytical framework was developed which considers four societal levels—individual, community, city, and national. The main challenges identified from the literature review are as follows: environmental, organizational, socio-economical, biophysical . The paper had identified several measures that could be taken to reduce the fast growth of AC use. However, due to the complex nature of the problem, there is no single solution to provide sustainable cooling. Alternative solutions were categorized in three broad categories: climate-sensitive urban planning and building design, alternative cooling

technologies, and climate-sensitive attitudes and behavior. The main findings concern the problems arising from leaving the responsibility to come up with cooling solutions entirely to the individual, and how different societal levels can work towards more sustainable cooling options. It concluded that there has a need for a more holistic view both when it comes to combining various solutions as well as involving various levels in society. Conclusion – Huge economics loss in air conditioning system cause increased financial expenditures and environmental impacts

2)Briana Elizabeth Amoroso,Comparing Economic, Environmental, and Social Effects of Central Air Conditioner Size and Thermostat Schedule Interactions. The number of U.S. homes with central air conditioning (AC) grew from 68% in 1993 to 87% in 2009. These homeowners had spend $11 billion on air conditioning each year corresponding to about 13% of their household energy consumption. In addition to economic costs, this had environmental impacts from the pollutants released due to electricity generation. The average central AC system consumed 2,000 kWh annually, with consequential emissions of 3,500 pounds of carbon dioxide and 31 pounds of sulfur dioxide These and other pollutants impacted on human health effects. The aggregate of homes with air conditioning also contributed significantly to electrical loads. In warmer climates such as California, 30% of the peak electricity demand during the summer months was created by air conditioning use These economic, environmental, and social effects had been continued to grow, as almost 90% of newly built homes in the U.S. have central AC Conclusion – Increase in cost f development and running cost of the warehouses and cold storages due to high cost of air conditioning equipment's makes them not suitable for most of the location which may leads into loss of the products and quality.

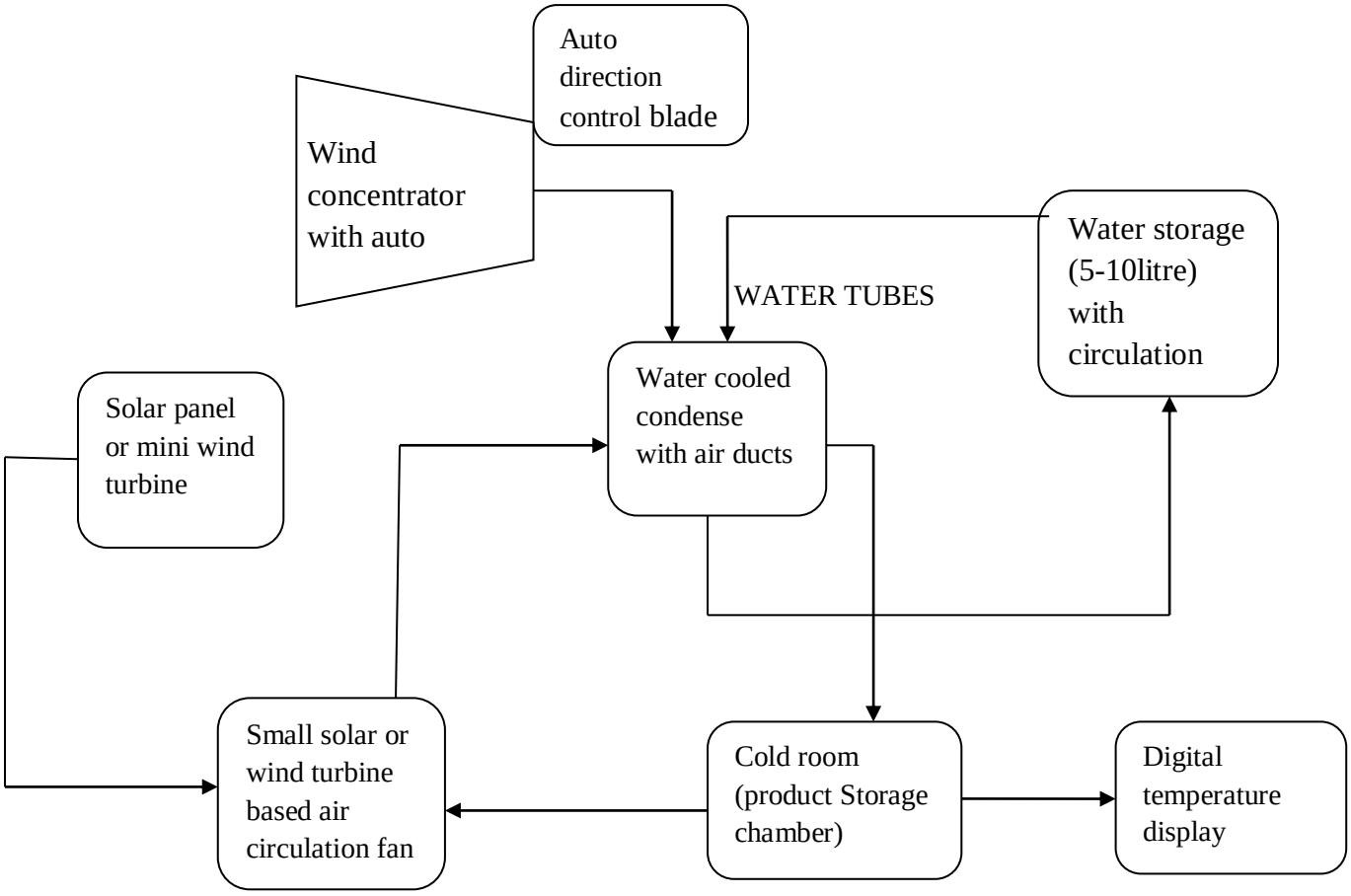
3) International journal of refrigeration, the impacts of air conditioning and refrigeration systems on stratospheric ozone had primarily linked to release of ozone-depleting refrigerants. Their contributions to global warming stem both from release of refrigerants and from emission of greenhouse gases (GHGs) for associated energy use. Because the energy-related component has a significantly higher warming impact, phase-out of hydro fluorocarbon (HFC) refrigerants with less efficient options caused increase net GHG emissions. The same conclusion applied for per fluorocarbon (PFCs), though they are less commonly used as refrigerants. Integrated assessment of ozone depletion, global warming, and atmospheric lifetime provides essential indications in the absence of ideal refrigerants, namely those free of these problems as well as safety, stability, compatibility, cost, and similar burdens. This study examines the trend in refrigerant losses from chiller use. It documents both substantial progress in release reductions and the technical innovations accomplished.. It contrasts the impacts of current refrigerants with alternatives and with the chlorofluorocarbons (CFCs) they replaced. The study examines the sensitivity of efficiency to charge loss. It also summarizes thermodynamic and environmental comparisons of options to show that phase-out decisions based on chemical composition alone, without regard to attributes of individual substances, can result in greater environmental harm than benefit.

