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SURVEY ON GREEN COMPUTING

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ABSTRACT

Green computing is receiving more and more attention with increasing energy cost and growing environmental disquiets. Green Computing is a latest movement in IT industry towards scheming, building, and operating computer systems to be energy proficient. Green computing is environmentally sustainable to use of computers and related resources efficiently and effectively. Green computing also called green technology whose goals are to diminish the use of perilous materials, maximize energy effectiveness during the lifetime of the product, and encourage the recyclability or Biodegradability of obsolete products and waste of factory. This research paper is helpful to aware the common man about the term green computing with the help of a survey performed and results of the survey are being shown.

Keywords: ***Energy star, Green IT, Green Marketing***

I. INTRODUCTION

Green computing or green IT, refers to environmentally sustainable computing or IT. Green computing is the environmentally responsible and eco-friendly use of computers and their resources. In broader terms, it is defined as the learning of scheming, manufacturing, engineering, using and disposing of computing devices in a way that reduces their environmental blow efficiently and effectively [2].

Green computing is "where the organizations adopt aplan of ensuring that the setup and operations of information technology produces the minimal CO2 emission and minimizes the energy consumption.

Environmental Protection Agency launched Energy Star, a proscribed labeling program that is calculated to promote and be familiar with energy-efficiency in monitor, climate control equipment, and other technologies which help in green computing. This resulted in the common adoption of sleep mode among consumer electronics [2].

The goals of green computing are similar to green chemistry; lessen the use of dangerous materials, maximize energy efficiency during the product's lifetime, and encourage the recyclability or biodegradability of obsolete products and factory dissipate. Research continue into major areas such as making the use of computers as energy proficient as probable and designing algorithms and systems for efficiency-related computer technologies

Different IT manufacturers and developers are continuously involved in designing computing devices which are energy proficient and lessen the cost of dangerous materials. It also encourages the reusability of different things such as papers and digital devices. When the environmental protection agency (EPA) launched the Energy Star program in 1992 then Green Computing practices were started.

Green Computing is also called as green informationtechnology (green IT)."Greening" your computing equipment is a low risk wayfor your business to not only help the environment but also decrease costs. It's also one of the largest upward trends in

business today.

Making an appropriate decision to go green in the agency such as offices, not only improves the net profit of your trade, but also reduces the carbon footprint.

As the pledge to reduce environmental impact and power consumption are appropriate gradually more important vision for organizations, architecture selected are now proactively in view of environmental resource constraints along with more traditional IT business goals.

II. CAUSE OF GREEN COMPUTING

2.1 Electricity Consumption

All the natural resources which are being used to produce electricity have some or the other impact on environment.

2.2. Toxic Waste Creation

Most of us are update our computers, throw the computer resources, peripherals, and other hardware devices etc, which are outdated , which are the hazardous toxic waste we are producing that really harms the environment now a days.

2.3 Effect of Electricity to the Environment

The environment is more polluted due to the environment. These may be air, land and water effluence. Air pollution impacts on climate transform, acid rain, ozone, air toxics. Water pollution results on consumption of water resources and pollutes the water bodies and land pollution devalues the land and degrades the land which have harmful brunt on ecosystem and aesthetics.

III. STEPS TO GREEN COMPUTING

Five Simple Steps to Green Computing are as follows:

3.1. Develop a Sustainable Green Computing Plan

The elements that should be factored into such a map should be discuss with your business leaders together with organizational policy and checklists. These plan's should include policies for recycling, recommendations for disposal of used equipment, government rule and recommendations for purchasing green computer tools. Green computing best practices and policies should encase power usage, reduction of paper consumption, as well as suggest for new equipment and recycling old equipment. Organizational policies should consist of communication and implementation.

3.2. Recycle

Dispose the electronic equipment which are used or unwanted in an environment friendly and convenient way. A computer contains toxin metals and pollutants which emits harmful emissions into the Environment. Never discard computers in a landfill. Instead we can recycle them in the course of manufacturer programs

3.3. Make Environmentally Sound Purchase Decisions.

We should Purchase Electronic Product Environmental Assessment Tool registered products. EPEAT is a procurement device which is promote by the nonprofit Green Electronics Council :

3.3.1 It helps the institutional purchasers to calculate, select and balance the desktop computers, notebooks and monitors based on environmental attributes.

