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SURVEY OF GREEN COMPUTING

Ms. Pooja Verma, Prof. Pooja Kadam

Ms. Pooja Verma, Bharati Vidyapeeth's Institute of Management and Information Technology, CBD Belapur, Navi Mumbai
Prof. Pooja Kadam Bharati Vidyapeeth's Institute of Management and Information Technology, CBD Belapur, Navi Mumbai

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Abstract - *This paper describes Green computing and its uses. Green computing secures the Earth and its environment. It describes Carbon Footprint i.e. It provides the carbon dioxide measures; with the help of it we can work on how to reduce emission of it. The paper also takes a look at renewable sources. It takes a long time to replenish conventional sources of energy. The purpose of this paper is to raise awareness about Green Computing and the related factors amongst common people through the findings of the survey that was conducted.*

Key Words: **Green Computing, Carbon Footprint, Energy Consumption, Fossil Carbon.**

1. INTRODUCTION

Green computing is an eco-friendly environment performance to tackle global warming and resource among a list of global challenges. Green computing is very important nowadays [2].In starting green IT services for the first time, 'Energy Star' was launched by 'US Environmental Protection Agency'. It is used in our day to day life cycle as per new generation techniques. Green technology comprises of the study of advanced materials to be used. The usage of computer has a negative impact on the environment. The waste of computer hardware contains toxic chemicals. But nowadays more and more computers are produced causing unnecessary production of gases every year. Computer servers and associated subsystems should be designed, manufactured, used and disposed with minimal or no impact to the environment. Using computers for 20-24 hours costs us of ₹7500-9000 per year, and it also produces 1500-1800 pounds of carbon-dioxide (CO_2) in the Atmosphere [12]. Government agencies and private firms are examining ways to protect the environment. Green computing represents one of these. No work in the present day can be done without the use of gadgets. Many gadgets are used nowadays, consuming a lot of power. Climate control equipment and technology helps to identify the sources of energy wastage. The IT system analyzes and archives huge amounts of data. In IT organization data center need a high amount of power and cooling system require more energy and cooling capacities are insufficient resulting in loss of energy.

2. Energy Consumption

What percentage of the electrical energy used by a filament light bulb comes out as useful light?
Most of the energy comes out as waste and less than 3% is light. So replace your filament light bulbs with new LED lights which are nearly 100% efficient [6]. If you use a dishwasher or washing machine make sure they are full and on low temperature settings.

2.1 Solar Power

The United States and Europe represent about 40% of global demand. Energy consumption in the rest of the world grew by 5.1% from 2007 to 2017[15]. Greenhouse-gas emission from the energy sector represents 2/3 of the global total. Nonrenewable sources such as coal, oil, natural gas are 75% of the global power supplies and renewable sources are solar energy and wind power. Renewable sources $4.5 billion from 2012 to 2015 sun and solar city among the major recipients. Solar energy is the leading source of energy for Indian companies. For example: the name of companies which provides the services are as follows.

1) Tata Power Solar Systems Ltd.

2) Kotak Urja Pvt. Ltd.

3) Icomm Tele Ltd.

4) Moser Baer Solar Ltd. (MBSL).

5) Websol Energy System Ltd.

6) Vikram Solar Pvt. Ltd.

These are the companies which provide the solar energy source in India.

2.2 Wind Power

Wind power has generated $2.2billion mega volts of electricity from 2012 to 2015. One wind turbine can produce as much electricity as 300 homes can consume. Renewable source of energy wind power is used by leading companies in India. For example: Vestas India, Regen Powertech Pvt.Ltd, Suzlon energy limited, Enercon India Pvt.Ltd, wind world India Ltd and so on company are available.

2.3 India's Changing Energy

India is moving towards a robust energy mix focusing on sustainable energy sources such as solar and wind. By the end of 2026-27, India is projected to get 56% of its installed power capacity from clean energy sources [14]. India's share of global energy demand has been predicted to rise to 9% by 2035. India is the second largest faster wind power increasing from 4 to 14% in 2035.India produced common fuel with a 65% share of total production in 2035. Example:

In Brazil 2%, Russia 4%, India 9%, US 13%, China 26% energy demands.