3. Process and Components:-

The air conditioning project concept was taken from today's modern days environmental concern. However, it started with the selection of parts according to need of working project .the concept was developed and studied. All the data regarding to the project was collected and studied its was analysed. The concept was designed and finalized .Later analysis of design was done. All the components such as Metal sheet, Hole saw for drilling , Solar Panel, Welding rods, Bearings, mounting board,

Fasteners, Ms Square channel, Water Pump, Air circulating pump, Water jackets, Water tubes, Water spray nozzle, Water Pipe connectors type, Air tube connection type were selected according to the need . As the main aim of ac is to provide human comfort and cooling to the given space to provide cool and dry air . So the heart of ac is the compressor but due to the increasing electricity bill and environmental concern we are using solar and also eliminating the compressor . We are using air concentrator , air directional blade , water jackets, air pumps and air pump all will run on solar panel except the water pump. All process started with MS metal sheet through making holes polishing burring process . All metal sheets were cut according to drawing made by the auto cad software all measurement were taken into the mind and worked was placed . First air concentrator was made by using proper suitable metal then the piping was made and connected to the water jacket the piping was covered by the insulating materials such as glass wool inside the water jacket sponge type material was used . Air sprayer was attached to it . A water pump was connected from the bottom side of water jacket . Air pump to was connected and the cooled air was passed to the area required . All the temperature difference was known by the temperature sensing instruments . As we have accomplished the model there were some obstacles while doing it such as a experience person was needed for the insulation process while installing the insulating material many members meet with injuries all the cutting sheet process required proper hand safety welding process required proper eye glasses and hand gloves. Also after making the model the sufficient air was needed to carry out the proper operation for that we have to place it properly and at right position. We finally carried the operation theoretically and come to know its efficiency and we got succeed . Electricity consumption was quiet less and somewhat negligible .We accomplished the air cooling at half of the surrounding temperature in twenty minutes . By this we also meet the term of go green and save electricity by using the natural resource available .

BLOCK DIAGRAM:-



4. Methodology:-

1. Project selection and developing concept.
2. Collection of data and analysis.
3. Creation of final design.
4. Proper material selection.
5. Completing material selection and working process.
6. Completing manufacturing and testing and documentation work.

5.Summary: As completing this task, we fell quite fulfil in having completed it we have enormous practical experience on fulfilment of our task. By this topic we have fulfil the required objective that it saves electricity and go green it uses solar power and is cost effective .If we do some more modification in upcoming time with the new technology, we can get it implemented in every area as possible . Using the environmental things is today's most important thing and we are trying to give our small contribution.

REFERENCES:-

1. Karin Lundgren Kownacki, Elisabeth Dalholm Hornyanszky, Johanna Alkan Olsson Research gate (2017). " Challanges of using air conditioning in an increasingly hot climate"
2. Briana Elizabeth Amoroso RIT Scholar works (2017)."Compairing Economics, Environmental, and Social Effects Of Central Air Conditioner Size And Thermostat Schedule Interaction.
3. Daniel. M. Madiyar Science direct International journal of refrigeration volume 25, issue3, May (2002) ,pages 293-305 " Cold storage for low-cost air conditioning "https://doi.org/10.1080/20421338.2018.1439277
4. 4 CoolBot." Store it cold with coolbot! N.p.,2006. Web.24 Feb. (2014).
5. Shachtman. Tom (2000). Absolute Zero: And the conquest of cold. Marnier books.p.272. ISBN 978-0-618-08239-1.
6. 6..Laszlo, Pierre (2001). Salt: Grain of Life. New York City: Columbia University Press. p. 117. ISBN 9780231121989. OCLC 785781471. Corn elius Drebbel air conditioning.
7. 7.. Franklin, Benjamin (June 17, 1758). "Archived copy". Letter to John Lining. Archived from the original on February 25, 2021. Retrieved May 12, (2021).