3.3.2 It provides a clear, reliable set of performance criteria for designing the products.

3.4 Reduce Paper Consumption.

We can many easy and understandable ways to decreasethe consumption of papers: such as e-mails, electronic archiving, use the "track changes" feature in electronicdocuments, when you print out some documents, both sides of the papers should be used , smaller font sizes should be used, smaller margins are also helpful and only selective pages should be printed out.

Power management features should also be turned on when we won't use it even for shorter period of time or for shorterperiods of inactivity. Monitors and computers use low power when they are idle. Power management strategy helps in protecting the environment by saving the energy used by monitors or computers.

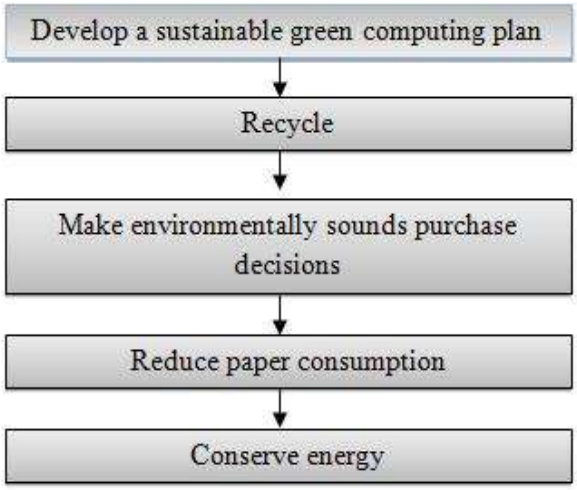

Fig 1: Steps for Green Computing

IV. TACTICS OF GREEN COMPUTING

4.1 Virtualization

Computer virtualization refers to the generalization of computer resources, such as the procedure of running two or more rational computer systems on one set of objective hardware. IBM mainframe operating systems of the 1960s, originated the concept but was commercialized for computers compatible withx86 only in the 1990s. A system administrator could unite numerous physical systems into virtual equipment on one single, influential system, thus unplugging the original hardware and dropping power and cooling expenditure with virtualization

4.2. Materials Recycling

Those computer systems can be re purposed that have outlived their meticulous purpose, or are donated to various non-profit organizations and charities. Though, different charities have lately imposed least amount system requirements for donated equipment. As well parts from out-of-date systems may be salvaged and used again through certain trade outlets and municipal or classified recycling centers [5].

4.3. Conserve Energy

We can conserve energy by turning off the computer when we know that we won't use it for longer time period.The Advanced Configuration and Power Interface (ACPI), an open industry standard, allows an operating system to directly control the power saving aspects of itsfundamental hardware. This allows a system to routinely turn off components such as monitors and hard drives after set periods of idleness. In addition, a system may hibernate, where most components (including the CPU and the system RAM) are curved off. ACPI is a heir to an earlier Intel-Microsoft standard called Advanced Power Management, which allows a computer's BIOS to manage power management functions [5].

4.4. Green Data Center

Computer center or Data centers has a computer system and its related system such as telecommunication system data storage system. It needs power supply for backup, some cooling system and security system. A green data center is a data center which has a efficient management of the system and associated system less power consumed environment [5].

4.4.1 Practical condition of data centers are as follows: Provide a substantial protected position for server. Should make available full time network connectivity in data center. Should endow with crucial power to function all tools.

4.4.2 Characteristics of data centers are that the Design must be:

Simple

Scalable

Modular

Flexible

V. RESULTS OF SURVEY ON GREEN COMPUTING

Pie chart below shows the percentage of people awareabout environment, green computing, recycling and decomposing of computer hardware's, how much effortthey take towards the green computing and whether the government should participate in green computing or not.

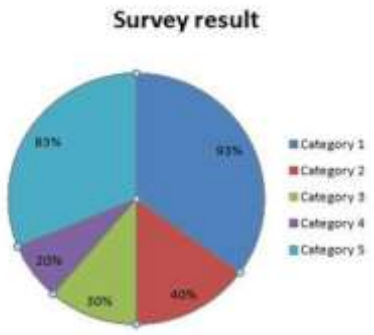

Fig 2: Pie Chart on The Basis of Survey

Category 1 - awareness about environment

Category 2 - awareness about green computing

Category 3-awareness about recycling and disposing

Category 4 – efforts taken by people towards green computing

Category 5 – should government participate in green computing?

Pie chart shows that according to the survey 93% of people are aware about environment, only 40% persons are aware about green computing, 30% people are aware about formal recycling and decomposing, 20% people take efforts toward green computing and about 83% people says that the government should participate in green computing.