3. Carbon Footprint

Carbon footprint is measured by the amount of carbon dioxide your lifestyle adds to the atmosphere as a result of the use of fossil fuels or cutting down of trees etc.

The gases which come out from the car are harmful to human health. It contains toxic gases like CO_2; NOX (nitrogen oxide) hydrocarbons (HC).These causes breathing problems for humans or living things. Indirect carbon emission is generated by product for the carbon footprint of product food, textiles, materials, cement etc.

3.1 Home

If your country generates electricity without burning fossil fuel, for example nuclear power or replacement such as wind or hydroelectric your carbon footprint will be reduced.
Can you think of ways you might reduce your own personal carbon footprint?

You have to think of ways to reduce your use of fossil fuel. You might use energy to heat your home or cool it down. So put at least 40cm of insulation made of mineral wool or similar in the attic have larger windows facing the midday sun, fit triple glazing (now standard for new homes in Canada), insulate the walls of your house well in hot climate build around or have a central courtyard (as in ancient Rome and in the medinas in Morocco) with natural looking you avoid the need to use air conditioning or fans.

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3.2 Travel

You might need to travel. If you use a car, reduce your speed. Most of the car's energy is used to push air out of the way. Use public transport and for short journeys walk or cycle.

3.3 Food

You need to eat, growing and processing your food and bringing it to your house may have used fuel. If you cannot grow your own food try to buy it locally to save transport costs. However, the main use of fossil fuel in agriculture is on the farm.

For example: Dairy and sheep meat production for the UK is more energy efficient if grown in new Zealand even including the transport costs , because fertilizers are not needed in New Zealand where sheep graze on hillsides unsuitable for human crops. Maybe the biggest way to reduce your carbon footprint is not eating meat and especially beef meat. In agriculture we harvest the food for human being, the crop residue is consumed by animals and waste is used as fertilizer.

3.4 Recycle

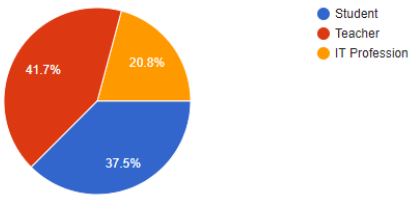
Finally recycle unwanted materials although it costs energy to transport and reprocess the wastes; it uses less energy than fresh raw materials.

4. Survey of Green Computing

Table -1: Survey Question table

Sr. No	Questionnaires	Yes	No
1	Do you know Green Computing?		
2	Have you heard about term CO_2 emission?		
3	Do you know how to calculate carbon footprint?		
4	Do you know most of the CO_2 emission is generate through computers and its devices?		

4.1 Survey of Green Computing Chart



This pie chart shows the percentage of people aware of green computing, carbon emission, and computer hardware. This survey is taken from the many departments and received many feedbacks. The sample contained of 100 out of 51.7% percentage teachers and 42 percentage student and 22 percentage IT Professional from a bharati vidyapeeth's college of technology, partial of the respondents 51% remain from several specializations. The questionnaires were administered via email. The researchers used a number of follow-up measures, email prompts, high response rate [4].

Pie chart shows the result on the survey of green computing and carbon emission.it shows about the percentage of the awareness of people about green computing, carbon emission, carbon footprint, and energy consumption.

As per the survey every person cares about environment but only 50% people are aware about green computing, carbon footprint and around 50% not aware about green computing, carbon emission. So it is very important to increase the awareness about Green computing, carbon footprint to all people [4].

Many questions are provided in this survey related to green computing. It has been conducted to understand the importance of green computing. According to this survey 59% of people are not aware of green computing .There are some who are aware of the green computing (41%).Only 49% are using computer 5 to 10 hours per day. Mostly people aren't aware that the carbon emission is generated by computer.

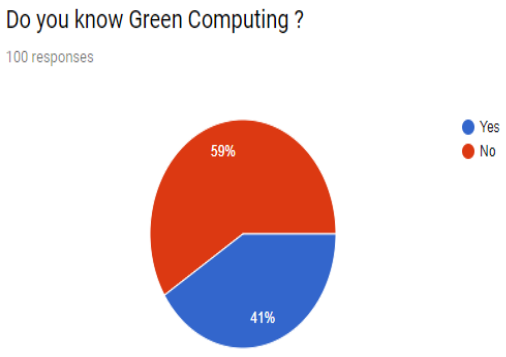


Chart -1: Green Computing

More than 41% are not aware of the green computing. Only 59% of people are having knowledge about green computing.