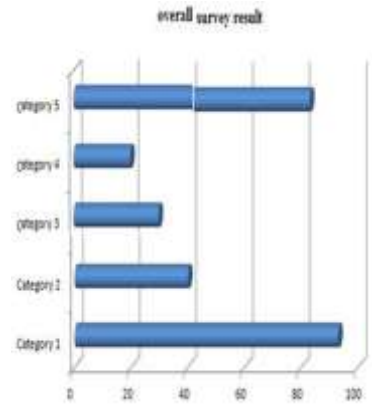

Fig 3: Bar Graph on the basis of survey

The above bar graph shows the percentage of people aware about different categories of the survey as explained before.Below we show a bar graph which shows different areas of different categories as examined in the survey. The series shows the areas being surveyed in different categories such as how many person are familiar to formal and informal disposing, how much people are aware about green computing and many more

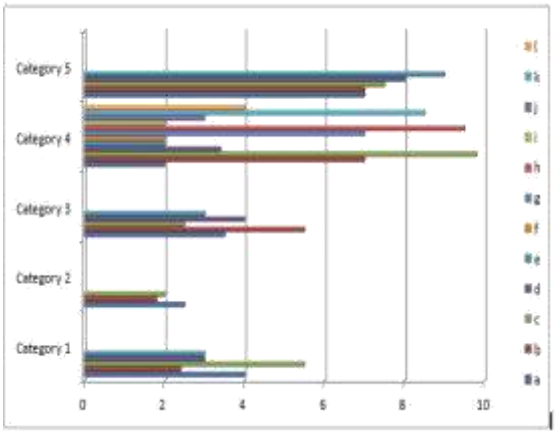

Fig 4: Bar Graph on the basis of differentcategories

Here a to l series denotes the questions used in survey ineach categories.

VI. CONCLUSION AND FUTURE SCOPE

This research paper shows a result on a survey done at educational level which shows that most of the people are not aware about the green computing and the few who are aware about green computing takes no effort for using the idea of green computing in their day today life. The basis of the survey was to aware people about the green computing and its effect on environment and how the people can use green computing in their daily life. The future work in green computing can be research in IT industry that how the IT industry can use green computing by use of green productsand green marketing. How IT industries can use only green products to

develop new computer system's so that theproducts does not produce harmful effects to the environment.

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ANNEXURE

Survey on Green Computing

Your name_____

STATEMENT	**YesNo**
Attentiveness on the subject of environment.	
a. Do you actually are concerned about environment?	
b. Are you aware that the use of computing devices has harmful effect on our environment?	
c. Are you aware that the high utilization of electricity has a big role for harmful environment?	
d. Do you know that the parts of computers are mostly non-biodegradable?	
e. Do you know about greenhouse effect?	
Attentiveness on the subject of Green Computing, please attempt if already known	
a. Are you eminent with tenure Green Computing?	
b. Does Green Computing also refer to environmentally sustainable computing?	
c.Is the aim of green computing is to lessen the dangerous material and	

protect our environment.

Awareness about recycling and disposing of materials, please check if already familiar

a. Are you well-known about disposing of computing devices

b. Are you well-known about recycling of computing devices

c. Are you well-known about formal and informal disposing

d. Is Informal disposing is destructive to our environment

e. Is Formal disposing costly but sustainable to our environment.

Measures you are taking in context to green computing

a. Are you having multiple computers?

b. Do you use computer from an extended period?

c. Do you use computer for additional than 5 hour in a day?

d. Is your computer turned off when it is not in use?

e. While purchasing new electronic devices do you judge energy star logo?

f. Do you have any product having energy star logo?

g. Do you take efforts to save energy at home?

h. Are you considered about cost when buying new products?

i. Have you listened about any green computing related campaigns?

j. Ever disposed any computing device?

k. Are you using screen savers on your computer?

l. when the computer is idle does the screen saver save energy? Government**'s role in context to** green computing?

Do you think government should encourage green computing?

a. Do you think government should encourage formal disposing?

b. Do you think government should give funding for formal disposing?

c. Do you think government should take steps to aware community about green computing?

d. Do you think government should set aside some currency for green computing in financial plan?

The objectives of research – do you agree or not?

a. Every general man should have to be conscious about green computing.

b. Government should have to take strict actions to implement green computing

c. Computer developers should have to develop less energy intense and less heat producing devices

b. Every person should shut down their devices if it is not used for more than 3 minutes

e. Campaigns should be conducted timely to aware a community about green computing

f**. Institutes' and colleges should** awake their students about green computing

g. In teaching green computing should be introduced as a regular subject.