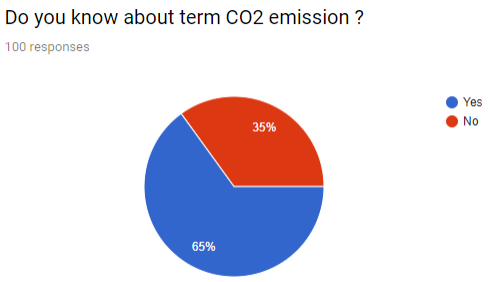


Chart -2:CO2 Emission

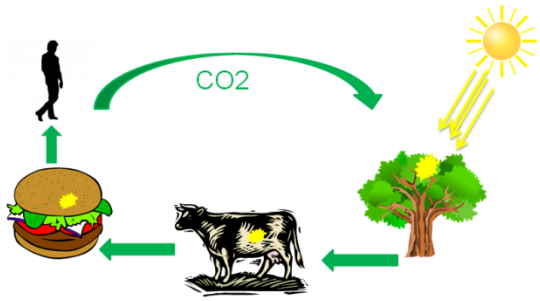
Mostly people don't know about CO_2 emission. They have no idea what CO_2 is. Only more than 65% people are having knowledge about CO_2. And 35% people are not having knowledge about of carbon emission.

These are some of the perspective which can cut the 60% of the carbon footprint. Our new perspective has two parts:

1) Green carbon
2) Fossil carbon

4.4.1 Green Carbon

Green carbon is all about carbon dioxide. It's released out of our smokestacks we know that the climate is changing but the truth is different, existence of carbon dioxide is always present in the atmosphere. And that's a good thing because without carbon dioxide our planet would be a lifeless frozen hunk of rock like mars. We need carbon dioxide to create the natural greenhouse effect that keeps us from freezing and that's really important but even more than that we need carbon dioxide because it's something called the carbon cycle. The carbon cycle is the beating heart of our planet on geologic timescales the carbon cycle is sets the earth's temperature like a thermostat. It balances the air and the rocks and oceans and determines hot it is going to get here. But on a day to day time scale the carbon cycle is allows complex life.



All living things are made of carbon. Carbon is also a part of the sea, air, plant and animal and even underlying soil, because the earth is a dynamic place, carbon does not stay still.

Where plants consume CO_2 and release oxygen (O_2), while animals consume by the Oxygen and release the CO_2 that is then used by plants [13].

Plants inhale carbon from air to make their food they also use sunlight to help them make their food. The carbon is moved in the plant when human and other animal eat the plants. We store that carbon inside our bodies and all animals use the carbon to grow. So bigger animals eat smaller ones and carbon keeps on moving from one body to another. All living things breathe in when we breathe out some of this carbon is released back into the air as carbon dioxide.

Carbon moves from the atmosphere to living thing and back plants breathe in carbon dioxide to make food then this food is eaten by animals sometimes smaller animals are eaten by bigger animals this way carbon is transferred from air to plants and animals and plants breathe out carbon dioxide then it goes back into the air. The same cycle happens in

water too in fact the ocean floor has such huge amounts of carbon stored in it that it is called a carbon sink.

4.4.2 Fossil Carbon

Fossil carbon is because climate change now climate change is a huge issue there are all sorts of contributing factors but this is the big one. Fossil carbon is the main cause of climate change if we can stop releasing fossil carbon we can turn the tide of climate change. There's seven times as much CO_2 in the atmosphere. When a plant or animals dies most of the stored carbon goes back into the soil. Some of it goes back into the air but most of it gets trapped in the soil and over millions of years the trapped carbon changes shape it can end up as a diamond probably coal or fossil fuels such as petrol and diesel.

5. CONCLUSIONS

The aim of paper is to represent the awareness of Green Computing in Students, teachers, IT professionals. Now recently most of the CO_2 emission and dangerous material is produced with the use of computer and it's very high but no one is aware about it. Aim towards increasing knowledge about something and putting into use green computing method will help in reduction of energy use and wastage. In this paper we have conducted a survey of 100 people to analyze the awareness of Green Computing.

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